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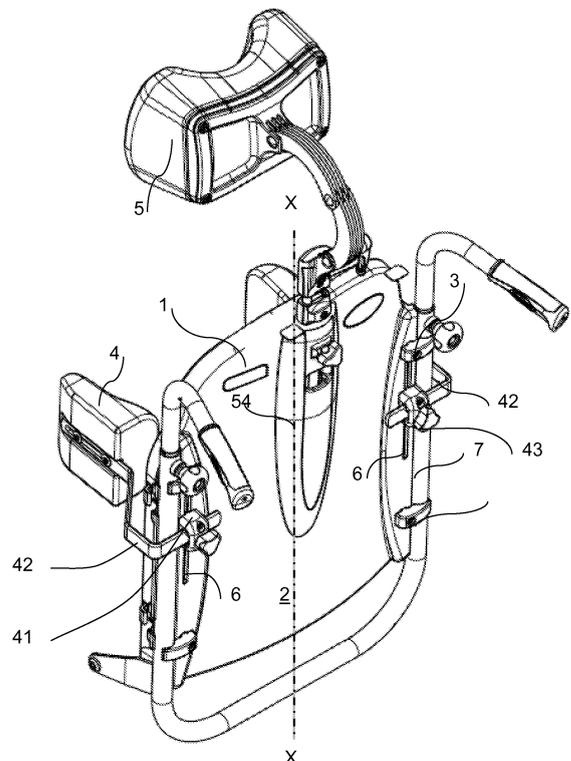
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(54) **Backrest for wheelchair**

(57) A backrest (1) for a wheelchair comprising a backrest plate (2), for supporting the backrest of a user using said wheelchair and provided with a main axis X-X, a backrest frame (7), for holding said backrest plate, having two substantially parallel bars extending along said X-X axis, at least one lateral trunk support (4) for laterally holding the trunk of said wheelchair user and provided with trunk support arms, attachment members (3), for attaching said backrest plate to said frame, said backrest plate (2) being provided with at least two longitudinal adjustment slots (6) extending on the side portions of said backrest plate (2) substantially parallel to said backrest main axis X-X, and at least one pair of backrest attachment members (3) being slidably mounted on said slots (2), enabling height adjustment of said backrest plate (2) on said frame (7), the lateral trunk support (4) being also slidably mounted on said slots (2).

Figure 1



Description**FIELD OF THE INVENTION**

[0001] The present invention relates to a backrest for a wheelchair provided with a backrest plate, a backrest frame for holding said backrest plate, at least one lateral trunk support and attachment members, for attaching said backrest plate to said frame.

BACKGROUND OF THE INVENTION

[0002] Many backrests types are known in the art. Most backrests are attached to a frame and do not allow any adjustment possibilities. Adjustable backrests are also known. For instance, document US 2006/0091706, Christofferson et al. "Seat assembly for wheelchair", describes a typical seat assembly that can be mounted on various wheelchair bases. The seat assembly enables the seat width and backrest width to be adjusted independently of each other. The backrest has a plurality of open slots, the number and orientation of which contributes to depth, width, and height adjustment of the backrest as well as angular adjustment of lateral supports to permit the backrest to conform to the anatomical curves of a user. A first set of slots is provided for height adjustment of the thoracic support. Further slots are provided for lateral adjustment of the thoracic support. Threaded fasteners provided in adjustment holes are provided for height adjustment of the backrest with respect to a main member. In the disclosed embodiment, all adjustments are made independently, involving time consuming manipulations. Moreover, once a first adjustment has been made with a first member, further adjustments of this first member may be required after another member is adjusted.

[0003] Thus, there is a need for a backrest for wheelchair avoiding the above-mentioned drawbacks. Such backrest should be adjustable in a quick and easy way.

[0004] There is also a need for a backrest that may be manufactured with reasonable equipment requirements in a cost effective way.

SUMMARY OF THE INVENTION

[0005] According to the invention, these aims are achieved by means of a wheelchair backrest comprising:

- a backrest plate, for supporting the backrest of a user using said wheelchair and provided with a main axis X-X;
- a backrest frame, for holding said backrest plate, having two substantially parallel bars extending along said X-X axis;
- at least one lateral trunk support for laterally holding the trunk of said wheelchair user;
- attachment members, for attaching said backrest plate to said frame;

- said backrest plate being provided with at least two longitudinal adjustment slots extending on the side portions of said backrest plate substantially parallel to said backrest main axis X-X, at least one pair of backrest attachment members being slidably mounted on said slots, enabling height adjustment of said backrest plate on said frame;
- said lateral trunk support being provided with trunk support arm extending from a body support towards the rear portion of the backrest plate, wherein lateral trunk support is also slidably mounted on said slots.

[0006] With such an arrangement, the longitudinal slots enable adjustment of the vertical position of the backrest and trunk supports. Adjustment is thus easier and quicker to perform than standard configurations having separate adjustments.

[0007] In a first embodiment, the lateral trunk support holder member is slidably mounted on said slots with securing members for holding said lateral trunk support.

[0008] The securing members preferably comprise screws and nuts arrangements.

[0009] In a preferred variant, the lateral trunk support holder member is provided with a transversal slot into which the trunk support arm is slidably mounted.

[0010] In a further embodiment, the backrest attachment members are clamps, slidably mounted on said adjustment slots and cooperating with said frame for holding the backrest plate by tightening the frame between the clamp and the backrest plate.

[0011] In another embodiment, further pair of attachment members are provided in a non-slidable relationship on said backrest plate and cooperate with said frame in a clamping manner.

[0012] In a still further embodiment, the two slidable attachment members are placed in said slot on top of said lateral trunk support holder member, when said backrest is in an upright position. In a variant, the two slidable attachment members are placed in said slot below said lateral trunk support holder member, when said backrest is in an upright position. The set up modification to change from one configuration to the other is very quick and easy to perform.

[0013] In a further embodiment, the backrest plate is made of a single molded plastic element. This enable reducing manufacturing costs, while producing high quality components.

[0014] In a preferred embodiment, the backrest plate is provided with a neckrest attachment and adjustment channel, extending substantially along said main axis X-X, into which a neckrest attachment arm is slidably mounted.

[0015] This enables the suppression of the attachment plate used with previous wheelchairs. The channel is molded into a single element with the backrest. Thanks to the channel, easy adjustment of the neckrest height is possible. In a variant, an Allen key holder is molded into the backrest plate.

[0016] In still another variant, wire attachment hooks are molded together with the backrest plate.

[0017] The invention also provides a wheelchair having backrest according to the above-mentioned characteristics.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention will be better understood with the aid of the description of an embodiment given by way of example and illustrated by the figures, in which:

- Figure 1 illustrates a perspective view of a backrest according to the invention;
- Figure 2 is an enlarged view of the backrest of Figure 1, with some components in exploded view;
- Figure 3 is an exploded view of the backrest of Figures 1 and 2;
- Figure 4 illustrates a frontal perspective view of the backrest of Figure 1;
- Figure 5 shows a rear view of the backrest;
- Figure 6 depicts a side view of the backrest.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0020] In this document, the "outer portion" of the backrest or of the slot corresponds to the rear portion of the wheelchair; the "inner portion" corresponds to the portion against which the user back rests.

[0021] Figures 1 to 3 illustrate perspective views of the backrest 1, showing the rear portion and part of the left side of the backrest. A backrest plate 2, preferably made of plastic or other mouldable material provides the backrest active plane, that is to say the plane providing the surface against which the user back will be placed, in use. The main longitudinal axis X-X of the backrest plate 2 is shown in the central portion of the backrest.

[0022] A frame 7, cooperating with the bottom portion of a wheel chair, provides the required support for the backrest plate 2. In the illustrated embodiment, the frame 7 is U-shaped, with its two extended legs serving as supports on which the backrest plate 2 is slidably attached. At least one, and preferably two lateral trunk supports 4 are provided on each side of the backrest. On the upper

portion of the backrest 1, a neckrest 5 is attached to the backrest plate 2 in a manner described hereafter.

[0023] As best seen in Figure 5, the backrest plate 2 is provided with two longitudinal adjustment slots 6, extending on each side of the backrest plate 2, along an axis substantially parallel to the main axis X-X. These open slots 6 provide slidably attachment of the backrest plate 2 on the frame 7 and of the lateral trunk support 4, as further described hereafter.

[0024] To adjust the height of the backrest 1, the backrest plate 2 is movable along the X-X axis and may be secured in almost any position along the frame 7. Adjustment may be made in a very simple and quick way. When the screw 31 and nut 32 arrangements are slightly loosened, that is to say enough to allow the backrest plate 2 to slide against the frame 7, but not enough to allow complete removal of the latter, the backrest plate 2 may be moved up and down and adjusted along a position allowing a maximum comfort for the user. Once an appropriate position is reached, the backrest plate 2 is secured with the screw 31 and nut 32 arrangements. These screw and nut arrangements allow securing clamps 3 simultaneously in the slots 6 and against the frame 7. In this way, the backrest is firmly held against the frame 7. The clamping arm 33 of clamps 3 cooperates with the frame 7 and provides a tight fit relationship between the frame and the backrest plate when the screw and nut arrangement is tightened. The clamps are further provided with a leg, extending from the clamp to slightly penetrate into the slot, to enable easy sliding displacement.

[0025] The slots 6 enable a very wide choice of potential positions. When the clamps 3 are placed in the upper section of the slots, the backrest plate 2 may be lowered. When the clamps 3 are placed in the lower section of the slots, the backrest plate 2 may be lifted. To enable an extreme lifted position, the clamps 3 and the lateral trunk support holder member 41 (described hereafter) may be exchanged, so that the support holder member 41 occupies the highest position.

[0026] Additional clamps 3 may be provided in the lower portion of the backrest plate 2, in a non slidably relationship with respect to the backrest plate 2. These clamps may however be slid along the frame 7 when the backrest plate 2 position is modified. In the illustrated example, these clamps are also secured by screw 31 and nut 32 arrangements.

[0027] Figures 1, 4 and 6 show the lateral trunk supports, comprising a body support 4, for direct contact with the user's body, a trunk support arms 42, extending from said body support 4 towards the rear portion of the backrest plate 2, for attachment thereof. The trunk support arm 42 is slidably mounted into a lateral trunk support holder member 41. Such holder member 41 is conceived to provide two degrees of freedom. First, it is slidably mounted into slot 6 in a similar manner as the backrest clamps 3. It may thus be slidably displaced along the slot for selection of the most appropriate position to provide a best support and comfort to the wheelchair user.

Screws 44 (see fig. 3) and dual nut arrangement 45 secure the holder member 41 along the slot. Secondly, a holder slot 46 is provided in the holder member 41 and is oriented substantially transversal to main axis X-X, so as to provide lateral adjustment of the trunk support arms 42. A screwable securing member 43 enables securing the support arm into holding member 41. Unscrewing the latter allows lateral displacement, to adjust the lateral position of the lateral trunk support 4. Once proper positioning is reached, the securing member 43 may be tightened.

[0028] As shown in Figures 2, 3 and 5, the backrest plate 2 is further provided with a neckrest attachment structure 54 comprising a neckrest attachment and adjustment channel 52. The channel is oriented substantially parallel to said main axis X-X and has its opening in the upper direction, to enable insertion of the neckrest attachment arm 51. The channel 52 is shaped as an extended tunnel, allowing slidable displacement of the neckrest attachment arm 51 along the channel axis, enabling height adjustment of the neckrest 5. Once the optimal position is reached, securing screw 53 allows securing the neckrest attachment arm in place, until further adjustment is required. The neckrest attachment structure is preferably integrally molded together with the backrest plate 2.

[0029] Figure 4 shows the inner portion of the backrest plate 2. This view allows showing the inner portion of the adjustment channel 52, with the neckrest attachment arm 51 placed therein. An Allen key holder 8, molded together with the backrest plate 2 enables safe storing of the tool required to screw/unscrew important components of the chair. Storing the tool therein avoids losing it, ensuring its availability in any circumstance.

[0030] Figure 4 also illustrates a set of wire hooks 9 that may be used for wire or cable attachment purposes.

[0031] Although not shown in the Figures, the backrest 1 is preferably covered with foam or other soft material to provide more comfort for the user. A covering may also be provided.

[0032] The above detailed description with reference to the drawings illustrates rather than limit the invention. There are numerous alternatives, which fall within the scope of the appended claims. For instance, the clamps and holder members are shown with screws and nuts. Other types of fastening means may also be used without departing from the invention.

[0033] The word "comprising" does not exclude the presence of other elements or steps than those listed in a claim. The word "a" or "an" preceding an element or step does not exclude the presence of a plurality of such elements or steps. The mere fact that respective dependent claims define respective additional features, does not exclude a combination of additional features, which corresponds to a combination of dependent claims.

Claims

1. A backrest (1) for a wheelchair, comprising:

- 5 - a backrest plate (2), for supporting the backrest of a user using said wheelchair and provided with a main axis X-X;
- a backrest frame (7), for holding said backrest plate, having two substantially parallel bars extending along said X-X axis;
- 10 - at least one lateral trunk support (4) for laterally holding the trunk of said wheelchair user;
- attachment members (3), for attaching said backrest plate to said frame; **characterised in that:**
- 15 - said backrest plate (2) is provided with at least two longitudinal adjustment slots (6) extending on the side portions of said backrest plate (2) substantially parallel to said backrest main axis X-X, at least one pair of backrest attachment members (3) being slidably mounted on said slots (2), enabling height adjustment of said backrest plate (2) on said frame (7);
- 20 - said lateral trunk support (4) is provided with trunk support arm (42) extending from a body support (45) towards the rear portion of the backrest plate (2), wherein lateral trunk support (4) is also slidably mounted on said slots (2).

30 2. A backrest according to claim 1, wherein a lateral trunk support holder member (41) is slidably mounted on said slots (2) with securing members (44, 45), for holding said lateral trunk support (4).

35 3. A backrest according to claim 2, in which the lateral trunk support holder member (41) is provided with a transversal slot (46) into which trunk support arm (42) is slidably mounted.

40 4. A backrest according to any one of preceding claims, in which said backrest attachment members are clamps (3), slidably mounted on said adjustment slots (6) and cooperating with said frame (7) for holding said backrest plate by tightening the frame (7) between the clamp (3) and the backrest plate (2).

45 5. A backrest according to any one of preceding claims, in which further pair of attachment members (3) are provided in a non-slidable relationship on said backrest plate (2) and cooperate with said frame (7) in a clamping manner.

50 6. A backrest according to any one of claims 1 to 5, in which the two slidable attachment members (3) are placed in said slot (6) on top of said lateral trunk support holder member (41), when said backrest is in an upright position.

7. A backrest according to any one of claims 1 to 5, in which the two slidable attachment members (3) are placed in said slot (6) below said lateral trunk support holder member (41), when said backrest is in an upright position. 5
8. A backrest according to any one of preceding claims, made of a single molded plastic element.
9. A backrest according to any one of preceding claims, in which the backrest plate is provided with a neckrest attachment and adjustment channel, extending substantially along said main axis X-X, into which a neckrest attachment arm is slidably mounted. 10
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10. A backrest according to any one of preceding claims, in which an Allen key holder is molded into the backrest plate.
11. A backrest according to any one of preceding claims, in which wire attachment hooks are molded together with the backrest plate. 20
12. A wheelchair having a backrest (1) according to any one of preceding claims. 25

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Figure 1

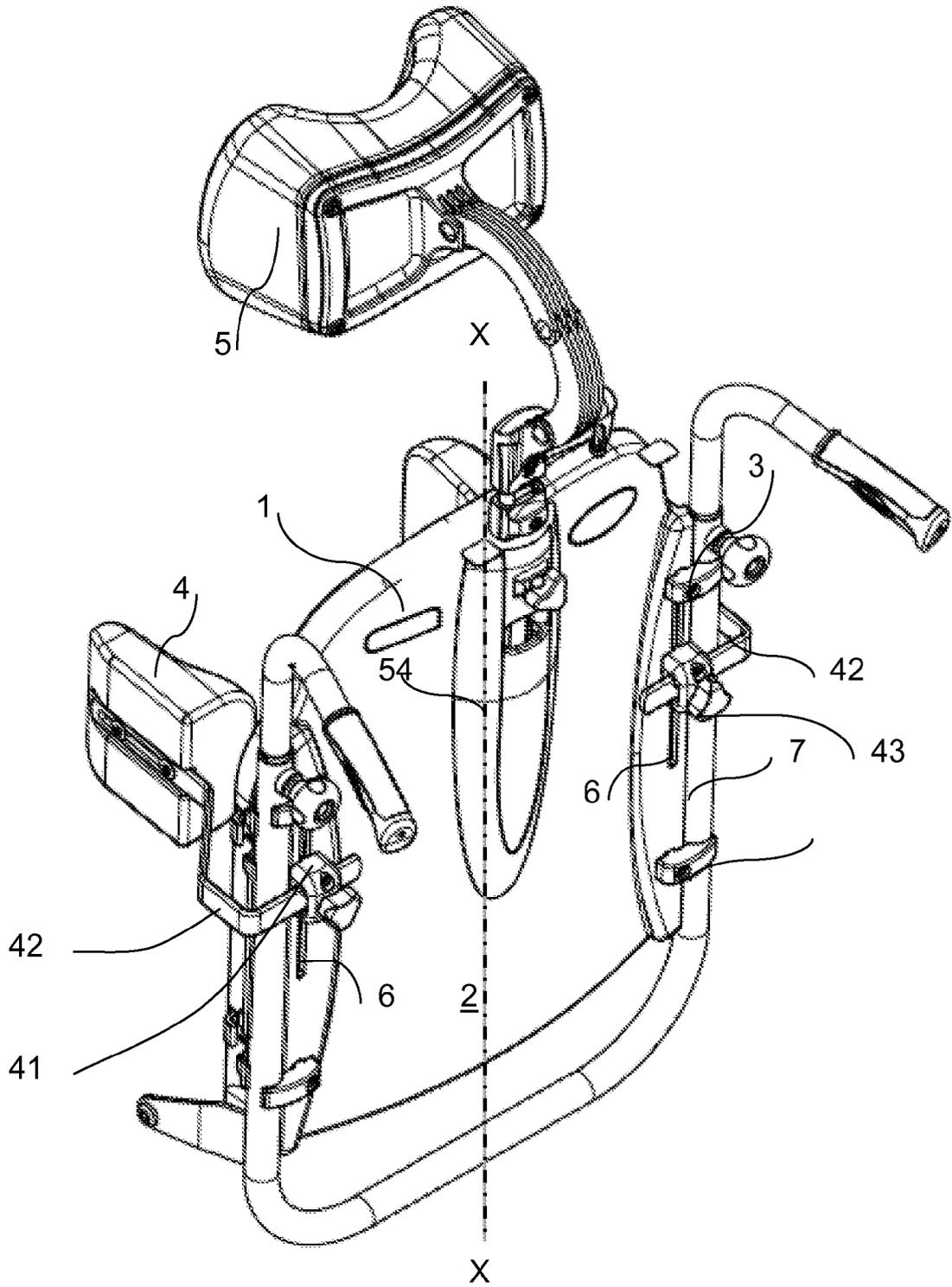


Figure 2

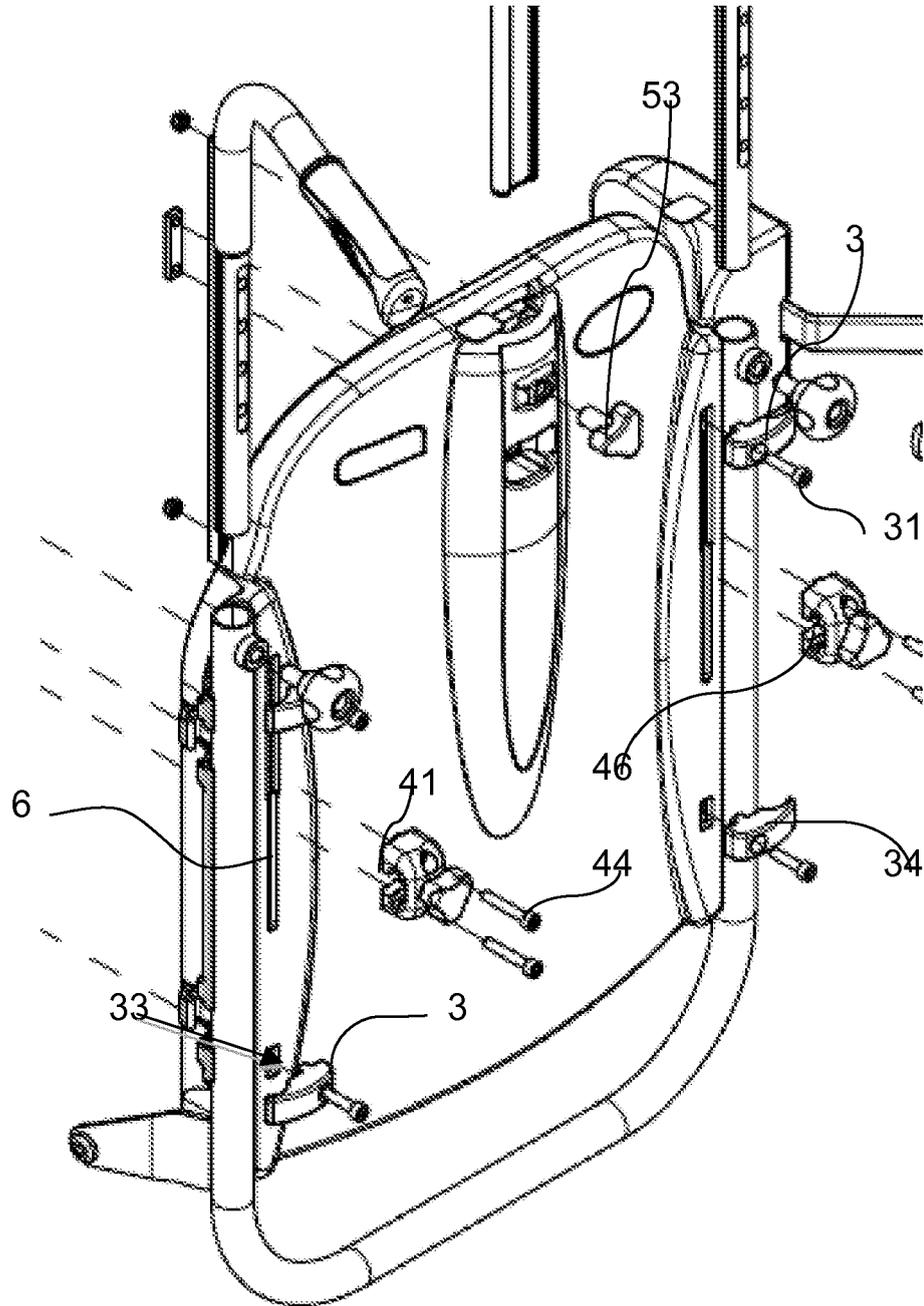


Figure 3

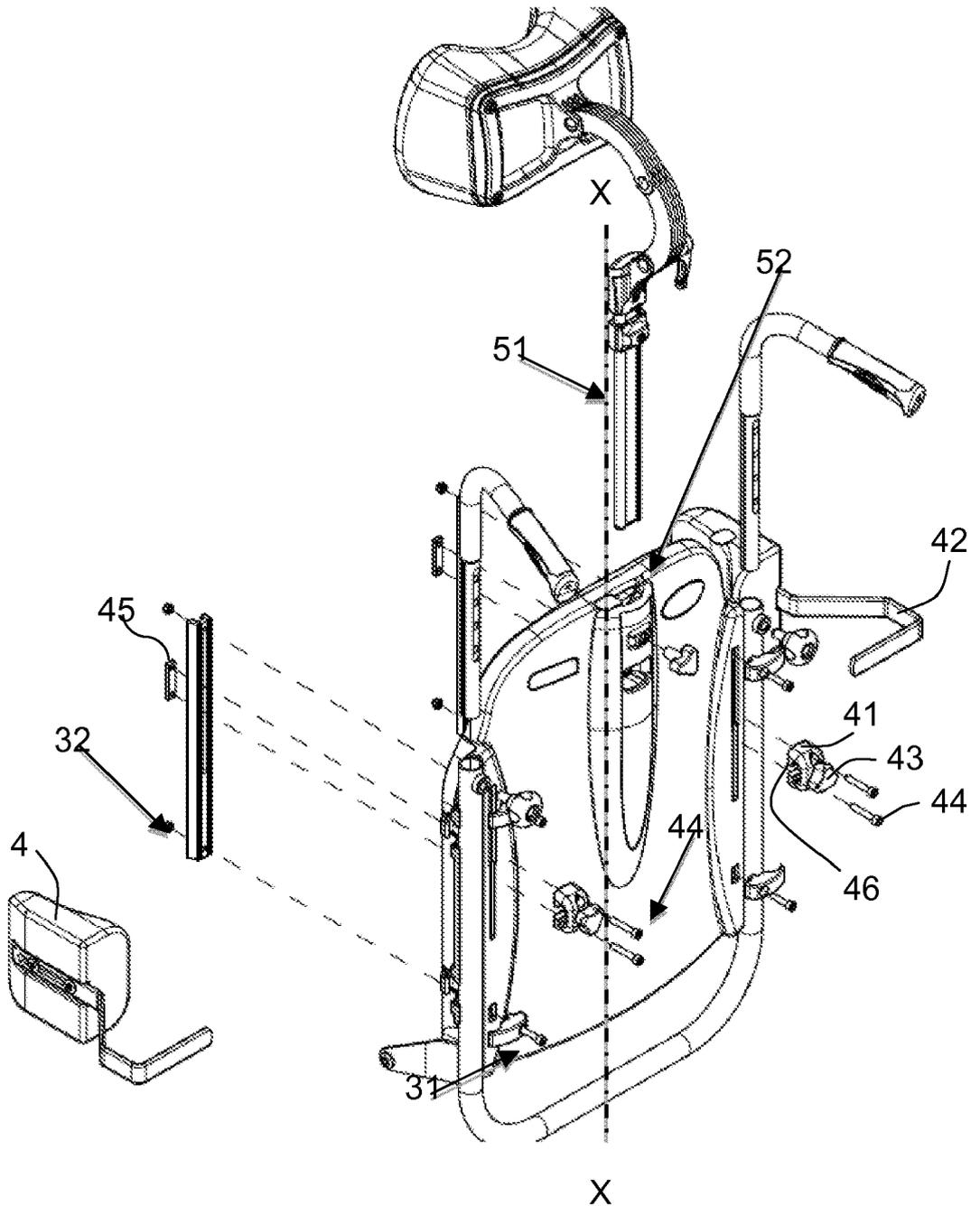


Figure 4

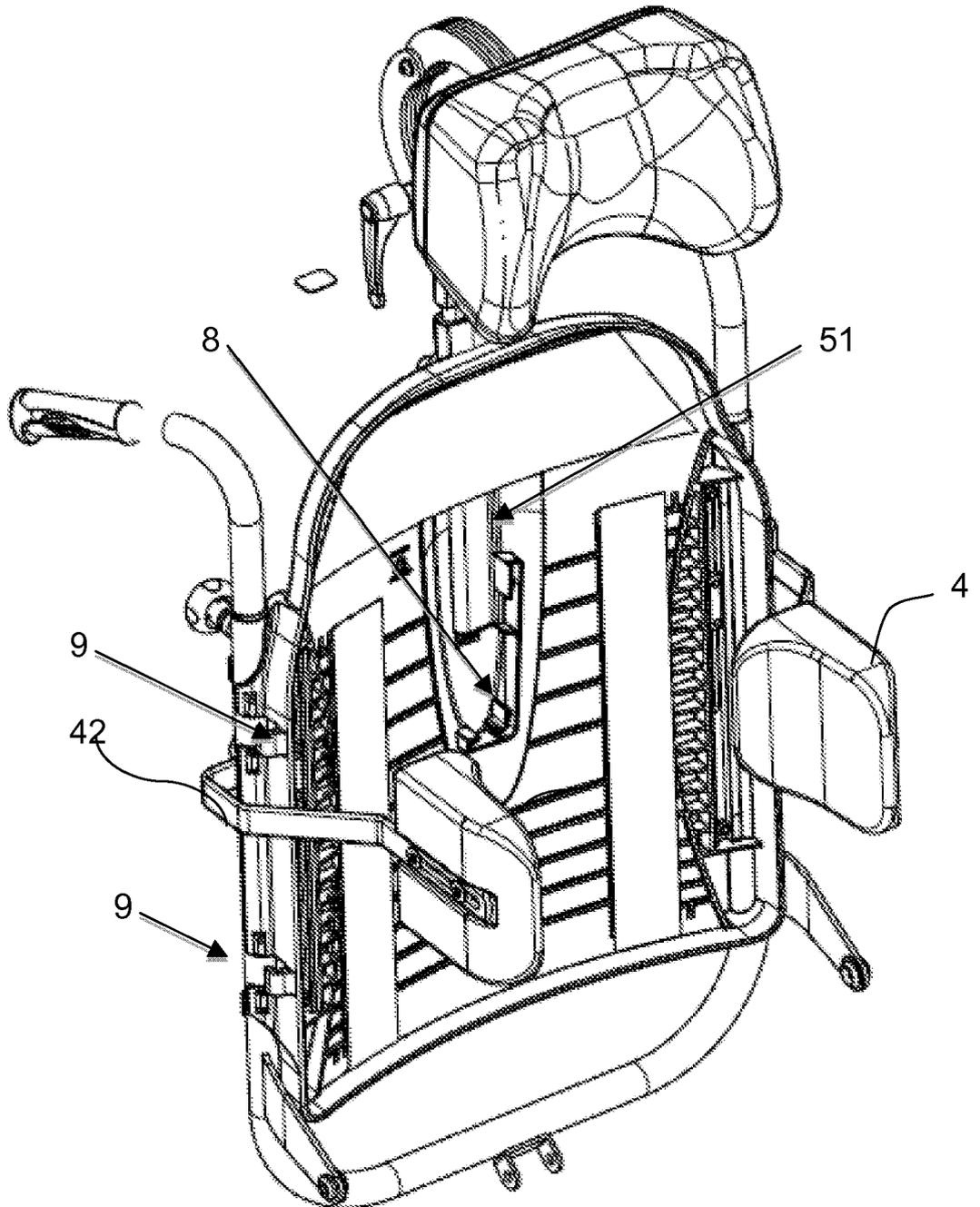


Figure 5

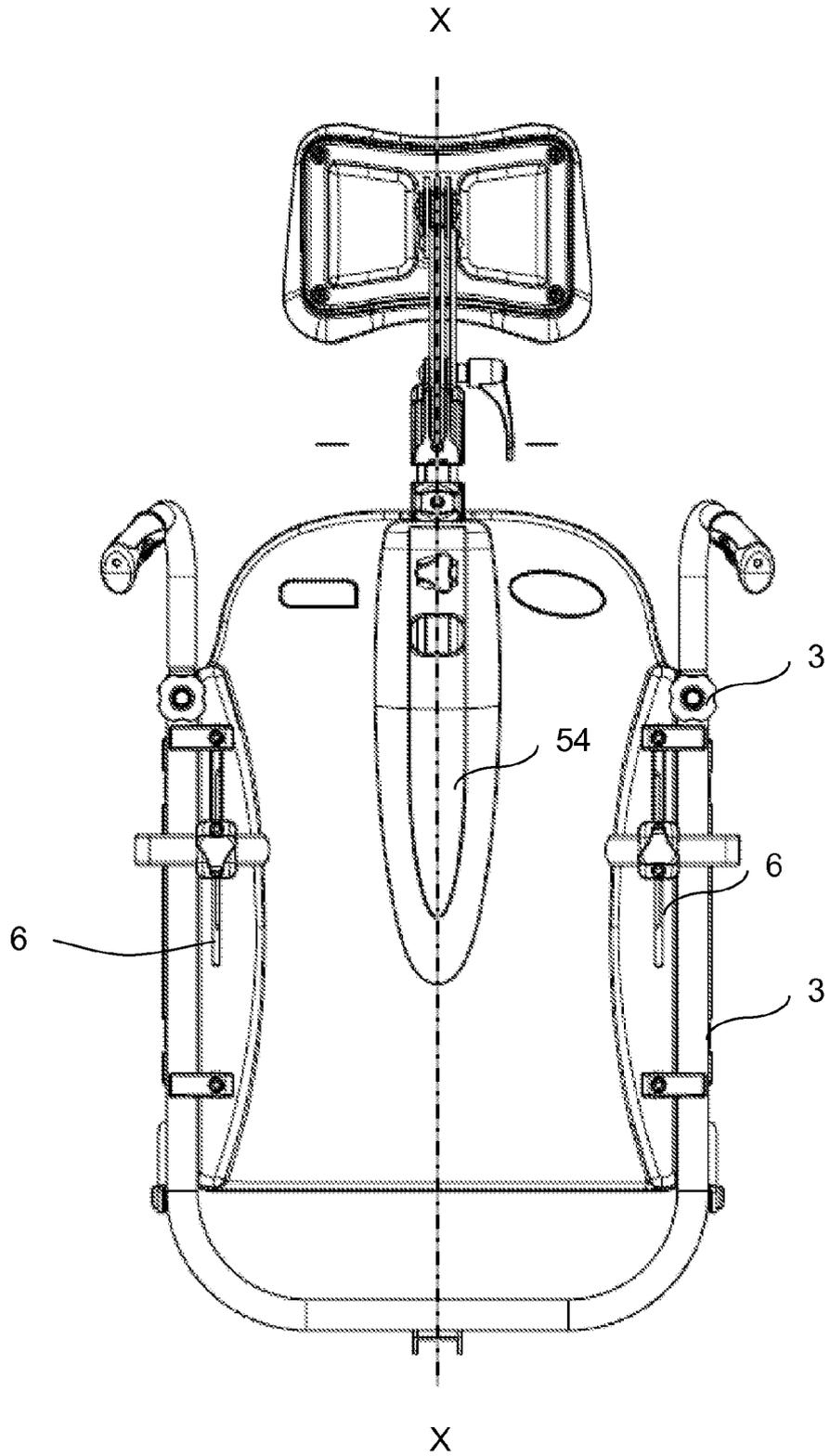
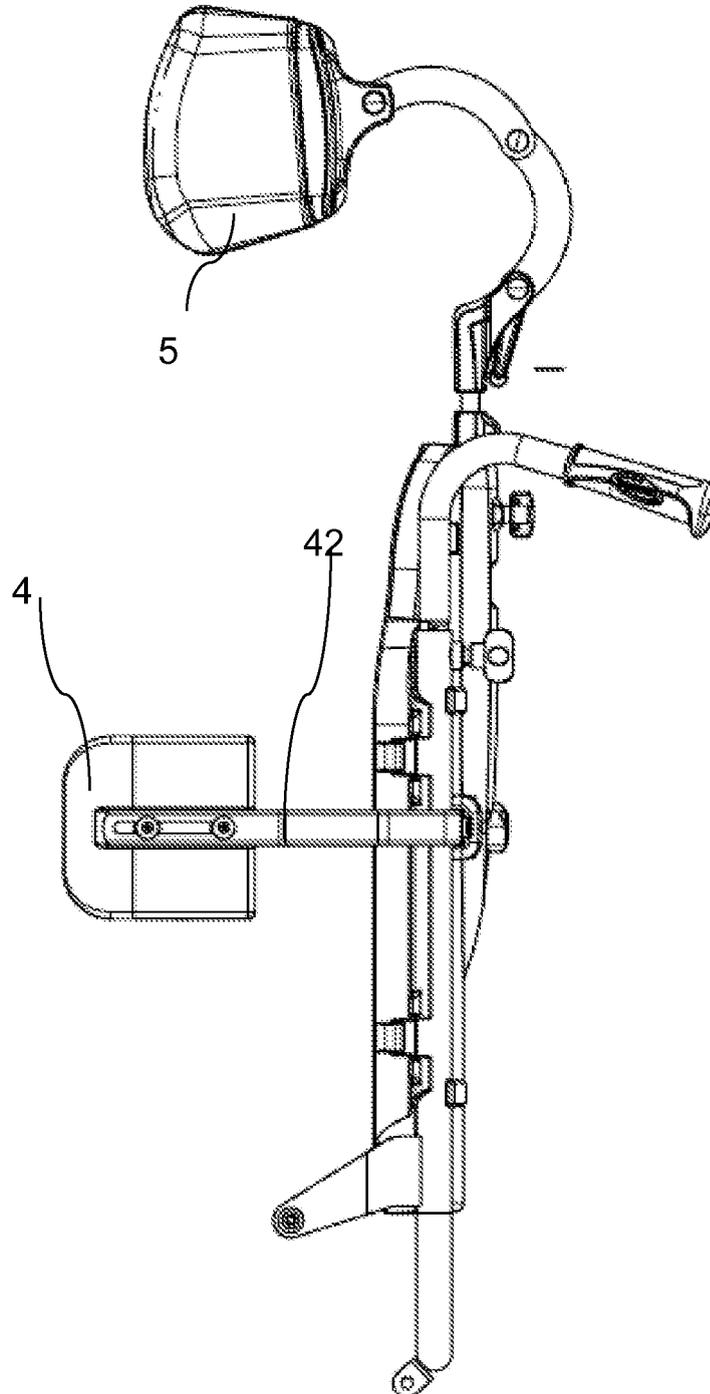


Figure 6





EUROPEAN SEARCH REPORT

Application Number
EP 09 16 0786

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2006/047341 A (SUNRISE MEDICAL HHG INC [US]; CHRISTOFFERSON JAMES L [US]; WHELAN THOM) 4 May 2006 (2006-05-04) * paragraphs [0053], [0057]; figures 1,8,9 *	1-12	INV. A61G5/10
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A	DE 20 2007 013812 U1 (JOHN UDO [DE]) 28 February 2008 (2008-02-28) * paragraphs [0044], [0045], [0048]; figure 3 *	1-12	
A	EP 1 256 333 A (VASSILLI SRL [IT]) 13 November 2002 (2002-11-13) * figure 11 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61G
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		28 October 2009	Bielsa, David
CATEGORY OF CITED DOCUMENTS		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 L : document cited for other reasons & : member of the same patent family, corresponding document	
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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 16 0786

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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28-10-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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