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(54) **SEATING SYSTEM**

(57) The present invention relates to an ergonomic seating system configured in such a way as to induce an individual to adopt a correct posture when sitting.

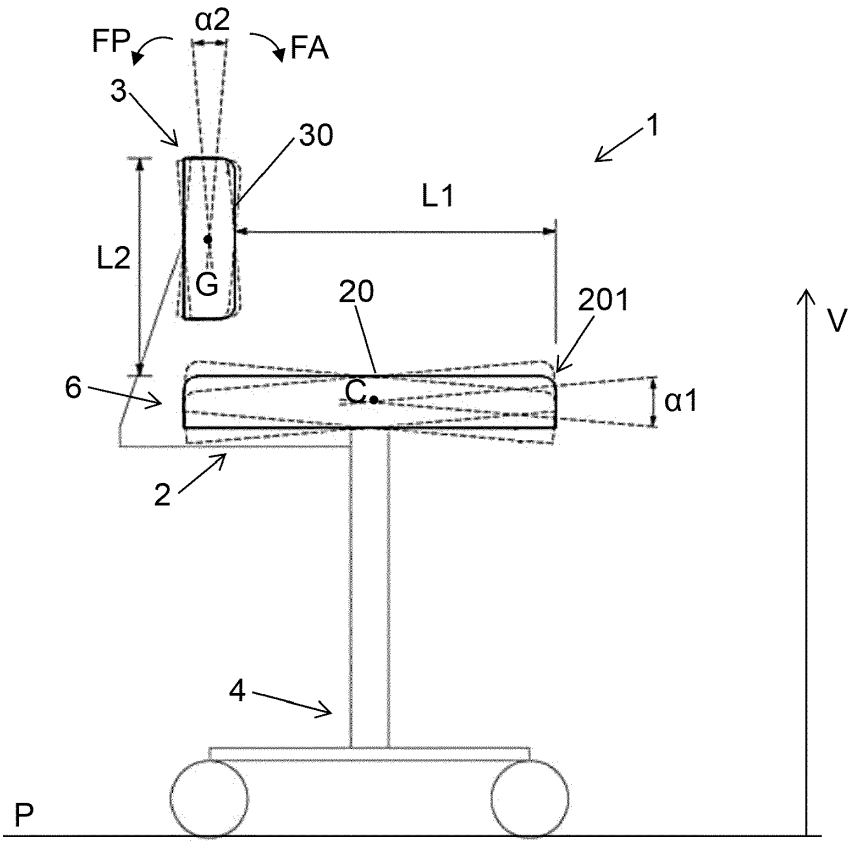

FIG.1A

EP 3 195 761 A1

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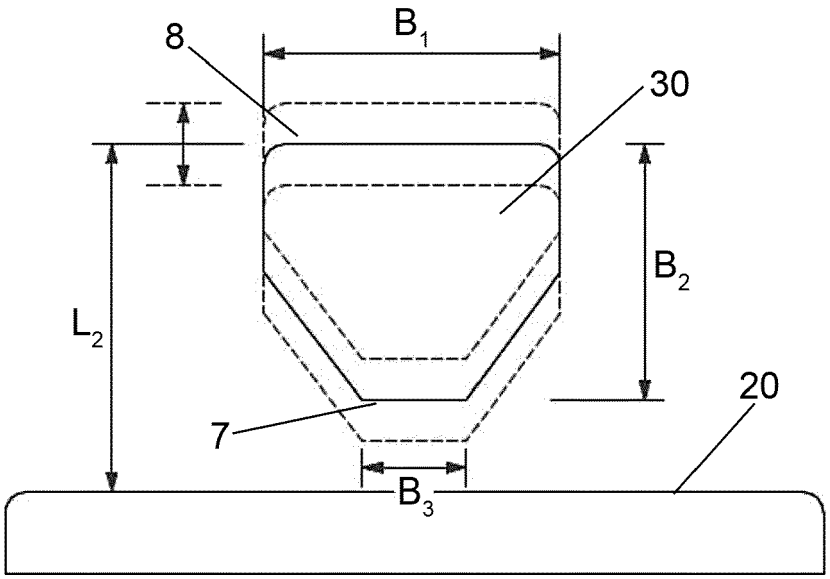

FIG.1B

Description

Technical field of the invention

[0001] The present invention relates to an ergonomic seating system.

Background

[0002] Conventional seating systems are manufactured according to standard sizing parameters, which for some specific applications are regulated by law.

[0003] In the current state of the art, household and office chairs typically have a seat about 40 cm deep, a backrest 36 cm wide and reaching about 40 cm up from the seat. Often an adjustable lumbar support is also provided for.

[0004] Unfortunately, such seating systems have a configuration such that a seated individual adopts an incorrect posture, i.e. a configuration designed to facilitate or directly cause the onset of illness or discomfort.

[0005] This problem cannot be underestimated, since most of the population spends a large number of hours seated during the day, often for work. In general, the number of hours that an individual spends seated during an entire lifetime is extremely high, so it may be particularly damaging that seating systems encourage the adoption of an incorrect posture.

[0006] Poor posture can cause long term health problems directly or indirectly such as back pain, stomach pain, or toothache, or even more serious diseases such as spinal abnormalities like scoliosis, kyphosis and lordosis.

[0007] In particular, the traditional area of the seat is so broad that the pelvis tends to lean back, to achieve a mixed support between the ischial tuberosities and sacrum, and natural lumbar lordosis becomes kyphosis.

[0008] This occurs mainly because the body seeks support on the backrest, as a result thoracic kyphosis becomes more pronounced, the shoulders rotate forward and cervical hyperlordosis appears.

[0009] Unfortunately, with the incorrect posture encouraged by seating systems of the known type, the intestines and organs of the abdominal cavity are subject to downward pressure.

[0010] Also diaphragmatic breathing does not function correctly or is made more difficult because it has to work against a strong resistance.

Summary of the invention

[0011] The technical problem posed and solved by this invention is therefore to provide a seating system which makes it possible to overcome the drawbacks mentioned above with reference to the prior art.

[0012] Such problem is solved by an ergonomic seating system according to claim 1.

[0013] Preferred features of the present invention are the subject of dependent claims.

[0014] The seating system according to the present invention is configured in such a way as to induce an individual to adopt the correct posture when sitting.

[0015] Advantageously, such correct posture is spontaneously adopted by virtue of the supports specially designed for such purpose.

[0016] In this context, a correct posture is understood as a posture that produces benefits from a physical point of view, or which in any case does not facilitate the onset of phenomena harmful to health. In general, a correct posture is defined as a posture in which the body is kept erect (with its naturally occurring kyphosis and lordosis) with minimum muscular effort.

[0017] With respect to the seating systems of the prior art, preferred embodiments of the claimed system have a reduced seating surface and a sacral support surface instead of the traditional lumbar support area, which conveniently makes it possible to keep the pelvis in a neutral position to encourage the adoption of the correct posture by a seated individual.

[0018] This way the curves (lordosis and kyphosis) may remain in a physiological condition and the spine can remain extended along a vertical axis, so that a minimum effort is required to keep the chest erect.

[0019] Advantageously, the seating system of the present invention allows a stable support in three anatomical points of a user, in a substantially exclusive manner in such points.

[0020] More precisely, when the user is seated on the seating system of the present invention, his/her sacrum lies against the sacral support in a localised manner and advantageously without the lower back being involved in the support, while the reduced seating surface is designed to provide support to the two ischial tuberosities of the pelvic girdle.

[0021] This way the user is seated firmly by virtue of the three support points discussed previously but, in the absence of further support elements (which he/she would spontaneously tend to recline on), with a minimum though present muscular effort to maintain the correct posture.

[0022] Advantageously, the pressure on internal organs is decreased compared with the seating systems of the prior art, diaphragmatic breathing is easier and a state of physical well-being is thus produced which may also lead to better concentration.

[0023] Other advantages, characteristics and conditions of use of the present invention will be evident from the following detailed description of some embodiments, presented by way of non-limiting examples.

Brief description of the drawings

[0024] Reference will be made to the appended drawings, wherein:

figures 1A and 1B respectively show a schematic

side view and front views of a first preferred embodiment of a seating system according to the present invention;

figure 2 shows a schematic side view of a second preferred embodiment of the seating system according to the present invention;

figure 3 shows a schematic front view of a further embodiment of the seating system according to the present invention;

figures 4A and 4B respectively show a schematic front view and side view of another embodiment of a seating system according to the present invention; and

figure 5 shows a schematic view from above of an alternative embodiment of the seating system according to the present invention.

[0025] The figures above are provided solely by way of non-limiting examples.

Detailed description of preferred embodiments

[0026] With initial reference to figures 1A and 1B, a first preferred embodiment of an ergonomic seating system according to the present invention is globally denoted by reference numeral 1.

[0027] The seating system 1 comprises a seat 2, sacral support 3 and a ground support 4.

[0028] The support 4 may substantially comprise a frame of any known shape supporting the seat 2 and the individual to be seated on it above the floor level P, or a reference plane P for example horizontal. In particular, it can be made according to a facilitated movement configuration for example with casters as shown in figures 1A and 2.

[0029] The seat 2 is configured to create a support for the individual according to a substantially horizontal plane, in other words substantially parallel to the reference or floor surface P which the support 4 is placed on. The seat 2 has a seating surface 20 substantially parallel to the floor surface P, which can be covered in materials, preferably padded, suitable to make it more comfortable to maintain the sitting position for long periods of time.

[0030] The seating surface 20 has advantageously a seat depth L1, understood as the distance between a distal surface 201 of the surface 20 and the sacral support 3, in a range of 20-25 cm, preferably a range of 22-23 cm. As regards the other dimensional parameters of the seat, these are not directly related to the adoption of a particular posture by the user, consequently the teachings of the prior art may be followed, such implementation being within the grasp of a person skilled in the art.

[0031] According to one embodiment of the present invention, the seating surface 20 is the surface which the user of the present seating system effectively sits on.

[0032] Preferably, the seat 2 can tilt from the aforesaid substantially horizontal position by rotating around a first axis C substantially parallel to the floor plane P and to the sacral support 3, by a first tilt angle $\alpha 1$ of adjustable amplitude, comprised in particular between 0° and 10° in each of two possible directions of rotation. Preferably, the C-axis passes through the centre line of the seat depth L1, as shown in Figure 1A.

[0033] The sacral support 3 is configured to create a support surface of the sacral area of the seated individual. It extends substantially on a plane perpendicular to the seat 2, in particular has a larger surface area or support surface 30 facing the seating surface 20, at a rear edge 6 of the seat, and is centred on the centreline of said edge 6.

[0034] The sacral support 3 preferably has an overturned isosceles trapezoid configuration, with a width of the support surface 30 increasing as the distance L2 of an upper edge 8 of the sacral support 3 from the seat 2 increases, measured along a vertical line V coming out of the floor plane P, L2 being comprised in a range of 12-22 cm, preferably 16-18 cm even more preferably L2 being equal to 17 cm.

[0035] In this embodiment, the width of the support 3 may vary from a minimum width B3 comprised in a range of 4-6 cm, preferably 5 cm, at its lower edge 7, proximal to the seat 2, to a maximum width B1 comprised in the range of 5-15 cm, preferably equal to 12.5 cm, at its upper edge 8 distal to the seat 2. Alternatively, the sacral support 3 may have an oval or circular or even generally polygonal transverse shape. For example, the sacral support 3 may have a triangular shape, with a vertex of the triangle facing the seat 2. This embodiment provides preferably that the sacral support 3 is the shape of an isosceles triangle, with the base forming the upper edge of said support.

[0036] The sacral support 3 has a height B2, understood as the distance between the lower edge 7 and the upper edge 8 measured along the vertical V coming out of the floor plane P, which can be adjusted. According to a preferred embodiment, the height B2 of the sacral support 3 may be comprised in a range of 10-15 cm, preferably equal to 12.5 cm. The sacral support 3 may have an adjustable tilt with respect to the seat 2 by rotating around a second axis G, substantially parallel to the floor plane P. In particular, the tilt may be of a second tilt angle a2 of amplitude comprised in particular between 0° and 10° in a first direction of rotation identified by the arrow FA (frontal relative to the seat) and/or of an amplitude greater than or equal to 15° in a second opposite direction of rotation marked by the arrow FP (posterior relative to the seat) in each of the two possible directions of rotation, as shown in the example in Figure 1B1A.

[0037] Figure 2 shows a schematic side view of a second preferred embodiment of the invention. The seating system 10 shown has a seat 200 comprising, in addition to the seating surface 20 previously described, a portion 21 tilting at the edge opposite the sacral support 3, in particular tilting with respect to the remaining portion of the seat 200 by a third tilt angle $\alpha 3$ of an amplitude preferably between 20° and 30°. The length L3 of the seat

200 measured along the direction of the depth of the seat, as shown in figure 2, is preferably not less than 40 cm when $\alpha 3$ is equal to 0°.

[0038] According to further preferred embodiments of the invention, the sacral support 3 may be associated and/or comprise a backrest. In particular, as shown in Figure 3, it is possible to provide for the presence of a support backrest 50 behind the sacral support 3. The backrest 50 has a backrest height B4 measured along the vertical V equal to 40 cm and a maximum backrest width B5 of 36 cm at the maximum height of the backrest.

[0039] Figures 4A and 4B show by way of example an embodiment in which the sacral support 3 is integrated in a first backrest 51. The backrest may be any shape and preferably comprises soft materials inside it, to ensure adequate comfort to the seated individual.

[0040] Lastly, Figure 5 shows an embodiment variant of a seating system according to the present invention which comprises a second backrest 52 in which two sacral supports 3, aligned with respect to one another are integrated. As can be seen from the figure, this implementation of the invention has a greater width of the seating surface 2000 compared to the previous embodiments, and allows two individuals be seated at the same time. It is clear to see that it is possible to create a seating system according to the present invention configured to simultaneously seat several individuals merely by increasing the width of the seating surface 2000, without altering its depth, and providing a sacral support 3 for each seat.

[0041] The present invention, in all the embodiments so far described, has a broad sphere of application in many areas, such as:

chairs for work stations (working at video terminals);
office chairs - even for private use;
waiting room chairs;
chairs for schools;
kitchen chairs;
dining chairs;
seats for public use (for example: theatres, park benches, etc.); and
seats for vehicles (cars, planes, buses).

[0042] The present invention has been described here with reference to preferred embodiments. It is clear that other embodiments may exist relating to the inventive nucleus, as defined by the scope of protection of the claims below.

Claims

1. Ergonomic seating system (1), comprising:

- a seat (2) having a seating surface (20) substantially parallel to a floor plane (P),
said seating surface (20) presenting a seat depth (L1) in a range of 20-25 cm,
said seat (2) tilting with respect to the aforesaid position by a first tilt angle ($\alpha 1$) of adjustable amplitude;
- a sacral support (3) extending in a plane substantially orthogonal to the seat (2), presenting a support surface (30) facing said seating surface (20), and a distance (L2) of an upper edge (8) of the sacral support (3) from the seat (2) measured along a vertical line (V) coming out of the floor plane (P) in a range of 12-22 cm; and
- a ground support (4).

2. System (1) according to claim 1, wherein said sacral support (3) presents an overturned, isosceles trapezoid shape with a width of the support surface (30) which increases as said distance (L2)increases.

3. System (1) according to claim 1 or 2, wherein the width of the support (3) varies between a minimum width (B3) in a range of 4-6 cm at a lower edge (7), and a maximum width (B1) in a range of 5-15 cm, at the upper edge (8), and the height (B2) of the sacral support (3) being adjustable and in a range of 10-15 cm.

4. System (1) according to one of the preceding claims, in which said seat depth (L1) is in a range of 22-23 cm.

5. System (1) according to one of the preceding claims, wherein said first tilt angle ($\alpha 1$) presents an amplitude between 0° and 10° in each of the two possible directions of rotation.

6. System (1) according to one of the preceding claims, wherein said distance (L2) is between 15 and 20 cm, preferably equal to 17 cm.

7. System according to one of the preceding claims, wherein the minimum width (B3) is 5 cm.

8. System according to one of the preceding claims, wherein the maximum width (B1) is 12.5 cm.

9. System according to one of the preceding claims, wherein said height (B2) is 12.5 cm.

10. System (1) according to one of the preceding claims, wherein said sacral support (3) has an adjustable tilt in relation to said seat (2) by rotating around a second axis (G) substantially parallel to the floor plane (P), by a second tilt angle ($\alpha 2$).

11. System (1) according to the preceding claim, wherein said second tilt angle ($\alpha 2$) has an amplitude between 0° and 10° in a first direction of rotation (FA) and/or amplitude greater than or equal to 15° in an

opposite, second direction of rotation (FP).

12. System (1) according to one of the preceding claims, wherein said seat (200) comprises a tilting portion (21) at an edge opposite the sacral support (3), said portion (21) being tilted with respect to the remaining portion of the seat (200) by a third tilt angle ($\alpha 3$).

13. System (1) according to the preceding claim, wherein the amplitude of said third tilt angle ($\alpha 3$) is between 20° and 30°.

14. System (1) according to one of the preceding claims, wherein said sacral support (3) is integrated in a backrest (51).

15. System (1) according to one of the preceding claims, **characterised in that** it is designed to provide a firm support solely at three anatomical points of a user, the sacrum of the latter lying against the sacral support (3), the two ischial tuberosities of the pelvic girdle of said user being supported by the seating surface (20).

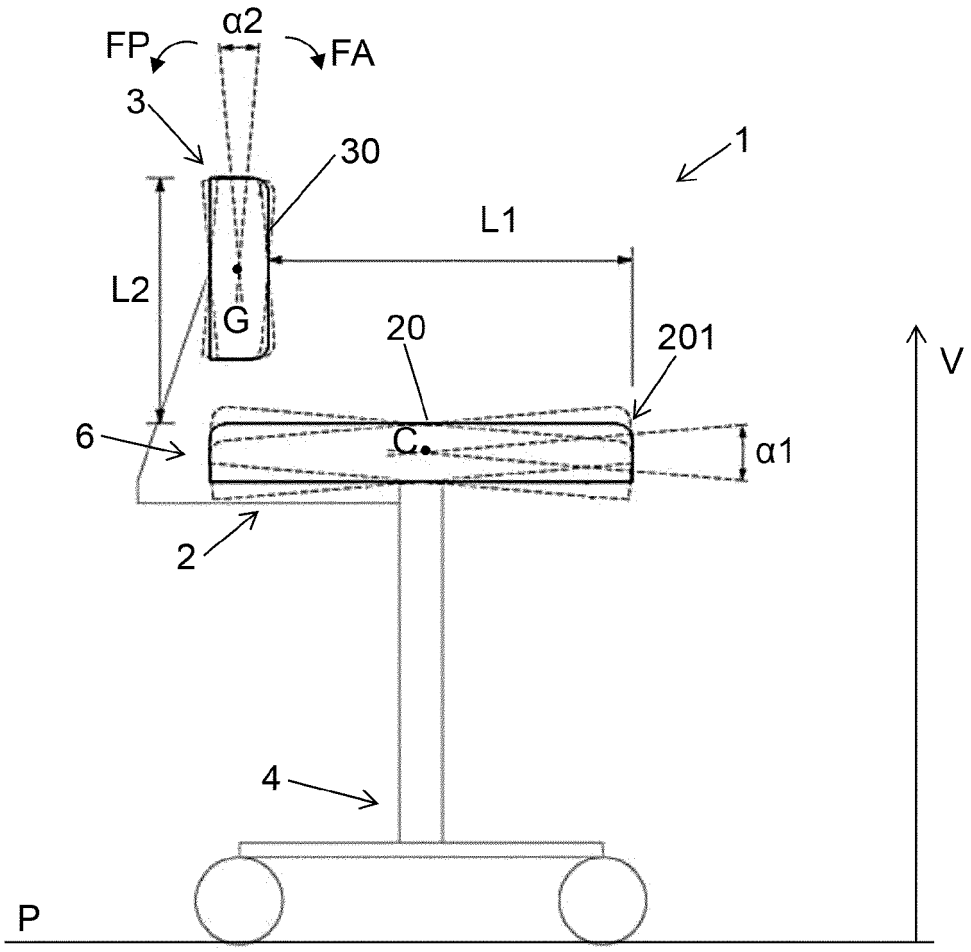

FIG.1A

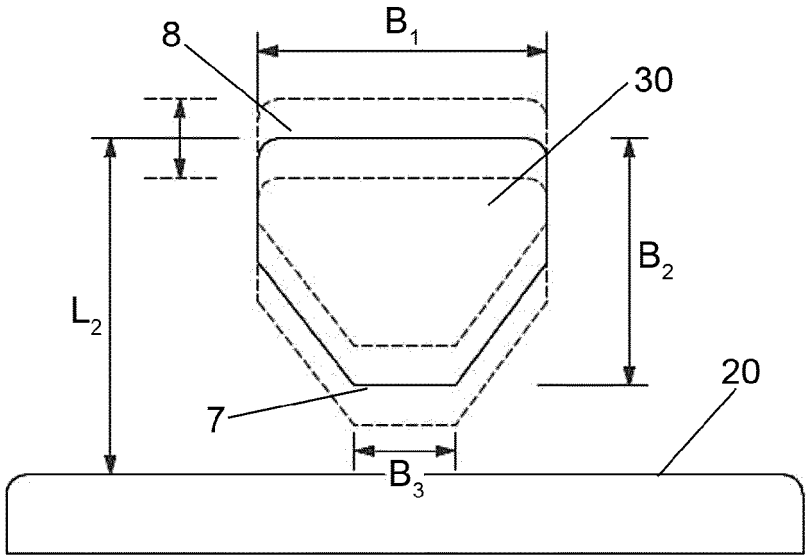

FIG.1B

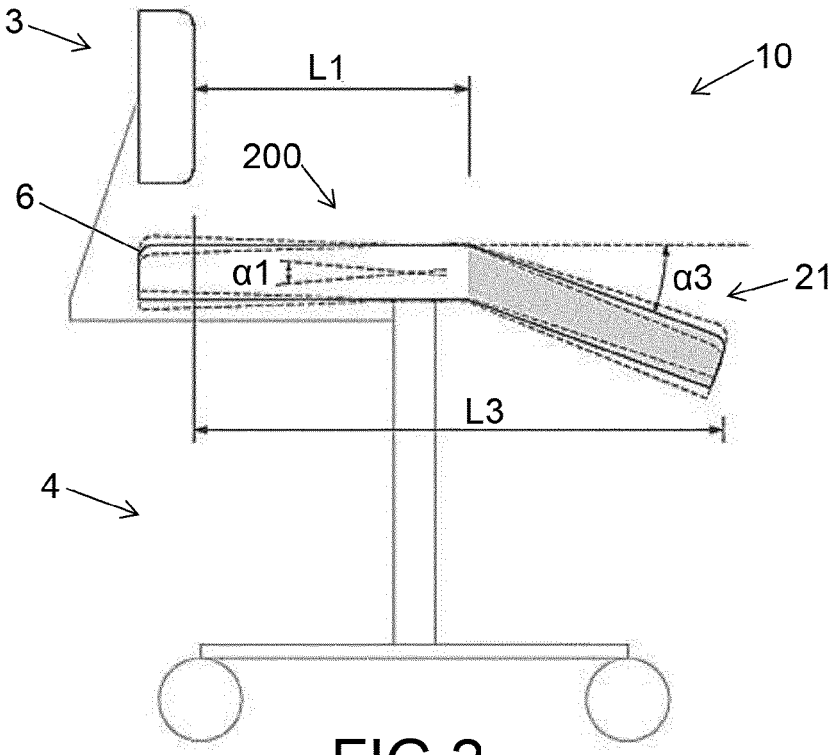

FIG.2

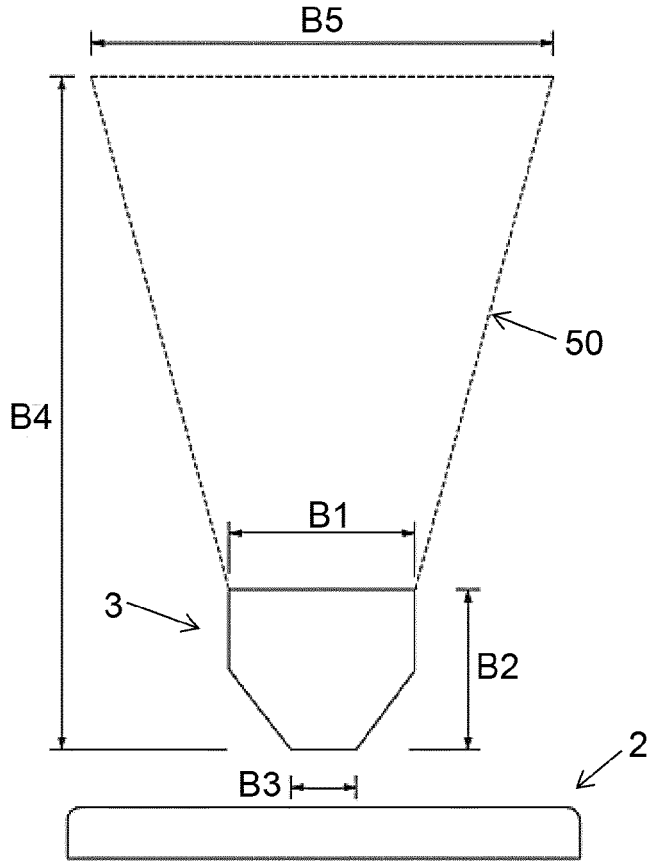

FIG.3

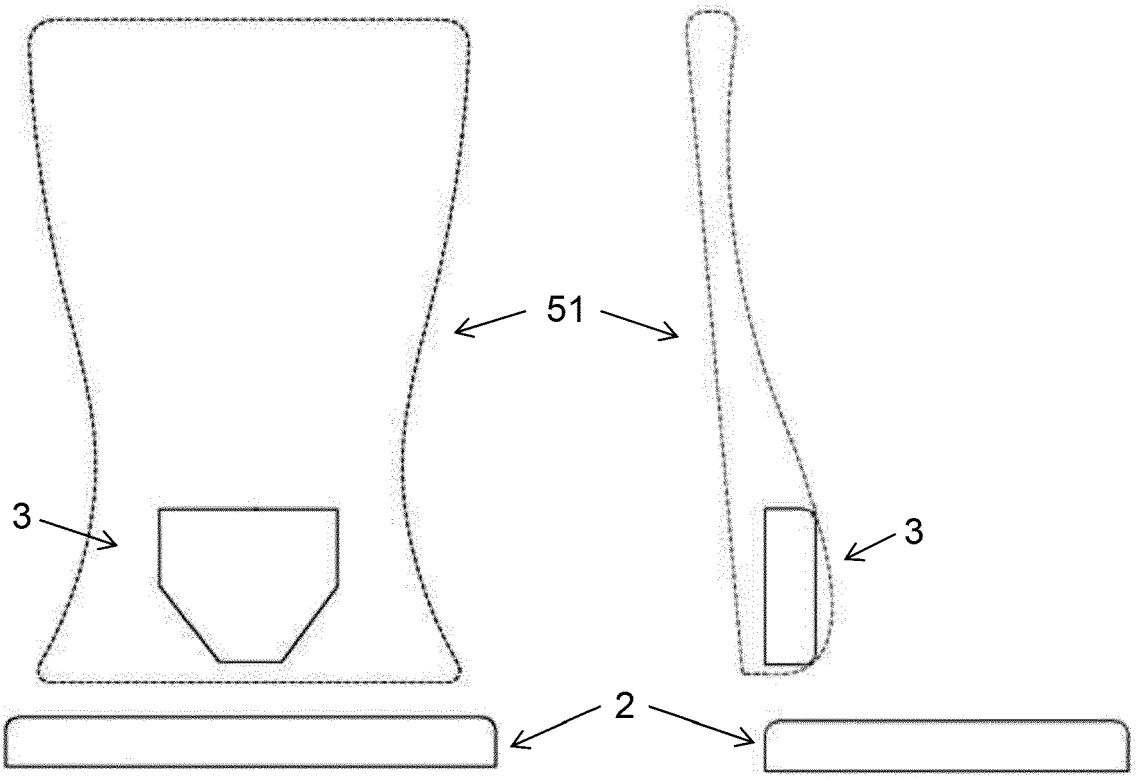

FIG.4A

FIG.4B

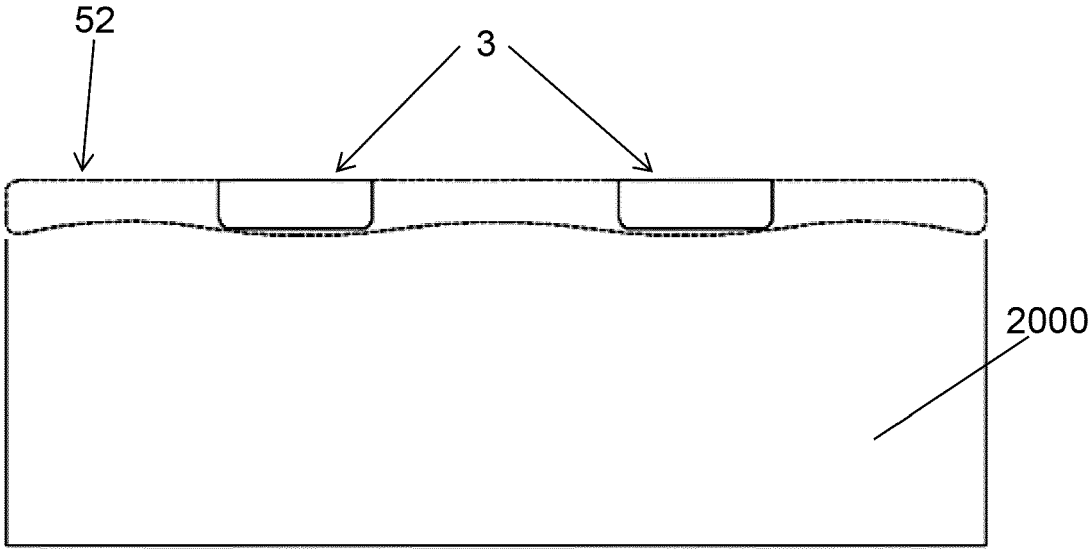

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 17 15 2292

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 03/099070 A1 (SAVVY PHYSIOTHERAPY PTY LTD [AU]; KNEESHAW DAVID COLIN O'NEILL [AU]) 4 December 2003 (2003-12-04)	1-11, 13-15	INV. A47C3/026 A47C7/46
Y	* page 6, lines 22-32; claim 10; figures *	12	
Y	US 5 536 067 A (PINTO SHLOMO [IL]) 16 July 1996 (1996-07-16) * claims 3,4; figures 2a,2b,3a,3b,4a,4b *	12	

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 March 2017	Amghar, Norddin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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29-03-2017

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