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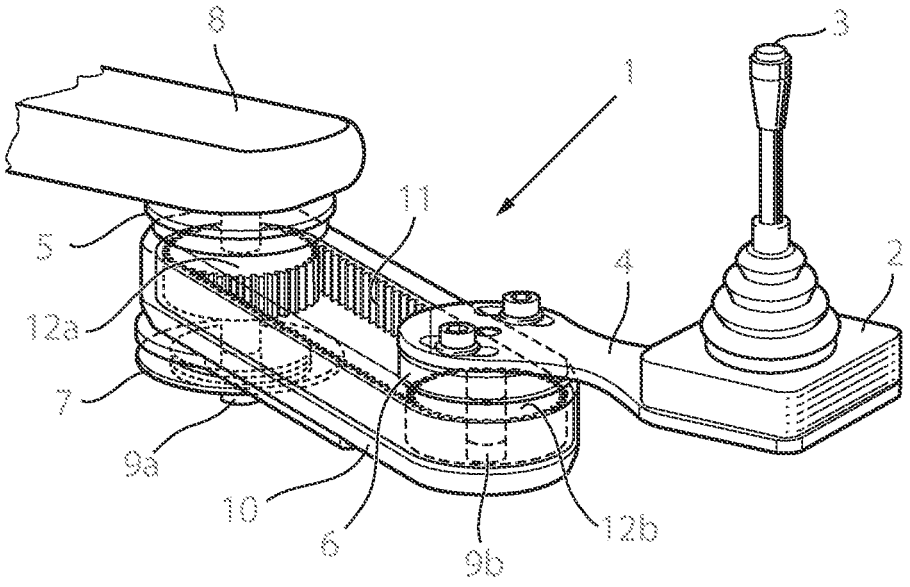
(54) **Movable supporting device**

(57) A movable supporting device for changing the position of a control assembly is provided. The movable supporting device comprises an operable joint and an electrically releasable lock. The operable joint is adapted to be locked by the electrically releasable lock.

Fig.2



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Description

TECHNICAL FIELD

[0001] The present invention relates generally to support devices for control assemblies.

BACKGROUND

[0002] A control assembly in connection with a seat is most often mounted somewhere along the side of the seat, enabling the person to use the control assembly with one of the hands while seated in the seat. Having the control assembly being supported by a movable support device enables the control assembly to be adjusted such that the control assembly is placed in a desired position by the particular user of the seat. When using the control assembly the desired position is typically in front of the person on the right or left hand side, whereas when not using the control assembly, the desired position is typically in a retracted position further back or even behind the user. In US5326063 a movable support device for controlling the position of a control assembly is disclosed. The movable support device of US5326063 allows the control assembly to be locked in a retracted and an extended position.

[0003] An electrically powered wheelchair is usually controlled by a control assembly, such as a joystick, a touch panel or a finger control assembly. In normal use, the electrically powered wheelchair is used as means of transportation as well as means for sitting when working, eating and interacting with other persons. When the electrically powered wheelchair is used as a means for transportation, control precision and comfort is of essence, why it is important that the control assembly can be positioned where the user desires. When, on the other hand, the electrically powered wheelchair is used as sitting means, especially at a table, it is highly desirable that the control assembly can be stowed away, not to interfere with the mobility or activities of the user.

[0004] A user of an electrically powered wheelchair, usually have some sort of disability limiting the person's ability to move or limiting the muscular strength of that person. This makes it difficult for the person to move objects or to affect mechanical constructions with muscular strength. For non-disabled users it may be difficult to move a heavy control assembly with the precision required to position the control assembly in a desired position if the movable supporting device, to which the control assembly is mounted, should fixate the control assembly adequately in normal use.

SUMMARY

[0005] A movable supporting device for changing the position of a control assembly is provided. The movable supporting device comprises an operable joint and an electrically releasable lock. The operable joint is adapted to be locked by the electrically releasable lock such that the control assembly can be locked in a position along the motion track of the movable supporting member.

[0006] According to one embodiment, the electrically releasable lock comprises an electromagnet which interacts with friction creating elements for locking the movable supporting device, such as an electromagnetic break.

[0007] According to another embodiment, the operable joint of the movable supporting device is actively operable, e.g. by means of an electric motor. In other embodiments the movable supporting device further comprises a second operable joint, which may be interlinked with said first operable joint. The two operable joints could be interlinked using a timing belt.

[0008] The movable supporting device could be adapted to create a pantographic movement of the control assembly, for always maintaining the orientation of the control assembly. The control assembly could be a mechanical, hydraulic, pneumatic or electric and could be in the form of for example a joystick, a leaver, a wheel, a knob or a touch panel.

[0009] The movable supporting device could further comprise a switch for controlling the electrically releasable lock, which could be an electrical switch possible to operate without the use of large muscular force, which for example could be placed in connection with the control assembly for easy access by a user.

[0010] According to one embodiment, the movable supporting device is movable along a motion track, and the electrically releasable lock is adapted to lock the movable supporting device anywhere along the motion track.

[0011] It is furthermore conceivable that the movable supporting device, according to any one of the embodiments herein, further comprises a fixating element, which for example could be adapted to fixate the movable supporting device to an armrest.

BREIF DESCRIPTION OF THE DRAWINGS

[0012] The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows a movable supporting device mounted to the armrest of a wheelchair.

Fig. 2 shows the movable supporting device of fig. 1 in further detail in a see-through view.

Fig. 3 shows the movable supporting device and a control assembly, according to another embodiment.

Fig. 4 illustrates the motion track of a movable supporting device and control assembly.

DETAILED DESCRIPTION

[0013] In the following a detailed description of embodiments will be given. In the drawing figures, like reference numerals designate identical or corresponding elements throughout the several figures. It will be appreciated that these figures are for illustration only and are not in any way restricting the scope of the invention. Thus, any references to direction, such as "up" or "down", are only referring to the directions shown in the figures.

[0014] An operable joint is to be understood as a joint connecting two or more parts in a way such that the two or more parts can be moved in relation to each other.

[0015] A control assembly is to be understood as an assembly with the purpose of affecting the state or movement of a device, such as an electrical wheelchair or a construction crane. Examples of control assemblies are mechanical, pneumatic, hydraulic and electrical control assemblies which could be in the form of a joystick, a leaver, a wheel, a knob or a touch panel.

[0016] Fig. 1 shows the movable supporting device 1 according to an embodiment in which the movable supporting device 1 is fixated to the armrest 8 of a wheelchair. The movable supporting device 1 is here adapted for changing the position of a control assembly 2, here being a joystick 2. The movable supporting device 1 comprises a first and a second operable joint 5,6. The first operable joint 5 is in connection with the armrest 8 of the wheelchair, whereas the second operable joint 6 is in connection with a supporting plate 4 supporting the control assembly 2 fixated thereon. The two operable joints 5,6 may be interlinked through a timing belt (shown in greater detail in fig. 2) which enables the movable supporting device 1 to perform a pantographic movement of the control assembly 2 which renders the orientation of the control assembly 2 unchanged when the movable supporting device 1 moves. The movable supporting device 1 further comprises an electrically releasable lock 7 in connection with the first operable joint 5 for locking the movement of the movable supporting device 1. According to the embodiment shown in fig 1, the electrically releasable lock 7 comprises an electromagnet which is operated by a switch 3 placed in connection with the control assembly 2, for activating the electromagnet and thereby releasing the electrically releasable lock 7. When the electrically releasable lock 7 is released, the movable supporting device 1 is easily movable, almost without friction, and thereby is the position of the control assembly 2 easy to alter, for example from a position suitable for operating the wheel chair, to a retracted position suitable for using the wheelchair as sitting means while eating. The electrically releasable lock according to the embodiment of fig. 1 comprises multiple friction creating discs, which are pushed against each other by means of a spring member. An electromagnet is placed in connection with the friction creating discs and releases the force created by the spring when activated, thereby allowing the friction creating discs to move easily in relation to each other. According to other embodiments multiple such friction creating discs may be used for increasing the friction and hence the holding power of the electrically releasable lock 7 locking the movable supporting device 1. This particular embodiment of an electrically releasable lock 7 may of course, in any of the embodiments herein, be substituted to any other electrically releasable lock. Such electrically releasable locks are generally well known in the art. The movable supporting device is thereby movable, with use of very small force, when the releasable lock is released, and locked in a very firm hold, when the releasable lock is locked.

[0017] Fig. 2 shows the movable supporting device 1 according to fig. 1 in further detail, where the first operable joint 5 comprises a centrally placed rotation axis 9a on to which an inner gear wheel 12a in connection with the timing belt 11 is fixated. The electrically releasable lock 7 is also fixated to the centrally placed rotation axis 9a and adapted to lock the centrally placed rotation axis 9a when in its locked state. By the connection with the timing belt 11, which interconnects the first centrally placed rotation axis 9a with the centrally placed rotation axis 9b of the second operable joint 6, the electrically releasable lock 7 also locks the second centrally placed rotation axis 9b. The gear wheels 12a,b and the timing belt 11 is housed in a housing 10 preferably made of a durable material such as aluminum or polyamide.

[0018] According to other embodiments (not shown), the movable supporting device 1 comprises two electrically releasable locks placed on the first centrally placed rotation axis 9a and the second centrally placed rotation axis 9b, respectively.

[0019] Fig. 3 shows the movable supporting device 1 in a side view when the movable supporting device 1 is fixated to the armrest 8. The movable supporting device 1 comprises a first and second operable joint 5,6, each comprising a centrally placed rotation axis 9a,b, interconnected with a timing belt 11 such that the control assembly 2 creates a pantographic movement when the operable joints 5,6 are moved. The electrically releasable lock 7 is here placed on the rear operable joint 5, however it is equally conceivable that the electrically releasable lock 7 is placed on the frontal operable joint 6, or that the movable supporting device 1 comprises two electrically releasable locks, one located on the frontal operable joint 6 and one on the rear operable joint 5.

[0020] The movable supporting device 1 according to the embodiment of fig. 3 is actively operable using an electric motor 13, which could enable a person to move the support even if the person is unable to push the movable supporting device 1 with muscular force. The electric motor 13 could for example be placed in the armrest 8 of a wheelchair and could be operated using a switch on the control assembly 2 or a switch placed in connection with the headrest or in a tongue control unit.

[0021] Fig. 4 shows the motion track of the movable supporting device 1 of fig. 1 from above, displaying the pantographic movement made by the control assembly

2 by the connection with the two interlinked operable joints 5 and 6. The electrically releasable lock 7 is adapted to lock the movable supporting device 1 anywhere along its motion track and the pantographic movement guaranties that the control assembly 2 remains in the same orientation wherever it is locked. In embodiments where the control assembly 2 is a joystick controlling the movements of a wheelchair the direction that the joystick needs to be pushed in order for the wheelchair to travel foreword and backwards respectively, will be the same, no matter where the movable supporting device 1 to which the joystick 2 is mounted, is locked. It is also conceivable that the moveable supporting device 1 shown in fig. 4 is actively operable to crate said pantographic movement, e.g.by means of an electrical motor as shown with reference to fig. 3.

[0022] Please note that any embodiment or part of embodiment or feature described herein may be combined in any way if such combination is not clearly contradictive.

Claims

1. A movable supporting device for changing the position of a control assembly, wherein said movable supporting device (1) comprises an operable joint (5;6) , **characterized in that** said movable supporting device (1) further comprises an electrically releasable lock (7), and wherein said operable joint (5; 6) is adapted to be locked by said electrically releasable lock (7).

2. The movable supporting device according to claim 1, wherein said electrically releasable lock (7) comprises an electromagnet.

3. The movable supporting device according to any one of claims 1 and 2, wherein said operable joint (5;6) is actively operable.

4. The movable supporting device according to claim 3, wherein said actively operable joint is actively operable using an electric motor (13).

5. The movable supporting device according to any one of the preceding claims, wherein said movable supporting device (1) further comprises a second operable joint (5;6).

6. The movable supporting device according to claim 5, wherein said two operable joints (5,6) are interlinked.

7. The movable supporting device according to claim 6, wherein said two operable joints (5,6) are interlinked using a timing belt (11).

8. The movable supporting device according to any one of claims 6 and 7, wherein said movable supporting device (1) is adapted to create a pantographic movement of said control assembly (2).

9. The movable supporting device according to any one of the preceding claims, wherein said control assembly (2) is a joystick.

10. The movable supporting device according to any one of the preceding claims, wherein said movable supporting device (1) further comprises a switch for controlling said electrically releasable lock (7).

11. The movable supporting device according to any one of the preceding claims, wherein said movable supporting device (1) is movable along a motion track and wherein said electrically releasable lock (7) is adapted to lock said movable supporting device (1) anywhere along said motion track.

12. The movable supporting device according to any one of the preceding claims, wherein said movable supporting device (1) further comprises a fixating element adapted to fixate said movable supporting device (1) to an armrest (8).

Fig.1

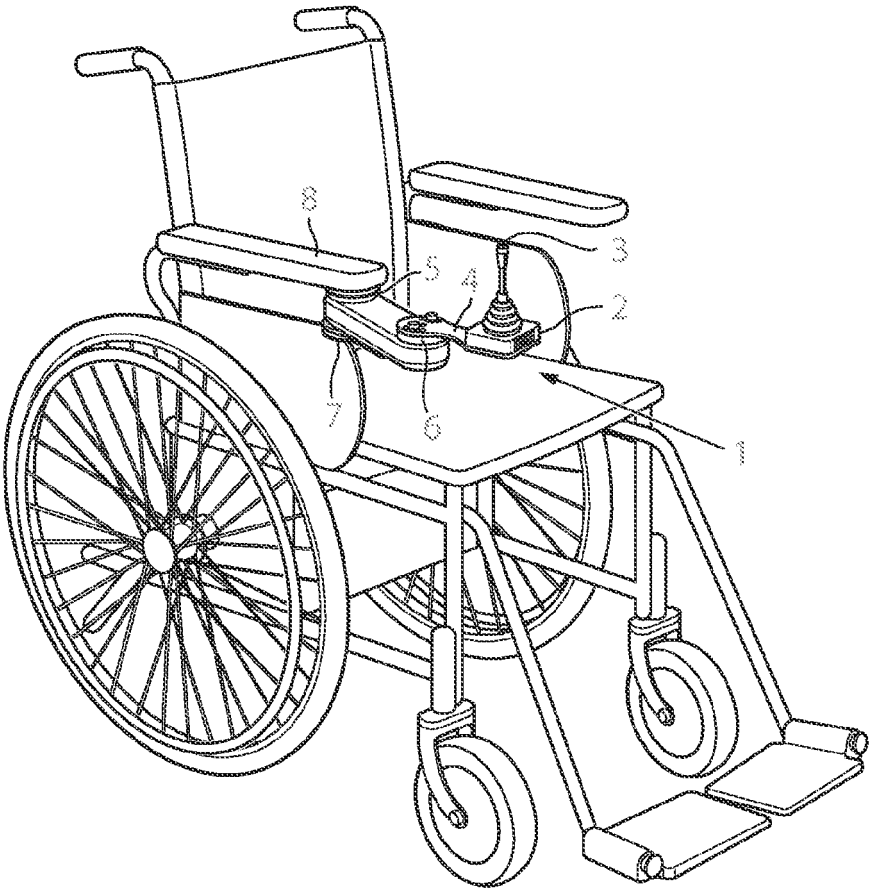


Fig.2

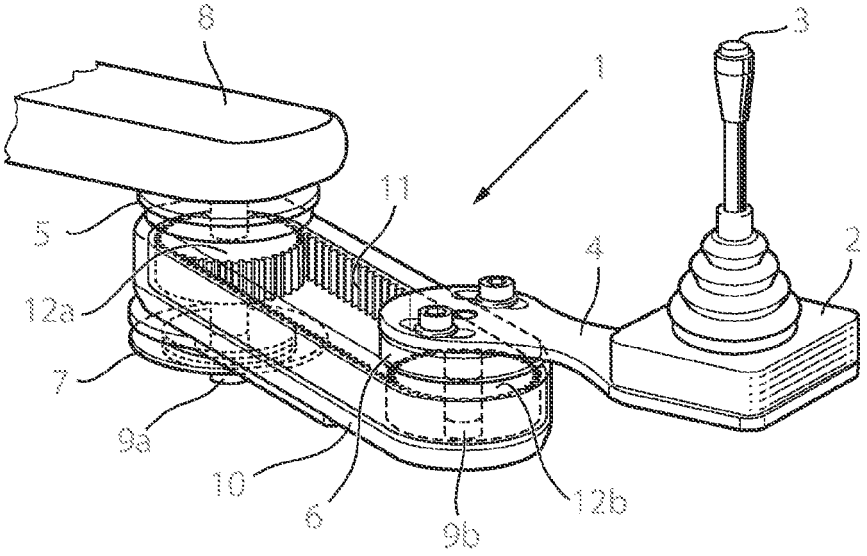


Fig.3

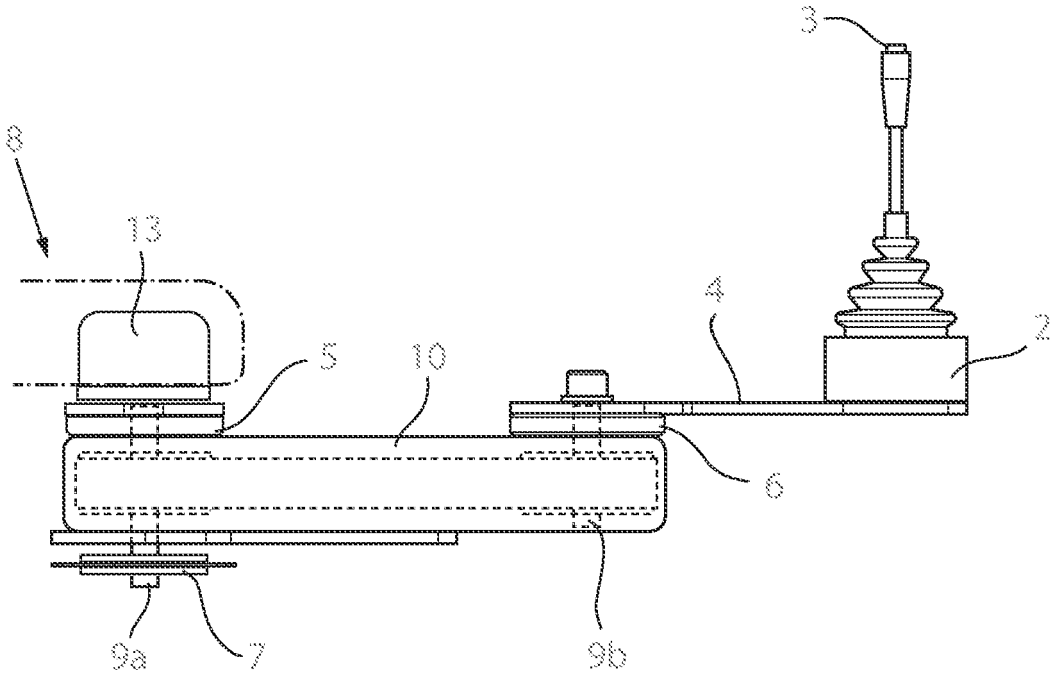
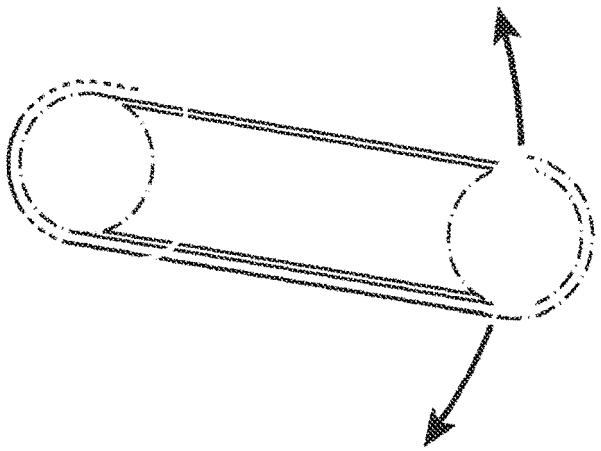


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
EP 09 15 8285

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	8 September 2009	Birlanga Pérez, J

CATEGORY OF CITED DOCUMENTS

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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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