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(54) CHAIR FRAME OF WHEELCHAIR

(57) A chair frame of a wheelchair includes a base unit (1), a seating unit (2), a driving unit (3), and a buffer unit (4). The base unit (1) includes a base frame (11) and two pivot seats (12) mounted to the base frame (11). The seating unit (2) includes two pivot pins (23) connected rotatably and respectively to the pivot seats (12). The driving unit (3) is disposed between the seating unit (2) and a front side of the base unit (1), and includes an operating rod (31) operable to generate a first torque for driving the seating unit (2) to pivot, via connection among the pivot pins (23) and the pivot seats (12), relative to the base unit (1). The buffer unit (4) is disposed between the base unit (1) and the seating unit (2), and includes at least one biasing member (41) disposed to generate a second torque having a direction opposite to that of the first torque during operation of the operating rod (31).

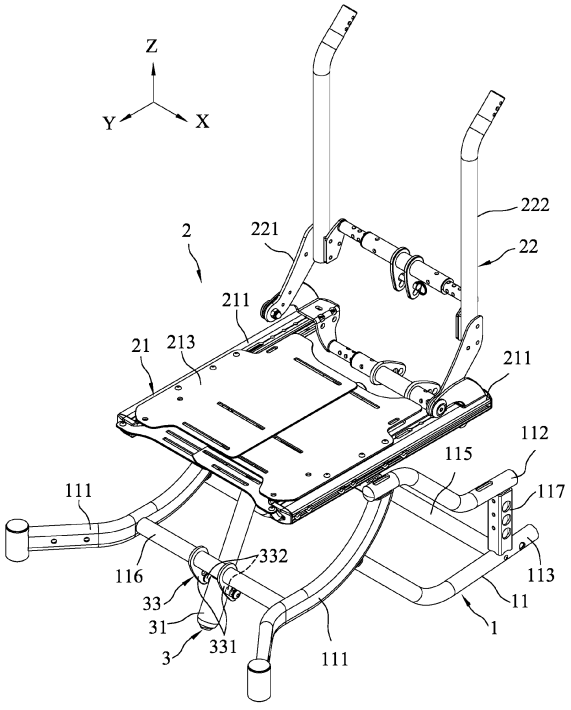

FIG.1

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Description

[0001] The disclosure relates to a chair frame, and more particularly to a chair frame of a wheelchair.

[0002] A conventional chair frame of a wheelchair usually includes a base portion, a seat portion that is pivotably connected to the base portion, and a pneumatic cylinder. The pneumatic cylinder is disposed between a rear side of the base portion and the seat portion, and is operable to drive the seat portion to pivot relative to the base portion. Thus, a user may operate the pneumatic cylinder from the rear side of the base portion to adjust an angle between the seat portion and the base portion as desired via pivot action of the seat portion relative to the base portion.

[0003] However, an impact force may suddenly be generated during operation of the pneumatic cylinder, which may send bounces to the chair frame, so the user sitting in the wheelchair may be startled or feel unsafe. Furthermore, since a space near the rear side of the base portion is usually utilized for accommodating personal belongings of the user, disposing the pneumatic cylinder at the rear side of the base portion reduces the space for accommodating the user's personal belongings and adversely affects operation of the pneumatic cylinder as the personal belongings may block the pneumatic cylinder.

[0004] Therefore, an object of the disclosure is to provide a chair frame of a wheelchair that can alleviate at least one of the drawbacks of the prior art.

[0005] According to the disclosure, the chair frame includes a base unit, a seating unit, a driving unit, and a buffer unit. The base unit includes a base frame and two pivot seats that are mounted to the base frame. The seating unit includes two pivot pins that are connected rotatably and respectively to the pivot seats. The driving unit is disposed between the seating unit and a front side of the base unit, and includes an operating rod that is operable to generate a first torque for driving the seating unit to pivot, via connection among the pivot pins and the pivot seats, relative to the base unit. The buffer unit is disposed between the base unit and the seating unit, and includes at least one biasing member that is disposed to generate a second torque having a direction opposite to that of the first torque during operation of the operating rod.

[0006] Other features and advantages of the disclosure will become apparent in the following detailed description of the embodiment(s) with reference to the accompanying drawings. It is noted that various features may not be drawn to scale.

FIG. 1 is a perspective view of an embodiment of a chair frame for a wheelchair according to the disclosure.

FIG. 2 is a fragmentary perspective view of the embodiment with a seat plate set of the chair frame shown in FIG. 1 being omitted.

FIG. 3 is a fragmentary partly sectional view of the embodiment.

FIG. 4 is a fragmentary partly sectional view of the embodiment, illustrating a driving unit being operated to drive a seating unit to pivot.

[0007] Before the disclosure is described in greater detail, it should be noted that where considered appropriate, reference numerals or terminal portions of reference numerals have been repeated among the figures to indicate corresponding or analogous elements, which may optionally have similar characteristics.

[0008] It should be noted herein that for clarity of description, spatially relative terms such as "top," "bottom," "upper," "lower," "on," "above," "over," "downwardly," "upwardly" and the like may be used throughout the disclosure while making reference to the features as illustrated in the drawings. The features may be oriented differently (e.g., rotated 90 degrees or at other orientations) and the spatially relative terms used herein may be interpreted accordingly.

[0009] Referring to FIGS. 1 and 2, an embodiment of a chair frame of a wheelchair according to the present disclosure includes a base unit 1, a seating unit 2, a driving unit 3, and a buffer unit 4.

[0010] The base unit 1 includes a base frame 11 and two pivot seats 12. The base frame 11 includes two front rod portions 111 that are elongated in a front-rear direction (Y), two first rear lower rod portions 112 that are connected respectively to the front rod portions 111 and that extend rearwardly, and two second rear lower rod portions 113 that extend rearwardly and respectively from the front rod portions 111 and that are located respectively under the first rear lower rod portions 112. The base frame 11 further includes a first transverse rod portion 114 that is connected between the first rear lower rod portions 112, a second transverse rod portion 115 that is connected between the second rear lower rod portions 113, and a third transverse rod portion 116 that is connected between the front rod portions 111. The base frame 11 further has two connection portions 117 extending in an up-down direction (Z) that is transverse to the front-rear direction (Y). Each of the connecting portions 117 is connected between a respective one of the first rear lower rod portions 112 and a corresponding one of the second rear lower rod portions 113. The pivot seats 12 are disposed respectively at opposite left and right sides of the first transverse rod portion 114. Each of the pivot seats 12 is formed with a pivot hole extending in a left-right direction (X) that is transverse to the front-rear direction (Y) and the up-down direction (Z).

[0011] The seating unit 2 includes a seat frame subunit 21, a backrest frame subunit 22, and two pivot pins 23. The seat frame subunit 21 includes two frame bars 211 that extend in the front-rear direction (Y), a transverse bar 212 that is connected between the frame bars 211, and a seat plate set 213 that is disposed fixedly on the frame bars 211. The backrest frame subunit 22 is disposed on the seat frame subunit 21, and includes an

interconnecting portion 221 that is mounted to the frame bars 211 and an extension portion 222 that extends upwardly from the interconnecting portion 221. Each of the pivot pins 23 is mounted to an inner side of a respective one of the frame bars 211, protrudes toward the other one of the frame bars 211, and is connected pivotably to a respective one of the pivot seats 12 by engaging with the pivot hole of the pivot seat 12.

[0012] The driving unit 3 is disposed between the seating unit 2 and a front side of the base unit 1, and includes an operating rod 31, a first articulating set 32 mounted to the transverse bar 212, and a second articulating set 33 mounted to the third transverse rod portion 116. The operating rod 31 has an upper portion and a lower portion that is disposed lower than the upper portion. Specifically, the upper portion of the operating rod 31 is connected pivotably to the transverse bar 212 via the first articulating set 32, and the lower portion of the operating rod 31 is connected pivotably to the third transverse rod portion 116 via the second articulating set 33. The operating rod 31 is operable to drive the seat frame subunit 21 to pivot, via the first articulating set 32, about the pivot pins 23. In this embodiment, the first articulating set 32 includes two first plates 321 that are fixed onto the transverse bar 212, and a first pin 322 that is connected between the first plates 321. The upper portion of the operating rod 31 is connected pivotably to the first pin 322. The second articulating set 33 includes two second plates 331 that are fixed onto the third transverse rod portion 116, and two second pins 332 that are connected respectively to the second plates 331. The lower portion of the operating rod 31 is pivotably connected to the second pins 332.

[0013] In one embodiment, the operating rod 31 is a pneumatic linkage or a hydraulic linkage, and the first articulating set 32 is movable relative to the second articulating set 33 during operation of the operating rod 31.

[0014] The buffer unit 4 is disposed between the base unit 1 and the seating unit 2, and includes two biasing members 41, each being disposed between a respective one of the pivot seats 12 and a corresponding one of the pivot pins 23.

[0015] In this embodiment, the biasing members 41 are mounted symmetrically with respect to the center of the seating unit 2 in the left-right direction (X), and thus provide a relatively good buffer to users who are incapable of balancing their bodies, such as patients with stroke or scoliosis.

[0016] In one embodiment, each of the biasing members 41 is a torsion spring.

[0017] In this embodiment, the number of the biasing member 41 is two, but in other embodiments, the number of the biasing member 41 may be one, three or more.

[0018] Further referring to FIGS. 3 and 4, in this embodiment, the operating rod 31 is a pneumatic linkage including a piston rod that is connected to the first articulating set 32, and each of the biasing members 41 is a torsion spring. The operating rod 31 may be driven to move the piston rod upwardly for pushing the transverse bar 212 upwardly so as to generate a first torque for driving the seating unit 2 to pivot, via the first articulating set 32 and the connection among the pivot pins 23 and the pivot seats 12, relative to the base unit 1, so that the user may adjust a pivot angle of the seating unit 2 relative to the base unit 1 as desired. At this time, each of the biasing members 41 disposed between the respective one of the pivot seats 12 and the corresponding one of the pivot pins 23 generates a second torque that has a direction opposite to that of the first torque during operation of the operating rod 31. Thus, during operation of the driving unit 3, an impact force resulting therefrom may be promptly buffered by the biasing members 41, and the chair frame of the present disclosure may not experience too much rebound so a relatively comfortable seating experience can be provided to the user and the users who are incapable of balancing their bodies can be protected from injuries that might otherwise have been caused by severe rebound.

[0019] In summary, by virtue of the buffer unit 4, the chair frame of the wheelchair according to the present disclosure is capable of buffering the impact force generated during operation of the driving unit 3 that drives the seating unit 2 to pivot, and reducing bounces to thereby provide a relatively comfortable seating experience. Additionally, since the driving unit 3 is disposed at the front side of the base unit 1, better utilization of a space near a rear side of the base unit 1 for accommodating other components of the wheelchair or personal belongings of the user may be achieved.

[0020] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiment(s). It will be apparent, however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or characteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects; such does not mean that every one of these features needs to be practiced with the presence of all the other features. In other words, in any described embodiment, when implementation of one or more features or specific details does not affect implementation of another one or more features or specific details, said one or more features may be singled out and practiced alone without said another one or more features or specific details. It should be further noted that one or more features or specific details from one embodiment may be practiced together with one or more features or specific details from another embodiment, where appropriate, in the

practice of the disclosure.

Claims

1. A chair frame of a wheelchair, including:

   a base unit (1) including a base frame (11) and two pivot seats (12) that are mounted to said base frame (11);
   a seating unit (2) including two pivot pins (23) that are connected rotatably and respectively to said pivot seats (12); **characterized in that** said chair frame further includes:

   a driving unit (3) disposed between said seating unit (2) and a front side of said base unit (1), and including an operating rod (31) that is operable to generate a first torque for driving said seating unit (2) to pivot, via connection among said pivot pins (23) and said pivot seats (12), relative to said base unit (1); and
   a buffer unit (4) disposed between said base unit (1) and said seating unit (2), and including at least one biasing member (41) that is disposed to generate a second torque having a direction opposite to that of the first torque during operation of said operating rod (31).

2. The chair frame as claimed in claim 1, **characterized in that**:

   said base frame (11) includes a first transverse rod portion (114);
   said pivot seats (12) are disposed respectively at opposite left and right sides of said first transverse rod portion (114); and
   said buffer unit (4) includes two of said biasing members (41), each of said biasing members (41) being disposed between a respective one of said pivot seats (12) and a corresponding one of said pivot pins (23).

3. The chair frame as claimed in claim 2, **characterized in that**:

   said seating unit (2) further includes a seat frame subunit (21) and a backrest frame subunit (22) that is disposed on said seat frame subunit (21);
   said seat frame subunit (21) includes two frame bars (211) that extend in a front-rear direction (Y), and a transverse bar (212) that is connected between said frame bars (211); and
   each of said pivot pins (23) is mounted to an inner side of a respective one of said frame bars (211) and protrudes toward the other one of said frame bars (211).

4. The chair frame as claimed in claim 3, **characterized in that** said seat frame subunit (21) further includes a seat plate set (213) disposed on said frame bars (211).

5. The chair frame as claimed in any one of claims 3 and 4, **characterized in that** said driving unit (3) further includes a first articulating set (32), said operating rod (31) having an upper portion that is connected to said transverse bar (212) via said first articulating set (32), and being operable to drive said seat frame subunit (21) to pivot, via said first articulating set (32), about said pivot pins (23).

6. The chair frame as claimed in claim 5, **characterized in that**:

   said base frame (11) of said base unit (1) further includes

   two front rod portions (111) being elongated in the front-rear direction (Y),
   two first rear lower rod portions (112) connected respectively to said front rod portions (111) and extending rearwardly, said first transverse rod portion (114) being connected between said first rear lower rod portions (112),
   two second rear lower rod portions (113) extending rearwardly and respectively from said front rod portion (111), and located respectively under said first rear lower rod portions (112),
   a second transverse rod portion (115) connected between said second rear lower rod portions (113), and
   a third transverse rod portion (116) connected between said front rod portions (111); and

   said driving unit (3) further includes a second articulating subunit (33), said operating rod (31) further having a lower portion that is disposed lower than said upper portion and that is connected to said third transverse rod portion (116) via said second articulating set (33).

7. The chair frame as claimed in claim 6, **characterized in that**:

   said first articulating set (32) includes two first plates (321) fixed onto said transverse bar (212), and a first pin (322) connected between said first plates (321);
   said upper portion of said operating rod 31 is connected pivotably to said first pin (322);

said second articulating set (33) includes two second plates (331) fixed onto said third transverse rod portion (116), and two second pins (332) connected respectively to said second plates (331); and
said lower portion of said operating rod (31) is pivotably connected to said second pins (332).

8. The chair frame as claimed in any one of claims 6 and 7, wherein said base frame (11) of said base unit (1) further has two connecting portions (117) extending in an up-down direction (Z) that is transverse to the front-rear direction (Y), each of said connecting portions (117) being connected between a respective one of said first rear lower rod portions (112) and a corresponding one of said second rear lower rod portions (113).

9. The chair frame as claimed in any one of claims 1 to 8, **characterized in that** said at least one of biasing member (41) is a torsion spring.

10. The chair frame as claimed in any one of claims 1 to 9, **characterized in that** said operating rod (31) is one of a pneumatic linkage and a hydraulic linkage.

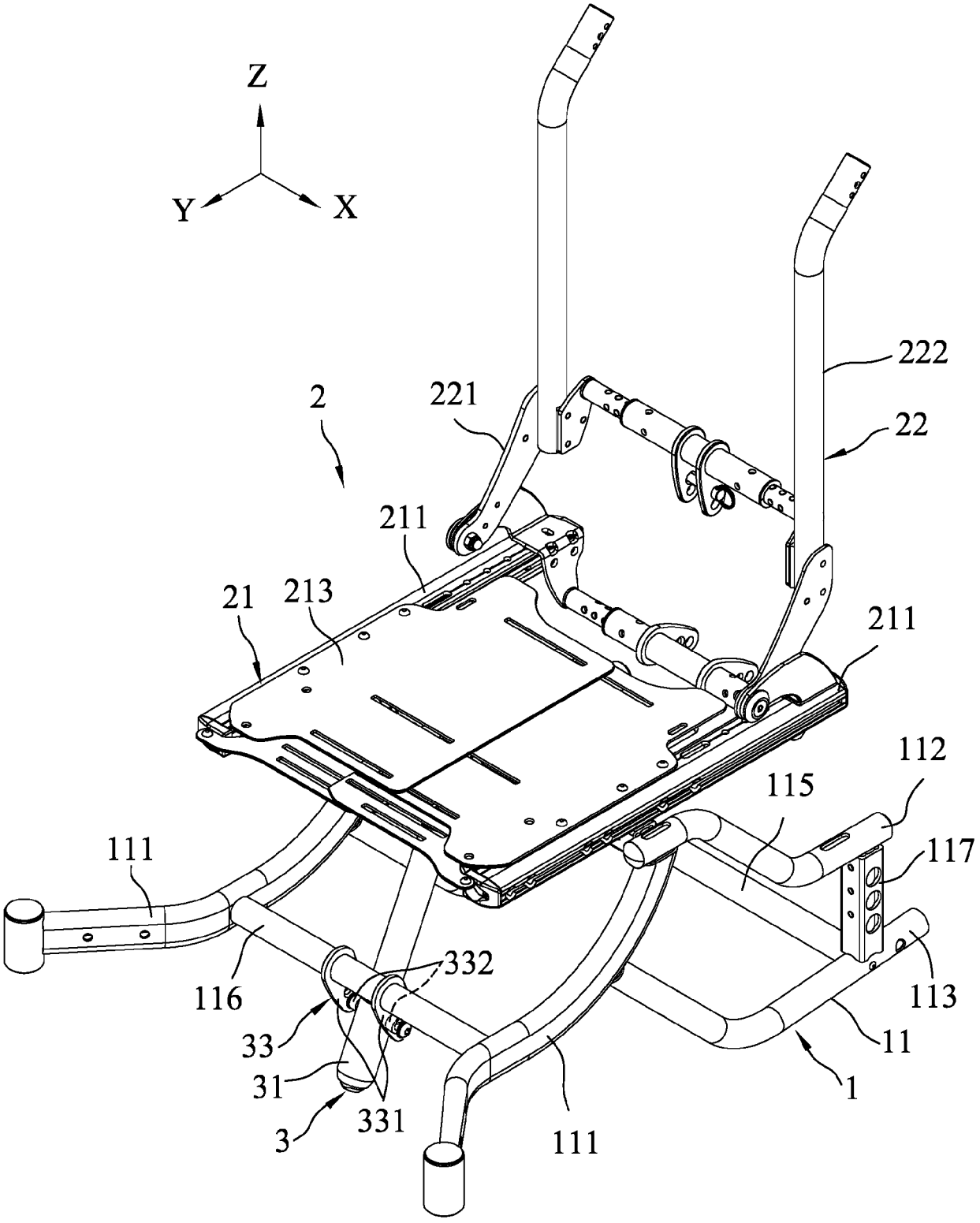
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FIG.1

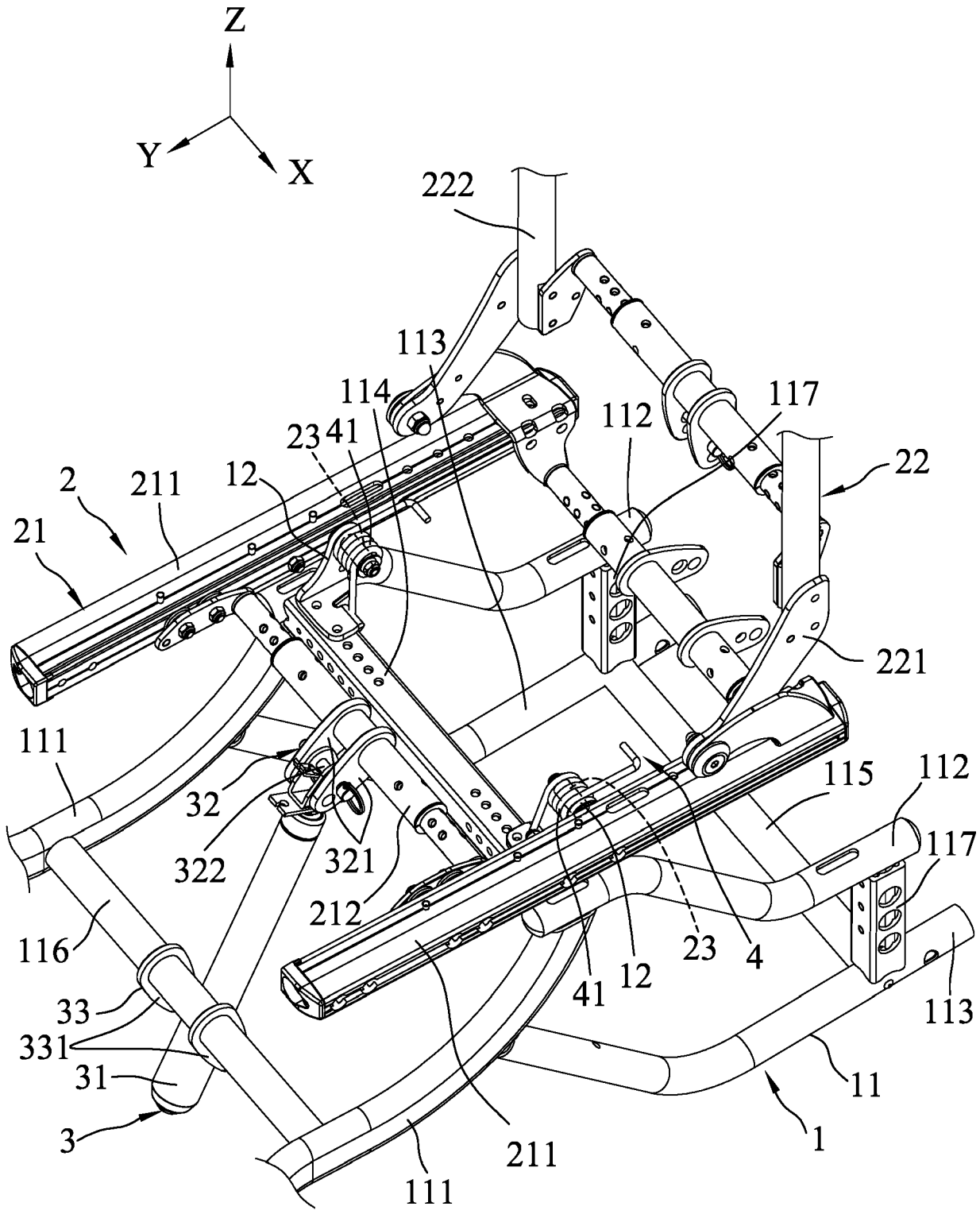
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FIG.2

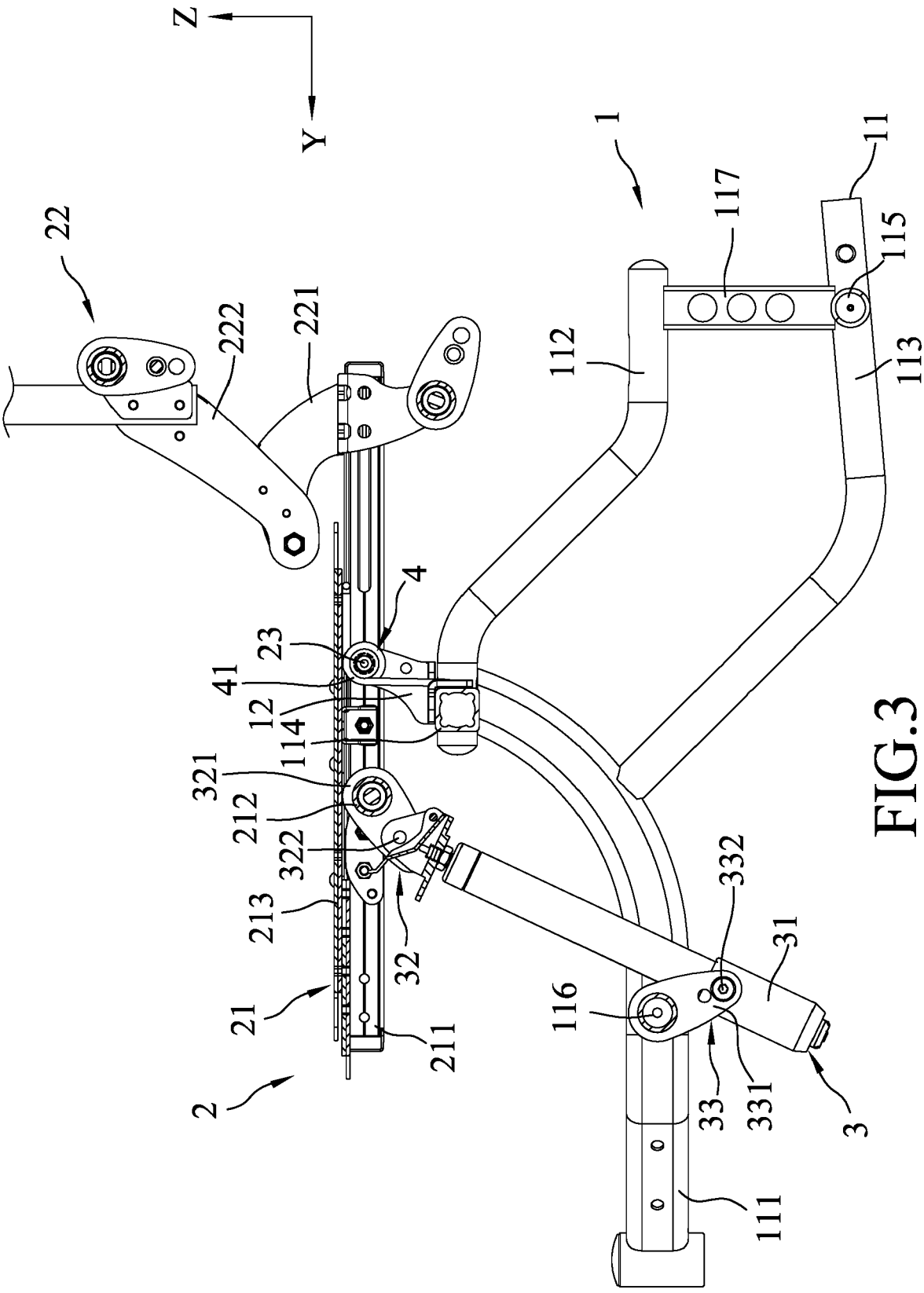
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FIG.3

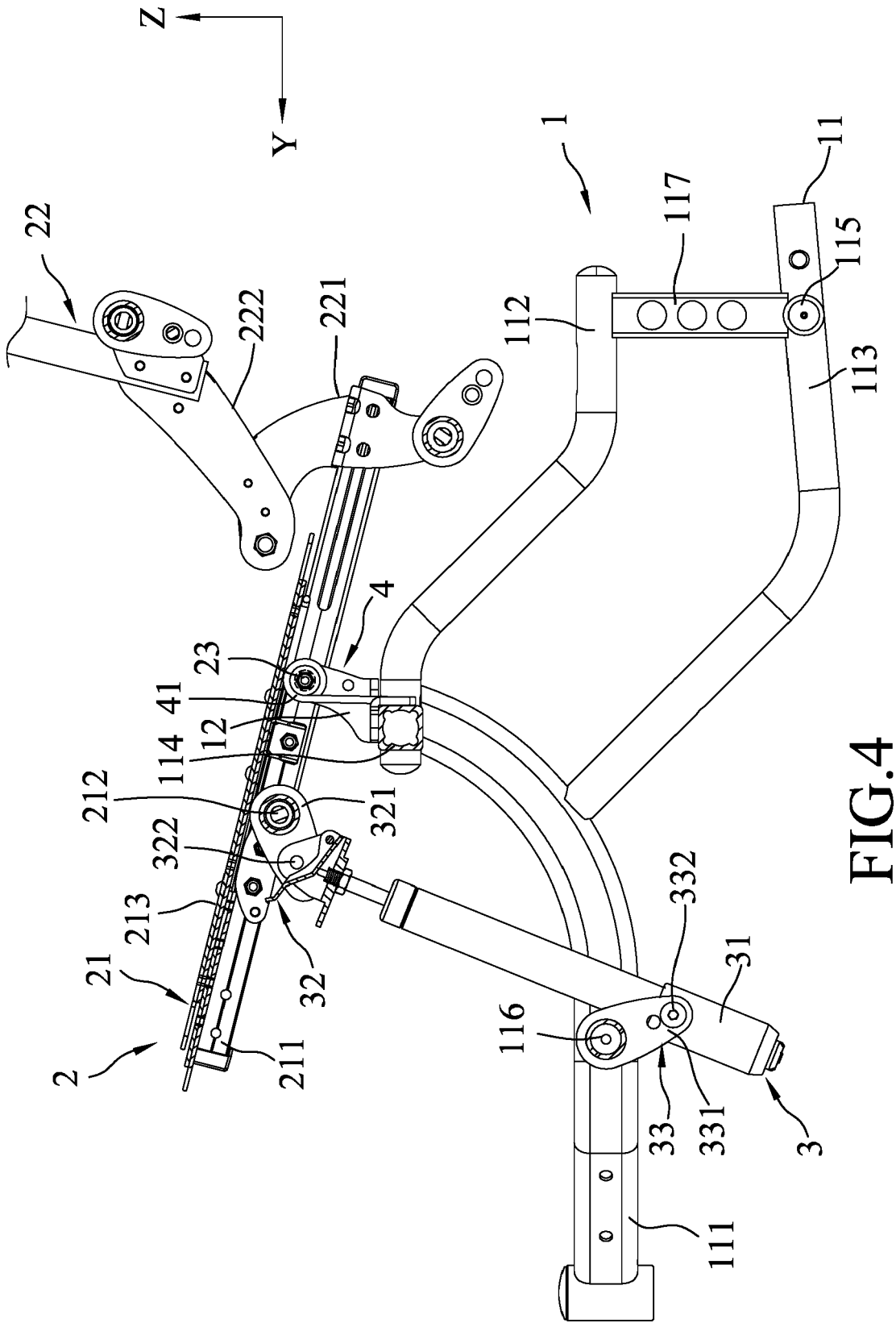
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FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 22 20 8015

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	JP 2010 158284 A (IKEDA MITSUHIKO) 22 July 2010 (2010-07-22) * the whole document *	1	
			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	22 June 2023	Kousouretas, Ioannis

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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22-06-2023

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