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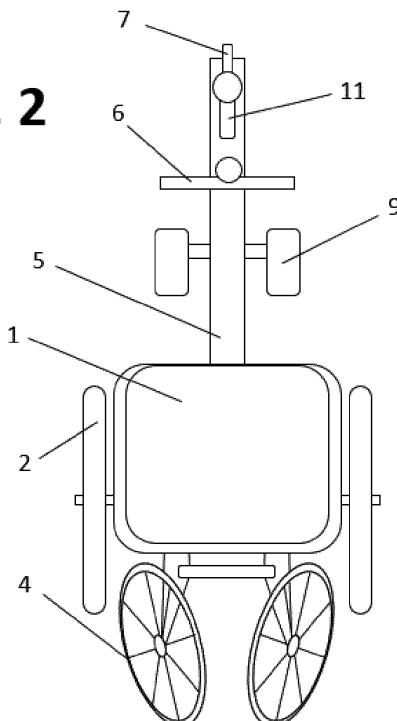
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(54) **WHEELCHAIR FOR DIFFICULT PATHS**

(57) The invention relates to a wheelchair for difficult paths, such as in mountaineering, alpinism or climbing, which comprises:

a seat (1) carried by a series of wheels (2, 3, 4), two inclined rear wheels (4) being disposed behind the seat (1) and converging at their upper rear part; and a front longitudinal extension (5) that supports a handle (6) fixed in a position facing the seat (1) and a front wheel (3) with idle rotation disposed in front of the seat.

Fig. 2



Description

SECTOR OF THE ART

[0001] The present invention refers to a wheelchair for travelling on high-impassable paths, e.g. those encountered when mountaineering. Therefore, it can be used by persons with reduced mobility in their lower body due to them being affected by either paralysis of their lower extremities, a loss of a limb, or injuries of any kind.

[0002] It is applicable in the field of adaptive sports, on paths which a regular wheelchair or any other type of adapted vehicle cannot navigate, to make it easier for them to move about and play sports or enjoy leisure activities in nature.

STATE OF THE ART

[0003] People with any kind of injury to their lower body, especially if its severity forces them to use a wheelchair, are restricted in their movements to those places where the chair can go through. However, the appearance of different types of sport adapted to disabled people has exponentially increased their chances. There are now on the market high-performance chairs for short and long races, for long distances and so on, on both flat and paved surfaces. Nevertheless, there are no chairs that make it easy to move around in natural environments, slopes, mountains or jungles, or in snow, with steep slopes, and rocky or stony terrain; those that exist are still limited by the need to have a path with the width, ground firmness and slope conditions that allows them to move upwards.

[0004] If the sportsperson wants to do any type of climbing or take any type of path that does not meet the conditions, they need a wheelchair that can be used on high-impassable paths and has aids that allow it to move under its own power or, maybe, with the minimum assistance in preparing the path.

[0005] The applicant does not know of any wheelchair similar to that of the invention, that allows travelling on almost any path (including those which are rocky and with steep slopes) and is tailored to people with mobility issues. In other words, that is independent of the slope and the conditions of the surface.

BRIEF EXPLANATION OF THE INVENTION

[0006] The invention consists in a wheelchair that can be used on high-impassable paths, such as those encountered when mountaineering, as claimed. It allows moving forward in a sloping situation and is mainly intended for people with reduced mobility in their lower body.

[0007] The chair is intended to be used in very narrow paths, with steep slopes (up to 60%) or a lot of rocks. This type of path is not accessible to or passable by other types of wheelchair or "handcycles." Thus, the chair of the invention increases the autonomy of people with re-

duced mobility.

[0008] The chair has a seat carried by a series of wheels, as usual, but these wheels are disposed in a different way. It is provided with two tilted rear wheels, disposed behind the seat, and converging on its rear upper portion. In other words, they are not parallel, and their closest point is at the rear upper area of the wheels so that it can travel on very narrow paths and act as the point of support when climbing between rocks and boulders. In addition, in front of the seat there is a longitudinal front extension that supports a front idler wheel. Thus, the chair rests on three points and is highly stable. Given that the front wheel idles, it shall preferably be of small size so that it does not distort the support area of the whole too much

[0009] The extension also has a fixed handle in a seat-facing position that can be used to incorporate optional complements such as headlamps (longitudinal and/or transverse), tilt sensors, water bottles, brake push buttons for the front wheel, and so on.

[0010] In a preferred embodiment, the chair also has a push wheel on each side of the seat, generally parallel, for propelling oneself, and preferably detachable. More preferably, its lower portion shall be on a lower plane in relation to the rear wheels.

[0011] The extension preferably supports stirrups for fastening the user's feet.

[0012] In a more preferred embodiment, the extension supports a coupling for a cable, a rope or the like to allow the user to move forward in difficult terrain using climbing-like techniques without having to use the traditional push wheels. The cable can be wound up on a drum or winder.

[0013] Other variants will be discussed in other places hereof.

DESCRIPTION OF THE DRAWINGS

[0014] A series of figures are presented to facilitate understanding the invention:

Figure 1 is a schematic side view of an embodiment example.

Figure 2 is a top view of the schematic of a second embodiment example.

EMBODIMENTS OF THE INVENTION

[0015] An embodiment of the invention is briefly described below as an illustrative, non limiting example of the latter.

[0016] The chair of the embodiment shown in the figures comprises a seat (1), preferably narrow and with a safety harness or belt, carried by a series of wheels (2, 3, 4), which fall into various types:

- Two push wheels (2), generally parallel and approximately vertical, disposed on both sides of the seat

(1). They correspond to the wheels of traditional wheelchairs for self-propulsion. Ideally they shall be detachable so as to be able to reduce the effective width of the chair.

- A front wheel (3), disposed in front of the seat (1), on a front extension (5). This front wheel (3) shall preferably idle on a vertical axis so as to be able to orientate itself in any direction. An orientation-angle limiter may be included to lock the front wheel (5) in position or to limit the possible orientations down to a precise angle.
- Two tilted rear wheels (4) disposed behind the seat (1). The rear wheels (4) have a dual tilt so as to converge towards its rear upper portion. In other words, on the one hand, they converge at its upper portion (the upper area of both rear wheels (4) is closer to the longitudinal axis of the chair than the lower portion) and, on the other, they converge at its rear portion (the rear end of the horizontal diameter of the rear wheels (4) is closer to the longitudinal axis of the chair than the front end).

[0017] The rear wheels (4) shall be more elevated than the push wheels (2) so that they only touch the ground if the chair tilts backwards or if the push wheels (2) have been detached. Thus, in the second situation they shall lower the centre of gravity of the whole to increase the stability. If desired, the rear wheels (4), or any other wheel (2, 3) or shaft, will have suspension or shock-absorbing equipment.

[0018] The extension (5) of this embodiment can be seen particularly well in Figure 1. It consists in a horizontal profile joined to the lower portion of the seat (1) and the front wheel (3). A fixed handle (6), which shall be disposed in a position that is easy to reach by the user of the chair, emerges from the profile. It can be used by the person with reduced mobility to rest their arms on and adopt a comfortable posture.

[0019] A tilt sensor (gyroscope, accelerometer, bubble level...) allowing the user to know the tilt of the chair on the longitudinal and transverse axes and hence the risk of overturning can be situated on this handle (6). A brake, with a Bowden cable, for the front wheel (3) or for the push wheels (2) can also be placed thereon. The chair can have a 360° camera built in for recording and studying the terrain, a GPS and a pivoting compass, as well as a parasol, backup electric motors (preferably on the push wheels (2)), batteries, and a solar panel for recharging the latter.

[0020] The chair has, e.g. on the handle (6) or before it, a coupling (7) for a cable (8) or the like that allows the chair to be anchored to a fixed point. A safety rope or lifeline like those used for climbing can thus be installed. Indeed, this cable (8) allows the user of the chair to haul themselves up by pulling or winding it up. The winding-up can be done on a drum with two handles for manual turning or on a motor-driven drum, by hauling oneself up or by means of the "rope and fist" climbing technique. If

the cable (8) is not wound up on that point, a winding system can be installed behind the seat, or at its height. This winding system can be a drum with a loosely coiled spring that winds up the slack cable (8) or a winder.

[0021] A more complex solution would be to assemble a hook on one end of the cable (8) that allows the chair to be anchored, or even a cable system for launching said cable (8).

[0022] It can be seen in the figures that the extension (5) comprises stirrups (9) for fastening the user's feet, and, likewise, it can have a fastener for the knees. It is thus guaranteed that there will be no uncontrolled motions of the lower body.

[0023] The chair in the figures comprises a handhold (10) on its back to enable a person accompanying the user to help the latter at certain times. On the one hand, it allows helping the chair to be placed at the starting position and, on the other, it will allow to offset or stop the overturning of the chair. This function is also performed by the handle (6) on the opposite end of the chair. A handle (11) on the rear portion helps the chair to be moved and orientated to the starting position.

[0024] It is advisable to reduce the weight of the chair to the maximum, so the parts shall be reduced to the maximum and light materials chosen.

[0025] The chair shall be assemblable by the user or their companions, it being able to be provided as a Mecano-type construction kit, with parts in a case, and with spare replacement parts.

Claims

1. A wheelchair for high-impassable paths, such as those encountered when mountaineering and practising mountain climbing or climbing, which has a seat (1) carried by a series of wheels (2, 3, 4), characterized in that it has:

Two tilted rear wheels (4), disposed behind the seat (1), and converging on its rear upper portion;
a longitudinal front extension (5) that supports:

a handle (6) fixed in a position facing the seat (1)
a front wheel (3) disposed in front of the seat and which idles; and
a push wheel (2) on each side of the seat (1) for self-propulsion.

2. The wheelchair according to claim 1, characterized in that its push wheels (2) are detachable.

3. The wheelchair according to claim 1, characterized in that its push wheels (2) are on a lower plane in relation to the rear wheels (4).

4. The wheelchair according to claim 1, **characterized**
in that its extension (5) supports stirrups (9) for fastening the user's feet.
5. The wheelchair according to claim 1, **characterized** 5
in that its handle (6) has a longitudinal- and transverse-tilt sensor.
6. The wheelchair according to claim 1, **characterized**
in that its front wheel (3) has an orientation-angle 10 limiter.
7. The wheelchair according to claim 1, **characterized**
in that its handle (6) comprises a brake of the front wheel (3). 15
8. The wheelchair according to claim 1, **characterized**
in that its extension (5) supports a coupling (7) for a cable (8) or the like. 20
9. The wheelchair according to claim 8, **characterized**
in that it comprises a drum or winder for winding up the cable (8) or the like.
10. The wheelchair according to claim 1, **characterized** 25
in that it comprises a handhold (10) behind the seat (1).

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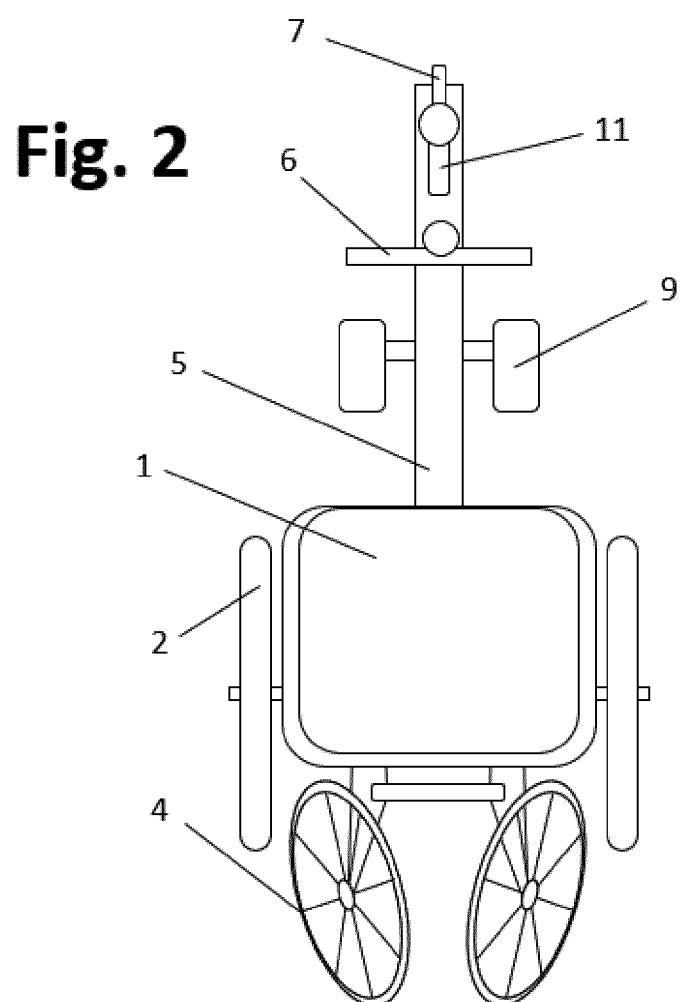
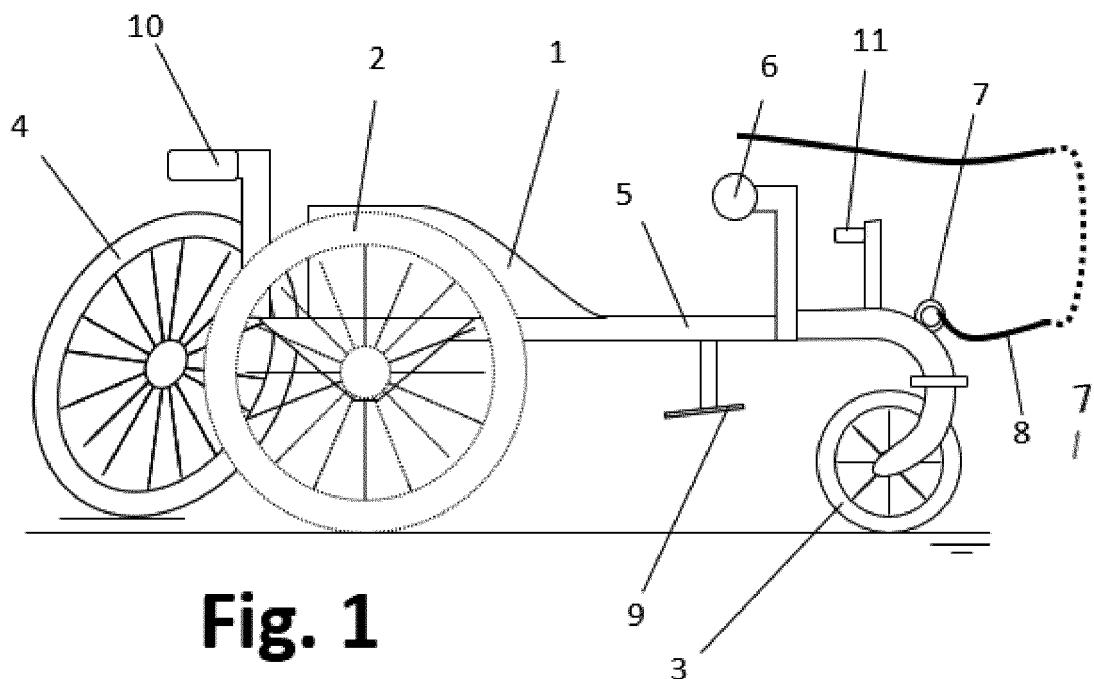
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070488

A. CLASSIFICATION OF SUBJECT MATTER

A61G5/10 (2006.01)

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)

A61G

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

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

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5573260 A (PETERSON CHRISTOPHER J ET AL.) 12/11/1996, description; figures 1 - 9.	1-11
A	KR 20160000075 A (KOREA IND TECH INST) 04/01/2016, description; figures 1 - 12.	1-11
A	US 5421598 A (ROBERTSON A SCOTT ET AL.) 06/06/1995, description; figures 1 - 29.	1-11
A	US 5605345 A (ERFURTH RONALD L ET AL.) 25/02/1997, description; figures 1 - 29.	1-11

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier document but published on or after the international filing date		
"L" document which may throw doubts on priority claim(s) or "X" which is cited to establish the publication date of another citation or other special reason (as specified)		document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"P" document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search 26/09/2019	Date of mailing of the international search report (30/09/2019)
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer J. Moreno Rodriguez Telephone No. 91 3495556

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INTERNATIONAL SEARCH REPORT		International application no.		
Information on patent family members		PCT/ES2019/070488		
5	Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
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15	KR20160000075 A	04.01.2016	JP2017518838 A JP6450782B B2 CN106572937 A CN106572937B B KR101598481B B1 WO2015199334 A1	13.07.2017 09.01.2019 19.04.2017 23.07.2019 02.03.2016 30.12.2015
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