

(19) **DANMARK**

(10) **DK/EP 2778267 T3**



Patent- og
Varemærkestyrelsen

(12) **Oversættelse af
europæisk patentskrift**

-
- (51) Int.Cl.: **B 32 B 5/02 (2006.01)** **B 32 B 5/24 (2006.01)** **B 32 B 7/05 (2019.01)**
D 03 D 7/00 (2006.01) **D 03 D 11/00 (2006.01)** **D 06 M 15/00 (2006.01)**
D 06 M 15/564 (2006.01) **D 06 N 3/00 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2019-12-02**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2019-08-28**
- (86) Europæisk ansøgning nr.: **13001216.4**
- (86) Europæisk indleveringsdag: **2013-03-11**
- (87) Den europæiske ansøgnings publiceringsdag: **2014-09-17**
- (84) Designerede stater: **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**
- (73) Patenthaver: **Parabeam B.V., Vossenbeemd 1C, 5705 CL Helmond, Holland**
- (72) Opfinder: **Koot, Jurgen, Dobbelsteynstraat 21, 3620 Lanaken, Belgien**
Tramnitz, Jürgen, Achterschlag 58, 21039 Hamburg, Tyskland
- (74) Fuldmægtig i Danmark: **Chas. Hude A/S, H.C. Andersens Boulevard 33, 1780 København V, Danmark**
- (54) Benævnelse: **POLSTERMATERIALE TIL EN ELASTISK, ISOLERENDE ELLER VATTERENDE AFDÆKNING AF GENSTANDE ELLER KOMPONENTER**
- (56) Fremdragne publikationer:
DE-A1- 4 228 958
GB-A- 1 028 141
JP-A- H05 247 783
US-A- 4 840 828
US-A- 5 589 245

Description

The invention relates to a cushioning material for resilient, insulating or padding covering of objects or components.

FR 1 393 269 discloses such a cushioning material. Depending on the type of resin used, with which a woven spacer fabric is impregnated, a soft or hard material can be produced. It has been found to be disadvantageous that the cushioning material affords only weakening properties on account of external influencing variables such as temperature, noise, pressure etc. Also GB 1,028,141 A discloses a cushioning material showing a double-pile fabric.

DE 37 05 756 A1 discloses a cushion for seats in motor vehicles, said cushion consisting of a coated double woven fabric, both fabrics of which are kept at a constant spacing by pile threads and are connected to one another in an airtight manner at the peripheries. In order to climatize the seat and backrest surface and to avoid heat build-up, provision is made for the elastomeric coating on one side of the double woven fabric to be perforated in an air-permeable manner and for the interior of the cushion to be connected to a controllable air supply in order to produce a permanent airflow under positive pressure. The ventilation of a seat is improved as a result, but the sitting comfort is low since it is similar to that of an air mattress and scarcely has damping properties.

DE 199 54 978 C1 discloses a seat part for a vehicle seat, in which an air-permeable cushion cover spans a cushion carrier made of a foam. The sitting comfort is then ensured by the foam. The foam is usually a polyurethane foam. However, polyurethane foams exhibit altered flexibility behaviour when heated slightly by the sitting person. This heating causes the sitting person to sink further. However, the greater sinking is associated with the person coming into contact with a large area of the plastics foam. This deeper sinking causes increased sweating.

DE 10 2004 037 625 A1 thus discloses a mattress having at least one layer made of a woven spacer fabric, wherein the woven spacer fabric consists of two outer woven fabric layers which are connected to one another by elements such as filaments, fibres or threads. This woven spacer fabric has a graduated flexibility since further and thinner woven fabrics are provided between the fabric layers, said further and thinner fabric woven fabrics only bearing load when the woven spacer fabric has been compressed to the extent of the thinner woven fabrics. However, such woven fabrics are very heavy on account of the high fibre content.

DE 195 45 596 C2 discloses an inner lining and/or seat covering material for vehicles, aircraft and the like, in which the foam layer known in the prior art is dispensed with and replaced with a brushed pile cover which is incorporated into a lower fabric. The brushed pile cover is soft-elastic and has a good restoring force, as a result of which it is suitable as a shock-absorbing padding layer. A upper fabric is then also laminated on. However, such covering materials have a low damping or shock-absorbing effect and cannot replace foams.

It is therefore the object of the invention to create a cushioning material according to the preamble of Claim 1, the comfort of which is improved.

This object is achieved by the features of Claim 1.

Hereby, a cushioning material is created, the spring characteristic of which is non-linear under formation of a damping zone. Under load, the cushioning material initially exhibits a restoring force that increases with the depth of indentation, said restoring force giving the material a flexibility that is known of cushions. In this region, the restoring force of the cushioning material is determined by elastic deformation which is provided by the webs connecting the upper fabric and the lower fabric.

Upon increasing load, the characteristic of the cushioning material passes into a medium characteristic region. Preferably, the restoring force is then no longer dependent at all or only slightly dependent on the depth of indentation, since the buckling load of the webs has been achieved. These parameters of the cushioning material are directly dependent on the degree of hardness of the resin used and the volume weight of the cushioning material. Both parameters therefore make it possible to adapt the flexibility of the cushioning material to the application in question.

The medium spring characteristic exhibits a pronounced hysteresis behaviour, the cause of which is the resin impregnation, by which the internal friction of the webs on deformation of the webs is increased. This hysteresis behaviour gives the cushioning material in the medium region a damping capacity. In combination with the flatter profile of the characteristic, the cushioning material thus has in this region a particularly good damping effect, since short-time loads or impacts are received quickly and the energy thereof is absorbed by the cushioning material.

Under further increasing loads, the cushioning material exhibits a characteristic with again a larger slope. After extensive deflection of the webs, the restoring force is dominated now by the elastic volume compression of the resin-impregnated double-pile fabric itself. This region determined by the upper characteristic thus prevents excessive sinking into the cushioning material at high loads. If the material is preferably used as upholstery of a vehicle seat, this upper characteristic region also provides for the necessary support even in the case of a sporty driving style and, after the end of the increased load, ensures the return to the medium damped characteristic region.

A further advantageous feature of the cushioning material according to the invention is the variable setting of the properties of the material in the medium characteristic region. In particular, the damping capacity is settable by the volume weight and the degree of hardness of the resin impregnation. Furthermore, the magnitude of the restoring force in the medium characteristic

region correlates with the degree of hardness of the resin impregnation and the magnitude of the volume weight.

By varying the settings of the material properties, the cushioning material can be used in a versatile manner, with the parameters of volume weight and resin hardness preferably being selected such that under the loads to be expected for each particular use, the medium characteristic region is reached with a selectable damping capacity. Thus, the cushioning material, when used in mattresses, can be adapted to the weight of the person, while cushioning for the gentle transport of goods should have a high damping capacity.

Further advantages and configurations of the invention can be gathered from the following description and the dependent claims.

The invention is explained in more detail in the following text with reference to the exemplary embodiments illustrated in the appended drawings.

Figure 1 schematically shows the perspective view of a cushioning material according to the invention,

Figure 2 schematically shows the non-linear spring characteristic of the cushioning material according to the invention, with a medium characteristic region which is characterized by the magnitude of the restoring force and the damping capacity,

Figure 3 schematically shows the non-linear spring characteristic of the cushioning material according to the invention, with an increased restoring force in the medium characteristic region,

Figure 4 schematically shows the non-linear spring characteristic of the cushioning material according to the invention, with an increased damping capacity in the medium characteristic region,

Figure 5 schematically shows the non-linear spring characteristic of the cushioning material according to the invention, with an increased restoring force and increased damping capacity in the medium characteristic region.

The cushioning material illustrated in Figure 1 for resilient, insulating or padding covering of objects or components is produced by resin impregnation of a double-pile fabric 1. The resin impregnation is such that the double-pile fabric 1 is elastically impregnated. The double-pile fabric 1 comprises an upper fabric 2 and a lower fabric 3, which are connected to one another in a spaced apart manner by pile threads 4. The pile threads 4 form webs, which, in the exemplary embodiment illustrated, consist of helically twisted individual webs 4.1, 4.2 and which space the upper fabric 2 and the lower fabric 3 apart from one another at a spacing X. In this way, a shape resilience with a non-linear spring characteristic 5 is established.

The non-linear spring characteristic 5 illustrated schematically in Figure 2 is distinguished by three characteristic regions having different qualities. A lower characteristic region 7 and an upper characteristic region 8 are formed with an ascending profile. The slope of these characteristic regions can correspond to the spring properties of typical cushioning materials. In comparison, a medium characteristic region 6 extends less ascending and exhibits a hysteresis loop profile, which gives the impregnated double-pile fabric 1 an internal damping capacity W. This damping capacity W is settable by the volume weight (of the cushioning material) and the degree of hardness of the resin impregnation.

The magnitude of a restoring force 9 in the medium characteristic region 6 correlates with the degree of hardness of the resin impregnation and the magnitude of volume weight, with the result that these are setting parameters. Resins having a degree of hardness in the range of 30 to 90 Shore A are used. The thread size for the thread systems of the upper fabric 2 and the lower fabric 3 and for the thread system of the pile threads 4 is preferably in the range of 60 to 300 tex. The pile threads 4 can be incorporated into the upper fabric 2 and the lower fabric 3 with a V-weave or a W-weave. The volume weight of the pile threads 4 is in this case preferably in the range from 50 to 200 pile threads/cm². The length of the pile threads 4 is preferably in a range from 1.0 to 50 mm. The pile threads 4 preferably consist of a filament yarn. The length of the pile threads 4 thus causes the spacing X. The volume weight and the length of the

pile threads 4 in conjunction with the thread size of the thread systems influence, *inter alia*, the volume weight of the cushioning material.

Figure 3 shows the non-linear characteristic 5 of an exemplary embodiment in which, by selection of a high volume weight, for example a thread size of 300 tex for one or more thread systems of the double-pile fabric 1 and a length of the pile threads 4 of about 15 mm, the restoring force 9 of the medium characteristic region 6 with a corresponding damping capacity W is increased.

Figure 4 illustrates an exemplary embodiment in which the damping capacity W is increased by the selection of a harder resin, of for example 80 Shore A.

The exemplary embodiment illustrated in Figure 5 shows a cushioning material having an increased restoring force 9 and an increased damping capacity W . This can be achieved by the selection of a harder resin, of for example 80 Shore A, in conjunction with a high volume weight, for example a thread size of 300 tex for one or more thread systems of the double-pile fabric 1 and a length of the pile threads 4 of about 15 mm.

Since the use of a harder resin also increases the restoring force 9 and stiffens the cushioning material overall, the variation in the volume weight for harder resins than for example 60 Shore A only has a smaller effect.

According to an exemplary embodiment that is not illustrated, the cushioning material may be connected to a ventilation or heating system. Since, according to the invention, only the pile threads 4 are arranged between the upper fabric 2 and the lower fabric 3, a free space 10, through which a fluid flow can be passed, is formed between the upper fabric 2 and the lower fabric 3. The cushioning material according to the invention thus affords improved sitting comfort in combination with an air-conditioning effect, without additional components being made necessary for this purpose. The medium which to this end is passed through the free space 10 is selectable and can be any form of fluid.

As the above exemplary embodiments show, the setting parameters of resin hardness and volume weight allow the formation of a cushioning material also in such a way that comparable cushioning properties are achieved even for different cushioning material weights. The setting parameters can partially substitute one another.

The upper fabric 2 and the lower fabric 3 can be woven, loop-drawingly knitted, loop-formingly knitted, or be in the form of raschel fabric. The double-pile fabric 1 can be produced by the warp velvet technique. Resins that are used for resin impregnation are for example PU resins.

The double-pile fabric 1 can also be foam-filled in the region of the pile threads 4 with an in particular soft foam material, as a result of which the damping capacity W can additionally be influenced, in particular in the medium characteristic region 6. Such a foam can also be used to carry substances which can be dispensed by the cushioning material during its use. The sitting movement becomes a pumping movement which can deliver substances out of such a foam material. This is advantageous in particular in the case of antimicrobial additives or other disinfectants with which the foam may be provided.

Patentkrav

1. Polstermateriale til en elastisk, isolerende eller vatterende afdækning af genstande eller komponenter af et dobbeltpolstertekstil (1), der er elastisk imprægneret ved harpiksmætning, i hvilket et øvre tekstil (2) og en nedre tekstil (3) er
5 forbundet på en adskilt måde ved væv, der er dannet af polstertråde (4), **kendetegnet ved, at** det elastiske imprægnerede dobbeltpolstertekstil (1) har en formelasticitet med en ikke-lineær fjederkarakteristik (5), som har et centralt karakteristisk område (6) mellem et stigende nedre karakteristisk område (7) og et stigende øvre karakteristisk område (8), og det centrale karakteristiske område (6)
10 har en fladere karakteristisk profil end de to andre, med en hysteresekarakteristik der giver det elastiske imprægnerede dobbeltpolstertekstil (1) en indre dæmpningskapacitet (W), som kan indstilles ved densiteten af polstermaterialet og hårdheden af harpiksmætning i et område fra 30 til 90 Shore A, og vævene der er dannet af polstertrådene (4), består af spiralformede snoede individuelle
15 væv (4.1, 4.2).

2. Polstermaterialet ifølge krav 1, **kendetegnet ved, at** graden af gendannelseskraft (9) i det centrale karakteristiske område (6) korrelerer med graden af hårdhed af harpiksmætning og graden af densitet.

20

3. Polstermateriale ifølge krav 1 eller 2, **kendetegnet ved, at** dobbeltpolstertekstilet (1) har garn i området fra 60 til 300 tex.

4. Polstermateriale ifølge et af kravene 1 til 3, **kendetegnet ved, at** vævene der
25 er dannet af polstertrådene (4), frembringer en afstand (X) i området fra 5 til 20 mm.

5. Polstermateriale ifølge et af kravene 1 til 4, **kendetegnet ved, at** det øvre tekstil (2) og det nedre tekstil (3) er vævede tekstiler eller strikkede tekstiler.

30

6. Polstermateriale ifølge et af kravene 1 til 5, **kendetegnet ved, at** dobbeltpolstertekstilet (1) kan tilsluttes et ventilations- eller varmesystem.

7. Polstermateriale ifølge et af kravene 1 til 6, **kendetegnet ved, at** dobbeltpolstertekstilet (1) fyldes med skum i området med polstertrådene (4).

5 **8.** Polstermaterialet ifølge krav 7, **kendetegnet ved, at** skumfyldningen er en blød skumfyldning, der skummes med antimikrobielle tilsætningsstoffer.



