



(51) International Patent Classification:

A61H 1/00 (2006.01) A61H 3/04 (2006.01)

A61H 3/00 (2006.01) A61H 1/02 (2006.01)

A61G 7/10 (2006.01)

(21) International Application Number:

PCT/PH2023/050002

(22) International Filing Date:

14 August 2023 (14.08.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12023050418 03 August 2023 (03.08.2023) PH

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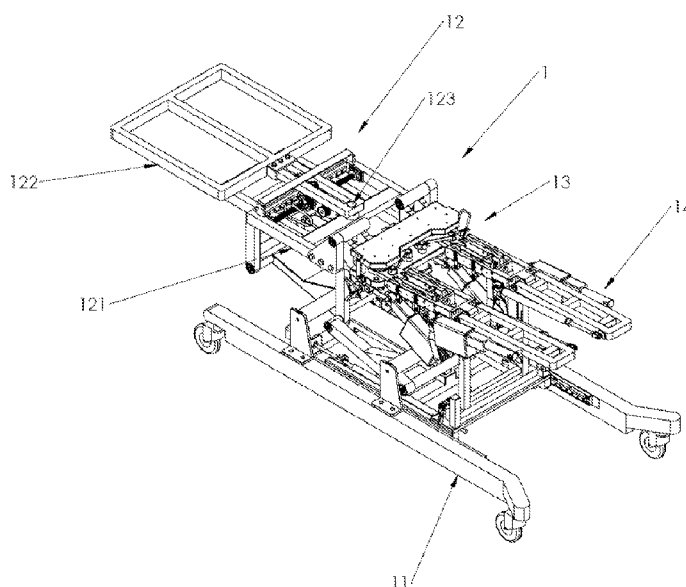
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(54) Title: ASSISTIVE PHYSICAL THERAPY POWERED TABLE

FIG. 1



(57) Abstract: A supporting structure of an assistive physical therapy powered table (1) is mounted on a base frame (11) and includes first, second and third support mechanisms (12, 13, 14) to support the trunk, upper legs, and lower legs of a human patient, respectively. A first drive mechanism (17) drives pivoting movement of the first support mechanism (12) relative to the second support mechanism (13), and a second drive mechanism (18) drives relative pivoting movement between the second support mechanism (13) and the third support mechanism (14). By operating the first drive mechanism (17) and the second drive mechanism (18), the supporting structure may be arranged in a selected one of a supine state, a sitting state, a lift state, and a standing state.



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(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE

ASSISTIVE PHYSICAL THERAPY POWERED TABLE

Field of the invention

The present invention relates to a physical therapy table, more particularly to an assistive physical therapy powered table having multiple states for patients to perform various physical exercises and/or receive treatments for enhancing flexibility and range of motion.

Description of the related art

Physical therapy is utilized for pain relief and restoring functional movements such as when recovering from surgery or injuries. A physical therapy table, which is commonly found in hospitals, physical rehabilitation centers and athletic training centers, provides a surface on an elevated platform where patients can receive treatment or perform exercises. Examples of physiotherapeutic treatments that may be conducted on a physical therapy table include massage, joint manipulation and stretching.

However, repetitive actions associated with traditional physical therapy can be strenuous for both patients and physiotherapists. Moreover, patients may experience worsening of pre-existing conditions if exercises are not performed properly.

Assistive physical therapy powered machines have been used to assist in physical therapy. Some machines, such as those disclosed in Patent Application Publication Nos. WO2010057873A1 and CN109512565A, are adjustable in shape and position and can stretch and/or lift different parts of the human body to help patients recover from injuries or joint problems.

There is increasing demand for more advanced equipment designed for a wider variety of physical exercises and/or treatments to meet the unique needs of patients with varying conditions. Supported standing is one example of a physical exercise that could help strengthen muscles and improve bladder and bowel function.

It is therefore an object of the present invention to provide an assistive physical therapy powered table that enables supine to sit to lift to stand movements and that allows patients to engage in various physical exercises and receive physical therapy from different

positions to promote rehabilitation of the trunk and lower extremities.

Summary of the invention

5 According to the invention, an assistive physical therapy powered table comprises a base frame, a supporting structure mounted on the base frame, first and second joint mechanisms, and first and second drive mechanisms.

10 The supporting structure includes a first support mechanism to support the trunk of a human patient, a second support mechanism to support the upper legs of the human patient, and a third support mechanism to support the lower legs of the human patient.

15 The first joint mechanism connects the first support mechanism to the second support mechanism and is configured to permit pivoting movement of the first support mechanism relative to the second support mechanism about a pivot axis that extends along a widthwise direction of the base frame.

20 The second joint mechanism connects the second support mechanism and the third support mechanism to the base frame and is configured to permit relative pivoting movement between the second support mechanism and the third support mechanism.

25 The first drive mechanism is connected to the first support mechanism and the second support mechanism. The second drive mechanism is connected to the second support mechanism and the third support mechanism. The first drive mechanism and the second drive mechanism are operable to arrange the supporting structure in a selected one of a supine state, a sitting state, a lift state, and a standing state.

30 In the supine state, the first support mechanism is arranged horizontally. In the sitting state, the second support mechanism is arranged horizontally, and the first drive mechanism is operable to drive movement of the first support mechanism relative to the second support mechanism about the pivot axis. In the lift state, the second support mechanism is inclined relative to the base frame with a trunk side of the second support mechanism disposed higher than a knee side
35 of the second support mechanism, the first support mechanism is in a forward leaning arrangement, and the third support mechanism is in a substantially vertical arrangement. In the standing state, the first

support mechanism, the second support mechanism and the third support mechanism are in a substantially vertical arrangement.

Brief description of the drawings

5 Other features and advantages of the invention will become apparent in the following detailed description of an embodiment with reference to the accompanying drawings, of which:

FIG. 1 is a top perspective view of an embodiment of the assistive physical therapy powered table according to the invention,
10 illustrating a supporting structure of the powered table in a supine state.

FIG. 2 is a top perspective view of an embodiment of the assistive physical therapy powered table according to the invention, illustrating the supporting structure of the powered table in a
15 sitting state.

FIG. 3 is a schematic side view of an embodiment of the assistive physical therapy powered table according to the invention, illustrating the supporting structure of the powered table in a lift
state.

20 FIG. 4 is a perspective view of an embodiment of the assistive physical therapy powered table according to the invention, illustrating the supporting structure of the powered table in a standing state.

FIG. 5 is a fragmentary, partly exploded view to illustrate a
25 second support mechanism and a third support mechanism of the supporting structure of an embodiment according to the invention.

FIG. 6 is a fragmentary, schematic side view to illustrate a supine leg-raise training mode of an embodiment according to the invention.

30 FIG. 7 is a fragmentary, schematic side view to illustrate a supine hip-and-knee-flexion training mode of an embodiment according to the invention.

FIG. 8 is a partly exploded bottom perspective view to illustrate a first support mechanism of the supporting structure of an embodiment
35 according to the invention.

FIG. 9 is a partly exploded top perspective view of the first support mechanism of the supporting structure of an embodiment

according to the invention.

FIG. 10 is a fragmentary, schematic side view to illustrate a seated knee-flexion training mode of an embodiment according to the invention.

5 FIG. 11 is a schematic view of an embodiment of the invention to illustrate latch members.

FIG. 12 is an enlarged view of encircled portion (X) in FIG. 11 to illustrate an engaged state of the latch member.

10 FIG. 13 is an enlarged view like FIG. 12 but illustrating a disengaged state of the latch member.

FIG. 14 is a circuit block diagram to illustrate a control module and an input/output device of an embodiment according to the invention.

15 **Description of the embodiment**

Referring to FIGS. 1, 7, 8, 9 and 10, an embodiment of an assistive physical therapy powered table 1 according to the present invention comprises a base frame 11, a supporting structure mounted on the base frame 11, a first joint mechanism 15, a second joint mechanism 16, a first drive mechanism 17 and a second drive mechanism 18.

In this embodiment, the base frame 11 is a wheeled frame and is height adjustable. The present invention, however, is not limited in this respect.

25 The supporting structure is used to support a human patient on the powered table 1 and includes a first support mechanism 12 to support the trunk of the patient, a second support mechanism 13 to support the upper legs of the patient, and a third support mechanism 14 to support the lower legs of the patient.

30 The first joint mechanism 15 (see FIGS. 8 and 9) connects the first support mechanism 12 to the second support mechanism 13 and is configured to permit pivoting movement of the first support mechanism 12 relative to the second support mechanism 13 about a pivot axis (A) that extends along a widthwise direction of the base frame 11.

35 The second joint mechanism 16 (see FIG. 7) connects the second support mechanism 13 to the third support mechanism 14 and is configured to permit relative pivoting movement between the second

support mechanism 13 and the third support mechanism 14.

As best shown in FIG. 10, the first drive mechanism 17 is connected to the first support mechanism 12 and the second support mechanism 13, and the second drive mechanism 18 is connected to the second support mechanism 13 and the third support mechanism 14. The first drive mechanism 17 and the second drive mechanism 18 are operable to arrange the supporting structure of the powered table 1 in a selected one of a supine state (FIG. 1), a sitting state (FIG. 2), a lift state (FIG. 3) and a standing state (FIG. 4).

As best shown in FIG. 1, the first support mechanism 12 is arranged horizontally when the supporting structure is in the supine state. In this embodiment, the powered table 1 provides several assisted training modes, including a supine hip-abduction-and-adduction training mode (FIG. 5), a supine leg-raise training mode (FIG. 6), a supine hip-and-knee-flexion training mode (FIG. 7), a supine trunk-lateral-flexion training mode (FIGS. 8 and 9) and a supine-to-sit training mode (FIGS. 1 and 2), when the supporting structure is arranged in the supine state.

As shown in FIGS. 1, 8 and 9, in this embodiment, the first support mechanism 12 includes a lower trunk member 121 coupled to a trunk side of the second support mechanism 13 via the first joint mechanism 15, an upper trunk member 122 resting against the lower trunk member 121, a joint unit 123 pivotally connecting the upper trunk member 122 to the lower trunk member 121 about a transverse axis (C) normal to the pivot axis (A), and a drive unit 124 connected between the lower trunk member 121 and the upper trunk member 122 and operable to pivot the upper trunk member 122 relative to the lower trunk member 121 about the transverse axis (C). The drive unit 124 will be described in greater detail in the succeeding paragraphs.

As best shown in FIGS. 5, 6 and 7, in this embodiment, the second support mechanism 13 includes a left upper leg member 131 and a right upper leg member 132, and the third support mechanism 14 includes a left lower leg member 141 and a right lower leg member 142. The second support mechanism 13 further includes a pelvic member 133 connected to the first support mechanism 12 via the first joint mechanism 15, a first motor assembly 134 that connects the left upper leg member 131 to the pelvic member 133, and a second motor assembly 135 that

connects the right upper leg member 132 to the pelvic member 133. The first motor assembly 134 and the second motor assembly 135, which are independently operable to move the left upper leg member 131 and the right upper leg member 132 sideways relative to the length of the base frame 11, will be described in greater detail in the succeeding paragraphs.

In this embodiment, the second support mechanism 13 additionally includes a first motor unit 136 connected between the left upper leg member 131 and the pelvic member 133, and a second motor unit 137 connected between the right upper leg member 132 and the pelvic member 133. The first motor unit 136 and the second motor unit 137 are independently operable to move the left upper leg member 131 and the right upper leg member 132 between horizontal and upright states, as best shown in FIGS. 7 and 10. The first motor unit 136 and the second motor unit 137 will be described in greater detail in the succeeding paragraphs.

As shown in FIG. 10, the first drive mechanism 17 includes a drive motor 171, such as a linear actuator, pivoted to a motor mount 1210 on the lower trunk member 121. A rod of the drive motor 171 is pivoted to a motor mount 1330 on the pelvic member 133.

As shown in FIGS. 5 and 10, the second drive mechanism 18 includes a left motor member 181 and a right motor member 182 which are linear actuators in this embodiment. The left motor member 181 has one end pivoted to the left upper leg member 131 and a rod pivoted to the left lower leg member 141. The left motor member 181 is operable to adjust an angle between the left upper leg member 131 and the left lower leg member 141. Similarly, the right motor member 182 has one end pivoted to the right upper leg member 132 and a rod pivoted to the right lower leg member 142. The right motor member 182 is operable to adjust an angle between the right upper leg member 132 and the right lower leg member 142. Preferably, gas springs 183 are connected to inner sides of the left and right upper leg members 131, 132 and the left and right lower leg members 141, 142 to balance forces acting on the inner and outer sides of the leg members 131, 132, 141, 142.

As shown in FIG. 5, during the supine hip-abduction-and-adduction training mode, the second support mechanism 13 and the third support mechanism 14 can straighten the legs of the patient by virtue

of the second drive mechanism 18. Moreover, the first motor assembly 134 and the second motor assembly 135 are independently operable to move the respective one of the left upper leg member 131 and the right upper leg member 132 sideways relative to the length of the base frame 11, thus bringing the corresponding one of the left lower leg member 141 and the right lower leg member 142 to move sideways. Since the first motor assembly 134 and the second motor assembly 135 are symmetric structures, only the second motor assembly 135 will be described herein for the sake of brevity.

In this embodiment, the second motor assembly 135 includes a rotary motor 1351, an angled gear drive 1352 driven by the rotary motor 1351, and a planetary gearbox 1353 driven by the angled gear drive 1352. An axle of the planetary gearbox 1353 extends through the pelvic member 133 and is connected to one end of a short link 1354. The other end of the short link 1354 is pivoted to one end of a long link 1355. A pin 1356 passes through the other end of the long link 1355 and a bearing 1357 seated in a recess 1359 formed in a pivot plate 1358. The right upper leg member 132 is coupled pivotally to the pivot plate 1358, and a plate fastener 1350 fastens pivotally the pivot plate 1358 onto the pelvic member 133. In operation, the axle of the planetary gearbox 1353 rotates due to actuation of the rotary motor 1351, thus rotating the short link 1354 which in turn results in pushing or pulling movement of the long link 1355. The pushing or pulling movement of the long link 1355 in turn results in the sideways swinging movement of the pivot plate 1358, together with the right upper leg member 132 that is connected to the pivot plate 1358, about the plate fastener 1350. Hip-abduction-and-adduction training can help promote hip stabilization.

FIG. 6 illustrates operation of the power table 1 during the supine leg-raise training mode. Like the supine hip-abduction-and-adduction training mode, the second support mechanism 13 and the third support mechanism 14 can straighten the legs of the patient by virtue of the second drive mechanism 18. Since structural arrangements of the first motor unit 136 and the second motor unit 137 (see FIG. 5) are symmetric, only the first motor unit 136 will be described herein for the sake of brevity.

In this embodiment, the first motor unit 136 is a linear actuator

having one end pivoted to a motor mount 1310 of the left upper leg member 131. A rod of the first motor unit 136 is connected to the pelvic member 133 via the plate fastener 1350 and a connector 1360. During the supine leg-raise training mode, when the rod of the first motor unit 136 is extended, the left upper leg member 131 pivots upward relative to the pivot plate 1358 on the pelvic member 133. Conversely, when the rod of the first motor unit 136 is retracted, the left upper leg member 131 pivots downward relative to the pivot plate 1358 on the pelvic member 133. Supine leg-raise training helps with hip strength and flexibility.

FIG. 7 illustrates operation of the powered table 1 during the supine hip-and-knee-flexion training mode, which targets the hip and knee flexors. Like the supine leg-raise training mode, the first motor unit 136 and the second motor unit 137 are independently operable to move the left upper leg member 131 and the right upper leg member 132 between horizontal (see FIG. 10) and upright states. However, in the supine hip-and-knee-flexion training mode, the left motor member 181 and the right motor member 182 are further operable to keep the respective one of the left lower leg member 141 and the right lower leg member 142 in a horizontal state while the left upper leg member 131 and the right upper leg member 132 move between horizontal and upright states.

Referring to FIGS. 8 and 9, the supine trunk-lateral-flexion training mode involves back-and-forth pivoting movement of the upper trunk member 122 relative to the lower trunk member 121 about the transverse axis (C). Supine trunk-lateral-flexion training targets the trunk muscles, specifically the oblique and side muscles responsible for lateral trunk flexion.

As best shown in FIG. 8, the drive unit 124 includes a carriage 1240 coupled to the lower trunk member 121 and slidable along the width of the lower trunk member 121. A rotary motor 1241 is secured to the carriage 1240 and drives a pulley 1242 to rotate. A timing belt 1243 couples the pulley 1242 to a worm gear 1244 on the carriage 1240. Rotation of the pulley 1242 thus results in corresponding rotation of the worm gear 1244. The worm gear 1244 meshes with a worm 1245 that extends along the widthwise direction of the lower trunk member 121. Hence, rotation of the worm gear 1244 results in movement

of the carriage 1240 along the width of the lower trunk member 121.

Referring further to FIG. 9, the drive unit 124 further includes a push pin 1246 that is mounted on the carriage 1240 and that extends into a slot 1220 in the upper trunk member 122. When the carriage 1240 moves along the width of the lower trunk member 121, the push pin 1246 pushes against the upper trunk member 122, thus causing the upper trunk member 122 to pivot relative to the lower trunk member 121 about the transverse axis (C).

Preferably, a guide carrier 1212 is slidable along a linear guide rail 1211 on the lower trunk member 121. A guide attachment 1247 is attached to the guide carrier 1212 and extends into the slot 1220 in the upper trunk member 122. The guide attachment 1247 provides additional support for the upper trunk member 122 when the upper trunk member 122 pivots about the transverse axis (C).

Referring once again to FIGS. 1, 2 and 10, in the supine-to-sit training mode, the first drive mechanism 17 is operated to vary an angle formed between the first support mechanism 12 and the second support mechanism 13. While the second support mechanism 13 is arranged horizontally, extension of the drive motor 171 results in upward pivoting movement of the first support mechanism 12 relative to the second support mechanism 13 about the pivot axis (A) (see FIG. 8). Retraction of the drive motor 171, on the other hand, restores the first support mechanism 12 to the horizontal state. Supine-to-sit training may be conducted to strengthen lower back muscles.

In this embodiment, a connector 151 of the first joint mechanism 15 connects the lower trunk member 121 to the pelvic member 133 to maintain an offset between the lower trunk member 121 and the second support mechanism 13. The offset makes it possible to locate the patient's hip joint close to the pivot axis (A) when cushions (not shown) are attached to the supporting structure.

In this embodiment, the powered table 1 provides a seated trunk-lateral-flexion training mode (like the supine trunk-lateral-flexion training mode) and a seated knee-flexion training mode when the supporting structure is arranged in the sitting state. During the seated knee-flexion training mode, the left motor member 181 and the right motor member 182 independently move the left lower leg member 141 and the right lower leg member 142 between horizontal and vertical

states. As best shown in FIG. 10, extension of the left motor member 181 results in upward pivoting movement of the left lower leg member 141, whereas retraction of the left motor member 181 results in downward pivoting movement of the left lower leg member 141. Seated
5 knee-flexion training focuses on the quadriceps muscles responsible for knee mobility.

As shown in FIG. 4, the powered table 1 includes a restraint unit 20 to prevent the patient from falling off the supporting structure. In this embodiment, the restraint unit 20 is a safety
10 harness. Other non-limiting examples of restraint units suitable for the present invention include a guard rail and a safety gate.

As best shown in FIGS. 2, 3, 11, 12 and 13, to arrange the supporting structure from the sitting state to the lift state, latch members 19 are provided for releasably locking the left lower leg
15 member 141 and the right lower leg member 142 to the base frame 11 while the third support mechanism 14 is in a substantially vertical arrangement. Thereafter, the second drive mechanism 18 is operated to bring the second support mechanism 13 to incline relative to the base frame 11 with a trunk side of the second support mechanism 13 disposed
20 higher than a knee side of the second support mechanism 13. The first support mechanism 12 is in a forward leaning arrangement relative to base frame 11 at this time. Leaning forward shifts the center of mass of the patient forward to shift weight onto the legs and can help reduce stress on the lower back and knees.

Finally, further operation of the first drive mechanism 17 and the second drive mechanism 18 results in conversion of the supporting structure from the lift state to the standing state (see FIG. 4), where the first support mechanism 12, the second support mechanism 13 and the third support mechanism 14 are in a substantially vertical
30 arrangement.

As shown in FIG. 14, in this embodiment, the rotary motor 1241 of the drive unit 124, the first and second motor assemblies 134, 135 and the first and second motor units 136, 137 of the second support mechanism 13, the drive motor 171 of the first drive mechanism 17 and
35 the left and right motor members 181, 182 of the second drive mechanism 18 are connected electrically to a control module 30. An input/output (I/O) device 40, such as a tablet computer, is operatively coupled to

the control module 30 in a wired or wireless manner. Through the I/O device 40 and the control module 30, an operator of the powered table 1 may select the desired arrangement of the supporting structure as well as the desired training mode in the supine state or the sitting state of the supporting structure.

Claims:

1. An assistive physical therapy powered table (1) comprising:

a base frame (11);

5 a supporting structure mounted on the base frame (11) for supporting a human patient, the supporting structure including a first support mechanism (12) to support the trunk of the human patient, a second support mechanism (13) to support the upper legs of the human patient, and a third support mechanism (14) to support the lower legs of the human patient;

10 a first joint mechanism (15) connecting the first support mechanism (12) to the second support mechanism (13) and configured to permit pivoting movement of the first support mechanism (12) relative to the second support mechanism (13) about a pivot axis (A) that extends along a widthwise direction of the base frame (11);

15 a second joint mechanism (16) connecting the second support mechanism (13) to the third support mechanism (14) and configured to permit relative pivoting movement between the second support mechanism (13) and the third support mechanism (14);

a first drive mechanism (17) connected to the first support mechanism (12) and the second support mechanism (13); and

20 a second drive mechanism (18) connected to the second support mechanism (13) and the third support mechanism (14);

wherein the first drive mechanism (17) and the second drive mechanism (18) are operable to arrange the supporting structure in a selected one of a supine state, a sitting state, a lift state and a standing state;

wherein, in the supine state, the first support mechanism (12) is arranged horizontally;

30 wherein, in the sitting state, the second support mechanism (13) is arranged horizontally, and the first drive mechanism (17) is operable to drive movement of the first support mechanism (12) relative to the second support mechanism (13) about the pivot axis (A);

35 wherein, in the lift state, the second support mechanism (13) is inclined relative to the base frame (11) with a trunk side of the second support mechanism (13) disposed higher than a knee side of the second support mechanism (13), the first support mechanism (12) is in

a forward leaning arrangement and the third support mechanism (14) is in a substantially vertical arrangement; and

wherein, in the standing state, the first support mechanism (12), the second support mechanism (13) and the third support mechanism (14) are in a substantially vertical arrangement.

2. The assistive physical therapy powered table (1) according to claim 1, wherein the first support mechanism (12) includes:

a lower trunk member (121) coupled to the trunk side of the second support mechanism (13) via the first joint mechanism (15);

an upper trunk member (122) resting against the lower trunk member (121);

a joint unit (123) pivotally connecting the upper trunk member (122) to the lower trunk member (121) about a transverse axis (C) normal to the pivot axis (A); and

a drive unit (124) connected between the lower trunk member (121) and the upper trunk member (122) and operable to pivot the upper trunk member (122) relative to the lower trunk member (121) about the transverse axis (C).

3. The assistive physical therapy powered table (1) according to claim 1, wherein the second support mechanism (13) includes a left upper leg member (131) and a right upper leg member (132), and the third support mechanism (14) includes a left lower leg member (141) and a right lower leg member (142);

the second drive mechanism (18) including a left motor member (181) connected between the left upper leg member (131) and the left lower leg member (141) and operable to adjust an angle between the left upper leg member (131) and the left lower leg member (141), and a right motor member (182) connected between the right upper leg member (132) and the right lower leg member (142) and operable to adjust an angle between the right upper leg member (132) and the right lower leg member (142);

the assistive physical therapy powered table (1) further comprising latch members (19) for releasably locking the left lower leg member (141) and the right lower leg member (142) to the base frame (11) when the third support mechanism (14) is in the

substantially vertical arrangement.

4. The assistive physical therapy powered table (1) according to claim 3, wherein the second support mechanism (13) further includes a pelvic member (133) connected to the first support mechanism (12) via the first joint mechanism (15), a first motor assembly (134) that connects the left upper leg member (131) to the pelvic member (133), and a second motor assembly (135) that connects the right upper leg member (132) to the pelvic member (133);

10 wherein, while the supporting structure is arranged in the supine state, the first motor assembly (134) and the second motor assembly (135) are independently operable in a hip abduction and adduction training mode, in which the left upper leg member (131) and the right upper leg member (132) move sideways relative to the length of the base frame (11).

5. The assistive physical therapy powered table (1) according to claim 3, wherein the second support mechanism (13) further includes a pelvic member (133) connected to the first support mechanism (12) via the first joint mechanism (15), a first motor unit (136) connected between the left upper leg member (131) and the pelvic member (133), and a second motor unit (137) connected between the right upper leg member (132) and the pelvic member (133);

25 wherein, while the supporting structure is arranged in the supine state, the first motor unit (136) and the second motor unit (137) are independently operable in a leg raise training mode in which the left upper leg member (131) and the right upper leg member (132) move between horizontal and upright states.

30 6. The assistive physical therapy powered table (1) according to claim 5, wherein, while the supporting structure is arranged in the supine state, the left motor member (181) and the first motor unit (136) are operable in a hip and knee flexion training mode to move the left upper leg member (131) between horizontal and vertical states while keeping the left lower leg member (141) in a horizontal state, and the right motor member (182) and the second motor unit (137) are operable in the hip and knee flexion training mode to move the right

upper leg member (132) between horizontal and vertical states while keeping the right lower leg member (142) in a horizontal state.

7. The assistive physical therapy powered table (1) according to claim
5 3, wherein, while the supporting structure is arranged in the sitting
state, the second drive mechanism (18) is operable in a knee flexion
training mode in which the left motor member (181) and the right motor
member (182) independently move the left lower leg member (141) and
the right lower leg member (142) between horizontal and vertical
10 states.

FIG. 1

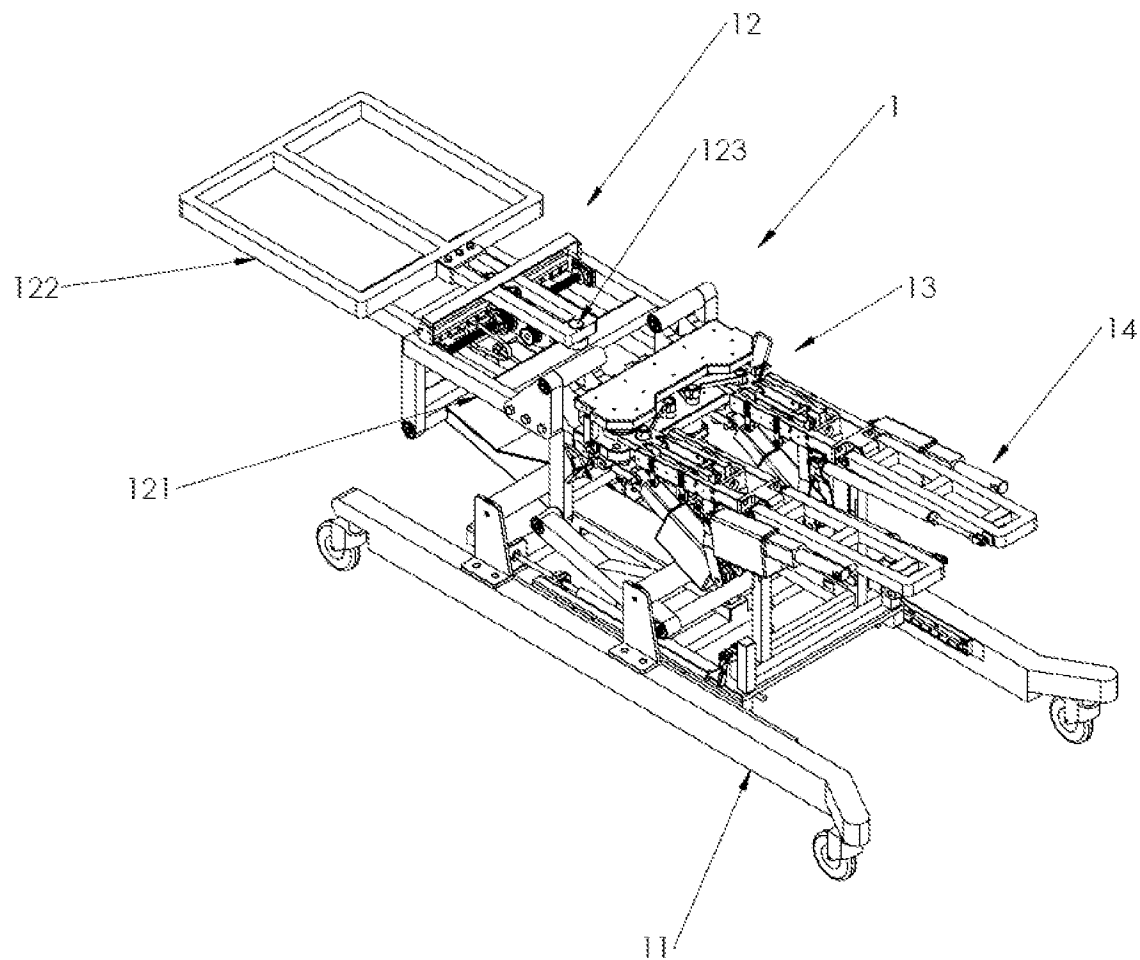


FIG. 2

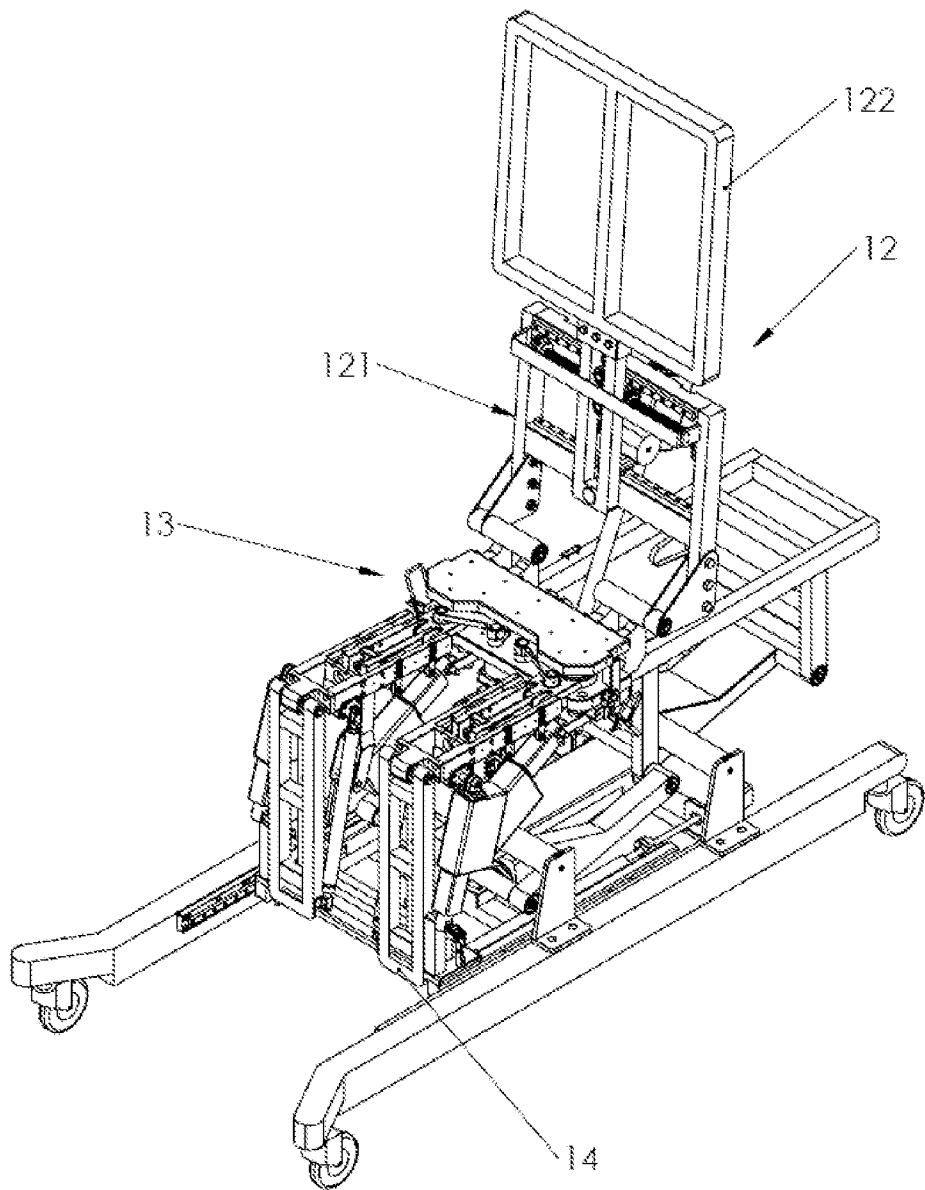


FIG. 3

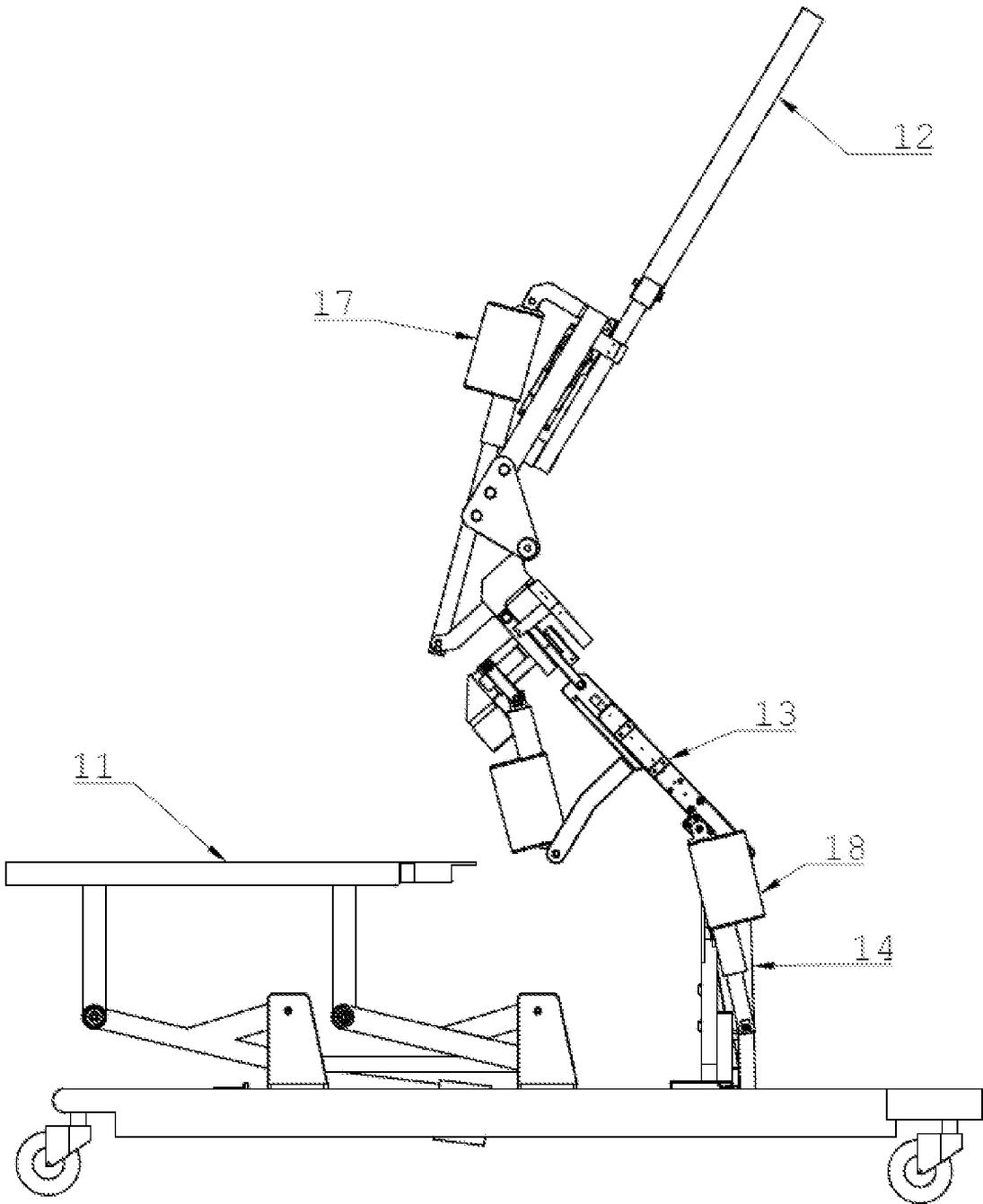


FIG. 4

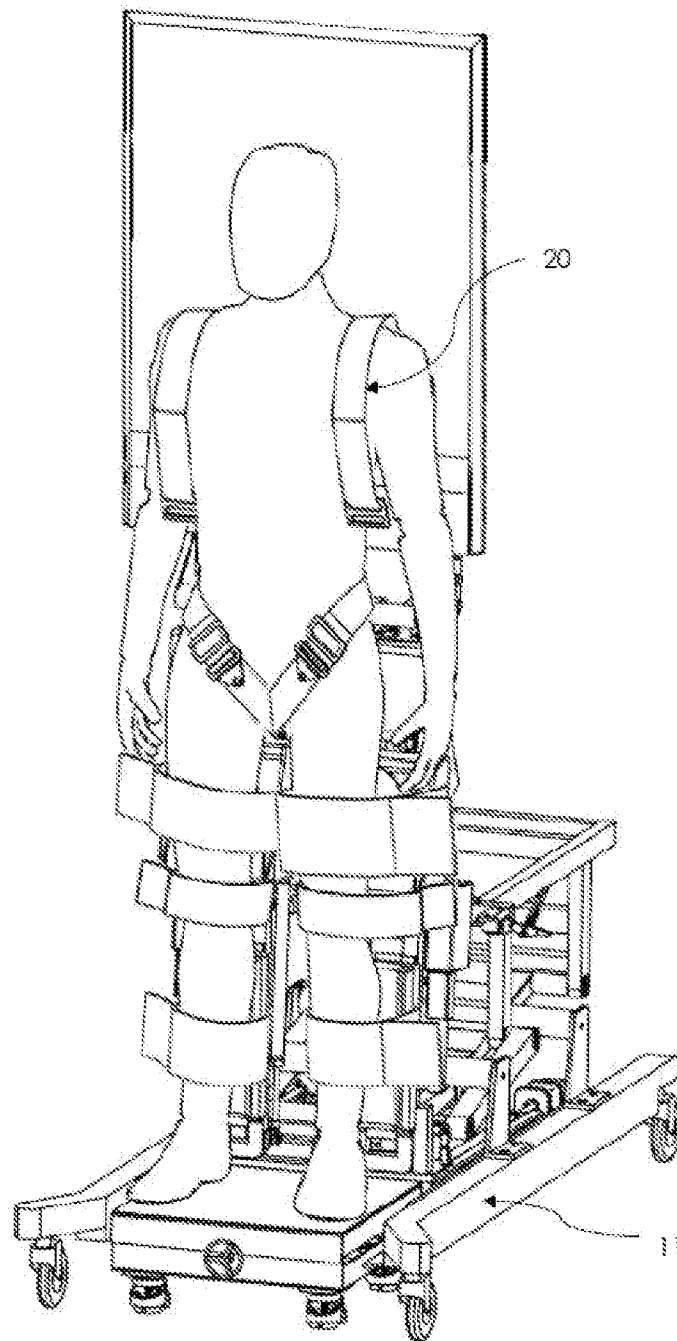


FIG. 5

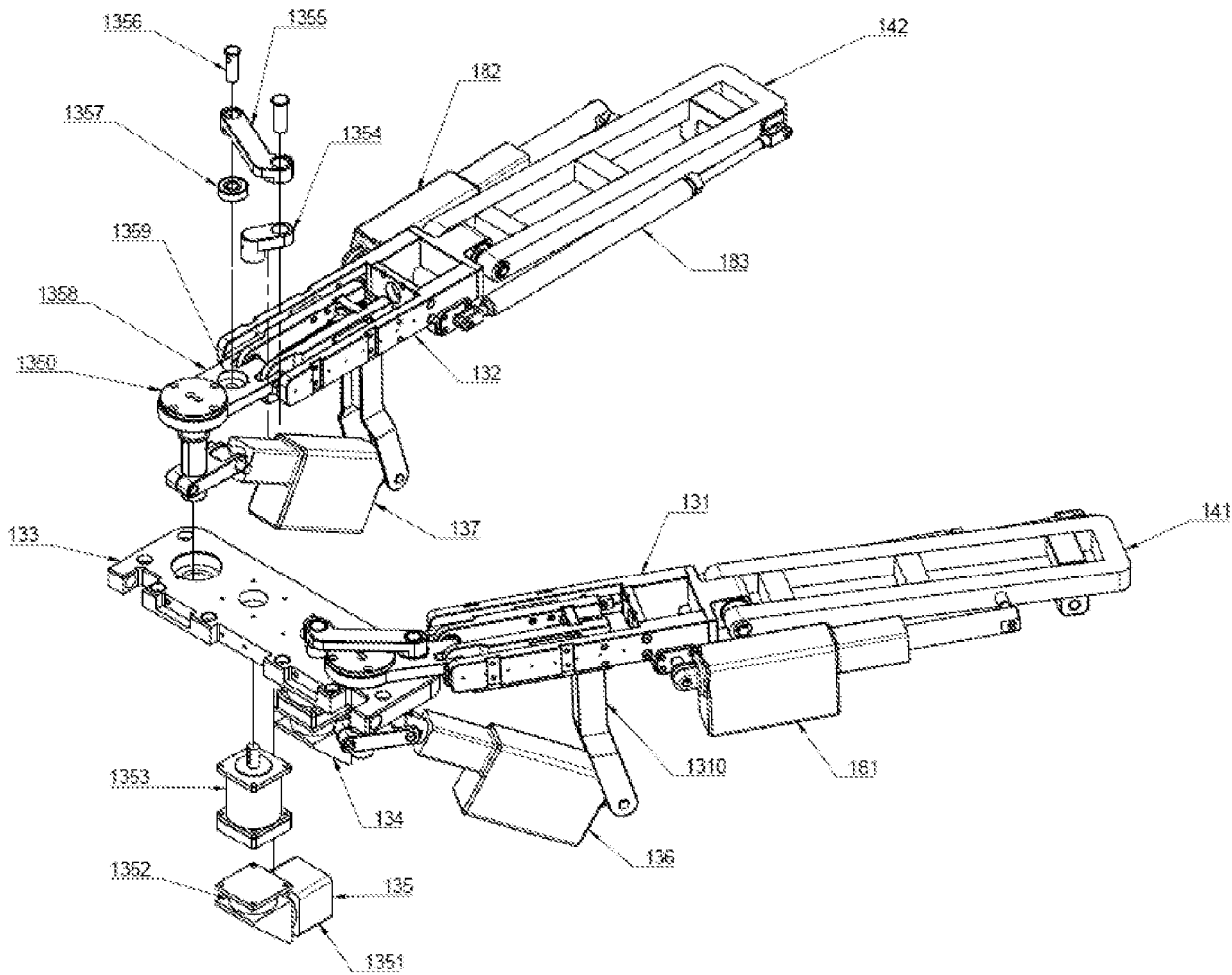


FIG. 6

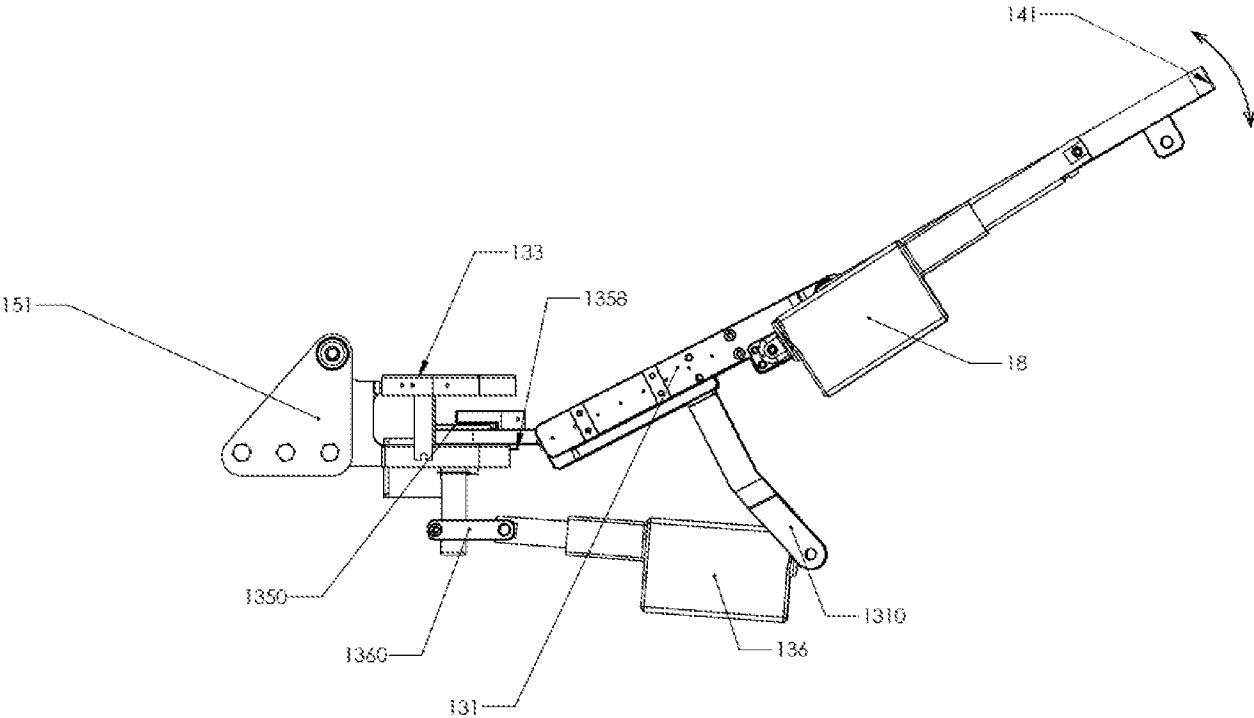


FIG. 7

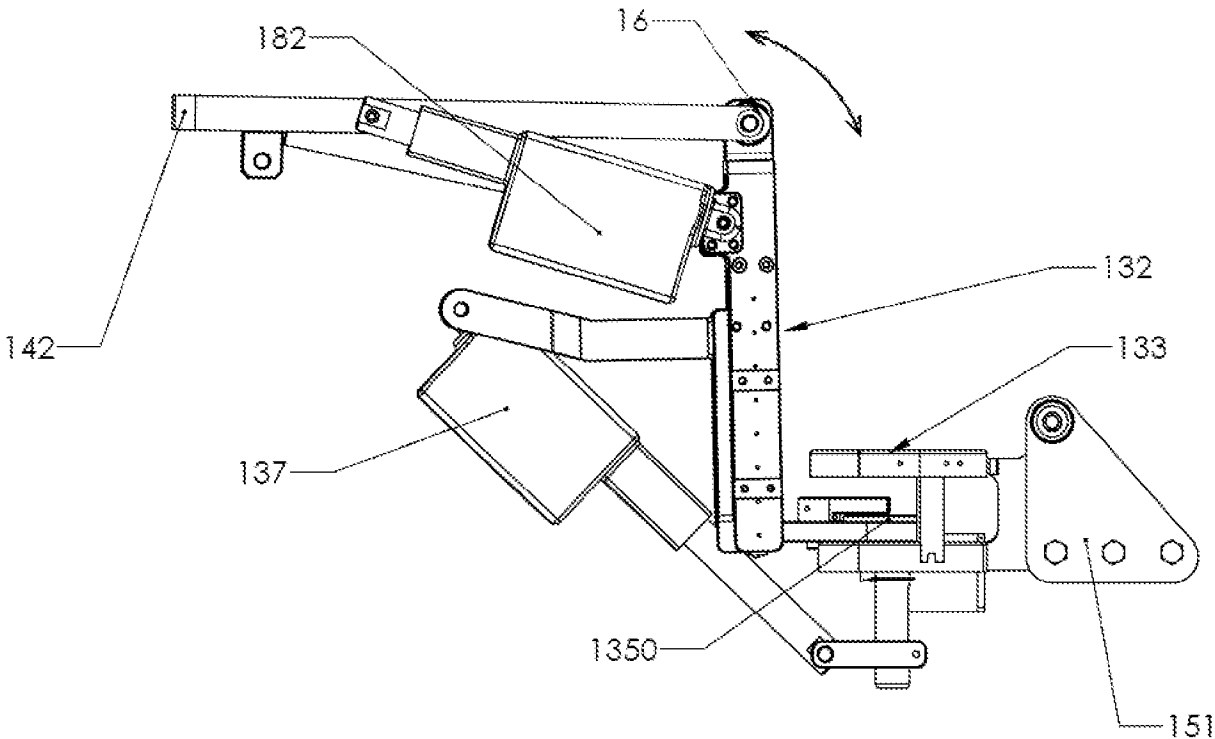


FIG. 8

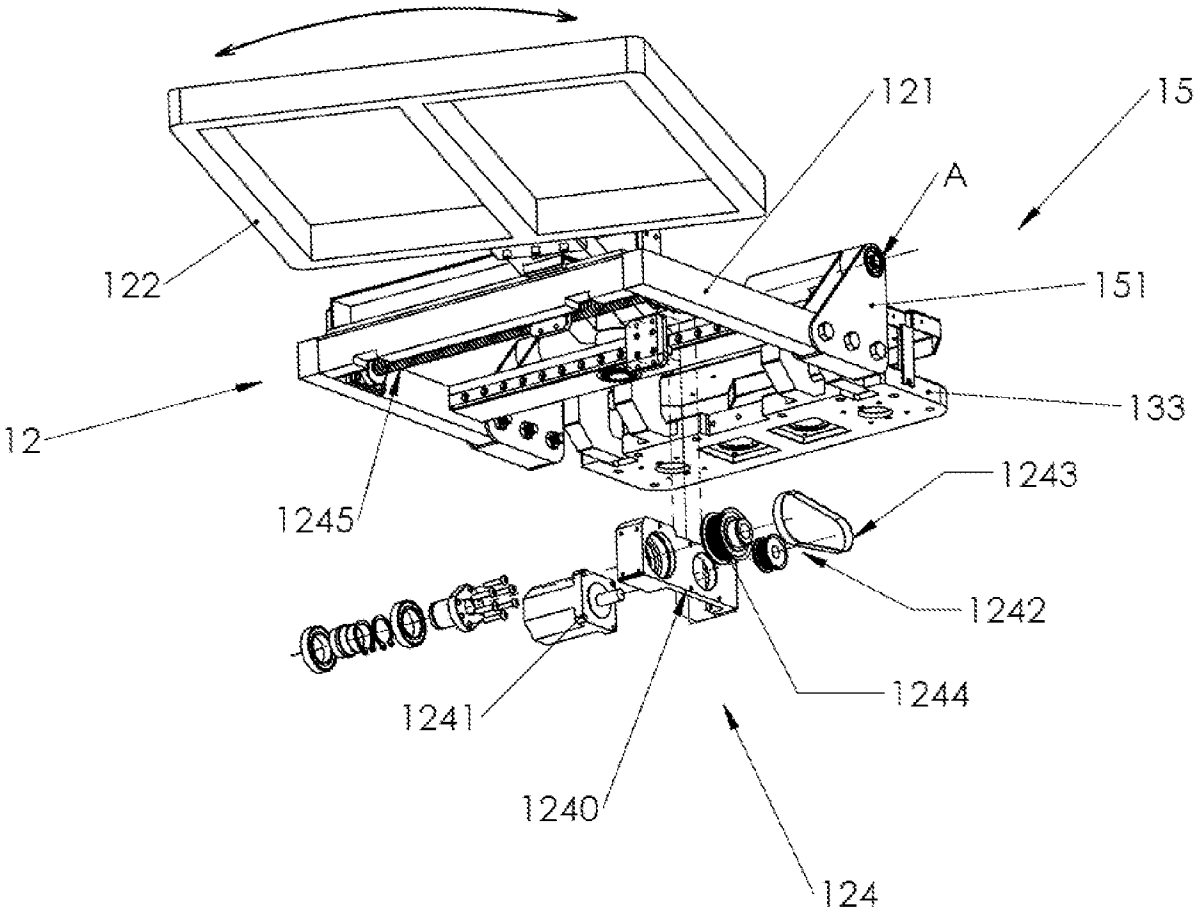


FIG. 9

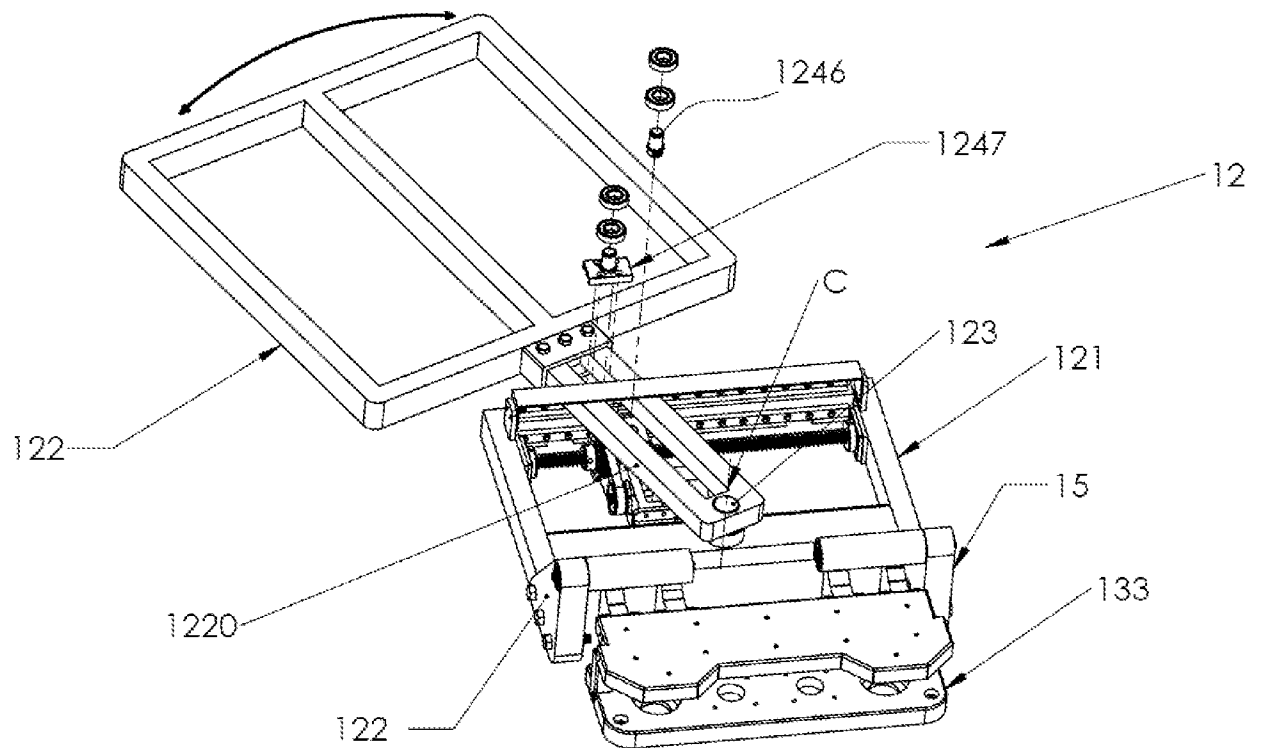


FIG. 10

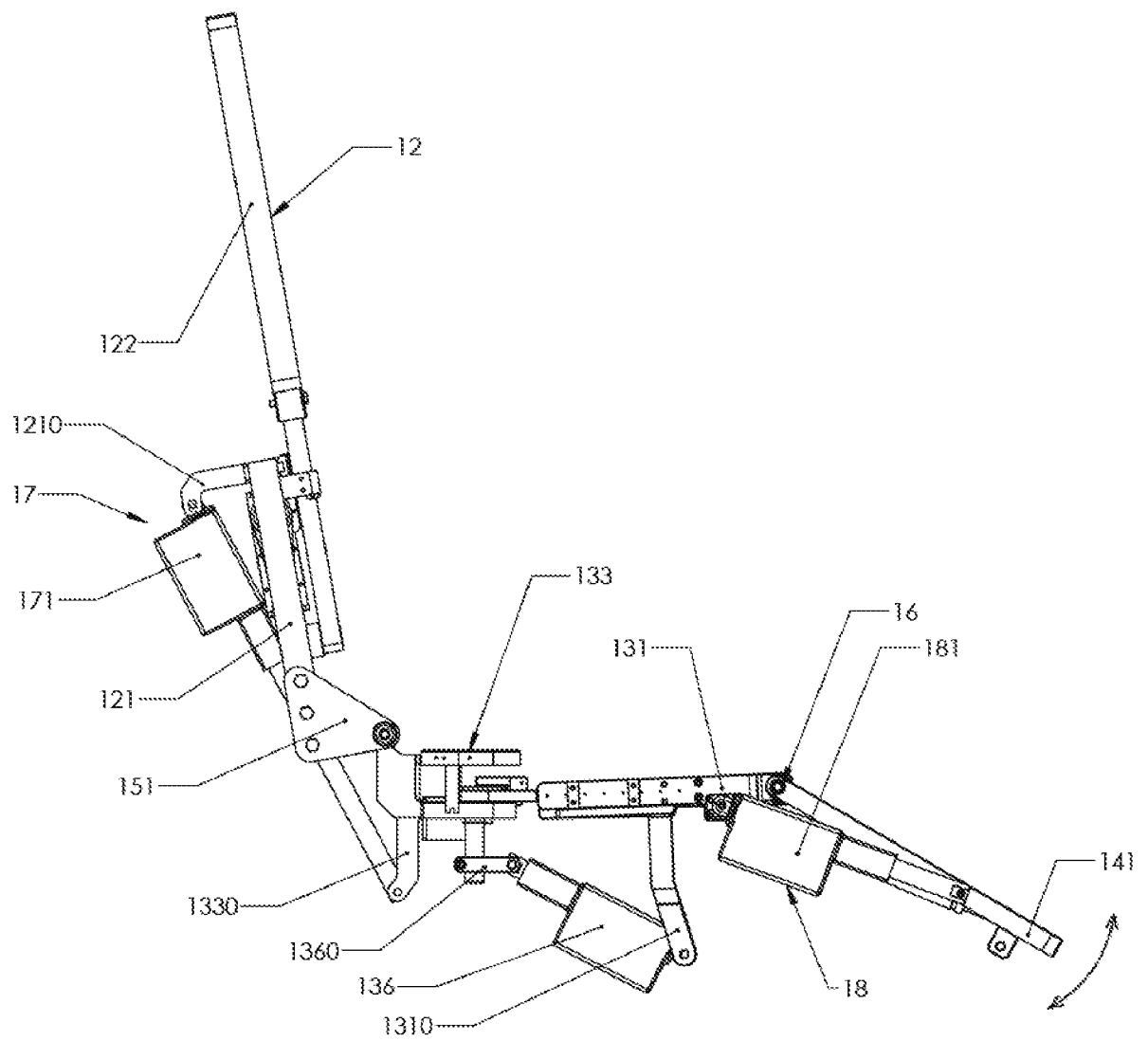


FIG. 11

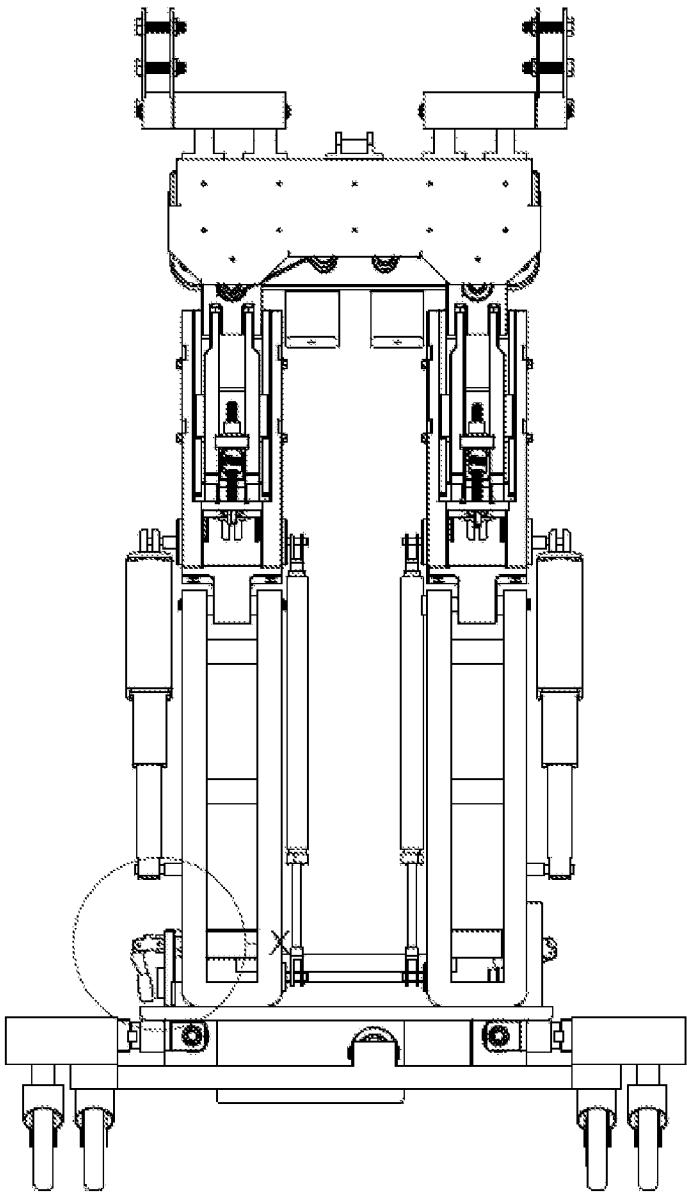


FIG. 12

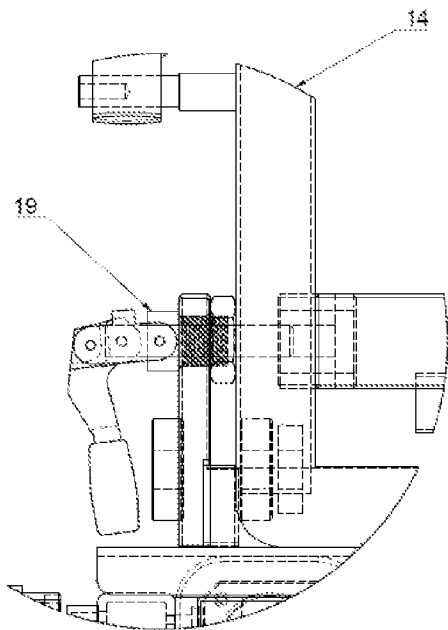


FIG. 13

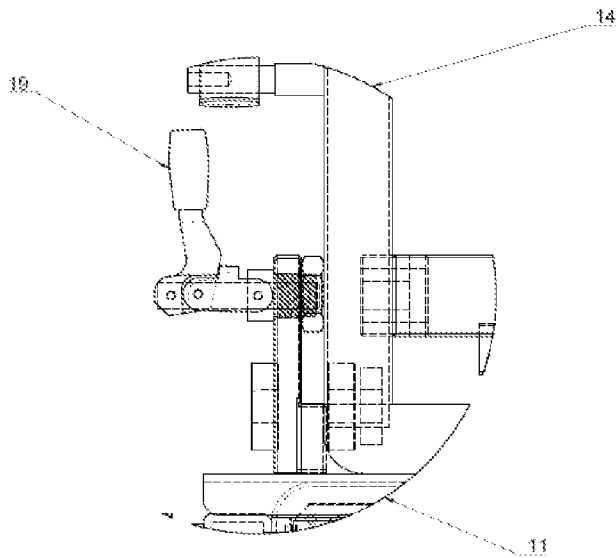
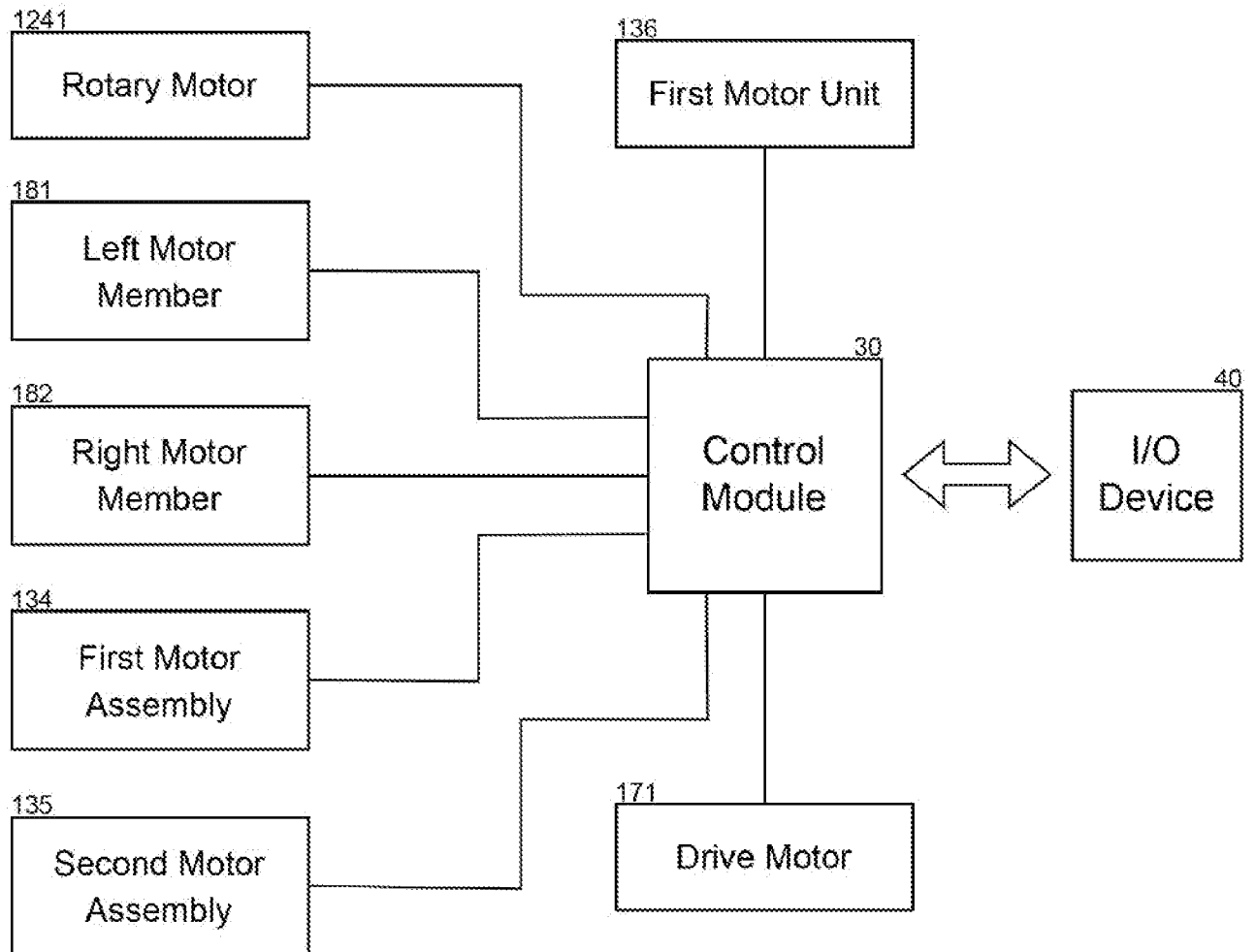


FIG. 14



INTERNATIONAL SEARCH REPORT

International application No.

PCT/PH2023/050002

A. CLASSIFICATION OF SUBJECT MATTER

A61H 1/00 (2006.01)i; A61H 3/00 (2006.01)i; A61G 7/10 (2006.01)i; A61H 3/04 (2006.01)i; A61H 1/02 (2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61H 1/00; A61H 3/00; A61G 7/10; A61H 3/04; A61H 1/02

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

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Espacenet Advanced Search, Patent Lens, Google Patent, Patent Scope, Epoquenet, Derwent Innovation, J-Plat pat, Industrial Property Automation System (IPAS), Science Direct; Search term used: physical, therapy, support, mechanism, drive, joint, powered, wheel, motor, table, supine, lift*, sit*, stand*, robot*, frame, assist

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 110151496 A (UNIV ANHUI TECHNOLOGY) 23 August 2019 (2019-08-23) Whole document	1 - 7
A	CN 114983756 A (UNIV GUILIN ELECTRONIC TECH) 02 September 2022 (2022-09-02) Whole document	1 - 7
A	WO 2006061834 A2 (TYLERTON INTERNAT INC [IL], et al) 15 June 2006 (2006-06-15) Whole document	1 - 7
A	CN 114053140 A (2ND XIANGYA HOSPITAL CENTRAL SOUTH UNIV) 18 February 2002 (2002-02-18) Whole document	1 - 7
A	CN 107595504 A (XIUHUA, Chen) 19 January 2018 (2018-01-19) Whole document	1 - 7



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

06 October 2023

Date of mailing of the international search report

10 November 2023

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/PH2023/050002

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CN	107595504	A	19 January 2018	CN	107595504	B	16 July 2019