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(54) MOVING AID FOR THE (FORE)ARM OF A PERSON

(57) Moving aid for the (fore)arm of a person, comprising an armrest for receiving the (fore)arm of a person; a carrier for the arm rest; a support, for movably supporting the carrier with respect to a (wheel)chair, work place, bed or other fixed world, wherein the support comprises a first parallelogram, having a first essentially horizontal extending upper side, connected to the (wheel)chair, and a first lower side, situated below the upper side, coinciding with a second lower side, forming part of a second parallelogram, which second parallelogram comprises a second upper side, situated above the first upper side of the first parallelogram and which holds the carrier; and wherein at least one of the legs of the second parallelogram that connect the second lower side and the second upper side extends beyond the second lower side; and wherein the lower end of the at least one leg that extends beyond the second lower side is beared in a conductor-track, which conductor-track is formed such that a second upper side of the second parallelogram is urged in an essentially horizontal track.

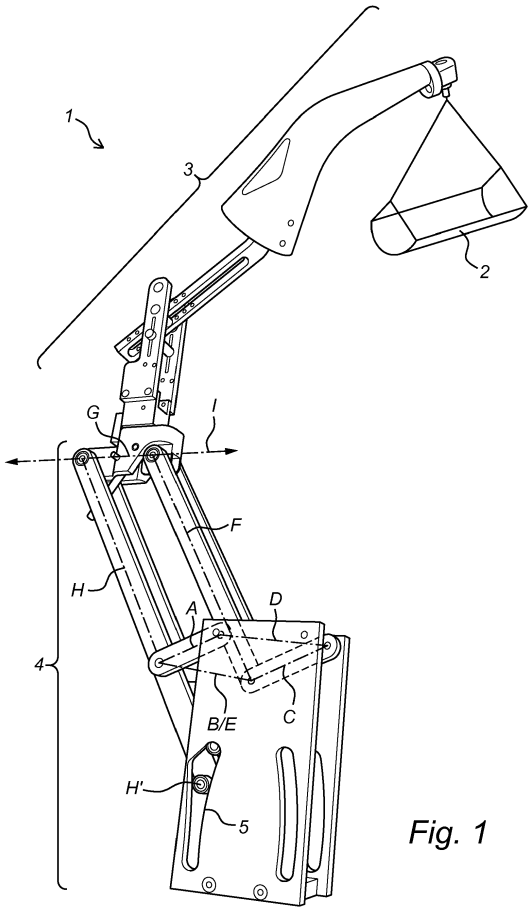

Fig. 1

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Description

[0001] The present invention relates to a moving aid for the (fore)arm of a person. Moving aids as such are known in the art. They serve to assist (partly) disabled persons to perform functions they are not able to perform without help, or which cost them extraordinary much effort.

[0002] In many cases this is done by supporting the (fore)arm in a certain position, or by providing a movable support for the (fore)arm with respect to a (roller)chair or bed. The support is then arranged for moving along with the arm, and may or may not be powered in order to ease the movement for a user.

[0003] In general, these aids provide an improvement in the well-being of the person, but still there are some disadvantages associated with them. In particular, the arrangements on (wheel-) chairs are voluminous, which causes - in the case of a wheelchair - for instance trouble when trying to pass through doors and other small openings. Furthermore, the operation of the existing aids is in many cases still intensive and exhausting for their users.

[0004] For that reason, and in general for providing a useful alternative to the existing moving aids, it is a goal of the present invention to provide a moving aid that at least partly lacks the above disadvantages, and that provides benefits over the prior art.

[0005] The present invention thereto proposes a moving aid for the (fore)arm of a person, comprising an armrest for receiving the (fore)arm of a person, a carrier for the arm rest, a support, for movably supporting the carrier with respect to the (wheel)chair, work place, bed or other fixed world;, work place, bed or other fixed world, wherein the support comprises a first parallelogram, having a first essentially horizontal extending upper side, connected to the (wheel)chair, work place, bed or other fixed world, and a first lower side, situated below the upper side, coinciding with a second lower side, forming part of a second parallelogram, which second parallelogram comprises a second upper side, situated above the first upper side of the first parallelogram and which holds the carrier; and wherein at least one of the legs of the second parallelogram that connect the second lower side and the second upper side extends beyond the second lower side; and wherein the lower end of the at least one leg that extends beyond the second lower side is beared in a conductor-track, which conductor-track is formed such that a second upper side of the second parallelogram is urged in a desired track, such as an essentially horizontal track.

[0006] The moving aid according to the present invention provides the advantage that an arm rest is provided that is able to follow for instance horizontal movement of the (fore)arm of a person, while being compact and robust. Alternative solutions according to the prior art with sliding constructions have appeared not to be able to resist the weight of an arm and a load for the arm for a long time without wear, and yet other solutions according to the prior art are not able to follow a straight horizontal or other desired movement of the arm, or are not compact.

[0007] The use of a double parallelogram enables the carrier for the arm rest and thus the arm rest to follow a straight horizontal path. The path is further controlled by the conductor-track through which the lower end of the at least one leg that extends beyond the second lower side is beared. This conductor track may thereto for instance have a V-shape, as will be explained later on with respect to the figures.

[0008] In order to increase the safety of the use of the moving aid, the conductor-track may be arranged under a cover. This also avoids dirt from entering the track and this causing malfunctioning. The cover may further have an aesthetic or ergonomic effect.

[0009] In an embodiment, the carrier comprises at least two mutually hinged parts, which are at least together rotatable about a vertical axis with respect to the support, and wherein the second hinged part is rotatable about a horizontal axis with respect to the first hinged part.

[0010] The at least two mutually hinged parts thus form two "arms" of which the carrier is formed, and together with the axes of rotation mentioned above enable to perfectly follow a user's arm movement.

[0011] In a further embodiment, the rotation about the vertical axis comprises a lock. Such lock prevents undesired and/or uncontrolled rotation and movements of a user's arm, and enables to fix the arm support in a desired position, which may be a preferred setting of a user. The lock may comprise a number of pins, arranged in a circle, and a different number of holes for receiving the pins, arranged in a circle with the same diameter, for enabling a number of locking positions that is equal to the product of the number of pins times the number of holes. Thereto, the greatest common divider of both numbers should be chosen equal to 1. This number of locking positions may be obtained if the number of pins and the number of holes are not a multitude of each other. The pins may be biased to move into a hole when the pin and the hole are outlined, for instance by a spring, and an unlocking mechanism may be present to remove the pin from a hole.

[0012] In yet another embodiment, the rotation of the second hinged part with respect to the first hinged part is restricted by a stop that defines the lowest position of the arm rest. The stop may be movable by means of an actuator, which can be arranged for moving the stop with an armrest resting on it. The actuator and the stop have a double function this way. On one hand, they serve to set the lowest rest position for the arm of the user, on the other hand, they provide lifting power for a user's arm and a load carried by that arm. The stop according to the invention may also be used without the features of the independent claim.

[0013] Preferably, the arm rest is balanced about its axis of rotation. That is, a counter-force is provided for the weight of the arm, or the arm and a load, so that a user minimally needs to exert a force for moving. Such

balance may be obtained by a using a zero free length spring for the balanced support of the arm rest, which zero free length spring may have an adjustable bias. In a specific embodiment, the zero free length spring comprises a compression-spring.

[0014] The invention will now be elucidated into more detail with reference to the following figures. Herein:

- Figure 1 shows a perspective view of a mock-up of a general principle of a first aspect of the present invention;
- Figure 2 shows a perspective view of a mock-up of a general principle of the present invention, mounted on a (wheel)chair;
- Figure 3 shows an overview and details of further aspects of the present invention.

[0015] Figure 1 shows a perspective view of a mock-up of a general principle of a first aspect of the present invention. The mock up comprises a moving aid 1 for the (fore)arm of a person, comprising an armrest 2 for receiving the (fore)arm of a person, a carrier 3 for the arm rest, a support 4, for movably supporting the carrier 3 with respect to a (wheel)chair (see figure 2) wherein the support 4 comprises a first parallelogram A-B-C-D having a first essentially horizontal extending upper side D, connected to the (wheel)chair, and a first lower side B, situated below the upper side, coinciding with a second lower side E, forming part of a second parallelogram E-F-G-H, which second parallelogram comprises a second upper side G, situated above the first upper side D of the first parallelogram and which holds the carrier 3; and wherein at least one of the legs H of the second parallelogram E-F-G-H that connect the second lower side and the second upper side extends beyond the second lower side E; and wherein the lower end H' of the at least one leg that extends beyond the second lower side E is beared in a conductor-track 5, which conductor-track is formed such that a second upper side G of the second parallelogram is urged in an essentially horizontal track I.

[0016] Figure 2 shows a perspective view of a mock up 6 of a general principle of the present invention, mounted on a (wheel)chair 7. As visible in the figure, the conductor-track is arranged under a cover 8.

[0017] Figure 3 shows an overview and details of further aspects of the present invention. The figure shows an embodiment of carrier 3, which comprises two mutually hinged parts 9, 10, which are at least together rotatable about a vertical axis J with respect to the support 2, and wherein the second hinged part 10 is rotatable about a horizontal axis L with respect to the first hinged part. This construction enables to follow the movement of a person's arm.

[0018] In the embodiment shown, the rotation about the vertical axis J comprises a lock 11, comprising a number of pins 12, arranged in a circle, and a different number of holes 13 for receiving the pins, arranged in a circle with the same diameter, for enabling a number of locking positions that is equal to the product of the number of pins 12 times the number of holes 13. In order to obtain that effect, these numbers should not be a multitude of each other wherein the greatest common divider is one.

[0019] The figure further shows in detail 16 how the rotation of the second hinged part 10 with respect to the first hinged part 9 is restricted by a stop 17 that defines the lowest position of the arm rest. The stop 17 cooperates with a protrusion 18 provided on lever 19 which determines the relative movement of hinged parts 9 and 10. The stop 17 is movable by means of an actuator 20 which drives a spindle 21. In a practical embodiment, the actuator 20 is arranged for moving the stop 17 with an arm resting on arm rest 2.

[0020] The arm rest is balanced about its axis of rotation L, that is, a vertical movement can be performed without the need of exerting a force. Thereto, the lever 19 may be provided with a zero free length spring construction for the balanced support of the arm rest. As detail 14 shows, the zero free length spring may - in order to create a very compact configuration - comprise a compression-spring 22. Detail 15 finally shows a lock for the rotations about two horizontal axes. The embodiments shown are for illustrative purposes only and do not limit the scope of the patent, which is defined in the following claims. In particular it may be possible that features of the dependent claim may be applied without those of the independent claim. Such embodiments may form part of a divisional application.

Claims

1. Moving aid 1 for the (fore)arm of a person, comprising:

- an armrest 2 for receiving the (fore)arm of a person;
- a carrier 3 for the arm rest;
- a support 4, for movably supporting the carrier 3 with respect to a (wheel)chair, work place, bed or other fixed world;

characterised in that

- the support 4 comprises:
  - a first parallelogram A-B-C-D, having
    - a first essentially horizontal extending upper side D, connected to the (wheel) chair, work place, bed or other fixed world, and
    - a first lower side B, situated below the upper side, coinciding with:
    - a second lower side E, forming part of a second parallelogram E-F-G-H,

which second parallelogram comprises a second upper side G, situated above the first upper side D of the first parallelogram and which holds the carrier 3; and wherein
- at least one of the legs H of the second parallelogram that connect the second lower side and the second upper side extends beyond the second lower side; and
- wherein the lower end H' of the at least one leg H that extends beyond the second lower side is beared in a conductor-track 5, which conductor-track 5 is formed such that a second upper side G of the second parallelogram is urged in an essentially horizontal track I.

2. Moving aid according to claim 1, wherein the conductor-track is arranged under a cover.

3. Moving aid according to claim 1, wherein the carrier comprises two mutually hinged parts, which are at least together rotatable about a vertical axis with respect to the support, and wherein the second hinged part is rotatable about a horizontal axis with respect to the first hinged part.

4. Moving aid according to claim 3, wherein the rotation about the vertical axis comprises a lock.

5. Moving aid according to claim 4, wherein the lock comprises a number of pins, arranged in a circle, and a different number of holes for receiving the pins, arranged in a circle with the same diameter, for enabling a number of locking positions that is equal to the product of the number of pins times the number of holes wherein the greatest common divider of both numbers is 1.

6. Moving aid according to claim 3, 4 or 5, wherein the rotation of the second hinged part with respect to the first hinged part is restricted by a stop that defines the lowest position of the arm rest.

7. Moving aid according to claim 6, wherein the stop is movable by means of an actuator.

8. Moving aid according to claim 7, wherein the actuator is arranged for moving the stop with an arm resting on the armrest.

9. Moving aid according to one of the previous claims 5-8, wherein the arm rest is balanced about its axis of rotation.

10. Moving aid according to claim 9, comprising a zero free length spring for the balanced support of the arm rest.

11. Moving aid according to claim 10, wherein the zero free length spring comprises a compression-spring.

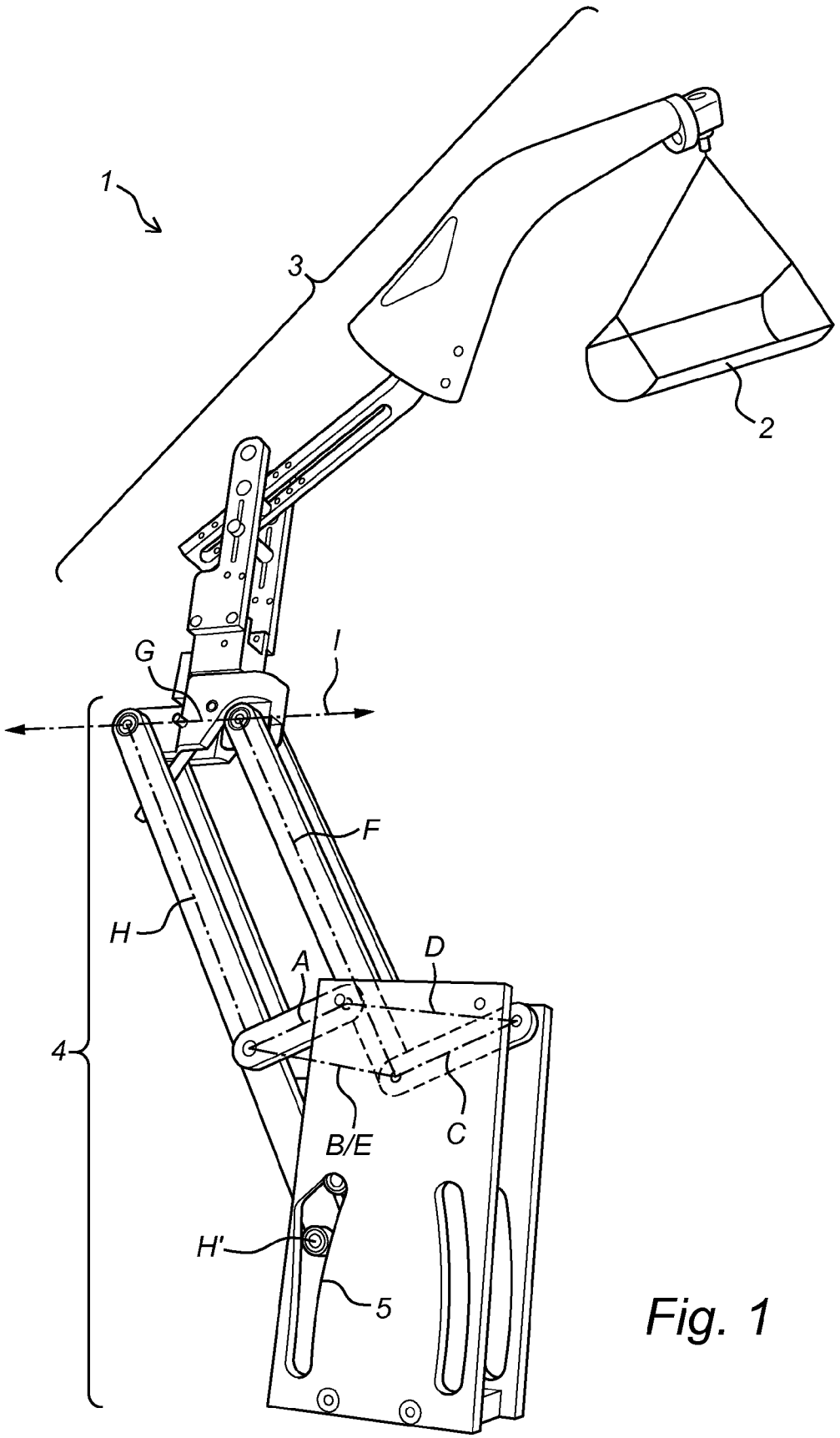


Fig. 1

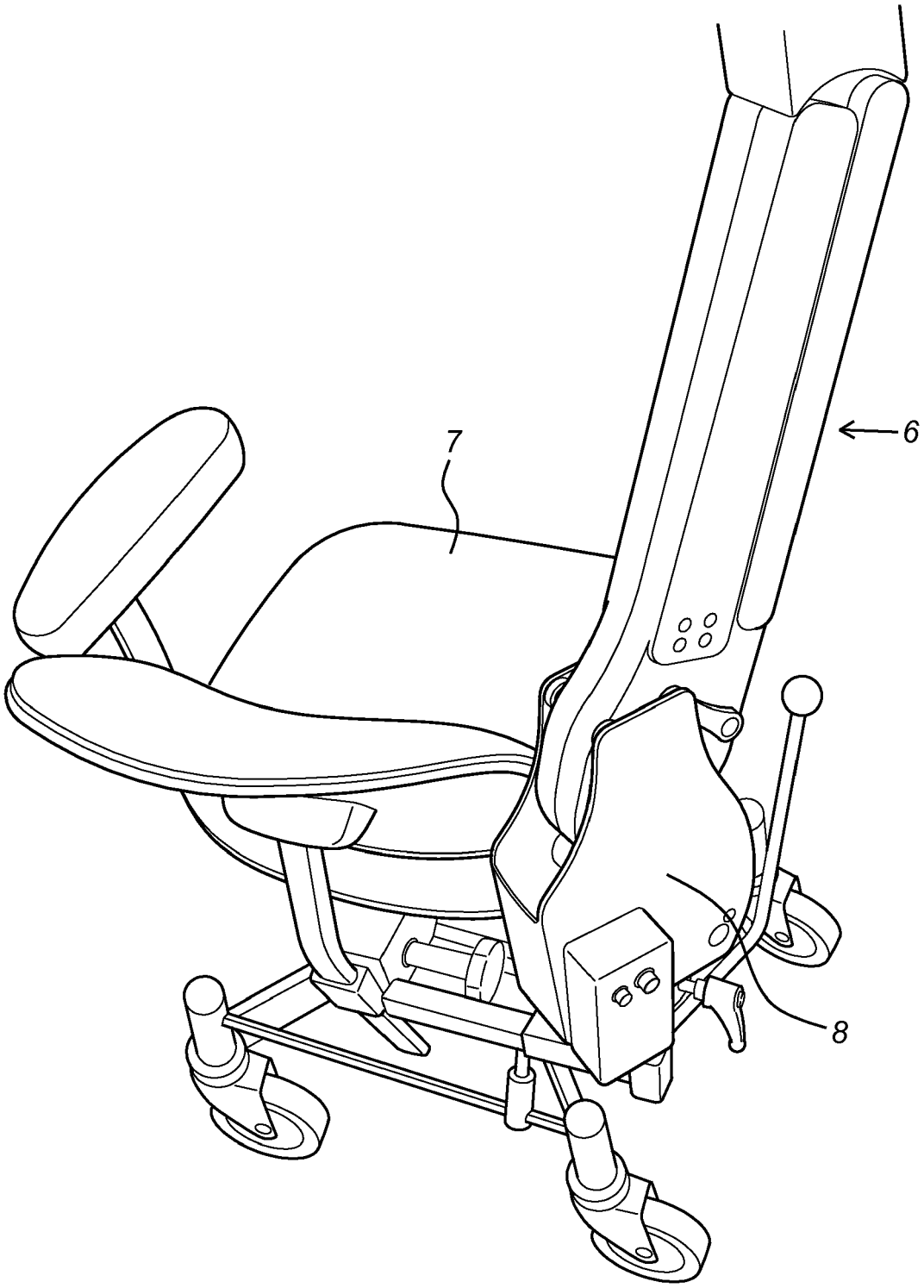


Fig. 2

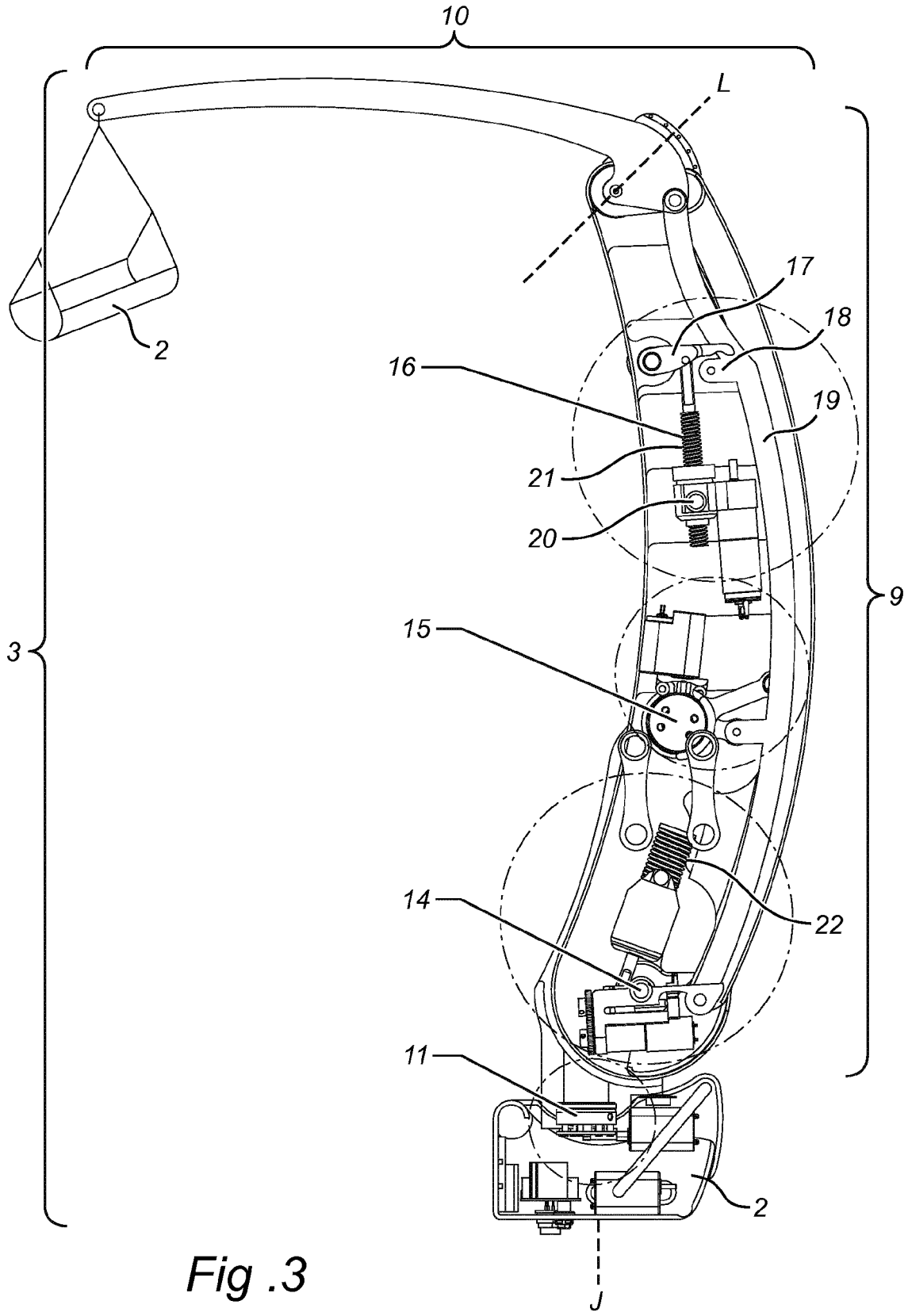
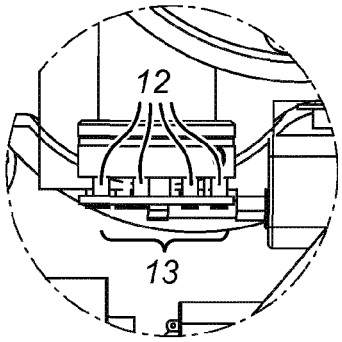
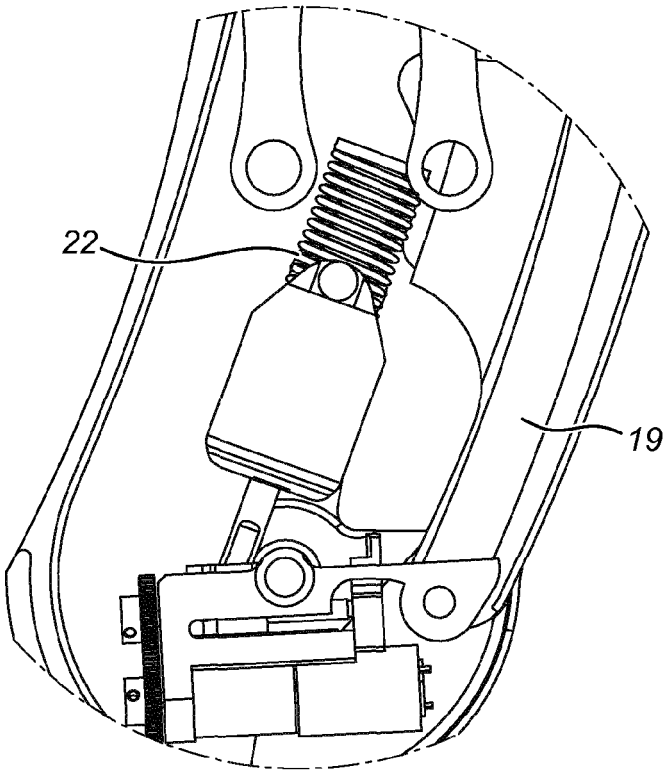


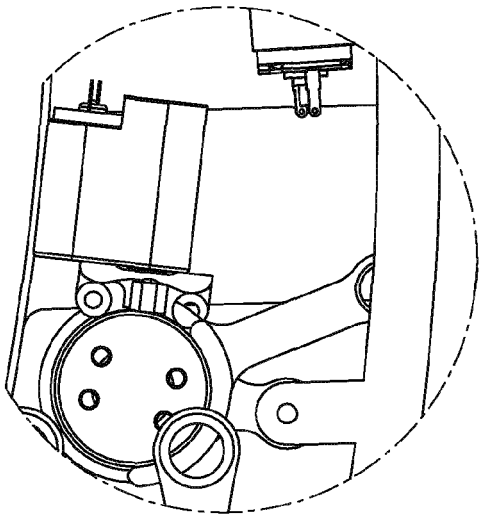
Fig .3



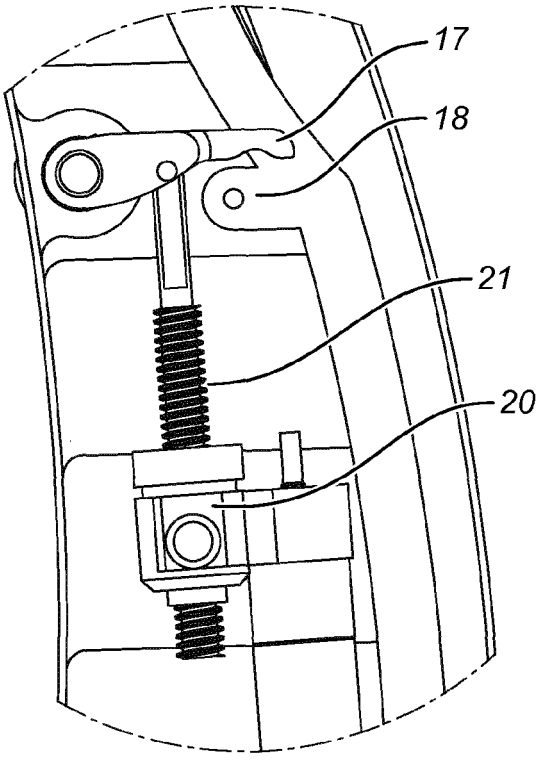
Detail 11



Detail 14



Detail 15



Detail 16

Fig .3 (continue)

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 5653

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 2009/029693 A1 (BROWN GARRETT W) 5 March 2009 (2009-03-05) * abstract; figures 2,6a,7a,7b,9a * -----	1	INV. A61G5/10 A61G7/10
A	EP 1 813 219 A1 (STORZ KARL GMBH) 1 August 2007 (2007-08-01) * abstract; figures 1,2 * * page 6, paragraph 56 * -----	1	
A	US 2005/012376 A1 (SIMINOVITCH MICHAEL J) 20 January 2005 (2005-01-20) * abstract; figures 1-3 * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

A61G
A47C
A61B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 October 2015	Tempels, Marco

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009029693 A1	05-03-2009	AU 2008293511 A1	05-03-2009
		CA 2697600 A1	05-03-2009
		CN 101795601 A	04-08-2010
		EP 2185036 A1	19-05-2010
		JP 2010537740 A	09-12-2010
		US 2011127390 A1	02-06-2011
		WO 2009029693 A1	05-03-2009
EP 1813219 A1	01-08-2007	DE 102006004126 A1	26-07-2007
		EP 1813219 A1	01-08-2007
		US 2007170767 A1	26-07-2007
US 2005012376 A1	20-01-2005	NONE	

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