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(54) **AN ADJUSTABLE WHEELCHAIR SEAT CUSHION APPARATUS**

ANPASSBARES ROLLSTUHLSTITZKISSEN

APPAREIL DE COUSSIN DE SIÈGE DE FAUTEUIL ROULANT RÉGLABLE

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- **EASYCOMFORTS: "Pressure Reducing Chair Cushion - Comfort Cushion Seat Pad for Wheelchair, Arm Chair, Patio Chair - Machine Wash Polyester/Cotton - Navy Blue", AMAZON, 18 August 2017 (2017-08-18), pages 1 - 6, XP055798313, Retrieved from the Internet <URL:https://www.amazon.com/Pressure-Reducing-Cushion-for-Wheelchairs/dp/B078PXBFL2/ref=pd_lpo_121_t_2/130-7786592-9163630?_encoding=UTF8&pd_rd_i=B078PXBFL2&pd_rd_r=5ad457ca-d3fa-4fcf-a5a7-6044f547583d&pd_rd_w=12epa&pd_rd_wg=hKgCQ&pf_rd_p=7b36d496-f366-4631-94d3-61b87b52511b&pf_rd_r=EVST5XQ8ZHJPFHW7CCE6&refRID=EVST5XQ8ZHJPFHW7CCE6&th=1>**

EP 3 855 980 B1

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Description**BACKGROUND OF THE INVENTION**

Field of the Invention

[0001] The present invention relates generally to anatomical support cushions adapted for use in improving pelvic and spinal alignment issues during use of a wheelchair apparatus.

[0002] Brief Statement of the Prior Art Problems to be Addressed by the Present Invention Non-ambulatory patients suffering with minor illness or simple leg bone injuries, or the like, do not normally require the use of special purpose wheelchair cushions. However, in those long term care (LTC) cases where the patient suffers from serious postural injury or physical conditions involving pelvic or spinal related abnormalities expressing pelvic obliquity issues, anterior pelvic tilt issues, posterior and/or pelvic tilt issues, or pelvic rotation issues, the use of specially configured cushioning or other body positioning, orienting or supporting means may be required. The present invention is intended to address this need and to provide an adjustable wheelchair cushion that can be specified, prescribed and/or used by LTC therapists to improve the efficacy of wheelchair cushioning used in this environment. The following is included to provide background information relating to some of the postural abnormalities toward which the present invention is directed, and how an LTC therapist has sought to provide, or has in fact provided, patient relief during use of a standard wheelchair and cushioning means.

TERMS used herein**[0003]**

LTC: Long Term Care

Lordosis: an abnormal forward curvature of the spine in the lumbar region, resulting in a swaybacked posture.

Kyphosis: an abnormal, convex curvature of the spine, with a resultant bulge at the upper back.

Scoliosis: an abnormal lateral curvature of the spine.

Oblique:

- 1) neither perpendicular nor parallel to a given line or surface; slanting; sloping.
- 2) (of a solid) not having the axis perpendicular to the plane of the base.
- 3) diverging from a given straight line or course.

Obliquity: the state of being oblique.

Cervical: of or relating to the cervix or neck.

Lumbar: of or relating to the loin or loins.

Loin: the part or parts of the human body or of quadruped animal

on either side of the spinal column, between the false ribs and hipbone.

Thorax: the part of the trunk in humans and higher vertebrates between

the neck and the abdomen, containing the cavity, enclosed by the ribs, sternum, and certain vertebrae, in which the heart, lungs, etc., are situated; chest.

Spine: the spinal or vertebral column; backbone.

Sacrum: a bone resulting from the fusion of two or more vertebrae between the

lumbar and the coccygeal regions, in humans being composed usually of five fused vertebrae and forming the posterior wall of the pelvis.

ELR: Elevating Leg rest

STFH: Seat-to-Floor Height

MWC: Manual Wheelchair

IT: Ischial Tuberosity

PSIS: Posterior Superior Iliac Spine

ASIS: Anterior Superior Iliac Spine

LE: Lower Extremity

UE: Upper Extremity

ROM: Range of Motion

ADLs: Activities of Daily Living

PPT: Posterior Pelvic Tilt

OPTIMAL POSTURE - generally depicted in Fig. 2 of the Drawings

[0004] Pelvis in midline.

[0005] ASIS & PSIS at equal height: no pelvic tilt.

[0006] L ASIS & R ASIS at equal height: no obliquity.

[0007] L ASIS & R ASIS at equal depth: no rotation.

[0008] Spine balanced and upright; no rotation, no lateral curvature.

[0009] Normal lordosis in cervical and lumbar spine and normal kyphosis in thoracic spine creating the desired "S" shape. The head is functionally upright with only mild forward/lateral flexion or rotation.

[0010] When fitting an LTC user for a wheelchair, an LTC therapist will usually try to maintain proper patient postural alignment with a STANDARD cushion (and back support).

[0011] PELVIC OBLIQUITY - generally depicted in Fig. 3 of the Drawings

[0012] In patients with this abnormality, the pelvis sits with the L or R ASIS higher than the other, causing the raising up of one hip. When one side of the pelvis is raised higher than the other, the thoracic spine curves away from the higher side creating a scoliosis over time.

[0013] The neck will go into lateral flexion as if the person is dropping an ear to his or her shoulder. The lateral flexion will usually be towards the side where the

hip is higher.

[0014] Pressure redistribution is the therapist's support goal whether the deformity is FIXED or FLEXIBLE.

[0015] If FLEXIBLE: the pelvis should be leveled by building up the lower side.

[0016] If FIXED: the deformity should be accommodated by protecting the bony prominences from pressure by "filling in" the higher side and immersing the lower side IT.

ANTERIOR PELVIC TILT - generally depicted in Fig. 4 of the Drawings

[0017] With this abnormality, the pelvis sits with ASIS higher than the PSIS resulting in the posterior pelvic tilt which produces the sacral sitting posture. With excessive lordosis of the lumbar and cervical spine, the patient hyperextends his or her back over the sling back of the chair, placing him or her at risk to tip the chair backwards.

[0018] Excessive lordosis of cervical spine causes hyperextension of the neck and upward eye gaze. With this abnormality, the goal is normally to utilize a cushion and back support that maximizes contact with the seat surface for optimal pelvic and spinal stability and pressure redistribution. Stability is the goal, so a back support is normally used that is tall enough for the patient. Measurements are made from seat surface to the top of shoulder. A moldable back support to conform to the curvature of the spine is normally used.

POSTERIOR PELVIC TILT - generally depicted in Fig. 5 of the Drawings

[0019] With this abnormality, the pelvis sits with ASIS higher than the PSIS resulting in the posterior pelvic tilt which produces the sacral sitting posture. Excessive thoracic kyphosis, producing "C" shape spine, "flattening out" of the lordosis of the cervical spine and "flattening out" of the lordosis of the lumbar spine.

[0020] Decreased lordosis in cervical spine causes forward neck flexion & downward eye gaze to floor/lap. A cushion with medial and lateral contour is often used to promote LE alignment and pelvic stability. Appropriate cushion depth should be used to prevent the patient from sliding forward as he seeks reduced pressure behind the knees.

[0021] A rigid insert is often used to prevent hammocking of the seat and cushion and to keep the pelvis from collapsing into a posterior pelvic tilt.

[0022] If FLEXIBLE: A cushion with tapered adductors can be used to load the trochanters, stabilizing the pelvis in the resident's most neutral alignment.

[0023] If FLEXIBLE: A cushion with an anti-thrust component can be used to reduce forward sliding of the pelvis into posterior pelvic tilt.

[0024] If FIXED: An immersion style cushion that contours to the shape of the patient used to promote maximum pressure redistribution, minimizing peak pres-

ures.

[0025] If FIXED: Opening seat-to-back angle in conjunction with a fixed tilt in the wheelchair is often used to match the patient's ROM limitations and minimize forward sliding.

PELVIC ROTATION - generally depicted in Fig. 6 of the Drawings

[0026] Pelvis sits with L or R ASIS more forward than the other producing rotation in the hips.

[0027] The thoracic spine follows and rotates in the same direction as the pelvis. Therefore, if the right side of the pelvis is rotated more forward, the right side of the spine is rotated more forward as well. The neck will go into lateral flexion as if the person is dropping the ear to his or her shoulder.

[0028] In addressing this abnormality, the objective is to stabilize the pelvis in the patient's most neutral position - adjusting for flexible or fixed postures - to prevent further pelvic rotation. One option is to apply an anti-thrust force to reduce forward migration of the pelvis.

[0029] If FLEXIBLE: use tapered adductors and a medial abductor to create leg troughs for midline LE alignment and to maintain a pelvic neutral position.

[0030] If FIXED: use a cushion with less aggressive contouring. Protect the bony prominences with an immersion-style cushion.

[0031] US 2003/0205920 A1 is an example of the background art. This document teaches a cushion having a shaped base on which is positioned a resilient, cushioning layer. The shaped base is constructed from a supportive foam and has front and lateral bolsters, The cushioning layer is an inflatable air cushion having a flexible base and an array of individual air cells arranged in rows across the flexible base.

Objects of this Invention

[0032] An object of the present invention is to provide an adjustable wheelchair cushion apparatus that can be adapted to accommodate the particular anatomical support needs of a user having postural abnormalities.

[0033] Another object of the present invention is to provide an improved anatomical support cushion apparatus including at least one thermoplastic elastomer honeycomb cushion panel and a plurality of selectable inserts that serve to conform, support and/or stabilize a wide variety of wheelchair user sitting positions, user anatomies and disabilities.

[0034] Another object of the present invention is to provide an improved adjustable anatomical support cushion apparatus for providing pelvic and trunk stability for a wheelchair user having postural abnormalities.

[0035] Still another object of the present invention is to provide an adjustable anatomical support cushion apparatus for maximizing functional activities of daily living for a wheelchair user having postural abnormalities.

[0036] Yet another object of the present invention is to provide an improved anatomical support cushion apparatus for protecting skin and preventing wounds, and/or promoting the healing of existing wounds suffered by a wheelchair user having postural abnormalities.

[0037] A further object of the present invention is to provide an adjustable support cushion apparatus for maximizing comfort for a wheelchair user having postural abnormalities.

[0038] Another object of the present invention is to provide an adjustable anatomical support cushion apparatus for minimizing unwanted skeletal movement by a wheelchair user having postural abnormalities.

[0039] Yet another object of the present invention is to provide an adjustable support cushion for preventing progression of postural abnormalities.

[0040] A still further object of the present invention is to provide an adjustable anatomical support apparatus that is breathable to permit cooling of the user.

[0041] Another object of the present invention is to provide an adjustable anatomical support apparatus that can be tailored to create certain desired cushioning and stabilizing characteristics without having to introduce elements such as foam, fluids or other means which add cost or reduce durability.

[0042] Still another object of the present invention is to provide an adjustable anatomical support apparatus constructed of materials that are fast drying, and can be easily disinfected and sterilized by chemical wash, microwave treatment, detergent wash, or other means.

SUMMARY OF THE INVENTION

[0043] The invention is defined by the independent claim 1.

[0044] Briefly stated, the present invention is directed to an adjustable wheelchair seat cushion apparatus including a resilient thermoplastic honeycomb seat cushion member and a pivotally attached base member forming a planar base upon which the upper cushion member will rest when folded about the pivot to engage and lay thereupon. The base member may also be made of one or more layers of a more rigid thermoplastic honeycomb material. Positioned upon the base member and disposed between it and the overlying cushion member are user and/or LTC therapist installable, prescriptively sized and shaped pelvic obliquity elements, pommel elements and/or wedge elements operative to deform the cushion member when engaged therewith. Once the obliquity, pommel and/or wedge elements are positioned and affixed to the base member, the cushion member is rotated into engagement therewith and deformed thereby, and the assembly is inserted into its fabric cover, the zipper is retracted and the cushion-assembly is ready for use. In some cases, an ischial pad may also be inserted into a pocket provided in the back-center portion of the cover to protect the patient's ischial bone.

[0045] An important advantage of the present inven-

tion is that the thermoplastic elastomeric honeycomb material used in the construction of the apparatus is an anisotropic material having improved pressure relief, stability, compression set resistance, durability and low maintenance characteristics.

[0046] Another advantage of the present invention is that in fitting the cushion apparatus for a particular user, an LTC therapist may select from a wide variety of preformed shaping elements and cushion positions therefor to customize and individually tailor the cushion apparatus for an individual user.

[0047] Yet another advantage of the present invention is that a single size and shape of cushion can be matched with a variety of individually selectable, preformed shaping elements to support the specific requirements of a particular wheelchair user.

[0048] Still another advantage of the present invention is that the anatomical support apparatus may be constructed from a perforated core thermoplastic elastomer honeycomb panel that is breathable to allow perspiration removal and cooling of the apparatus user.

[0049] Another advantage of the present invention is that different thermoplastic elastomeric honeycomb core designs and/or multiple panels of different thermoplastic honeycomb core designs may be utilized to maximize design flexibility of the improved anatomical support apparatus.

[0050] Still another advantage of the present invention is that the thermoplastic elastomeric honeycomb core is fabricated from recyclable materials that are fast drying, and easily disinfected and sterilized.

[0051] These and other objects and advantages of the present invention will no doubt become apparent to those skilled in the art after having read the following detailed description of the preferred embodiments which are contained in and illustrated by the various drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] In the accompanying drawings:

FIG. 1 is a perspective view generally illustrating a standard wheelchair having disposed thereon an improved anatomical support cushion apparatus constructed in accordance with a presently preferred embodiment of the present invention;

FIG. 2 is a stylized side elevational view illustrating an optimally postured patient sitting upright without cushion in a standard wheelchair of the type shown in FIG. 1;

FIG. 3 is a stylized partial cross-sectional view taken along the line 3--3 of the wheelchair illustrated in FIG. 1, and a patient expressing pelvic obliquity abnormality to illustrate one example of a condition that can be addressed using a cushion apparatus in accordance with the present invention;

FIG. 4 is a stylized side elevational view illustrating a patient sitting in a standard wheelchair of the type shown in FIG. 1 and expressing an anterior pelvic tilt abnormality to illustrate another example of a condition that can be addressed using a cushion apparatus in accordance with the present invention;

FIG. 5 is a stylized side elevational view illustrating a patient sitting in a standard wheelchair of the type shown in FIG. 1 and expressing a posterior pelvic tilt abnormality to illustrate another example of a condition that can be addressed using a cushion apparatus in accordance with the present invention;

FIG. 6 is a partially broken plan view illustrating a patient sitting in a standard wheelchair of the type shown in FIG. 1 and expressing a pelvic rotation abnormality to illustrate another example of a condition that can be addressed using a cushion apparatus in accordance with the present invention;

FIG. 7 is a stylized three-quarter view generally illustrating a cushion assembly, in its open configuration; the user supporting cushion member, the pivotally attached base member, and an assortment of obliquity elements, pommel elements and wedge elements disposed on the base member in accordance with an embodiment of the present invention;

FIGs. 8-10 illustrate in 3-dimensional perspective, generalized examples of the obliquity elements, pommel elements, and wedge elements depicted in FIG. 7;

FIG. 11 is a perspective view generally illustrating an ischial pad of a configuration that might be installed in an appropriate location in or on either the cushion assembly or its cover;

FIG. 12 is a stylized three-quarter perspective view generally illustrating, in its open configuration, a zippered cover envelope for receiving and containing the cushion assembly illustrated in FIG. 7;

FIG. 13 is a stylized three-quarter perspective view, generally illustrating, in its open configuration, as viewed opposite from the upper back side as depicted in FIG. 7, of the user supporting cushion member and the pivotally attached base member, in accordance with an embodiment of the present invention;

FIG. 14 is an enlarged side view of the cushion assembly depicted in its open configuration;

FIG. 15 is an enlarged side view of the cushion assembly depicted in its closed configuration;

FIG. 16 is an enlarged frontal view showing the cushion assembly depicted in its closed configuration; and

FIG. 17 is a partially broken side view showing the closed cushion assembly enveloped in its zippered cushion assembly cover.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0053] Referring now to FIG. 1 of the Drawings which, as pointed out above, depicts a conventional wheelchair 10 having disposed thereon a removable, improved anatomical support cushion 12. As will be described in greater detail below, the cushion 12 is constructed of at least one flexible thermoplastic elastomer honeycomb core panel built in accordance with the present invention. It should also be noted that although the cushion assembly 12 is particularly well suited for wheelchair applications, the cushion assembly, or analogs thereof, may also be used in a variety of other anatomical support applications (e.g., mattresses, automobile and airline seats, arm rests, etc.).

[0054] Fig. 2 is provided to illustrate optimal user posture when seated in a standard wheelchair.

[0055] Figs. 3-6 are provided to respectively illustrate postural conditions identified as pelvic obliquity, anterior pelvic tilt, posterior pelvic tilt and pelvic rotation; all are conditions that can be aided through use of the present invention.

[0056] Fig. 7 generally depicts the principal components of an adjustable wheelchair seat cushion apparatus 12 including a multi-layered resilient thermoplastic honeycomb seat cushion member 14 and a pivotally attached base member 16 forming a planar base upon which the upper cushion member 14 will rest when folded about the pivot 18 to engage and lay thereupon. The base member 16 may also be made of one or more layers of a more rigid thermoplastic honeycomb material. Positioned upon the base member 18 and disposed between it and the overlying cushion member 14 are user and/or LTC therapist installable, prescriptively sized and shaped pelvic obliquity elements 20, pommel elements 22 and/or wedge elements 24 operative to deform the cushion member 14 when engaged therewith. Once the obliquity, pommel and/or wedge elements are positioned and affixed to the base member 16, the cushion member 14 is rotated into engagement therewith and deformed thereby, and the assembly is inserted into its fabric cover 30, (Fig. 12), the cover zipper 32 (Fig. 11) is retracted and the cushion assembly is ready for use. In some cases, an ischial pad 23 may also be inserted into a pocket 28 provided in the back-center portion of the cover 30 to protect the patient's ischial bone.

[0057] FIG. 13 illustrates a multi-layered honeycomb panel structure constructed from thermoplastic elastomer materials. The panels include a honeycomb-like core preferably made of bonded together and expanded strips

or ribbons of plastic material to which facing sheets of perhaps heavier gauge material are thermo-compression bonded. The illustrated cover member 14 is an anisotropic three-dimensional structure having predetermined degrees of flex along the X, Y and Z axes. Each cell is formed, in part, by four generally S-shaped wall segments each of which is bonded to and shared by an adjacent cell. In addition, each cell shares a double thickness wall segment with two adjacent cells.

[0058] Panel 14 has high tear and tensile strength and is highly resilient, with optimal compression load and shock absorption or distortion characteristics, yet is extremely light weight. Selected combinations of elastomer material, honeycomb cell configurations, core thicknesses and facing material variables will determine the panel's characteristics of softness or hardness, resilient recovery rate and rigidity or flex as required for a particular application. The facing materials can be selected from a wide variety of films, including thermoplastic urethanes, foams, EVAs, rubber, neoprene, elastomer impregnated fibers and various fabrics, etc. The manufacturing and fabrication of the panel 14 is described in greater detail in our U.S. Pat. No. 5,039,567.

[0059] More specifically, the present invention relates to an adjustable seat cushion assembly including an upper component preferably made of multiple layers of resilient thermoplastic honeycomb material, shaped and bonded together to form a user supporting cushion member, and a generally planer lower component preferably made of at least one relatively thin sheet of more rigid honeycomb material, and having an edge thereof hingedly connected to the cushion member, preferably along its rearmost extremity. The lower component is adapted to form a relatively rigid base member upon which the overlying cushion member will be supported when folded about the hinged connection to lie thereover. Removably disposed between the base member and the cushion member, and preferably attached to the upper surface of the base member at predefined locations, are one or more cushion deforming elements selected to define the user support characteristics of the cushion assembly.

[0060] With the upper cushion member rotated upwardly relative to the base member, the upper surface of the base member forms a supporting surface for an assortment of prescriptively sized and shaped pelvic obliquity elements, pommel elements and/or wedge elements.

[0061] These elements are selected, positioned and secured by the user and/or assisting therapist or clinician on the upwardly facing base member surface so as to deform the overlying resilient cushion member to support, raise, align, orient or otherwise adjust the user's skeletal components supported by the cushion assembly to provide pelvic and trunk stability, maximize the user's comfort and function during ADLs, protect the user's skin and prevent wounds, or assist in the healing of existing wounds, minimize unwanted movement of the user on the cushion surface, correct or accommodate postural

abnormalities and/or prevent or mediate progression of postural abnormalities.

[0062] As will be further described below, these elements are adapted to deform the cushion member as it is lowered (folded down) into supporting engagement therewith. The preformed obliquity elements, pommels and wedges are carefully selected and positioned to provide a desired customizing deformation of the overlying cushion member so that the cushion provides the supporting needs of the user when the assembly is folded into its closed, or folded, configuration.

[0063] Once folded, the cushion assembly is inserted into an enveloping fabric cover that is configured to conform to the shape of the cushion assembly and is provided with perimeter zippering means, or the like, to securely house the cushion assembly and maintain it in its closed and functional configuration. The cover may also be provided with internal and/or external pockets for receiving additional ischial pads, pommels or wedges, etc.

[0064] In Figs. 12-17 a multi-layered cushion member embodiment, the details of which are more fully disclosed in Applicant's US Patent No. 5,617,595, is shown modified to include a lower flap or base member as described above to more clearly illustrate attachment of the flap edge by thermocompression bonding along the rear side of the upper cushion member. Alternatively, the flap edge may be otherwise attached to the upper cushion member.

[0065] In Figs. 14 and 15, side views of the above described cushion assembly are shown in more detail.

[0066] In Fig. 16 a frontal view is depicted and in Fig. 17, a partially broken side view is shown further illustrating the cushion assembly disposed within its fabric cover.

[0067] Note that a closing zipper is provided around three sides of the lower edge of the cover, and a second, medially disposed expansion zipper and excess material facility is suggested to accommodate an assembly of larger cushion deforming elements should that be necessary.

[0068] Although embodiments of the present invention have been disclosed above, it will be appreciated that numerous alterations and modifications thereof will no doubt become apparent to those skilled in the art after having read the above disclosures. For example, the anatomical support cushions may be configured in any appropriate shape, with multiple panels and with various combinations of perforated and non-perforated core panels, and with core walls and/or face sheet perforations the number and/or hole size of which are tailored to achieve desired damping characteristics.

Claims

1. An adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10) comprising:

a generally rectangular, resilient seat cushion

member (14) and a generally rectangular, planar base member (16),

characterized in that

the seat cushion member (14) is formed of a plurality of layers of thermoplastic honeycomb material;

the planar base member (16) is formed of at least one layer of a thermoplastic honeycomb material, the base member (16) being disposed beneath the seat cushion member (14) and having a rear edge (18) thereof pivotally attached to a corresponding rear edge of the seat cushion member (14) at a hinge, the base member (16) being rotatable between a non-parallel disposition relative to the seat cushion member (14), and a parallel disposition relative to the seat cushion member (14); and the adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10) further comprises:

a plurality of prescriptively sized and shaped pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24) affixed to a surface of the base member (16) generally facing the seat cushion member (14), the pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24) being operative to engage and deform the seat cushion member (14) when the base member (16) is rotated from the non-parallel disposition relative to the seat cushion member (14) into the parallel disposition relative to the seat cushion member (14), the plurality of prescriptively sized and shaped pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24) being removable from the base member (16).

2. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 1 and further comprising a cover (30) removably disposed about the base member (16) and the seat cushion member (14), the pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24), and the base member (16).
3. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 2 wherein the cover (30) includes an opening configured to allow the seat cushion member (14), the pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24), and the base member (16) to be inserted into the cover (30), and a zipper disposed about the opening and configured to allow the seat cushion member (14), the pelvic obliquity elements (20), pommel elements (22) and/or wedge elements (24), and the base member (16) to be closely enveloped within the cover (30).

4. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 1 wherein cell walls of the thermoplastic honeycomb material of at least one layer of the seat cushion member (14) are perforated.
5. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 1 wherein the at least one layer of thermoplastic honeycomb material of the base member (16) is more rigid than the plurality of layers of thermoplastic honeycomb material of which the seat cushion member (14) is formed.
6. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 1 wherein the pivotal attachment of the seat cushion member (14) to the base member (16) is made by thermo-compression bonding of the back edge of the seat cushion member (14) to the back edge of the base member (16).
7. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in claim 2 wherein the cover (30) includes a pocket (34) provided in a back-center portion of the cover (30) into which the ischial pad (32) is inserted.
8. The adjustable anatomical support and seat cushion assembly (12) for wheelchairs (10), as recited in any of the previous claims, wherein the hinge is thermo-compressively formed.

35 Patentansprüche

1. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10), umfassend:

ein im Allgemeinen rechteckiges, elastisches Sitzkissenelement (14) und ein im Allgemeinen rechteckiges, planes Basiselement (16),
dadurch gekennzeichnet, dass
 das Sitzkissenelement (14) aus einer Vielzahl von Schichten thermoplastischen Wabenmaterials ausgebildet ist;
 das plane Basiselement (16) aus mindestens einer Schicht eines thermoplastischen Wabenmaterials ausgebildet ist, wobei das Basiselement (16) unterhalb des Sitzkissenelements (14) angeordnet ist und eine Hinterkante (18) davon aufweist, die an einem Scharnier schwenkbar an einer entsprechenden Hinterkante des Sitzkissenelements (14) angebracht ist, wobei das Basiselement (16) zwischen einer nicht parallelen Anordnung relativ zu dem Sitzkissenelement (14) und einer parallelen Anordnung relativ zu dem Sitzkissenelement (14)

- drehbar ist; und die anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) ferner Folgendes umfasst:
- eine Vielzahl von verordnet bemessenen und geformten Beckenschiefstandelementen (20), Knaufelementen (22) und/oder Keilelementen (24), die an einer Fläche des Basiselements (16) befestigt ist, die im Allgemeinen dem Sitzkissenelement (14) zugewandt ist, wobei die Beckenschiefstandelemente (20), Knaufelemente (22) und/oder Keilelemente (24) wirksam in das Sitzkissenelement (14) eingreifen und dieses verformen, wenn das Basiselement (16) aus der nicht parallelen Anordnung relativ zu dem Sitzkissenelement (14) in die parallele Anordnung relativ zu dem Sitzkissenelement (14) gedreht wird, wobei die Vielzahl von verordnet bemessenen und geformten Beckenschiefstandelementen (20), Knaufelementen (22) und/oder Keilelementen (24) von dem Basiselement (16) entfernbar ist.
2. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 1 und ferner umfassend eine Abdeckung (30), die abnehmbar um das Basiselement (16) und das Sitzkissenelement (14), die Beckenschiefstandelemente (20), Knaufelemente (22) und/oder Keilelemente (24) und das Basiselement (16) angeordnet ist.
 3. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 2, wobei die Abdeckung (30) eine Öffnung, die zum Ermöglichen des Einsetzens des Sitzkissenelements (14), der Beckenschiefstandelemente (20), Knaufelemente (22) und/oder Keilelemente (24) und des Basiselements (16) in die Abdeckung (30) konfiguriert ist, und einen Reißverschluss beinhaltet, der um die Öffnung angeordnet und zum Ermöglichen des engen Umhüllens des Sitzkissenelements (14), der Beckenschiefstandelemente (20), Knaufelemente (22) und/oder Keilelemente (24) und des Basiselements (16) in der Abdeckung (30) konfiguriert ist.
 4. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 1, wobei Zellwände des thermoplastischen Wabenmaterials mindestens einer Schicht des Sitzkissenelements (14) perforiert sind.
 5. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 1, wobei die mindestens eine Schicht thermoplastischen Wabenmaterials des Basiselements (16) steifer ist als die Vielzahl von Schichten thermoplastischen Wabenmaterials, aus dem das Sitzkissenele-

ment (14) ausgebildet ist.

6. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 1, wobei die schwenkbare Anbringung des Sitzkissenelements (14) an dem Basiselement (16) durch Thermokompressionsverbindung der Hinterkante des Sitzkissenelements (14) an die Hinterkante des Basiselements (16) hergestellt wird.
7. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach Anspruch 2, wobei die Abdeckung (30) eine Tasche (34) beinhaltet, die in einem hinteren mittleren Abschnitt der Abdeckung (30) bereitgestellt ist, in die das Sitzbeinpolster (32) eingesetzt ist.
8. Anpassbare anatomische Stütz- und Sitzkissenbaugruppe (12) für Rollstühle (10) nach einem der vorhergehenden Ansprüche, wobei das Scharnier thermokompressiv ausgebildet ist.

Revendications

1. Ensemble (12) de support anatomique réglable et de coussin de siège pour fauteuils roulants (10) comprenant :
 - un élément de coussin de siège élastique généralement rectangulaire (14) et un élément de base plan généralement rectangulaire (16), **caractérisé en ce que** l'élément de coussin de siège (14) est formé d'une pluralité de couches de matériau thermoplastique en nid d'abeille ; l'élément de base plan (16) est formé d'au moins une couche d'un matériau thermoplastique en nid d'abeilles, l'élément de base (16) étant disposé sous l'élément de coussin de siège (14) et présentant un bord arrière (18) de celui-ci fixé de manière pivotante à un bord arrière correspondant de l'élément de coussin de siège (14) au niveau d'une charnière, l'élément de base (16) étant rotatif entre une disposition non parallèle par rapport à l'élément de coussin de siège (14) et une disposition parallèle par rapport à l'élément de coussin de siège (14) ; et l'ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10) comprend également : une pluralité d'éléments d'obliquité pelvienne (20), d'éléments de pommeau (22) et/ou d'éléments de coin (24) dimensionnés et formés de manière prescriptive, fixés à une surface de l'élément de base (16) faisant généralement face à l'élément de coussin de siège (14), les éléments d'obliquité pelvienne (20), les élé-

- ments de pommeau (22) et/ou les éléments de coin (24) étant opérationnels pour entrer en prise et déformer l'élément de coussin de siège (14) lorsque l'élément de base (16) est tourné de la disposition non parallèle par rapport à l'élément de coussin de siège (14) à la disposition parallèle par rapport à l'élément de coussin de siège (14), la pluralité d'éléments d'obliquité pelvienne (20), d'éléments de pommeau (22) et/ou d'éléments de coin (24) dimensionnés et formés de manière prescriptive étant amovibles de l'élément de base (16).
- 5
2. Ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10), tel que décrit dans la revendication 1 et comprenant également un couvercle (30) disposé de manière amovible autour de l'élément de base (16) et de l'élément de coussin de siège (14), des éléments d'obliquité pelvienne (20), des éléments de pommeau (22) et/ou des éléments de coin (24), et de l'élément de base (16).
- 10
3. Ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10), tel que décrit dans la revendication 2, dans lequel la housse (30) comporte une ouverture configurée pour permettre à l'élément de coussin de siège (14), aux éléments d'obliquité pelvienne (20), aux éléments de pommeau (22) et/ou aux éléments de coin (24) et à l'élément de base (16) d'être insérés dans la housse (30), et une fermeture à glissière disposée autour de l'ouverture et configurée pour permettre à l'élément de coussin de siège (14), aux éléments d'obliquité pelvienne (20), aux éléments de pommeau (22) et/ou aux éléments de coin (24) et à l'élément de base (16) d'être enveloppés de manière fermée dans la housse (30).
- 25
- 30
- 35
4. Ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10), tel que décrit dans la revendication 1 dans lequel les parois cellulaires du matériau thermoplastique en nid d'abeilles d'au moins une couche de l'élément de coussin de siège (14) sont perforées.
- 40
- 45
5. Ensemble (12) de support anatomique réglable et de coussin de siège pour fauteuils roulants (10) selon la revendication 1 dans lequel l'au moins une couche de matériau thermoplastique en nid d'abeille de l'élément de base (16) est plus rigide que la pluralité de couches de matériau thermoplastique en nid d'abeille desquelles l'élément de coussin de siège (14) est formé.
- 50
- 55
6. Ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10), tel que décrit dans la revendication 1 dans lequel la fixation pivotante de l'élément de coussin de siège (14) à l'élément de base (16) est réalisée par liaison par thermocompression du bord arrière de l'élément de coussin de siège (14) au bord arrière de l'élément de base (16).
7. Ensemble de support anatomique réglable et de coussin de siège (12) pour fauteuils roulants (10), tel que décrit dans la revendication 2 dans lequel la housse (30) comporte une poche (34) prévue dans une partie centrale arrière de la housse (30) dans laquelle le coussin ischiatique (32) est inséré.
8. Ensemble (12) de support anatomique réglable et de coussin de siège pour fauteuils roulants (10) selon l'une quelconque des revendications précédentes, dans lequel la charnière est formée par thermocompression.

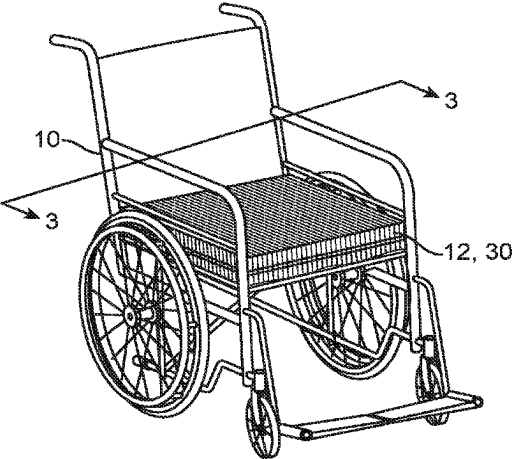


FIG. 1

OPTIMAL POSTURE

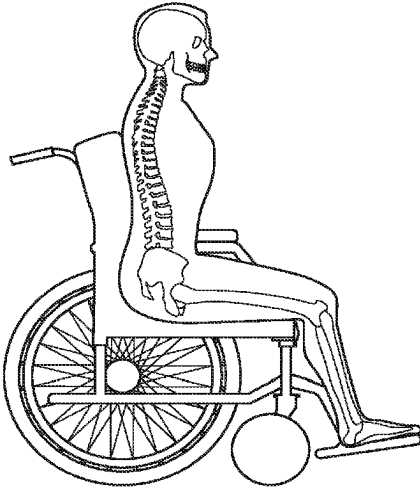


FIG. 2

PELVIC OBLIQUITY

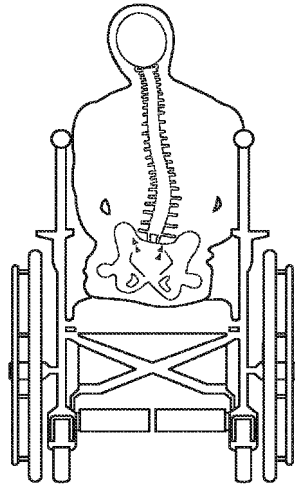


FIG. 3

ANTERIOR PELVIC TILT

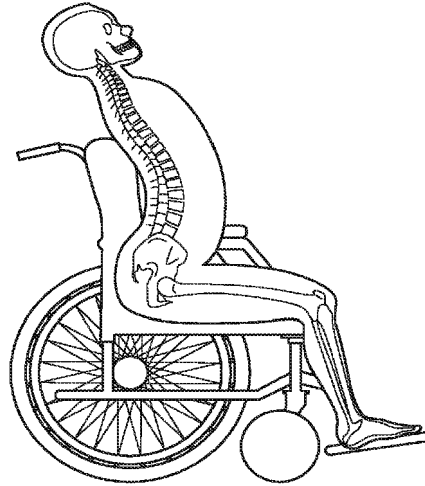


FIG. 4

POSTERIOR PELVIC TILT

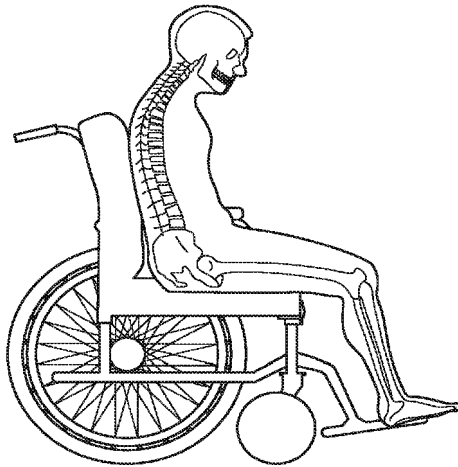


FIG. 5

PELVIC ROTATION

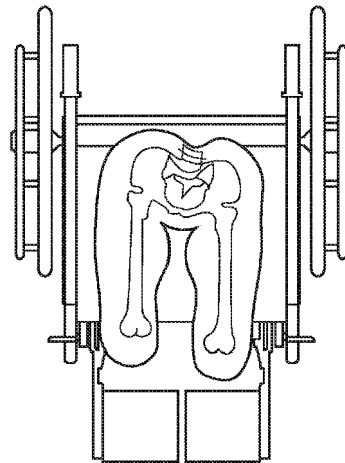


FIG. 6

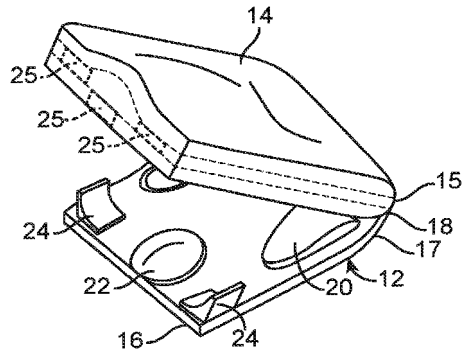


FIG. 7

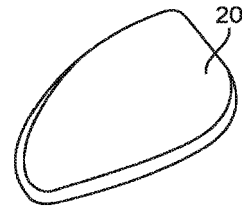


FIG. 8

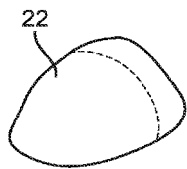


FIG. 9

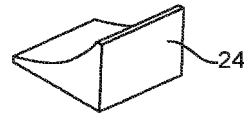


FIG. 10

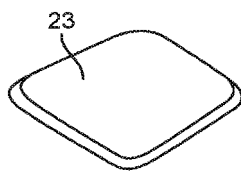


FIG. 11

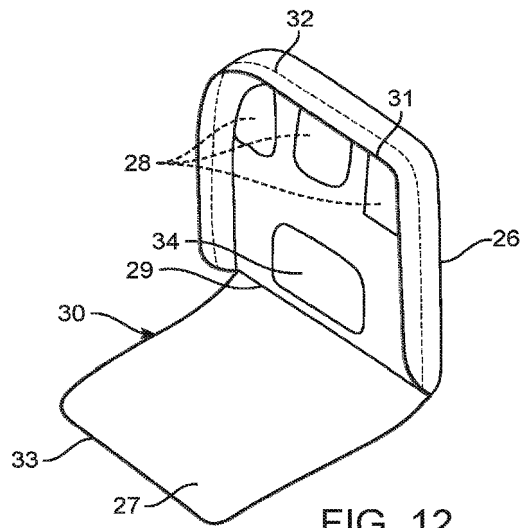


FIG. 12

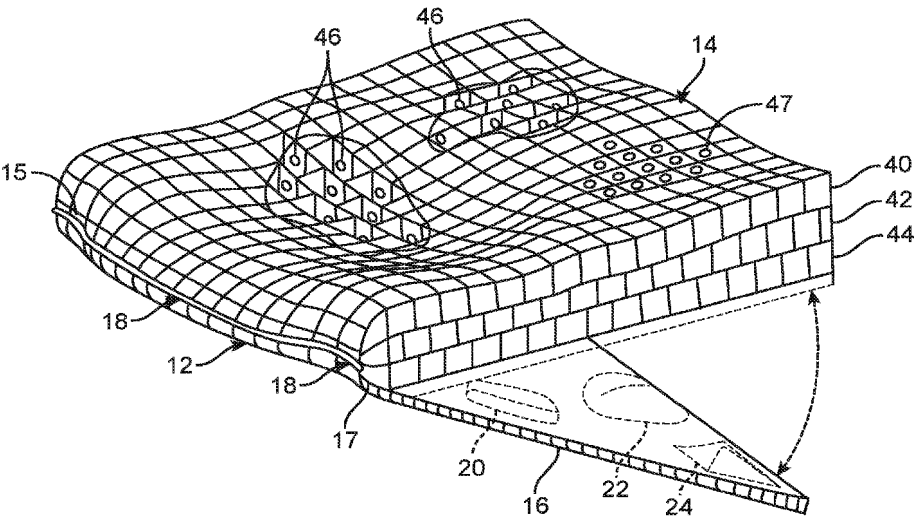


FIG. 13

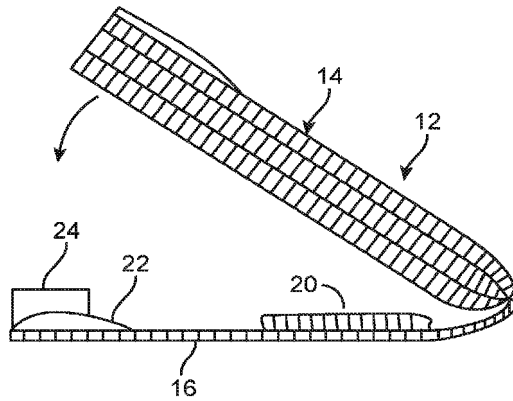


FIG. 14

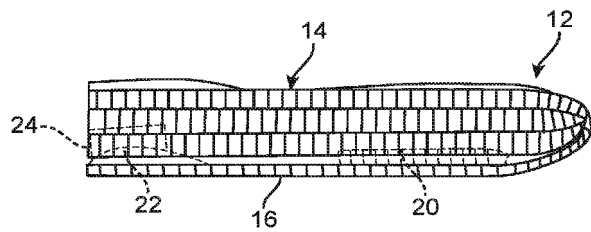


FIG. 15

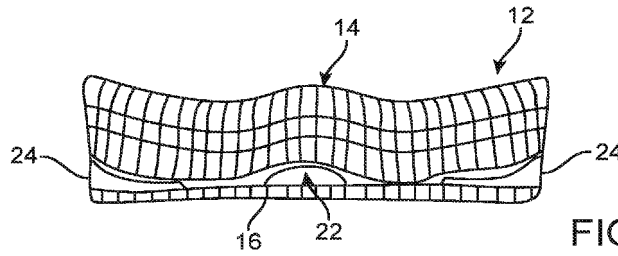


FIG. 16

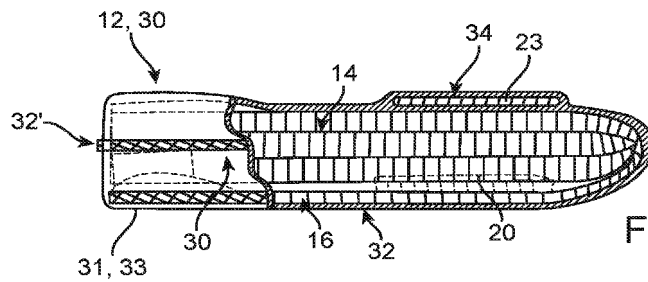


FIG. 17

REFERENCES CITED IN THE DESCRIPTION

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