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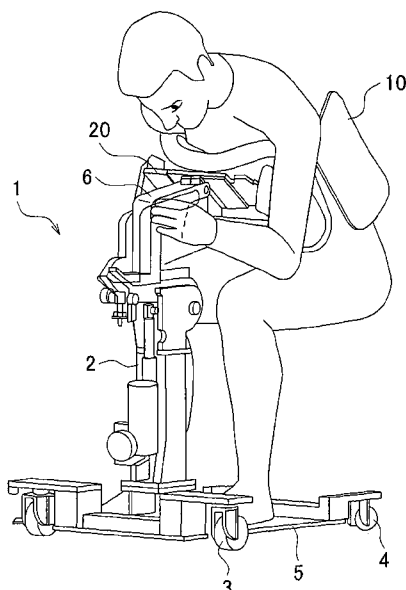
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(54) Title: SUPPORT AND TRANSPORT ASSIST APPARATUS

FIG. 1



(57) Abstract: A support (10) is a support that is used when assisting with transporting a care receiver and supports a body of the care receiver. This support (10) includes a front portion (11) that contacts a front side of a torso of the care receiver, a right side portion (12a) which contacts a right side of the torso of the care receiver, and a left side portion (12b) which contacts a left side of the torso of the care receiver. A distance between the right side portion and the left side portion becomes narrower from an aperture thoracis superior side toward an aperture thoracis inferior side of the care receiver.

SUPPORT AND TRANSPORT ASSIST APPARATUS

FIELD OF THE INVENTION

[0001] The invention relates to a support that assists with the transport of a care
5 receiver, and a transport assist apparatus.

BACKGROUND OF THE INVENTION

[0002] Japanese Patent Application Publication No. 2008-73501
10 (JP-A-2008-73501) and Japanese Patent Application Publication No. 2000-24040
(JP-A-2000-24040), for example, both propose a transport assist apparatus for
transporting a physically disabled person such as an injured person or a person requiring
care to and from a wheelchair, a bed or a bathroom (toilet) or the like. The transport
assist apparatus described in JP-A-2008-73501 has an upper body support portion that
15 supports a care receiver from the chest to the lower abdomen. Accordingly, the contact
area between the upper body of the care receiver and the upper body support is broad,
which reduces the pressure applied to the care receiver.

[0003] Also, a waist supporting mechanism is provided to support the waist of
the care receiver. The waist supporting mechanism includes a liquid-containing bag.
20 The liquid inside the liquid-containing bag shifts under the weight of the care receiver so
that the liquid-containing bag matches the shape of the waist of the care receiver.

[0004] Also, JP-A-2000-24040 describes a chest support of a transport assist
apparatus. The chest support includes a base plate that corresponds to the center of the
chest, front support plates positioned on both sides of the base plate, side support plates
25 corresponding to both arms, and a back support plate.

[0005] The transport assist apparatus described in JP-A-2008-73501 includes
the waist supporting mechanism that changes shape to match the shape of the waist of the
care receiver, as described above. However, the waist supporting mechanism is

provided separate from the upper body support portion that supports from the chest to the lower abdomen, which makes the structure complicated. Also, in JP-A-2000-24040, the two side support plates are arranged parallel to one another, so the care receiver may slide down between them.

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DISCLOSURE OF THE INVENTION

[0006] The invention provides a support capable of inhibiting a care receiver from sliding down by a simple structure, and a transport assist apparatus.

[0007] An aspect of the invention relates to a support that is used when assisting
10 with transporting a care receiver and supports a body of the care receiver. This support includes a front portion that contacts a front side of a torso of the care receiver, a right side portion which contacts a right side of the torso of the care receiver, and a left side portion which contacts a left side of the torso of the care receiver. A distance between the right side portion and the left side portion becomes narrower from an apertura
15 thoracis superior side toward an apertura thoracis inferior side of the care receiver.

[0008] The distance between the right side portion and the left side portion may become wider from the apertura thoracis inferior side toward an ilium side of the care receiver.

[0009] The front portion may contact from a clavicle to a lower abdominal
20 region of the care receiver, and each of the right side portion and the left side portion may contact from an armpit to an ilium of the care receiver.

[0010] The front portion may be curved near a fifth lumbar vertebra of the care receiver and have a bow shape that protrudes out toward the care receiver side.

[0011] A portion of each of the right side portion and the left side portion, which
25 faces an armpit of the care receiver, may contact from under the armpit to a scapula of the care receiver.

[0012] Each of the right side portion and the left side portion may be movably provided.

[0013] The front portion and the right side portion and the left side portion may

be integrally formed.

[0014] According to the invention, a support capable of inhibiting a care receiver from sliding down by a simple structure is able to be provided.

[0015] A second aspect of the present invention relates to a transport assist
5 apparatus that includes a movable body including a step; a wheel provided at the movable body; the support; and a manipulator which connects the movable body and the support.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The foregoing and further objects, features and advantages of the
10 invention will become apparent from the following description of exemplary embodiments with reference to the accompanying drawings, wherein like numerals are used to represent like elements and wherein:

FIG. 1 is a view of an example of a transport assist apparatus that employs a support according to a first example embodiment of the invention being used;

15 FIG. 2 is a view showing a frame format of the overall structure of the transport assist apparatus that employs the support according to the first example embodiment;

FIG. 3 is a view of the structure of the support according to the first example embodiment;

20 FIG. 4 is a view of an example of a mounting portion used to mount the support according to the first example embodiment to the transport assist apparatus;

FIG. 5A is a view of the structure of a support according to a second example embodiment of the invention;

FIG. 5B is another view of the structure of the support according to the second example embodiment;

25 FIG. 5C is another view of the structure of the support according to the second example embodiment;

FIG. 5D is still another view of the structure of the support according to the second example embodiment; and

FIG. 5E is yet another view of the structure of the support according to the second

example embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0017] First example embodiment

5 FIG. 1 is a view of an example of a transport assist apparatus that employs a support according to a first example embodiment of the invention being used. FIG. 2 is a view showing a frame format of the overall structure of the transport assist apparatus. As shown in FIGS. 1 and 2, the transport assist apparatus 1 includes a main body portion 2, driving wheels 3, driven wheels 4, a step 5, a manipulator 6, a mounting portion 20, and a
10 support 10. A movable body portion includes the main body portion 2 and the step 5.

[0018] A battery, a motor, actuators, and an electronic control unit and the like, none of which are shown, are housed in the main body portion 2. The motor receives a supply of power from the battery and is controlled by the electronic control unit to drive the wheels. The electronic control unit outputs control signals to the battery, the motor,
15 and the actuators and the like according to input signals from an operating portion, not shown, and a predetermined control program and the like.

[0019] The step 5 on which the feet of the care receiver are placed is connected to a lower portion of the main body portion 2. Two driving wheels 3 are rotatably supported at both end portions in front of the step 5. The driving wheels 3 are
20 connected to a drive shaft of the motor. Each driving wheel 3 may be independently controlled. The two driven wheels 4 are rotatably supported at both end portions behind the step 5. The two driven wheels 4 have no driving force and simply rotate when the driving wheels 3 are driven.

[0020] The manipulator 6 is connected to the main body portion 2 and the
25 support 10. The manipulator 6 has a plurality of articulating mechanisms. The actuators provided with these articulating mechanisms are controlled by control signals from the electronic control unit. The position and angle of the support 10 can be adjusted by operating the manipulator 6.

[0021] The support 10 is fixed to the mounting portion 20 that is provided at a

tip end of the manipulator 6. The support 10 supports the torso of the care receiver. The structure of the support 10 will be described in detail later. The support 10 is shaped to match the shape of the torso of the care receiver. Cushioning may be provided on the surface of the support 10 (i.e., the surface that the care receiver contacts).

5 [0022] As shown in FIG. 1, the basic riding posture of the care receiver is a posture in which the front of the torso (i.e., the chest or the abdomen) of the care receiver faces the support 10. Incidentally, the motor and the like may be omitted from the transport assist apparatus 1 and the transport assist apparatus 1 may instead be moved manually by a care giver.

10 [0023] Here, the structure of the support 10 will be described with reference to FIG. 3. FIG. 3 is a view of the structure of the support 10 according to this example embodiment. As shown in FIG. 3, the support 10 includes a front portion 11 and side portions 12a and 12b.

15 [0024] The front portion 11 is a portion that contacts the front of the torso (i.e., the chest and abdomen) of the care receiver. The front portion 11 is fixed to the tip end portion of the manipulator 6. The side portions 12a and 12b are provided, one on each side of the front portion 11. FIG. 4 is a view of an example of the mounting portion 20 for the side portions 12a and 12b of the transport assist apparatus 1 according to this example embodiment.

20 [0025] As shown in FIG. 4, the mounting portion 20 has a left extending portion 21a, a right extending portion 21b, a left mounting portion 22a, a right mounting portion 22b, a base 23, a pinion 24, racks 25a and 25b, and an adjusting portion 26. Incidentally, a mounting portion for the front portion 11 is provided on the mounting portion 20 but is not shown here. The base 23, the pinion 24, and the racks 25a and 25b are covered by
25 attaching the front portion 11, and are thus not able to be seen by the care receiver riding on the transport assist apparatus 1.

 [0026] The left extending portion 21a is attached to one end of the rack 25a and extends toward the left from the base 23. The left mounting portion 22a is provided on the other end of the left extending portion 21a. The left mounting portion 22a is formed

protruding out toward the care receiver side.

[0027] The right extending portion 21b is attached to one end of the rack 25b and extends toward the right from the base 23. The right mounting portion 22b is provided on the other end of the right extending portion 21b. The right mounting
5 portion 22b is formed protruding out toward the care receiver side. The left side portion 12a is mounted to the left mounting portion 22a and the right side portion 12b is mounted to the right mounting portion 22b.

[0028] The left side portion 12a and the right side portion 12b are arranged facing one another with the care receiver in between. The left side of the torso of the
10 care receiver contacts the left side portion 12a, and the right side of the torso of the care receiver contacts the right side portion 12b.

[0029] The pinion 24 is a small diameter circular gear. Also, the racks 25a and 25b are flat rods with teeth on them. The racks 25a and 25b move horizontally to the ends with the teeth by applying rotational force to the pinion 24. The left side portion
15 12a and the right side portion 12b move by rotating the pinion 24 using the adjusting portion 26. Accordingly, the distance between the left side portion 12a and the right side portion 12b can be adjusted to fit the build of the care receiver.

[0030] As shown in FIG. 3, the left side portion 12a and the right side portion 12b are arranged such that the distance therebetween becomes narrower from the apertura
20 thoracis superior side toward the apertura thoracis inferior side of the care receiver. That is, the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis inferior side of the care receiver is narrower than the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis superior side of the care receiver. In other words, the left side portion 12a and the right
25 side portion 12b become farther apart as they extend upward above the apertura thoracis inferior of the care receiver (i.e., at the upper portions of the left side portion 12a and the right side portion 12b), thereby inhibiting the care receiver from sliding down off of the support 10.

[0031] Also, the left side portion 12a and the right side portion 12b are arranged

such that the distance becomes wider from the apertura thoracis inferior side toward the ilium side of the care receiver. That is, the distance between the left side portion 12a and the right side portion 12b on the ilium side of the care receiver is wider than the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis inferior side of the care receiver. In other words, the left side portion 12a and the right side portion 12b become farther apart as they extend downward below the apertura thoracis inferior of the care receiver (i.e., at the lower portions of the left side portion 12a and the right side portion 12b), thereby reducing the pressure on the abdominal region of the care receiver.

[0032] Incidentally, the front portion 11 may contact from the clavicle to the lower abdomen of the care receiver. Also, the side portions 12a and 12b may contact from the armpit to the ilium of the care receiver. Shaping the support 10 such that it wraps around the front and sides of the upper body of the care receiver in this way makes it possible to increase the contact area between the support 10 and the care receiver, thereby reducing discomfort to the care receiver. Also, increasing the contact area makes it possible to increase the friction force between the support 10 and the care receiver, thereby further inhibiting the care receiver from sliding down off of the support 10.

[0033] Furthermore, the front portion 11 may be bow-shaped, protruding out toward the care receiver side. That is, the front portion 11 curves in a convex shape toward the care receiver side. Also, the front portion 11 may curve near the fifth lumbar vertebra (i.e., the lower portion of the front portion 11) of the care receiver. As a result, the body of the care receiver is able to be stably supported when the care receiver leans on the support 10.

[0034] The upper end portions of the left side portion 12a and the right side portion 12b, i.e., the portions facing the armpits of the care receiver, may contact from under the armpits to the scapulas of the care receiver. The portion from behind the armpit to the scapula is relatively insensitive to pain, so transporting the care receiver with the upper end portions of the left side portion 12a and the right side portion 12b in

contact from under the armpits to the scapulas of the care receiver enables discomfort to the care receiver to be reduced and makes it easier to lift the body.

[0035] Second example embodiment

A support according to a second example embodiment of the invention will now be described with reference to FIGS. 5A to 5E. FIGS. 5A to 5E are views of the structure of the support 30 according to this example embodiment. FIG. 5B is a sectional view taken along line 5B – 5B in FIG. 5A. FIG. 5C is a sectional view taken along line 5C – 5C in FIG. 5A. FIG. 5D is a sectional view taken along line 5D – 5D in FIG. 5A, and FIG. 5E is a longitudinal view taken along line 5E – 5E in FIG. 5A. The support 30 is fixed to the mounting portion 20 at the tip end of the manipulator 6 and supports the torso of the care receiver, similar to the support 10 according to the first example embodiment.

[0036] As shown in FIG. 5A, the support 30 includes a front portion 31, a left side portion 32a, and a right side portion 32b. In this example embodiment, the front portion 31, the left side portion 32a, and the right side portion 32b are integrally formed. Similar to the first example embodiment, the left side portion 32a and the right side portion 32b are arranged such that the distance therebetween becomes narrower from the apertura thoracis superior side toward the apertura thoracis inferior side of the care receiver.

[0037] The distance between the left side portion 12a and the right side portion 12b on the apertura thoracis inferior side of the care receiver shown in FIG. 5C is narrower than the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis superior side of the care receiver shown in FIG. 5B. That is, the left side portion 12a and the right side portion 12b become farther apart as they extend upward above the apertura thoracis inferior of the care receiver, which inhibits the care receiver from sliding down off of the support 10.

[0038] Also, the left side portion 32a and the right side portion 32b are arranged such that the distance therebetween becomes wider from the apertura thoracis inferior side toward the ilium side of the care receiver. That is, the distance between the left side portion 12a and the right side portion 12b on the ilium side of the care receiver shown in

FIG. 5D is wider than the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis inferior side of the care receiver shown in FIG. 5C. In other words, the left side portion 12a and the right side portion 12b become farther apart as they extend downward below the apertura thoracis inferior of the care receiver, thereby reducing the pressure on the abdomen of the care receiver. Incidentally, the distance between the left side portion 12a and the right side portion 12b on the apertura thoracis superior side of the care receiver and the distance between the left side portion 12a and the right side portion 12b on the ilium side of the care receiver can be determined appropriately for the build of the care receiver.

[0039] Furthermore, as shown in FIG. 5E, the front portion 11 may be bow-shaped, protruding out toward the care receiver side. That is, the front portion 11 curves in a convex shape toward the care receiver side. Also, the front portion 11 may curve near the fifth lumbar vertebra of the care receiver. As a result, the body of the care receiver is able to be stably supported when the care receiver leans on the support 30.

[0040] Incidentally, the invention is not limited to the example embodiments described above. To the contrary, the invention may be appropriately modified without departing from the scope thereof. For example, the invention allows for variation regarding the presence or absence of means for electrically driving the driving wheels 3, the riding posture of the care receiver, and the direction of travel of the vehicle, and the like. In the example embodiments described above, the sizes and shapes of the front portion 11, the left side portion 12a, and the right side portion 12b are set to fit a person of typical build. However, the sizes and shapes of the front portion 11, the left side portion 12a, and the right side portion 12b may be set to fit the individual care receiver. Also, the typical build differs from country to country, so the sizes and shapes of the front portion 11, the left side portion 12a, and the right side portion 12b may also be set for each country.

CLAIMS:

1. A support that is used when assisting with transporting a care receiver and supports a body of the care receiver, comprising:

a front portion that contacts a front side of a torso of the care receiver;

a right side portion which contacts a right side of the torso of the care receiver; and

a left side portion which contacts a left side of the torso of the care receiver,

wherein a distance between the right side portion and the left side portion becomes narrower from an apertura thoracis superior side toward an apertura thoracis inferior side of the care receiver.

2. The support according to claim 1, wherein the distance between the right side portion and the left side portion becomes wider from the apertura thoracis inferior side toward an ilium side of the care receiver.

3. The support according to claim 1 or 2, wherein the front portion contacts from a clavicle to a lower abdominal region of the care receiver, and each of the right side portion and the left side portion contacts from an armpit to an ilium of the care receiver.

4. The support according to any one of claims 1 to 3, wherein the front portion is curved near a fifth lumbar vertebra of the care receiver and has a bow shape that protrudes out toward the care receiver side.

5. The support according to any one of claims 1 to 4, wherein a portion of each of the right side portion and the left side portion, which faces an armpit of the care receiver, contacts from under the armpit to a scapula of the care receiver.

6. The support according to any one of claims 1 to 5, wherein each of the right side

portion and the left side portion is movably provided.

7. The support according to any one of claims 1 to 5, wherein the front portion and the right side portion and the left side portion are integrally formed.

8. A transport assist apparatus, comprising:

a movable body including a step;

a wheel provided at the movable body;

the support according to any one of claims 1 to 7; and

a manipulator which connects the movable body and the support.

FIG. 1

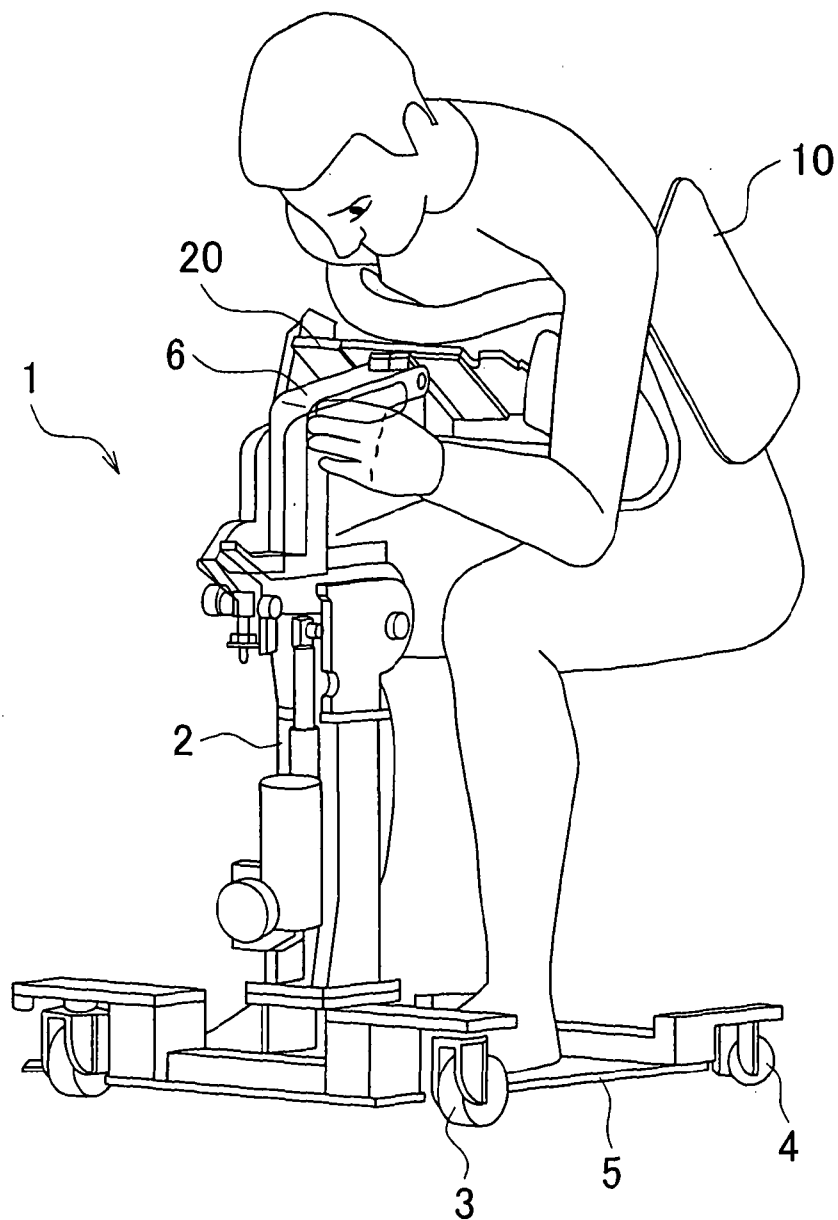


FIG. 2

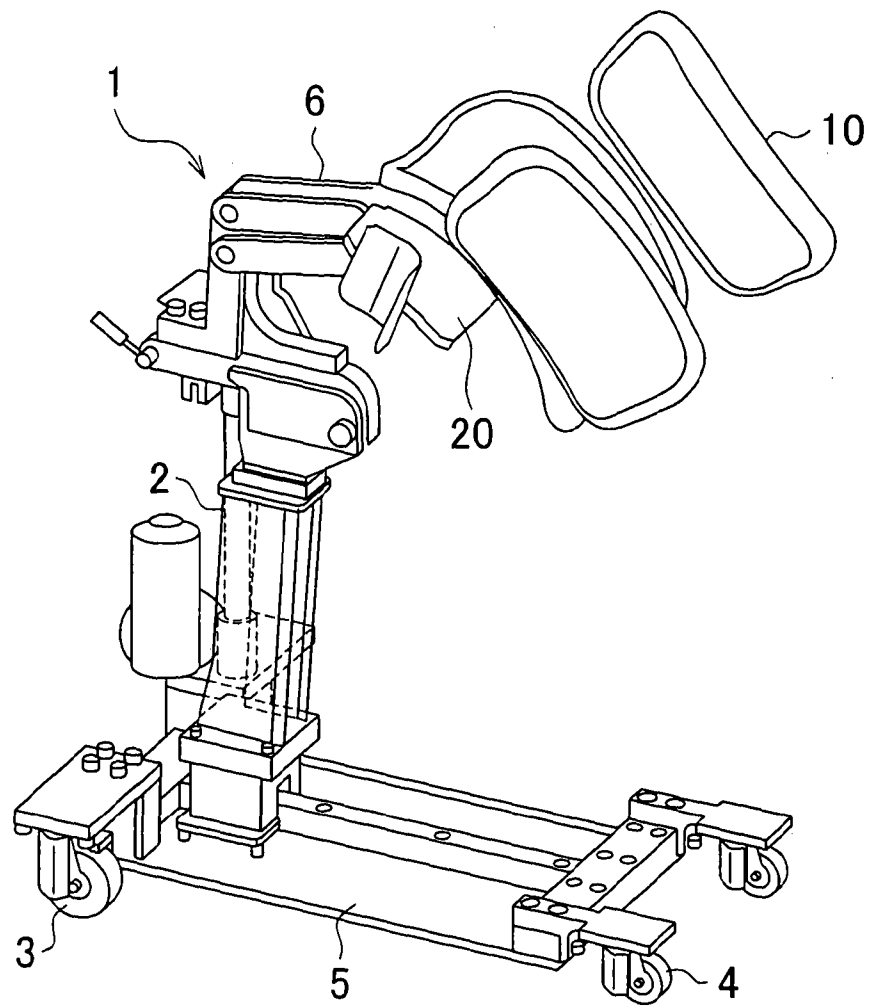


FIG. 3

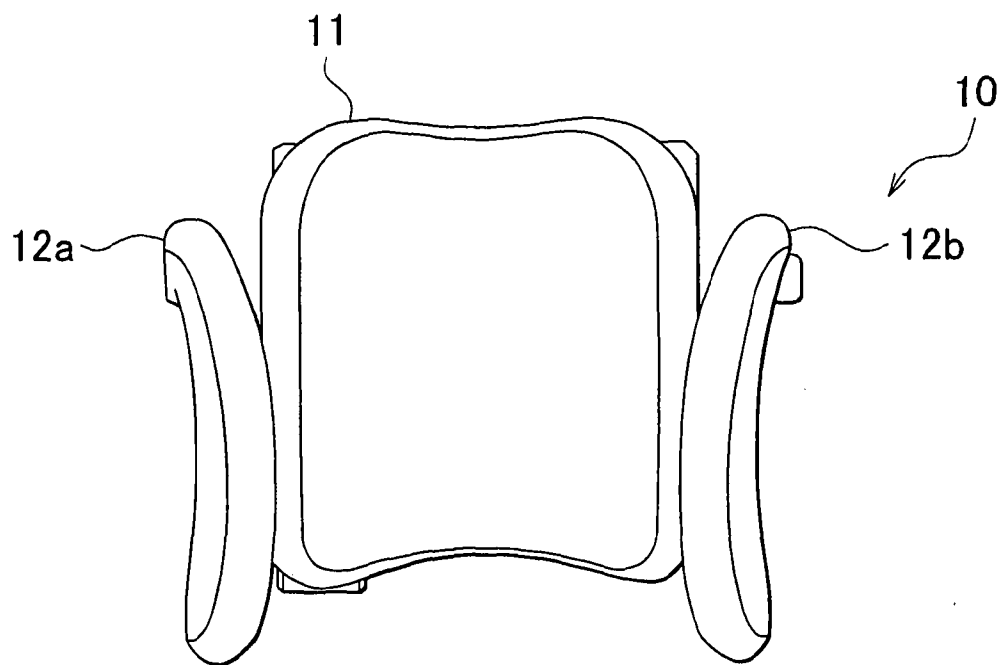


FIG. 4

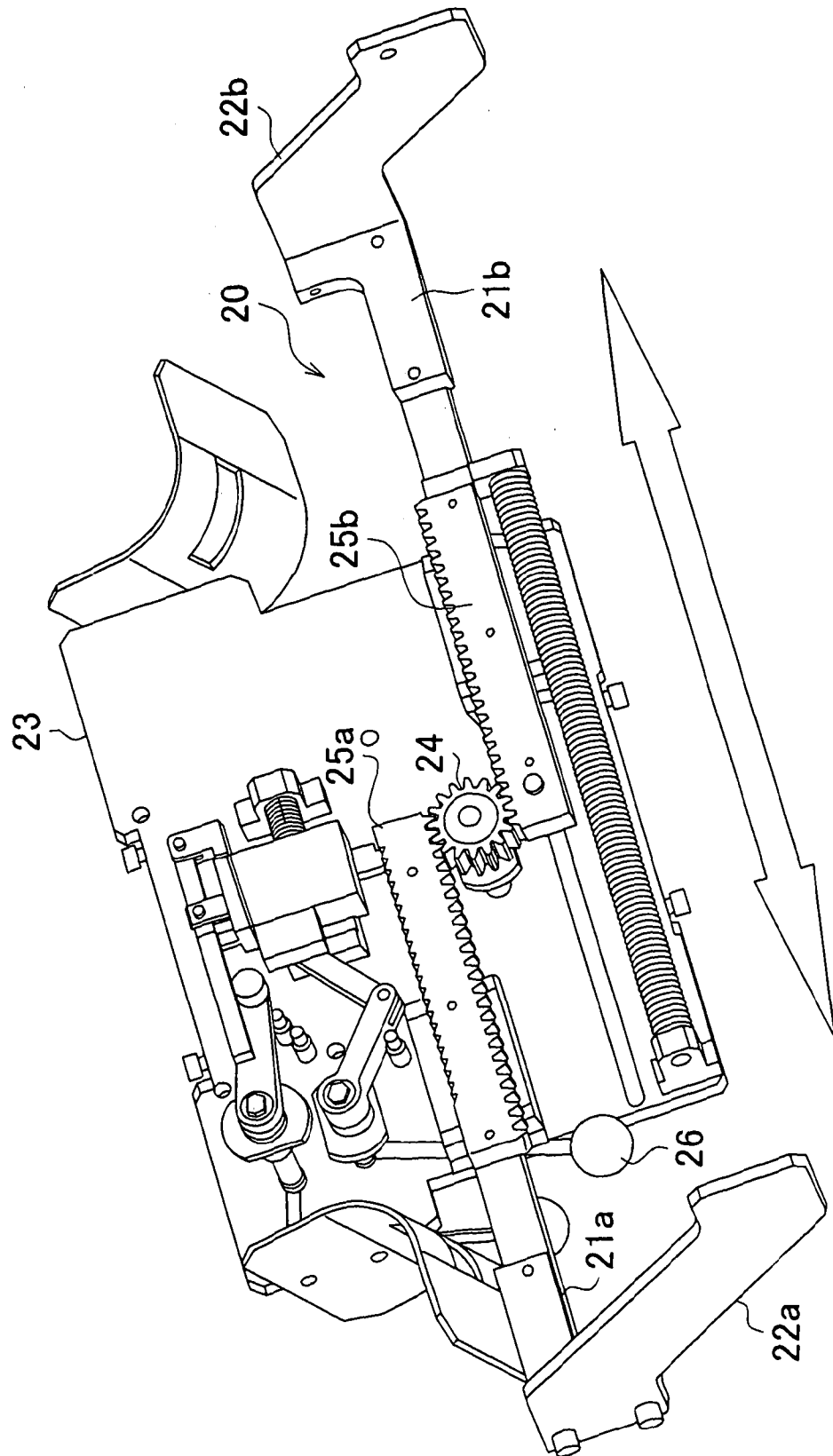


FIG. 5A

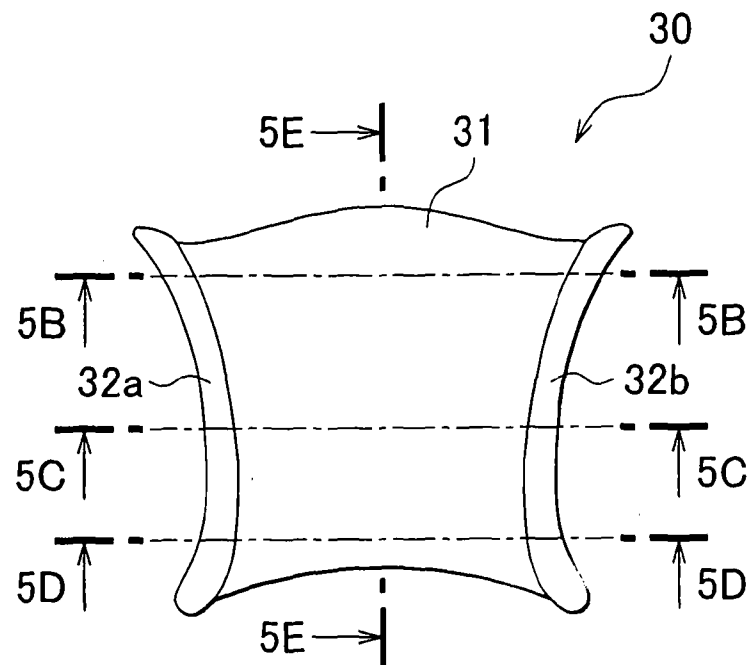


FIG. 5B

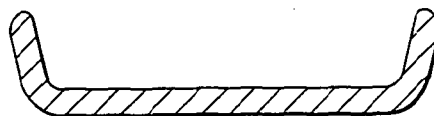


FIG. 5C

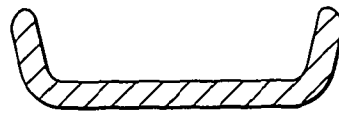
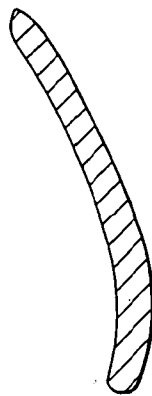


FIG. 5D



FIG. 5E



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2011/000827

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61G7/10
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 165 314 A (CLEARMAN JEROME P ET AL) 12 January 1965 (1965-01-12) column 3, lines 59-61; figures 1,2 -----	1-8
Y	US 2005/217024 A1 (AARESTAD JEROME K [US]) 6 October 2005 (2005-10-06) paragraphs [0041], [0043]; figures 1,2 -----	1-8
A	US 5 001 789 A (SCHOENBERGER LUTHER V [US]) 26 March 1991 (1991-03-26) figure 3 -----	1,8
A	JP 2008 073501 A (YASUDA TOSHIHIKO) 3 April 2008 (2008-04-03) cited in the application abstract ----- -/-	1,8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

13 July 2011

Date of mailing of the international search report

19/07/2011

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Mammeri, Damya

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/000827

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	----- FR 2 636 232 A1 (MARCHAND BERNARD [FR]) 16 March 1990 (1990-03-16) figures 1,6 page 8, lines 5-8 page 10, lines 17-19 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2011/000827

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