



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **94830373.0**

(51) Int. Cl.⁶ : **A47C 23/00**

(22) Date of filing : **25.07.94**

(30) Priority : **06.08.93 IT FI930156**

(43) Date of publication of application :
08.02.95 Bulletin 95/06

(84) Designated Contracting States :
CH DE ES FR LI PT

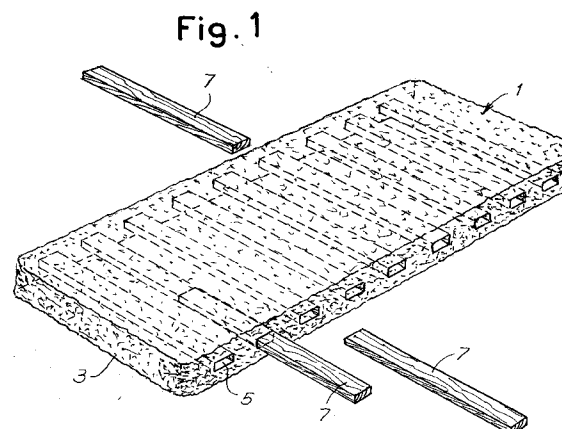
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(54) **Lying plane with variable rigidity for beds.**

(57) The lying plane (1) comprises one or more superimposed layers (3). Each layer is as wide as the surface of the bed and has uniform thickness and is elastically yielding under the weight of the user. Said layer or at least one of said layers (3) is crossed by transverse straight channels (5) longitudinally spaced apart along the lying plane. Elements (7) having the same length and similar cross section as the channels (5) are inserted within at least some of such channels; said elements (7) are chosen among types which, as far as the constructional material and the conformation thereof are concerned, have different flexural rigidities in the plane perpendicular to the lying plane.



Bed lying planes usually comprise one or more layers of uniform thickness characterized by being more or less pliable in a direction perpendicular to the lying plane.

One example of said layers are mattresses made up of bags of suitable shape and filled with natural or artificial fibres: said type of mattresses possess a poor transverse yielding characteristics, so that they are usually employed by having them supported by planes, which are in turn yielding and made up of a metal springbed or of thin and slightly curved wooden slats, or spring sacks.

Further examples are the so-called spring mattresses, comprising two fabric layers with interposed springs yielding in a direction perpendicular to the lying plane, or mattresses made of rubber foam or synthetic elastic foamed material, or inflatable mattresses. All these types of mattresses, owing to their compliance in the thickness direction, may be simply laid down on a rigid plane.

All the above cases refer to systems having a predetermined rigidity which can be varied only by substantially changing the system itself, for example, by putting more mattresses one on top of the other or changing the type of support. In any case, the system has an approximately uniform compliance in the lying plane, possibly enhanced in the middle, so that it may be detrimental to the correct orthopedic posture, especially if the mattress support is a springbed.

Solutions embodying regions with different compliance have in any case fixed compliance characteristics, which do not always meet the requirements of the user.

The object of the present invention is to provide a lying plane comprising one or more layers with rigidity varying according to the dimensions of the body of the user, such as height and bulkiness, and to the different personal requirements and wishes of the user. The or each layer is as wide as the surface of the bed and has uniform thickness but elastically yielding under the weight of the user, and is crossed by transverse channels having straight development. Such channels are spaced apart in the longitudinal direction of the lying plane, and inserted within at least some of them are elements having length and cross-section mostly similar to those of the channels. Said elements are chosen among types which, as far as the constructional material and the conformation thereof are concerned, have different characteristics of flexural rigidity in the plane perpendicular to the lying plane, and/or of compression rigidity in the direction of the layer thickness.

Said channels may be uniformly spaced apart and going from one side to the other of the layer.

Said elements may be bars made of wood, plastics or other compact material, and be of rectangular cross-section, for example, with the minor side thereof disposed perpendicular to the lying plane. Said ele-

ments may also have tubular cross-section and made up of elastic material such as rubber, rubber reinforced by fabric or threads variously disposed, and the like, the cross-section being chosen such as to have a suitable resistance to bending and compression. Said elements may also have cylindrical cross-section and be formed by a spongy material, or the like, of a nature able to provide different flexural characteristics.

To achieve a compliance of the lying plane varying at will, said elements are able to be inserted at any time, and possibly replaced with others having different characteristics of rigidity, or may be simply removed in correspondence of the regions corresponding to a greater weight of the body of the user.

In an alternative embodiment, said elements have a thin tubular cross-section, are closed at the two ends thereof so as to form a closed volume, and are made of a material with poor flexural resistance, good tensile strength, and impervious to air and water, such as rubberized canvas, thermoplastic film or the like. In such case, said elements are provided with a valve for the admission of air and/or water or other suitable gaseous or liquid fluid to provide such a pressure able to give said elements the desired resistance to bending and compression in a direction perpendicular to the lying plane. In this case said elements may be inserted steadily into said channels.

The invention will be better understood by a reading of the description and the attached drawing, which shows a practical, not limiting example of the same invention. In the drawing:

Figs. 1 and 2 are a perspective and side view, respectively, of a first embodiment of the invention; Figs. 3 and 4 are views similar to those of Figs. 1 and 2, respectively, of a second embodiment of the invention.

According to a first embodiment of the invention, there is provided a bed lying plane (1) comprising a layer (3) or more superimposed layers, the layer or each layer being approximately as wide as the surface of the bed and being made of a material with uniform thickness but elastically yielding under the weight of the person, such as rubber foam or synthetic elastic foamed material, possibly coated with a cloth sheath, not shown in the figure. Said layer or at least one of said layers (3) is crossed by transverse channels (5) having straight development and spaced apart in the longitudinal direction of the lying plane. Elements (7) may be inserted at any time within at least some of such channels, said elements having approximately the same length as the channels (5) and cross-section preferably (but not necessarily) similar thereto. Said elements (7) are chosen among types which, as far as the constructional material and the conformation thereof are concerned, have different flexural rigidities in the plane perpendicular to the lying plane, and various compression rigidities in the

direction of the layer thickness.

Said channels (5) are suitably uniformly spaced apart and extend from one side to the other of the lying plane.

According to the object of the invention, elements (7) are provided having various transverse bending and compression characteristics. Said elements (7) may consist of rods made of wood or plastics or other compact material with rectangular cross-section as in Figs. 1 and 2 whose minor side is perpendicular to the lying plane. However they may also have a tubular cross-section and may be made of elastic material such as rubber, rubber reinforced with fabric or threads variously disposed and the like, said cross-section being sufficient to give suitable flexural strength. Said elements (7) may also have cylindrical cross-section and made up of spongy material, or the like, whose variable characteristics provide different flexural properties.

According to the object mentioned above, said elements (7) may be inserted only in some of the apertures (5), so as to provide the maximum compliance in correspondence of the portions of the body of the user which are more voluminous, as illustrated in Fig. 2.

Fig. 3 shows a second embodiment, with a lying plane (101), including one layer (103) or more superimposed layers (103), similar to layer (3) of Figs. 1 and 2. Said layer or at least one of said layers (103) is crossed by transverse channels (105) having straight development and being spaced apart along the lying plane. Inserted within said apertures are elements (107) with thin tubular cross-section, closed at the two ends thereof, so as to form a closed volume, and made of a material having poor flexural strength, good tensile strength, and impervious to the air and water, such as rubberized canvas, thermoplastic film or the like. Said elements (107) are further provided with a valve (109) for the admission of air and/or water or other suitable gaseous or liquid fluid to provide such a pressure able to give said elements (107) the desired resistance to bending and compression in a direction perpendicular to the lying plane. In such embodiment the elements (107) may be inserted steadily into said channels (105) and the compliance of the various regions of the lying plane may be adjusted by inflating the elements (107) with different pressures.

As far as the adjustment of the elements (7 or 107) is concerned, these may be inserted or inflated even when the user is lying on the bed. The application of the elements has, in particular, the function of bringing all the resting surface of the user's body in contact with the resting plane - a condition made possible by the insertion of the said elements.

It is understood that the drawing shows an exemplification given only as a practical demonstration of the invention, as this may vary in the forms and dispositions without nevertheless coming out from the

scope of the idea on which the same invention is based. The possible presence of reference numbers in the appended claims has the purpose of facilitating the reading of the claims, reference being made to the description and the drawing, and does not limit the scope of protection represented by the claims.

Claims

1) Lying plane (1; 101) for beds, comprising one or more superimposed layers (3; 103), each layer having substantially uniform thickness and being elastically yielding under the weight of user resting on said plane, characterized in that said layer (3; 103) or at least one of said layers (3; 103) is crossed by transverse channels (5; 105) having straight development and spaced apart along the lying plane, and that in at least some of such channels, elements (7; 107) are inserted having approximately the same length as the channels (5; 105), said elements (7; 107) being chosen among types which, as far as the constructional material and conformation thereof are concerned, have different properties of rigidity in the plane perpendicular to the lying plane, and/or of compression in the direction of the layer thickness.

2) Lying plane according to claim 1, characterized in that said channels (5; 105) are uniformly spaced apart.

3) Lying plane according to claim 1 or 2, characterized in that said channels (5; 105) are through channels, open at both ends.

4) Lying plane according to one or more of claims 1 to 3, characterized in that said elements (7) are rods of wood, plastics or other compact material, and may have rectangular cross-section with the minor side perpendicular to the lying plane.

5) Lying plane according to one or more of claims 1 to 3, characterized in that said elements (7) have tubular cross-section and are made up of elastic material such as rubber, rubber reinforced with fabric or variously disposed threads and the like, and have a cross-section sufficient to give a suitable flexural strength.

6) Lying plane according to one or more of claims 1 to 3, characterized in that said elements (7) have cylindrical cross-section and are made of spongy material, or the like, of such characteristics as to provide different flexural properties.

7) Lying plane according to one or more of claims 1 to 6, characterized in that said elements (7; 107) are insertable at any time in to one or more of said channels (5; 105).

8) Lying plane (101) according to one or more of claims 1 to 3, characterized in that said elements (107) have a thin tubular cross-section, are closed at their two ends and are made of a material having poor flexural strength, good tensile strength and being im-

pervious to air and/or water, such as rubberized canvas or the like; that said elements (107) are further provided with a valve (109) for the admission of air and/or water or other suitable gaseous or liquid fluid to provide such a pressure able to give said elements (107) the desired resistance to bending and/or compression in a direction perpendicular to the lying plane. 5

9) Lying plane according to claim 8, characterized in that said elements (107) are steadily inserted within said channels (105). 10

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Fig. 1

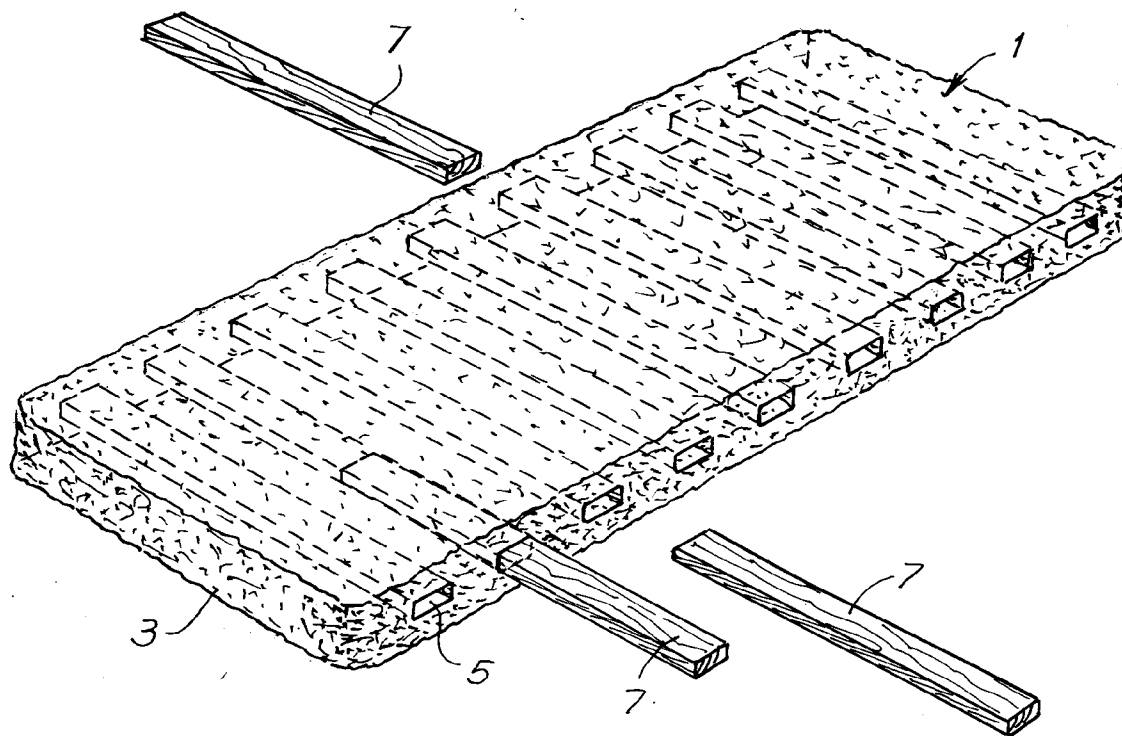


Fig. 2

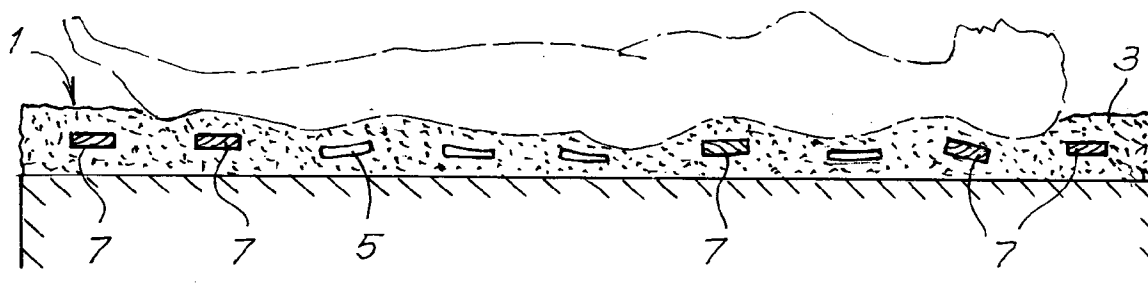


Fig. 3

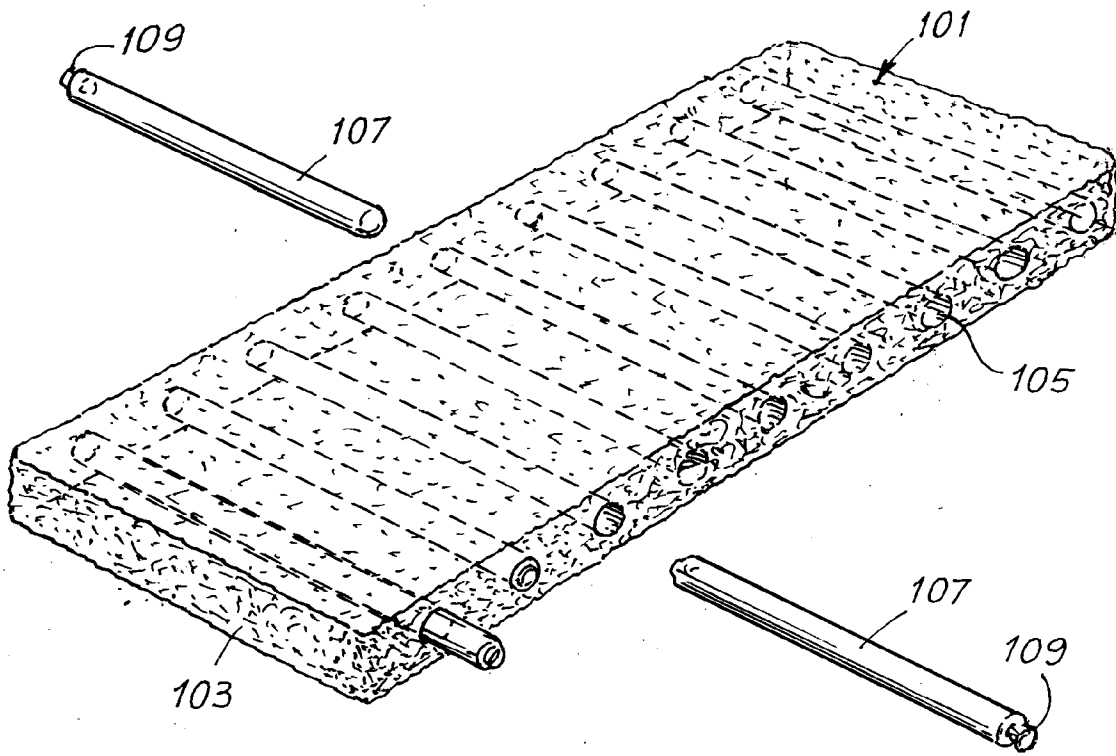


Fig. 4

