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(54) **Wheelchair for sports**

(57) Wheelchair for sports (10) comprising a central cross-beam (12); a first wheel (14) having a first hub (13) connected to a first end of the central cross-beam (12); a second wheel (16) having a second hub (15) connected to a second end of the central cross-beam (12); a seat post (22) slidably connected to the central cross-beam (12); a seat (21) slidably mounted on the seat post (22); further comprising an anti-tip wheels assembly (31) connected to that end of the seat post (22) which is opposite to the seat (21), said anti-tip wheels assembly (31) comprising a first arm (35), a second arm (36), and at least two anti-tip wheels (33), each wheel being connected to said first arm (35) and to said second arm (36) through resilient means (37).

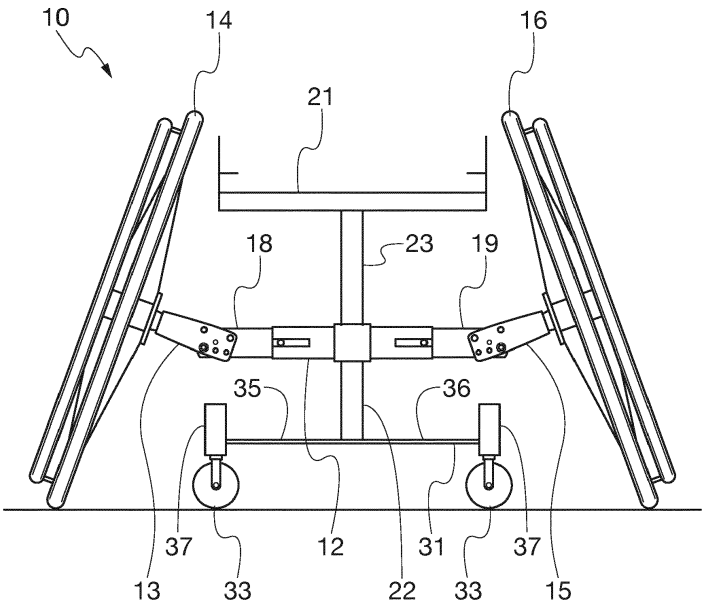

Fig. 1

EP 2 826 453 A1

Description

Technical field

[0001] The present invention relates, in general, to a wheelchair for sports, adapted to be used for sports requiring the use of a manually self-propelled wheelchair, such as tennis and basketball.

[0002] In particular, the present invention relates to a manually self-propelled wheelchair for sports provided with anti-tip wheels.

Prior art

[0003] Self-propelled wheelchairs for sports which are designed to achieve high stiffness of the structure and of the anti-tip wheels while limiting the weight of the wheelchair are known in the field.

[0004] The wheels of known wheelchairs for sports are mounted with a camber angle fixed with respect to a plane perpendicular to the support plane, in order to provide better maneuverability.

[0005] The Applicant has observed that the wheelchairs known in the field have a plurality of problems.

[0006] A first problem concerns the difficulty of adaptation and adjustment of the components of the wheelchair to the needs and to the physical characteristics of the user, and in particular they do not allow an easy adaptation to different users that share the use of the same wheelchair for practicing sports nor adaptation to the user's changing needs, which vary with his/her physical preparation and with the improvement of his/her sport skills.

[0007] A second problem is that the possible adjustments on known wheelchairs require complex interventions and cannot be made quickly on the playing field, but have to be made in a workshop.

[0008] A further problem of known wheelchairs consists in the fact that in order to maintain good traction of the wheels on the ground, the anti-tip wheels must be kept away from the ground, thus causing a pronounced pitching of the wheelchair while pushing.

[0009] Therefore, the known self-propelled wheelchairs for use in sports have a plurality of problems.

Summary of the Invention

[0010] It is an object of the present invention to provide a self-propelled wheelchairs for sports that solves the problem of eliminating or greatly reducing the pitching of the wheelchair while pushing, without decreasing the traction of the wheels.

[0011] Another object is to have a wheelchair that allows easy adjustment of its components, to be performed in a short time and without the need for specific tools, unlike the solutions adopted in the prior art.

[0012] According to the present invention, the above and other objects are achieved by means of a self-propelled wheelchair for sports defined in the characterizing part of the appended claim 1.

[0013] It is to be intended that the appended claims form an integral part of the technical teaching provided herein in the description in respect of the present invention.

Brief Description of the Figures

[0014] Further features and advantages of the present invention will become apparent from the following detailed description, given only by way of non-limiting example, with reference to the accompanying drawings, in which:

- figure 1 is a schematic front view of a wheelchair for sports according to the present invention;
- figure 2 is a schematic side view of a wheelchair for sports according to the present invention;
- figure 3 is an enlarged view of a detail of a wheelchair for sports according to the present invention; and
- figure 4 is a perspective view of a wheelchair for sports according to the present invention.

Description of Preferred Embodiments

[0015] With reference to the figures, a wheelchair for sports 10 according to the present invention comprises a central cross-beam 12, a first wheel 14 having a first hub 13 connected to a first end of the central cross-beam 12 and a second wheel 16 having a second hub 15 connected to a second end of the central cross-beam 12.

[0016] The wheelchair 10 of the invention further comprises a seat post 22 having a first end connected to a seat 21 and the opposite end connected, for example by welding, to an anti-tip wheels assembly 31.

[0017] The seat post 22 is slidably connected to the central cross-beam 12; preferably the seat post 22 is connected to the central cross-beam 12 by means of sliding guides, for adjusting the distance of the anti-tip wheels assembly 31 from the ground.

[0018] For example, in the embodiment of the invention shown in the figures, in the central cross-beam 12 there is provided a seat, within which the seat post 22 slides; preferably the seat post 22 is adapted to be locked to the central cross-beam 12 by known locking means 32, for example by quick release means, that are for example inserted in slots and holes formed in the seat post 22 and in the central cross-beam 12.

[0019] The anti-tip wheels assembly 31 comprises a first arm 35, a second arm 36 and at least two anti-tip wheels 33, each wheel being connected to the first arm 35 and to the second arm 36 through resilient means 37.

[0020] The arms 35 and 36 are made in a known manner of metal, for example aluminum, steel, titanium alloy, or even carbon fiber, so as to have a rigid structure.

[0021] Advantageously, the resilient means 37, consisting, for example, of leaf springs, are adapted to keep

the anti-tip wheels 33 in contact with the ground during the moving of the wheelchair, compensating the variations in distance between the anti-tip wheels assemblies 31 and the ground that occur when pushing the wheelchair.

[0022] In a second embodiment of the wheelchair 10 of the invention the anti-tip wheels assembly 31 comprises three arms, each arm being connected to an anti-tip wheel 33 through the resilient means 37; in a further embodiment of the wheelchair 10 of the invention the anti-tip wheels assembly 31 comprises four arms, each arm being connected to an anti-tip wheel 33 through the resilient means 37.

[0023] Preferably, the seat 21 is slidably mounted on the seat post 22; according to an embodiment of the invention the seat 21 is connected to an inner post 23 which in turn is slidably mounted with respect to the seat post 22, for example, is slidably mounted inside the seat post 22.

[0024] Preferably, the seat 21 is rotatably connected with respect to the inner post 23 by means of a first pivot 25, and is adapted to rotate about the axis of the first pivot 25 for varying its inclination; the axis of the first pivot 25 has a direction substantially perpendicular to the inner post 23 and substantially parallel to the central cross-beam 12. Preferably, the seat 21 is adapted to be locked to the inner post 23 with the desired inclination, for example up to thirty degrees, by known locking means 32, for example by quick release means, inserted for example in slots and holes formed in the seat 21, or in a plate connected to it, and in the inner post 23.

[0025] The seat of the wheelchair of the invention comprises a seat base 28 and a backrest 29 that can rotate with respect to the seat base; in a preferred manner the seat base can be inclined up to thirty degrees, and the inclination of the backrest 29 can vary by an angle between 70 and 90 degrees with respect to the seat base 28.

[0026] Optionally, the seat base of the seat 21 is slidably adjustable with respect to the post, in particular on a plane perpendicular or transverse to the post; for example, the seat 28 is adapted to slide with respect to a plate fixed to the seat post 22 or fixed to the inner post 23, and fixed by the locking means 32 or other known means inserted in holes formed in the seat and in the seat post 22 or in the inner post 23.

[0027] Preferably, the seat post 22 and the inner post 23 are constituted by a tube or a metal section, for example an extruded piece of aluminum, steel, or titanium alloy, or it can also be made of carbon fiber or other materials suitable to reduce its weight.

[0028] The wheels 14, 16 of the wheelchair for sports 10 of the invention are manually self-propelled wheels of the known type, and preferably have the camber angle, that is the inclination angle, and the distance between their hubs 13, 15, adjustable.

[0029] To allow adjustment of the camber angle the first hub 13 and the second hub 15 are rotatably connected to the central cross-beam 12, and are adapted to rotate about a pin perpendicular to the axis of the wheel, so as to allow a variation of the inclination angle of the wheel hub 13, 15 with respect to the central cross-beam 12.

[0030] For example, the first hub 13 and the second hub 15 are fork hubs, and the variation of the inclination angle of the hub is obtained by means of a plurality of reference holes which are formed in the hubs and in the central cross-beam and in which there are inserted known locking means 32, for example quick release means adapted to allow the adjustment of the inclination angle to a plurality of predefined values, by locking the rotation of the hub with respect to the cross-beam.

[0031] Preferably, the camber angle can be varied between 10 and 30 degrees; more preferably from 14 to 24 degrees.

[0032] In an embodiment of the invention the central cross-beam 12 has two movable ends; in particular a first movable cross-beam 18 and a second movable cross-beam 19 are slidably connected, for example on known guides, each at one end of the central cross-beam 12, and are adapted to adjust the distance between the first wheel 14 and the second wheel 16, allowing its adjustment.

[0033] Also in this embodiment the adjustment of the position of the movable cross-beams 18, 19 with respect to the central cross-beam 12 is obtained by means of a plurality of reference holes or slots which are formed in the movable cross-beams 18, 19 and in the central cross-beam and in which there are inserted the known locking means 32, for example quick release means adapted to lock the sliding of the movable cross-beams with respect to the central cross-beam 12. Preferably, the wheelchair 10 of the invention comprises a platform 26 for supporting the user's feet, with height and angle adjustable in a known manner, for example through the quick release means 32.

[0034] The operation of the wheelchair for sports 10 of the invention is the following.

[0035] A first adjustment of the wheelchair of the invention is the adjustment of the distance of the anti-tip wheels assembly 31 from the ground, which is realized by sliding the seat post 22 with respect to the central cross-beam 12 and locking it at the desired height, by means of the known locking means 32, for example the quick release means.

[0036] Advantageously, the wheelchair of the invention allows to adjust the distance of the anti-tip wheels assembly 31 from the ground so that the anti-tip wheels 33 are always in contact with the ground when the user is pushing the wheels 14, 16.

[0037] Moreover, the anti-tip wheels 33 remain in contact with the ground thanks to the presence of the resilient means 37, in particular when these are constituted by leaf springs, even in the presence of pitching of the wheelchair 10 and of the anti-tip wheels assembly 31, which is absorbed by the resilient means 37.

[0038] This brings about the advantage of improving

the efficiency in the transmission of the pushing force to the wheels 14, 16; this behavior is improved by the presence of three arms and three wheels in the anti-tip wheels assembly 31 and is maintained effective also in the presence of four wheels and four arms.

[0039] A second possible adjustment in an embodiment of the wheelchair 10 of the invention is that of the camber angle of the wheels 14, 16; in particular, the wheelchair of the invention allows to adjust the angle of the hubs 13, 15 so as to have one wheel with a camber angle different from that of the other wheel.

[0040] In general, the width obtainable for the camber angle of the wheels obtainable is greater in the embodiment of the invention in which there are the first movable cross-beam 18 and the second movable cross-beam 19.

[0041] In fact, in the wheelchair according to this embodiment, it is possible to space the wheel hubs by sliding the mobile cross beams 18, 19 with respect to the central cross-beam 12, thus allowing the increase of the inclination angle of the hubs 13, 15 and therefore the camber angle of the wheels, keeping the top of the wheels, on which the user acts while pushing, at the optimal distance from the seat.

[0042] Other possible adjustments in embodiments of the wheelchair according to the invention are those of the seat 21, in particular of the seat base 28, by sliding the seat post 22 or the inner post 23 with respect to the central cross-beam 12, and of the inclination of the seat base 28 and of the backrest 29.

[0043] Advantageously, the presence of a plurality of adjustable elements in the wheelchair 10 of the invention, such as the seat 21, the seat base, the inclination of the hubs 13, 15 of the wheels and their distance, allows to adapt the wheelchair 10 to the needs of the individual user, while also allowing to share the use of a wheelchair for sports practice by different users or to adapt it to changes in the playing style and ability of a user.

[0044] Moreover, the presence of the quick release means allows to adjust the wheelchair of the invention quickly "on the field" at user-level, without the need to use any equipment or tools.

[0045] In all the embodiments described the wheelchair for sports 10 of the invention advantageously allows to eliminate or strongly reduce the pitching of the wheelchair while pushing, without decreasing the traction of the wheels.

[0046] The wheelchair of the invention also has the advantage of allowing easy adjustment of its components, to be performed in a short time and without the need for special tools.

[0047] Of course, obvious changes and/or variations are possible with respect to the above description, in dimensions, shapes, materials, components, connections, as well as in the details of the illustrated construction and the method of operating without departing from the scope of the invention as defined in the appended claims.

Claims

1. Wheelchair for sports (10) comprising:

- a central cross-beam (12);
- a first wheel (14) having a first hub (13) connected to a first end of the central cross-beam (12);
- a second wheel (16) having a second hub (15) connected to a second end of the central cross-beam (12);
- a seat post (22) slidably connected to the central cross-beam (12);
- a seat (21) slidably mounted on the seat post (22), **characterized in that** it further comprises an anti-tip wheels assembly (31) connected to that end of the seat post (22) which is opposite to the seat (21), said anti-tip wheels assembly (31) comprising a first arm (35), a second arm (36), and at least two anti-tip wheels (33), each wheel being connected to said first arm (35) and to said second arm (36) through resilient means (37).

2. Wheelchair for sports (10) according to claim 1, **characterized in that** the anti-tip wheels assembly (31) comprises at least three arms and at least three anti-tip wheels (33), each wheel being connected to an arm through said resilient means (37).

3. Wheelchair for sports (10) according to any of the preceding claims, **characterized in that** said first hub (13) and said second hub (15) are rotatably connected to the central cross-beam (12) for varying the inclination angle of the wheels (13, 15).

4. Wheelchair for sports (10) according to claim 3, **characterized in that** said first hub (13) and said second hub (15) are fork hubs.

5. Wheelchair for sports (10) according to any of the preceding claims, **characterized in that** it comprises a first movable cross-beam (18) and a second movable cross-beam (19) slidably connected to an end of the central cross-beam (12) for adjusting the distance between the wheels (13, 15).

6. Wheelchair for sports (10) according to any of the preceding claims, **characterized in that** it further comprises an inner post (23) connected to the seat (21), said inner post (23) being slidably mounted with respect to the seat post (22).

7. Wheelchair for sports (10) according to claim 6, **characterized in that** the seat (21) is rotatably connected with respect to the inner post (23).

8. Wheelchair for sports (10) according to any of the

preceding claims, **characterized in that** said seat (21), said seat post (22), said inner post (23), said first hub (13) and said second hub (15) are adapted to be locked by quick release means.

9. Anti-tip wheels assembly (31) for a wheelchair for sports (10), said anti-tip wheels assembly (31) being connectable to a seat post (22) of the wheelchair (10) and comprising at least three arms and at least three anti-tip wheels (33), each wheel being connected to an arm through said resilient means (37).

10. Anti-tip wheels assembly (31) for a wheelchair for sports (10) according to claim 9, **characterized in that** said resilient means (37) are leaf springs.

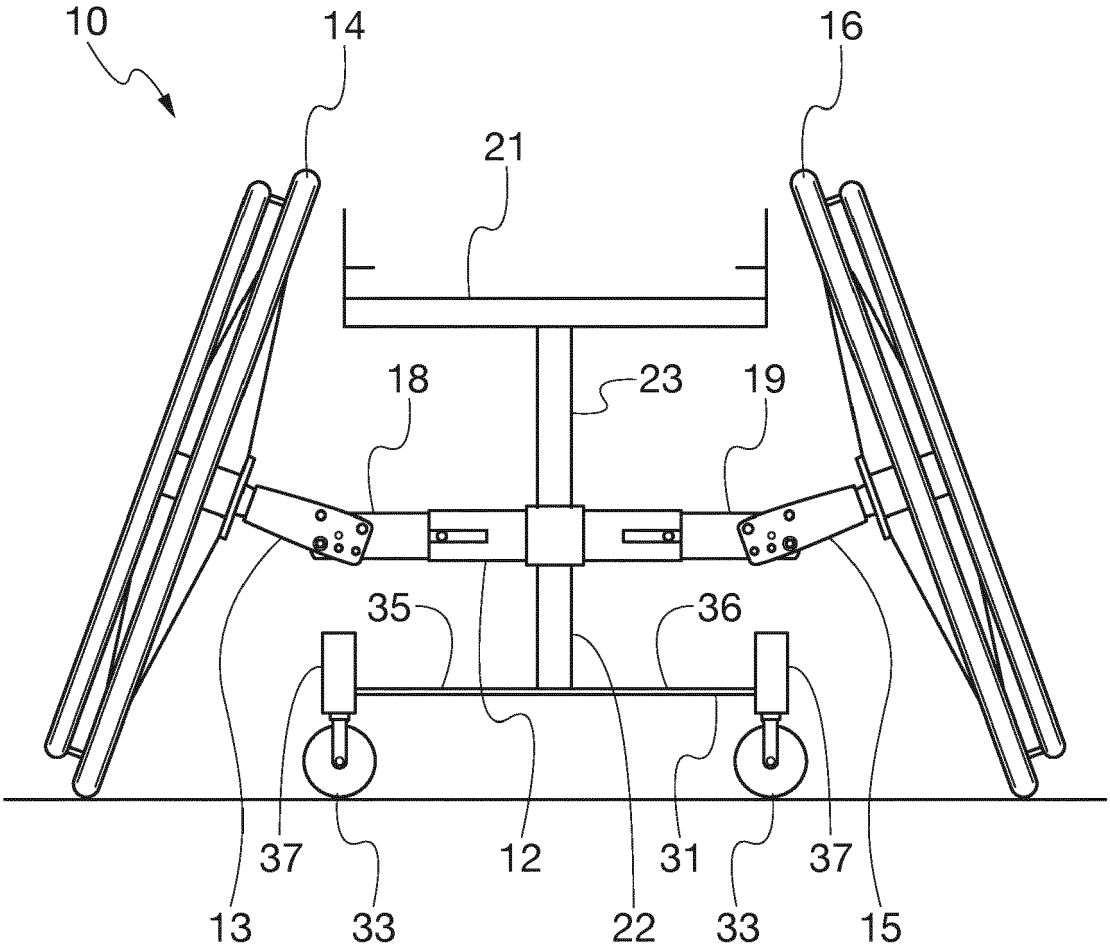

Fig. 1

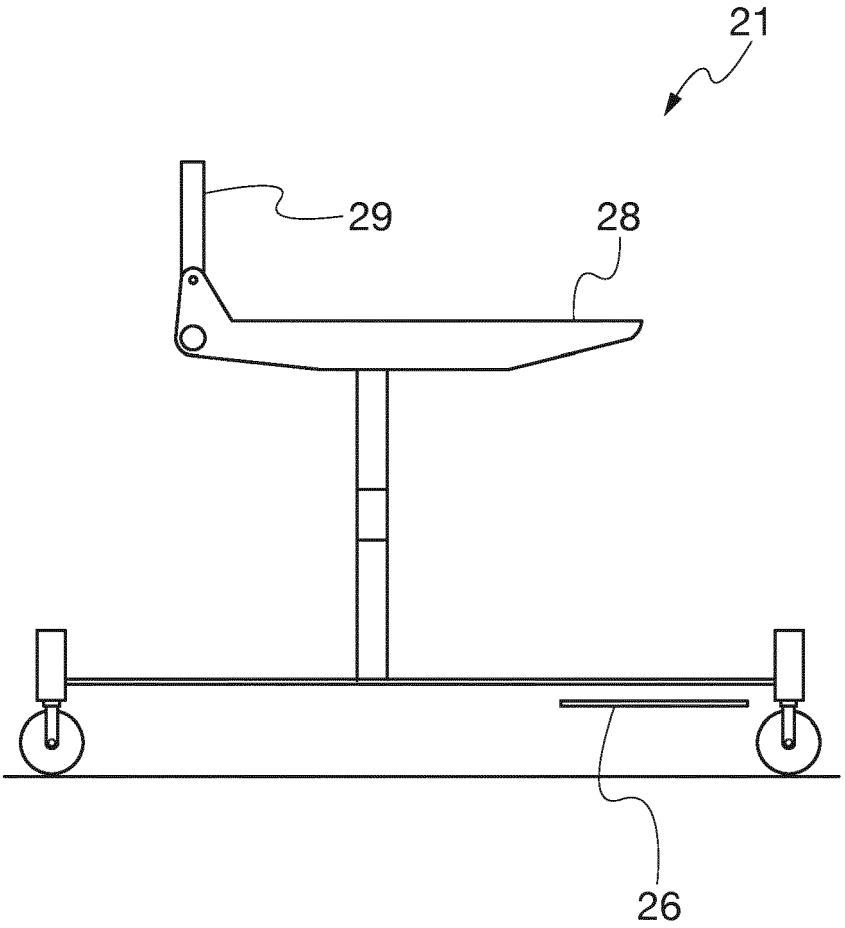

Fig. 2

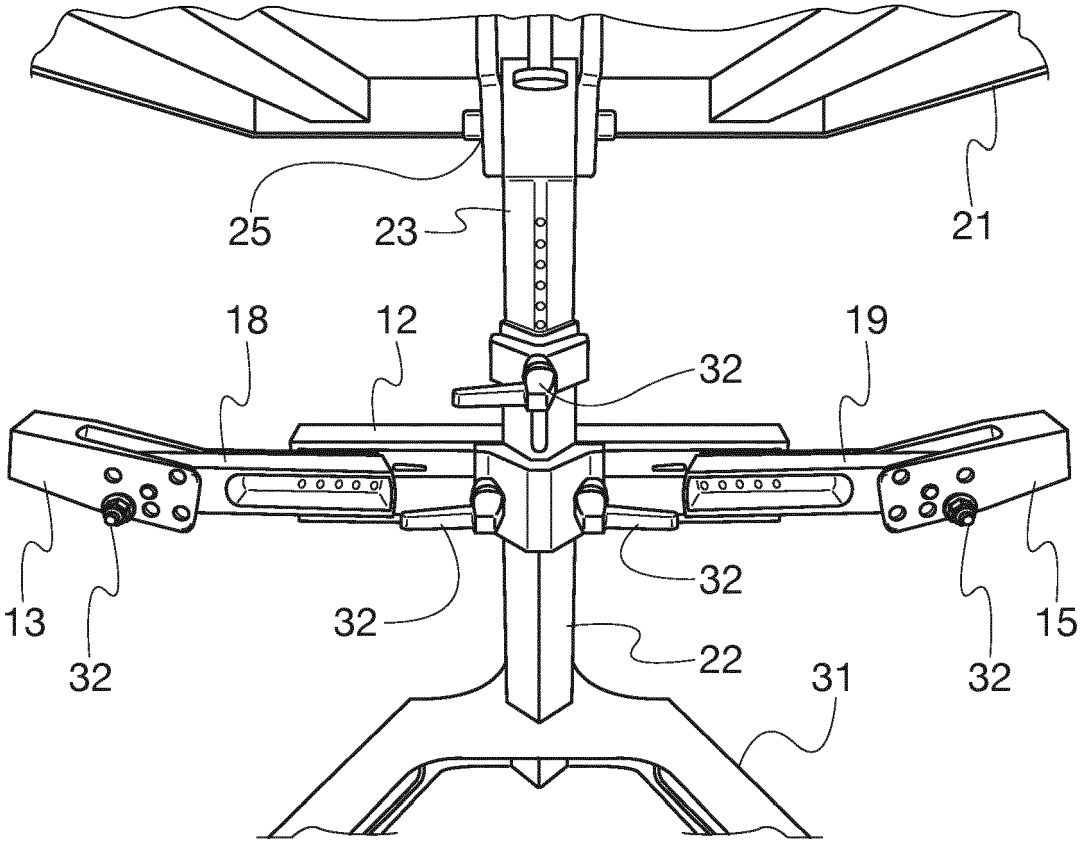

Fig. 3

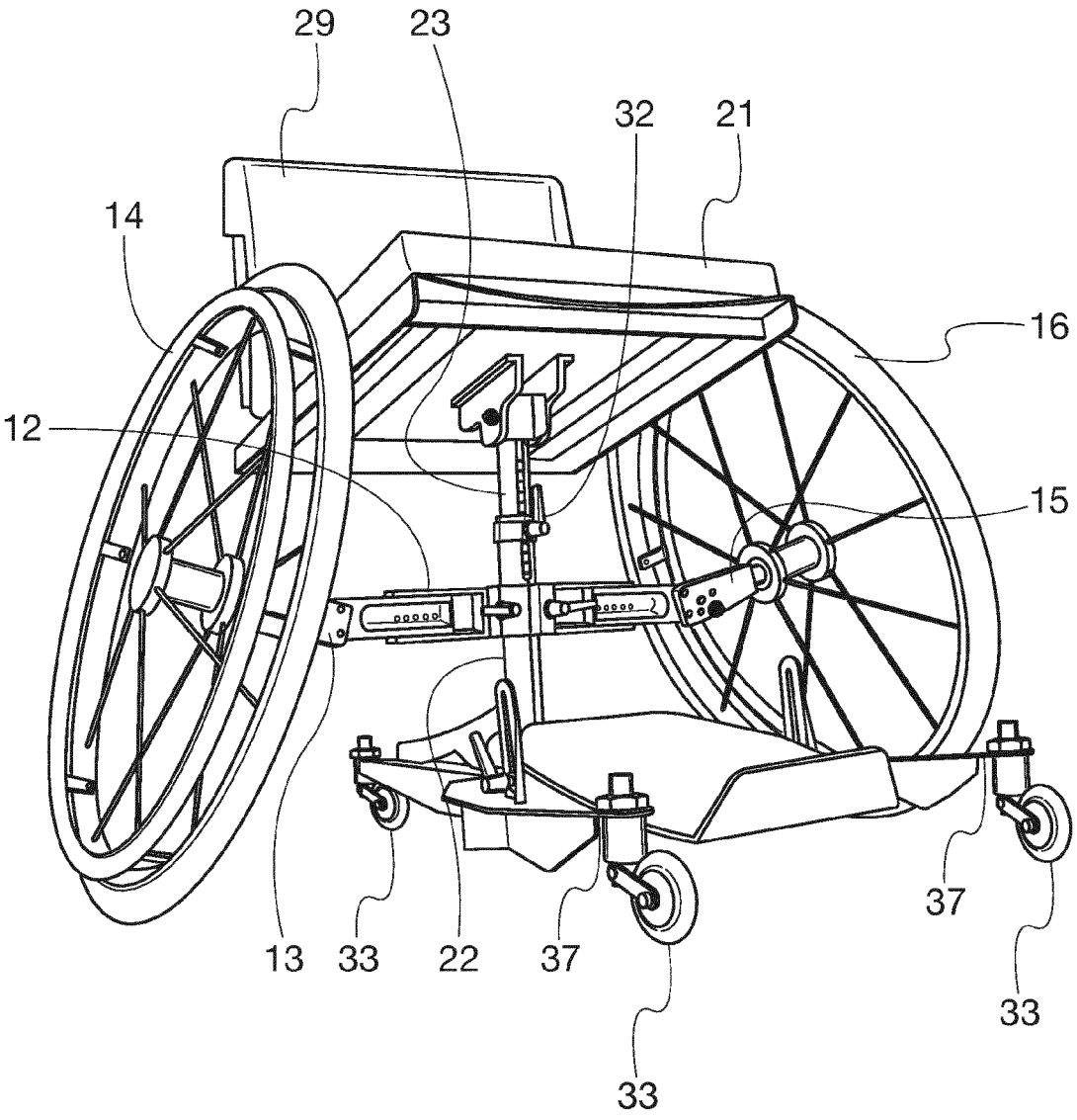

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 14 17 7501

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 October 2014	Kousouretas, Ioannis

CATEGORY OF CITED DOCUMENTS

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