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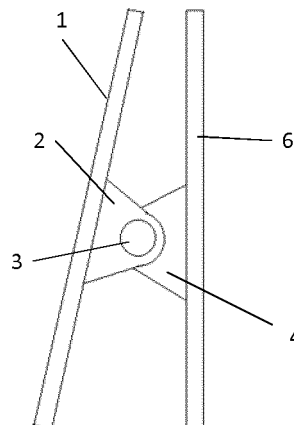
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(54) **IMPROVED SELF-ADJUSTABLE BACKREST DEVICE**

(57) The invention relates to a self-adjustable backrest device formed from a movable plate that pivots with respect to a horizontal shaft (3), the plate and shaft being connected together by means of a first set of hubs. The

shaft is also connected to a second set of hubs that are in turn associated with a supporting member that can be either the backrest of an existing chair or a backrest that forms part of the device.

FIG 2



Description

TECHNICAL FIELD

[0001] The present invention relates to a self-adjustable backrest device, which has an automatic means of position adaptation for the user's comfort. It is applicable to all types of seats: chairs, sofas, easy chairs, wheel chairs, automotive seats, etc, and even as an independent element to be placed on the floor.

STATE OF THE ART

[0002] For the manufacture of vehicle, office or of any other type of seats, more or less complex systems are applied so the backrest adapts to the user's position.

[0003] Thus, for example, patent ES2118081T3 refers to a chair comprising a seat and backrest connected to each other, characterised in that the backrest presents certain movement in being associated with two horizontal shafts, one on which it swivels, and another that limits its movement.

[0004] Patent US2005035636A1 discloses a chair of the type comprising a seat and backrest connected to each other, being self-adjustable, characterised by comprising a backrest formed by back-support plate, supported by a horizontal shaft joint provided on a support, such joint being at a certain distance from the base of the backrest, preferably in an area at an average height of the backrest, and has a rotation spring cushioned and limited by a rotation limit system, and when the plate is in resting position, it is in an approximately vertical position. The plate, the support and the joint are included in a semi-rigid casing.

[0005] None of the cited patents provides lumbar support.

[0006] Patent WO9427472A1 describes a chair comprising a seat and backrest connected to each other characterised by comprising a backrest / back support plate, supported by a horizontal shaft joint.

[0007] Patent ES2255466A1 refers to a self-adjustable chair characterised in that it comprises a continuous single piece that serves as backrest and seat and is supported by a joint.

[0008] Patent US6435615B1 discloses a chair comprising a seat and backrest connected to each other, characterised in that the backrest is supported by a horizontal shaft joint.

[0009] Patent DE20113075U1 refers to a chair, which comprises seat and backrest, characterised in that the backrest comprises an arm with two shafts, a lower one that associates it with the seat and another upper one that regulates the position of the plate on which the user rests.

[0010] None of these patents refer to an independent backrest that can be coupled to different chairs, easy chairs or any other type of seat.

[0011] Patent US2005168044A1 describes a seat

backrest that has a lower extensions suitable to be pushed into the ground, such as at the beach, and serves as backrest for users sitting on the ground.

[0012] Patent WO0117398A1 discloses a self-adjustable seat that is supported on the ground with an adaptation system not comprising a horizontal shaft.

[0013] None of the patents cited refer to an independent backrest, suitable to be installed in any type of chair, easy chair, armchair, or even on the floor itself that protects the lumbar area regardless of the posture adopted by the user and which lifts the buttocks relaxing the pressure thereon.

BRIEF EXPLANATION OF THE INVENTION

[0014] The invention relates to a self-adjustable backrest device, which protects the lumbar area and relaxes the pressure on the buttocks.

[0015] The backrest is self-adjustable, which means that it needs no control or command.

[0016] The device referred to supplements a seat surface such that the seat surface exists previously and what is covered by the object of this invention is that it adds a backrest or improves the already existing one.

[0017] The self-adjustable backrest assembly comprises a mobile plate on which the user rests, wherein said plate swivels on a horizontal shaft that passes through a first set of hubs connected to the plate, that shaft being associated with a second set of hubs connected to a support that may be the backrest itself of the chair or easy chair on which the self-adjustable backrest is going to be used, in which case it will be referred to as pre-existing backrest, or it may be a fixed backrest which forms part of the device, in which case it will be referred to as backrest of the device.

[0018] At least one of the sets of hubs is adjustable in height and thus, height variation of the first set of hubs will vary the relative point on which the plate swivels altering the lever while height variation of the second set of hubs will alter the height at which the plate is located.

[0019] Hub refers herein to any element that serves as support to the shaft allowing its rotation.

[0020] The backrest of the device may have different dimensions based on, among other things, the surface on which it should be supported.

[0021] The plate has an initial position, in the absence of forces applied by the user or at his or her will, and a balancing run that can be limited by a maximum position and a minimum position.

[0022] The ideal initial or resting position is preferably close to the vertical line although that can vary depending on the angle of the pre-existing backrest or support on which the backrest of the device rests.

[0023] This resting position is obtained thanks to the action of a rotation spring in the resting position of which the plate is in an approximately vertical position where said rotation spring can be cushioned for user comfort.

[0024] While not being used, the plate is forced into

the resting position by the rotation spring, which is capable of overcoming the weight of the plate and bringing it to the initial position and holding it in that position, but allowing it to yield under the pressure exerted by the user when sitting down without the user perceiving an ejection force.

[0025] Optionally, the run of the plate can have a limit.

[0026] Preferably, the assembly of mobile plate, first and second set of hubs, shaft and the support will be included in a semi-rigid casing so that the user will not see these mechanical elements and the risk of getting pinched is reduced.

[0027] In line with the above, the lower part of the plate may incorporate an elastic element which closes the space between the plate and the seat surface, reducing the risk of pinching an object or user body part which may be inserted therein. This elastic element will usually connect the seat surface to the plate, and may be made of a rubber fabric which, in addition, can help the plate to return to the vertical position, whereby two benefits are achieved with a single element.

[0028] The assembly comprising the plate, the first and second set of hubs, the shaft and the support is suitable to be associated with a chair, easy chair or sofa, among others, which can include car seats, which are more complex.

[0029] Once the self-adjustable backrest device has been installed, the user will sit on a seat surface, that is approximately horizontal and pre-existing, and will support the back on the self-adjustable backrest device.

[0030] Preferably, the height of the shaft will be adjustable and will be arranged at between 12 and 33 cm above the user's seat surface, and preferably between 18 and 27 cm.

[0031] For the case in which the self-adjustable backrest is not supported on a pre-existing backrest on the chair or easy chair for its location, the self-adjustable backrest may incorporate various accessory elements to stay affixed and prevent it from moving under the user's weight.

[0032] Thus, for example, in a possible embodiment, the device can incorporate suitable pegs to dig into soft ground such as earth or sand.

[0033] Another possible embodiment can incorporate non-skid legs to affix it to smooth surfaces.

[0034] In a third embodiment, the device can incorporate a flap with which the user affixes the support with his or her own weight, which will be useful when, for example, the user wants to read in bed and lean on the device.

[0035] The seat device may have armrests or any other element without altering the nature of the invention. Also, the plate may have a curvature, cushioning, flexibility, rigidity, or any other measure to increase user comfort.

[0036] Lastly, the material will be wood, plywood, plastic, metal, fabric, wicker, or any other.

[0037] The plate may be separated from the shaft to facilitate the tasks of cleaning, repair, or adjustment,

among others.

DESCRIPTION OF THE DRAWINGS

5 [0038] For a better understanding of the invention, the following figures are included.

10 [0039] FIGURE 1 shows the invention in an embodiment which uses the backrest itself of the chair where the device is used as a fixed backrest and thus we find the mobile plate (1), the first set of hubs (2) connected to the mobile plate, the shaft (3) and the second set of hubs (4) connected to the support, in this case a pre-existing backrest (5). The seat surface (10), in this case a chair, is also shown.

15 [0040] FIGURE 2 graphically shows an adjustable backrest device that does incorporate a fixed backrest in this case prepared to lean on the backrest of an armchair, with the mobile plate (1), the first set of hubs (2), the shaft (3), the second set of hubs (4) and the backrest of the device (6).

20 [0041] FIGURE 3 shows an embodiment wherein the backrest of the device (6) that presents a triangular cross-section, incorporates pegs (7) for anchoring the backrest to a soft and penetrable ground, such as earth or sand.

25 [0042] FIGURE 4 shows an embodiment wherein the backrest of the device (6) incorporates bases (8) suitable for affixing the device onto smooth ground.

30 [0043] FIGURE 5 shows an embodiment wherein the backrest of the device incorporates a flap (9) between the seat surface (10), in this case the floor, and the user such that, in this way, the user, prevents the movement of the device with his or her own weight.

EMBODIMENTS OF THE INVENTION

35 [0044] Briefly described hereunder is an embodiment of the invention, by way of example and without limiting the scope thereof.

40 [0045] The self-adjustable backrest that is supplemented with a seat surface comprising:

A mobile plate (1) having a sufficient size to cover the user's back from the coccyx to the area of the shoulder blades.

45 [0046] A horizontal shaft (3) on which the aforementioned mobile plate swivels, the said shaft being supported by a first set of hubs (2) connected to the mobile plate and a second set of hubs (4) connected to the backrest of the device (6).

50 [0047] A rotation spring that keeps the plate in an approximately vertical position when it is in resting position, i.e., when there is no external force acting thereupon.

[0048] The device is resting on a seat surface (10), such as a bed or the floor.

55 [0049] The first set of hubs (2) that is adjustable in height is connected to the mobile plate. When varying the relative height of the first set of hubs, and therefore the shaft, in relation to the plate, the point on which the plate swivels is altered modifying the torque exerted by

the plate.

[0050] The shaft (3) is also associated with the second set of hubs (4) that are connected to the backrest of the device (6).

[0051] In this embodiment the second set of hubs is further height-adjustable, and, by varying its height, the height of the plate and the shaft are modified in relation to the seat surface.

[0052] The shaft on which the plate swivels is located at a height of 23 cm, the normal height being between 12 and 33 cm from the seat surface and, preferably between 18 and 27 cm

[0053] The action of the first and second set of hubs, and the horizontal shaft associating them, allows the mobile plate to swivel on the backrest of the device such that the greater the force exerted by the user on the upper part of the mobile plate, the greater the action on the lumbar area, reducing the pressure on the buttocks being lifted.

[0054] In this embodiment being explained, to prevent the movement of the self-adjustable backrest device due to the horizontal force exerted by the user when leaning thereon, it comprises a flap by way of brace on which the user sits which, with his or her weight, prevents the assembly from moving.

Claims

1. **Self-adjustable backrest device** of the type that supplement a seat surface **characterised by** comprising a mobile plate (1), a first set of hubs (2) connected to the mobile plate, a horizontal shaft (3) on which the plate swivels and a second set of hubs (4) associated on the one hand with the aforementioned horizontal shaft, and on the other, with a support wherein the shaft is located at a distance from the seat surface (10) of between 12 and 33 cm, preferably between 18 and 27 cm.
2. **Self-adjustable backrest device** according to claim 1 **characterised by** further comprising a rotation spring, preferably cushioned, in whose resting position the plate is in an approximately vertical position.
3. **Self-adjustable backrest device** according to claim 1 **characterised in that** the movement of the mobile plate has a limit.
4. **Self-adjustable backrest device** according to claim 1 **characterised in that** the assembly consisting of the mobile plate, first and second set of hubs and the support is included in a semi-rigid casing.
5. **Self-adjustable backrest device** according to claim 1 **characterised in that** the lower part of the plate has an elastic element that closes the space between the plate and the seat surface.

6. **Self-adjustable backrest device** according to claim 1 **characterised in that** the support is a backrest of the device (6) and is fixed.
7. **Self-adjustable backrest device** according to claim 1 **characterised in that** the backrest of the device (6) has pegs (7).
8. **Self-adjustable backrest device** according to claim 1 **characterised in that** the backrest of the device (6) has a flap (9).
9. **Self-adjustable backrest device** according to claim 1 **characterised in that** at least one of the sets of hubs is adjustable in height.
10. **Self-adjustable backrest device** according to claim 1 **characterised in that** it has more than one plate.

Amended claims under Art. 19.1 PCT

1. Self-adjustable backrest device of the type which supplement a seat surface **characterised in that** it comprises a mobile plate (1), a first set of hubs (2) connected to the mobile plate, a horizontal shaft (3) on which the plate swivels and a second set of hubs (4) associated on the one hand with the horizontal shaft and on the other hand connected by any means to a support that can be the backrest itself of the chair or easy chair on which the self-adjustable backrest is to be used and referred to as pre-existing backrest or can be a fixed backrest which is part of the device, in which case it is referred to as backrest of the device, wherein the shaft is at a distance from the seat surface (10) of between 12 and 33 cm, and optimally between 18 and 27 cm.

2. Self-adjustable backrest device according to claim 1 **characterised in that** it further comprises a rotation spring that associates the plate and the horizontal shaft forcing their relative position, preferably cushioned, in the resting position of which the plate is in an approximately vertical position.

3. Self-adjustable backrest device according to claim 1 **characterised in that** the shaft run is limited by a stop.

4. Self-adjustable backrest device according to claim 1 **characterised in that** the assembly consisting of the mobile plate, first and second set of hubs and the support is included in a semi-rigid casing.

5. Self-adjustable backrest device according to claim 1 **characterised in that** the lower part of the plate has an elastic element that closes the space between the plate and the seat surface.

6. Self-adjustable backrest device according to claim 1 **characterised in that** the support is a backrest of the device (6) and is fixed.

7. Self-adjustable backrest device according to claim 1 **characterised in that** the backrest of the device (6) has pegs (7).

8. Self-adjustable backrest device according to claim 1 **characterised in that** the backrest of the device (6) has a flap (9).

9. Self-adjustable backrest device according to claim 1 **characterised in that** the connection of the first set of hubs and the plate comprises movement guides, the position of this first set of hubs being adjustable relative to the plate.

10. Self-adjustable backrest device according to claim 1 **characterised in that** the connection of the second set of hubs and the support comprises movement guides, the position of this second set of hubs being adjustable relative to the plate.

11. Self-adjustable backrest device according to claim 1 **characterised in that** it has more than one plate.

Statement under Art. 19.1 PCT

ABSTRACT: Claim 1 amended; Claim 2 amended; Claim 3 amended; Claim 4, unchanged; Claim 5 unchanged; Claim 6 unchanged; Claim 7 unchanged; Claim 8 unchanged; Claim 9 amended; Claim 10 new; Claim 11 unchanged, but renumbered.

In reply to the observations relating to the international application indicated in the written opinion of the International Searching authority, we submit the changes listed below:

(i) Grounds of the amendment: Claim 1 is subject to the following amendments, addressing the lack of clarity:

- In line 7: After the word "other", the following is added: "connected by any means to a support that may be the backrest itself of the chair or easy chair on which the self-adjustable backrest is to be used and referred to as pre-existing backrest or can be a fixed backrest which is part of the device, in which it is referred to as backrest of the device".
- In line 11: Following the word "33cm" the following "and optimally" are added.
- In line 11: The word "preferably" is removed

(ii) Grounds of the amendment: Claim 2 is subject to

the following correction, in order to clarify how the spring relates to the rest of the elements of the invention:

- In line 15: "that associates the plate and the horizontal shaft forcing their relative position" is added.

(iii) Grounds of the amendment: Claim 3 is subject to the following amendments, with the purpose of expressing it properly and avoiding lack of clarity:

- In line 20: "the shaft run is limited by a stop".
- In the same line 20: "movement of the mobile plate has a limit" is deleted.

(IV) Claim 4 has not been amended.

(V) Claim 5 has not been amended.

(VI) Claim 6 has not been amended.

(VII) Claim 7 has not been amended.

(VIII) Claim 8 has not been amended.

(IX) Grounds of the amendment: Claim 9 is subject to the following transformations to provide clarity in the claim explaining the characteristic whereby the hubs are adjustable in height:

- In line 8: the words "at least" are deleted.
- In line 8: "the connection of the first set of hubs and the plate comprises movement guides, the position of this first set of hubs being adjustable relative to the plate" is added.
- In line 10: "one of the sets of hubs is adjustable in height" is deleted.

(X) Grounds of the amendment: Claim 10 is added and is worded as follows, with the aim of explaining how to implement this embodiment using several plates, in relation to claim 11:

"Self-adjustable backrest device according to claim 1 **characterised in that** the connection of the second set of hubs and the support comprises movement guides, the position of this second set of hubs being adjustable relative to the plate."

(XI) Grounds of the amendment: Claim 10 is numbered as claim 11.

FIG 1

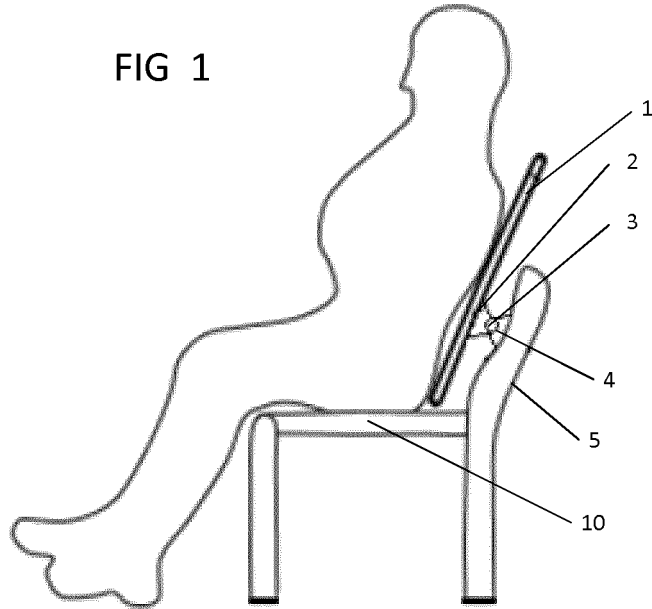


FIG 2

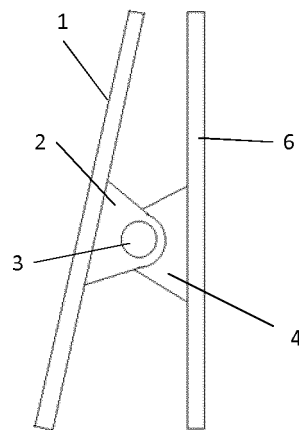


FIG.3

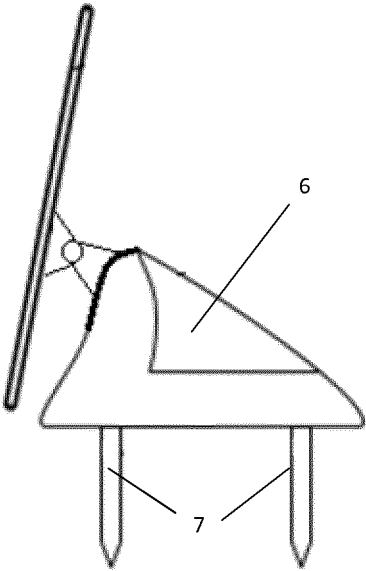


FIG.4

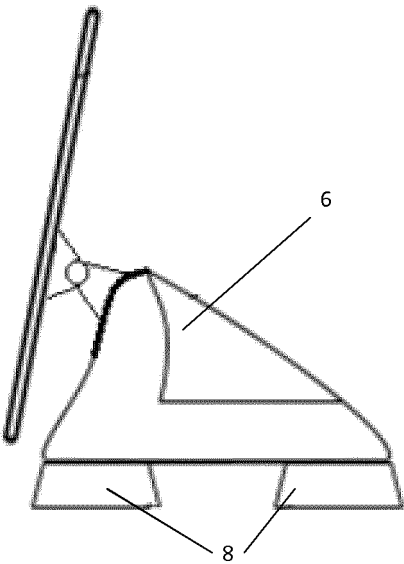
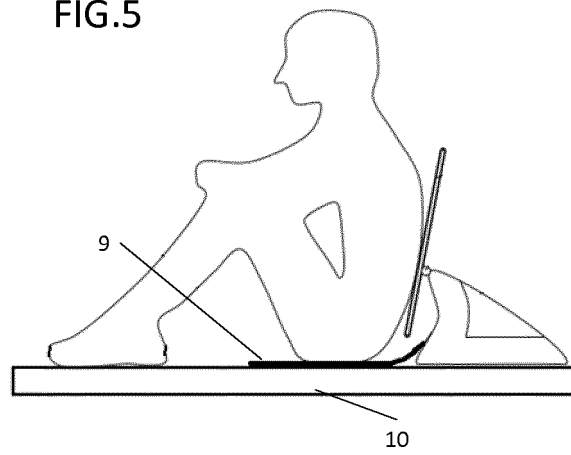


FIG.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2016/070830

A. CLASSIFICATION OF SUBJECT MATTER

A47C16/00 (2006.01)

A47C1/024 (2006.01)

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)

A47C

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 practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 1856534 A (JEAN BOERY) 03/05/1932, page 2, lines 42 - 45; figure 1,	1-2
A	US 2005035636 A1 (TURNER DENNIS M ET AL.) 17/02/2005, figure 4, paragraph [20];	1,2

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure use, exhibition, or other means.

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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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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art

"&"

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Date of the actual completion of the international search

31/01/2017

Date of mailing of the international search report

(09/02/2017)

Name and mailing address of the ISA/

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Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2016/070830

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
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INTERNATIONAL SEARCH REPORT

International application No.

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Form PCT/ISA/210 (patent family annex) (January 2015)

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