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(54) Device for the disabled

(57) Device for the disabled comprising a support structure (21) on which a seat (20) is mounted, a pair of first wheels (15) cooperating with the lateral sides of said support structure (21), and tracked means (11, 12) solidly associated with said support structure (21), in which first actuation means (33, 35, 37) are suitable to selectively vary, depending on the desires of the disabled person, the vertical position of said first wheels (15) and/or of said tracked means (11, 12), said first actuation means (33, 35, 37) being governed by command and control means (40) controlled by the disabled person.

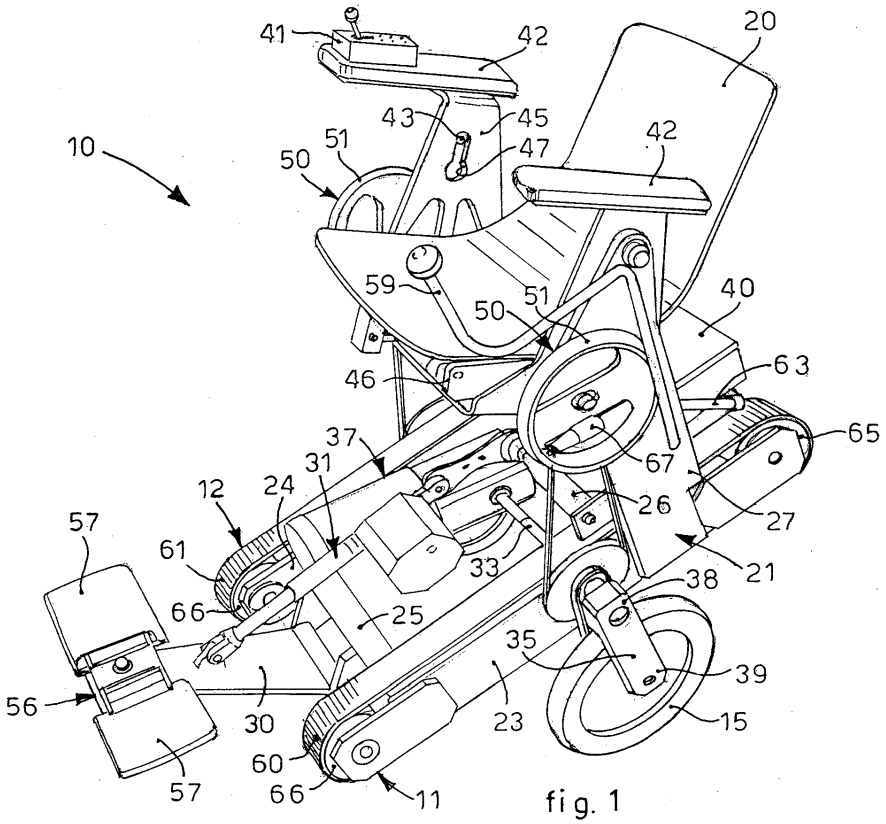

fig. 1

EP 2 452 662 A2

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a device for the disabled which allows a person with problems in walking to be able to move independently, of other people or of auxiliary equipment associated with stairs or with means of transport to overcome architectural barriers which the disabled may encounter in the space in which they move.

[0002] By architectural barriers, here and hereafter in the description and the claims, we mean steps, stairs, pavements or differences in height in general.

BACKGROUND OF THE INVENTION

[0003] A problem keenly felt by those with problems in walking is to overcome architectural barriers that they may encounter in the space in which they move, and which prevent them from easily reaching a desired destination.

[0004] For this reason civil and town planning interventions have tried to eliminate such architectural barriers, such as for example by making slopes or inclinations near the access to public places, pavements or suchlike.

[0005] However, it should be noted that the physical effort required of a person sitting on a wheelchair to overcome these slopes or inclinations is considerable, and not all people with such problems can apply such effort. Furthermore, in the process of overcoming the obstacles, the person may lose his/her balance and fall, or in the case of inclinations, may have difficulty in stopping the wheels. Many buildings have been provided with elevators or suitable stairlifts which provide to move such people.

[0006] It should also be noted that these equipment and devices are not only invasive on civil structures, but also they have not been adopted in every building and this, still now, limits people's movements.

[0007] To this purpose an apparatus equipped with tracks is known which, in case of need, is associated with the wheelchair on which the person with problems in walking is seated, and allows to overcome the architectural barriers such as, for example but not only, the stairs of a building.

[0008] This apparatus allows to attach a wheelchair of the traditional type and motor members provide to drive the tracks to overcome the architectural barrier.

[0009] The tracks are commanded and controlled by a third person, thus entailing problems of coordination with the disabled person. There are also problems of balance and correct positioning of the disabled person on the equipment.

[0010] As soon as the architectural barrier has been overcome, the wheelchair is detached from the apparatus so that the person with problems in walking can move independently.

[0011] All the operations described above require the assistance of another person who, as well as attaching the wheelchair, must also control and drive the movement thereof. To this must also be added a considerable time required for carrying out the operations of attachment and detachment, as well as the considerable physical effort required of the assistant.

[0012] Furthermore, there is also the problem of transporting the apparatus itself to the spaces where it is needed, and hence further problems in terms of time, effort and storage.

[0013] This known apparatus, moreover, given its bulk and weight, is not suitable to being transported and used in all the zones where it would be required.

[0014] One purpose of the present invention is to achieve a device for the disabled which allows the disabled to move normally in spaces with and without architectural barriers and which, when said architectural barriers are found, allow them to be overcome without requiring the intervention of auxiliary people or further equipment, making the disabled independent.

[0015] Another purpose of the present invention is to prevent physical effort by third parties, to simplify its use both during normal movement and also when architectural barriers have to be overcome.

[0016] Another purpose of the present invention is to achieve a device for the disabled that does not require the person transported to apply considerable physical effort in order to move.

[0017] Another purpose of the present invention is to achieve a device for the disabled with a limited bulk, such as not to prevent its movement even in normal living spaces, or prevent it from being transported, for example, in the trunk of an automobile.

[0018] Another purpose is to achieve a device for the disabled which, although it allows to overcome architectural barriers and to move the person transported, does not prevent it being used both as a wheelchair and as an integrated device, in order to keep the person transported active, as far as possible, from a physical point of view.

[0019] A further purpose is to is to achieve a device for the disabled which keeps the person transported always in a condition of balance, preventing sudden oscillations and losses of balance.

[0020] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0021] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0022] In accordance with the above purposes, a device for the disabled comprises a support structure, on the upper part of which a seat is mounted, and at least a pair of first wheels which are mounted rotatable on the

support structure.

[0023] According to a characteristic feature of the present invention, tracked means are provided in association with first actuation means connected to the first wheels and suitable to adjust on each occasion the set-up of the device for the disabled to the requirements of the route.

[0024] The first actuation means are also suitable to lift or lower the user, so as to allow him/her to grip objects at variable heights, and also to position the tracked means in a controlled manner.

[0025] According to another feature, the first actuation means are governed by command means that are controlled by the disabled person.

[0026] According to a variant, the command means may be of the mechanical type, electromechanical or servo controlled by a central command unit.

[0027] According to a variant, the tracked means comprise two tracks, selectively drivable, to allow the movement both rectilinear and curved of the device for the disabled, and each disposed advantageously on a lateral side of the support structure.

[0028] According to another feature, the support structure comprises a front part with which a front wheel is associated, which together with the first wheels allow the manual movement of the device for the disabled.

[0029] According to another feature, a footboard is pivotably connected to the front part, and the front wheel is associated with the footboard. Furthermore, actuation means are provided which orient the footboard with respect to the support structure to position the front wheel. By driving the actuation means a consequent inclination is obtained of the front part of the support structure so that even architectural barriers of a limited height can be overcome.

[0030] According to another feature of the present invention, the front part of the support structure comprises a crosspiece disposed transverse to the longitudinal extension of the tracked means and disposed in proximity with an end portion of the latter. Furthermore, during use, the footboard is disposed protruding with respect to the bulk of the tracked means, in this way allowing the front wheel associated therewith to protrude with respect to the bulk of the tracked means.

[0031] This particular disposition of the footboard allows the device according to the present invention to overcome architectural barriers of limited height as well, since it is able to take the front wheel above the architectural barrier and thus to take the tracks into a position where they are resting on the architectural barrier itself.

[0032] The fact of providing the footboard and also the front wheel protruding with respect to the bulk of the tracked means not only allows to house, in proximity to the free zone, the various components needed for moving the device for the disabled according to the present invention, but also allows to have a greater range in lifting the front wheel. This greater range in height therefore allows to overcome architectural barriers with a considerable height, for example, up to 30 cm.

[0033] According to another feature, the first actuation means comprise a shaft mounted rotatable on the support structure and two lateral arms each having a first end solid with the shaft and a second end on which one of the front wheels is mounted rotatable.

[0034] Another feature of the present invention provides that the seat cooperates with leveling means suitable to maintain the seat part substantially horizontal, so that during the lifting or lowering of the device for the disabled there is no unbalancing of the person transported.

[0035] According to one feature of the present invention, the leveling means comprise first pivoting elements associated with the seat and second pivoting elements associated with the support structure and cooperating with the first pivoting elements to allow the seat to rotate.

[0036] According to another feature, the leveling means comprise a fulcrum around which the seat can at least partly rotate; the fulcrum is advantageously disposed in an upper position, or at least on a level with the center of gravity of the disabled person when he/she is sitting on the seat.

[0037] According to a variant, the seat comprises damping devices to damp the oscillations, and control devices to control the rotation thereof, to prevent sudden oscillations.

[0038] According to another feature, the damping devices comprise damping pistons of a hydraulic or pneumatic type, associated with the seat and the support structure,

[0039] According to another variant embodiment, the seat comprises sliding means that allow to translate the seat horizontally both to maintain the distribution of the load balanced when architectural barriers are overcome, and also to allow the person seated to get out, for example to move to other seats, chairs, other types of wheelchair, bed or other.

[0040] According to a variant, other actuation means, commanded by the command and control means, are provided to actuate the sliding of the seat along the sliding means.

[0041] According to another variant, the front wheels are associated with manual movement means to move the device for the disabled by the person seated in it. In particular, the manual movement means provide to make the rear wheels rotate around their center of rotation and, together with the front wheel, determine the manual movement of the device.

[0042] According to one form of embodiment, the manual movement means comprise at least a steering wheel mounted rotatable on the support structure and transmission means suitable to transmit the motion from the steering wheels to the pair of first wheels.

[0043] According to another feature of the invention, the transmission means are chosen from a group comprising transmission means with chains, belts, gears.

[0044] According to another feature, the device for the

disabled has a transverse bulk comprised between 40 cm and 80 cm, advantageously between 55 cm and 65 cm, to allow it to be moved even in normal living spaces, and to facilitate transport thereof. Moreover, the total bulk sizes of the device for the disabled are completely comparable to those of a normal sized wheelchair.

[0045] The present invention also concerns the relative method for overcoming architectural barriers with the device for the disabled as described above.

[0046] In particular the method comprises a first step in which the device for the disabled is moved along a plane toward the architectural barrier to be overcome, disposing its rear part facing toward the architectural barrier; a second step in which, by means of the first actuation means, the vertical position of the first wheels and/or the tracked means is varied so as to dispose at least a part of the tracked means resting on at least part of the architectural barrier, keeping the first wheels on the plane; a third step in which the first actuation means are activated to dispose the first wheels in a position where they do not interfere with the movement of the device; and a fourth step in which the tracked means are activated to move the device on the architectural barrier.

[0047] Furthermore, a method for overcoming architectural barriers may also be provided which is carried out with the front part of the device for the disabled. In this case, at least a step is provided in which the device for the disabled is moved along a plane toward the architectural barrier to be overcome, disposing its front part facing toward the architectural barrier; a step in which the footboard is lifted by means of second actuation means, to take the front wheel associated therewith to a height equal to or more than the height of the architectural barrier; a step in which the device is made to advance, to dispose the front wheel above the architectural barrier; a step in which the second actuation means are activated to rotate the footboard so as to take the tracked means to the same height as the architectural barrier; and a step in which the device is moved along the architectural barrier.

[0048] It is also provided that, at least while the architectural barriers are being overcome, the damping devices are activated, possibly by the command and control means, in order to damp the oscillations of the seat which is kept substantially horizontal by the leveling means.

BRIEF DESCRIPTION OF THE DRAWINGS

[0049] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic perspective representation of the device for the disabled according to the present invention, in a first configuration;
- fig. 2 is a schematic representation of fig. 1 in a second configuration;
- fig. 3 is a schematic representation of fig. 1 in a third configuration.

[0050] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0051] With reference to the attached drawings, a device for the disabled is indicated in its entirety by the reference number 10 and comprises, in its essential parts, a support structure 21, a pair of first wheels 15, tracked means, in this case two in number 11, respectively 12, a front wheel 17 and a seat 20 that is hinged on the support structure 21 which in turn is solid with the tracked means 11, 12,

[0052] The support structure 21 (fig. 1) comprises in its entirety two side-members 23 and 24 on which, in a known manner, the tracked means 11 and 12 are mounted.

[0053] The side-members 23, 24 are distanced from each other by a front crosspiece 25 and a rear crosspiece 26 which keep the two tracked means 11 and 12 distanced from each other.

[0054] The transverse bulk of the device for the disabled 10, solely to give an example, is comprised between 60 and 65 cm. On the contrary, its longitudinal bulk is about 80 cm.

[0055] The tracked means 11 and 12 in this case comprise tracks 60 and 61 of a known type, fiber-reinforced and provided with teething to increase the gripping action on the ground.

[0056] Each of the tracks 60 and 61 is mounted respectively on a rear drive pulley 65 and a front return pulley 66 and two different motors 68 (fig. 3), disposed behind the seat, transmit motion, either directly or by means of transmission members, to the respective drive pulleys 65.

[0057] Using different motors to drive the tracked means 11 and 12 is indispensable to allow the device for the disabled 10 to steer.

[0058] Merely as an example, the motors 68 used are motor-reducers of an electric type and each have a power of about 250 W.

[0059] The tracked means 11 and 12 also comprise, in a known manner, tensioner members mounted on the return pulley 66, which keep each track 60, 61 under tension, preventing any slipping.

[0060] In substantial proximity to the center line of each side-member 23, 24, and externally to them, a support 27 respectively 28 is attached, disposed substantially orthogonal to the side-members 23 and 24 and on which the seat 20 is housed as will be described hereafter.

[0061] A footboard 30, on which the front wheel 17 is pivotably mounted, is hinged to the front crosspiece 25,

along one side, in a known manner.

[0062] The front wheel 17 is smaller than the wheels 15, for example 125 mm. Actuation means, in this case a screw jack 31 driven by an electric motor, are hinged both to the footboard 30 and to the rear crosspiece 26, and allow to incline the footboard 30 and therefore the front wheel 17 with respect to the ground. Merely to give an example, the footboard 30 (fig. 2) can be rotated in a clockwise direction by an angle of about 80° so that the front wheel 17 is lifted by about 200 mm from the floor P. Moreover, the screw jack 31 also allows to lower the footboard 30 with respect to the plane of movement so that the front wheel 17 lifts the device for the disabled 10, inclining it on the front part by about 5 cm.

[0063] The footboard 30 (fig. 1) also comprises a footrest 56 having two plates 57 hinged and partly rotatable around the footboard 30 so as to take them into conditions where they do not impede the user, for example when he/she has to get out of the device for the disabled 10.

[0064] The positioning means comprise a shaft 33 and two lateral arms 35 of the two first wheels 15.

[0065] In particular, near the center line of the two side-members 23, 24, the shaft 33 is mounted passing through them and protrudes, on both sides, toward the outside so that on the two protruding ends the two arms 35 of the rear wheels 15 are mounted through same-shape coupling.

[0066] Each arm 35 has a first end 38 associated with the shaft 33 and a second end 39, opposite the first, on which the wheel 15 pivots.

[0067] The shaft 33 is made to rotate around its own axis of rotation by means of a drive member 37, of an electric type, which is connected directly to it and is attached to the support structure 21.

[0068] By making the shaft 33 rotate, it is possible to make the arms 35 of the wheels 15 rotate, said wheels 15 being attached to said arms 35, with a consequent inclination and lifting or lowering, from the rear part, of the device for the disabled 10.

[0069] Simply as an example, the device for the disabled 10 can be lifted from the ground at the rear by about 50 cm.

[0070] Each wheel 15 is also connected to manual movement means 50 which comprise two steering wheels 51, each of which is provided with a knob 67 and is pivoted on the outer part of the respective support 27 or respectively 28. Each steering wheel 51 is solid and coaxial with a first toothed wheel 52 for the transmission by means of chains to a second toothed wheel 53 which is hinged to the end, external with respect to the respective side-member 23, 24 of the shaft 33.

[0071] A third toothed wheel 54, more external than the second 53 and solid with it, provides to transfer the motion with transmission by chain to a fourth toothed wheel, not visible in the drawings, which is solid with it and in axis with the respective wheel 15.

[0072] In this way the operator, acting on both the knobs 67 of the two steering wheels 51, is able to make the wheels 15 rotate so as to allow the whole device for the disabled 10 to move forward.

[0073] It is quite clear that the sizes of the toothed wheels and hence the respective transmission ratios are such that an optimum compromise is achieved between bulk and effort required from the user to move with the device for the disabled 10.

[0074] In another form of embodiment the manual movement means may also comprise motorized means to drive the wheels 15, or in still other forms of embodiment, may comprise gears able to reduce the effort required and vary the speed of rotation of the wheels 15.

[0075] In other forms of embodiment, the wheels 15 comprise disc or drum type brakes to brake the device 10 for example on slopes.

[0076] During the lifting and lowering of the device for the disabled 10, the seat 20, due to the weight of the person seated upon it and because it is pivoted to the supports 27 and 28, tends to remain with the seat plane substantially horizontal.

[0077] More specifically, each support 27 and 28 comprises a pivoting pin 43 of the seat 20 around which the latter can rotate.

[0078] The seat 20 is mounted on a support element 45 conformed substantially as a cradle. In particular, between the seat 20 and the support element 45 two sliding guides 46 are interposed, solid with the support element 45 and a linear jack 48 which provides to make the seat 20 slide along the sliding guides 46, in order to maintain a distribution of the weight on the device so that it does not overbalance.

[0079] Each of the two parallel and vertical sides of the support element 45 comprises leveling means, in this case an eyelet 47 that allows it to pivot around the two pins 43 of the two supports 27 and 28 of the support structure 21, in order to keep the seat substantially horizontal.

[0080] Damping pistons 63, of a hydraulic or pneumatic type, selectively activated, are associated with the support element 45 and the support structure 21 to limit the oscillations of the seat 20 when a user is seated on it. This solution allows to avoid a sudden imbalance of the person once he/she is seated and is overcoming an architectural barrier, for example, and de-activating them stops the oscillation of the seat 20, for example allowing the user to get out.

[0081] The damping action of the damping pistons 63 is activated and controlled by the central unit 40 during the different movements of the device. The central unit 40 may also possibly control and adjust the intensity of the damping and adjust it for example to the sensitivity of the user sitting on the seat 20, or to his/her weight.

[0082] On the parallel and vertical sides of the support element 45 of the seat 20, at the respective upper ends, respective armrests 42 are attached.

[0083] On one of the two armrests 42 a command device 41 is mounted, selectively removable, which is commanded by buttons and devices such as a joystick by the

person seated thereon.

[0084] The command device 41 is governed by the central unit 40 disposed behind the seat 21, which commands the different movements of the device for the disabled 10.

[0085] More specifically, the central unit 40 is equipped with suitable predetermined programs to overcome the architectural barriers of a standard type, such as for example a single step of a limited height or ascent or descent of a flight of stairs.

[0086] Detection sensors are associated with the actuation means 31 of the footboard 30 and with the drive motor 37 of the shaft 33, to detect whether respectively the front wheel 17 or the rear wheels 15 are gripping the ground or raised. Signals detected by the sensors are sent to the central unit 40 to be processed during the execution of the pre-established programs. Other sensors detect the different positions of the footboard 30, the rotation of the shaft 33, and the rotation and inclination of the tracks 60 and 61, and send signals in order to block the device for the disabled if dangerous conditions for the user occur.

[0087] In a containing box, behind the seat, batteries of the rechargeable type are disposed for the accumulation of electric energy, for example 10 Ah lithium batteries, to feed the drive motor 37, the actuation means 31, the two motors of the tracked means 11 and 12 and the central unit 40.

[0088] The support 27 of the frame 21 is also provided on its outer side with a gripper mean 59 to stabilize the user during movement and when obstacles are overcome. The device for the disabled 10 functions as follows.

[0089] The device for the disabled 10 in the configuration shown in fig. 2, that is, with the front wheel 17 and the rear wheels 15 raised from the ground, has the tracks 60 and 61 in contact with the floor P and can therefore move by driving the tracks rectilinearly and also by steering.

[0090] The same movement can be obtained when the front wheel 17 is completely lowered and, thanks to the screw jack 31, lifts the device for the disabled 10 from the ground, inclining it frontward, since the tracks 60 and 61, continuing to grip with their rear portion on the floor P, allow the whole device for the disabled 10 to move.

[0091] Architectural barriers of limited height, such as for example a step, can be overcome either by drawing up to the step frontally and driving the front wheel 17, or by drawing up to it backward and driving the rear wheels.

[0092] If the user intends to pass over the step frontally, he/she commands the front wheel 17 to be completely lifted, making the footboard 30 rotate in an anticlockwise direction; he/she makes the device for the disabled 10 move forward by means of the tracked means 11 and 12 until the front part of the tracks 60 and 61 comes into contact with the step B to be overcome, and until the front wheel 17 is taken above the step B.

[0093] In this condition, the user commands the front wheel 17 to be lowered by the screw jack 31 which, pivoting on the step B, lifts the device for the disabled 10 at the front until the tracks 61 and 62 are taken to the same level as the step B. The tracks 61 and 62, remaining with a rear portion gripping on the floor P, allow the whole device for the disabled 10 to move forward. During this forward movement the tracks 60 and 61 grip on step B. In this position, the front wheel 17 is commanded to lift, so as to allow the front part of the tracks 60 and 61 to grip with the plane of step B, and also the rear wheels 15 are commanded to lower, so as to lift the device for the disabled 10 at the rear and take it to a horizontal condition with respect to the step B.

[0094] In this step, to prevent the device for the disabled 10 from overbalancing, the seat 20 is commanded to move forward, by driving the screw jack 48, in order to distribute the load substantially on the front part of the tracks 60 and 61. It is then possible to lift the rear wheels 15 again, leaving their rear part cantilevered over the step B without any danger of overbalancing backward. By driving the tracks 60 and 61, the entire device for the disabled 10 then moves forward.

[0095] In a flat zone without obstacles, the device for the disabled 10 can be used manually, by driving the steering wheels 51.

[0096] More specifically, when the user is in the position just described (fig. 2), that is, with the tracks completely gripping the floor P and with front wheel 17 and wheels 15 lifted, he/she commands the footboard 30 to rotate in a clockwise direction, to take the front wheel 17 into contact with the floor P.

[0097] Subsequently, or simultaneously, he/she commands the shaft 33 to rotate so as to make the wheels 15 rotate around it and to lift the device for the disabled, inclining it to the rear part. In this condition (fig. 1), the device for the disabled 10 rests on the floor P on its wheels 15 and on the front wheel 17, and by acting on the knobs 67 of the steering wheels 51, the user can move easily.

[0098] In this configuration of the device for the disabled 10, the user can overcome the architectural barriers by drawing near to them backward, and can not only overcome simple architectural barriers like the step B as described above, but can also overcome complex barriers such as for example a flight of stairs S (fig. 3).

[0099] In particular, the user approaches one step of a flight of stairs S to be overcome, with the rear part of the device for the disabled 10, and as soon as the wheels 15, which are resting on the floor P, come into contact with the side of a first step G of the stairs S, the shaft 33 is commanded to rotate in an anticlockwise direction, to take the rear part of the tracks 60 and 61 into contact with the first step of the flight of stairs S.

[0100] In fact, when the arms 35 on which the wheels 15 are mounted are substantially aligned with the longitudinal extension of the tracked means 11, 12, the wheels 15 are contained in the bulk defined by the latter. In this way, the tracked means 11, 12 protrude with at least an end portion with respect to the wheels 15, allowing a sub-

sequent positioning on the architectural barrier to be overcome.

[0101] During this operation, the user acts constantly on the knobs 67 to keep the wheels 15 in contact with the first step to be overcome. When the device for the disabled 10 is completely resting on the step, the wheels 15 are taken to a position where they do not constitute an obstacle and then rotated clockwise toward the rear part of the seat until they do not interfere with the movement of the tracks 60 and 61. Similarly, the front wheel 17 is also lifted so as to prevent the device for the disabled 10 from slipping, and so as not to impede the movement thereof.

[0102] By driving the tracks 60 and 61, the device for the disabled 10 is moved along the steps of the stairs.

[0103] During these operations, the seat 20 is taken to a condition of maximum retraction toward the rear part, so as to prevent the device for the disabled 10 from overbalancing forward.

[0104] When the device for the disabled 10 is passing over the last step, the rear wheels 15 are commanded to descend, to keep the device for the disabled 10 inclined with the same inclination as the stairs, until the tracks 60 and 61 have passed over the last step completely.

[0105] An analogous combination of lifting and lowering of the front wheel 17 and the rear wheels 15 also allows the user to descend a flight of stairs, or other types of architectural barriers.

[0106] All these operations can be carried out by single drives commanded by the user or by commands that are established by a central unit commanded by suitable preset programs which, according to the signals sent by detection sensors, establish the succession of the operations to be carried out.

[0107] It is clear that modifications and/or additions of parts may be made to the device for the disabled as described heretofore, without departing from the field and scope of the present invention.

[0108] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of device for the disabled, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Device for the disabled comprising a support structure (21) on which a seat (20) is mounted, a pair of first wheels (15) cooperating with the lateral sides of said support structure (21), tracked means (11, 12) solidly associated with said support structure (21), first actuation means (33, 35, 37) governed by command and control means (40) controllable by the disabled person and suitable to selectively vary, depending on the desires of the disabled person, the vertical position of said first wheels (15) and/or of said tracked means (11, 12), leveling means (43, 47) being provided to position the seat plane of said seat (20) substantially horizontal during movement, **characterized in that** damping devices (63) are associated with said leveling means (43, 47) in order to damp the oscillations of said seat (20) at least during the variation in the vertical position of said first wheels (15) and/or said tracked means (11, 12) with respect to said support structure (21).

2. Device for the disabled as in claim 1, **characterized in that** said damping devices comprise damping pistons (63) of a hydraulic or pneumatic type associated with said seat (20) and with said support structure (21).

3. Device for the disabled as in claim 1 or 2, **characterized in that** sliding means (46) are associated with said seat (20) and are suitable to allow its horizontal translation.

4. Device for the disabled as in claim 3, **characterized in that** said said sliding means (46) comprise second actuation means (48) commanded by said command and control means (40) to provide the horizontal translation of said seat (20).

5. Device for the disabled as in any claim hereinbefore, **characterized in that** said leveling means comprise first pivoting elements (47) associated with said seat (20) and second pivoting element (43) associated with said support structure (21) and cooperating with said first pivoting elements (47) to allow the rotation of said seat (20).

6. Device for the disabled as in any claim hereinbefore, **characterized in that** said leveling means (43, 47) provide an oscillation fulcrum (43, 47) disposed above or at least on the level of the barycenter of the disabled person.

7. Device for the disabled as in any claim hereinbefore, **characterized in that** said support structure (21) comprises a front part (25) to which a footboard (30) is pivotingly associated, at least a front wheel (17) being associated with said footboard (30), and third actuation means (31) being provided in order to orientate said footboard means (30) with respect to said support structure (21).

8. Device for the disabled as in claim 7, **characterized in that** said front part comprises a crosspiece (25) disposed transverse to the longitudinal extension of said tracked means (11, 12) and disposed in proximity to an end portion of the latter, said footboard (30), in use, being disposed protruding with respect to the bulk of said tracked means (11, 12).

9. Device for the disabled as in claim 7 or 8, **characterized in that** manual movement means (50) are associated with said first wheels (15), to make said first wheels (15) rotate around their center of rotation, and to determine, together with said first wheel (17), a manual movement of the device.

10. Device for the disabled as in claim 9, **characterized in that** said manual movement means (50) comprise at least a steering wheel (51), mounted rotatable on said support structure (21), and transmission means (52, 53, 54) suitable to transmit the motion from said steering wheel (51) to said pair of first wheels (15).

11. Device for the disabled as in claim 10, **characterized in that** said transmission means (52, 53, 54) are chosen from a group comprising belt, chain or gear transmission means.

12. Device for the disabled as in any claim from 7 to 11, **characterized in that** contact sensors are associated with said first wheels (15) and with said front wheels (17) in order to detect their contact with the ground and to transmit a signal to said central command unit (40).

13. Method to overcome architectural barriers with a device for the disabled (10) as in any claim hereinbefore, comprising at least a first step in which said device for the disabled is moved along a plane (P) toward the architectural barrier (G) to be overcome, disposing its rear part facing toward said architectural barrier (G), **characterized in that** it comprises a second step in which, by means of said first actuation means (33, 35, 37) the vertical position of said first wheels (15) and/or said tracked means (11, 12) is varied so as to dispose at least a part of said tracked means (11, 12) resting on at least part of said architectural barrier (G), keeping said first wheels (15) on said plane (P), a third step in which said first actuation means (33, 35, 37) are activated to dispose said first wheels (15) in a position of non-interference with the movement of said device (10), and a fourth step in which said tracked means (11, 12) are activated to move said device (10) on said architectural barrier (G).

14. Method to overcome architectural barriers with a device for the disabled (10) as in any claim from 7 to 13, comprising at least a first step in which said device for the disabled is moved along a plane (P) toward the architectural barrier (G) to be overcome, disposing its front part facing toward said architectural barrier (G), **characterized in that** it comprises a second step in which said footboard (30) is lifted by means of second actuation means (31), to take the front wheel (17) associated therewith to a height equal to or more than the height of said architectural barrier (G), a third step in which said device is made to advance so as to dispose said front wheel (15) above said architectural barrier (G), a fourth step in which said second actuation means (31) are actuated to rotate said footboard (30) so as to take said tracked means (11, 12) to the same height as the architectural barrier (G), and a fifth step in which said device is moved along said architectural barrier (G).

15. Method as in claim 13 or 14, **characterized in that** at least while said architectural barriers (G) are overcome, said damping device (63) are activated, possibly by said command and control means (40), to damp the oscillations of said seat (20) which is maintained substantially horizontal by said leveling means (43,47).

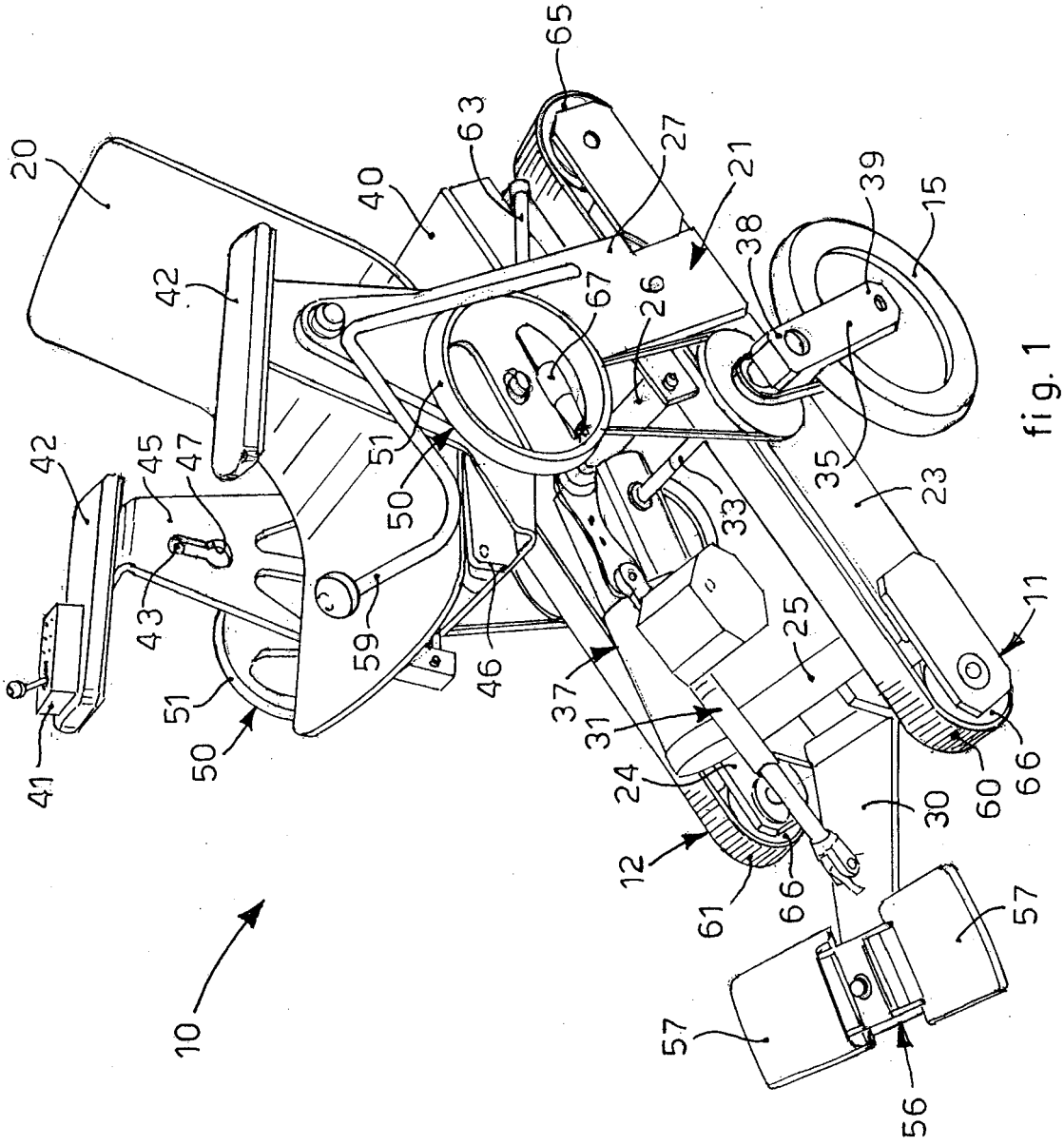
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fig. 1

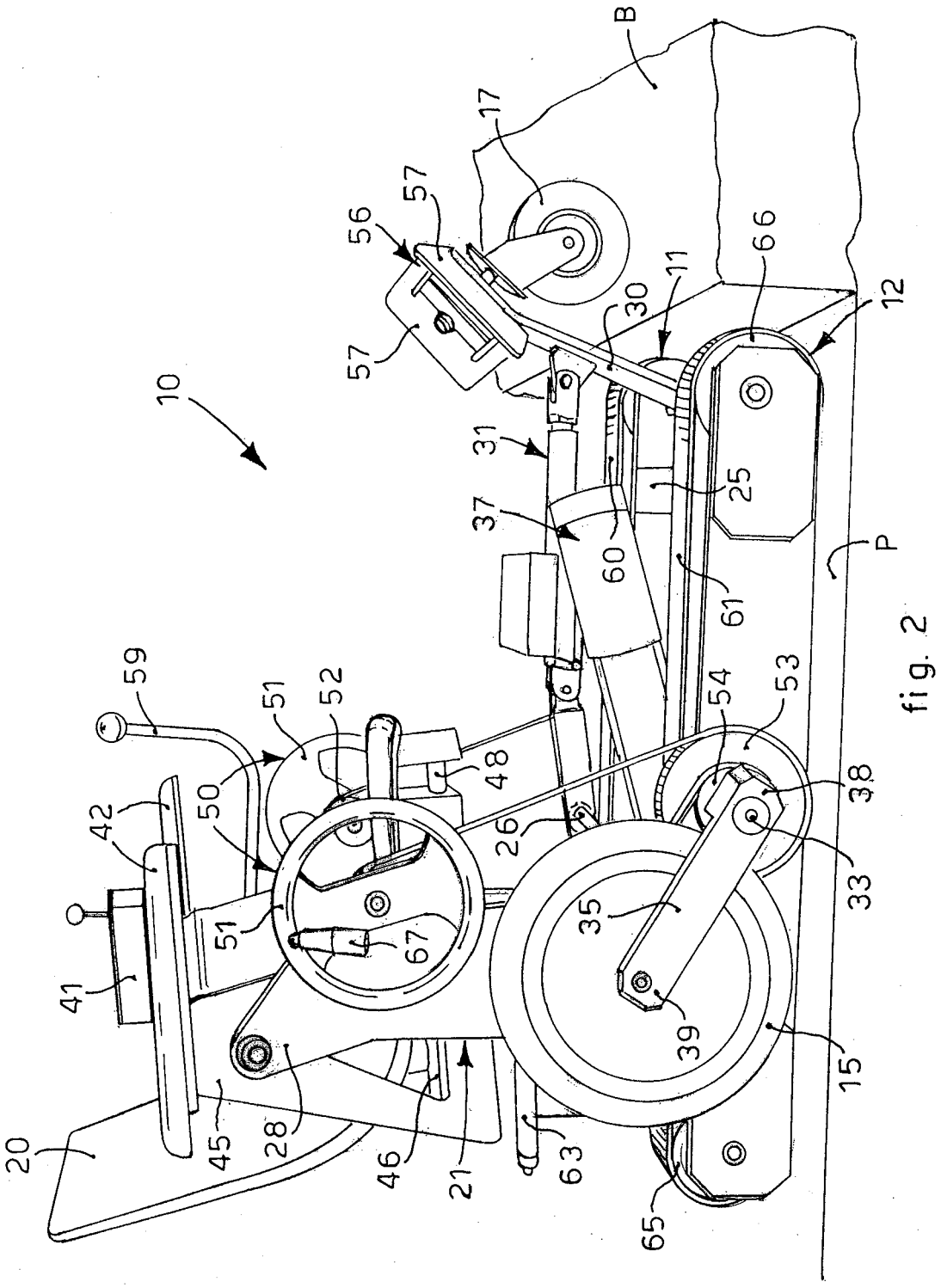
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fig. 2

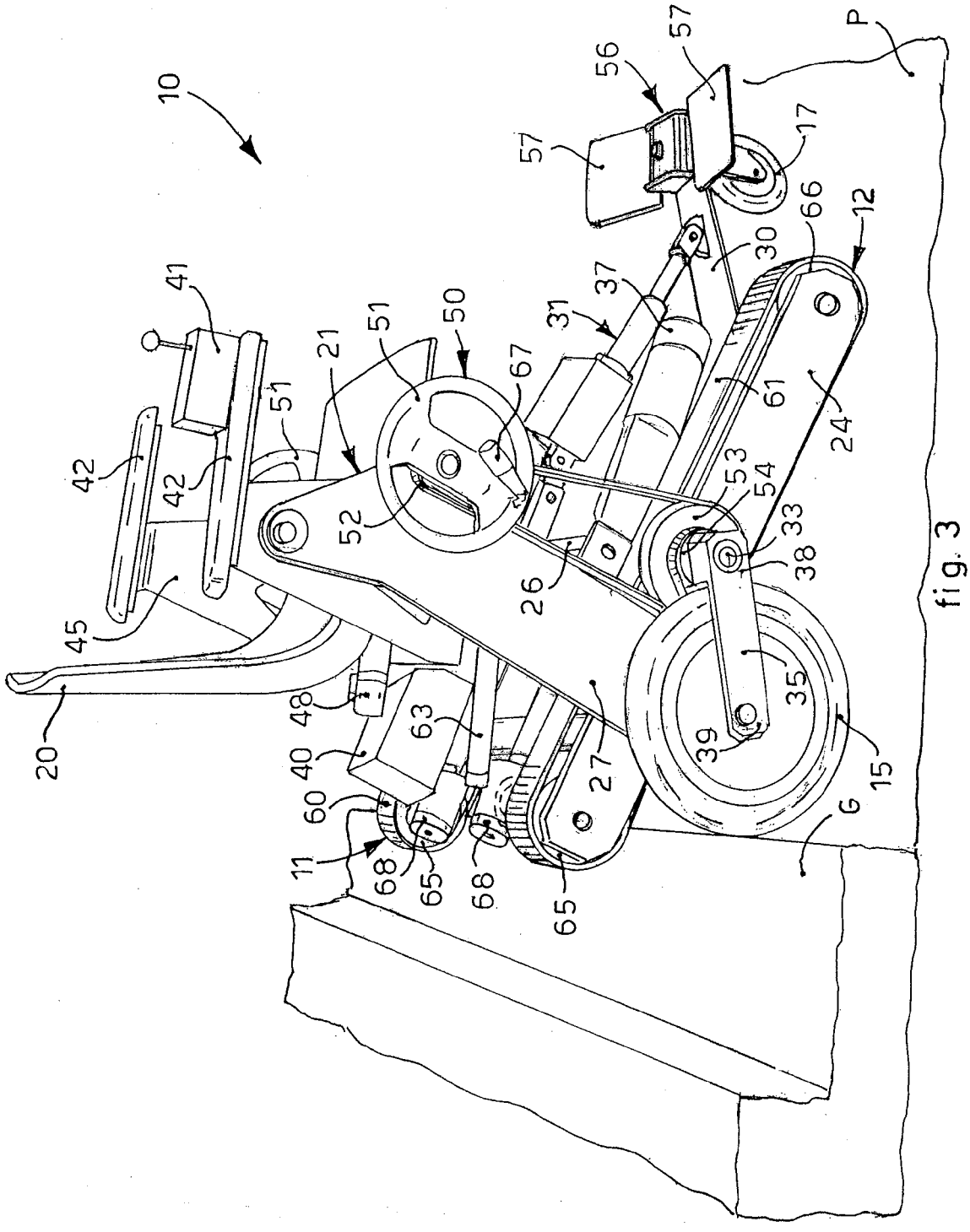
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fig. 3