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(54) **A CHAIR FOR DISABLED OR NON SELF-SUFFICIENT PEOPLE PROVIDED WITH AUTOMATIZED LIFTING OF THE SEAT.**

STUHL FÜR BEHINDERTE ODER NICHT AUTARKE PERSONEN MIT AUTOMATISIERTEM SITZHEBEMECHANIMUS

CHAISE À LEVAGE AUTOMATIQUE DU SIÈGE POUR HANDICAPÉ OU PERSONNE DÉPENDANTE

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(56) References cited:
WO-A1-01/21128
WO-A1-2004/052263
US-A- 4 941 709
US-A- 5 153 953
US-A1- 2006 213 007

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Description

Field of the invention

[0001] The present invention concerns the technical field relative to medical devices of support and assistance to disabled or non self-sufficient people.

[0002] In particular, the invention refers to an innovative type of wheelchair that allows the easy handling of the patient when he has to be lifted from the seat.

Background Art

[0003] A great variety of wheelchairs have long been known, which serve as support for disabled people in the most general sense of the term. This means that such chairs, as it is well known, can be used in hospital or home environments by people momentarily injured, destined to the almost total recovery of their motor capacities, as well as old people and/or people with permanent handicaps.

[0004] A traditional wheelchair comprises a frame provided with a seat and wheels arranged in such a way that the chair results mobile. Some chairs require that an operator pushes them while others have wheels with a certain diameter that allows their rotation to be activated manually directly by the disabled person seated on it. In other cases, some of these wheelchairs are provided with electric motorization so that they can be activated and driven very easily without the help of a manual push.

[0005] Such chairs, therefore, solve the general technical problem of people's mobility.

[0006] Nevertheless, it is known that such types of chairs present a rather common technical inconvenience when it is necessary to lift the patient from the seat. Currently, it is in fact necessary the intervention of an operator who has to lift the patient to put him in the chosen place, as for example on a bed, a bath or any other place. In case of heavy bodies, such operation is not simple and it often requires the help of a second person. It is therefore evident that such an operation, above all in the case of particularly heavy bodies, is not either an easy operation nor a safe one since the risk of falls and therefore of further injuries, both for the operator and for the patient, is high (see e.g. the wheel chair with detachable lifted seat of. US2006/0213007 which intend to solve said inconveniency.)

Brief description of the invention

[0007] It is therefore the aim of the present invention to provide a wheelchair (1) that solves the said inconveniency.

[0008] In particular, it is the aim of the present invention to provide a wheelchair that integrates a patient lifting system so as to facilitate the operations of lifting and movement of the patient.

[0009] These and other technical problems are therefore solved with the present wheelchair, as per claim 1.

[0010] In particular, the wheelchair (1), in accordance with the invention, comprises a seat (3) mounted in a detachable manner or anyway that is separable from the frame (2). In such a manner, by means of an appropriate lifting device (21, 40; 240) it is possible to carry out the lifting of the seat, and therefore of the patient seated on it, without any effort. In particular, the frame serves as guide for the lifting device, which is mounted in a sliding manner with respect to it. The lifting device is handled through the activation of appropriate activation means (22, 23, 25), for example an engine or meshing gears that engage with the lifting device. A support element (50), for example one.or more than one belts, connect the lifting device (21, 40; 240) with the seat (3) in such a way that when the lifting device slides with respect to the frame, this causes, on the basis of the sliding direction, a lifting or lowering of the seat (3) from/towards the frame through the support element (50).

[0011] In such a manner, all the aims established by the invention are reached and in particular, it is possible to lift and lower a patient in a safe manner, without any effort, and, most important of all, maintaining the patient comfortably seated and without having to lift him.

[0012] Advantageously, the lifting means (21, 40; 240) comprise an arcuate element (21) according to such a shape as to follow the outline of the frame with respect to which it is slidingly mounted. Such an element (21) is further provided with a rack (24) on which the said activation means engage in such a way that the actuation of such means causes the lifting/lowering with respect to the frame itself of the element (21) through the racks.

[0013] Advantageously, in a possible embodiment of the invention, the arcuate element (21) comprises a pair of arches (21) distanced between them and each one provided with the said rack (24) along at least a part of their length.

[0014] These arches are inserted in a rollaway manner within the respective hollow seats obtained in the frame.

[0015] Advantageously, the activation means (22, 23, 25) can comprise an engine (25) that rotates one or more than one dented wheels (22, 23, 26) engaged with the lifting device.

[0016] Advantageously, the lifting means further comprise a sliding block (40) fixed to the upper end of the arcuate element (21).

[0017] Advantageously, the sliding block (40) is mounted in a rotatable manner around its vertical axis (101).

[0018] In particular, advantageously, a rotation device (100) can be comprised to rotate the sliding block around its vertical axis (101) and that comprises an engine (105) provided with a rotating axis (106) that engages with a vertical shaft (101) by means of a dented coupling, the said axis (101) comprising on the opposite side a set of teeth catching in a rotatable manner with a cyclopic rotating device (102, 107) integral to the sliding block (40).

[0019] Advantageously, the cyclopic device can comprise a conducted crown (102) with internal set of teeth

catching with at least one, preferably three, dented wheels (107) interposed between the internal set of teeth of the crown (102) and the set of teeth of the shaft (101).

[0020] Advantageously, the support element (50) comprises at least two belts of which a first belt (50) connected on a side with the lifting device through the sliding block (40) and on the opposite side with the base (3') of the seat (3) and a second belt (50) connected on a side always with the sliding block and on the opposite side with the back (3'') of the seat.

[0021] Advantageously, two pairs of belts (50) are comprised of which a pair connected from the sliding block to the base and a pair connected from the sliding block to the back of the seat.

[0022] Advantageously, the sliding block (40) can comprise inside it at least an engine to control the rewinding of the said belts (50).

[0023] Advantageously, the rewinding of the belts (50) connected to the base of the seat is independent from the rewinding of the belts connected to the back so as to be able to spread the back with respect to the base once the lifting has occurred.

[0024] Advantageously, the seat (3) comprises a back that is reclining with respect to the base in such a way that the independent control of the rewinding of the belts allows to recline the back when the seat is lifted.

[0025] Advantageously, the frame (2) comprises a banana-like curved shape so that when the chair is placed beside a support lifted by legs, for example a bed, the lower part of the frame can slide below the support, allowing a predisposition of the seat, when it is lifted, above the support.

[0026] Advantageously, the lower part of the frame (2) comprises two final appendixes (2') distanced between them and arcuate.

Brief description of drawings

[0027] Further characteristics and advantages of the present wheelchair, according with the invention, will result clearer with the description of some of its embodiments that follows, made to illustrate but not to limit, with reference to the annexed drawings, wherein:

- Figure 1 represents an axonometric view of the wheelchair in accordance with the invention;
- Figure 2 shows a lateral view of the chair;
- Figure 3 further shows an axonometric view that highlights the lower part of the wheelchair in accordance with the invention;
- Figures from 4 to 7 show in detail, in accordance with a first possible embodiment, the racks coupled with the engine 25 to control the lifting of the arches 21 with respect to the frame 2;
- Figure 8 and figure 9 show a detail of the winding assembly of the belts within the sliding block 40;
- Figures 10 and 11 show in detail the rotation device that allows the rotation of the sliding block around its vertical axis;
- Figure 12 shows in detail the lifting piston of the seat;
- Figures from 13 to 20 show in succession lifting phases of the seat.

Description of some preferred embodiments

[0028] Figure 1 shows a first axonometric view of the present wheelchair 1 in a first possible configuration of the invention. This comprises a frame 2, a lifting device 20 to lift a seat 3 which is fixed in a removable manner to the frame. In particular, the seat 3 results arranged on a support 4 made integral to the frame 2 (see for example also figure 3).

[0029] As described in figure 1, a pair of the back wheels 5 and of the front wheels 6 allow the normal mobility of the entire chair. The front wheels 6 are arranged at the end of the frame, which finishes in two appendixes 2' parallel between them, separated and emerging from the central body of the frame, like the fork points. The said two apexes 2', in correspondence of their ends, comprise, each one of them, one or more than one pairs of wheels 6 eventually rotating as to result directionable.

[0030] The centre of gravity of the entire curved frame is such that it falls internally within the area delimited by the front and back wheels in such a way as to result, as a whole, stable and to avoid over-turnings backwards.

[0031] That being stated, in accordance with the invention and as better described in detail below, the lifting device 20 is mounted slidingly with respect to the frame 2 in such a way that, through an engine 25, it is possible to control its handling.

[0032] To this aim, figure 6 shows the frame 2 from which two lifting arches 21 exit, each one of them controlled by the engine 25, as better described in detail below.

[0033] The engine 25 is placed at the back of the seat 3 in such a way that a pair of conducting wheels 22 engage each one respectively with a conducted wheel 23 (see lateral view of figure 4 and axonometric view of figure 5). As better described in detail in figure 7, each lifting arch 21 is provided with a rack 24 which engages with the conducted wheel 23 by means of a double pinion 26 interposed between the rack 24 and the conducted wheel 23.

[0034] It is evident that the choice of appropriate diameters of the wheels would allow to vary freely the rotation speeds of the said wheels and therefore the handling speed of the arches 21, while the choice of the length of the racks allows to vary the exit extension.

[0035] According, therefore, to the direction of rotation of the wheels, the arches 21 slide in a direction or in the opposite one with respect to the frame 2, thus exiting from it or retracting within it.

[0036] As shown in figure 3, the arches 21 can be covered with a housing 2" which can be external or also integral to the arches themselves. In case of integral housing, this naturally enters/exits from the frame during its

motion. Otherwise, the arches could be left at sight, as shown in figure 6.

[0037] Going back to figure 2, in correspondence of the upper end of the arches 21 a sliding block 40 of the motorized type is fixed, which is connected to the seat 3 by means of support elements 50 that will serve to support the seat during the operation of lifting, as well described in detail below.

[0038] In particular, the support elements can be realized through belts 50 like the safety belts of motor vehicles.

[0039] As shown in figure 1, from the sliding block 40 four belts 50 branch off, two of which are connected to the back of the seat 3, while the other two are substantially connected to the base of the seat itself. This solution of connection guarantees a good stability of the seat when it is lifted.

[0040] The lifting device 20, as better shown in figure 12, can optionally include the help of a thrust piston arranged below the seat 3 and which, through its exit, allows to control with greater safety the motion of lifting of the seat and of detachment of the frame.

[0041] It is also evident that the auxiliary function of support and lifting of the piston can be substituted with other equivalent systems, such as leaf springs arranged under the chair between the frame and the chair itself.

[0042] The motorized sliding block 40, as better described in figure 8 and figure 9, includes inside it a winding assembly 41 of the belts which is naturally controlled by the operator through a common push-button activation system from a control panel or also from remote.

[0043] The winding system 41 therefore includes a certain number of winding assemblies 42, rotatable through a control electric engine 43. As better shown in the axonometric view of figure 9, each winding assembly includes an axis 44 in contact with a belt in such a way that the rotation of the axis causes by slipping a returning of the belt itself. The assemblies are also provided with torsion springs 45 in such a way that, in the winding phase, the spring loads and in the winding release phase the spring can make the axis 44 rotate in the opposite direction, causing the unrolling.

[0044] In the particular case of four independent belts, it is possible to include four winding assemblies.

[0045] Preferably, as better clarified below, the motorization of the belts connected to the back is independent from that connected to the base of the seat.

[0046] With such a solution, it is therefore possible to decide to leave the belts slightly loose or mainly in tension before carrying out the lifting so that the lifting height results variable.

[0047] Moreover, there is the further advantage of being able to exploit the electric engine as block system once the tensioning is selected and the lifting is carried out.

[0048] In addition, it is also possible to lift and lower further the lifted chair by operating a further winding or unwinding of the belts.

[0049] Last, as shown in figure 17, for example, and as better described below with reference to an example of functioning, it is possible to include a seat 3 provided with a simple block of the back 3" with respect to the base 3'. By unhooking the block it is possible to lower the back with respect to the base in a controlled manner by simply controlling a release of such belts connected to it in such a way as to substantially realize a bed.

[0050] As shown in figure 10 and 11, the sliding block 40 comprises an orbital rotation system 100 that allows to control its rotation around a vertical shaft 101 (vertical axis of rotation of the sliding block itself). This makes that, for example, once the seat is lifted it can be rotated at will, for example to place it on a bed as shown also in figure 16. The rotation system comprises in detail an electric engine 105 from which a rotating axis 106 exits provided with a dented pinion. The dented pinion 106 engages with the vertical shaft 101 of the cyclopic rotating device that controls the rotation of the chair. The cyclopic device comprises a conducted crown 102 with internal set of teeth on which three transmission wheels 107 engage. The shaft 101 therefore includes a dented wheel (for example integrally obtained from the shaft itself or connected to it) on the opposite side to that of coupling with the axis 106 in exit from the engine 105. In this manner, the rotation of the shaft 101 is transmitted to the wheel 102 through the wheels 107. The dented wheel 102 is naturally made integral to the sliding block 40, which will rotate integrally as per figure 15, for example.

[0051] A second preferred configuration of the invention comprises a lifting device of another type.

[0052] Taking always into consideration what has been described before, it would also be possible to substitute the arches 21 (which, when they exit confer an overall C shape of the frame) with a fixed C shaped frame and wherein, precisely, the upper portion overheads the seat exactly as when the arches 21 are in extended position out of the frame 2 in the first configuration described. At this point, it is possible to think that the frame is provided with a rack binary on which a sliding block 240 engages, exactly like the sliding block 40 described, but provided in addition with wheels that engage on the rack and that rotate through an activation engine in such a way that the sliding block translates with respect to the frame.

[0053] Having described the essential elements of the invention, we now pass on to a description of functioning of it, in particular way with reference to the preferred configuration.

[0054] Figure 13 and figure 14 show a first phase of functioning wherein the arches 21 are retracted within the receiving cavity formed by the frame 2. In this configuration the seat 3 lays entirely on the frame and in particular way on the support 4 integral to the frame.

[0055] When the movement of lifting is activated, the electric engine 25 causes the rotation of the dented wheels 23 which engage with the racks of the arches through the pinions 26. In such a manner, the progressive lifting of the arches is produced with respect to the frame,

the said arches dragging in an integral manner to them the sliding block 40 fixed to their end (see figure 15 and 16). As shown in figure 15 and in figure 16 the chair is lifted from its support 4 thanks precisely to the tensioning action of the belts 50.

[0056] To that lifting phase contributes also the exit of the piston arranged below the chair and that thrusts the seat 3 in such a way as to facilitate the detachment of it with respect to the support 4.. Once the stop of the arches is reached, the piston retracts and frees the seat 3.

[0057] At this point, as better shown in figure 17 and 18, if needed the rotation of the sliding block 40 around its vertical axis 101 can be activated so as to rotate the seat 3 at will. Just as a way of example, figure 17 shows a rotation of 90 degrees, ideal to later arrange the patient on a bed, for example.

[0058] It is evident here that the particular C shape of the frame is not accidental but, on the contrary, is significantly advantageous. Its shape in fact allows at will that the chair 1 comes closer to a bed or other support lifted by legs from the ground, through the two lower appendixes 2' that can be slid below it, like with the load forks. This allows an approach of the chair 1 such as to allow, once the seat 3 is lifted, to arrange the latter directly in suspension on the bed. It is therefore evident that such a solution allows a safe approach of the patient on the bed itself, minimizing the efforts to translate him once the lifting has occurred.

[0059] Although the C shape is the one preferred, it is anyway possible to include other similar shapes such as L or upside down U shapes, for example.

[0060] Figures 19 and 20, last, show the stretching of the seat by means of the unhooking of the block of the back and the contextual release of the belts connected to it, in such a way as to be able to stretch the patient in a similar way as on a stretcher.

Claims

1. A wheelchair (1) comprising:

- A frame (2) and;
- A seat (3) arranged on the frame (2);

the seat (3) being detachable from the frame (2) and wherein, further, the wheelchair (1) comprises:

- A lifting device (21, 40; 240) mounted in a sliding manner with respect to the frame (2);
- Activation means (22, 23, 25) to control the sliding of the lifting device (21, 40; 240) with respect to the frame (2);
- And wherein, further, a support element (50) is comprised to connect the lifting device (21, 40; 240) to the seat (3) so that, as a consequence of a sliding of the lifting device with respect to the frame, the seat is lifted/lowered from/towards the frame through the support element (50) such that to detach/rest from/on the frame;

Characterized by the fact that the lifting device (21, 40; 240) comprises an arcuate element (21) provided with a rack (24) on which the said activation means engage to cause the sliding with respect to the frame.

2. A wheelchair (1), according to claim 1, wherein the said arcuate element (21) includes a pair of arches (21) distanced between them and each one of them provided with the said rack (24) along at least a part of their length.

3. A wheelchair (1), according claim 1 or 2, wherein the said activation means (22, 23, 25) include an engine (25) that puts in rotation one or more than one dented wheels (22, 23, 26) that engage with the lifting device.

4. A wheelchair (1), according to one or more of the preceding claims, wherein the said lifting device further include a sliding block (40) fixed at the upper end of the said arcuate element (21) and to which the said support element is connected on one side (50).

5. A wheelchair (1), according to claim 4, wherein the sliding block (40) is mounted in a rotatable manner around its vertical axis (101).

6. A wheelchair (1), according to claim 5, wherein a rotation device (100) is included to rotate the sliding block around its vertical axis (101) and that includes an engine (105) provided with a rotating axis (106) that engages with a vertical axis (101) by means of a dented coupling, the said axis (101) including on the opposite side a set of teeth that engage in a rotatable manner with a cyclopic rotating device (102, 107) integral to the sliding block (40).

7. A wheelchair (1), according to claim **6**, wherein the cyclopic device includes a conducted crown (102) with an internal set of teeth that engage with at least one, preferably three, dented wheels (107) interposed between the internal set of teeth of the crown (102) and the set of teeth of the shaft (101).

8. A wheelchair (1), according to one or more of the preceding claims, wherein the said support element (50) includes at least two belts of which a first belt (50) connected on one side to the lifting device and on the opposite side to the base (3') of the seat (3) and a second belt (50) connected on one side to the lifting device and on the opposite side to the back (3'') of the seat.

9. A wheelchair (1), according to claim **8**, wherein two pairs of belts (50) are included, of which one pair connected to the base and one pair connected to the back of the seat.

10. A wheelchair (1), according to one or more of the preceding claims, wherein the sliding block (40) includes inside it a winding assembly (41) to control the winding/unwinding of the said belts (50).

11. A wheelchair (1), according to claim 10, wherein the winding of the belts (50) connected to the base of the seat is independent from the winding of the belts connected to the back.

12. A wheelchair (1), according to one or more of the preceding claims, wherein the seat (3) includes the back that is reclining with respect to the base so that the independent control of the winding of the belts allows to recline the back when the seat if lifted.

13. A wheelchair (1), according to claim 1, wherein the frame (2) includes a banana-like curved shape so that when the chair is placed beside a support lifted by legs, for example a bed, the lower part of the frame can slide below the support, allowing a predisposition of the seat, when it is lifted, above the support.

14. A wheelchair (1), according to claim **13**, wherein the lower part of the frame (2) includes two final appendixes (2') distanced between them and arcuate.

15. A wheelchair (1) comprising:

- A frame (2) and;
- A seat (3) arranged on the frame (2);

the seat (3) being detachable from the frame (2) and wherein, further, the wheelchair (1) comprises:

- A lifting device (21, 40; 240) mounted in a sliding manner with respect to the frame (2);
- Activation means (22, 23, 25) to control the sliding of the lifting device (21, 40; 240) with respect to the frame (2);
- And wherein, further, a support element (50) is comprised to connect the lifting device (21, 40; 240) to the seat (3) so that, as a consequence of a sliding of the lifting device with respect to the frame, the seat is lifted/lowered from/towards the frame through the support element (50) such that to detach/rest from/on the frame
- The lifting device comprising a sliding block (240);

Characterized by the fact that the frame is a fixed C shaped frame with the upper portion that overheads the seat (3), the frame being provided with a rack binary on which the sliding block (240) engages and provided with wheels that engage on the rack and that rotate through an activation engine in such a way that the sliding block translates with respect to the frame.

Patentansprüche

1. Rollstuhl (1), umfassend:

- einen Rahmen (2); und
- einen Sitz (3), der an dem Rahmen (2) angeordnet ist;

wobei der Sitz (3) von dem Rahmen (2) lösbar ist, und wobei der Rollstuhl (1) des Weiteren umfasst:

- eine Hubvorrichtung (21, 40; 240), die bezüglich des Rahmens (2) verschiebbar montiert ist;
- Betätigungsmittel (22, 23, 25) zum Steuern des Gleitens der Hubvorrichtung (21, 40; 240) bezüglich des Rahmens (2);
- und wobei des Weiteren ein Stützelement (50) vorhanden ist, um die Hubvorrichtung (21, 40; 240) mit dem Sitz (3) zu verbinden, so dass der Sitz als Folge des Gleitens der Hubvorrichtung bezüglich des Rahmens durch das Stützelement (50) von/zu dem Rahmen angehoben/gesenkt wird und von dem Rahmen gelöst wird/daran ruht;

Dadurch gekennzeichnet, dass die Hubvorrichtung (21, 40; 240) ein bogenförmiges Element (21) umfasst, das mit einer Zahnstange (24) versehen ist, die mit dem Betätigungsmittel in Eingriff kommen kann, um das Gleiten bezüglich des Rahmens zu bewirken.

2. Rollstuhl (1) nach Anspruch 1, wobei das bogenförmige Element (21) ein Paar von Bögen (21) aufweist, die einander beabstanden und jeweils mit der Zahnstange (24) entlang zumindest einem Teil ihrer Länge versehen sind.

3. Rollstuhl (1) nach Anspruch 1 oder 2, wobei das Betätigungsmittel (22, 23, 25) einen Motor (25) aufweist, der ein oder mehrere Zahnräder (22, 23, 26) in Drehung versetzt, die mit der Hubvorrichtung kämmen.

4. Rollstuhl (1) nach einem oder mehreren der vorhergehenden Ansprüche, wobei die Hubvorrichtung des Weiteren einen Gleitblock (40) aufweist, der an dem oberen Ende des bogenförmigen Elements (21) befestigt ist, und mit dem auf einer Seite (50) das Stützelement verbunden ist.

5. Rollstuhl (1) nach Anspruch 4, wobei der Gleitblock (40) um seine vertikale Achse (101) drehbar montiert ist.

6. Rollstuhl (1) nach Anspruch 5, wobei eine Drehvorrichtung (100) vorgesehen ist, um den Gleitblock um seine vertikale Achse (101) zu drehen, die einen Motor (105) enthält, der eine Drehachse (106) aufweist, die mittels einer gezahlten Kupplung mit einer vertikalen Achse (101) in Eingriff kommt, wobei die Achse (101) auf der gegenüberliegenden Seite einen Satz von Zähnen aufweist, die drehend mit einer zyklopischen Drehvorrichtung (102, 107) in Eingriff kommen, welche einteilig mit dem Gleitblock (40) ausgebildet ist.

7. Rollstuhl (1) nach Anspruch **6**, wobei die zyklopische Vorrichtung eine Führungskrone (102) mit einem innenliegenden Satz von Zähnen aufweist, die mit mindestens einem, vorzugsweise drei Zahnrädern (107) in Eingriff kommen, die zwischen dem innenliegenden Satz von Zähnen der Krone (102) und dem Satz von Zähnen der Welle (101) angeordnet sind.

8. Rollstuhl (1) nach einem oder mehreren der vorhergehenden Ansprüche, wobei das Stützelement (50) mindestens zwei Riemen aufweist, von welchen ein erster Riemen (50) auf einer Seite mit der Hubvorrichtung und auf der gegenüberliegenden Seite mit der Basis (3') des Sitzes (3) verbunden ist, und ein zweiter Riemen (50) auf einer Seite mit der Hubvorrichtung und auf der gegenüberliegenden Seite mit dem Rücken (3'') des Sitzes verbunden ist.

9. Rollstuhl (1) nach Anspruch **8**, wobei zwei Paare von Riemen (50) vorgesehen sind, von welchen ein Paar mit der Basis verbunden ist und ein Paar mit dem Rücken des Sitzes verbunden ist.

10. Rollstuhl (1) nach einem oder mehreren der vorhergehenden Ansprüche, wobei der Gleitblock (40) im Inneren eine Wicklungsanordnung (41) aufweist, um das Aufwickeln/Abwickeln der Riemen (50) zu kontrollieren.

11. Rollstuhl (1) nach Anspruch 10, wobei das Wickeln der Riemen (50), die mit der Basis des Sitzes verbunden sind, unabhängig von dem Wickeln der Riemen erfolgt, die mit dem Rücken verbunden sind.

12. Rollstuhl (1) nach einem oder mehreren der vorhergehenden Ansprüche, wobei der Sitz (3) den Rücken aufweist, der bezüglich der Basis zurückklappt, so dass die unabhängige Steuerung des Wickelns der Riemen das Zurückklappen des Rückens erlaubt, wenn der Sitz angehoben wird.

13. Rollstuhl (1) nach Anspruch 1, wobei der Rahmen (2) eine bananenförmig gebogene Form aufweist, so dass, wenn der Stuhl neben einem von Beinen getragenen Gestell platziert wird, wie beispielsweise einem Bett, der untere Teil des Rahmens unter das Gestell gleiten kann und eine Anordnung des Sitzes, wenn er angehoben wird, über dem Gestell möglich wird.

14. Rollstuhl (1) nach Anspruch **13**, wobei der untere Teil des Rahmens (2) zwei Endansätze (2') aufweist, die einander beabstanden und bogenförmig sind.

15. Rollstuhl (1), umfassend:

- einen Rahmen (2); und
- einen Sitz (3), der an dem Rahmen (2) angeordnet ist;

wobei der Sitz (3) von dem Rahmen (2) lösbar ist, und wobei der Rollstuhl (1) des Weiteren umfasst:

- eine Hubvorrichtung (21, 40; 240), die bezüglich des Rahmens (2) verschiebbar montiert ist;
- Betätigungsmittel (22, 23, 25) zum Steuern des Gleitens der Hubvorrichtung (21, 40; 240) bezüglich des Rahmens (2);
- und wobei des Weiteren ein Stützelement (50) vorhanden ist, um die Hubvorrichtung (21, 40; 240) mit dem Sitz (3) zu verbinden, so dass der Sitz als Folge des Gleitens der Hubvorrichtung bezüglich des Rahmens durch das Stützelement (50) von/zu dem Rahmen angehoben/gesenkt wird und von dem Rahmen gelöst wird/daran ruht;
- die Hubvorrichtung, die einen Gleitblock (240) umfasst;

Dadurch gekennzeichnet, dass der Rahmen ein fester C-förmiger Rahmen ist, dessen oberer Abschnitt oberhalb des Sitzes (3) liegt, wobei der Rahmen mit einer Zahnstangenschiene versehen ist, mit welcher der Gleitblock (240) in Eingriff kommt und Räder aufweist, die mit der Zahnstange kämen und durch einen Betätigungsmotor so gedreht werden, dass der Gleitblock bezüglich des Rahmens translatorisch bewegt wird.

Revendications

1. Un fauteuil roulant (1) comprenant :

- Un châssis (2) et ;
- Un siège (3) agencé sur le châssis (2) ;

le siège (3) étant détachable du châssis (2) et dans lequel, en outre, le fauteuil roulant (1) comprend :

- Un dispositif de levage (21, 40 ; 240) monté de manière coulissante par rapport au châssis (2) ;
- Des moyens d'activation (22, 23, 25) pour commander le coulissement du dispositif de levage (21, 40 ; 240) par rapport au châssis (2) ;
- Et dans lequel, en outre, un élément de support (50) est compris pour connecter le dispositif de levage (21, 40 ; 240) au siège (3) de sorte que, à la suite d'un glissement du dispositif de levage par rapport au châssis, le siège est soulevé/abaissé à partir de/vers le châssis à travers l'élément de support (50) de sorte à se détacher/reposer du/sur le châssis ;

Caractérisé par le fait que le dispositif de levage (21, 40 ; 240) comprend un élément arqué (21) muni d'une crémaillère (24) sur laquelle lesdits moyens d'activation viennent en prise pour provoquer le coulissement par rapport au châssis.

2. Fauteuil roulant (1), selon la revendication 1, dans lequel ledit élément arqué (21) comprend une paire d'arcs (21) à distance l'un de l'autre et chacun d'eux muni de ladite crémaillère (24) le long d'au moins une partie de leur longueur.

3. Fauteuil roulant (1), selon la revendication 1 ou 2, dans lequel lesdits moyens d'activation (22, 23, 25) comprennent un moteur (25) qui met en rotation une ou plusieurs roues dentées (22, 23, 26) qui viennent en prise avec le dispositif de levage.

4. Un fauteuil roulant (1), selon l'une ou plusieurs des revendications précédentes, dans lequel ledit dispositif de levage comprend en outre un bloc coulissant (40) fixé à l'extrémité supérieure dudit élément arqué (21) et auquel ledit élément de support est relié d'un côté (50).

5. Fauteuil roulant (1), selon la revendication 4, dans lequel le bloc coulissant (40) est monté d'une manière rotative autour de son axe vertical (101).

6. Un fauteuil roulant (1), selon la revendication 5, dans lequel un dispositif de rotation (100) est inclus pour faire tourner le bloc coulissant autour de son axe vertical (101) et qui comprend un moteur (105) muni d'un axe de rotation (106) qui vient en prise avec un axe vertical (101) au moyen d'un couplage bosselé, ledit axe (101) comportant sur le côté opposé un ensemble de dents qui vient en prise de manière rotative avec un dispositif de cyclope de rotation (102, 107) solidaire du bloc coulissant (40).

7. Fauteuil roulant (1), selon la revendication **6**, dans lequel le dispositif de cyclope comprend une couronne menée (102) avec un ensemble de dents intérieur qui vient en prise avec au moins un, de préférence trois, roues dentées (107) interposées entre l'ensemble de dents intérieur de la couronne (102) et l'ensemble des dents de l'arbre (101).

8. Fauteuil roulant (1), selon l'une ou plusieurs des revendications précédentes, dans lequel ledit élément de support (50) comprend au moins deux courroies dont une première courroie (50) reliée d'un côté au dispositif de levage et sur le côté opposé à la base (3') du siège (3) et une seconde courroie (50) reliée d'un côté au dispositif de levage et sur le côté opposé à l'arrière (3") du siège.

9. Fauteuil roulant (1), selon la revendication **8**, dans lequel deux paires de courroies (50) sont incluses, dont une paire connectée à la base et une paire connectée au dossier du siège.

10. Fauteuil roulant (1), selon l'une ou plusieurs des revendications précédentes, dans lequel le bloc coulissant (40) comporte à l'intérieur un appareil d'enroulement (41)destiné à commander l'enroulement/déroulement desdites courroies (50).

11. Fauteuil roulant (1), selon la revendication 10, dans lequel l'enroulement des courroies (50) connectées à la base du siège est indépendant de l'enroulement des courroies connectées au dossier.

12. Fauteuil roulant (1), selon l'une ou plusieurs des revendications précédentes, dans lequel le siège (3) comporte le dossier qui est inclinable par rapport à la base de sorte que le contrôle indépendant de l'enroulement des courroies permet d'incliner le dossier quand le siège est levé.

13. Fauteuil roulant (1), selon la revendication 1, dans lequel le châssis (2) comporte une forme incurvée en forme de banane de sorte que lorsque le fauteuil est placé à côté d'un support soulevé par les jambes, par exemple un lit, la partie inférieure du châssis peut glisser en dessous du support, ce qui permet une prédisposition du siège, quand il est soulevé, au-dessus du support.

14. Fauteuil roulant (1), selon la revendication **13**, dans lequel la partie inférieure du châssis (2) comporte deux appendices (2') finales à distance l'une de l'autre et arquées.

15. Un fauteuil roulant (1) comprenant :

- Un châssis (2) et ;
- Un siège (3) agencé sur le châssis (2) ;

le siège (3) étant détachable du châssis (2) et dans lequel, en outre, le fauteuil roulant (1) comprend :

- Un dispositif de levage (21, 40 ; 240) monté de manière coulissante par rapport au châssis (2) ;
- Des moyens d'activation (22, 23, 25) pour commander le coulissement du dispositif de levage (21, 40 ; 240) par rapport au châssis (2) ;
- Et dans lequel, en outre, un élément de support (50) est compris pour connecter le dispositif de levage (21, 40 ; 240) au siège (3) de sorte que, à la suite d'un glissement du dispositif de levage par rapport au châssis, le siège est soulevé/abaissé à partir de/vers le châssis à travers l'élément de support (50) de sorte à se détacher/reposer du/sur le châssis ;
- Le dispositif de levage comprenant un bloc coulissant (240) ;

Caractérisé par le fait que le châssis est un châssis fixe en forme de C avec la partie supérieure qui surplombe le siège (3), le châssis étant pourvu d'un binaire de crémaillère sur lequel le bloc coulissant (240) vient en prise et qui tourne au moyen d'un moteur d'activation de sorte que le bloc coulissant se déplace par rapport au châssis.

FIG. 1

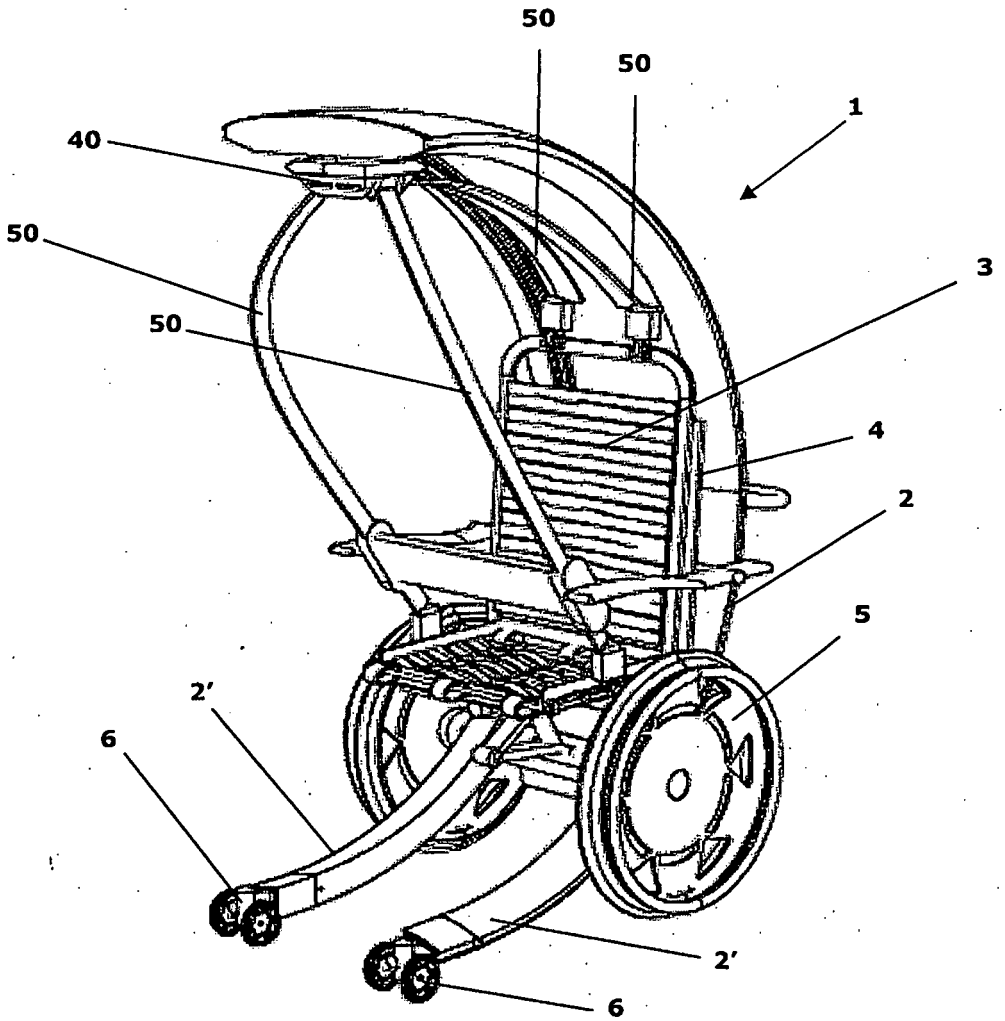


FIG. 2

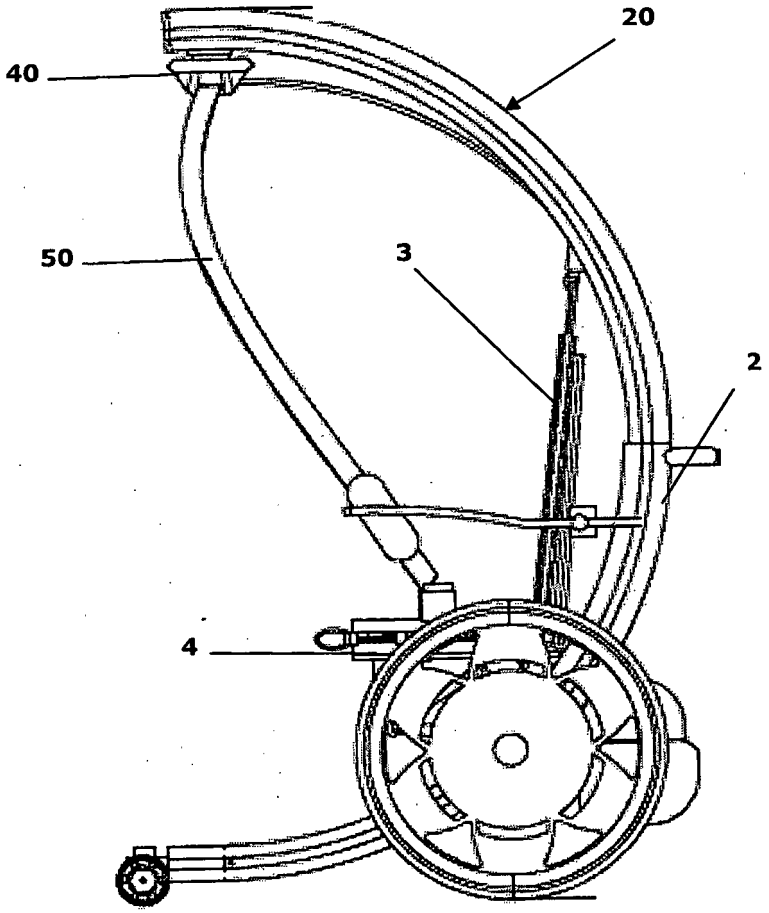


FIG. 3

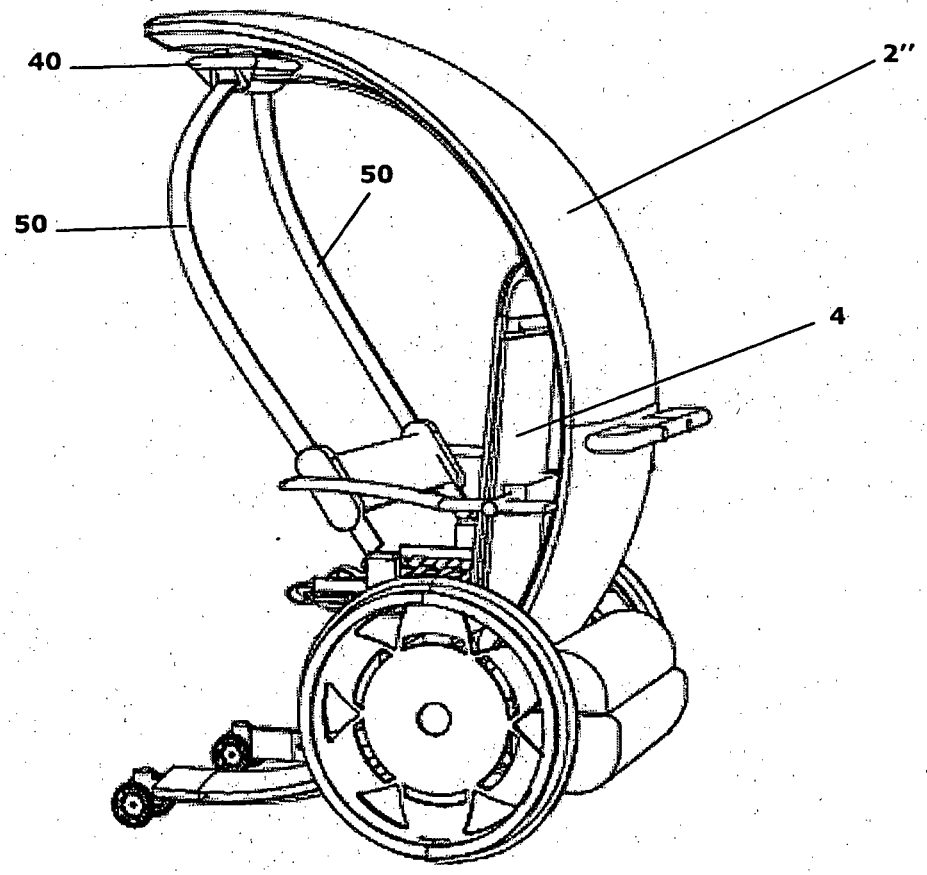


FIG. 4

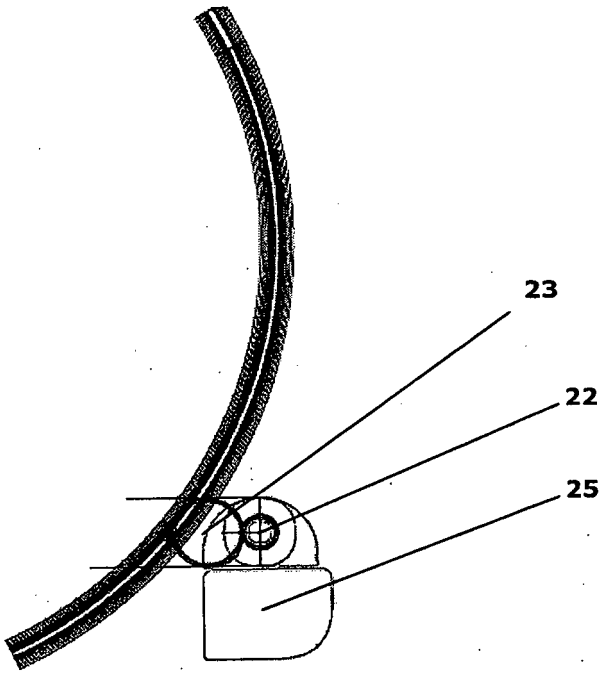


FIG. 5

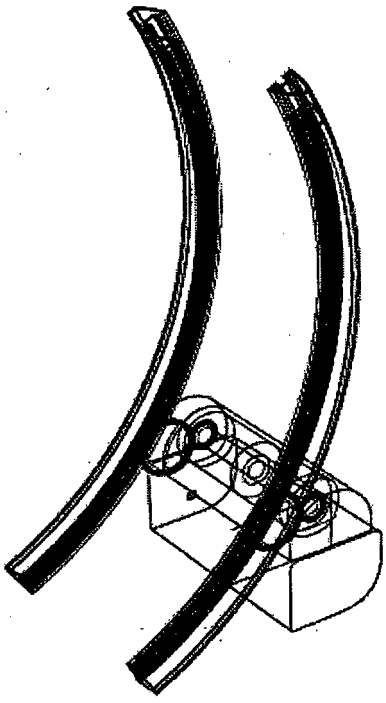


FIG. 6

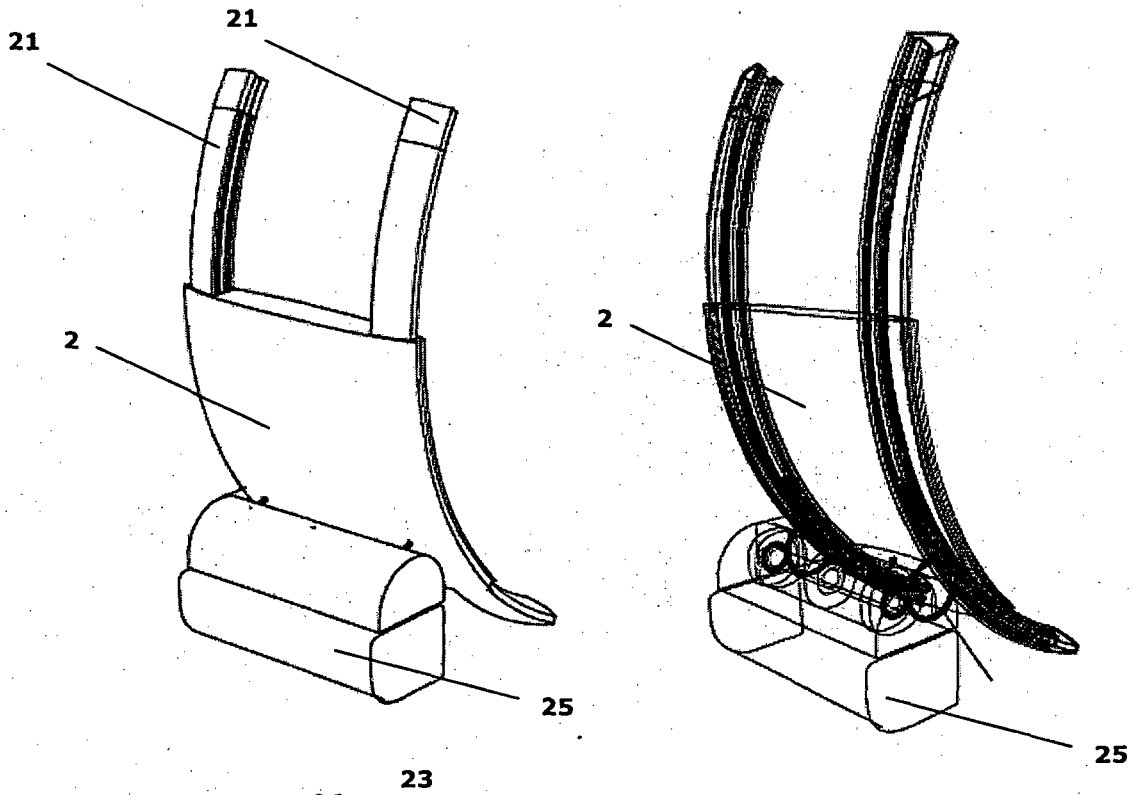


FIG. 7

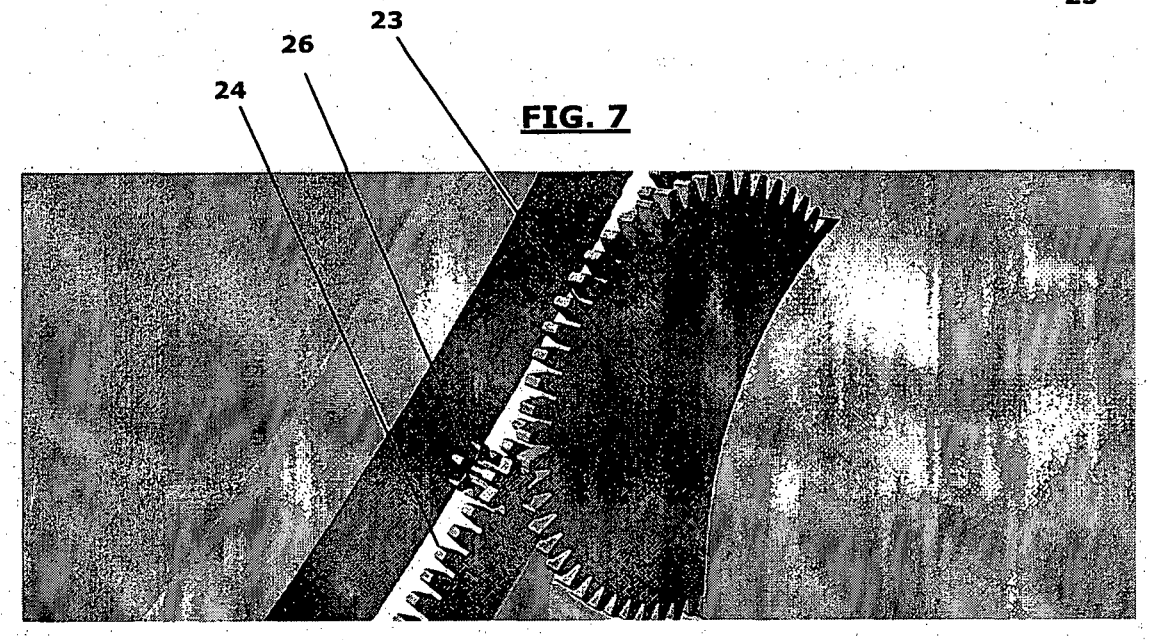


FIG. 8

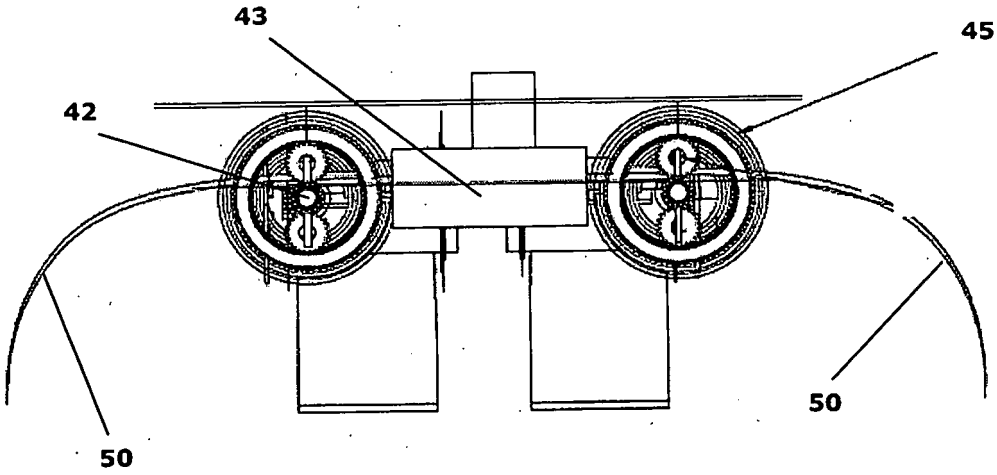


FIG. 9

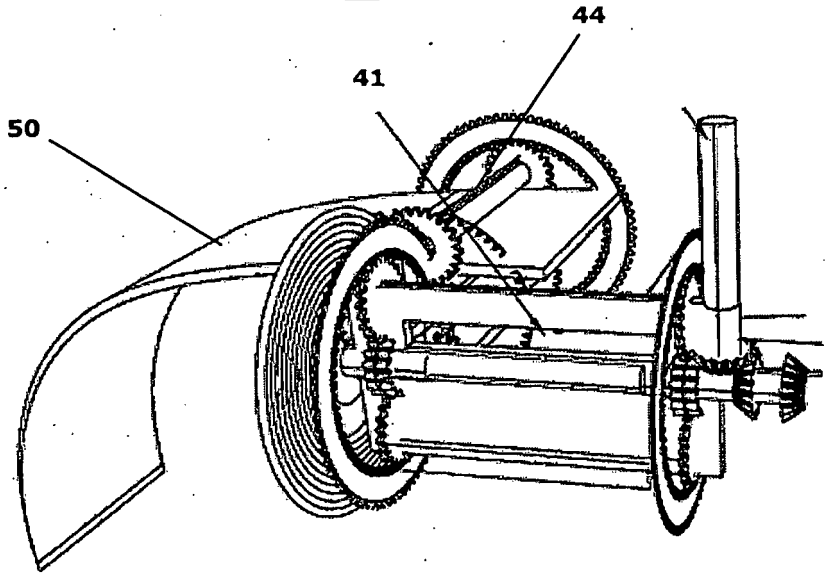


FIG. 10

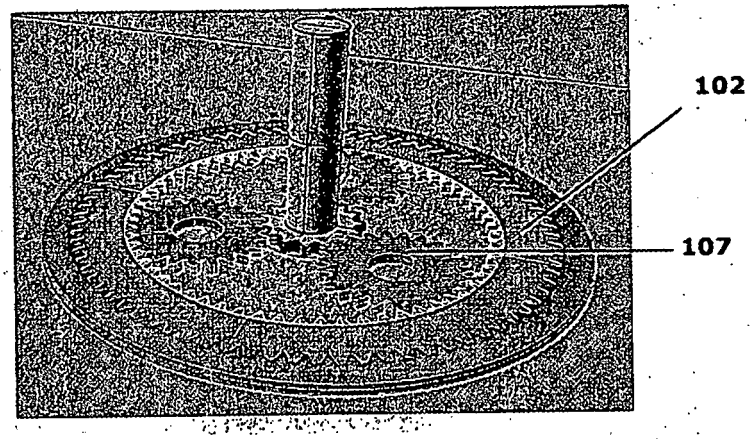


FIG. 11

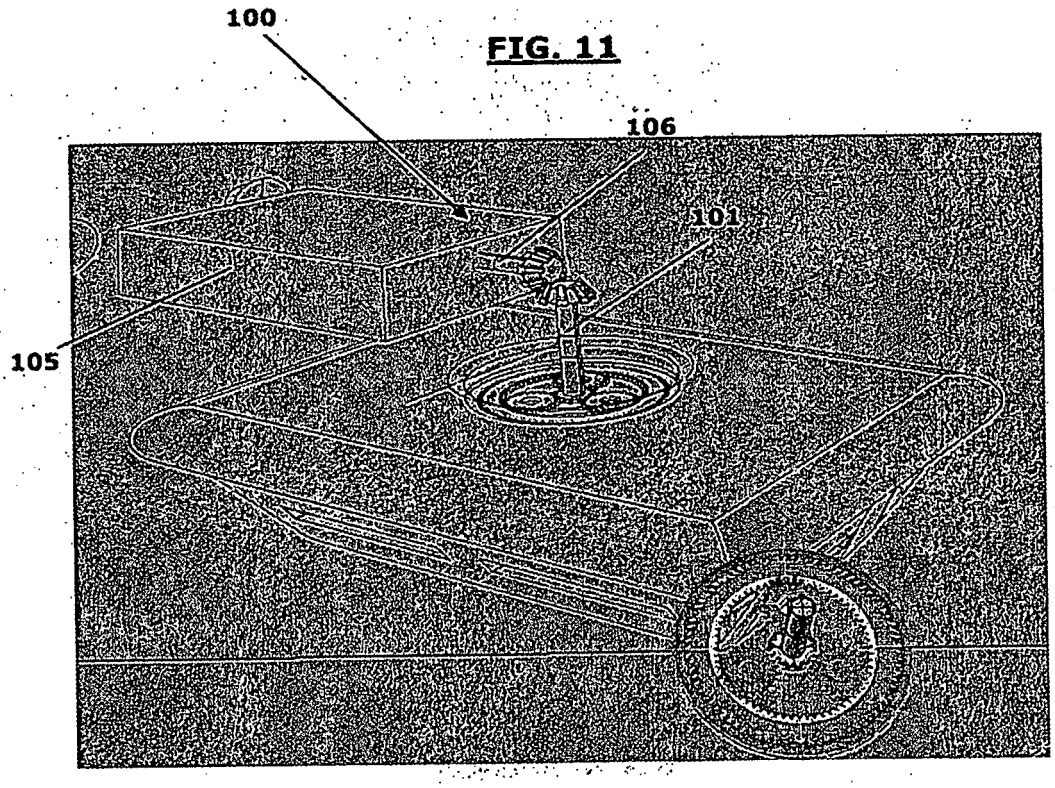


FIG. 12

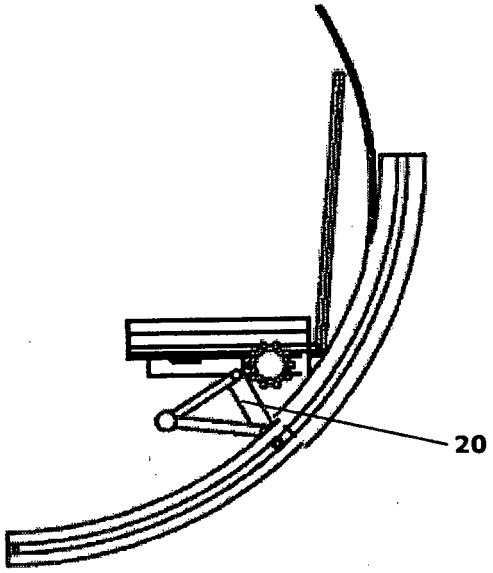


FIG. 13

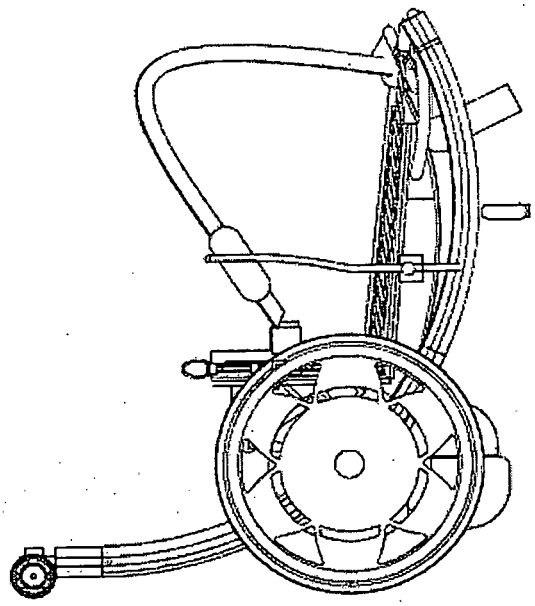


FIG. 14

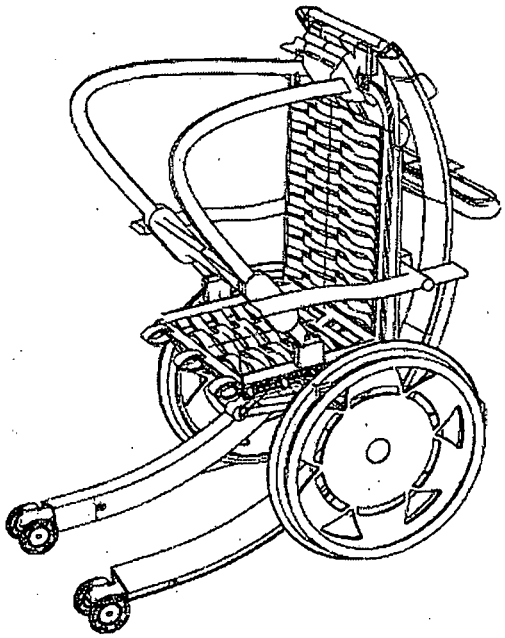


FIG. 15

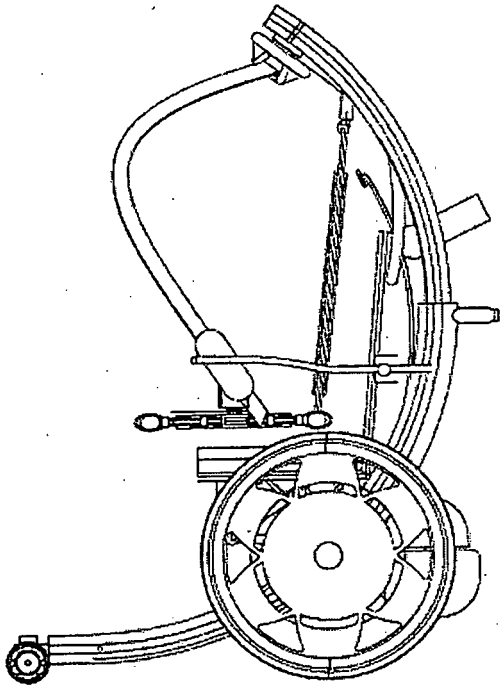


FIG. 16

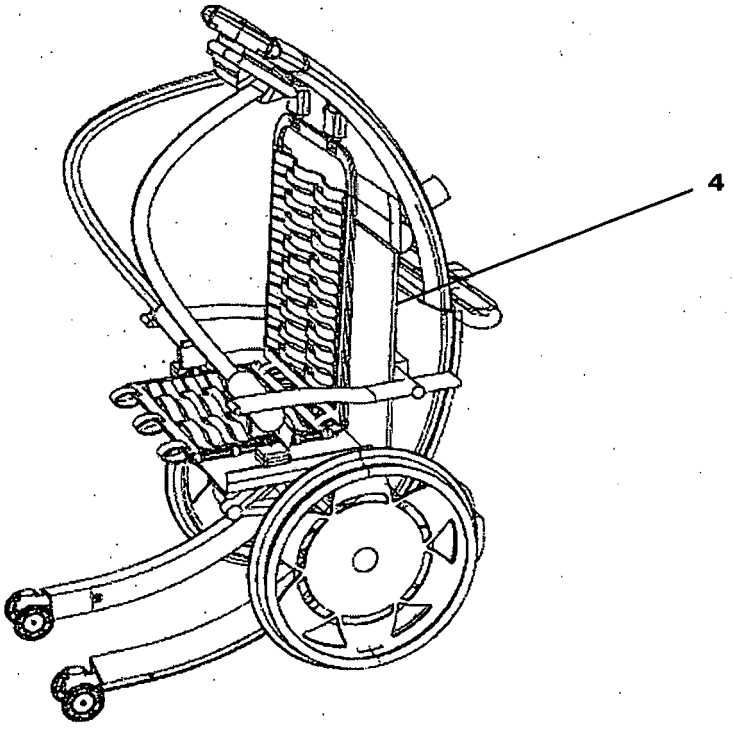


FIG. 17

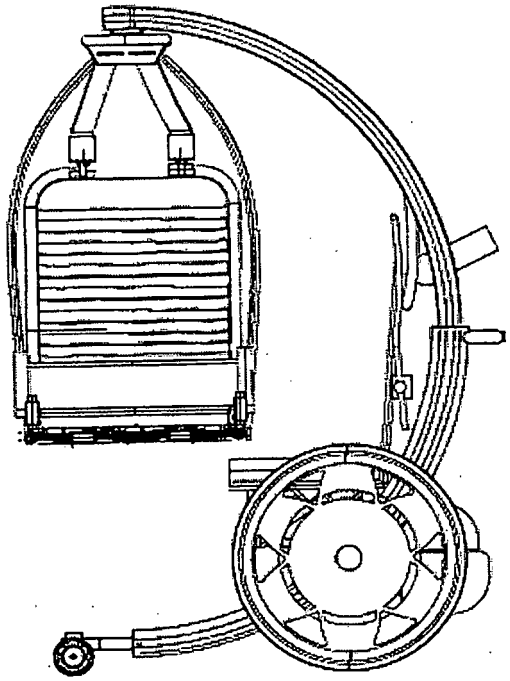


FIG. 18

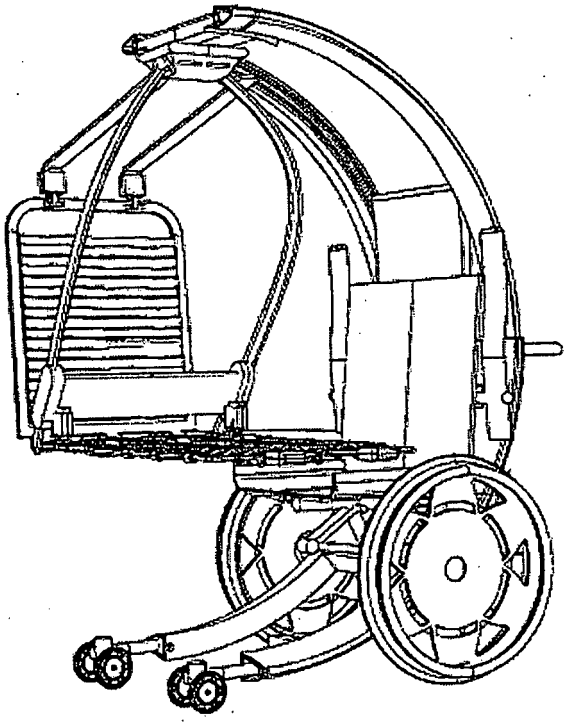


FIG. 19

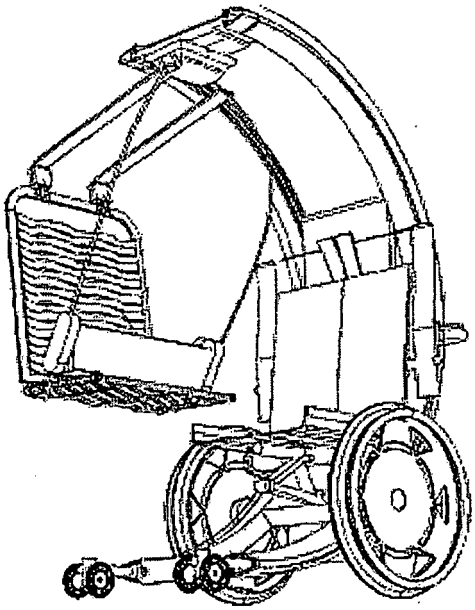
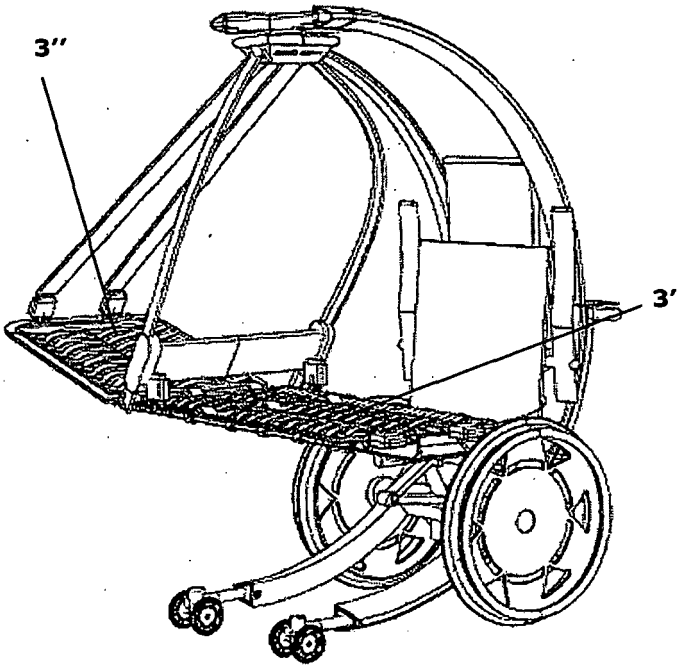


FIG. 20



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Patent documents cited in the description

- US 20060213007 A **[0006]**