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(54) **Mattress having a two-part core with stiffness increasing toward the center.**

(57) The invention relates to a mattress having a core formed from foamed material. The core comprises a core part (3) and a number of edge parts (4), the core part (3) in longitudinal section of the mattress having a gradually increasing thickness from the two ends in the direction of the center. The core part (3) is manufactured from a material having a greater stiffness than the edge parts (4) and the core formed by the core part (3) with edge parts (4) provided thereon is substantially block-shaped, the arrangement being such that the stiffness of the mattress gradually increases in the direction of the center.

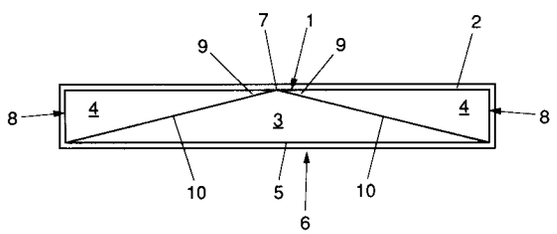

FIG. 1

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The invention relates to a mattress having a core formed from foamed material.

Mattresses having a core formed from foamed material, such as, for instance, foam rubber or latex rubber mattresses, are substantially block-shaped, and have a constant stiffness distributed over the surface. During use, the mattress under the body of the user will be compressed locally, causing a deformation of the mattress. When the user is in a normal lying position, his hips will be located approximately at the center of the mattress, his head near the head end and his feet near the foot end. Hence, in that position, the larger part of his weight will be borne by the center portion of the mattress, and consequently, the greatest compression will occur at that location. At the head and foot ends, this compression will clearly be smaller.

The deformations of the mattress that occur have an adverse effect on the durability of the mattress and on the outward appearance thereof, in particular during use, but due to repeated use, permanent deformations will occur as well. Moreover, the deformations occurring have an adverse effect on the body support and hence on the practical comfort of the mattress. Due to the greater compression of the mattress, a hollow is formed in the center portion of the mattress, as a consequence of which the user's head and feet are pushed upward relative to his hips and his back is forced into a bent, unfavorable position.

Hence, the object of the invention is to provide a mattress of the type described in the introduction, wherein the drawbacks mentioned are avoided.

To that end, the mattress according to the invention is characterized in that the core comprises a core part and a number of edge parts, the core part in longitudinal section of the mattress having a gradually increasing thickness from the two ends in the direction of the center, the core part being manufactured from a material having a greater stiffness than the edge parts and the core formed by the core part with edge parts provided thereon being substantially block-shaped, the arrangement being such that the stiffness of the mattress gradually increases in the direction of the center.

The mattress according to the invention has in the center portion a greater stiffness than near the head and foot ends. Due to this greater stiffness, the difference in compression between the center portion and the head and foot ends of the mattress will be optimum, as a result of which hollow formation in the mattress, and hence an uncomfortable lying position for the user, is prevented, the durability of the mattress is increased and the outward appearance is influenced positively, both during and after repeated use.

In a preferred embodiment of the mattress according to the invention, the core part is substantially diamond-shaped, located centrally between the edge parts at least relative to the top and bottom faces of the core, and it defines a part of the top and bottom face thereof.

Because the core part is of a diamond-shaped design, the thickness thereof changes gradually from the two ends in the direction of the center, while the thickness of the edge parts located on both sides of the center above and below the core part increases in opposite direction. As the material of the edge parts has a lower stiffness than the material of the core part, the stiffness of the entire core also gradually increases from the two ends in the direction of the center, while the difference between the stiffness of the core part and of the edge parts may be relatively small, which benefits the supporting characteristics of the mattress.

As the core part defines at least a part of the top and bottom face of the core, or at any rate touches it, and is located centrally between these faces, the edge parts lying opposite one another are similar in form and complementary, so that they can readily be obtained, with hardly any waste, from an approximately rectangular block, and the core has a constructively simple construction. Moreover, the mattress in this embodiment is turnable, as a result of which the mattress is simple in use and the service life can be influenced positively, because the two sides of the mattress will periodically be loaded mechanically and thermally, while the body-supporting characteristics on both sides of the mattress are equal.

Preferably, of the core of the mattress according to the invention, the proportion of the stiffness near the foot end to the stiffness near the center and near the head end is as at least 3:4:3, and in a particularly advantageous embodiment as 1:5:3. This provides a practically optimum distribution of the occurrent reactive forces when the mattress is used by a lying user, as a result of which a particularly favorable pattern of compression of the core of the mattress occurs.

To explain the invention, a number of exemplary embodiments of the mattress will be described hereinafter, with reference to the accompanying drawing. In this drawing:

Fig. 1 shows a mattress according to the invention in longitudinal section;

Fig. 2 shows a mattress according to the invention in longitudinal section, in an alternative embodiment; and

Fig. 3 shows a mattress according to the invention in a further embodiment.

The mattress as shown in the drawing consists of a core 1, manufactured from foamed material, such as foam rubber or latex rubber, and a mat-

tress cover 2, with the possible inclusion of different intermediate layers, known per se and not shown in the drawing, between the core and the cover. The core 1 comprises a core part 3 and a number of edge parts 4. The core 1 is substantially block-shaped.

Fig. 1 shows an embodiment of the mattress whose core part 3 has a flat, triangular section, the base 5 at least substantially forming one of the lying surfaces 6 of the core 1, and the apex 7 touching the opposite lying surface 6. The core 1 further comprises two edge parts 4 having cross sections in the shape of a right-angled triangle, the base 8 defining one of the ends of the core 1, the apices 9 being located near the apex 7 of the core part 3, and the hypotenuse 10 abutting against the core part 3. The edge parts 4 are preferably glued on the core part 3 to prevent displacements between the parts.

This embodiment of the mattress has as an advantage that the core 1 has two different lying surfaces 6 having for instance different thermal and physical characteristics, allowing the user to have one of the two surfaces turned upward on the basis of his own preferences and conditions of use. Moreover, the mattress has a simple construction and is relatively cheap and can be manufactured with only little waste, particularly so if the core part 3 is composed of two identical, triangular parts.

Fig. 2 shows an embodiment of the mattress whose core part 103 is of a diamond-shaped design and located centrally relative to the two lying surfaces 106. Each obtuse angle 107 of the core part 103 contacts a lying surface 106 of the core 101, while each acute angle 113 of the core part 103 is located near one of the ends 108 of the core 103.

The edge parts 104 have a trapezoidal section, comprising two right angles 111. In each case, the part 108' located between the right angles 111 defines half of the relevant end 108. From the two right angles 111, abutting against each other, of the edge parts 104 at one end 108 of the core 103, a contact face 112 extends between the two relevant edge parts 104 to the adjacent acute angle 113 of the core part 103. As a result, a confectioning edge 114 is formed along the two ends 108, on which the cover 2 can simply be fixed.

The edge parts 104 are at least identical two by two (the edge parts opposite each other in vertical direction on both sides of the core part 103), and can be obtained from a substantially rectangular block without waste and in one cutting operation. The core part 103 may be manufactured from one piece, but may also be composed of two or four identical, triangular parts.

This embodiment of the mattress according to the invention has the advantage that the stiffness thereof increases linearly from the two ends 108 in the direction of the center, yielding a proper supporting characteristic, while the mattress has a simple construction and can moreover be used on two sides.

In the exemplary embodiments given, the obtuse angles 7, 107 of the core part 3, 103 are positioned in the center of the mattress, but it is also possible to construct the core part not as a true equilateral triangle or diamond form, but as a scalene triangle or kite-shaped, so that the part of the mattress having the greatest stiffness is located off-center. In this manner, the supporting characteristic can be adapted such that the maximum reactive force is shifted more or less in the direction of the head end or, by contrast, the foot end. In particular when the core part 103 is composed of several parts, the apices 107 of the diamond form can moreover be arranged so as to be shifted in longitudinal direction relative to one another.

Fig. 3 shows an embodiment of the mattress whose core part 203 is constructed with an approximately bell-shaped top and bottom face 210 and is located centrally relative to the two lying surfaces 206. Each apex 207 of the core part 203 forms a part of a lying surface 206 of the core 201, while each thin end 213 of the core part 203 lies near one of the ends 208 of the core 20.

The edge parts 204 have a section such that they on the one hand fittingly abut against the core part surface 210, and on the other, together with the apices 207 of the core part 203, constitute the lying surfaces 206 and the two ends 208 of the mattress core 201. At the two ends 208 of the core 201, two edge parts 204 practically abut against one another by a face 212, and form a confectioning edge 214.

This embodiment of the mattress according to the invention has the advantage that the stiffness gradually increases from the two ends 208 in the direction of the center, the increase being at least partly progressive, as a result of which the supporting characteristic is excellently adapted to the weight distribution of the body of the user. For different users, the contour of the core part can simply be adapted to optimize the stiffness distribution and, accordingly, the supporting characteristic individually. Obviously, in this embodiment, too, it applies that the position of the maximum stiffness can be varied at will, by displacing the apices relative to each other and/or the center of the mattress.

The invention is by no means limited to the exemplary embodiments shown in the Figures. For instance, the core part may be provided with identical, yet more irregularly shaped surfaces, or, on the top and bottom sides thereof, with different surfaces which may or may not be regularly

shaped. Moreover, the edge parts on both sides of the core part may be manufactured from materials having for instance different stiffnesses and other physical properties. Further, the mattress may for instance be provided with hinged parts and recesses for ventilation or changes in stiffness.

Claims

1. A mattress having a core formed from foamed material, characterized in that the core comprises a core part and a number of edge parts, the core part in longitudinal section of the mattress having a gradually increasing thickness from the two ends in the direction of the center, the core part being manufactured from a material having a greater stiffness than the edge parts and the core formed by the core part with edge parts provided thereon being substantially block-shaped, the arrangement being such that the stiffness of the mattress gradually increases in the direction of the center.

2. A mattress according to claim 1, characterized in that the core part is located centrally between the edge parts at least relative to the top and bottom faces of the core.

3. A mattress according to claim 1 or 2, characterized in that the core part is substantially diamond-shaped.

4. A mattress according to any one of the preceding claims, characterized in that the core part defines at least a part of the top and/or bottom face of the core.

5. A mattress according to any one of the preceding claims, characterized in that edge parts located near one end of the core, on both sides thereof, abut against one another by a contact face.

6. A mattress according to any one of the preceding claims, characterized in that the core part is glued together with the edge parts.

7. A mattress according to any one of the preceding claims, characterized in that the stiffness of the mattress increases linearly from the two ends in the direction of the center.

8. A mattress according to any one of the preceding claims, characterized in that the proportion of the stiffness of the core near the foot end to the stiffness near the center and near the head end is as at least 3:4:3, and preferably as 1:5:3.

9. A mattress according to any one of the preceding claims, characterized in that the mattress is inversely symmetrical.

10. A mattress according to any one of the preceding claims, characterized in that the core is provided, at least near the head end and/or the foot end, with hinge means.

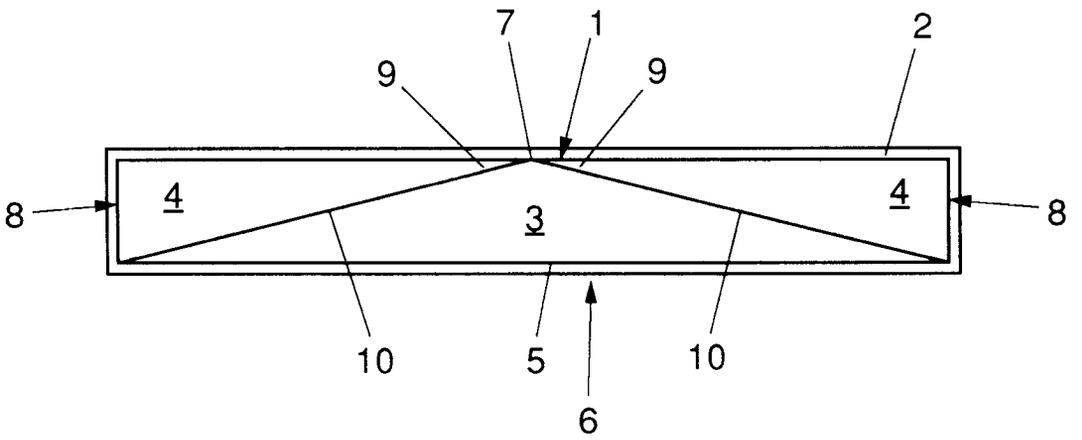

FIG. 1

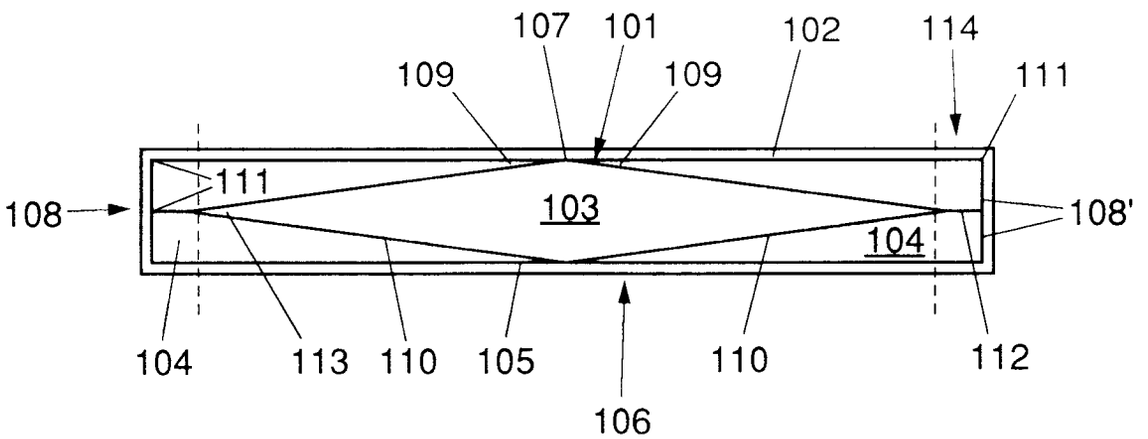

FIG. 2

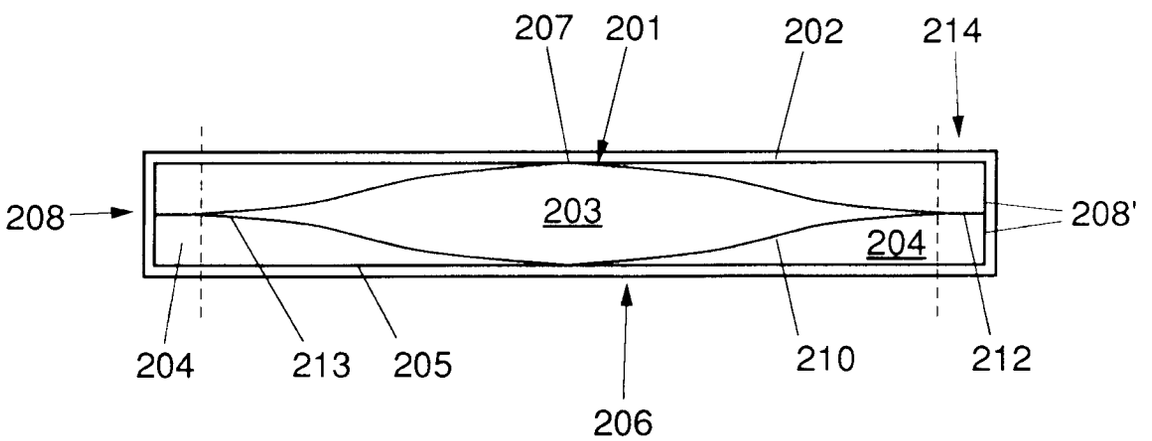

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 3426

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-2 002 306 (FABRICACION ESPANOLA DE COLCHONES ANATOMICOS) * the whole document *	1,2,4-6	A47C27/15
A	EP-A-0 011 755 (S.A. PRB N.V.) * page 6, line 1 - page 7, line 20; figure 11 *	1,2,4,6,7	
A	CH-A-639 546 (H. NEUKOM AG FABRIKATION VON SCHAUMGUMMI) * page 3, left column, line 61 - right column, line 9; figures 1,2,4 *	1,2,5,9,10	
A	WO-A-81 02384 (KENNAWAY) * abstract; figures 1,2 *	1,9	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 February 1995	De Coene, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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