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(54) EASILY DISSOCIABLE WHEELCHAIR

EINFACH AUSEINANDERBAUBARER ROLLSTUHL

CHAISE ROULANTE FACILEMENT DÉMONTABLE

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a wheelchair that can be easily and quickly dissociated so as to permit it to be easily placed inside an automobile or other suitable conveyance.

[0002] The present invention relates also to a wheelchair having a modular structure that can be easily modified in accordance with the needs or wishes of the user. The present invention relates also to a wheelchair that can be step-less adjustable.

BACKGROUND OF THE INVENTION

[0003] The portability of a wheelchair is an important consideration to many wheelchair users. It is desirable that a wheelchair be lightweight and easily broken down so that it can be readily and conveniently transported in an automobile or other suitable conveyance. Most wheelchairs today are foldable which permits them to be placed in the trunk or behind the front seat of an automobile. These wheelchairs, however, are still unusually bulky and heavy and therefore, somewhat inconvenient to transport. An alternative to this problem consists in disassembling the wheelchair before placing it inside the automobile. Dismountable wheelchairs are known from DE 299 01 471 U1, US 6 311 999 B1 or GB 2 238 275 A. However, most wheelchairs today have a complex structure which makes such a disassembling operation very difficult and very long to do. Furthermore, considering that the main frame of the wheelchair generally comprises both the seat frame and the bended legs on which is connected the caster wheels, the volume occupied by said wheelchair after said disassembling operation remains too high for an easy positioning of said disassembled wheelchair inside an automobile. In addition, with such a structure, the entire main frame has to be replaced when only the bended legs of said main frame are damaged.

[0004] Thus, there is a need for a wheelchair avoiding the above-mentioned drawbacks.

[0005] There is also a need for a wheelchair that may be adjustable in a quick and easy way.

[0006] There is also a need for a wheelchair that may be adapted to the needs or the wishes of the user.

[0007] There is also a need for a wheelchair that permits the stepless adjustment of the rear wheels in a direction orthogonal to the seat plane.

[0008] There is also a need for a wheelchair in which the seat plate is integral with the seat frame.

[0009] There is also a need for a wheelchair in which the connection between the rear wheels and the seat is improved.

[0010] There is finally a need for a wheelchair in which the connection between the front wheels and the seat is improved.

SUMMARY OF THE INVENTION

[0011] According to a first embodiment of the invention, these aims are achieved by means of a wheelchair according to independent claim 1.

[0012] Important features of the device are defined in the dependent claims 2 to 15.

[0013] According to a second embodiment of the invention, these aims are achieved by a means of a wheelchair comprising:

- a seat module including a seat frame supporting a seat;
- a backrest module including a backrest frame connected to said seat frame and supporting a backrest;
- a front frame module including a front frame, said front frame including left and right bended legs removably connected at their upper end to said seat frame and at their lower end to a footrest, said bended legs being supported by caster wheel assemblies via caster support;
- a rear wheel module including left and right rear wheels pivotally connected to an axle, said rear wheel module being removably connected to said seat module through left and right connecting elements;

wherein said seat frame consists in left and right longitudinal profiles extending in the same plane;
wherein said left and right connecting elements are configured so as to permit a step-less adjustment of the position of the rear wheel module with regard to the seat module in a direction orthogonal to the plane defined by the seat frame.

[0014] According to a third embodiment of the invention, these aims are achieved by a means of a wheelchair comprising:

- a seat module including a seat frame supporting a seat;
- a backrest module including a backrest frame connected to said seat frame and supporting a backrest;
- a front frame module including a front frame, said front frame including left and right bended legs removably connected at their upper end to said seat frame and at their lower end to a footrest, said bended legs being supported by caster wheel assemblies via caster support;
- a rear wheel module including left and right rear wheels pivotally connected to an axle, said rear wheel module being removably connected to said seat module through left and right connecting ele-

ments;

wherein said seat frame consists in left and right longitudinal profiles extending in the same plane;
wherein the seat comprises a seat plate extending between the left and right profiles of the seat frame, said seat plate being integral with said left and right profiles;
wherein, preferably, said seat plate is made in a rigid material;
wherein, preferably, said rigid material is a carbon fiber material;
wherein, preferably, said seat plate is provided with parallel slots extending from the rear end of said seat plate in a rear-to-front direction so as to define a plurality of flexible areas in a rear part of said seat plate.

[0015] According to a fourth embodiment of the invention, these aims are achieved by a means of a wheelchair comprising:

- a seat module including a seat frame supporting a seat;
- a backrest module including a backrest frame connected to said seat frame and supporting a backrest;
- a front frame module including a front frame, said front frame including left and right bended legs removably connected at their upper end to said seat frame and at their lower end to a footrest, said bended legs being supported by caster wheel assemblies via caster support;
- a rear wheel module including left and right rear wheels pivotally connected to an axle, said rear wheel module being removably connected to said seat module through left and right connecting elements;

wherein said seat frame consists in left and right longitudinal profiles extending in the same plane;
wherein said left, respectively said right, connecting element comprises a tubular element extending in a direction approximately orthogonal to the plane defined by the seat frame, a first securing arrangement positioned at the upper end of said tubular element, said first securing arrangement allowing said tubular element to be fixed with respect to the left, respectively the right, profile of the seat frame, and a second securing arrangement positioned along said tubular element, said second securing arrangement allowing said tubular element to be fixed with respect to the axle of the rear wheel module;
wherein said first, respectively said second, securing arrangement comprises a nut, a screw and a mounting piece, said screw being adapted to slide inside a slot provided in the seat frame, respectively in the tubular element of the left or right connecting element, said screw being also adapted to be inserted through a hole provided in said mounting piece and to sit in a threaded hole provided in said nut;
wherein, preferably, the nut of the first securing arrangement has approximately the form of a trapezoidal prism, the non-parallel lateral sides of said nut abutting against two converging flanges downwardly extending from the periphery of the left, respectively the right, profile of the seat frame when the left, respectively the right, connecting element is fixed on said left, respectively said right, profile, the free ends of said flanges defining the slot inside which slides the screw of said first securing arrangement;
wherein, preferably, the mounting piece of the first securing arrangement comprises a U-shape element extending in a rear-to-front direction, the lateral flanges of said U-shape element abutting against the flanges downwardly extending from the periphery of the left, respectively the right, profile of the seat frame when the left, respectively the right, connecting element is fixed on said left, respectively said right, profile;
wherein, preferably, the nut of the second securing arrangement has approximately the form of a trapezoidal prism, the non-parallel lateral sides of said nut abutting against two converging flanges rearwardly or forwardly extending at the periphery of the tubular element when the left or the right connecting element is fixed on the axle of the rear wheel module, the free ends of said flanges defining the slot inside which slides the screw of said second securing arrangement;
wherein, preferably, the mounting piece of the second securing arrangement comprises a cylindrical split ring having forwardly, respectively rearwardly, extending U-shape portion, said split ring having a cylindrical aperture extending in a left-to-right direction, said aperture being adapted to receive the axle of the rear wheel module, said U-shape portion extending in a direction approximately orthogonal to the plane defined by the seat frame (11), the lateral flanges of said U-shape portion abutting against the flanges rearwardly, respectively forwardly, extending at the periphery of the tubular element when the left or the right connecting element is fixed on the axle of the rear wheel module.

[0016] According to a fifth embodiment of the invention, these aims are achieved by a means of a wheelchair comprising:

- a seat module including a seat frame supporting a seat;
- a backrest module including a backrest frame connected to said seat frame and supporting a backrest;
- a front frame module including a front frame, said front frame including left and right bended legs removably connected at their upper end to said seat frame and at their lower end to a footrest, said bended legs being supported by caster wheel assemblies via caster support;

- a rear wheel module including left and right rear wheels pivotally connected to an axle, said rear wheel module being removably connected to said seat module through left and right connecting elements;

wherein said seat frame consists in left and right longitudinal profiles extending in the same plane;
wherein the left, respectively the right, bended leg of the front frame module telescopically extends into the left, respectively the right, profile of the seat frame and includes at least one pair of bores for registering with a plurality of pair of holes provided along said left, respectively said right, profile, said bores and said holes being adapted to receive the shank of a screw.

[0017] With such an arrangement, the wheelchair may be easily dissociated or adapted to the needs of the user.

[0018] In particular, each module can be easily replaced or changed when they are damaged or do not correspond to the needs or whishes of the user.

[0019] Moreover, the connection means between the seat module and the other modules enable step-less adjustment of the position of the seat in a rear-to-front direction and/or in a bottom-to-top direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention will be better understood with the aid of the description of an embodiment given by way of example and illustrated by the figures, in which:

- Figure 1 illustrates a front perspective view of a wheelchair according to an embodiment of the invention;

- Figure 2 is a side view of the wheelchair of Figure 1;

- Figure 3 is a front perspective exploded view of the wheelchair of Figure 1, showing the different connection means used for connecting the backrest, front frame and rear wheel modules of the wheelchair to the left profile of the seat module;

- Figure 4 is a front perspective exploded view of the wheelchair of Figure 1, showing in greater detail the upper part of the right connecting element used for connecting the rear wheel module to the seat module;

- Figure 5 is a front view of the wheelchair of Figure 1, showing in greater detail the upper part of the right connecting element used for connecting the rear wheel module to the seat module;

- Figure 6 is a rear perspective exploded view of the wheelchair of Figure 1, showing in greater detail the lower part of the left connecting element used for connecting the rear wheel module to the seat module.

DETAILED DESCRIPTION OF THE INVENTION

[0021] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0022] For the purpose of the present specification, situations and directions of elements of the wheelchair are determined by the perspective of a user seated in the wheelchair. Accordingly, the left side of the wheelchair corresponds to the right side of Figure 1 and vice versa. The situations or directions "up" or "top" and "down" or "bottom", "rear" or "back" and "front", "behind" and "in front", "distal" and "proximal", "lateral" and "central" follow the same rule. The term "longitudinal" indicates a direction of an element, such as a tube, having, as a major direction component, the rear-to-front direction. Such an element may also to some or to a minor extent be skewed laterally and/or towards the bottom or the top. The terms "forward" or "forwardly" and "rearward" or "rearwardly" refer to the direction of motion of the wheelchair. The term "horizontal" refers to a plane parallel to the plane defined by the seat frame when the wheelchair stands on a horizontal plane and the term "vertical" refers to a plane orthogonal to a horizontal plane. Said terminology will include the words specifically mentioned, derivatives thereof, and words of similar import.

[0023] Referring to Figures 1 and 2, a wheelchair according to the invention is illustrated. The wheelchair 1 comprises four independent modules, a seat module 10, a backrest module 20, a front frame module 30 and a rear wheel module 40, that may be easily adjusted or separated.

[0024] The seat module 10 comprises a seat frame 11 supporting a seat plate 12 and the backrest module 20 comprises a backrest frame 21 supporting a backrest plate 22. The seat frame 11 consists in left and right longitudinal profiles 11a and 11b, said profiles consisting in the embodiment shown in hollow tubes extending in a substantially parallel rear-to-front direction. Thus, said profiles 11a, 11b extend in the same plane. In a further embodiment of the present invention, the axes of the profiles 11a, 11b may also extend in the same plane without defining the same direction. The cross section of said profiles 11a, 11b may define a circular form as in the embodiment shown in Figure 1, or other forms, such as an ellipse, a rectangle, a square, a U-shape or I-shape form. The backrest module 20 is connected to the seat module 10 via left and right angle linking elements 23a and 23b. As shown in detail in Figure 3, each linking element 23a, 23b comprises an L-shape bracket 23c fix-

edly connected to a tail plug 23d along its horizontal portion and to the backrest frame 21 along its vertical portion, said tail plug 23d being configured to telescopically extend into the left or the right profile 11a, 11b. In the embodiment illustrated in Figure 3, the tail plug 23d is fixedly connected to the left profile 11a via screws 56 adapted to be received inside bores 54, 55 of the tail plug 23d and the left profile 11a respectively. In a further embodiment of the invention, the linking elements 23a and 23b may be configured so as to pivotally connect the backrest module 20 to the seat module 10. The seat plate 12 extends between the left and right profiles 11a, 11b. In the embodiment illustrated in Figure 1, said seat plate 12 is integral with said left and right profiles 11a, 11b. Such a configuration improves the rigidity of the seat frame 11, and thus, the rigidity of the wheelchair as a whole. Furthermore, such a configuration reduces the volume occupied by and the weight of conventional seats in which the seat is generally a bulky and heavy structure. Finally, such a configuration reduces the number of processing steps for making such a seat. Indeed, no fixing means is necessary for connecting the seat plate 12 to the seat frame 11. The seat plate 12 may advantageously be made in a rigid material, and preferably in the same material as the left and right profiles 11a and 11b. Said rigid material may advantageously be a lightweight material, such as a carbon fiber material. To improve the comfort of the wheelchair for the user, this rigid seat plate 12 is provided with parallel slots 16 extending from the rear end 18 of said seat plate 12 in a rear-to-front direction so as to define a plurality of flexible areas 17 in a rear part of said seat plate 12. In a further embodiment of the present invention, a cushion may be attached to the upper side of the seat plate 12, said cushion improving the comfort of the wheelchair. As shown in detail on Figures 4 and 5, the left and right profiles 11a and 11b are provided with two converging flanges 13c and 13d downwardly extending from the circular periphery of said profiles 11a, 11b. The role of said flanges 13c and 13d will be explained in the following paragraphs.

[0025] The front frame module 30 comprises a front frame 31 including left and right bended legs 31a and 31b, said legs being removably connected at their upper end to the left and right profiles 11a and 11b respectively and at their lower end to a footrest 32. Each bended leg 31a, 31b is supported by a caster wheel assembly via a caster support 34. Said caster wheel assembly consists in a caster fork 35 supporting a caster wheel 36. As shown in detail on Figure 3, each bended leg 31a, 31b consists in a hollow tube telescopically extending into the left or right profiles 11a, 11b. Each bended leg 31a, 31b include at least one pair of bores 51 defining a left-to-right direction, said bores 51 being registered with a pair of holes 52 provided along the left or the right profile 11a, 11b when the legs 31a, 31b are connected to the profiles 11a, 11b. Said bores 51 and said holes 52 are configured to receive the shank of a screw 53 so as to removably connect the legs 31a, 31b to the profiles 11a, 11b. In a further embodiment of the invention, said legs 31a, 31b may be connected to said profiles 11a, 11b via a quick release mechanism. Such a quick release mechanism is known per se.

[0026] The rear wheel module 40 comprises left and right rear wheels 41a, 41b pivotally connected to an axle 42, said axle 42 being removably connected to the seat frame 21 through left and right connecting elements 43a and 43b. Said left and right connecting elements 43a, 43b are configured so as to permit a step-less adjustment of the position of the axle 42 with regard to the seat frame 11 in a rear-to-front direction and in a bottom-to-top direction. As shown in detail on Figure 3, said left, respectively said right, connecting element 43a, 43b comprises a tubular element 44 extending in a direction approximately orthogonal to the plane defined by the seat frame 11, a first securing arrangement 60 positioned at the upper end of said tubular element 44 to be fixed with respect to the left, respectively the right, profile 11a, 11b and a second securing arrangement 70 positioned along said tubular element 44, said second securing arrangement 70 allowing said tubular element 44 to be fixed with respect to the axle 42. The cross section of tubular element 44 may define the same or a similar form as the cross section of the left or right profile 11a, 11b. Thus, as shown in detail on Figures 4 and 6, two converging flanges 13c and 13d downwardly extend from the periphery of the left or right profile 11a or 11b and two converging flanges 45c and 45d rearwardly extend at the periphery of the tubular element 44. The free ends of said flanges 13c and 13d, respectively 45c and 45d, are configured to define a slot 14, respectively a slot 46, extending in a rear-to-front direction, respectively a bottom-to-top direction. The slot 14, respectively 46, is configured to permit the sliding movement of two screws 62, respectively two screws 72, along said rear-to-front direction, respectively said bottom-to-top direction. Each of said screws 62, respectively 72, cooperates with two nuts 63, respectively two nuts 73, and a mounting piece 61, respectively a mounting piece 71, to define the first securing arrangement 60, respectively the second securing arrangement 70. In particular, each nut 63, respectively 73, of the first, respectively the second, securing arrangement 60, respectively 70, has approximately the form of a trapezoidal prism, the non-parallel lateral sides 63c, 63d, respectively 73c, 73d, of said nut 63, respectively 73, abutting against the flanges 13c, 13d, respectively 45c, 45d, when the left or right connecting element 43a, 43b is fixed on the left or right profile 11a, 11b, respectively on the axle 42. The fixation of the left or right connecting element 43a, 43b on the left or right profile 11a, 11b, respectively on the axle 42, occurs when each screw 62, respectively 72, is inserted through a hole 61i, respectively a hole 71i, provided in the mounting piece 61, respectively 71, and sits in a threaded hole 63i, respectively a threaded hole 73i, provided in a nut 63, respectively 73. In a further embodiment of the invention, the first, respectively the second, securing arrangement 60, respectively 70, may

comprise only one screw cooperating with only one nut so as to removably connect the left or right connecting element 43a, 43b to the left or right profile 11a, 11b, respectively to the axle 42. In a further embodiment of the invention, the nuts 63 or 73, the mounting piece 61 or 71 and the flanges 13c, 13d or 45c, 45d may have other alternative forms, such alternative forms being configured so that the flanges 13c, 13d or 45c, 45d are sandwiched between the lateral sides 63c, 63d or 73c, 73d of said nuts and the lateral flanges 61c, 61d or 75c, 75d of said mounting piece when the left or right connecting element 43a, 43b are fixed on the left or right profile 11a, 11b or on the axle 42. As shown in detail on Figures 4 and 5, the mounting piece 61 consists in a U-shape element extending in a rear-to-front direction, a central portion of the bottom flange 61e and a lower portion of the lateral flanges 61c, 61d of said U-shape element 61 extending upwardly from the upper end of the tubular element 44 and being integral therewith. The lateral flanges 61c, 61d of said U-shape element 61 abut against the flanges 13c and 13d of the left or right profile 11a, 11b when the left or right connecting element 43a, 43b is fixed on said left or right profile 11a, 11b. As shown in detail on Figure 6, the mounting piece 71 comprises a cylindrical split ring 74 having forwardly extending U-shape portion 75. Said split ring 74 has a cylindrical aperture 76 extending in a left-to-right direction, said aperture being adapted to receive the axle 42. Said U-shape portion 75 extends in a bottom-to-top direction, the lateral flanges 75c, 75d abutting against the flanges 45c and 45d when the left or right connecting element 43a, 43b is fixed on the axle 42. In a further embodiment of the invention, the U-shape portion 75 may rearwardly extend from the cylindrical split ring 74. In this case, the flanges 45c and 45d forwardly extend at the periphery of the tubular element 44.

[0027] The above detailed description with reference to the drawings illustrates rather than limit the invention. There are numerous alternatives, which fall within the scope of the appended claims.

Claims

1. A wheelchair (1) comprising:

- a seat module (10) including a seat frame (11) supporting a seat (12);
- a backrest module (20) including a backrest frame (21) connected to said seat frame (11) and supporting a backrest (22);
- a front frame module (30) including a front frame (31), said front frame (31) including left and right bended legs (31a, 31b) removably connected at their upper end to said seat frame (11) and at their lower end to a footrest (32), said bended legs (31a, 31b) being supported by caster wheel assemblies (35, 36) via caster support (34);
- a rear wheel module (40) including left and right rear wheels (41a, 41b) pivotally connected to an axle (42), said rear wheel module (40) being removably connected to said seat module (10) through left and right connecting elements (43a, 43b);

wherein said seat frame (11) consists in left and right longitudinal profiles (11a, 11b) extending in the same plane;
wherein the seat comprises a seat plate (12) extending between the left and right profiles (11a, 11b) of the seat frame (11), said seat plate (12) being integral with said left and right profiles (11a, 11b).

2. The wheelchair (1) according to claim 1, wherein said left and right connecting elements (43a, 43b) are configured so as to permit a step-less adjustment of the position of the rear wheel module (40) with regard to the seat module (10) in a rear-to-front direction.

3. The wheelchair (1) according to claim 1 or claim 2, wherein said left and right connecting elements (43a, 43b) are configured so as to permit a step-less adjustment of the position of the rear wheel module (40) with regard to the seat module (10) in a direction orthogonal to the plane defined by the seat frame (11).

4. The wheelchair (1) according to claim 1, wherein said seat plate (12) is made in a rigid material.

5. The wheelchair (1) according to claim 4, wherein said rigid material is a carbon fiber material.

6. The wheelchair (1) according to any one of preceding claims, wherein said seat plate (12) is provided with parallel slots(16) extending from the rear end (18) of said seat plate (12) in a rear-to-front direction so as to define a plurality of flexible areas (17) in a rear part of said seat plate (12).

7. The wheelchair (1) according to any one of the preceding claims, wherein said left, respectively said right, connecting element (43a, 43b) comprises a tubular element (44) extending in a direction approximately orthogonal to the plane defined by the seat frame (11), a first securing arrangement (60) positioned at the upper end of said tubular element (44), said first securing arrangement (60) allowing said tubular element (44) to be fixed with respect to the left, respectively the right, profile (11a, 11b) of the seat frame (11), and a second securing arrangement (70) positioned along said tubular element (44), said second securing arrangement (70) allowing said tubular element (44) to be fixed with respect to the axle (42) of the rear wheel module (40).

8. The wheelchair (1) according to claim 7, wherein said first, respectively said second, securing arrangement (60, 70) comprises a nut (63, 73), a screw (62, 72) and a mounting piece (61, 71), said screw (62, 72) being adapted to slide inside a slot (14, 46) provided in the seat frame (11), respectively in the tubular element (44) of the left or right connecting element (43a, 43b), said screw (62, 72) being also adapted to be inserted through a hole (61i, 71i) provided in said mounting piece (61, 71) and to sit in a threaded hole (63i, 73i) provided in said nut (63, 73).

9. The wheelchair (1) according to claim 8, wherein the nut (63) of the first securing arrangement (60) has approximately the form of a trapezoidal prism, the non-parallel lateral sides (63c, 63d) of said nut (63) abutting against two converging flanges (13c, 13d) downwardly extending from the periphery of the left, respectively the right, profile (11a, 11b) of the seat frame (11) when the left, respectively the right, connecting element (43a, 43b) is fixed on said left, respectively said right, profile (11a, 11b), the free ends of said flanges (13c, 13d) defining the slot (14) inside which slides the screw (62) of said first securing arrangement (60).

10. The wheelchair (1) according to claim 9, wherein the mounting piece of the first securing arrangement (60) comprises a U-shape element (61) extending in a rear-to-front direction, the lateral flanges (61c, 61d) of said U-shape element (61) abutting against the flanges (28c, 28d) downwardly extending from the periphery of the left, respectively the right, profile (11a, 11b) of the seat frame (11) when the left, respectively the right, connecting element (43a, 43b) is fixed on said left, respectively said right, profile (11a, 11b).

11. The wheelchair (1) according to any one of claims 8 to 10, wherein the nut (73) of the second securing arrangement (70) has approximately the form of a trapezoidal prism, the non-parallel lateral sides (73c, 73d) of said nut (73) abutting against two converging flanges (45c, 45d) rearwardly or forwardly extending at the periphery of the tubular element (44) when the left or the right connecting element (43a, 43b) is fixed on the axle (42) of the rear wheel module (40), the free ends of said flanges (45c, 45d) defining the slot (46) inside which slides the screw (72) of said second securing arrangement (70).

12. The wheelchair (1) according to claim 11, wherein the mounting piece (71) of the second securing arrangement (70) comprises a cylindrical split ring (74) having forwardly, respectively rearwardly, extending U-shape portion (75), said split ring (74) having a cylindrical aperture (76) extending in a left-to-right direction, said aperture (76) being adapted to receive the axle (42) of the rear wheel module (40), said U-shape portion (75) extending in a direction approximately orthogonal to the plane defined by the seat frame (11), the lateral flanges (75c, 75d) of said U-shape portion (75) abutting against the flanges (45c, 45d) rearwardly, respectively forwardly, extending at the periphery of the tubular element (44) when the left or the right connecting element (43a, 43b) is fixed on the axle (42) of the rear wheel module (40).

13. The wheelchair (1) according to any one of preceding claims, wherein the left, respectively the right, bended leg (31a, 31b) of the front frame module (30) telescopically extends into the left, respectively the right, profile (11a, 11b) of the seat frame (11) and includes at least one pair of bores (51) for registering with a plurality of pair of holes (52) provided along said left, respectively said right, profile (11a, 11b), said bores (51) and said holes (52) being adapted to receive the shank of a screw (53).

14. The wheelchair (1) according to any one of the preceding claims, wherein the backrest frame (21) is pivotally connected to the seat frame (11).

15. The wheelchair (1) according to any one of the preceding claims, wherein the cross section of said left and right profiles (11a, 11b) define a form chosen among a circle, an ellipse, a rectangle, a square, a U-shape form and an I-shape form.

Patentansprüche

1. Rollstuhl (1), umfassend:

- ein Sitzmodul (10), das einen Sitzrahmen (11) aufweist, der einen Sitz (12) stützt,
- ein Rückenlehnenmodul (20), das einen Rückenlehnenrahmen (21) aufweist, der mit dem Sitzrahmen (11) verbunden ist und eine Rückenlehne (22) stützt,
- ein Vorderrahmenmodul (30), das einen Vorderrahmen (31) aufweist, wobei der Vorderrahmen (31) ein linkes und ein rechtes gebogenes Bein (31a, 31b) aufweist, die an ihrem oberen Ende entfernbar mit dem Sitzrahmen (11) und an ihrem unteren Ende mit einer Fußstütze (32) verbunden sind, wobei die gebogenen Beine (31a, 31b) über eine Laufrollenstütze (34) durch Laufrollenanordnungen (35, 36) gestützt sind,
- ein Hinterradmodul (40), das ein linkes und ein rechtes Hinterrad (41a, 41b) aufweist, die schwenkbar mit einer Achse (42) verbunden sind, wobei das Hinterradmodul (40) durch ein linkes und ein rechtes Verbindungselement (43a, 43b) entfernbar mit dem Sitzmodul (10) verbunden ist,

wobei der Sitzrahmen (11) aus einem linken und einem rechten Längsprofil (11a, 11b) besteht, die sich in derselben Ebene erstrecken,
wobei der Sitz eine Sitzplatte (12) umfasst, die sich zwischen dem linken und dem rechten Profil (11a, 11b) des Sitzrahmens (11) erstreckt, wobei die Sitzplatte (12) mit dem linken und dem rechten Profil (11a, 11b) integral ist.

2. Rollstuhl (1) nach Anspruch 1, wobei das linke und das rechte Verbindungselement (43a, 43b) dazu konfiguriert sind, eine stufenlose Verstellung der Position des Hinterradmoduls (40) bezüglich des Sitzmoduls (10) in einer von hinten nach vorne verlaufenden Richtung zu gestatten.

3. Rollstuhl (1) nach Auspruch 1 oder Auspruch 2, wobei das linke und das rechte Verbindungselement (43a, 43b) dazu konfiguriert sind, eine stufenlose Verstellung der Position des Hinterradmoduls (40) bezüglich des Sitzmoduls (10) in einer orthogonal zu der vom Sitzrahmen (11) definierten Ebene verlaufenden Richtung zu gestatten.

4. Rollstuhl (1) nach Anspruch 1, wobei die Sitzplatte (12) aus einem starren Material hergestellt ist.

5. Rollstuhl (1) nach Anspruch 4, wobei das starre Material ein Kohlenstofffasermaterial ist.

6. Rollstuhl (1) nach einem der Ansprüche 3 bis 5, wobei die Sitzplatte (12) mit parallelen Schlitzen (16) versehen ist, die sich vom hinteren Ende (18) der Sitzplatte (12) in einer von hinten nach vorne verlaufenden Richtung erstrecken, um eine Vielzahl von flexiblen Bereichen (17) in einem hinteren Teil der Sitzplatte (12) zu definieren.

7. Rollstuhl (1) nach einem der vorhergehenden Ansprüche, wobei das linke beziehungsweise das rechte Verbindungselement (43a, 43b) ein röhrenförmiges Element (44), das sich in einer ungefähr orthogonal zu der vom Sitzrahmen (11) definierten Ebene verlaufenden Richtung erstreckt, eine erste Befestigungsanordnung (60), die am oberen Ende des röhrenförmigen Elements (44) positioniert ist und es dem röhrenförmigen Element (44) gestattet, bezüglich des linken beziehungsweise des rechten Profils (11a, 11b) des Sitzrahmens (11) fixiert zu werden, und eine zweite Befestigungsanordnung (70) umfasst, die entlang dem röhrenförmigen Element (44) positioniert ist und es dem röhrenförmigen Element (44) gestattet, bezüglich der Achse (42) des Hinterradmoduls (40) fixiert zu werden.

8. Rollstuhl (1) nach Anspruch 7, wobei die erste beziehungsweise die zweite Befestigungsanordnung (60, 70) eine Mutter (63, 73), eine Schraube (62, 72) und ein Montagestück (61, 71) umfasst, wobei die Schraube (62, 72) geeignet ist, in einem im Sitzrahmen (11) beziehungsweise im röhrenförmigen Element (44) des linken oder rechten Verbindungselements (43a, 43b) vorgesehenen Schlitz (14, 46) zu gleiten, wobei die Schraube (62, 72) ebenfalls geeignet ist, durch ein im Montagestück (61, 71) vorgesehenen Loch (61i, 71i) eingeführt zu werden und in einem in der Mutter (63, 73) vorgesehenen Gewindeloch (63i, 73i) zu sitzen.

9. Rollstuhl (1) nach Anspruch 8, wobei die Mutter (63) der ersten Befestigungsanordnung (60) ungefähr die Form eines trapezförmigen Prismas hat, wobei die nicht parallelen lateralen Seiten (63c, 63d) der Mutter (63) an zwei konvergierenden, sich vom Umfang des linken beziehungsweise rechten Profils (11a, 11b) des Sitzrahmens (11) nach unten erstreckenden Flanschen (13c, 13d) anschlagen, wenn das linke beziehungsweise rechte Verbindungselement (43a, 43b) am linken beziehungsweise rechten Profil (11a, 11b) fixiert ist, wobei die freien Enden der Flansche (13c, 13d) den Schlitz (14) definieren, in dem die Schraube (62) der ersten Befestigungsanordnung (60) gleitet.

10. Rollstuhl (1) nach Anspruch 9, wobei das Montagestück der ersten Befestigungsanordnung (60) ein sich in einer von hinten nach vorne verlaufenden Richtung erstreckendes U-förmiges Element (61) umfasst, wobei die seitlichen Flansche (61c, 61d) des U-förmigen Elements (61) an den sich vom Umfang des linken beziehungsweise rechten Profils (11a, 11b) des Sitzrahmens (11) nach unten erstreckenden Flanschen (28c, 28d) anschlagen, wenn das linke beziehungsweise rechte Verbindungselement (43a, 43b) am linken beziehungsweise rechten Profil (11a, 11b) fixiert ist.

11. Rollstuhl (1) nach einem der Ansprüche 8 bis 10, wobei die Mutter (73) der zweiten Befestigungsanordnung (70) ungefähr die Form eines trapezförmigen Prismas hat, wobei die nicht parallelen lateralen Seiten (73c, 73d) der Mutter (73) an zwei konvergierenden, sich am Umfang des röhrenförmigen Elements (44) nach hinten oder nach vorne erstreckenden Flanschen (45c, 45d) anschlagen, wenn das linke beziehungsweise rechte Verbindungselement (43a, 43b) an der Achse (42) des Hinterradmoduls (40) fixiert ist, wobei die freien Enden der Flansche (45c, 45d) den Schlitz (46) definieren, in dem die Schraube (72) der zweiten Befestigungsanordnung (70) gleitet.

12. Rollstuhl (1) nach Anspruch 11, wobei das Montagestück (71) der zweiten Befestigungsanordnung (70) einen zylindrischen Spaltring (74) umfasst, der einen sich nach vorne beziehungsweise nach hinten

erstreckenden U-förmigen Abschnitt (75) hat, wobei der Spaltring (74) eine zylindrische Öffnung (76) hat, die sich in einer von links nach rechts verlaufenden Richtung erstreckt, wobei die Öffnung (76) geeignet ist, die Achse (42) des Hinterradmoduls (40) aufzunehmen, wobei sich der U-förmige Abschnitt (75) in einer ungefähr orthogonal zu der vom Sitzrahmen (11) definierten Ebene verlaufenden Richtung erstreckt, wobei die seitlichen Flansche (75c, 75d) des U-förmigen Abschnitts (75) an den sich am Umfang des röhrenförmigen Elements (44) nach hinten beziehungsweise nach vorne erstreckenden Flanschen (45c, 45d) anschlagen, wenn das linke oder das rechte Verbindungselement (43a, 43b) an der Achse (42) des Hinterradmoduls (40) fixiert ist.

13. Rollstuhl (1) nach einem der vorhergehenden Ansprüche, wobei sich das linke beziehungsweise das rechte gebogene Bein (31a, 31b) des Vorderrahmenmoduls (30) teleskopartig in das linke beziehungsweise rechte Profil (11a, 11b) des Sitzrahmens (11) erstreckt und mindestens ein Paar Bohrungen (51) aufweist, die mit einer Vielzahl von Paaren von Löchern (52), die entlang dem linken beziehungsweise rechten Profil (11a, 11b) vorgesehen sind, registerhaltig sind, wobei die Bohrungen (51) und die Löcher (52) zur Aufnahme des Schafts einer Schraube (53) geeignet sind.

14. Rollstuhl (1) nach einem der vorhergehenden Ansprüche, wobei der Rückenlehnenrahmen (21) schwenkbar mit dem Sitzrahmen (11) verbunden ist.

15. Rollstuhl (1) nach einem der vorhergehenden Ansprüche, wobei der Querschnitt des linken und des rechten Profils (11a, 11b) eine aus einem Kreis, einer Ellipse, einem Rechteck, einem Quadrat, einer U-förmigen Form und einer I-förmigen Form ausgewählte Form definiert.

Revendications

1. Chaise roulante (1), comprenant:

un module de siège (10) comprenant un cadre (11) supportant un siège (12);
un module de dossier (20) comprenant un cadre de dossier (21) qui est connecté audit cadre de siège (11) et qui supporte un dossier (22);
un module de cadre avant (30) comprenant un cadre avant (31), ledit cadre avant (31) comprenant des branches courbes gauche et droite (31a, 31b) connectées de façon détachable à leur extrémité supérieure audit cadre de siège (11) et à leur extrémité inférieure à un repose-pieds (32), lesdites branches courbes (31a, 31b) étant supportées par des ensembles de roulette (35, 36) par l'intermédiaire d'un support de roulette (34);
un module de roue arrière (40) comprenant des roues arrière gauche et droite (41a, 41b) connectées de façon pivotante à un essieu (42), ledit module de roue arrière (40) étant connecté de façon détachable audit module de siège (10) par l'intermédiaire d'éléments de connexion gauche et droit (43a, 43b);

dans laquelle ledit cadre de siège (11) est constitué de profils longitudinaux gauche et droit (11a, 11b) qui s'étendent dans le même plan,
dans laquelle le siège comprend un plateau de siège (12) qui s'étend entre les profils gauche et droit (11a, 11b) du cadre de siège (11), ledit plateau de siège (12) étant intégré auxdits profils gauche et droit (11a, 11b).

2. Chaise roulante (1) selon la revendication 1, dans laquelle lesdits éléments de connexion gauche et droit (43a, 43b) sont configurés de manière à permettre un réglage progressif de la position du module de roue arrière (40) par rapport au module de siège (10) dans une direction de l'arrière vers l'avant.

3. Chaise roulante (1) selon la revendication 1 ou 2, dans laquelle lesdits éléments de connexion gauche et droit (43a, 43b) sont configurés de manière à permettre un réglage progressif de la position du module de roue arrière (40) par rapport au module de siège (10) dans une direction orthogonale au plan défini par le cadre de siège (11).

4. Chaise roulante (1) selon la revendication 1, dans laquelle ledit plateau de siège (12) est constitué d'un matériau rigide.

5. Chaise roulante (1) selon la revendication 4, dans laquelle ledit matériau rigide est un matériau de fibre de carbone.

6. Chaise roulante (1) selon l'une quelconque des revendications 3 à 5, dans laquelle ledit plateau de siège (12) comporte des fentes parallèles (16) qui s'étendent à partir de l'extrémité arrière (18) dudit plateau de siège (12) dans une direction de l'arrière vers l'avant de manière à définir une pluralité de régions flexibles (17) dans une partie arrière dudit plateau de siège (12).

7. Chaise roulante (1) selon l'une quelconque des revendications précédentes, dans laquelle ledit élément de connexion gauche, respectivement droit (43a, 43b) comprend un élément tubulaire (44) qui s'étend dans une direction approximativement orthogonale au plan défini par le cadre de siège (11), un premier agencement de fixation (60) est position-

né à l'extrémité supérieure dudit élément tubulaire (44), ledit premier agencement de fixation (60) permettant audit élément tubulaire (44) d'être fixé par rapport au profil gauche, respectivement droit (11a, 11b) du cadre de siège (11), et un deuxième agencement de fixation (70) est positionné le long dudit élément tubulaire (44), ledit deuxième agencement de fixation (70) permettant audit élément tubulaire (44) d'être fixé par rapport à l'essieu (42) du module de roue arrière (40).

8. Chaise roulante (1) selon la revendication 7, dans laquelle ledit premier, respectivement ledit deuxième, agencement de fixation (60, 70) comprend un écrou (63, 73), une vis (62, 72) et une pièce de montage (61, 71), ladite vis (62, 72) étant apte à coulisser à l'intérieur d'une fente (14, 46) prévue dans ledit cadre de siège (11), respectivement dans l'élément tubulaire (44) de l'élément de connexion gauche ou droit (43a, 43b), ladite vis (62, 72) étant également apte à être insérée à travers un trou (61i, 71i) prévu dans ladite pièce de montage (61, 71) et à se loger dans un trou fileté (63i, 73i) prévu dans ledit écrou (63, 73).

9. Chaise roulante (1) selon la revendication 8, dans laquelle l'écrou (63) du premier agencement de fixation (60) présente approximativement la forme d'un prisme trapézoïdal, les côtés latéraux non parallèles (63c, 63d) dudit écrou (63) butant contre deux ailes convergentes (13c, 13d) s'étendant vers le bas à partir de la périphérie du profil gauche, respectivement droit (11a, 11b) du cadre de siège (11) lorsque l'élément de connexion gauche, respectivement droit (43a, 43b) est fixé sur ledit profil gauche, respectivement droit (11a, 11b), les extrémités libres desdites ailes (13c, 13d) définissant la fente (14) à l'intérieur de laquelle la vis (62) dudit premier agencement de fixation (60) coulisse.

10. Chaise roulante (1) selon la revendication 9, dans laquelle la pièce de montage du premier agencement de fixation (60) comprend un élément en forme de U (61) qui s'étend dans une direction de l'arrière vers l'avant, les ailes latérales (61c, 61d) dudit élément en forme de U (61) butant contre les ailes (28c, 28d) s'étendant vers le bas à partir de la périphérie du profil gauche, respectivement droit (11a, 11b) du cadre de siège (11) lorsque l'élément de connexion gauche, respectivement droit (43a, 43b) est fixé sur ledit profil gauche, respectivement droit (11a, 11b).

11. Chaise roulante (1) selon l'une quelconque des revendications 8 à 10, dans laquelle l'écrou (73) du deuxième agencement de fixation (70) présente approximativement la forme d'un prisme trapézoïdal, les côtés latéraux non parallèles (73c, 73d) dudit écrou (73) butant contre deux ailes convergentes (45c, 45d) s'étendant vers l'arrière ou vers l'avant à la périphérie de l'élément tubulaire (44) lorsque l'élément de connexion gauche ou droit (43a, 43b) est fixé sur l'essieu (42) du module de roue arrière (40), les extrémités libres desdites ailes (45c, 45d) définissant la fente (46) à l'intérieur de laquelle la vis (72) dudit deuxième agencement de fixation (70) coulisse.

12. Chaise roulante (1) selon la revendication 11, dans laquelle la pièce de montage (71) du deuxième agencement de fixation (70) comprend un anneau fendu cylindrique (74) présentant une partie en forme de U s'étendant vers l'avant, respectivement vers l'arrière (75), ledit anneau fendu (74) comportant une ouverture cylindrique (76) s'étendant dans une direction de la gauche vers la droite, ladite ouverture (76) étant apte à recevoir l'essieu (42) du module de roue arrière (40), ladite partie en forme de U (75) s'étendant dans une direction approximativement orthogonale au plan défini par le cadre de siège (11), les ailes latérales (75c, 75d) de ladite section en forme de U (75) butant contre les ailes (45c, 45d) s'étendant vers l'arrière, respectivement vers l'avant à la périphérie de l'élément tubulaire (44) lorsque l'élément de connexion gauche ou droit (43a, 43b) est fixé sur l'essieu (42) du module de roue arrière (40).

13. Chaise roulante (1) selon l'une quelconque des revendications précédentes, dans laquelle la branche courbe gauche, respectivement droite (31a, 31b) du module de cadre avant (30) s'étend de façon télescopique dans le profil gauche, respectivement droit (11a, 11b) du cadre de siège (11) et comporte au moins une paire d'alésages (51) devant s'aligner avec une pluralité de paires de trous (52) prévus le long dudit profil gauche, respectivement droit (11a, 11b), lesdits alésages (51) et lesdits trous (52) étant aptes à recevoir la tige d'une vis (53).

14. Chaise roulante (1) selon l'une quelconque des revendications précédentes, dans laquelle le cadre de dossier (21) est connecté de façon pivotante au cadre de siège (11).

15. Chaise roulante (1) selon l'une quelconque des revendications précédentes, dans laquelle la section transversale desdits profils gauche et droit (11a, 11b) définit une forme choisie parmi un cercle, une ellipse, un rectangle, un carré, une forme en forme de U et une forme en forme de I.

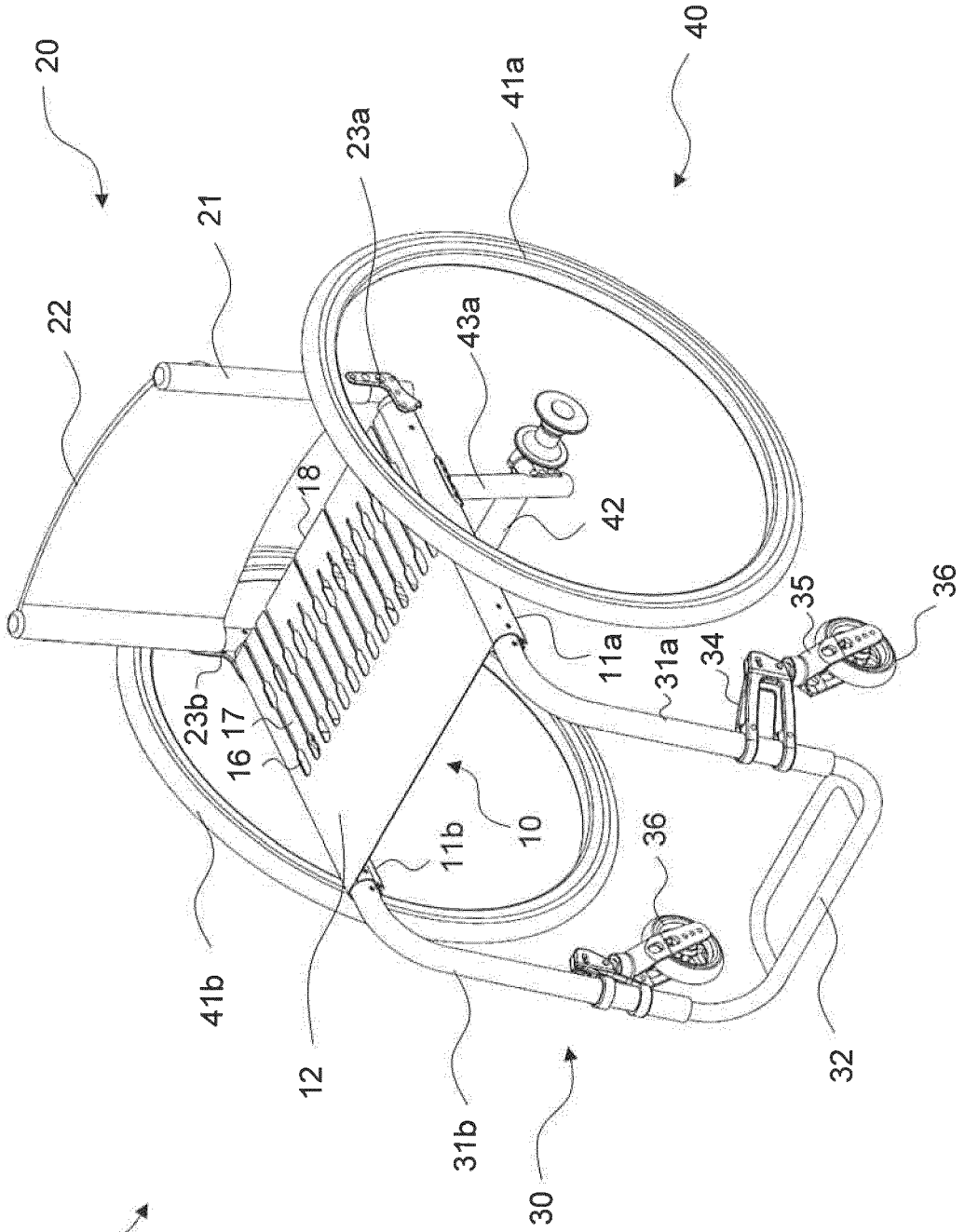
1
20
21
22
23a
23b
16
17
18
40
41a
41b
43a
42
11a
11b
10
12
31a
31b
30
32
34
35
36
36

Fig.1

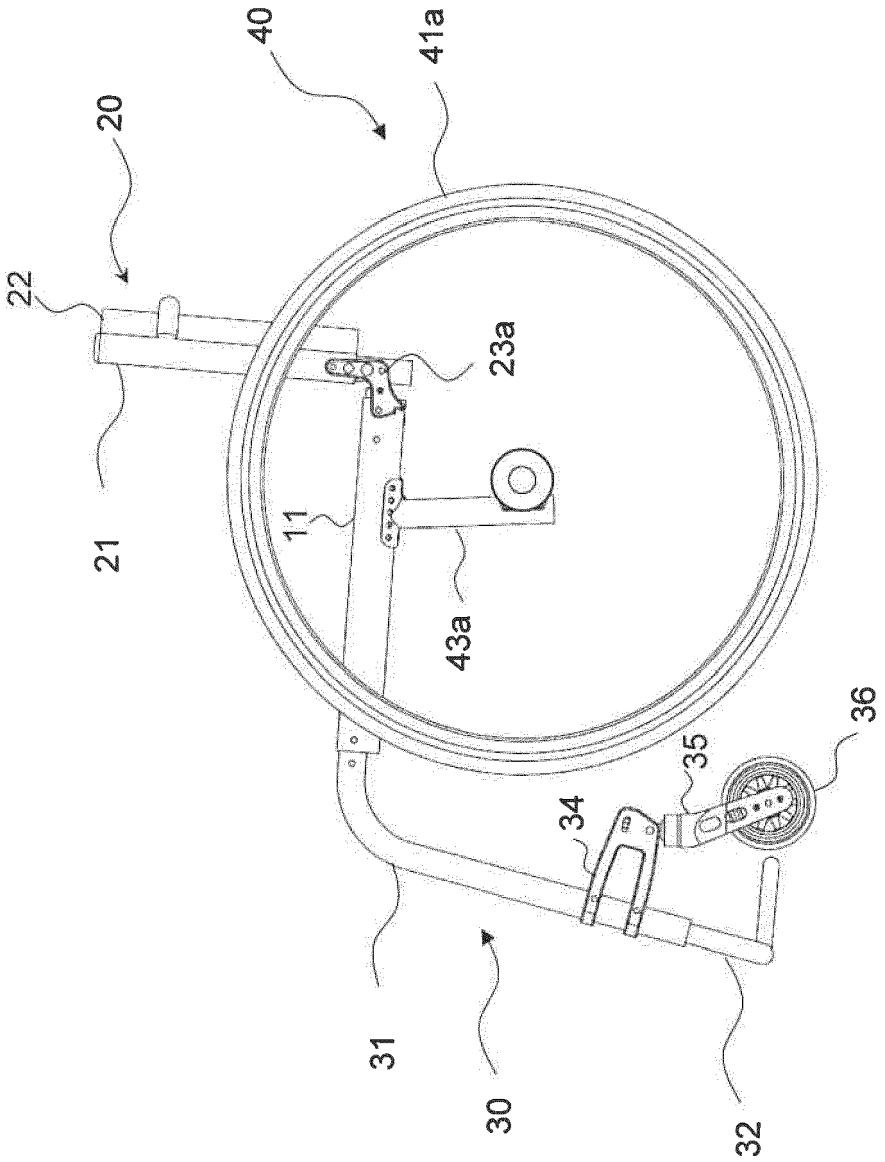

Fig.2

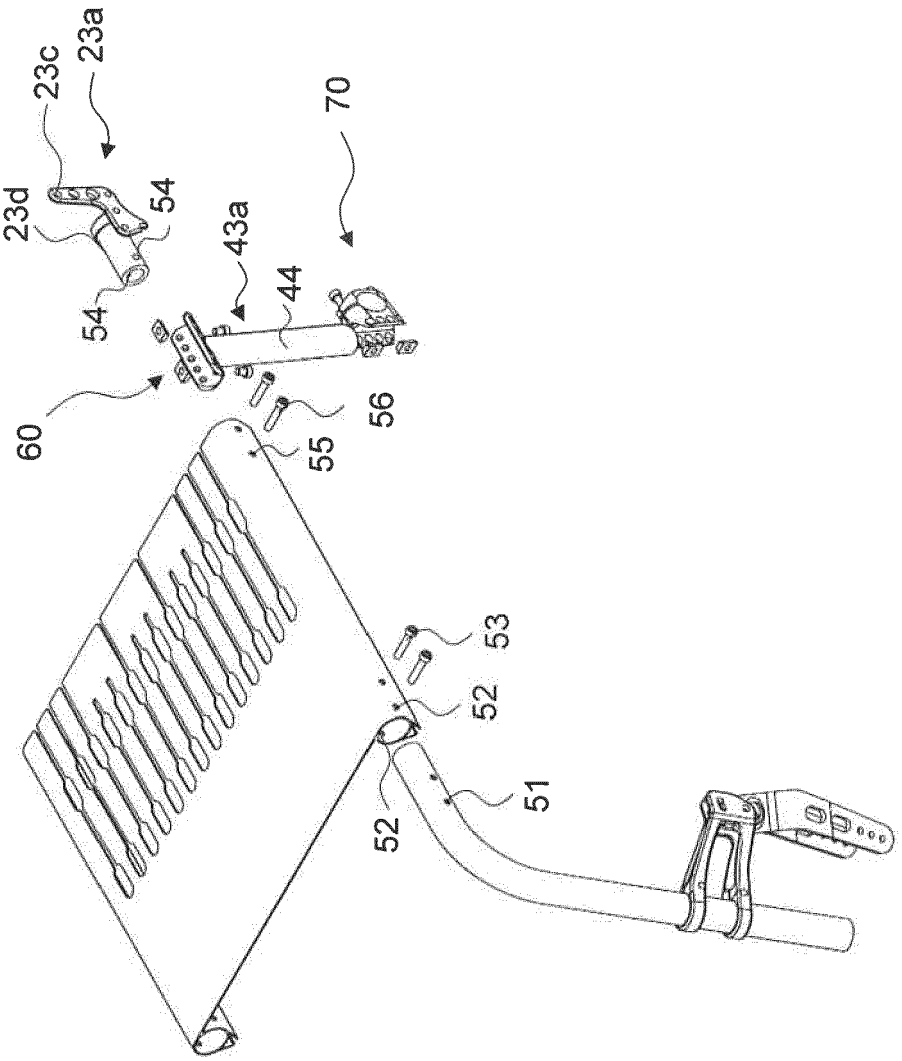

Fig.3

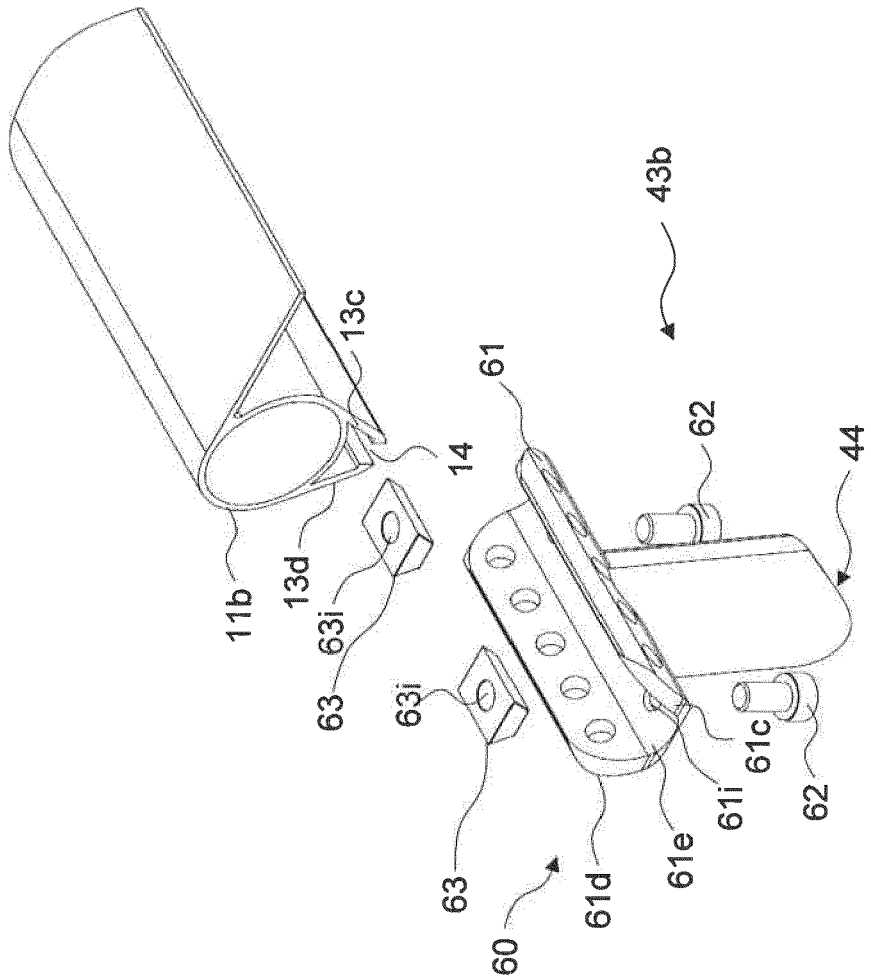

Fig.4

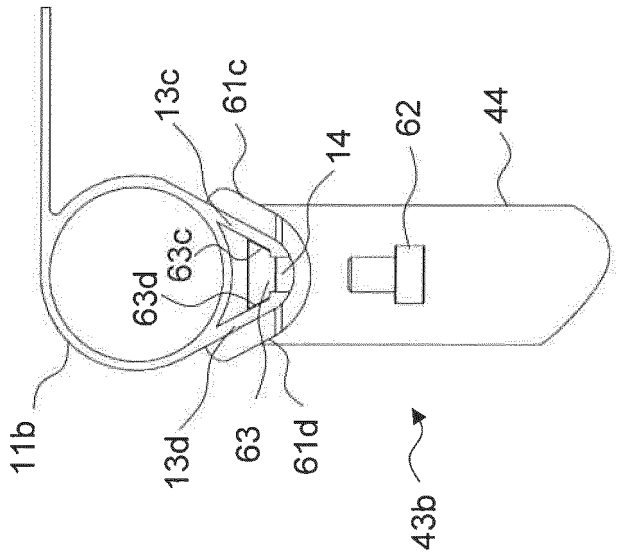

Fig.5

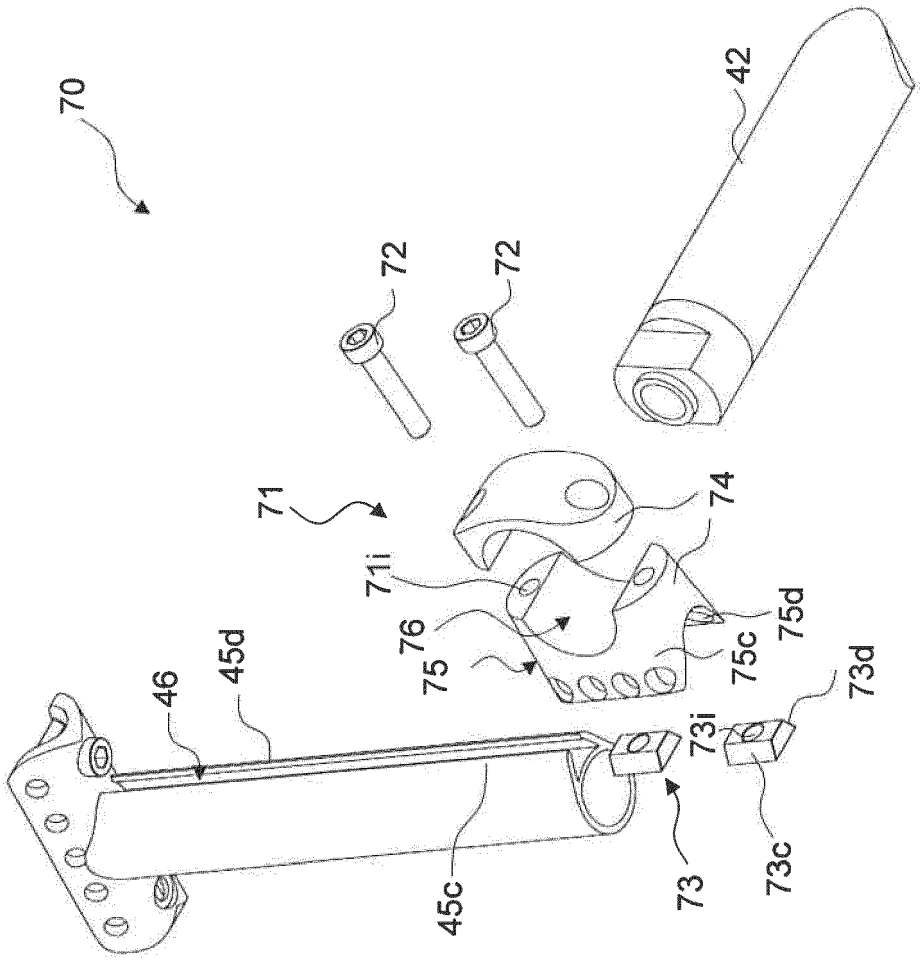

Fig.6

REFERENCES CITED IN THE DESCRIPTION

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