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(71) Applicant: **Technicka univerzita v Liberci**
460 01 Liberec (CZ)

(72) Inventors:
- **Fliegel, Vitezslav**
  460 15 Liberec (CZ)
- **Martonka, Rudolf**
  460 01 Liberec (CZ)
- **Srb, Pavel**
  293 01 Mlada Boleslav (CZ)
- **Lepsik, Petr**
  463 12 Liberec (CZ)

(74) Representative: **Musil, Dobroslav**
Zàbrdovicka 11
615 00 Brno (CZ)

(54) **COMPOSITE FILLING FOR A SEAT**

(57) The filling for a seat comprising polyurethane foam (1), whereby inside the polyurethane foam (1) are arranged fibers (2) which are firmly connected to the polyurethane foam (1).

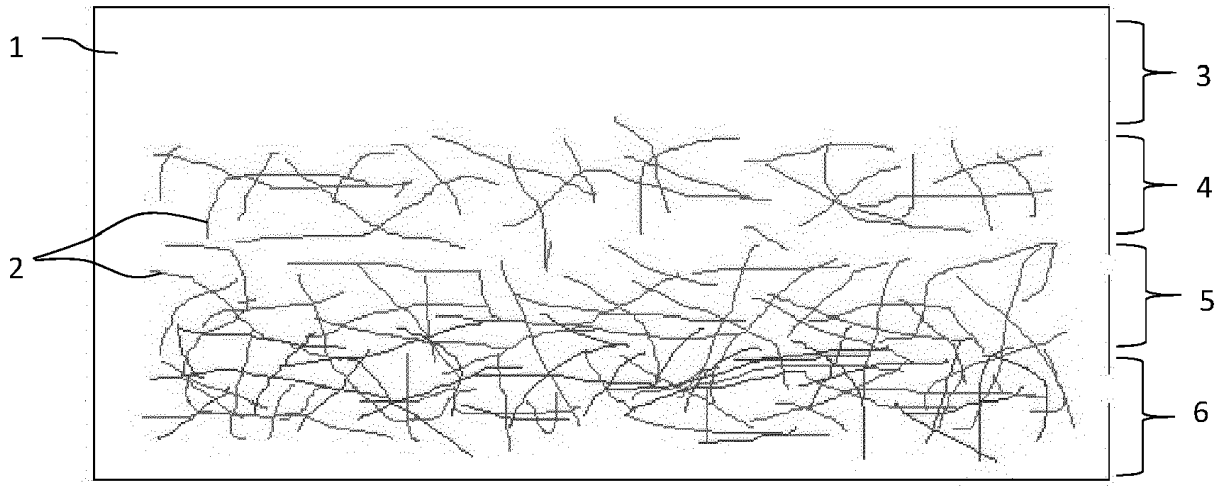

Fig.3

EP 3 918 955 A1

Description

Technical field

[0001] The invention relates to a composite filling for a seat comprising polyurethane foam.

Background art

[0002] Polyurethane foam, which is easily shaped and deformable, is used to fill the bottom seat and backrests of seats, especially car seats, mattresses and sofas. When polyurethane foam is loaded, e.g. when a person sits on the bottom seat, the polyurethane foam is compressed and deformed, thus providing a certain static and dynamic comfort for the seated person.

[0003] The disadvantage of the seats the filling of which is made of a filling composed of polyurethane foam, is its large deformation, when at a certain level of load the maximum compression of the polyurethane foam occurs, which results in the polyurethane foam losing its comfort properties. This disadvantage is solved by increasing the thickness or density of the polyurethane foam, which, however, increases the height of the seat and increases the production costs.

[0004] The object of the present invention is providing a filling for a seat comprising polyurethane foam which has an increased load-bearing capacity, while maintaining the same height and density, or which has the same load-bearing capacity with reduced height or density of the polyurethane foam.

Principle of the invention

[0005] The object of the invention is achieved by a filling for a seat whose principle consists of the fact that fibers are arranged inside the polyurethane foam and are firmly connected to the polyurethane foam, creating a new composite material.

[0006] To increase the comfort properties of the seat filling, the fibers in the polyurethane foam are arranged in at least one or two or more regions arranged one above the other, the individual regions having different fiber densities, with the upper regions having a lower fiber density and lower regions having a higher density.

[0007] The fibers are arranged in the polyurethane foam in the horizontal direction or in the vertical direction, or they are arranged chaotically or the fibers are arranged in different directions in the individual regions of the polyurethane foam.

[0008] To maintain the load-bearing properties of the polyurethane foam, the bulk density of the fibers in the polyurethane foam is in the range of 1 to 40 % of the volume of the polyurethane foam.

[0009] In a preferred embodiment, the density of the polyurethane foam can be reduced to 90 to 99 % of the original density of the polyurethane foam.

[0010] To increase the comfort of the filling, the filling contains a comfort region on its upper side, which does not contain any fibers.

Description of the drawings

[0011] Exemplary embodiments of the seat filling according to the invention are shown in the accompanying drawings, where the polyurethane foam in Fig. 1 comprises fibers arranged in the horizontal direction, in Fig. 2 it comprises fibers arranged in the vertical direction and in Fig. 3 it comprises fibers arranged chaotically.

Examples of embodiment

[0012] The seat filling according to the invention comprises polyurethane foam **1**, which is saturated with fibers **2** in such a manner that the individual fibers 2 are firmly connected to the polyurethane foam and thus form a composite material. The bulk density of the fibers in the polyurethane foam **1** ranges from 1 to 40 % of the total bulk density of the filling, whereby at a higher bulk density of the fibers in the polyurethane foam **1** the polyurethane foam **1** acquires a higher load-bearing capacity and thus deforms less under load. To ensure that the polyurethane foam **1** in the seat filling retains its load-bearing properties, the bulk density of the polyurethane foam **1** must be at least 60 % of the total bulk density of the filling.

[0013] The filling for a seat consists of one or several load regions **4, 5, 6,** which comprise composite polyurethane foam **1** saturated with fibers **2,** whereby se the individual load regions differ in the density of the fibers **2** in the polyurethane foam **1.** In the variant of embodiment shown, there is no firm division between these load regions, since they merge into one another. Hereinafter, a particularly advantageous variant of embodiment will be disclosed, which comprises three load regions **4, 5, 6,** namely a region **4** of light load and/or a region **5** of middle load and/or a region **6** of heavy load. These regions differ in the density of the fibers **2** in the composite polyurethane foam **1,** which is particularly suitable for loading by a seated person. If the composite polyurethane foam **1** comprises several load regions **4, 5, 6,** they are arranged one above the other so that the region with lower density of the fibers **2** in the polyurethane foam **1** is placed above the region with higher density of the fibers **2.** As the composite polyurethane foam **1** is compressed, the load regions **4, 5, 6** are gradually compressed from top to bottom. Since there is a higher density of the fibers **2** in each further lower load region **4, 5, 6,** each further load region **4, 5, 6** has a higher load capacity and less compression, thus achieving adjustable stiffness over the whole height and a wide range of possible loads without losing seating comfort. Depending on the desired properties of the final product, the fibers in the individual load regions **4, 5, 6** are arranged either in the horizontal or vertical direction or chaotically in different directions. To increase the comfort of the seated person, there is a comfort region **3** in the upper part of the

filling, which is formed by polyurethane foam **1** which does not contain any fibers **2.**

[0014] In one variant of embodiment, synthetic fibers, such as polyamide fibers, polyester fibers, silon fibers, etc., are used as fibers **2,** while in another variant of embodiment, natural fibers are used, such as flax, coconut, African grass, cotton, etc.

[0015] In the exemplary embodiments shown in Fig. 1, Fig. 2 and Fig. 3, the polyurethane foam **1** of the seat comprises in total four regions with a different density of the fibers **2** in the polyurethane foam **1,** whereby in Fig. 1 the fibers **2** in the polyurethane foam **1** are arranged in the horizontal direction, in Fig. 2 the fibers **2** in the polyurethane foam **1** are arranged in the vertical direction and in Fig. 3 the fibers **2** in the polyurethane foam **1** are arranged chaotically.

[0016] The first comfort region **3** is located at the top of the polyurethane foam **1,** i.e. the side which will face upwards when the seat is positioned in its place, and there are essentially no fibers **2** arranged in it. This region serves as a comfort region for increased comfort and as a thermo area to maintain the temperature on the surface of the first comfort region **3.** Under the first comfort region **3** is arranged a second region **4** of light load in which arranged in the polyurethane foam **1** are fibers **2** whose density in the polyurethane foam **1** is greater than in the first comfort region **3.** Under the second region **4** of light load is arranged a third region **5** of middle load, in which in the polyurethane foam **1** are arranged fibers **2** whose fiber **2** density in the polyurethane foam **1** is greater than the density of the fibers **2** in the polyurethane foam **1** in the second region **4** of light load. Under the third region **5** of middle load is arranged a fourth region **6** of heavy load, in which in the polyurethane foam **1** are arranged fibers **2,** whereby the density of the fibers **2** in the polyurethane foam **1** in the fourth region **6** of heavy load is greater than the density of the fibers **2** in the polyurethane foam **1** in the third region **5** of middle load.

[0017] In the standard embodiment, the height of the first comfort region **3** is in the range of 10 to 15 mm and only serves to increase the comfort of the seated person and for air conditioning. The heights of the light, medium and heavy load regions **4, 5, 6** are identical in the embodiment shown, i.e. they evenly distribute the remaining height of the polyurethane foam **1** without the first comfort region **3.** In another embodiment, the height of the individual load regions **4, 5, 6** is unevenly distributed.

[0018] Each region **3, 4, 5, 6** of the polyurethane foam **1** has a different load-bearing capacity depending on the density of the fibers **2** arranged in it. By changing the number of fibers **2** in individual regions **3**, **4**, **5**, **6**, i.e., by changing the density of the fibers **2** in the polyurethane foam **1**, the total load-bearing capacity of the resulting seat filling changes.

[0019] Another factor which partly influences the overall load-bearing capacity of the seat filling is the direction in which the fibers are arranged **2** in the polyurethane foam **1**. In a variant shown in Fig. 1 the fibers **2** in the polyurethane foam **1** are arranged in the horizontal direction in which the filling has the most compact dimensions, but the least load-bearing capacity. In a variant shown in Fig. 2, the fibers **2** in the polyurethane foam **1** are arranged in the vertical direction, in which the filling has a greater load-bearing capacity at the same fiber **2** density **2,** but also larger dimensions. In the variant shown in Fig. 3, the fibers **2** in the polyurethane foam **1** are arranged chaotically, i.e. the fibers **2** directed randomly in all directions, in which the filling has omnidirectional strength and is the simplest to manufacture. In another embodiment not shown, the fibers **2** are arranged in at least two load regions **4, 5, 6** in different directions, i.e. horizontally in one of the load regions **4, 5, 6** and vertically in the remaining load regions **4, 5, 6.**

[0020] To reduce the production costs of the seat filling, the production density of the polyurethane foam **1,** which is costly, is reduced and the lost load-bearing capacity of the filling is replaced by adding a number of fibers **2** of different densities in one or several load regions **4, 5, 6** of the polyurethane foam **1.**

[0021] In an exemplary embodiment, the composite polyurethane foam **1** comprises in total four regions **3**, **4**, **5**, **6** with a different density of the fibers **2.** In the first comfort region **3,** there is zero density of the fibers **2,** i.e., no fibers **2** are arranged in this comfort region **3.** In the second region **4** of light load, the density of the fibers **2** in the polyurethane foam **1** is in the range of 1 to 10 kg/m^3. In the third region **5** of middle load, the density of the fibers **2** in the polyurethane foam **1** is in the range of 10 to 15 kg/m^3. In the fourth region **6** of heavy load, the density of the fibers **2** in the polyurethane foam **1** is in the range of 15 to 20 kg/m^3.

[0022] In another embodiment, the number of the load regions **4, 5, 6** in the polyurethane foam **1** varies depending on the desired properties of the resulting filling and the bulk density of the fibers **2** in the polyurethane foam **1** is adapted in a manner known to the person skilled in the art in the range of 1 to 40 % of the volume of the polyurethane foam **1.** To reduce the cost of producing the seat filling while maintaining its sufficient load-bearing capacity, the density of the polyurethane foam **1** is reduced by 1 to 10 %, i.e. to 90 to 99 % of the original density of the polyurethane foam **1**.

Claims

1. A filling for a seat comprising polyurethane foam (1), **characterized in that** inside the polyurethane foam (1) are arranged fibers (2) which are firmly connected to the polyurethane foam (1).

2. The filling for a seat according to claim 1, **characterized in that** the fibers (2) are arranged in the polyurethane foam (1) in at least two load regions (3, 4, 5) arranged one above the other, the density of the fibers (2) in the polyurethane foam (1) varying in each

part and gradually increasing from top region to bottom.

3. The filling for a seat according to any of the preceding claims, **characterized in that** the fibers (2) are arranged in the polyurethane foam (1) in the horizontal direction and/or vertical direction and/or chaotically.

4. The filling for a seat according to any of the preceding claims, **characterized in that** the bulk density of the fibers (2) in the load region (3, 4, 5) of the polyurethane foam (1) is in the range of 1 % to 40 % of the volume of the polyurethane foam (1).

5. The filling for a seat according to any of the preceding claims, **characterized in that** the density of the polyurethane foam (1) ranges from 90 to 99 % of the original density of the polyurethane foam (1).

6. The filling for a seat according to any of the preceding claims, **characterized in that** the polyurethane foam (1) comprises at least one comfort region (3), in which the fiber (2) density is zero.

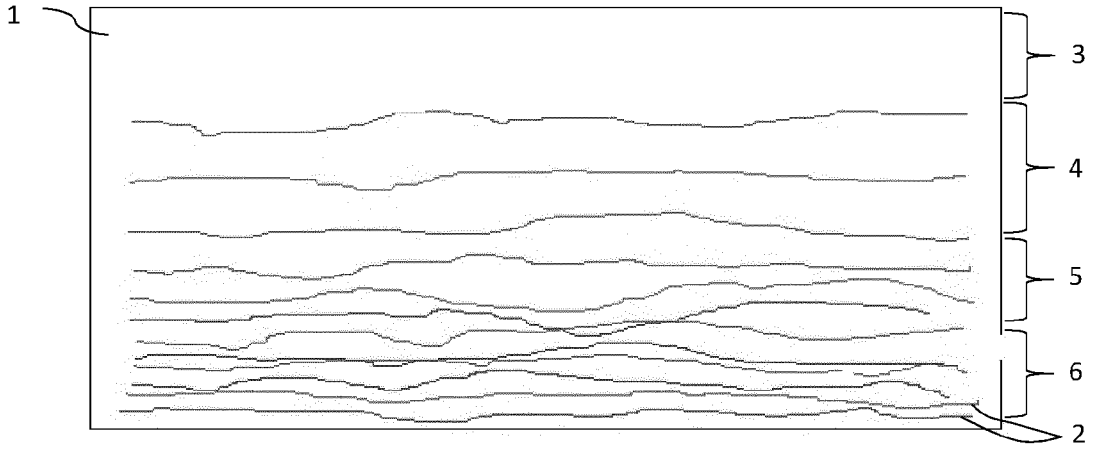

Fig. 1

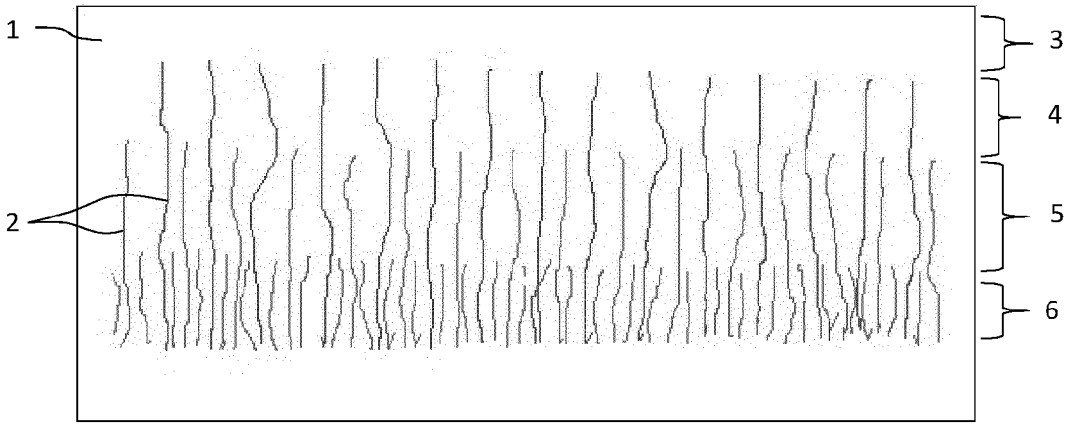

Fig. 2

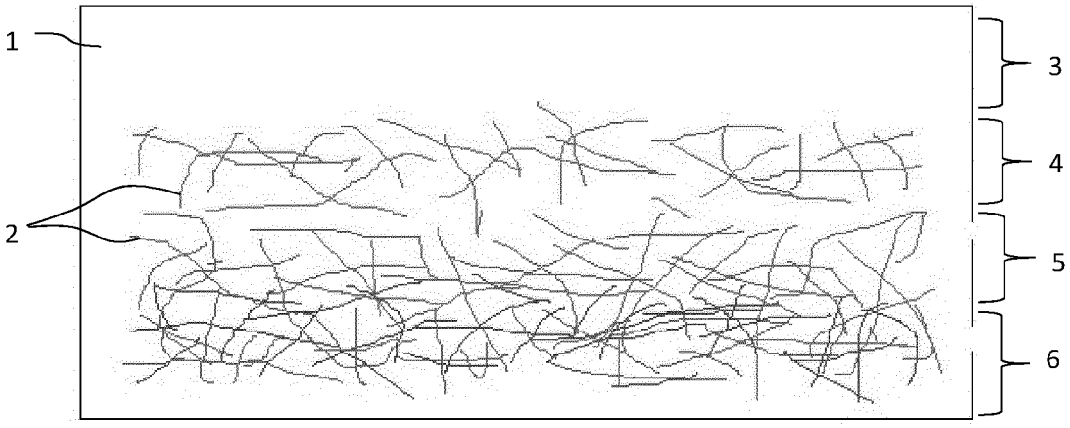

Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 8616

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A47C
B60N
B29L
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 October 2020	Kus, Slawomir

CATEGORY OF CITED DOCUMENTS

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