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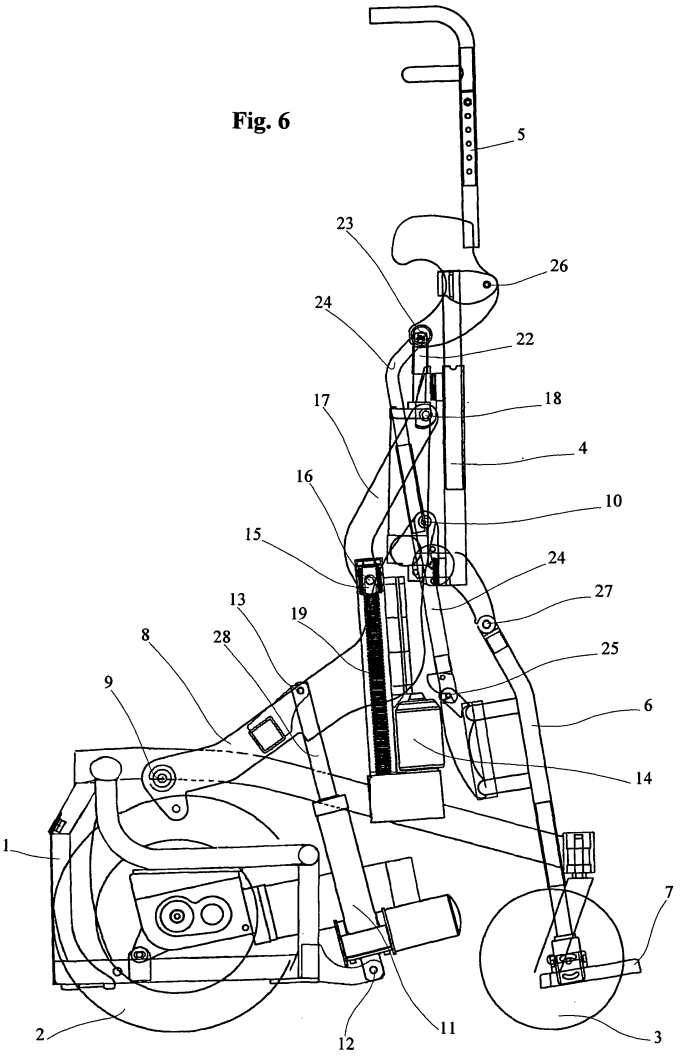
(54) Wheelchair which stands up simplified

(57) It is a wheelchair which stands up, which uses for the movements of its various parts the simplified components , especially a limited number of actuators.

Fig. 6



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Description

[0001] It is known that in the market exist wheelchairs for rehabilitation of certain kinds of disabled having various performances like the adjustment of the height of the seat, the backrest and the legs support, the tilting, the verticalization.

[0002] The solutions to obtain the above said performances are the most various adopting single actuators operating by electric motors or by oildynamic devices and a complete serie of compund levers and linkages.

[0003] The inconvenients which are evidenced by the present wheelchairs, for saying, multifunctional are complex, expensive and liable to need often setting up or registrations for the complexity of the kinematic and the great quantity of actuators of various type.

[0004] Purpose of this patent is that one to manufacture a multifunctional wheelchair with the less possible of actuators, few poles, compound levers and linkages, in order to result simplified, more lightweight, more safe. More precisely all the configurations which the wheelchair can assume as height of the seat, as orientation of the backrest with concomitant orientation of the legrests, as tilting, as verticalization is obtained with only 3 actuators obtained by a detailed location and assembling among them.

[0005] A lever with fulcrum with an edge on the base loading structure of the wheelchair is connected by hinging with the free edge opposed to the seat structure and an actuator with the cylinder connected by hinging to the loading base structure of the wheelchair, it moves by its stem the above described lever.

[0006] Applying in a joint way, in an intermediate point, to the above said lever it is located a screw actuator which moves along to a threaded bar a slide to which is connected by hinging the edge of a stem whose opposite edge is connected by hinging to the structure of the seat.

[0007] Operating by these 2 actuators it is possible to obtain the adjustment of the height of the seat, or its tilting, or its verticalization, singularly or in combination among them.

[0008] The third existing actuator, is applied to the structure of the seat.

[0009] The moving of the steam of the said third actuator acts on the backrest until line it with the seat.

[0010] The backrest transmit in concomitancy to its adjustments of laying, by a connecting stem, to the legrests structure parallel adjustments of laying to the above legrests structure.

[0011] The combined action of this actuator, applied to the structure of the seat which makes the lining up of the backrest and the legrest to the seat and the action of the 2 actuators which act on the structure of the seat setting it on the vertical position, define the verticalization of the active part of the wheelchair which interest the disabled person as user.

[0012] All what explained previously is clarified by the examination of the enclosed drawings.

[0013] The fig. 1 shows sidely a wheelchair schematized in its standard configuration of wheelchair with seat, backrest, legrests, footplates showing the 3 actuators in their initial position to be activated.

[0014] The fig. 2 shows once again sidely the wheelchair of fig. 1 with the actuators in the previous initial position to be activated which now shows the actuator which in the previous figure was in a laying flat under the other 2.

[0015] The fig. 3 shows the wheelchair of fig. 1 in which the third actuator placed under the seat and jointed with it is actived having effected the backwards upsetting of the backrest and the elevating of the legrests in order to obtain the backrest and the legrests nearly lined to the seat in the specific case it correspond to the horizontality.

[0016] The fig. 4 shows the wheelchair of fig. 1 where it results activated the main actuator in direct connection to the loading base structure of the wheelchair which uprise the seat (with connected backrest and legrests in parallel of its connection point by hinging so that the seat assumes a backwards reclined position.

[0017] The figure 5 shows the wheelchair of figure 1 where now in addition to the activation of the main actuator in that said connection with the loading basic structure which raise a point of the seat, it is partially activated also the secondary actuator loaded jointly by the lever of the above said main actuator which raises the seat in another point by the edge of the stem connected to it, moved, the said stem, to the opposite edge in uprise from the said secondary actuator.

[0018] The seat complete with backrest and legrests results to be uprised with the standard placing of horizontal seating.

[0019] The fig. 6 shows the wheelchair of fig. 1 with all the 3 actuators activated and exactly the main actuator and the secondary actuator which keep uprised the structure of the seat in order to aasume a position almost vertical and the third placed under the structure of the seat which define the position of the backrest of the legrests almost aligned with the position of the seat.

[0020] From the examination of the figures it is evidenced that on the loading basic structure of the wheelchair composed by the framing 1 and the wheels 2,3 is hinged in 9 the lower edge of the lever 8 which upper edge is coupled by a hinging to the understructure of the seat 4; and it is hinged in 12 the lower appendage of the cylinder 11 which stem 28 coupled in 13 with the lever 8 provide to its moving.

[0021] The ensemble of the lever 8 and of the cylinder 11 with its stem 28 compose the main actuator.

[0022] It is setted joint in an intermediate position of the stem 8, the loading structure 20 of the secondary actuator 14.

[0023] This last one is composed of a worm 19 which let move up and down on a groove (not evidenced) a slide 15.

[0024] To the said slide 15 it is hinged the lower edge of a stem 17 whose upper edge 18 it is hinged in a point

of the understructure of the seat 4 suitably moved away from the connection point 10 of the upper edge of the lever 8.

[0025] The travels suitably coordinated by the stem 28 of the cylinder 11 which moves the lever 17 defines both the adjustments of height of the seat 4 and its position.

[0026] The third actuator 21 joint to the understructure of the seat 4 by its stem 22 coupled in the point 23 of the lower appendance of the backrest 5 hinged in the point 26 with the seat 4 defines the orientation making it to turn around the point 26.

[0027] In concomitance with the moving of the stem 22 and therefore of the backrest 5 it is moved the stem 24 hinged with one of the edges in the point 23 and with the opposite edge hinged in the point 25 of the structure of the legrest 6.

[0028] The moving of the stem 24 defines the moving of the legrest 6 and connected footrest 7 coupled by hinging in the point 27 of the forwards extension 18 of the structure of the seat 4.

[0029] The activation of this third actuator 21 defines the concomitant moving of the seat 5 and of the footrest 6, 7 passing from the positions of normal seating to the position of almost alignment of backrest, seat and legrests.

[0030] The said further configuration, in combination of the activation of the 2 previous actuators which set the seat in vertical position contribute to obtain the positioning in vertical of the wheelchair.

[0031] The said wheelchair with the possibility of its adjustments allows the use for disabled persons of different size or in any case for a same disabled person for his complete evolutive growing phase.

[0032] It is of relevant inventiveness to have been able to obtain with only 3 actuators all the possible performances singularly or in combination for a wheelchair until its verticalization being able to obtain a wheelchair simplified at the maximum in its kinematisms, making it more handy, and more economic both about the cost and the maintenance.

[0033] There is no outcoming from the patent for solutions that persons expert of that domain would have to carry out also with improvements in case of use of the teachings of this patent.

Claims

1. Wheelchair for disabled which stands up simplified **characterized by** the fact that for the adjustments of the seat height (4) and of its orientation compared to the loading structure of the wheelchair, it includes only 2 actuators and only one of the 2 actuators (8,11), which provide singularly or in combination to the above said movements of the seat (4), is directly connected by hinging (12,9) to the loading structure (1) of the wheelchair, being the said actuator (8,11) composed of a lever (8) hinged to an edge (9) with the loading structure (1) and with the other edge (10) to the seat (4), and of a cylinder (11) with stem (28) which on support (12) to the loading structure (1) of the wheelchair acts with the stem (28) in an intermediate position (13) of the lever (8).

2. Wheelchair for disabled which stands up simplified following claiming 1 **characterized by** the fact that the said second actuator (14) those which provides together with the said first actuator (8,11) to the adjustment of the seat (4), has its loading structure (20) jointed to the lever (8) of the first one (8,11) and therefore mobile compared to the loading structure (1) of the wheelchair, being the said second actuator (14) composed of a worm gear (19) which moves a slide (16) and by a lever (17) which edges (15, 18) are connected to the said slide (15) and to the seat (4).

3. Wheelchair for disabled which stands up simplified following claiming 1 or claiming 2 **characterized by** the fact that the actuator (8,11) directly connected by hinging (12,9) to the structure (1) of the wheelchair can be activate alone to act to move the seating (4), in an independent way from the actuator (14) jointed to it.

4. Wheelchair for disabled which stands up simplified following one or more of the previous claiming **characterized by** the fact that the second actuator (14) joint (20) to the first one (8) can be activated alone, whatever is the position assumed by the first actuator (8,11), to move the seat (4).

5. Wheelchair for disabled which stands up simplified following one or more of the previous claiming **characterized by** the fact that the said 2 actuators (8,11,14,19,17) can be activated simultaneously to obtain registrations coordinated of the seat (4).

6. Wheelchair for disabled which stands up simplified following one or more of the previous claiming **characterized by** the fact that it is joint to the structure of the seat a third actuator (21) composed of a cylinder (21) and by a stem (22) which actioned provide to move the backrest (5) adjusting the laying and to move a stem (24) which operate the legrest (6) and the footrest (7) adjusting its laying.

7. Wheelchair for disabled which stands up simplified following the previous claiming **characterized by** the fact that the adjustment of the laying of the backrest (5) happens coordinate to the adjustment of the laying of the legrest (6) and the footrest (7) obtaining to the limit with the seating level (4) a single laying.

8. Wheelchair for disabled which stands up simplified following ono or more of the previous claiming **characterized by** the fact that by the combined action of

the first 2 actuators (8,11,14,19,17) which verticalize the seat level (4) and by the action of the third actuator (21,22,24,23,25) which alignes the laying of the backrest (5) and of the legrest (6) ato the seat (4) is obtained the verticalization of the entire wheelchair (1).

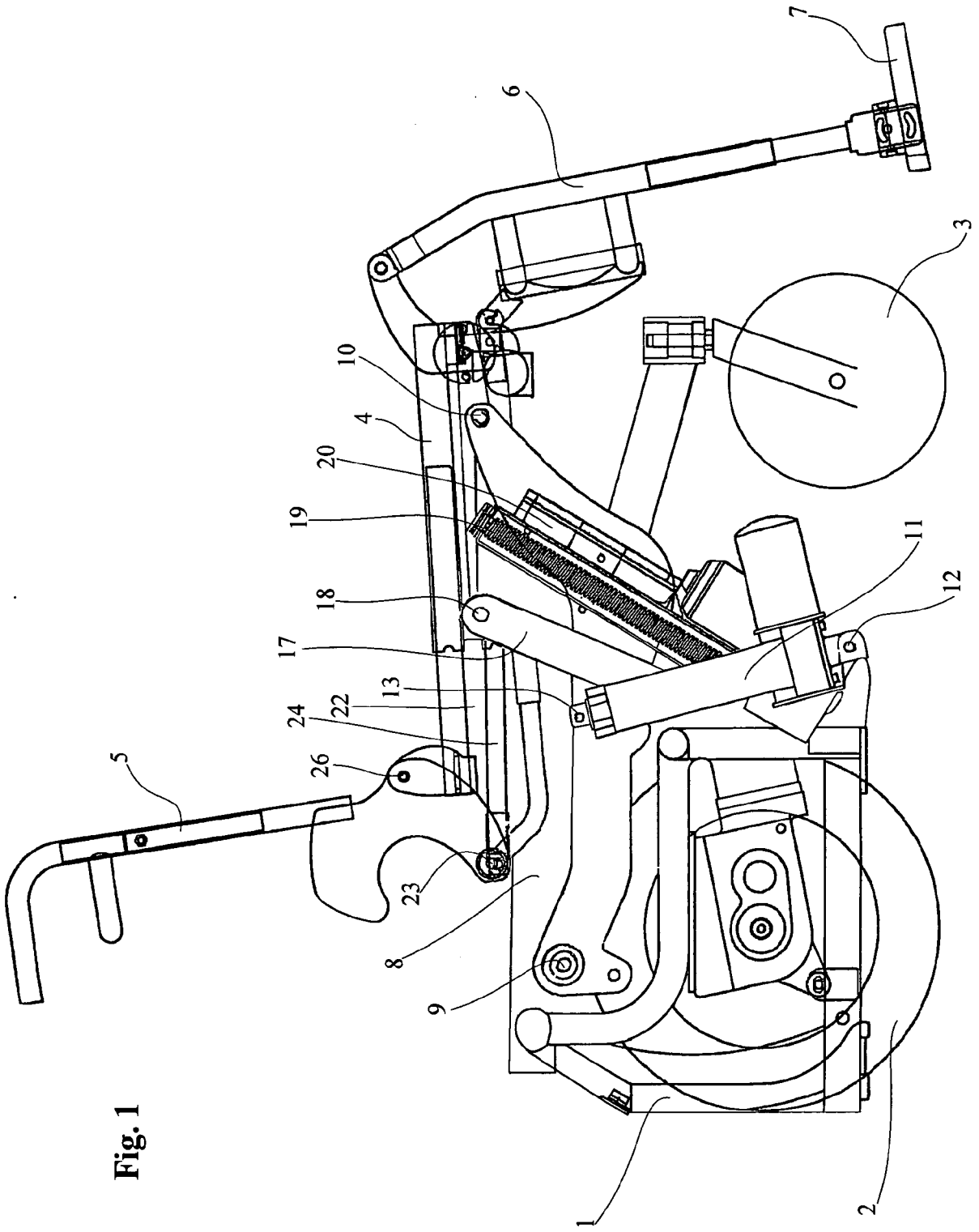

Fig. 1

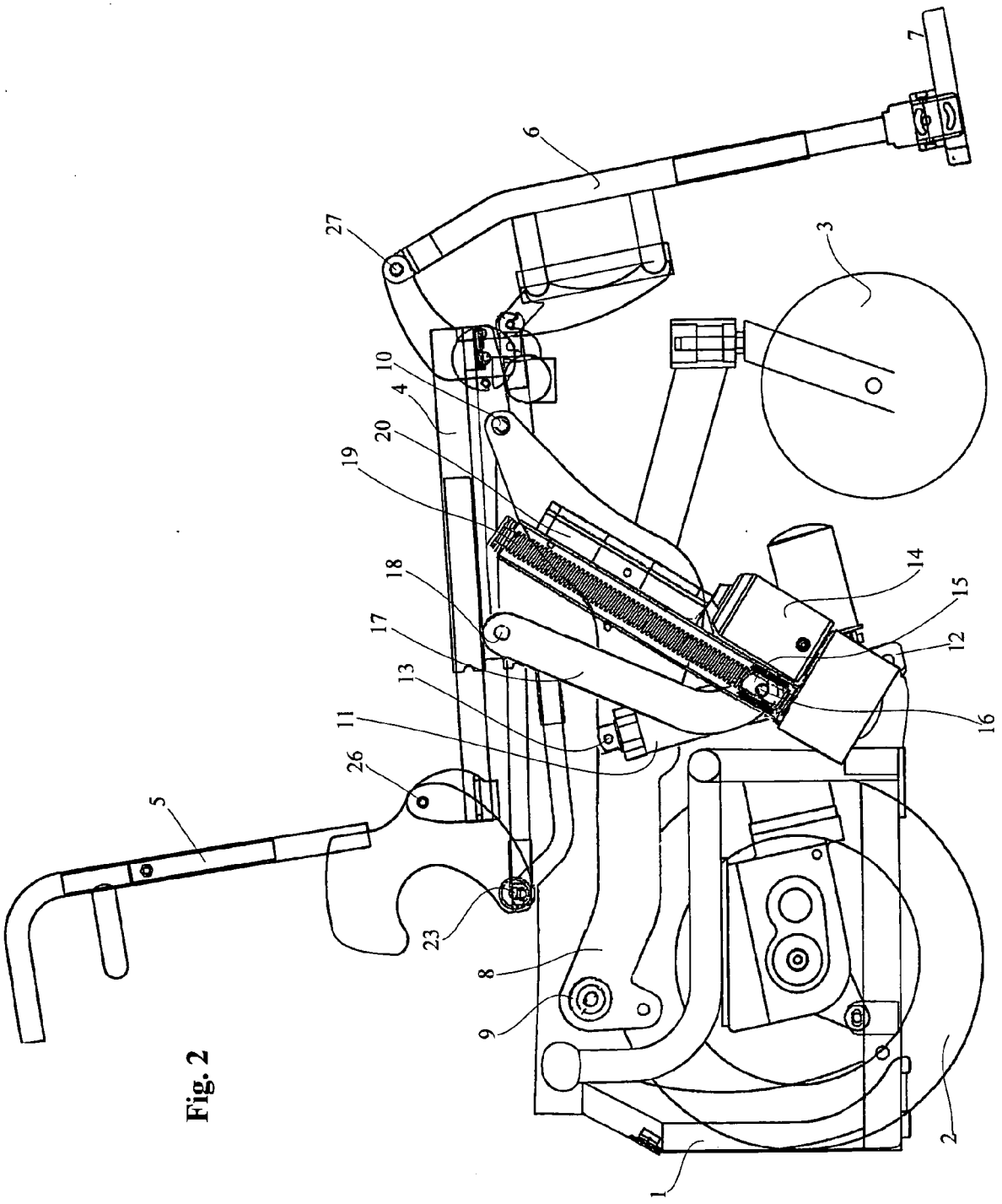

Fig. 2

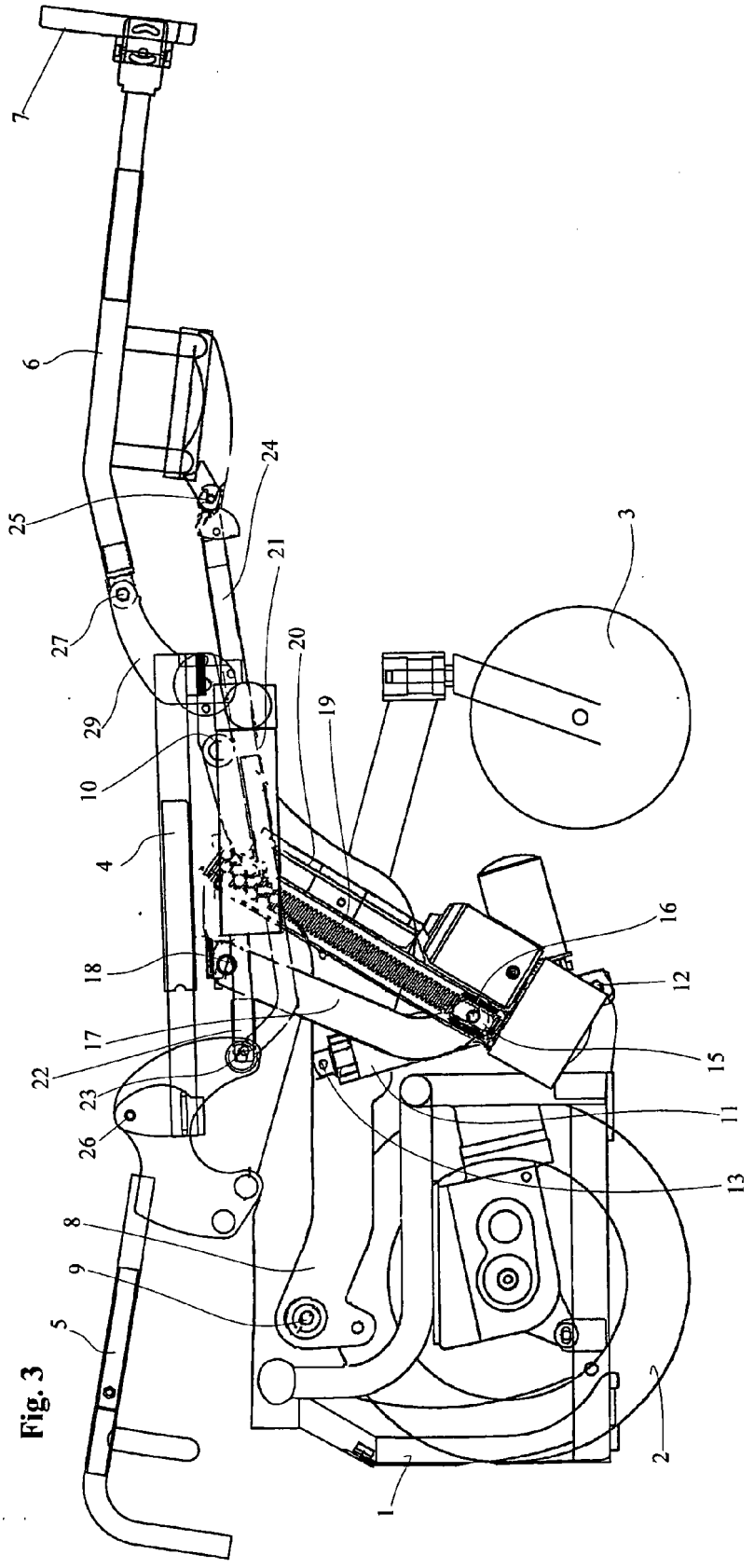

Fig. 3

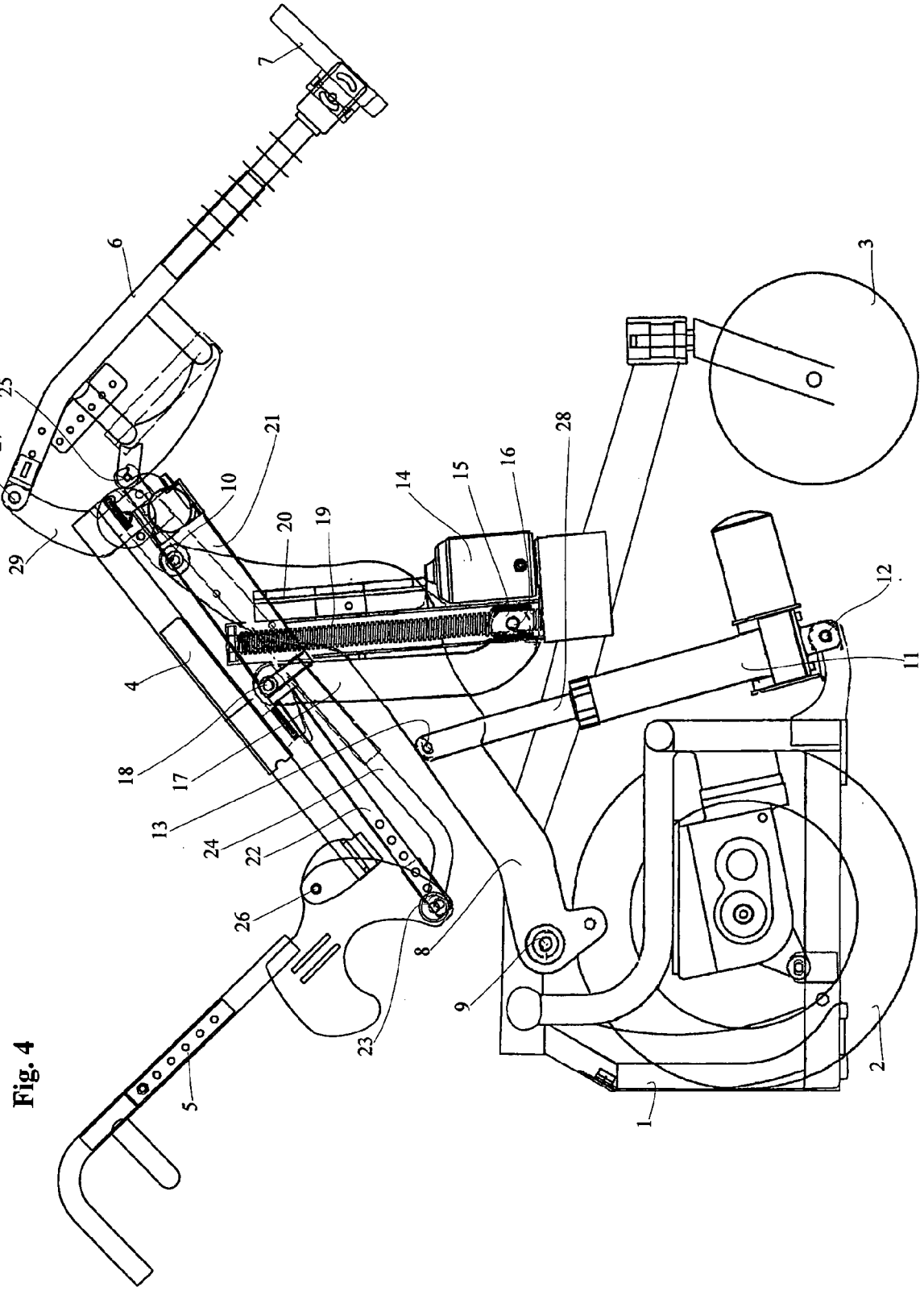

Fig. 4

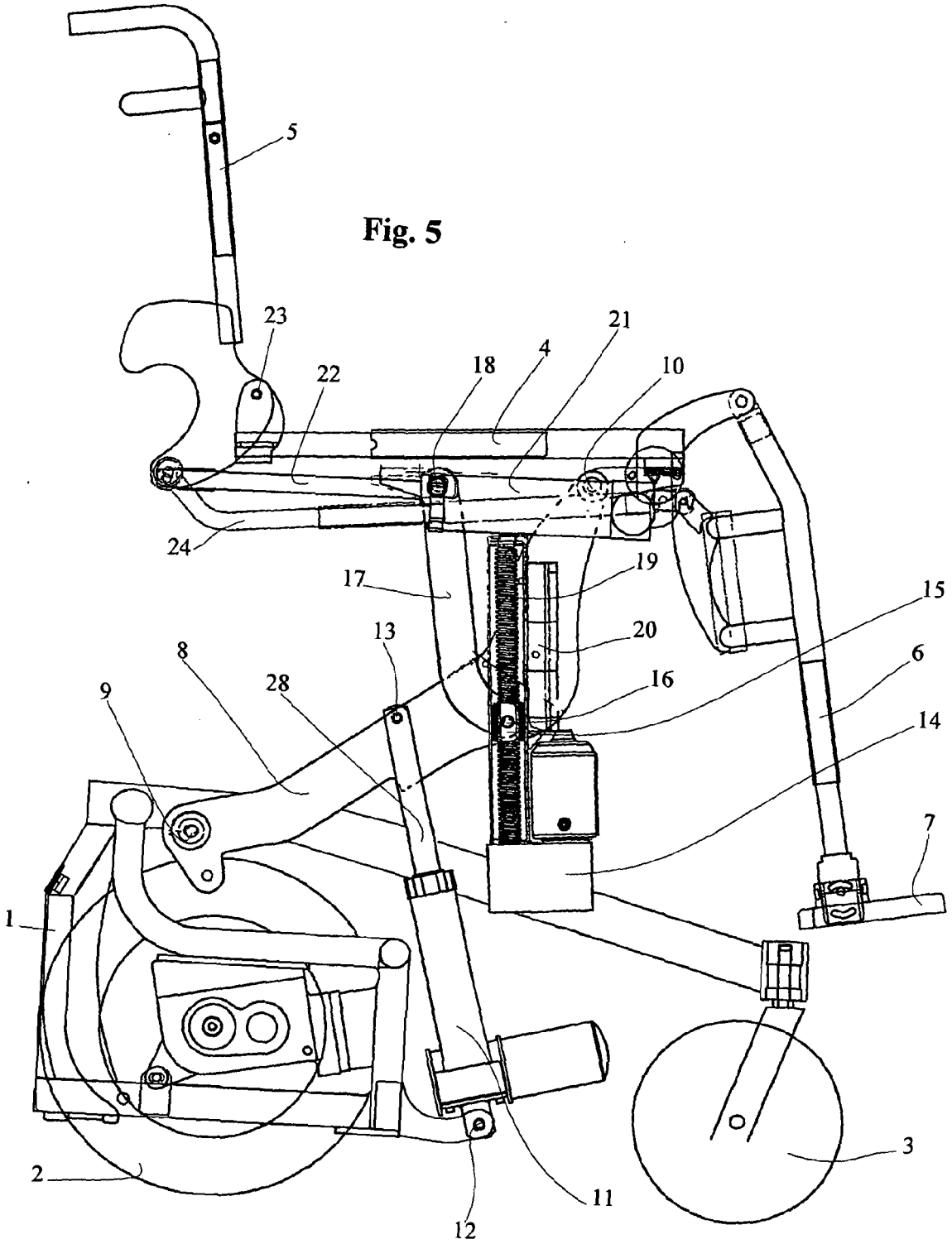

Fig. 5

Fig. 6