(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 868 349 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.08.2021 Bulletin 2021/34

(21) Application number: **19874057.3**

(22) Date of filing: **17.10.2019**

(51) Int Cl.:
A61G 7/07 *(2006.01)* ***A61G 13/12*** *(2006.01)*
A47C 16/00 *(2006.01)*

(86) International application number:
PCT/ES2019/070708

(87) International publication number:
WO 2020/079306 (23.04.2020 Gazette 2020/17)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **18.10.2018 ES 201831579 U**

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(54) **MULTILAYER CRANIAL SUPPORT**

(57) The present invention relates to a multilayer head support particularly designed to achieve maximum comfort for the purpose of preventing the onset of bedsores.

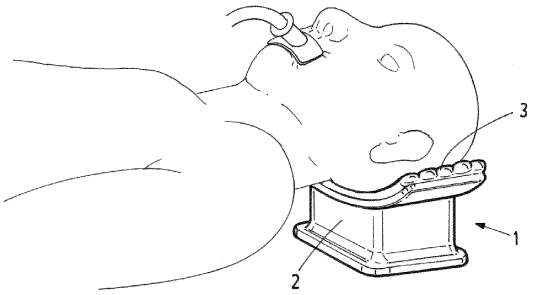

FIG.2

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Description

OBJECT OF THE INVENTION

[0001] The present invention belongs to the field of healthcare for long-term patients, such as critically ill patients, for example.

[0002] The object of the present invention relates to a multilayer support for the patient's head particularly designed to achieve maximum comfort for the purpose of preventing the onset of bedsores.

BACKGROUND OF THE INVENTION

[0003] Bedsores or pressure ulcers have become a common problem among patients with reduced mobility such as, for example, patients subjected to decompressive craniectomy, patients with long periods of intubation or sedation, patients with hemodynamic instability, or patients with neurological pathologies, where body movement is continuously compromised. Bedsores develop as a result of a constant increase in pressure on the skin and tissues exposed to overload. The physiopathological mechanisms causing bedsores are mainly due to the lack of irrigation of the exposed area, which causes the subsequent ischemia and the onset of the ulcerative lesion. The exposure of deep tissues to the outside then occurs, which implies a significant superinfection tendency.

[0004] Four stages are defined in the onset of bedsores. Stage I involves reddening or erythema; Stage II involves partial thickness skin loss which affects the epidermis, dermis, or both; Stage III involves full thickness skin loss and subcutaneous tissue lesion or necrosis; and Stage IV involves full thickness skin loss with extensive destruction, tissue necrosis which may cause muscle, tendon, or bone lesions.

[0005] In the general population, about 10% of bedsores appear in the occipital region of the cranium. This percentage increases considerably among neurological patients, and particularly among patients subjected to neurosurgical interventions in serious condition such as, for example, severe brain injuries, requiring patients to remain in the same position at all times.

[0006] For these reasons, there is a need to create a simple, malleable, and easy-to-use device which allows significantly reducing the onset of bedsores and ulcers in the patient's occipital region.

DESCRIPTION OF THE INVENTION

[0007] The present invention solves the preceding problems as a result of a multilayer cranial support particularly designed to prevent bedsores. This support fundamentally comprises two elements joined to one another: a base and a pillow. Each of said elements is described below:

a) Base

The base is an orientable base configured to be supported on the surface of a bed. In this context, the term "orientable" means that it allows certain variation in terms of the orientation of the upper side thereof to which the pillow is joined for the purpose of adapting the orientation of said pillow to different postures of the patient's head. The capacity of the base to orient its upper side can be achieved in different ways.

In a particularly preferred embodiment of the invention, the base comprises a bag inside which there is housed a plurality of granules or beads that adopt different positions according to the orientation of the pillow. It is a support system lacking elasticity typical of pillows, because once the granules settle in a position corresponding to a specific orientation, said orientation does not change until the base is manipulated again. It is a system similar to that used in current nursing pillows, as described for example in United States patent document US6651282B1. The granules can be made of expanded polystyrene.

In a preferred embodiment alternative with respect to the preceding one, the base comprises a rigid plate and an orientable bar structure joined to the pillow. In this case, the orientation of the upper side of the base is performed mechanically by means of manipulating the bar structure supporting the pillow.

In another preferred embodiment of the invention compatible with any of the described base types, the lower side of the base comprises self-screwing feet to even further facilitate the adjustments of the orientation of the patient's head.

b) Pillow

The pillow is a multilayer pillow which has an anatomical shape that accommodates a patient's nape and is joined to the base. The anatomical shape is chosen such that it adapts as perfectly as possible to the shape of the nape and the back of the cranium of a person. This pillow is joined to the upper side of the base and, since they are orientable, the orientation of the pillow can be changed such that it adapts to different postures of the patient's head.

The pillow can be configured in different ways provided that it is soft and smooth enough so as to allow comfortably supporting the patient's head. In a particularly preferred embodiment of the invention, the pillow comprises at least one external layer of polyurethane, a first intermediate layer of polymer material, a second intermediate layer of air chamber, and an internal layer of rigid material.

The external layer serves to provide comfort for the patient's head and to prevent lesions when the patient's head comes into direct contact with another structure.

The layer of air allows adjusting the height required between the patient's mattress and his or her head according to the required position, be it in extension,

hypertension, flexion, and lateral rotations. Furthermore, in a particularly preferred embodiment of the invention, the layer of air comprises several compartments therein to help in the adjustment and direction of the orientation of the supported head of the patient. In other words, the layer of air is formed by at least two levels of air chamber. Furthermore, the layer of air serves to prevent direct contact of the patient's head supported on the external layer with the rigid internal layer, creating an anti-gravity effect for the purpose of reducing lesions caused by the patient resting continuously in the same position.
Moreover, the support of the invention may comprise means for alternately filling and emptying the layer of air to prevent the head from being supported continuously on one and the same specific point, thereby creating a bedsore prevention effect. For example, the means for alternately filling and emptying can be an alternately actuated pump or automatic compressor connected to the layer of air.

[0008] As a result of this configuration, the cranial support of the invention solves the problems of the prior art by providing a soft anatomical support with configurable orientation for a patient's head.

BRIEF DESCRIPTION OF THE FIGURES

[0009]

Figure 1 shows a perspective view of an example of a cranial support according to the present invention.

Figure 2 shows a perspective view of a patient with his or her head supported on an example of a cranial support according to the invention.

Figure 3 shows a perspective view of an example of a cranial support with the base formed by a bag filled with granules.

Figure 4 shows a perspective view of an example of a cranial support with the base formed by a rigid plate coupled to a bar structure.

Figure 5 shows a perspective view of a section of an example of a cranial support in which the different layers of the pillow can be seen.

PREFERRED EMBODIMENT OF THE INVENTION

[0010] Figure 1 shows a perspective view of a cranial support (1) according to the present invention formed by a base (2) and a pillow (3) fixed to the upper side of the base (2).

[0011] In this example, the base (2) has an essentially parallelepiped shape provided with a flat lower side to be supported on the bed or stretcher on which the patient lies. As can be seen, the lower side of the base (2) has a surface larger than the rest of the base (2) itself for the purpose of increasing the stability of the support as much as possible. Furthermore, although not shown in this figure, the base (2) is orientable in the sense that the orientation of its upper side can be changed so that the pillow (3) adapts to the patient's posture.

[0012] In turn, the pillow (3) is designed with an anatomical shape envisaged for adapting as perfectly as possible to the nape area and the back of the patient's head. Furthermore, as will be described in detail herein below, the pillow (3) is formed by a plurality of layers conferring thereto adaptability, compressibility, and elasticity properties that are ideal for supporting the patient's head.

[0013] Figure 2 shows a view of a patient with his or her head supported on the example of a support (1) of the present invention shown in Figure 1. As can be seen, a perfect alignment of the spine is achieved, thereby minimizing not only problems relating to skin disorders, but also musculoskeletal disorders.

[0014] Figure 3 shows another example of a support (1) according to the invention, wherein the base (2) is formed by a bag containing a plurality of granules made of expanded polystyrene. It is a system that is similar to that currently used in the so-called nursing pillows which allows the orientation of the pillow (3) to be changed manually, with the granules made of expanded polystyrene being relocated according to the particular posture.

[0015] Figure 4 shows another example of a support (1), wherein the base (2) is formed by a rigid plate (21) on which an orientable structure (22) formed by a plurality of bars joined to the pillow (3) is supported. In this example, the bar structure (22) can allow changing the orientation of the pillow (3), for example, by means of changing the length of the bars through screwing mechanisms. In other words, each bar can be fixed to the pillow (3) through a ball joint, and by means of a mechanism similar to that of a threaded rod, the length thereof can be changed. The pillow (3) can thereby be reoriented by lengthening or shortening certain bars.

[0016] Figure 5 shows a section view of the pillow (3) in which the different layers forming said pillow can be seen. Said layers include an external layer (31) made of polyurethane, a first intermediate layer (32) made of polymer material, a second intermediate layer (33) containing an air chamber, and an internal layer (34) of rigid material. Figure 5 also shows a cross-section of the plate (21), which can be made of a low-profile plastic material (for example, PVC), acrylic material, titanium, among others. It is important for the plate to be lightweight to facilitate moving the same and to be strong enough to prevent the weight of the head from deforming it.

Claims

1. A multilayer cranial support (1), **characterized in that** it comprises:

an orientable base (2) configured to be supported on the surface of a bed; and
a multilayer pillow (3) joined to the base (2), wherein the pillow (3) has an anatomical shape that accommodates a patient's nape.

2. The support (1) according to claim 1, wherein the base (2) comprises a bag inside which there is housed a plurality of granules that adopt different positions according to the orientation of the pillow (3).

3. The support (1) according to claim 2, wherein the granules are made of expanded polystyrene.

4. The support (1) according to claim 1, wherein the base (2) comprises a rigid plate (21) and an orientable bar structure (22) joined to the pillow (3).

5. The support (1) according to claim 4, wherein the rigid plate (21) is made of PVC, acrylic material, or titanium.

6. The support (1) according to any of the preceding claims, wherein the lower side of the base (2) further comprises self-screwing feet to facilitate the adjustments of the orientation of the patient's head.

7. The support according to any of the preceding claims, wherein the pillow (3) comprises at least one external layer (31) of polyurethane, a first intermediate layer (32) of polymer material, a second intermediate layer (33) of air chamber, and an internal layer (34) of rigid material.

8. The support (1) according to claim 7, wherein the second intermediate layer (33) of the air chamber comprises several compartments therein to help in the adjustment and direction of the orientation of the supported head of the patient.

9. The support (1) according to any of claims 7 to 8, further comprising a means for alternately filling and emptying the second intermediate layer (33) of air chamber to prevent the head from being supported continuously on one and the same point.

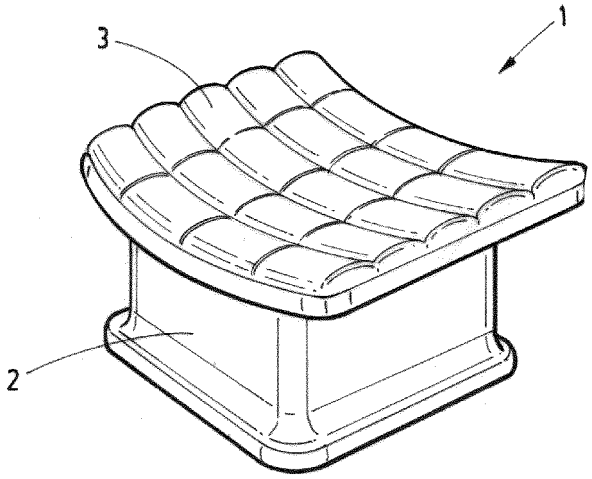

FIG.1

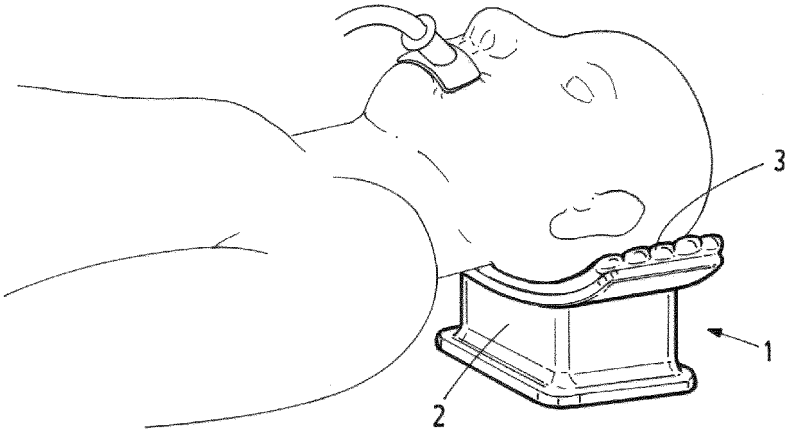

FIG.2

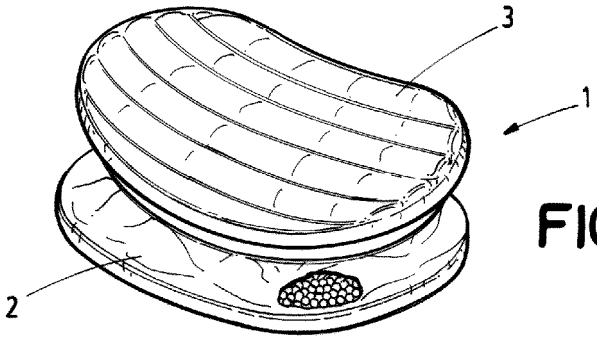

FIG.3

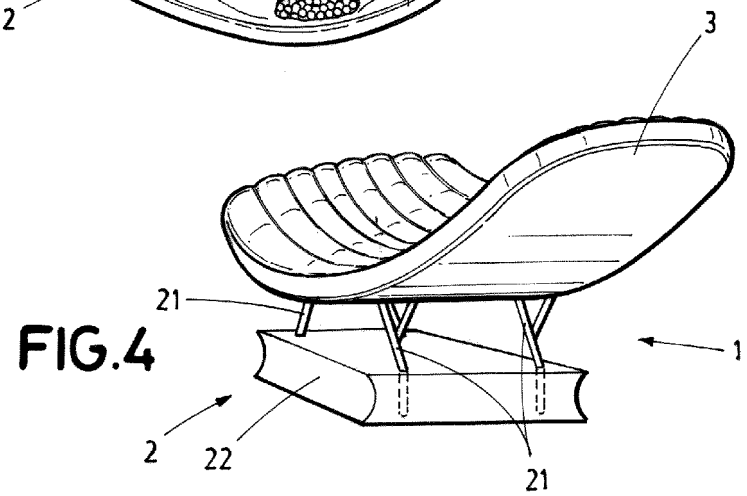

FIG.4

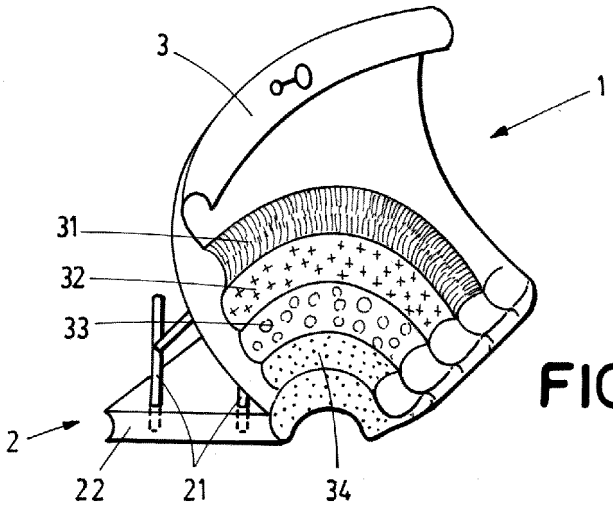

FIG.5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070708

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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, 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, WPI, PAJ, INTERNET.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5163194 A (IMPERIAL FEATHER CORP. LTD.) 17/11/1992, column 1, lines 5-9; column 3, lines 10-42; column 4, lines 55-56; column 5, lines 7-10; column 5, line 38 – column 6, line 19; column 7, lines 1-7; figures.	1-6 7-9
A	US 2239003 A (JONES) 22/04/1941, description; figures.	1, 4-5
A	US 2107962 A (SHEASBY) 08/02/1938, description; figures.	1, 4-5
A	US 2015223622 A1 (MOBLEY ET AL.) 13/08/2015, paragraphs [5-39]; figures.	1

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

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
03/12/2019	**(10/12/2019)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer J. Cuadrado Prados Telephone No. 91 3495522

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070708

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2019/070708

CLASSIFICATION OF SUBJECT MATTER

A61G7/07 (2006.01)
A61G13/12 (2006.01)
A47C16/00 (2006.01)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2019/070708

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