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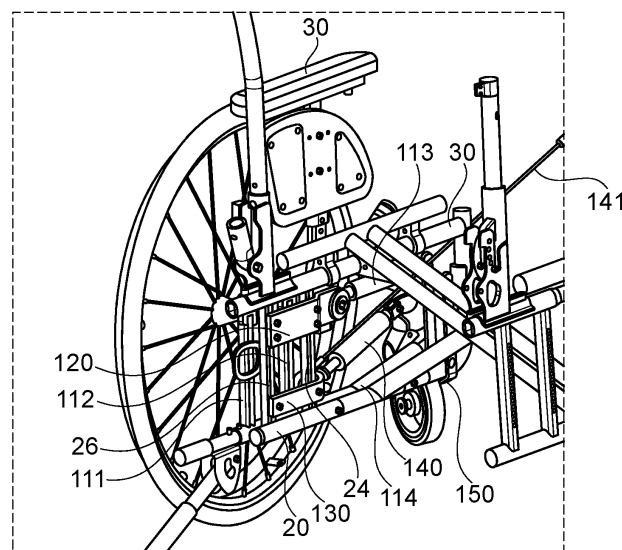
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(54) MODULAR TILT ASSEMBLY AND FOLDABLE WHEELCHAIR THEREWITH

(57) The present disclosure refers to a modular tilt assembly configured for being attached and/or retro-fitted, on demand, to a foldable wheelchair having side frames (10, 10'), the modular tilt assembly comprising two sets of modules, one for each side of the wheelchair, wherein each set of modules comprises an external tilt frame (110) adapted to be attached to the external side of a wheelchair side frame (10), at least one internal mounting hinge bracket adapted to be attached to the internal side of a wheelchair side frame (10), an actuator for activating a tilting function, which is attached to the ex-

ternal tilt frame (110) and the at least one internal mounting hinge bracket, and a guidance and stability bracket (150) adapted to be attached to wheelchair side frame (10), the actuator and the external tilt frame (110). It also refers to a foldable wheelchair (1) with two side frames (10, 10') connected via a foldable cross brace (18) and having the modular tilt assembly releasably mounted thereto, wherein each side frame (10, 10') is equipped with a set of modules (100) of the modular tilt assembly without interfering with the foldable cross brace (18).

**Fig. 1c**

Description

[0001] The present disclosure relates to a modular tilt assembly for attachment to the side frames of a wheelchair and a foldable wheelchair having such a modular tilt assembly attached thereto.

[0002] Foldable wheelchairs are commonly used as they are easy to transport. For example, US 6.241.275 B1 describes a link configuration for a wheelchair having laterally spaced side frames, said link configuration comprising a plurality of links extending between the wheelchair side frames, each said link having opposing ends, one of said ends of each said link being pivotally coupled to one of the side frames and the other one of said ends of each said link being pivotally coupled to the other side frame, each said link having a hinge, said links being foldable in non-parallel planes relative to one another; and an interference member coupled to one of said hinges and engageable with the other one of said hinges upon unfolding said links to couple said links together.

[0003] There is a need to add additional functions to said foldable wheelchairs without compromising the foldability. For example fold, recline, and tilt mechanisms for wheelchairs are known, see e.g. US 11.382.810 B2 teaching a side frame assembly of a personal mobility vehicle comprising a base frame assembly; a seat frame having a rail housing that supports a folding actuation rail and a recline adjustment rail for relative linear movement and concurrent linear movement, the folding actuation rail configured to be selectively fixed relative to the rail housing between a first position of the base frame assembly and a second position of the base frame assembly that is more compact than the first position; a backrest cane pivotally attached to the seat frame; and a backrest link pivotally attached to the backrest cane and pivotally attached to the recline adjustment rail such that pivoting movement of the backrest cane moves the folding actuation rail between the first and second positions.

[0004] GB 2564728 A describes a seating device of a foldable wheelchair, with a base module, a seat module and a backrest module, wherein the seat module is movable relative to the base module and relative to a backrest unit of the backrest module, and both movements are independent. The backrest module further comprises a compensation unit on both of its sides, which is connected with the seating module in a manner that during movement of the backrest unit between an upright position and an inclined position and an equivalent center of rotation of the backrest unit relative to the seat module is relatively close to a body pivot point about which the upper body of a wheelchair user pivots relative to its lower body.

[0005] Add-ons to wheelchairs become more important, such that connection assemblies also become more important. A connection assembly for connecting an auxiliary element to a wheelchair is for example described in DE 10 2023 107 713. This body connection assembly comprises at least one first body to be attached

to the auxiliary element; at least one second body adapted to be attached to the personal mobility vehicle; and at least one locking assembly adapted to lock the connection of the at least one first body and the at least one second body. The at least one locking assembly comprises at least one locking spring coupled to at least one locking member and biasing the at least one locking member into a locking position, and at least one return spring coupled to at least one unlocking actuator and biasing the at least one unlocking actuator into a locked position, wherein actuating the at least one unlocking actuator causes the at least one locking assembly to unlock, and the at least one locking member of the at least one locking assembly is allowed to be in a locking position, when the unlocking actuator is pushed or moved into the locked position.

[0006] It is the object of the present disclosure to provide a modular tilt assembly for attachment to a foldable wheelchair, with the modular tilt assembly being configured for being attached and/or retrofitted, whenever needed, such that the foldable wheelchair may be used without the modular tilt assembly and, thus, without the tilting function, or with the modular tilt assembly for enabling a tilting function. Accordingly, the object in particular is to combine folding as well as tilting functions of wheelchairs on demand in order to combine the advantages of a light weight foldable wheelchair, which is easy to store, with an external tilt frame to make it possible for end users to prolong the use of their foldable wheelchair, instead of switching to a non-folding tilt wheelchair, wherein this combination is based on a modular solution.

[0007] This object is solved by a modular tilt assembly configured for being attached and/or retrofitted, on demand, to a foldable wheelchair having side frames, the modular tilt assembly comprising two sets of modules, one for each side of the wheelchair, wherein each set of modules comprises

- an external tilt frame adapted to be attached to the external side of a wheelchair side frame,
- at least one internal mounting hinge bracket adapted to be attached to the internal side of a wheelchair side frame,
- an actuator for activating a tilting function, which is attached to the external tilt frame and the at least one internal mounting hinge bracket, and
- a guidance and stability bracket adapted to be attached to wheelchair side frame, the actuator and the external tilt frame.

[0008] The external tilt frame may be a welded frame. The at least one internal mounting hinge bracket may comprise two mounting hinge brackets, which, when mounted to the wheelchair provide a top mounting hinge bracket and a lower mounting hinge bracket. The actuator may comprise spring means, in particular in form of a gas spring, with a control cable, preferably in form of a Bowden cable.

[0009] It is proposed that the external tilt frame comprises

- a round opening for a rotational attachment to the top mounting hinge bracket, and/or
- an arc-shaped slot for a sliding attachment to the actuator and the lower mounting hinge bracket, and/or
- an opening for a, preferably fixed, attachment to the actuator, and/or
- at least one further opening for a, preferably fixed, attachment of the guidance and stability bracket, and/or
- a plurality of openings for attaching a drive wheel attachment bracket at a selectable position, preferably at a selectable height when mounted to the wheelchair, and/or
- a further plurality of openings for attaching a front caster wheel attachment bracket at a selectable position, preferably at a selectable height when mounted to the wheelchair.

[0010] The at least one internal mounting hinge bracket may be adapted to be mounted in a form and/or force fit to the wheelchair side frame, preferably at a selectable height when mounted to the wheelchair. The top mounting hinge bracket and/or the lower mounting hinge bracket may be adapted to be mounted in a form and/or force fit to the wheelchair side frame, preferably at a selected position, in particular height.

[0011] Further, the at least one internal mounting hinge bracket may be provided with at least one extension through which at least one opening for a fastening means is extending, and/or the top mounting hinge bracket may be provided with two extensions through each of which at least one opening for a fastening means is extending, and/or the lower mounting hinge bracket may be provided with two extensions through each of which at least one opening for a fastening means is extending, and/or the at least one internal mounting hinge bracket, the top mounting hinge bracket and/or the a lower mounting hinge bracket may be provided with a step.

[0012] Embodiments of the present disclosure may be characterized in that, each set of modules comprises a drive wheel attachment bracket, which is provided with a plurality of first openings for attaching a drive wheel axle at a selectable position, preferably at a selectable horizontal position when mounted to the wheelchair, and/or at least one second opening for attachment to either one of the side frames or the external tilt frame.

[0013] The present disclosure also provides a foldable wheelchair with two side frames connected via a foldable cross brace and having releasably mounted thereto the modular tilt assembly according to one of the present disclosure, wherein each side frame is equipped with one set of modules of the modular tilt assembly without interfering with the foldable cross brace.

[0014] Wheel attachment brackets for detachably at-

taching wheels, comprising two drive wheels, two front casters and at least one rear wheel, in particular in form of an anti-tip wheel, and a detachably attachable brake may be provided, wherein the set of modules being adapted for having the wheel attachment brackets and the brake attached thereto.

[0015] It is proposed that each of the two external tilt frames is attachable to one of the two side frames at an outside of the wheelchair, whereas the at least two internal mounting hinge brackets are attachable to the inside of each side frame, and each one of the two guidance instability brackets is attachable to one external tilt frame, one actuator and a side frame.

[0016] Further it is proposed that the front caster wheel attachment brackets are detachably attached either to the side frames or the external tilt frames, and/or the drive wheel attachment brackets are detachably attached either to the side frames or the external tilt frames, and/or each rear wheel attachment bracket is detachably attached either to one of the side frames or the external tilt frames, and/or the brakes for the drive wheel are detachably attached either to the side frames or the external tilt frames.

[0017] Fastening means passing through openings and/or extensions to be accommodated within recesses may be adapted for the detachable attachments in a force and/or form fit manner, and/or shoulders may be provided for alignment.

[0018] Thus, the present disclosure provides an enhanced flexibility, as a foldable wheelchair may be used with and without a tilting function, depending on whether a claimed modular tilt assembly is attached or not. Thus, said modular tilt assembly allows to retrofit and thereby to upgrade a foldable wheelchair with two side frames connected by a foldable cross brace to also become a tiltable wheelchair. For that purpose, the modular tilt assembly provides external as well as internal modules for attachment to the wheelchair side frames.

[0019] Various aspects of the present disclosure will become apparent to those skilled in the art from the following detailed description of embodiments, when read in light of the accompanying, schematic drawings.

Figure 1a is a perspective side view of a part of a foldable wheelchair with add-on modules of a tilt assembly according to the present disclosure at one wheelchair side, from the rear and the outside of the unfolded wheelchair;

Figure 1b is a perspective side view of the part shown in figure 1a, but with further details on wheel attachment brackets;

Figure 1c is another perspective side view of the part shown in figure 1a, from the rear and the inside of the unfolded wheelchair;

Figure 1d is a further perspective side view of the part shown in figure 1a, from the rear and the inside of the folded wheelchair;

- Figure 1e is a further perspective side view of the part shown in figure 1b, from the rear and the inside of the unfolded wheelchair;
- Figure 1f is a still further perspective view of the part shown in figure 1b, from the front and the outside of the unfolded wheelchair;
- Figure 2a is a perspective side view of a first module of the tilt assembly shown in figures 1a to 1f in form of a welded tilt frame;
- Figure 2b is a perspective side view of a second module of the tilt assembly shown in figures 1a to 1f in form of a top mounting hinge bracket;
- Figure 2c is a perspective side view of a third module of the tilt assembly shown in figures 1a to 1f in form of a lower mounting hinge bracket;
- Figure 2d is a perspective side view of a fourth module of the tilt assembly shown in figures 1a to 1f in form of a front lateral guidance and stability bracket; and
- Figure 2e is a perspective side view of a fifth module of the tilt assembly shown in figures 1a to 1f in form of a drive wheel attachment bracket.

[0020] Figures 1a to 1f show a part of a foldable wheelchair 1 with two side frames 10, 10'. Only one of said side frames 10 is shown with a front caster 12, a drive wheel 14 and a rear anti-tip wheel 16 attached thereto, with front caster and drive wheel of the other side frame 10' being omitted for the sake of clarity. In the present embodiment there is only one rear anti-tip wheel 16 on one side of the wheelchair 1. Each of the five wheels 12, 14 and 16 is attached via a specific wheel attachment bracket, with the respective brackets 13, 15 and 17 in particular being shown in figure 1b. The wheel attachment brackets 13, 15, 17 are detachable from the side frames 10, 10' and attachable at least in different heights in particular in order to adjust the specific position to the needs of the user of the wheelchair 1. For that purpose, the side frames 10, 10' and/or the wheel attachment brackets 13, 15, 17 are provided with a plurality of openings for fastening means. Further, on each side, a brake 28 is detachable attached to act on the drive wheel 14.

[0021] Both side frame 10, 10' are connected via a foldable cross brace 18 and each comprise a lower tube 20 and an upper tube 22 parallel to the lower tube 20, with two parallel bars 24, 26 connecting said tubes 20, 22 at a rear end of the side frame 10, when viewed in the forward driving direction of the wheelchair 1. The cross brace 18 is connecting the lower tubes 20 of the side frames 10, 10' with each other, while the upper ends of the cross brace 18 are connected to both, the upper tubes 22 and a seat or seat frame (not shown). The two bars 24, 26 are provided with a plurality of openings for attaching fastening means. Said openings are arranged in recesses to accommodate rail type projections.

[0022] When a conventional foldable wheelchair is to

be used with an add-on according to the present invention in order to be supplemented with a tilt function, the attachment bracket 15 of the drive wheel 14 can be detached by loosening fastening means passing through respective openings 24a, 26a of the two bars 24, 26 on each side of the wheelchair. Further, the attachment bracket 13 of the front caster 12 can be detached from the lower tube 20 of each side frame 10, 10', whereas the single anti-tip wheel 16 can be detached via the attachment bracket 17 only on one of the respective lower tubes 20. Also the brake 28 has to be detached.

[0023] The tilt function is implemented via two sets of modules 100, which are assembled to the wheelchair side frames 10, 10' leaving the foldable cross brace 18 intact and foldable. Each set is attached to one side frame 10, 10', after having disassembled the wheels 12, 14 and 16 by detaching the attachment brackets 13, 15 and 17, respectively, and having detached the brake 28.

[0024] Pivoting may be actuated and restricted with a gas spring 140 of each set of modules 100. The gas spring 140 may be actuated by means of a Bowden cable 141 connected to a handle mounted on either a backrest (not shown) or to an arm rest 30 of the wheelchair 1.

[0025] The foldable wheelchair 1 of figures 1a to 1f is up-graded by having one set of modules 100 mounted on one side frame 10. The set of modules 100 comprises further modules in addition to the gas spring 140 with Bowden cable 141, namely

- a welded tilt frame 110, see also figure 2a,
- a top mounting hinge bracket 120, see also figure 2b,
- a lower mounting hinge bracket 130, see also figure 2c, and
- a front lateral guidance and stability bracket 150, see also figure 2d,

which can be attached to each other and the side frame 10 via a plurality of fastening means. As an additional module of the set of modules 100, the wheel attachment bracket 15 of the drive wheel 14 might be adapted for the tilt function in order to compensate a change of center of gravity due to tilting. The second set of modules 100, which is not shown in figures 1a to 1f and is to be attached to the other side frame 10', comprises analogue modules as the first set of modules 100. This set up of the two sets of modules 100 makes it possible to add the tilting function to the foldable wheelchair 1 even in the aftermarket.

[0026] While the welded tilt frame 110 and the wheel attachment bracket 15 are arranged at the external side of the wheelchair side frame 10, the other modules of the set of modules 100 are arranged at the internal side of the wheelchair side frame 10 such that the wheelchair side frame 10 of the conventional foldable wheelchair 1 is sandwiched between the welded tilt frame 110 and wheel attachment bracket 15 on the one side and the top mounting hinge bracket 120 as well as lower mounting hinge bracket 130 at a rear end on the other side and the front lateral guidance and stability bracket 150 at a front

end on the other side. The gas spring 140 is extending from the lower mounting hinge bracket 130 to the upper end of the welded tilt frame 110, wherein the lower end of the front lateral guidance and stability bracket 150 is mounted on the lower tube 20 of the wheelchair side frame 10 and the upper end thereof is attached to the welded tilt frame 110.

[0027] The two sets of modules 100 provide a modular tilt assembly and further details of the modules are described in the following:

The welded tilt frame 110, shown in figure 2a, comprises two bar shaped attachment means 111, 112, which are running substantially parallel to each other, i.e. substantially vertically when mounted to the wheelchair 1, and are each provided with a plurality of openings 111a, 112a. The two bar shaped attachment means 111, 112 are connected to each other via two connecting pieces 111b, 112b, which are running substantial perpendicular to the two bar shaped attachment means 111, 112. An extension 116 is connected to the lower attachment means 112, and a further extension 112c is provided by the upper connecting piece 112b. Two tubes 113, 114 are extending from the two connecting pieces 111b, 112b to an u-shaped attachment means 117 provided with a further extension 118. Each extension 112c, 116, 118 is provided with a through hole for connecting the top mounting hinge bracket 120, the lower mounting hinge bracket 130 as well as the gas spring 140. For that purpose, the lower rear through hole is in form of an arc-shaped slot 116 for allowing a sliding connection between the welded tilt frame 110 and the rear end of the gas spring 140 also attached to the lower mounting hinge bracket 130 via a first fastening means 160; the upper rear through hole is in form of a round opening 115 in the connecting piece extensions 112c for allowing a rotational connection of the welded tilt frame 110 relative to the top mounting hinge bracket 120 via a second fastening means 161; and the upper front through hole is in form of a round opening 118a in the extension 118 for allowing a rotational connection of the welded tilt frame 110 relative to the upper end of the gas spring 140 via a third fastening means 171. In addition, the u-shaped attachment means 117 is provided with an upper and a low opening 119a, 119b for the attachment of the front lateral guidance and stability bracket 150 via extensions 154a, 154b thereof. The u-shaped attachment means 117 is also provided with a plurality of openings 119c, which allow the attachment of the wheel attachment bracket 17 of front caster 16 at different height via further fastening means 169a, 169b.

[0028] The top mounting hinge bracket 120, shown in figure 2b, comprises two attachment portions 121, 122, with a step 124 formed there between. The front attachment portion 121 is provided with an opening 123 for the second fastening means 161 passing the round opening 115 of the welded tilt frame 110 and an opening of the housing of the gas spring 140. The rear attachment portion 122 has openings 125a, 125b, 126a, 126b for

fastening means 164a, 164b, 165a, 165b allowing an attachment to the side frame bars 24, 25. First openings 125a, 125b extend through a first rail-like protrusion 125 and second openings 126a, 126b extend through a second rail-like protrusion 126, with said protrusions 125, 126 being suited for being accommodated in complementary recesses of the side frame bars 24, 25 for a form as well as force fit. The step 124 of the top mounting hinge bracket 120 allows to partly embrace the side frame bar 24 for enhancing securement.

[0029] The lower mounting hinge bracket 130, shown in figure 2c, also comprises two attachment portions 131, 132, with a step 134 formed there between. The step 134 again partly embraces the side frame bar 24 for further securement. The front attachment portion 131 is provided with an opening 133 for the first fastening means 160 passing the arc-like slot 116 of the welded tilt frame 110 as well as an opening at the rear end of the housing of the gas spring 140. The rear attachment portion 132 has openings 135a, 136a for further fastening means 162, 163 allowing an attachment to the side frame bars 24, 25. Each opening 135a, 136a is extending through a rail-like protrusion 135, 136 suited for being accommodated in complementary recesses of the side frame bars 24, 25 for a form as well as force fit.

[0030] The front lateral guidance and stability bracket 150, shown in figure 2d, comprises a split tube 151 for at least partly surrounding the lower tube 20 of the wheelchair side frame 10, wherein the split tube 151 is attached to two bracket arms 152, 153 connected via connecting means 155 to each other and via two extensions 154a, 154b to the welded tilt frame 110, with the extensions 154a, 154b passing through the openings 119a, 119b of the front attachment means 117. Still further there is an opening 156 provided by the front lateral guidance and stability bracket 150 for a further attachment.

[0031] The wheel attachment bracket 15 for the drive wheel 14, shown in figure 2e, comprises three openings 15a, 15b, 15c for the attachment of the drive wheel axle, allowing an adaptation of the drive wheel location to the center of gravity in three different positions along a substantially horizontal line. Further, there are two openings 15d, 15e for the attachment of the attachment bracket 15 to the attachment means 111, 112 of the welded tilt frame 110, which are, for that purpose, provided with the plurality of openings 111a, 112a.

[0032] The amount and shape of the openings as well as the amount and kind of fastening means may vary. Also the exact location of said openings may vary. Important is which modules are connected to each other and how the modules are connected to the wheelchair side frames.

[0033] In order to upgrade a conventional foldable wheelchair 1 for being provided with a tilting function, first of all the wheel attachment brackets 13, 15 and 17 together with the respective wheels 12, 14 and 16 have to be disassembled, as well as the brake 28. In a next step, on each side of the wheelchair 1, one set of modules 100

is to be attached via fastening means 160 to 171. In a final step, the wheels 12, 14 and 16 are attached via the respective wheel attachment brackets 13, 15 and 17. Still further, the bracket 28 is attached. This upgrade of the wheelchair is easy to be realized. Still, it is recommendable to have this upgrade implemented by a technician as the positions of the wheels 12, 14 and 16 has to be adapted to the change of gravity when allowing a tilting.

[0034] Still further, the set of modules 100 according to the present disclosure may be used with different foldable wheelchairs as the plurality of openings of the different modules allows an adaption to the different wheelchairs, in addition to allowing an individual adaption of each wheelchair to its user.

[0035] The principle and mode of operation of this invention have been explained and illustrated in its preferred embodiment. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

Reference Signs

[0036]

1	foldable wheelchair
10, 10'	side frame
12	front caster
13	wheel attachment bracket
14	drive wheel
15	wheel attachment bracket
15a-c	wheel attachment opening
15d, e	frame attachment opening
16	anti tip wheel
17	wheel attachment bracket
18	foldable cross brace
20	lower tube
22	upper tube
24	front bar
24a	opening
26	rear bar
26a	opening
28	brake
30	arm rest
100	set of modules
110	welded tilt frame
111	attachment means
111a	opening
111b	connecting piece
112	attachment means
112a	opening
112b	connecting piece
112c	extension
113	tube
114	tube
115	round opening
116	arc-shaped slot

117	attachment means
118	attachment extension
118a	opening
119a, b	opening
5 119c	opening
120	top mounting hinge bracket
121	attachment portion
122	attachment portion
123	opening
10 124	step
125	rail-like protrusion
125a, b	opening
126	rail-like protrusion
126a, b	opening
15 130	lower mounting hinge bracket
131	attachment portion
132	attachment portion
133	opening
134	step
20 135	rail-like protrusion
135a	opening
136	rail-like protrusion
136a	opening
140	gas spring
25 141	actuation cable (Bowden cable)
150	front lateral guidance and stability bracket
151	split tube
152	bracket arm
153	bracket arm
30 154a, b	extension
155	connection means
156	opening
160	fastening means
161	fastening means
35 162	fastening means
163	fastening means
164a, b	fastening means
165a, b	fastening means
166a, b	fastening means
40 168	fastening means
169a, b	fastening means
171	fastening means

Claims

- 45 1. A modular tilt assembly configured for being attached and/or retrofitted, on demand, to a foldable wheelchair having side frames (10, 10'), , the modular tilt assembly comprising two sets of modules
- 50 (100), one for each side of the wheelchair, wherein each set of modules (100) comprises
- an external tilt frame (110) adapted to be attached to the external side of a wheelchair side frame (10),
 - at least one internal mounting hinge bracket adapted to be attached to the internal side of a wheelchair side frame (10),
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- an actuator for activating a tilting function, which is attached to the external tilt frame (110) and the at least one internal mounting hinge bracket, and
 - a guidance and stability bracket (150) adapted to be attached to wheelchair side frame (10), the actuator and the external tilt frame (110).
2. The modular tilt assembly according to claim 1, wherein
- the external tilt frame (110) is a welded frame, and/or
 - the at least one internal mounting hinge bracket comprises two mounting hinge brackets, which, when mounted to the wheelchair (1) provide a top mounting hinge bracket (120) and a lower mounting hinge bracket (130), and/or
 - the actuator comprises spring means (140), in particular in form of a gas spring, with a control cable, preferably in form of a Bowden cable (141).
3. The modular tilt assembly according to claim 1 or 2, wherein
- the external tilt frame (110) comprises a round opening (115) for a rotational attachment to the top mounting hinge bracket (120), and/or
 - the external tilt frame (110) comprises an arc-shaped slot (116) for a sliding attachment to the actuator and the lower mounting hinge bracket (130), and/or
 - the external tilt frame (110) comprises an opening (118a) for a, preferably fixed, attachment to the actuator, and/or
 - the external tilt frame (110) comprises at least one further opening (119a, 119b) for a, preferably fixed, attachment of the guidance and stability bracket (150), and/or
 - the external tilt frame (110) comprises a plurality of openings (111a, 112a) for attaching a drive wheel attachment bracket (15) at a selectable position, preferably at a selectable height when mounted to the wheelchair (1), and/or
 - the external tilt frame (110) comprises a further plurality of openings (119c) for attaching a front caster wheel attachment bracket (17) at a selectable position, preferably at a selectable height when mounted to the wheelchair (1).
4. The modular tilt assembly according to one of the preceding claims, wherein
- the at least one internal mounting hinge bracket is adapted to be mounted in a form and/or force fit to the wheelchair side frame (10), preferably at a selectable height when mounted to the wheel-
- chair (1), and/or
- the top mounting hinge bracket (120) and/or the lower mounting hinge bracket (130) is adapted to be mounted in a form and/or force fit to the wheelchair side frame (10), preferably at a selected position, in particular height.
5. The modular tilt assembly according to one of the preceding claims, wherein
- the at least one internal mounting hinge bracket is provided with at least one extension (125, 126, 135, 136) through which at least one opening (125a, 126a, 135a, 136a) for a fastening means is extending, and/or
 - the top mounting hinge bracket (120) is provided with two extensions (125, 126) through each of which at least one opening (125a, 126a) for a fastening means is extending, and/or the lower mounting hinge bracket (130) is provided with two extensions (135, 136) through each of which at least one opening (135a, 136a) for a fastening means is extending, and/or
 - the at least one internal mounting hinge bracket, the top mounting hinge bracket (120) and/or the lower mounting hinge bracket (130) is provided with a step (124, 134).
6. The modular tilt assembly according to one of the preceding claims, wherein
- each set of modules (100) comprises a drive wheel attachment bracket (15), which is provided with
- a plurality of first openings (15a, 15b, 15c) for attaching a drive wheel axle at a selectable position, preferably at a selectable horizontal position when mounted to the wheelchair (1), and/or
- at least one second opening (15d, 15e) for attachment to either one of the side frames (10, 10') or the external tilt frame (110).
7. A foldable wheelchair (1) with two side frames (10, 10') connected via a foldable cross brace (18) and having releasably mounted thereto the modular tilt assembly according to one of the preceding claims, wherein
- each side frame (10, 10') is equipped with one set of modules (100) of the modular tilt assembly without interfering with the foldable cross brace (18).
8. The foldable wheelchair (1) of claim 7, further comprising
- wheel attachment brackets (13, 14, 15) for detachably attaching wheels, comprising two drive wheels (14), two front casters (12) and at least

one rear wheel, in particular in form of an anti-tip wheel (16), and a detachably attachable brake (28), wherein the set of modules (100) being adapted for having the wheel attachment brackets (13, 15, 17) and the brake (28) attached thereto. 5

9. The foldable wheelchair (1) according to claim 7 or 8, wherein

each of the two external tilt frames (110) is attachable to one of the two side frames (10) at an outside of the wheelchair (1), whereas the at least two internal mounting hinge brackets are attachable to the inside of each side frame (10, 10'), and each one of the two guidance instability brackets (150) is attachable to one external tilt frame (110), one actuator and a side frame (10, 10'). 10 15 20

10. The foldable wheelchair (1) according to any one of the claims 7 to 9, wherein

the front caster wheel attachment brackets (17) are detachably attached either to the side frames (10, 10') or the external tilt frames (110), and/or the drive wheel attachment brackets (15) are detachably attached either to the side frames (10, 10') or the external tilt frames (110), and/or each rear wheel attachment bracket (13) is detachably attached either to one of the side frames (10, 10') or the external tilt frames (110), and/or the brakes (28) for the drive wheel (14) are detachably attached either to the side frames (10, 10') or the external tilt frames (110). 25 30 35

11. The foldable wheelchair (1) according to any one of the claims 7 to 10, wherein fastening means (160 - 171) passing through openings (15d, 15c, 24a, 25a, 111a, 111b, 119c, 125a, 125b, 126a, 126b, 135a, 136a) and/or extensions (125, 126, 135, 136) to be accommodated within recesses are adapted for the detachable attachments in a force and/or form fit manner, and/or shoulders (124, 134) are provided for alignment. 40 45

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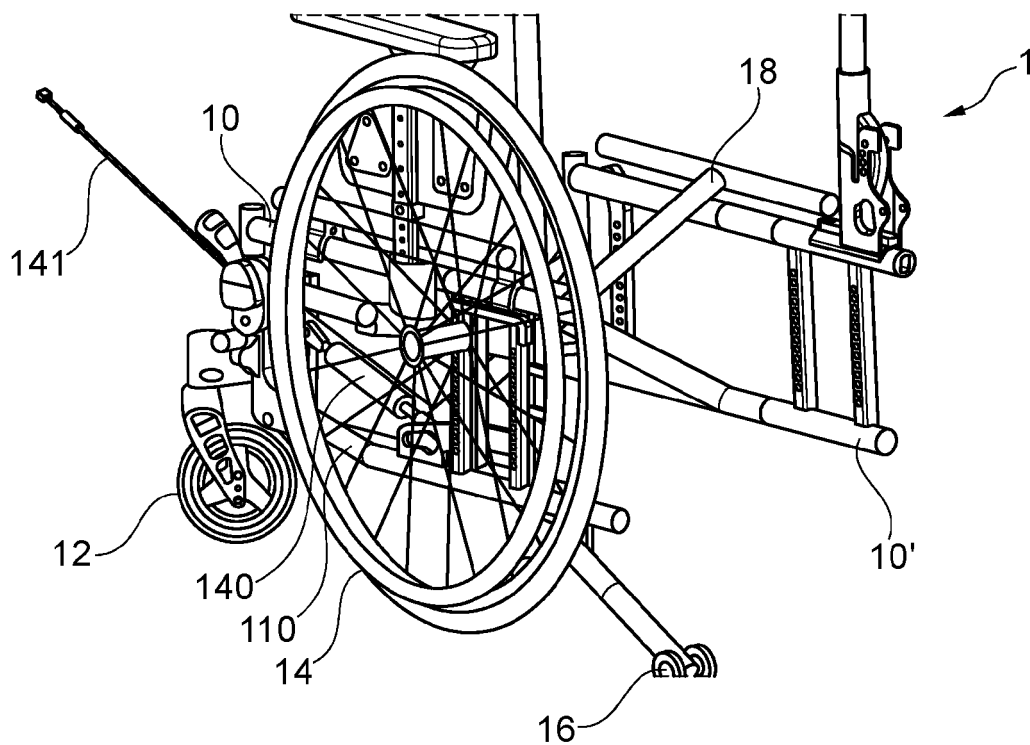


Fig. 1a

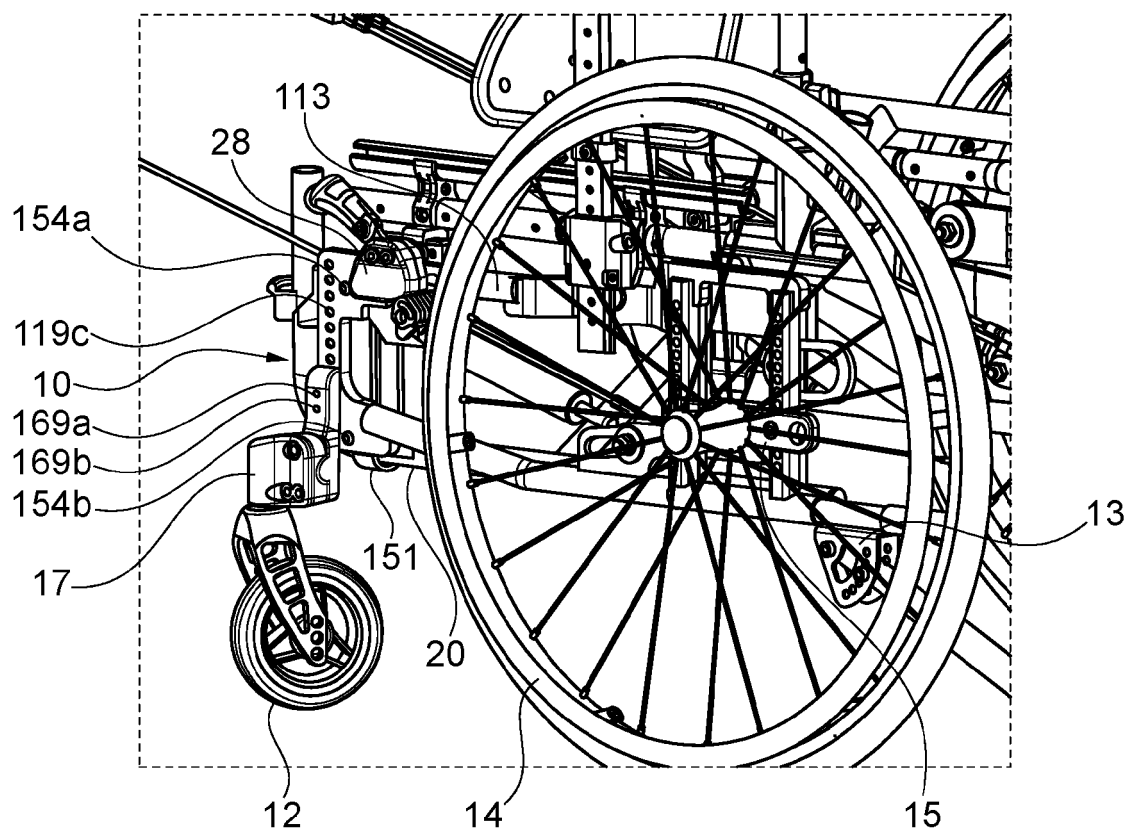


Fig. 1b

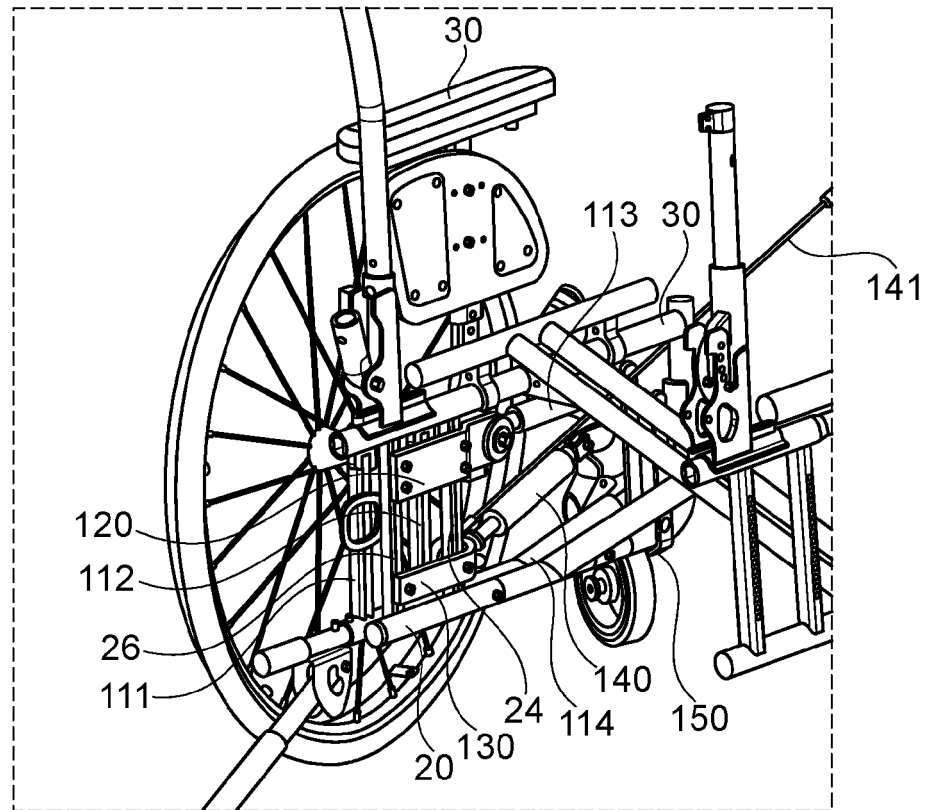


Fig. 1c

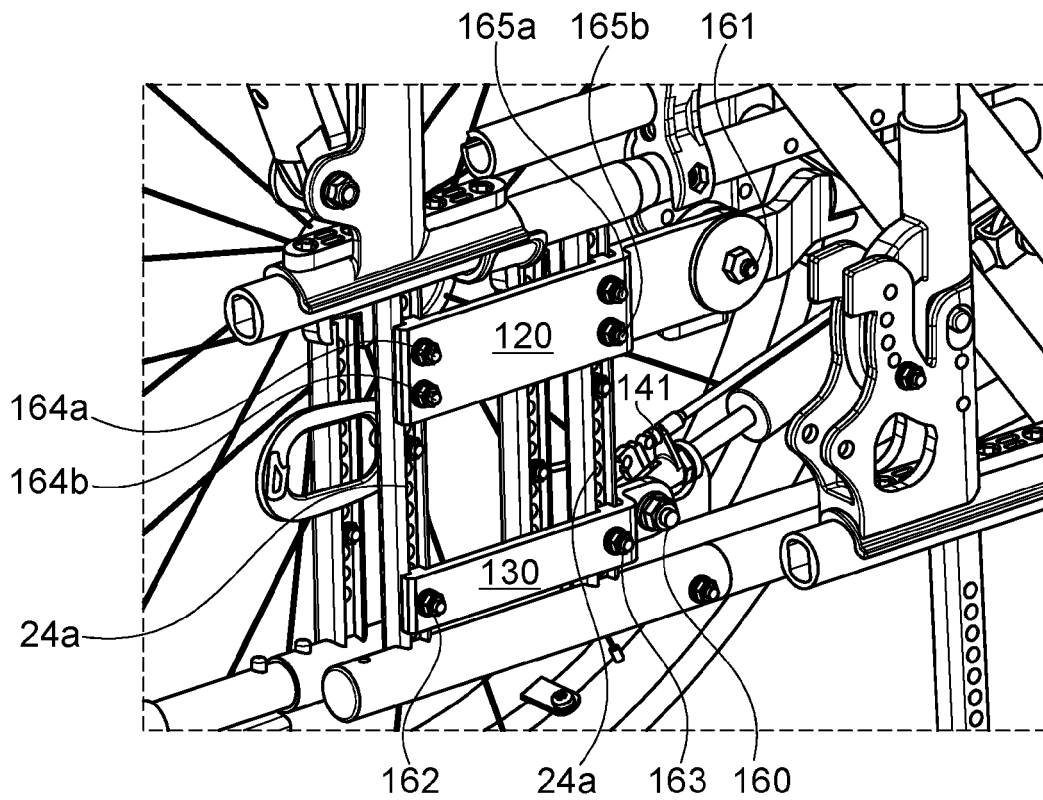


Fig. 1d

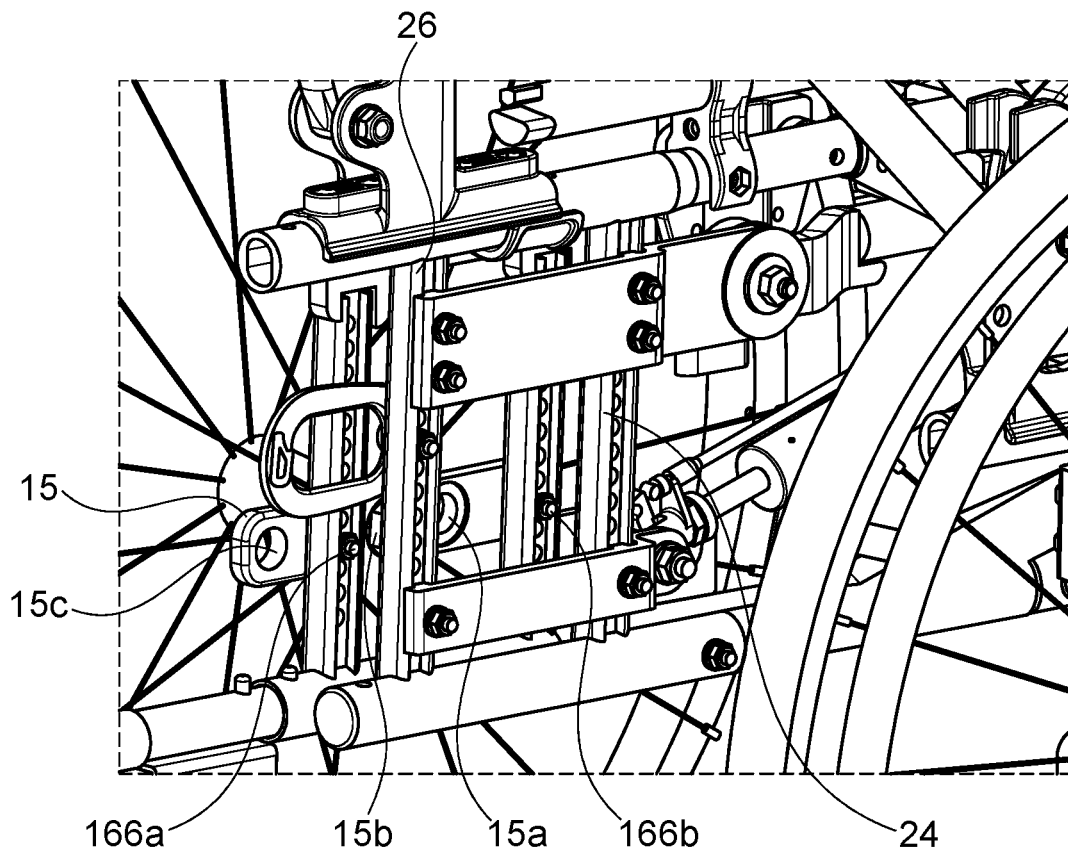


Fig. 1e

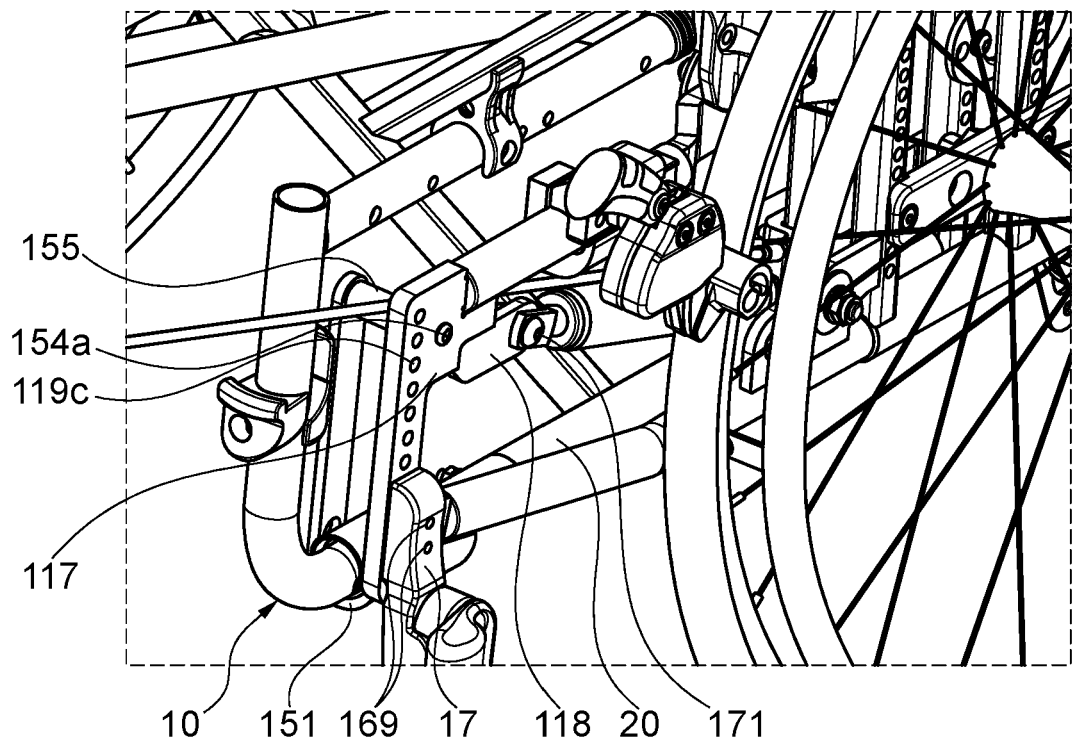


Fig. 1f

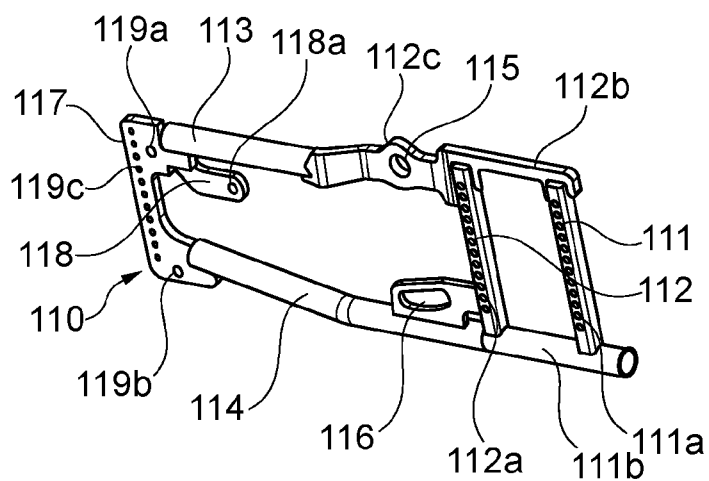


Fig. 2a

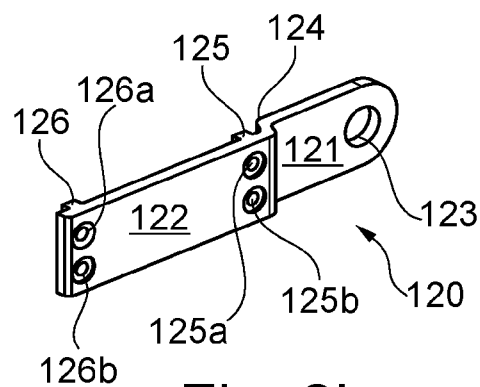


Fig. 2b

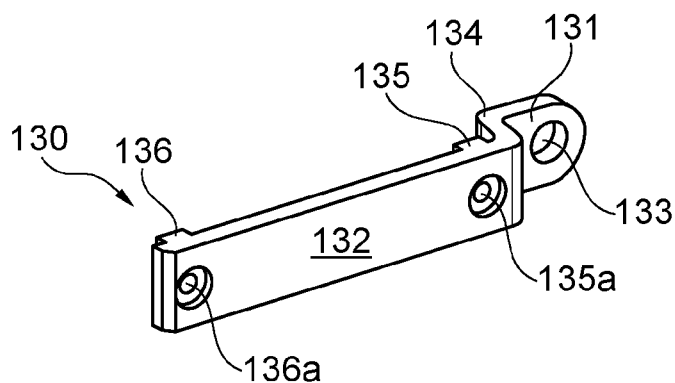


Fig. 2c

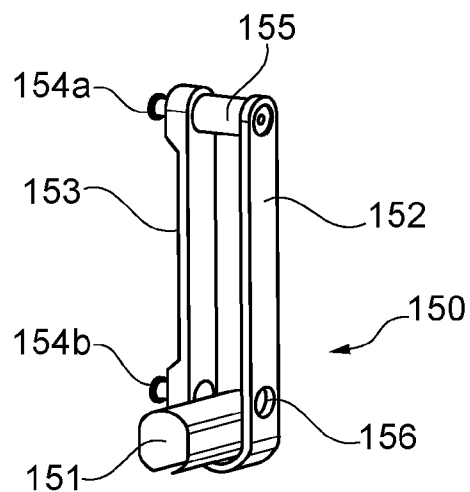


Fig. 2d

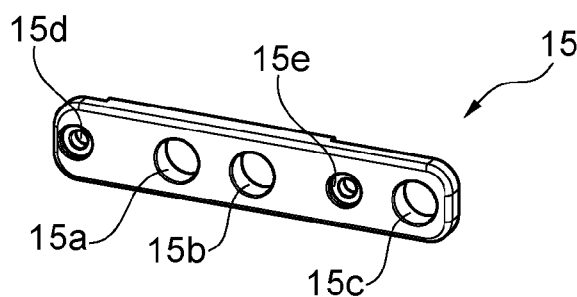


Fig. 2e



EUROPEAN SEARCH REPORT

Application Number

EP 24 22 0602

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 564 728 A (KARMA MEDICAL PROD CO LTD [TW]) 23 January 2019 (2019-01-23) * page 3, line 26 - page 13, line 16 * * figures 1-7 * -----	1-11	INV. A61G5/08 A61G5/10
			TECHNICAL FIELDS SEARCHED (IPC)
			A61G
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		20 March 2025	Schiffmann, Rudolf
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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