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A wheelchair.

The invention relates to a wheelchair provided with a driving frame supported by ground wheels and with a seating frame supported by said driving frame, wherein the seating frame is supported by two sliding members (1,2) connected to the frame, which are pivotable with respect to the driving frame about horizontal pivot (3,4) pins extending perpen-

dicularly to the longitudinal direction of the frame, and which are accommodated in two slotted holes (10,26) provided in the seating frame, which lie one behind the other in the longitudinal direction of the driving frame, whereby the longitudinal axis of the front slotted hole (26) includes an obtuse angle with the longitudinal axis of the rear slotted hole (10).

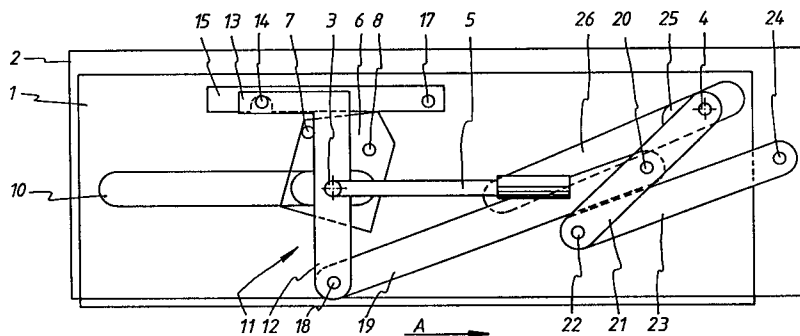


Fig 1

The invention relates to a wheelchair provided with a driving frame supported by ground wheels and with a seating frame supported by said driving frame.

The possibility to tilt the seating frame of a wheelchair about an imaginary pivot axis extending perpendicularly to the longitudinal direction of the driving frame is of great importance to the user of the wheelchair. Said tilting makes it possible to effect a different pressure distribution over the contact surfaces between the occupant and the parts supporting the occupant, such as the headrest, the back, the seat, the calfrests and/or the footrests. Such a changing pressure distribution provides a better blood circulation and prevents unpleasant effects, such as becoming seat-sore and/or tiring rapidly.

A side effect of this kind of tilting is furthermore the greater ground clearance of the footrests, which tilt along with the seating part, in their backward-tilted position, since it will be easier to move the wheelchair over possible obstacles then.

The object of the invention is to obtain a wheelchair of the above kind, wherein the seating part can be tilted with respect to the driving frame by means of a simple, compact and lightweight construction, using comparatively little physical effort.

Especially for hand-propelled wheelchairs a lightweight and compact construction is of particular importance, with a view to easy transport of the wheelchair in a transport vehicle or the like.

According to the invention the object aimed at can be achieved in that the seat is supported by two sliding members connected to the frame, which are pivotable with respect to the driving frame about horizontal pivot pins extending perpendicularly to the longitudinal direction of the frame, and which are accommodated in two slotted holes provided in the seating frame, which lie one behind the other in the longitudinal direction of the driving frame, whereby the longitudinal axis of the front slotted hole includes an obtuse angle with the longitudinal axis of the rear slotted hole.

When such a construction is used it will be possible, upon moving the seating frame with respect to the sliding members, to effect a tilting movement of the seating frame with respect to the driving frame, about an imaginary pivot point located some distance above the seat of the seating frame, which pivot point will at least substantially coincide with the centre of gravity of the occupant plus the seating frame in case of an appropriate selection of the construction, partly dependent on the weight of the seating frame and the weight and dimensions of the user, as a result of which only a minimal physical effort will be required for tilting the chair.

The invention will be explained in more detail hereafter with reference to the accompanying figures.

Figures 1 - 3 diagrammatically indicate the driving frame and the seating frame, with the mechanism for tilting the seating part into three different positions provided between the said two frames.

Figure 4 diagrammatically shows a seating frame with a person seated thereon.

For the sake of clarity the driving frame and the seating frame are shown as two plate-shaped members 1 and 2 respectively in Figures 1 - 3. It will be apparent, however, that the driving frame may be a conventional wheelchair frame supported by ground wheels, whilst the seating part 2 may be provided with a normal seat, a back, armrests, footrests and the like.

Two parallel pins 3 and 4 are journaled in the seating frame, in such a manner that said pins are rotatable with respect to the frame 1 about horizontal central axes extending perpendicularly to the longitudinal direction of the wheelchair. A hand lever 5 is secured to the pin 3, so as to be able to rotate the pin 3 about its central axis. Furthermore a cam plate 6 is secured to the pin 3, to which two studs 7 and 8 extending parallel to the pin 3 are secured. A sliding member 9 is furthermore pivotable about the pin 3. Said sliding member 9 is movably accommodated in a slotted hole 10 provided in the seating frame, the longitudinal axis of said slotted hole at least substantially extending in the longitudinal direction of the wheelchair.

Furthermore an L-shaped lever 11 having an at least substantially vertical leg 12, seen in Figure 1, and an at least horizontal leg 13 joining the leg 12 at its upper end is pivotally mounted on the pin 3, at a point located about halfway between the ends of the long leg 12. A stud 14 extending parallel to the pin 3 is secured near the free end of the arm 13 of the L-shaped lever 11. In the position shown in Figure 1 said stud is accommodated in a recess 16 provided at the bottom side of an arm 15. The arm 15 is coupled to the driving frame 1 so as to be pivotable about a pin 17 extending parallel to the pins 3 and 4. It will be apparent that in view of the fact that the stud 14 secured to the lever 11 is accommodated in the recess 16 of the arm 15, the lever 11 is locked against rotation about the pin 3. As is furthermore apparent the point of the triangular upper part of the cam 6 abuts against the bottom side of the arm 15.

One end of a coupling rod 19 is pivotally coupled to the bottom end of the arm 12 of the lever 11 by means of a pin 18 extending parallel to the pin 3. The other end of said coupling rod 19 is pivotally coupled to a second coupling rod 21 by means of a pin 20 extending parallel to the pin 18,

and that in a point about halfway between the two ends of the coupling rod 21.

The coupling rod 21 is secured to the pin 4 with one end. One end of a third coupling rod 23 is pivotally coupled to the bottom end of the coupling rod 21 remote from the pin 4, by means of a pin 22 extending parallel to the pin 4. The other end of the coupling rod 23 extending to the front from the pin 22 is pivotally coupled to the seating frame 2 by means of a pin 24 extending parallel to the pin 22.

A sliding block 25 is freely pivotable about the pin 4. Said sliding block 25 is accommodated in a slotted hole 26 provided in the seating frame 2. Said slotted hole 26 is located ahead of the slotted hole 10, seen in the intended direction of movement of the wheelchair according to the arrow A, whilst, as will be apparent from Figure 1, the longitudinal axis of said slotted hole 26 includes an obtuse angle with the longitudinal axis of the slotted hole 10, said obtuse angle being $\pm 160^\circ$ in the illustrated embodiment.

When mounted in the wheelchair the slotted holes will generally slope upwards in opposite directions from their lowermost points.

The position of the various parts with respect to each other shown in Figure 1 will correspond with the position in which parts of the seat 27 (Figure 4) forming part of the seating frame 2 occupy a position for normal driving of the wheelchair. From this position it is possible to tilt the seat slightly backwards. For this purpose the lever 5, which is initially located beside the seat and which extends at least substantially in horizontal direction, is slightly pivoted upwards, whereby the cam 6 connected to the lever 5 via the pin 3 is pivoted along to the position shown in Figure 2. It will be apparent that said pivoting of the cam 6 by means of the point of the cam 6 abutting against the bottom side of the arm 15 will cause the arm 15 to pivot from the position shown in Figure 1, against the action of a spring (not shown), to the position shown in Figure 2. In this position the arm 15 is pivoted to such an extent that the stud 14 secured to the lever 11 is clear of the arm 15, the locking of the pivoting motion of the lever 11 effected by the arm 15 thus being released.

In this position shown in Figure 2 also the stud 8 abuts against the right-hand side of the vertical leg 12 of the lever 11. Upon further pivoting of the pin 3 and the cam 6 by means of the lever 5 to the position shown in Figure 3, the lever 11 is caught by the stud 8 secured to the cam 6 and, seen in the Figures, pivoted anti-clockwise to the position shown in Figure 4, in which the lever extending upwards in that position will be located near the back 28 of the seating frame.

As a result of this pivoting of the lever 11 the coupling rod 19 is moved to the right, seen in the

Figures, which will result in pivoting of the coupling rod 21 about the pin 4. As a result of this anti-clockwise pivoting of the coupling rod 21 about the pin 4, the coupling rod 23 and the seating frame 2 coupled thereto will be moved to the right as well. This movement will cause the seating frame 2 to move with respect to the sliding members 9 and 25, said sliding members thus making a relative movement within the slotted holes 10 and 26. As a result of the above-described movement the seating frame will make a slight tilting motion about a horizontal pivot axis extending perpendicularly to the plane of the drawing and consequently also perpendicularly to the longitudinal direction of the wheelchair.

With an appropriate construction of the mechanism for effecting the pivoting or tilting motion, which mechanism is provided between the driving frame and the seating frame, the tilting axis about which said motion takes place will at least substantially be located near the mass centre 29 defined by the weight and dimensions of the combination of seating frame and user. The position of said imaginary pivot or tilting axis can be influenced by changing the distance between the pins 3 and 4; this will take place in dependence on the size and the body weight of the wheelchair user. Furthermore it is possible to influence the initial position from which the seating part is to be tilted by suitably selecting the position of the slotted holes with respect to the horizontal and the point of attachment of the coupling rod 23 to the seating frame 2 by means of the pin 24.

As is furthermore apparent from Figure 3, in the final position shown in Figure 3 the pivot point 18 between the arm 12 of the lever 11 and the coupling rod 19 has been moved through the dead centre, in which the arm 12 and the coupling rod 19 are in line. This results in a certain amount of locking of the seating frame with respect to the driving frame in its backward-tilted position.

The seating part can be returned from the backward-tilted position to the position shown in Figure 1 again by pivoting the lever 5 clockwise, seen in the Figures.

In view of the fact that the imaginary axis about which the seating frame with the user seated thereon will be located at least substantially at the mass centre of the combination of seating part and user, only a relatively small amount of force is required for tilting the seating part with the user seated thereon.

Claims

1. A wheelchair provided with a driving frame supported by ground wheels and with a seating frame supported by said driving frame,

characterized in that said seating frame is supported by two sliding members connected to the frame, which are pivotable with respect to the driving frame about horizontal pivot pins extending perpendicularly to the longitudinal direction of the frame, and which are accommodated in two slotted holes provided in the seating frame, which lie one behind the other in the longitudinal direction of the driving frame, whereby the longitudinal axis of the front slotted hole includes an obtuse angle with the longitudinal axis of the other slotted hole.

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2. A wheelchair according to claim 1, characterized in that said slotted holes slope upwards in opposite directions from their lowermost points.

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3. A wheelchair according to claim 1 or 2, characterized in that an arm is pivotable about the pivot pin of the one sliding member, said arm being pivotally coupled, by means of a coupling rod, to an arm which is pivotable about the other pivot pin, said arm being coupled to the seating frame by means of a coupling rod.

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4. A wheelchair according to claim 3, characterized in that the arm being pivotable about the pivot pin of the one sliding member can be pivoted by means of a hand lever, which is pivotable through a certain angle with respect to said arm, so as to disengage a locking mechanism, which locks the arm, prior to the arm being caught by the hand lever.

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5. A wheelchair according to claim 4, characterized in that said arm is retained between two projections, which are secured to a cam secured to the hand lever, by means of which a lever locking the arm can be pivoted from the locking position to a non-locking position.

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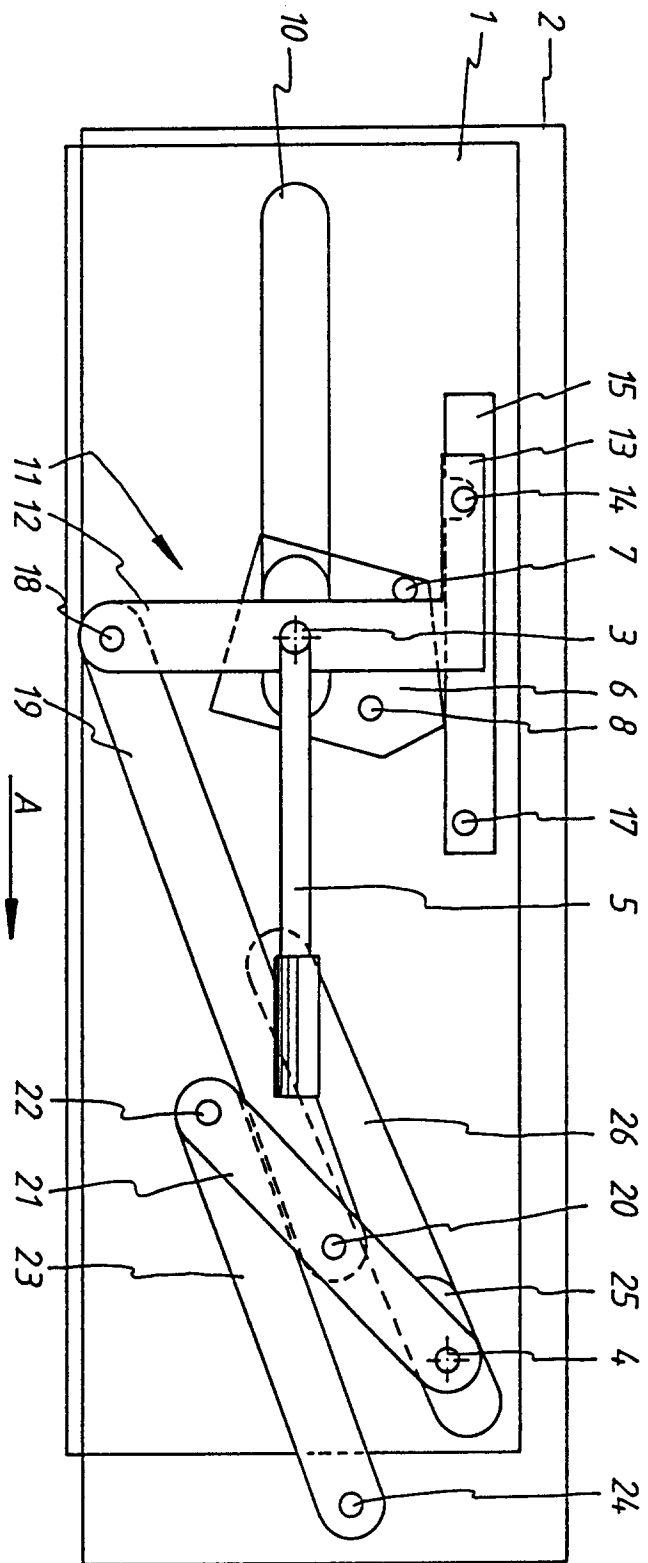


Fig 1

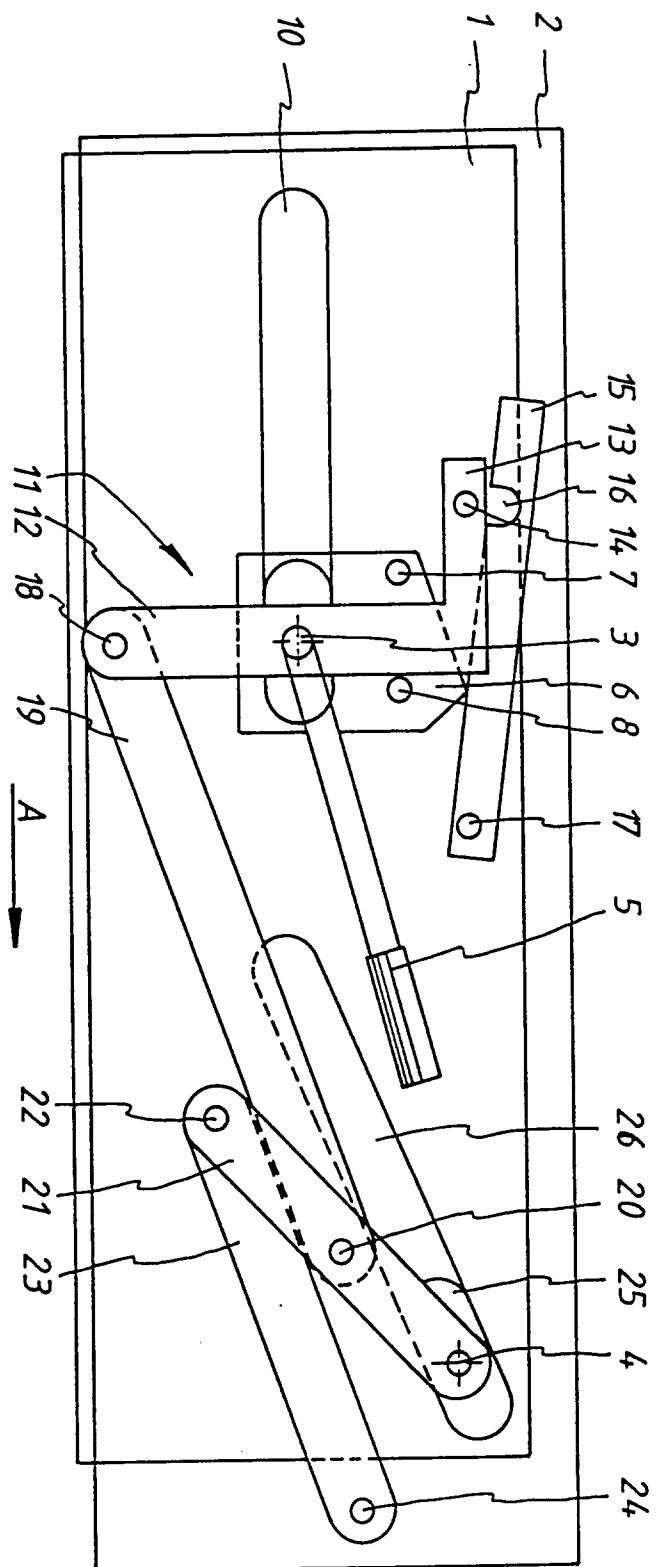


Fig 2

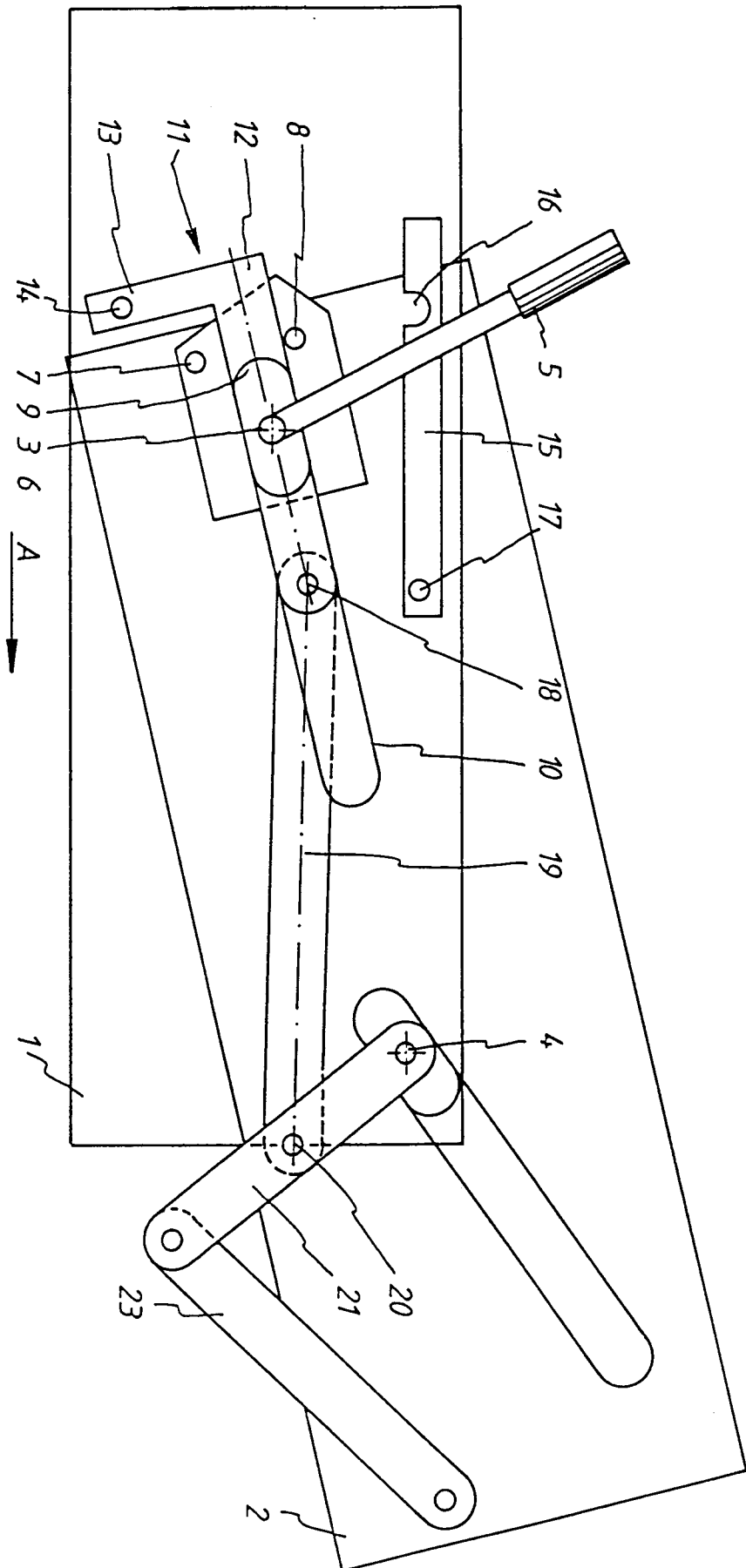


Fig 3

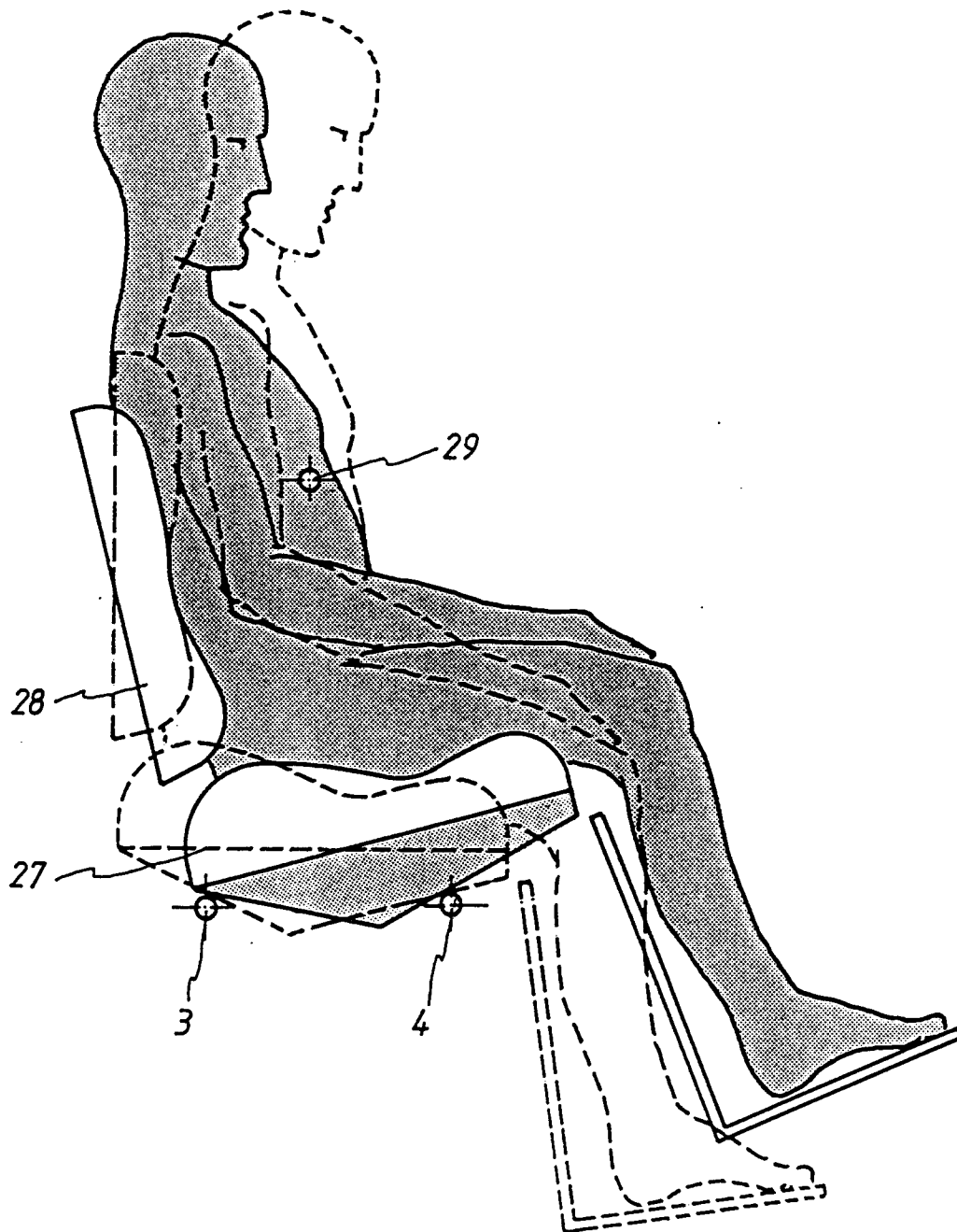


Fig 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 20 1026

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 248 474 (HUKA DEVELOPMENTS B.V.) * the whole document *	1,2	A61G5/00
X	FR-A-2 663 211 (MOREAU) * the whole document *	1,2	
A	NL-A-8 701 951 (RICHARD VAN SEENUS NEDERLAND B.V.) * claims *	1	
A	DE-A-2 459 908 (PONTIAC FURNITURE INDUSTRIES) * page 14, line 10 - page 19, line 6; figures 7-10 *	3	
A	DE-A-3 808 149 (LIGTVOET PRODUCTS B.V.) * column 4, line 52 - line 58; figures 1,2 *	4	
A	DE-A-3 902 694 (ORTOPEDIA GMBH) * column 3, line 53 - line 59; figure 1 *	4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A61G A47C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 JUNE 1993	Examiner BAERT F.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			