



12 **NEW EUROPEAN PATENT SPECIFICATION**

45 Date of publication of the new patent specification : **06.03.91 Bulletin 91/10**

51 Int. Cl.⁵ : **D06N 7/00, B32B 27/12, D06N 1/00, D03D 15/00**

21 Application number : **82201096.3**

22 Date of filing : **07.09.82**

54 **A floor covering.**

30 Priority : **10.09.81 NL 8104177**

43 Date of publication of application : **23.03.83 Bulletin 83/12**

45 Publication of the grant of the patent : **28.05.86 Bulletin 86/22**

45 Mention of the opposition decision : **06.03.91 Bulletin 91/10**

84 Designated Contracting States : **AT BE CH DE FR GB IT LI LU NL SE**

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EP 0 074 681 B2

Description

With several floor covering materials, comprising a substrate and an upper layer, consisting, respectively, of a fabric and a more or less wear resistant material, often difficulties in respect of their dimensional stability are met with. For instance so-called linoleum is manufactured from a substrate consisting of jute fabric, on which a hot plastic mass of oxidised and gelated linseed oil, fillers and dyes and, as the case may be, further additives, is calendered. The web thus obtained is introduced into a drying chamber in which it is suspended in loops, and the upper layer is allowed to set therein. After leaving the drying chamber, the web is cut to the required size, and is wound on rolls.

The threads of the substrate should withstand the forces exerted thereon in the longitudinal direction of the web during calendering and also during setting. These forces may give rise to more or less elastic deformations in the fabric and in the upper layer fixed thereon, which will partly be restored after setting of the upper layer. The linoleum then shows a more or less elastomeric behaviour, which means that on deformation the total volume will not or not substantially change, so that a reduction of the length in one direction will lead to an increase of the length in a different direction and vice versa. The restoration of a deformation after disappearance of the forces causing said deformation can occur with a certain delay, and is not necessarily complete. Moreover the jute fabric and also the upper layer material are sensitive for moisture which may also lead to changes of dimension which cannot be controlled. A consequence of all this is that linoleum is not dimensionally stable, which also holds for other materials with a comparable behaviour.

This lack of dimensional stability is not very objectionable in the case of webs wound on a roll which are to be glued on a floor, but will be inconvenient in the case of loosely applied webs. This will be very objectionable, however, if the material is cut into tiles, as during storage, i.e. by moisture, considerable dimensional variations can occur, which will substantially reduce the usefulness, and in particular the mutual fitting of the tiles. However there is a large demand for tile-shaped material, i.e. because of the effects obtainable thereby, the ease of laying and the like, but this demand has not been satisfied until now because of the above-mentioned objections.

A substrate which is less sensitive for moisture than jute and which can better resist to increases of length might, probably, improve the insufficient dimensional stability of linoleum and similar floor coverings. Glass fibre fabrics will, as such, satisfy this requirement, but the longitudinal threads thereof can often not withstand the longitudinal forces occurring during calendering, so that rupture can occur then.

The invention is based on the insight that use can

be made of the elastomeric behaviour of the upper layer material for improving the dimensional stability.

The invention comprises a floor covering according to claim 1.

5 The fabric threads extending in the longitudinal direction ensure the integrity of the formed material during calendering and setting, and can undergo a certain stretch, which, after disappearance of the generating forces, has a tendency of recovering. The upper layer material will, after setting and after disappearance of the longitudinal forces, try to shrink somewhat. Shrinkage in the longitudinal direction would lead to an increase of the transversal dimension which will be opposed by the transversal threads which had not been loaded during calendering and setting, so that shrinkage in the longitudinal direction is, therefore, counteracted. In this manner a very good dimensional stability can be obtained.

20 The transversal threads of such a substrate fabric consist, in particular, of glass fibres, and the longitudinal threads can consist of a polyester.

Fabrics consisting of threads having different characteristics in the longitudinal and transversal directions respectively are known per se from US-A-3 871 946 and 4 015 038, which fabrics, however, are used for temperature resistant dryer belts, in which the transversal threads can consist of coated glass fibres, but such fabrics do not cooperate with a closed upper layer so as to give a dimensional stability to the latter.

30 It can be favourable to interconnect the fabric threads in the crossing points by means of an adhesive, which cross-linking can counteract deformation of the substrate by the forces occurring during calendering, and also the remaining parts of the substrate can be covered so as to reduce its moisture sensitivity and to improve the adhesion of the upper layer material and/or of a glue used for fixing.

40 Such a web is particular suitable for being cut into tiles, as the tiles have now become sufficiently dimensionally stable, so that during storage no substantial dimensional deviations will occur which would reduce the usefulness of the tiles.

45 From FR-A-2 300 191 ceramic tiles on a multilayer support are known, but such tiles have an intrinsic dimensional stability.

The invention will be elucidated below in more detail by reference to a drawing, in which, by way of example, a top view of a part of a substrate for a floor covering according to the invention is schematically shown.

55 The substrate shown consists of an open fabric with threads or bands 1 of glass fibres directed in the transversal direction of the web, and having a large elasticity modulus which means that, on stretching said threads, very considerable tensions will occur, so that a high resistance against stretching will be obtained. Such fibres have a relatively low stretch at

rupture.

In the longitudinal direction of the web threads or bands 2 consisting of a polyester are provided. These threads have a lower elasticity modulus so that less resistance against stretching will be provided. The tensile strength of these threads should, however, be sufficient for withstanding the forces occurring during manufacturing.

During calendering, i.e. providing the upper layer material on the substrate between rollers, very substantial tensile forces may be exerted, so that threads with a high tensile strength are required. For completing the setting of the cover layer material provided on the substrate, the formed web is suspended in a drying chamber in loops, and also then substantial longitudinal forces can occur. The fabric used according to the invention has a high longitudinal tensile strength, and can, moreover, sufficiently yield in said direction; the longitudinal threads have a large stretch at rupture. These longitudinal threads will yield, and keep the whole assembly together.

The cover layer material calendered on the fabric intrudes into the interspaces 3 between the fabric threads 1 and 2, and adheres to said threads. After completion of setting of the material and disappearance of the longitudinal loads, however, a tendency to shrink will occur, but the cover layer material shows, in linoleum or similar floor coverings, to a substantial degree an elastomeric character, which means that on deformation the total volume will remain substantially unchanged. This means, furthermore, that when longitudinal shrinkage will occur, this should be accompanied by a lateral expansion. This expansion, however, is opposed by the glass fibre threads 1, so that a substantial longitudinal shrinkage cannot take place either. The polyester threads 2 remain, therefore, subjected to a certain tension, and also in the upper layer tensions will remain.

The current linoleum with a jute substrate is sensitive for moisture. For the filler substances present in the upper layer, such as sawdust or the like, can absorb moisture, and also the jute fibres are moisture sensitive. All this will be expressed in a rather substantial increase in width, but also a certain longitudinal shrinkage appears to occur. The total volume may slightly increase when absorbing moisture.

When using a substrate according to the invention, the upper layer is equal to that of the known linoleum, and is, therefore, moisture sensitive. The increase in width, however, is prevented for the greater part by the glass fibres. The expansion should, therefore, take place primarily in the longitudinal direction, and then the tendency to shrink in that direction is to be overcome first, but also the prestressing to which the polyester threads are submitted. It has appeared to be possible to obtain substantially equal expansions in both directions. A part of the expansion can, moreover, express itself as an increase in thick-

ness. If square tiles are cut from such a floor covering, said tiles will remain substantially square even when absorbing moisture, so that laying such tiles in specific patterns, in particular with alternating directions, remains possible.

Therefore, in the manner described above, a substantial improvement of the dimensional stability can be obtained, which can be improved still further by providing in the crossing points of the threads 1 and 2 a cross-linking by means of a suitable plastic, as schematically indicated at 4. Thereby it can be prevented that, as a consequence of the substantial forces occurring during calendering, the threads will be mutually displaced. Moreover it is avoided thereby that the threads, after completion of the setting of the upper layer, will be displaced under the influence of tensions already present or occurring later.

If the threads 1 and 2 are completely covered with said plastic, the adhesion of the upper layer material and/or of a glue used for fixing the floor covering to an underlying floor can be improved, and, as the case may be, also the moisture sensitivity can be reduced thereby.

It will be clear that the invention is not restricted to a fabric of glass fibre and polyester threads, and that also other kinds of threads can be used, provided that the latter will be able to provide a sufficient transversal resistance against stretching and are longitudinally sufficiently strong and yieldable for being able to withstand the occurring forces. The invention is, moreover, not restricted to linoleum, but can also be applied with other floor coverings showing a certain elastomeric behaviour.

Claims

1. A floor covering, of linoleum or a similar elastomeric sheet material, comprising a fabric substrate with threads (1, 2) in the longitudinal and transversal direction respectively of said sheet, and an upper layer of an elastomeric wear-proof material adhered to said substrate by calendering, characterised in that the transversal threads (1) of said substrate have an elasticity modulus larger than that of the longitudinal threads (2) and which is of the order of magnitude of the modulus of glass fibres, and that the longitudinal threads (2) have a sufficient strength for withstanding the longitudinal and bending forces exerted thereon during calendering and further manufacturing steps.

2. The floor covering of claim 1, characterised in that the transversal threads (1) consist of glass fibres.

3. The floor covering of claim 2, characterised in that longitudinal (2) threads consist of a polyester.

4. The floor covering of any one of claims 1 to 3, characterised in that the longitudinal and transversal threads (1, 2) are interconnected by means of a suit-

able adhesive (4).

5. The floor covering of claim 4, characterised in that also the remaining parts of the threads are covered with an adhesive too.

6. A tile, cut from sheet material according to any one of claims 1 to 5.

Ansprüche

1. Bodenbelag aus Linoleum oder ähnlichem elastomerem Blattmaterial, das einen Gewebeträger mit sich in der Längs- bzw. Querrichtung dieses Blattes erstreckenden Fäden (1, 2), und an diesem Träger durch Kalandern angehefteten Oberschicht aus einem elastomeren und schleissfesten Material umfasst, dadurch gekennzeichnet, dass die Querfäden (1) dieses Trägers einen Elastizitätsmodul haben, der grösser als derjenige der Längsfäden (2) und von der Grössenordnung von Modul von Glasfasern ist, und dass die Längsfäden (2) eine genügende Festigkeit haben um den während des Kalanderns und weiterer Herstellungsstufen darauf ausgeübten Längs- und Biegekräften zu widerstehen.

2. Bodenbelag nach Anspruch 1, dadurch gekennzeichnet, dass die Querfäden (1) aus Glassfasern bestehen.

3. Bodenbelag nach Anspruch 2, dadurch gekennzeichnet, dass die Längsfäden (2) aus einem Polyester bestehen.

4. Bodenbelag nach irgendeinem der Ansprüche 1-3, dadurch gekennzeichnet, dass die Längs- und Querfäden (1, 2) mittels eines geeigneten Heftmittels (4) miteinander verbunden sind.

5. Bodenbelag nach Anspruch 4, dadurch gekennzeichnet, dass auch die Übrigen Teile der Fäden mit einem Heftmittel bedeckt sind.

6. Aus blattförmiges Material nach irgendeinem der Ansprüche 1-5 geschnittene Fliese.

Revendications

1. Revêtement du sol consistant en linoleum ou une matière elastomère en feuille similaire, comprenant un substrat de tissu avec des fils (1, 2) dans la direction longitudinale et transversale de ladite feuille respectivement, et une couche supérieure attachée audit substrat par calandrage, et consistant d'une matière élastomère et résistante à l'usure, caractérisé en ce que les fils transversaux (1) duquel substrat ont un module d'élasticité supérieur à celui des fils longitudinaux (2), et étant d'un ordre de magnitude du module des fibres de verre, et en ce que les fils longitudinaux (2) ont une résistance suffisante pour résister aux forces longitudinaux et de flexion exercées sur ces fils pendant le calandrage et autres étapes de la fabrication.

2. Revêtement de sol suivant la revendication 1, caractérisé en ce que les fils transversaux (1) sont constitués de fibres de verre.

3. Revêtement de sol suivant la revendication 2, caractérisé en ce que les fils longitudinaux (2) sont en polyester.

4. Revêtement de sol suivant l'une quelconque des revendication 1 à 3 caractérisé en ce que les fils longitudinaux et transversaux (1, 2) sont interconnectés au moyen d'un adhésif approprié (4).

5. Revêtement de sol suivant la revendication 4, caractérisé en ce que les autres parties des fils sont également recouvertes d'un adhésif.

6. Dalle découpée dans la matière en feuille suivant l'une quelconque des revendications 1 à 5.

