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- A request for correction ..... has been filed pursuant to Rule 88 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).
- Amended claims in accordance with Rule 86 (2) EPC.

(54) A slatted base and a slat for use therein

(57) A slatted base comprising a frame (1) and slats (2) mounted thereon, the slats (2) comprising a top portion (3) forming a supporting surface of the slatted base. At least one of the slats (2) is extended, at both extremities of the supporting surface forming top portion (3), by a portion (4) curved over an angle of at least 90°. The ends of the curved portions, opposite the supporting surface forming top portion (3) of the slat, are irrotatably connected to one another, in particular by an integral bottom portion (7) in such a manner that the slat forms a closed loop. The curved portions (4) themselves have a limited flexibility to exert tensile forces onto the top portion (3) of the slat (2) upon depression of this top portion (3). As a result thereof, the slats (2) can be made more flexible and may show greater resilient properties.

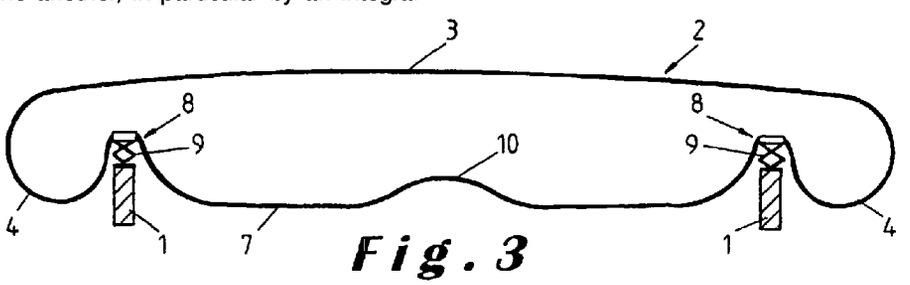

Fig. 3

EP 0 965 294 A1

Description

[0001] The present invention relates to a slatted base for a bed, a seat or other seating or lying furniture comprising a frame and slats mounted thereon, the slats comprising a top portion forming a supporting surface of the slatted base, and at least one of the slats being extended, at both extremities of the supporting surface forming top portion, by a portion curved over an angle of at least 90°. The invention also relates to a slat for use in such a slatted base

[0002] In practice, there is always looked for new types of slatted bases. One of the important properties of slatted bases is the resiliency thereof which is determining for the comfort properties. In order to improve the resiliency, different supporting elements for fixing the slats to the frame of the slatted base have already been proposed. The resilient properties of the slats themselves are, however, only determined by the material, thickness, and cross-section of the slats.

[0003] DE-A-196 32 960 discloses for example slats for a slatted base, in particular for a bed, which are extended at their extremities with an integral curved, more particular U-shaped portion. These known slats are made from an elastic synthetic material. They are not supported by separate resilient supporting elements but the curved portions are directly attached to the frame. These curved portions have such a reduced thickness, compared to the thickness of the top portions of the slats, and are so flexible that they are compressed resiliently when a weight is resting on the slats. In other words, the curved portions of the slats disclosed in DE-A-196 32 960 act like the usual resilient supporting elements and do not influence the resilient properties of the top portions of the slats. In other words, notwithstanding the fact that the resilient supporting elements form an integral portion of the slats, the resilient properties of the supporting surface forming top portions of the slats are still only determined by the material, thickness, and cross-section of these portions.

[0004] An object of the present invention is to provide a new type of slat which enables to achieve substantially higher resilient properties, especially dynamic spring properties, for the supporting surface forming top portions compared to the conventional slats, in particular slats of a wood laminate.

[0005] To this end, the slatted base according to the invention is characterised in that the ends of the curved portions, opposite the supporting surface forming top portion of the slat, are irrotatably connected to one another and the curved portions themselves have a limited flexibility to exert tensile forces onto the top portion of the slat upon depression of this top portion.

[0006] Due to the limited flexibility of the curved portions of the slats, and due to the fact that the ends thereof are prevented from rotating, a high tensile force is exerted by the curved portions on the top portion of the slat when this slat is loaded and bends through downwards. As a result of the tensional stresses thus created in the slat, a thinner and hence more flexible slat can be used for supporting a same weight. It has been found that the thickness of the slat can be reduced to such an extend that it will be depressed over a larger distance when loaded with a same weight and will enable in other words larger dynamic spring properties. Without the considerable tensile forces exerted by the curved portions on the top portion of the slat, a slat of such a reduced thickness would not be able to support the usual weights which are to be supported thereby.

[0007] In an advantageous embodiment of the slatted base or the slats according to the invention, the ends of the curved portion of the slat are connected to one another by an integral bottom portion of the slat, the supporting surface forming top portion, the two curved portions and the bottom portion of the slat forming a closed loop.

[0008] Such a slat is easy to be made either from a synthetic material or especially also from a wood laminate and can be fixed in the same way as the conventional wooden slats, more particularly through the intermediary of resilient supporting elements, to the frame of the slatted base.

[0009] Other particularities and advantages of the invention will become apparent from the following description of some particular embodiments of the slatted base and slats according to the present invention. This description is only given by way of illustrative example and is not intended to limit the scope of protection. The reference numerals relate to the annexed drawings wherein:

Figure 1 shows schematically a top plan view of a slatted base according to the invention.

Figure 2 shows a schematic cross-section according to line II-II of the slatted base shown in Figure 1; and

Figures 3 and 4 show schematic cross-sections corresponding to the cross-section shown in Figure 2 but relating to variant embodiments.

[0010] The slatted base shown in Figure 1 comprises a frame 1 and slats 2 mounted thereon. The shape of the illustrated base is rectangular and is especially designed for a bed, i.e. for supporting a mattress, but all kinds of other shapes are possible, in particular for other applications such as seating furniture. These shapes are however not an essential feature of the invention and will thus not further be described.

[0011] Although preference is given to slats made of a wood laminate comprising several, for example 7, wood layers which are glued together, the material the slats are made of is also not an essential feature of the invention. In practice, it is for example possible to make the slats from a synthetic material, in particular from a glass, carbon or other type of fibre reinforced synthetic material. According to the lateral views of Figures 2 to 5,

the slats 2 comprise first of all a top portion 3 forming a supporting surface of the slatted base, similar to the conventional slats made of a wood laminate. An essential difference with these conventional slats is however that, at both extremities of the top portion 3, they are extended by a portion 4 curved over an angle of at least 90°.

[0012] In Figure 2, the portions 4 of the slat 2 are for example curved over an angle of 180°. The free ends of the curved portions 4 are irrotatably fixed to one another, in particular by means of a cross-bar or lath 5 screwed or otherwise fixed, for example glued, to the free ends of the curved portions 4. An essential feature of the slats according to the invention is further that the curved portions 4 have only a limited flexibility. The curved portions 4 are more particularly so rigid or inflexible that considerable tensile forces are exerted by these curved portions 4 on the top portion 3 when this top portion 3 is depressed according to arrow 6. As a result of these tensile forces, the top portion 3 of the slat 2 may be much more flexible or thinner than conventional wooden slats. In this way, the top portion 3 can be depressed over a larger distance resulting thus in larger dynamic spring properties. At both extremities of the top portion, the slat 2 is, however, just like the conventional wooden slats, still substantially incompressible due to the limited flexibility of the curved portions 4. In order to achieve also a sufficient resiliency of the slatted base in the area of the curved portions, the slats 2 can be mounted onto the frame 1 in the usual way through the intermediary of resilient supporting elements 9.

[0013] The required limited flexibility of the curved portions can be achieved by means of a synthetic material suitably reinforced by means of fibres or by thickened portions. According to the invention it has further been found that the required rigidity of the curved portions can also easily be obtained by means of a wood laminate. It has more particularly been found that the curved portions and the top portions and the top portions of the slats can be made of the same wood laminate so that the slats may have in particular a uniform thickness thus simplifying the production thereof

[0014] As mentioned hereinabove, the ends of the slat shown in Figure 2, are curved over 180°. According to the invention, these ends should be curved over an angle of at least 90°. Preferably, this angle is however larger, especially larger than 120°, in order to increase the dynamic spring properties of the slat to a larger extend. Instead of an angle of 180°, the angle over which the ends of the slat 2 are curved, could comprise for example 270°. In that case, these ends could be attached to the end faces of the cross-bars or laths 5.

[0015] In an advantageous embodiment of the invention, the slats 2 do not have any free ends but the ends of both curved portions 4 are irrotatably connected to one another by means of a further extension of the slat, more particularly by an integral bottom portion 7, which extends opposite the top position 3, between the two curved portions 4. In this way, the slat 2 forms an integral closed loop.

[0016] A preferred embodiment of a closed loop slat 2 is shown in Figure 3. In this embodiment, the curved portions 4 are curved over an angle of about 270° so that these curved portions 4 considerably increase the spring properties of the slat 2. After the curved portions 4, the bottom portion 7 of the slat 2 diverges again from the top portion 3 so that the movement of the top portion is not hampered by the bottom portion when being depressed. As shown in Figure 3, upwardly bulged portions 8 are thus formed in the bottom portion of the slat. In the recesses formed by these bulged portions 8, the slat 2 is fixed through the intermediary of the resilient supporting elements 9 on top of the frame 1. An advantage of the bulged portions 8 is that the curved portions 4 are curved over a greater angle so that a larger amount of potential energy can be stored therein when depressing the slat and that the top surface of the slat extends at a lower level above the frame 1 of the slatted base.

[0017] In Figure 3, it can further be noticed that the bottom portion 7 of the slat 2 forms an additional, smaller upwardly bulged portion 10 which is intended to give an extra support to the top portion of the slat when this top portion is depressed under a too large, in particular a too localised load.

[0018] The embodiment shown in Figure 4 differs from the embodiment of Figure 3 in that it comprises no bulged portion so that the top portion can be depressed only over a shorter distance. Moreover, the angle over which the curved portions are curved is somewhat smaller and comprises about 225°.

[0019] In the embodiment of Figure 5 this angle comprises about 180° and the top portion extends at a relatively high level above the frame 1. In order to lower the top level of the slats, they could possibly be supported by the supporting elements 9 underneath the top instead of the bottom portion. Of course, this is also possible in the embodiments of the previous figures.

[0020] According to the invention, it has been found that not only the angle over which the curved portions of the slats are curved is an important feature but also the curvature radius of these curved portions. It has more particularly been found that the inner curvature radius is preferably comprised between 3 and 10 cm and most preferably between 4 and 7 cm, depending on the desired spring properties and on the properties, in particular the flexibility, of the material of the slat. The curvature radius should especially be sufficiently large in order to enable the curved portions to give the desired additional dynamic spring properties to the slats but should on the other hand be sufficiently small to be able to exert the required tensile forces to the top portions of the slats.

[0021] As to these top portions, it should be noted that in all the shown embodiments, the slats 2 have always a somewhat convex upper surface. Such a shape is pre-

ferred according to the invention in view of the following effect obtained in combination with the curved portions. When the slats 2 are depressed, the length of the top portions 3 will initially increase so that the curved portions 4 will be urged outwards and a tension will be created therein. Upon further depressing the slats 1, the length of the top portions 3 will decrease again as they bend through and the tension or potential energy stored initially in the curved portions will be released so that the force required for depressing the slats is reduced. In other words, the slats are apparently softer in this phase due to this effect.

[0022] Subsequently, the curved portions take in their initial rest position and, upon further depression of the slat, are drawn towards one another. In the phase, a tension is built up again in the curved portions and increasing tensile forces are exerted into the top portion 3 providing an additional, progressive resistance against depression of this portion 3. When the top portion 3 of the slat is allowed to rise again, the potential energy stored in the previous phase in the curved portions is released again thus contributing to the dynamic spring properties of the slat.

[0023] From the above, it will be clear that, compared to the conventional slats of wood laminate, special spring properties are obtained with the salts according to the invention.

[0024] Further, it will be clear that the invention is not limited to the above described embodiments but that many modifications can still be applied thereto without leaving the scope of the present invention as defined in the appended claims.

Claims

1. A slatted base comprising a frame (1) and slats (2) mounted thereon, the slats (2) comprising a top portion (3) forming a supporting surface of the slatted base, and at least one of the slats (2) being extended, at both extremities of the supporting surface forming top portion (3), by a portion (4) curved over an angle of at least 90°, characterized in that the ends of the curved portions, opposite the supporting surface forming top portion (3) of the slat, are irrotatably connected to one another and the curved portions (4) themselves have a limited flexibility to exert tensile forces onto the top portion (3) of the slat (2) upon depression of this top portion (3).

2. A slatted base according to claim 1, characterized in that said curved portions (4) are curved over an angle of at least 120° and preferably over an angle equal to or greater than 180°.

3. A slatted base according to claim 1 or 2, characterized in that said ends of the curved portion (4) of the slat (2) are connected to one another by an integral bottom portion (7) of the slat, the supporting surface forming top portion (3), the two curved portions (4) and the bottom portion (7) of the slat (2) forming a closed loop.

4. A slatted base according to claim 3, characterized in that said bottom portion (7) of the slat (2) shows, at both ends thereof, a portion (8) bulged towards the supporting surface forming top portion (3) of the slat (2), the slat being supported by said frame (1) in these bulged portions (8).

5. A slatted base according to any one of the claims 1 to 4, characterized in that said curved portions (4) are substantially incompressible in a direction perpendicular to said supporting surface.

6. A slatted base according to any one of the claims 1 to 5, characterized in that the slats (2) are mounted on said frame (1) through the intermediary of resilient supporting elements (9).

7. A slatted base according to any one of the claims 1 to 6, characterized in that the curved portions (4) show an inner curvature radius of between 3 and 10 cm, preferably of between 4 and 7 cm.

8. A slat for use in a slatted base according to any one of the claims 1 to 7, the slat (2) comprising a top portion (3) forming a supporting surface of the slatted base, and being extended, at both extremities of the supporting surface forming top portion (3), by a portion (4) curved over an angle of at least 90°, preferably over an angle of at least 120° and most preferably over an angle of at least 180°, characterized in that the ends of the curved portions, opposite the supporting surface forming top portion (3) of the slat, are irrotatably connected to one another and the curved portions (4) themselves have a limited flexibility to exert tensile forces onto the top portion (3) of the slat (2) upon depression of this top portion (3)..

9. A slat according to claim 7 or 8, characterized in that the curved portions (4) show an inner curvature radius of between 3 and 10 cm, preferably of between 4 and 7 cm.

10. A slat according to any one of the claims 7 to 9, characterized in that said ends of the curved portion (4) of the slat (2) are connected to one another by an integral bottom portion (7) of the slat, the supporting surface forming top portion (3), the two curved portions (4) and the bottom portion (7) of the slat (2) forming a closed loop.

11. A slat according to any one of the claims 7 to 10, characterized in that it has a substantially uniform

thickness.

12. A slat according to any one of the claims 7 to 11, characterized in that said curved portions (4) are substantially incompressible in a direction perpendicular to said supporting surface.

13. A slat according to any one of the claims 7 to 12, characterized in that said slat (2) is made of a wood laminate.

Amended claims in accordance with Rule 86(2) EPC.

1. A slatted base comprising a frame (1) and slats (2) mounted thereon, the slats (2) comprising a top portion (3) forming a supporting surface of the slatted base, and at least one of the slats (2) being made of wood or a synthetic material and extended, at both extremities of the supporting surface forming top portion (3), by a portion (4) curved over an angle of at least 90°, characterized in that the ends of the curved portions (4), opposite the supporting surface forming top portion (3) of the slat, are substantially irrotatably connected to one another by a bottom element (5) or portion (7) extending between the two curved portions (4) to form, together with these two curved portions (4) and the supporting surface forming top portion (3), a closed loop, the curved portions (4) themselves haveing a limited flexibility to exert tensile forces onto the top portion (3) of the slat (2) upon depression of this top portion (3).

2. A slatted base according to claim 1, characterized in that said curved portions (4) are curved over an angle of at least 120° and preferably over an angle equal to or greater than 180°.

3. A slatted base according to claim 1 or 2, characterized in that said ends of the curved portion (4) of the slat (2) are connected to one another by an integral bottom portion (7) of the slat.

4. A slatted base according to claim 3, characterized in that said bottom portion (7) of the slat (2) shows, at both ends thereof, a portion (8) bulged towards the supporting surface forming top portion (3) of the slat (2), the slat being supported by said frame (1) in these bulged portions (8).

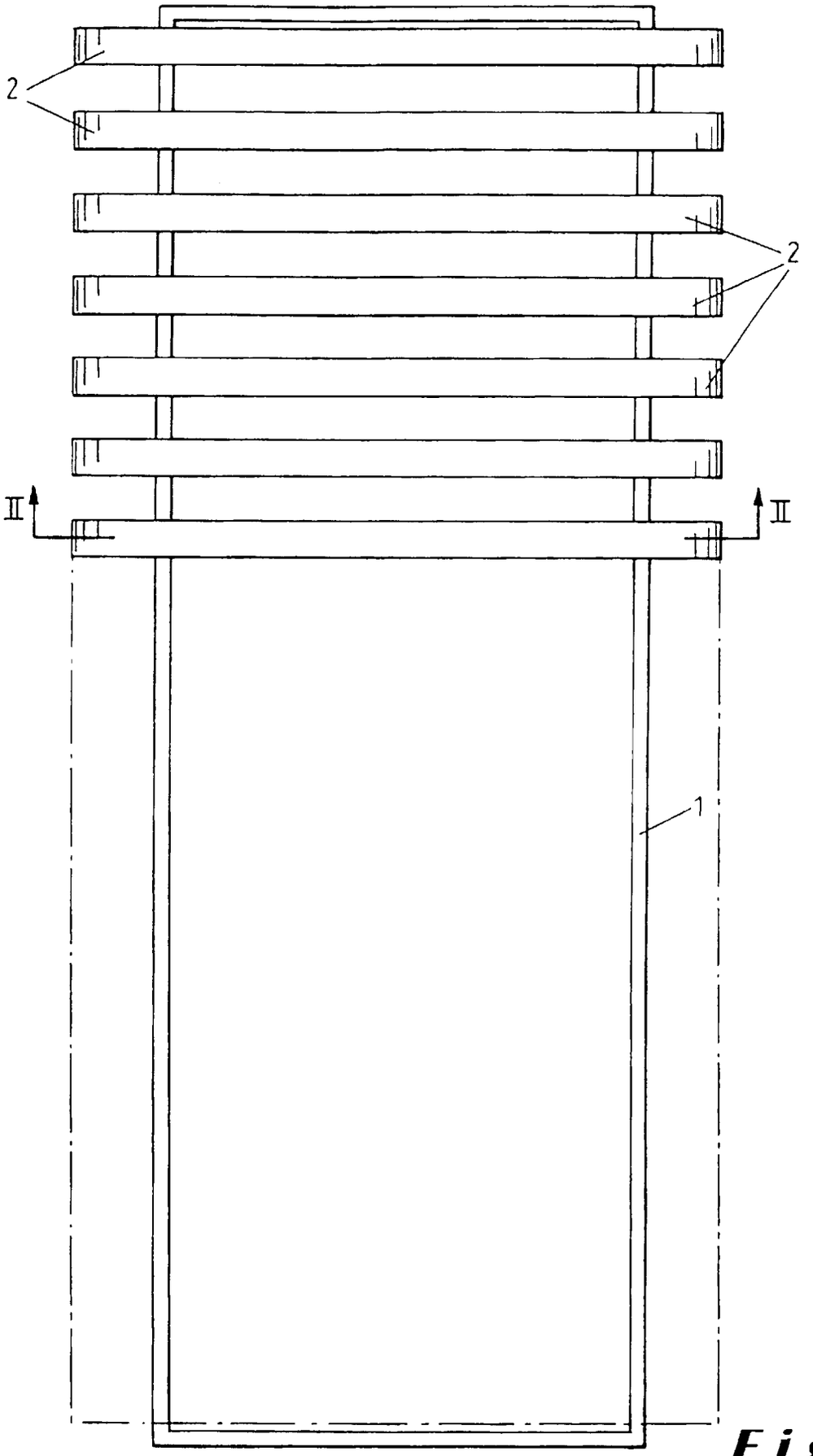

Fig. 1

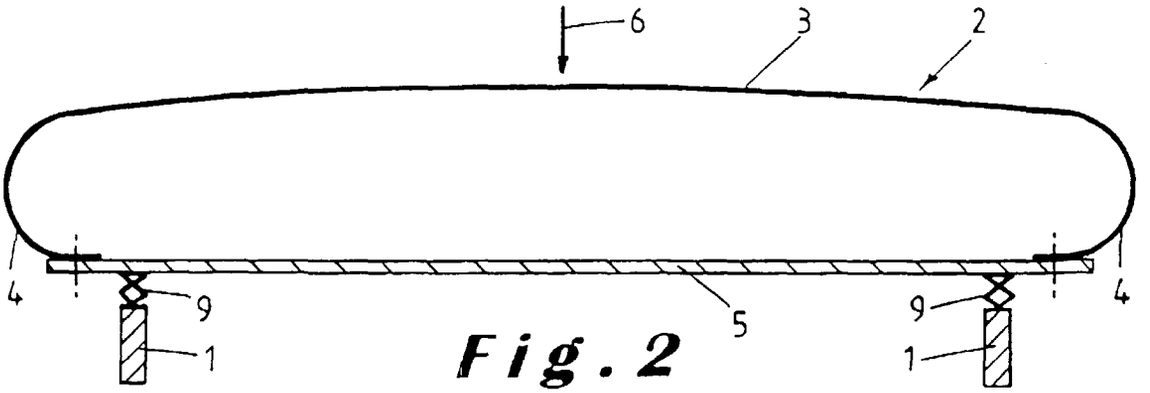

Fig. 2

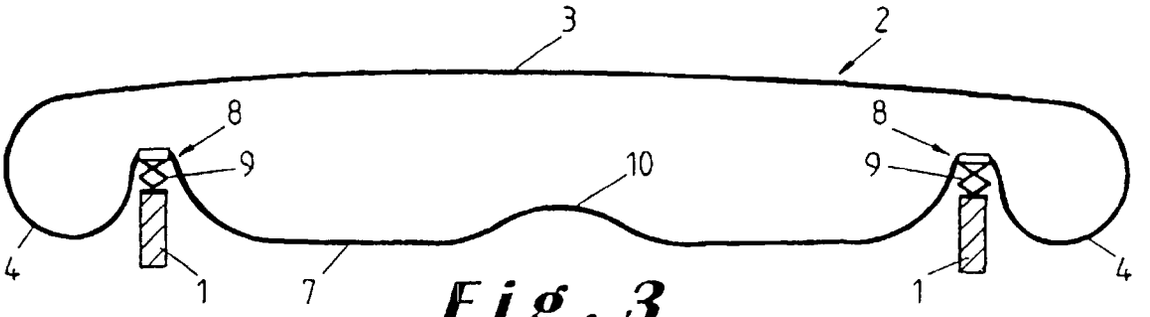

Fig. 3

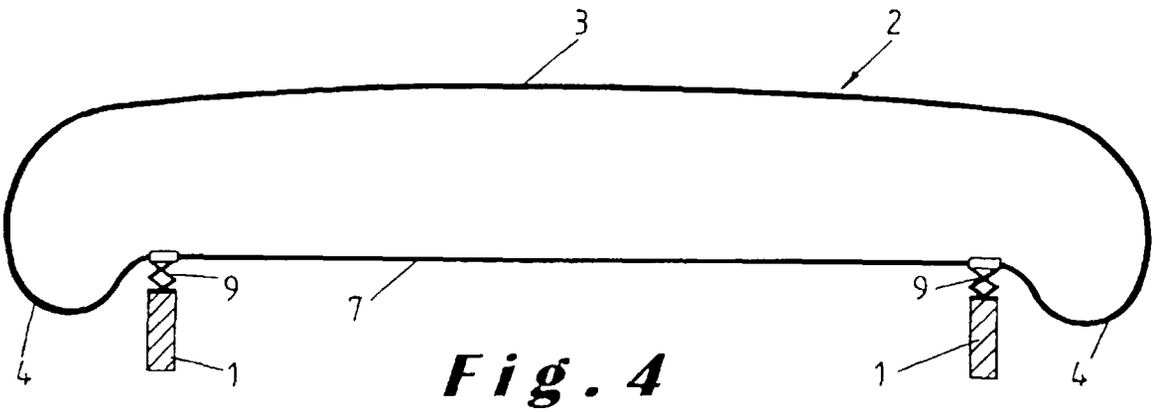

Fig. 4

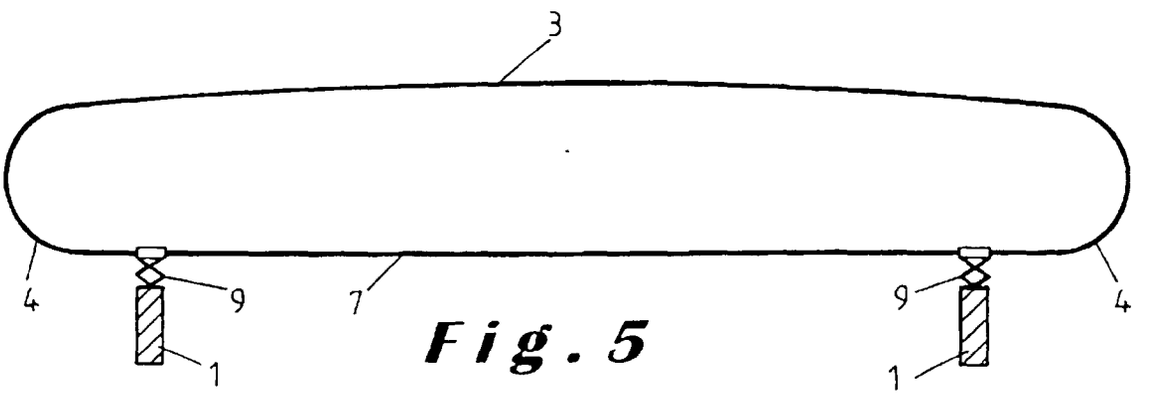

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1998

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 1 092 256 A (KOMMANDITBOLAGET IRVING & FRISELL) 20 April 1955 * the whole document *	1,2,8	A47C23/06
A		5,7,9, 11,12	
X	FR 370 517 A (LAMBOTTE) * the whole document *	1	
A		5-9,12	
X	FR 1 569 242 A (WILH. BERG) 30 May 1969 * the whole document *	1	
A		2,5-9,12	
A	CH 268 125 A (EPSTEIN) * the whole document *	1-3,6-11	
A	FR 1 253 004 A (HASENFRATZ) 12 May 1961 * the whole document *	13	

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	12 November 1998	VandeVondele, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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