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74 Gemachtigde:

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54 **Panel suitable for assembling a floor or wall covering, and the like covering**

57 Panel suitable for assembling a floor or wall covering by interconnecting a plurality of said panels with each other, wherein the panel has a substantially planar top side, and a substantially planar bottom side, at least four substantially linear side edges comprising at least one pair of opposite side edges, the panel having a layered structure which comprises:

- a main layer made from a mineral material,
- a top layer provided on the top side of said main layer;

wherein the mineral material is a composition comprising as primary components:

- magnesium oxide and/or magnesium hydroxide,
- a suitable binder,

wherein the binder comprises magnesium sulfate, ferric sulfate, potassium salt, a plastic material, or an adhesive, or a combination of these compounds, with the proviso that the binder has a weight content magnesium chloride of less than 10%, preferably less than 3%, and most preferably less than 0.1%.

## **Panel suitable for assembling a floor or wall covering, and the like covering**

The present invention relates to a panel suitable for assembling a floor covering by interconnecting a plurality of said panels with each other,

5            wherein the panel has a substantially planar top side, and a substantially planar bottom side, at least four substantially linear side edges comprising at least one pair of opposite side edges,

            the panel having a layered structure which comprises:

- a main layer made from a mineral material,
- 10            - a top layer provided on the top side of said main layer;

            wherein the mineral material is a composition comprising as primary components:

- magnesium oxide and/or magnesium hydroxide,
- a suitable binder.

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The invention further relates to a floor or wall covering composed of a plurality of interconnected panels, which panels conform to the invention.

20            In the relevant technical field of floor and wall panels, the use of magnesium boards is ubiquitous. These boards are basically made from a layer of a mineral material that is a composition containing as primary components magnesium oxide and/or magnesium hydroxide mixed with magnesium chloride as a binder. Further in this composition, hydrates or water molecules are included in minor amounts in the mineral material.

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A relevant example of the above panel, is given in EP2060389 which discloses such a panel wherein the binder is magnesium chloride. Furthermore, this panel is provided with interconnecting coupling means for interconnecting one panel with another.

30            Although being quite popular for its intrinsic advantages, the use of a magnesium board panel comes with some disadvantages as well: especially when magnesium board panels are used regularly under humid conditions, condensation of water from the humid air onto the exposed surface of mineral material is observed. Dependent on the circumstances and the exposed surface itself, the  
35            condensed water may be present over a longer period of time on the exposed

surface. It is believed that this condensation effect may be promoted by the presence of chloride ions in the composition of the mineral material: the condensed water on the surface contains a relatively high content of dissolved chloride ions.

5 Importantly, the condensed water when present over a longer time on the panels, forms an ideal basis for the growth of mold or fungus on the exposed surfaces of the magnesium board panel.

The growth of mold is unwanted for humans as it impedes the hygienic circumstances. Furthermore, any condensed water that remains on the panels for a longer time, may enter the structure of the mineral material and soften the  
10 interconnecting coupling means that are provided on the sides of the panel. As such, the interconnecting means become less rigid, and hence the connections between adjacent panels that are interconnected by these means, become less reliable.

15 The negative effect of condensation on magnesium boards has been recently discussed in a scientific article by Hansen et al., that was published during the *International RILEM Conference on Materials, Systems and Structures in Civil Engineering Conference segment on Moisture in Materials and Structures 22-24 August 2016, Technical University of Denmark, Lyngby, Denmark.*

20 The objective of the invention is to reduce or eliminate the negative effect of condensation on panels having bare surfaces of mineral material, and thus to avoid the negative side-effects of mold growth and softening of interconnecting structures.

25 According to a first aspect of the invention, the above objective is reached by providing:

a panel of the above type, wherein the binder comprises magnesium sulfate, ferric sulfate, potassium salt, a plastic material, or an adhesive, or a combination of  
30 these compounds, with the proviso that the binder has a weight content magnesium chloride of less than 10%, preferably less than 3%, and most preferably less than 0.1%. It is noted that the invention also includes a binder which is free from magnesium chloride.

It has been found that it is possible to develop an improved panel wherein the mineral material is not reliant on a substantial amount of magnesium chloride as a binder, but contains for the major part an alternative binder. As will be elucidated below by comparative tests, such a panel is improved in the sense that it shows significantly less absorption of water under humid conditions, in comparison to a panel in which magnesium chloride is used as a binder. A weight content of at most 10% magnesium chloride in the binder ensures that the amount of this compound is insufficient to contribute significantly to any condensation effect. Obviously, the lower the weight content magnesium chloride in the binder, the better the reduction of the condensation effect is ensured.

Examples of a plastic material suitable in the binder are PE, PET, PP, PU, or PVC. Examples of an adhesive suitable in the binder are polyurethane, polyester, isocyanate, phenol, or urea formaldehyde.

In the context of the invention, the primary components, i.e. magnesium oxide and a suitable binder, have a combined content in the total mineral material of about 60 to 90 wt.%.

Further, the weight ratio between magnesium oxide and a suitable binder, is in the range of 4:1 to 2:1, and preferably about 3:1.

In the panel according to the invention, it is preferred that the major part of the binder component consists of magnesium sulfate. Advantageously, the weight content of magnesium sulfate in the binder is 50% or more, preferably above 75%.

Such a panel has been tested under humid conditions, and showed a significantly reduced condensation effect.

In the context of this mineral composition, the term magnesium sulfate comprises any hydrated molecular form of magnesium sulfate. Typically, the mineral composition will contain predominantly the molecular form of magnesium sulfate heptahydrate.

The panel of the invention is preferably provided with interconnecting coupling means for interconnecting one panel with another.

Such a feature allows for connecting the panels with another without the need of glue, and creates a free floating floor surface.

It is preferred in the panel of the invention, that the composition further comprises reinforcing fibers, perlite, fly ash, and/or foaming agent.

Reinforcing fibers contribute to the rigidity of the main layer, and hence the panel as a whole. Furthermore, the side edges having interconnecting coupling  
5 means are rendered more robust. The fibers may be homogeneously mixed throughout the mineral material. Alternatively, a net structure of fibrous material may be embedded within the main layer of mineral material.

Suitable reinforcing fibers for the invention, are organic fibers such as from wood, straw and bamboo.

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With further preference, in the panel according to the invention, the density of the composition is at least 1250 kg/m<sup>3</sup>, preferably at least 1350 kg/m<sup>3</sup>.

It has been found that higher densities are achievable when using an alternative binder than magnesium chloride, and it is assumed that such may  
15 contribute to further reducing the condensation effect.

According to a preferred embodiment of the panel according to the invention, the main layer has a thickness of 4 to 12 mm.

Such a minimum thickness of the panel is needed in order to ensure the  
20 integrity of the panel, given the mineral material of the main layer.

It is preferred in the panel of the invention, that the top layer has suitable properties for its intended use as a waterproof layer, wear layer, and/or decorative layer.

Any suitable material may be used for the top layer, wherein thermoplastic  
25 materials are preferred, such as vinyl. Alternatively, the top layer may be a resin impregnated paper layer. These materials are well-known in the art as top layers that can be used for the intended purposes.

Obviously, it is preferred that the top layer has waterproof properties as this will minimize the surface of the mineral material exposed to humid air, and thus  
30 further limits the condensation effect to the remaining exposed surfaces, i.e. the side edges and bottom side of the main layer.

Typically, the thickness of the top layer in the panel of the invention is in the range of 0.2 to 2.0 mm.

Preferably in the panel according to the invention, the top layer is adhered to the main layer by an adhesive material.

This is an effective way to avoid delamination between top layer and main layer, which would result in the creation of another exposed surface of mineral material, which is to be avoided as much as possible.

It is preferred in the panel according to the invention, that a backing layer is provided on the bottom side of the main layer.

A backing layer is helpful in providing an optimum interface between the panel and the underlying surface on which the panels are applied. The general advantageous effects of the backing layer are well described in the art. Furthermore, the backing layer can contribute to further limiting the exposed surface of mineral material of the panel.

As a further additional layer, the invention may include a sublayer that is positioned between the core and the top layer in order to reach a desired effect such as sound improvement, indentation resistance improvement.

In the panel according to the invention, it is preferable that the interconnecting coupling means are part of the main layer.

A further preferred embodiment of the panel according to the invention comprises two pairs of opposite side edges which are provided with interconnecting coupling means. As such, the panel may be coupled to adjacent panels in four directions, so that a surface area can expediently be covered by merely interconnected panels.

It is preferred in the panel according to the invention, that the interconnecting coupling means comprise a tongue and a groove wherein the tongue is provided on one side edge of one pair of opposite side edges, and the groove is provided on the other side edge of the same pair of opposite side edges.

In a special preferred embodiment of the panel according to the invention, the interconnecting coupling means have an interlocking feature which avoids free movement of interconnected panels.

Typically, suitable panels for a floor covering have a width in the range of 100 to 600 mm and a length in the range of 300 to 2500 mm.

In a second aspect, the invention relates to a floor or wall covering composed of a plurality of interconnected panels, which panels conform the first aspect of the invention.

Such a floor or wall covering profits from the already discussed advantages of reduction of the condensation effect, so that the covering will suffer less from mold growth, and is moreover less prone to a weakening of the interconnecting parts by water absorption on the side edges.

The invention will be further explained with reference to the appended figures wherein:

- Fig 1 shows in perspective a preferred embodiment of the panel according to the invention;
- Fig. 2 shows a cross section of the preferred embodiment of the panel according to the invention;

Figure 1 shows a panel 1 suitable for assembling a waterproof floor or wall covering by interconnecting a plurality of said panels with each other, wherein the panel has a substantially planar top surface 3, and a substantially planar bottom surface 5, at least four substantially linear side edges 6a,6b,6c,6d comprising at least one pair of opposite side edges 6a,6c which are provided with interconnecting coupling means 7,8 for interconnecting one panel within another, the panel having a sandwich structure which comprises a main layer 10 basically composed of a mineral material, a top layer 12 and a bottom layer 14.

Figure 2 shows the same embodiment as fig. 1 in cross-section, wherein the interconnecting coupling means 7,8 comprise a tongue 7 and a groove 8, each having an interlocking feature 20a (a projection) and 20b (a recess) which avoids free movement of interconnected panels when the tongue of one panel is inserted in the groove of another neighbouring panel.

The central layer 10 is composed of a magnesium board material basically consisting of magnesium oxide with magnesium sulfate as a binder. For strength, reinforcing fibers are mixed into the magnesium board material.

## 5 Example

A hygroscopic comparative test has been performed for two different types of main layers:

10 A main layer according to the prior art, made from a composition based on the primary components MgO and MgCl<sub>2</sub> as binder, referred to as type A;

A main layer according to invention, made from a composition based on the primary components MgO and MgSO<sub>4</sub> as binder, referred to as type B.

15 The composition of type A and type B was as follows:

| <b>Composition</b>             | <b>A<br/>(wt.%)</b> | <b>B<br/>(wt.%)</b> |
|--------------------------------|---------------------|---------------------|
| Magnesium Oxide                | 53                  | 58                  |
| Magnesium chloride             | 29                  | 0                   |
| Magnesium sulfate heptahydrate |                     | 20                  |
| Water                          | 8                   | 8                   |
| Fly ash                        | 1                   | 5                   |
| Wood fibers                    | 8                   | 8                   |
| Perlite                        | 1                   | 0.5                 |
| Modifier aluminum sulfate      | 0                   | 0.5                 |



For both the type A and the type B composition, two samples were produced, with specific dimensions as indicated below. Intrinsic to the nature of the composition, higher densities were obtainable for both type B samples.

| Sample | Composition<br>(primary<br>comp.) | Density<br>(kg/m <sup>3</sup> ) | Thickness<br>(mm) | Width<br>(mm) | Length<br>(mm) |
|--------|-----------------------------------|---------------------------------|-------------------|---------------|----------------|
| A1     | MgO+MgCl <sub>2</sub>             | 1050                            | 5.12              | 60.2          | 71.5           |
| A2     | MgO+MgCl <sub>2</sub>             | 1210                            | 5.20              | 61.1          | 58.7           |
| B1     | MgO+MgSO <sub>4</sub>             | 1380                            | 5.87              | 59.3          | 58.7           |
| B2     | MgO+MgSO <sub>4</sub>             | 1400                            | 5.91              | 60.5          | 45.0           |

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The boards were first dried at rel. humidity 30% and weighed, and subsequently subjected to a rel. humidity of 100% for 24 hrs. and weighed. The relative weight gain is a proper indication of the hygroscopic nature of each sample.

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The results of the above test for each sample, are shown in the table below.

| Sample | Composition<br>(primary<br>comp.) | Density<br>(kg/m <sup>3</sup> ) | Dry<br>Weight<br>(g) | Weight<br>(g) after<br>test | Relative<br>weight<br>gain (%) |
|--------|-----------------------------------|---------------------------------|----------------------|-----------------------------|--------------------------------|
| A1     | MgO+MgCl <sub>2</sub>             | 1050                            | 16.49                | 23.15                       | 40                             |
| A2     | MgO+MgCl <sub>2</sub>             | 1210                            | 17.29                | 22.55                       | 30                             |
| B1     | MgO+MgSO <sub>4</sub>             | 1380                            | 23.08                | 28.22                       | 22                             |
| B2     | MgO+MgSO <sub>4</sub>             | 1400                            | 19.21                | 22.53                       | 17                             |

The above shows that samples B1 and B2 of a main layer according to the invention have a significantly lower weight gain after subjection to the humidity test, than the samples A1 and A2 according to the prior art.

Consequently, the B samples which are based on using magnesium sulfate as a binder instead of magnesium chloride, will suffer less from the condensation effect in general, and the detrimental consequences thereof when applied in a panel according to the invention.

20

## Conclusies

1. Paneel dat geschikt is voor het assembleren van een vloerbedekking door het onderling verbinden van een veelvoud van de panelen,
- 5           waarbij het paneel een wezenlijk vlakke bovenzijde en een wezenlijk vlakke onderzijde, ten minste vier wezenlijk rechte zijranden die ten minste één paar tegenover elkaar gelegen zijranden omvatten, omvat,
- waarbij het paneel een gelaagde structuur heeft die het volgende omvat:
- een hoofdlaag die is gemaakt van een mineraal materiaal,
  - 10           - een toplaag die verschafte is op de bovenzijde van de hoofdlaag;
- waarbij het minerale materiaal een samenstelling is die als voornaamste componenten het volgende omvat:
- magnesiumoxide en/of magnesiumhydroxide,
  - een geschikt bindmiddel,
- 15   **met het kenmerk dat**
- het bindmiddel magnesiumsulfaat, ijzer(III)sulfaat, kaliumzout, een kunststofmateriaal of een hechtmiddel, of een combinatie van deze verbindingen omvat,
- met dien verstande dat het bindmiddel een gewichtsgehalte aan
- 20   magnesiumchloride van minder dan 10%, bij voorkeur minder dan 3% en met de meeste voorkeur minder dan 0,1% heeft.
2. Paneel volgens conclusie 1, waarbij het grootste gedeelte van de bindmiddelcomponent bestaat uit magnesiumsulfaat, en waarbij het paneel bij
- 25   voorkeur voorzien is van koppelingsmiddelen om het ene paneel met het andere te verbinden.
3. Paneel volgens een van de voorgaande conclusies, waarbij de samenstelling verder versterkingsvezels, perliet, vliegias en/of schuimmiddel omvat.
- 30
4. Paneel volgens een van de voorgaande conclusies, waarbij de dichtheid van de samenstelling ten minste 1250 kg/m<sup>3</sup>, bij voorkeur ten minste 1350 kg/m<sup>3</sup> bedraagt.

5. Paneel volgens een van de voorgaande conclusies, waarbij de hoofdlaag een dikte van 4 tot 12 mm heeft.
6. Paneel volgens een van de voorgaande conclusies, waarbij de toplaag geschikte eigenschappen voor zijn bestemde toepassing als een waterbestendige laag, slijtlaag en/of decoratieve laag heeft.
7. Paneel volgens een van de voorgaande conclusies, waarbij de toplaag met een hechtmiddelmateriaal aan de hoofdlaag gehecht is.
8. Paneel volgens een van de voorgaande conclusies, waarbij een onderlaag op de onderzijde van de hoofdlaag verschaft is.
9. Paneel volgens een van de voorgaande conclusies, waarbij de koppelingmiddelen onderdeel van de hoofdlaag zijn.
10. Paneel volgens een van de voorgaande conclusies, dat twee paar tegenover elkaar gelegen zijranden omvat die van koppelingmiddelen voorzien zijn.
11. Paneel volgens een van de voorgaande conclusies, waarbij de koppelingmiddelen een tong en een groef omvatten, waarbij de tong verschaft is op één zijrand van één paar tegenover elkaar gelegen zijranden en de groef verschaft is op de andere zijrand van hetzelfde paar tegenover elkaar gelegen zijranden.
12. Paneel volgens een van de voorgaande conclusies, waarbij de koppelingmiddelen een vergrendelingselement hebben dat vrije beweging van onderling verbonden panelen vermijdt.
13. Vloer- of wandbedekking die opgebouwd is uit een veelvoud van onderling verbonden panelen, welke panelen volgens een van de voorgaande conclusies zijn.

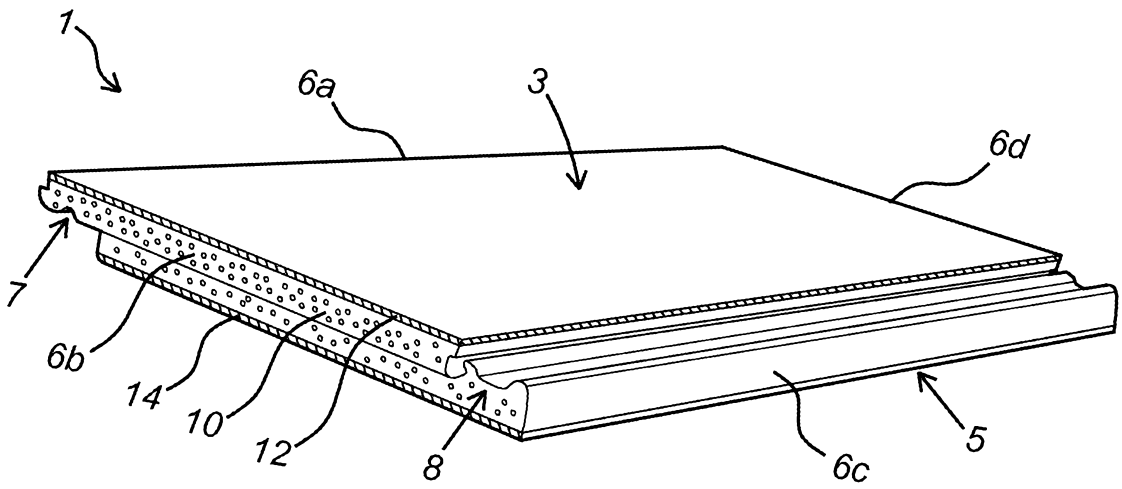


Fig. 1

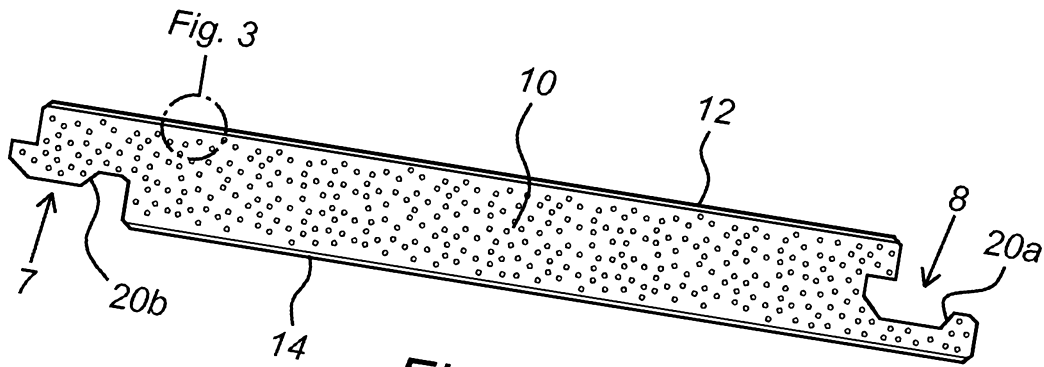


Fig. 2

**Abstract**

Panel suitable for assembling a floor or wall covering by interconnecting a plurality of said panels with each other,

5            wherein the panel has a substantially planar top side, and a substantially planar bottom side, at least four substantially linear side edges comprising at least one pair of opposite side edges,

             the panel having a layered structure which comprises:

- a main layer made from a mineral material,
- 10            - a top layer provided on the top side of said main layer;

             wherein the mineral material is a composition comprising as primary components:

- magnesium oxide and/or magnesium hydroxide,
- a suitable binder,

15        wherein

             the binder comprises magnesium sulfate, ferric sulfate, potassium salt, a plastic material, or an adhesive, or a combination of these compounds,

             with the proviso that the binder has a weight content magnesium chloride of less than 10%, preferably less than 3%, and most preferably less than 0.1%.

## SAMENWERKINGSVERDRAG (PCT)

### RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

|   |  |
|---|--|
| IDENTIFICATIE VAN DE NATIONALE AANVRAGE   | KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE   |
|   | <b>1.1112.008 NL</b>   |
| Nederlands aanvraag nr.   | Indieningsdatum  |
| <b>2019107</b>  | <b>22-06-2017</b>  |
|   | Ingeroepen voorrangdatum   |
| Aanvrager (Naam)  |  |
| <b>CHAMPION LINK INTERNATIONAL CORPORATION</b>  |  |
| Datum van het verzoek voor een onderzoek van internationaal type  | Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. |
| <b>19-08-2017</b>   | <b>SN69525</b>   |
| <b>I. CLASSIFICATIE VAN HET ONDERWERP</b> (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)         |  |
| Volgens de internationale classificatie (IPC)   |  |
| <b>B32B13/00;B32B13/04;B32B13/08;B32B13/12;B32B27/30;<br/>B32B29/00;B32B29/04</b>   |  |
| <b>II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK</b>  |  |
| Onderzochte minimumdocumentatie   |  |
| Classificatiesysteem  | Classificatiesymbolen  |
| <b>IPC</b>  | <b>B32B</b>  |
| Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen |  |
|   |  |
| <b>III.</b>   | <b>GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES</b> (opmerkingen op aanvullingsblad)                                 |
| <b>IV.</b>  | <b>GEBREK AAN EENHEID VAN UITVINDING</b> (opmerkingen op aanvullingsblad)  |

**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek  
NL 2019107

| A. CLASSIFICATIE VAN HET ONDERWERP  |   |  |
|---|---|--|
| INV.  | B32B13/00   | B32B13/04  |
|   | B32B29/00   | B32B29/04  |
|   |   | B32B13/08  |
|   |   | B32B13/12  |
|   |   | B32B27/30  |
| ADD.  |   |  |
| Volgens de internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.   |   |  |
| B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK  |   |  |
| Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)   |   |  |
| B32B  |   |  |
| Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen   |   |  |
| Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)   |   |  |
| EPO-internal, WPI Data  |   |  |
| C. VAN BELANG GEACHTE DOCUMENTEN  |   |  |
| Categorie <sup>1)</sup>   | Geopteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages | Van belang voor conclusie nr.  |
| X   | EP 2 060 389 A1 (CAUWENBERGE NV VAN [BE])<br>20 mei 2009 (2009-05-20)                   | 1  |
| Y   | * samenvatting; conclusies 1-12 *<br>-----  | 2-13   |
| Y   | US 5 256 222 A (SHEPHERD PHILIP B [US] ET<br>AL) 26 oktober 1993 (1993-10-26)           | 1-13   |
|   | * samenvatting; conclusies 1-15 *   |  |
| Y   | CN 105 130 350 A (HUIZHOU MEI SEN BOARD CO<br>LTD) 9 december 2015 (2015-12-09)         | 1-13   |
|   | * samenvatting; conclusies 1-7 *  |  |
| X   | WO 2013/061182 A1 (CANTI MAX [IT])<br>2 mei 2013 (2013-05-02)                           | 1  |
| A   | * samenvatting; conclusies 1-9 *<br>-----   | 2-13   |
|   | -/--  |  |
| <input checked="" type="checkbox"/> Verdere documenten worden vermeld in het vervolg van vak C. <input checked="" type="checkbox"/> Leden van dezelfde octrooifamilie zijn vermeld in een bijlage   |   |  |
| <sup>1)</sup> Speciale categorieën van aangehaalde documenten<br>"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft<br>"D" in de octrooiaanvraag vermeld<br>"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven<br>"L" om andere redenen vermelde literatuur<br>"O" niet-schriftelijke stand van de techniek<br>"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur<br>"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding<br>"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur<br>"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geopteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht<br>"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie |   |  |
| Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid  |   | Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type |
| 21 september 2017   |   |  |
| Naam en adres van de instantie  |   | De bevoegde ambtenaar  |
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040<br>Fax: (+31-70) 340-3016   |   | Bergmans, Koen   |

**ONDERZOEKSRAPPORT BETREFFENDE HET  
 RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
 VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar  
 de stand van de techniek  
**NL 2019107**

| C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN |   |                               |
|---|---|-------------------------------|
| Categorie *                                 | Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages   | Van belang voor conclusie nr. |
| X   | CN 105 712 693 A (LIU YANCAI)<br>29 juni 2016 (2016-06-29)  | 1                             |
| A   | * samenvatting; conclusies 1-10 *<br>-----  | 2-13                          |
| A   | CN 105 462 299 A (UNIV HAINAN; HAINAN<br>ZHAOSHENG TECH DEV CO LTD)<br>6 april 2016 (2016-04-06)<br>* samenvatting; conclusies 1-10 * | 1-13                          |
| A   | CN 105 440 958 A (LUOYANG LVREN ENV<br>EQUIPMENT CO LTD)<br>30 maart 2016 (2016-03-30)<br>* het gehele document *<br>-----            | 1-13                          |



**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek

NL 2019107

| In het rapport<br>genoemd octrooigeeschrift | Datum van<br>publicatie | Overeenkomend(e)<br>geschrift(en) | Datum van<br>publicatie   |
|---|-------------------------|-----------------------------------|---|
| EP 2060389                                  | A1                      | 20-05-2009                        | GEEN  |
| US 5256222                                  | A                       | 26-10-1993                        | AU 640040 B2 12-08-1993<br>AU 5060393 A 27-01-1994<br>CA 2051002 A1 11-03-1992<br>JP H0655472 B2 27-07-1994<br>JP H04244840 A 01-09-1992<br>NZ 239734 A 27-04-1994<br>TW 215469 B 01-11-1993<br>US 5256222 A 26-10-1993 |
| CN 105130350                                | A                       | 09-12-2015                        | GEEN  |
| WO 2013061182                               | A1                      | 02-05-2013                        | BR 112014007172 A2 04-04-2017<br>EP 2760802 A1 06-08-2014<br>RU 2014115852 A 10-11-2015<br>US 2014238266 A1 28-08-2014<br>WO 2013061182 A1 02-05-2013   |
| CN 105712693                                | A                       | 29-06-2016                        | GEEN  |
| CN 105462299                                | A                       | 06-04-2016                        | GEEN  |
| CN 105440958                                | A                       | 30-03-2016                        | GEEN  |

## WRITTEN OPINION

|   |  |                                |                              |
|---|--|--------------------------------|------------------------------|
| File No.<br>SN69525   | Filing date (day/month/year)<br>22.06.2017 | Priority date (day/month/year) | Application No.<br>NL2019107 |
| International Patent Classification (IPC)<br>INV. B32B13/00 B32B13/04 B32B13/08 B32B13/12 B32B27/30 B32B29/00 B32B29/04 |  |                                |                              |
| Applicant<br>CHAMPION LINK INTERNATIONAL CORPORATION  |  |                                |                              |

This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the application
- Box No. VIII Certain observations on the application

|  |                            |
|--|----------------------------|
|  | Examiner<br>Bergmans, Koen |
|--|----------------------------|

## WRITTEN OPINION

Application number  
NL2019107

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### Box No. I Basis of this opinion

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1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - a sequence listing
    - table(s) related to the sequence listing
  - b. format of material:
    - on paper
    - in electronic form
  - c. time of filing/furnishing:
    - contained in the application as filed.
    - filed together with the application in electronic form.
    - furnished subsequently for the purposes of search.
3.  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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### Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

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1. Statement

|                          |             |      |
|--------------------------|-------------|------|
| Novelty                  | Yes: Claims | 1-13 |
|                          | No: Claims  |      |
| Inventive step           | Yes: Claims |      |
|                          | No: Claims  | 1-13 |
| Industrial applicability | Yes: Claims | 1-13 |
|                          | No: Claims  |      |
2. Citations and explanations  
**see separate sheet**

**WRITTEN OPINION**

Application number  
NL2019107

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**Box No. VIII Certain observations on the application**

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**see separate sheet**

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**Novelty**

Document D1 EP2060389 discloses a laminate panel comprising a core layer comprising magnesium oxide disposed between a surface layer such as a decorative layer at the upper side of said core layer and a backing layer at the underside of said core layer, at least one pair of opposing edges of the core layer being profiled to represent a groove and tongue, the tongue having a configuration corresponding to the groove so that several panels can be mutually interlocked in the vertical or horizontal direction in relation to one another, wherein said groove and tongue are made in one piece with the core layer, characterized in that said core layer comprises a composition derived from a colloidal mixture of magnesium oxide, magnesium chloride (low amount) and water. The subject matter of claim 1 over D1 is considered to be not novel

Document D2 US5256222 discloses a lightweight building material board (panel) comprising magnesium oxychloride and magnesium oxy-sulfate as effective binders. It will be understood that similar procedures and formulations would be employed when using this ingredient, with the magnesium chloride being replaced by magnesium sulfate. The difference with the present invention is the panel comprising a multi-layer structure (not disclosed).

Document D3 CN105130350 discloses an inorganic decoration base material plate wherein the magnesium sulfate is used to replace the magnesium chloride as the gelling material, such that the prepared base material plate almost does not contain chlorine ions and significantly increase the water resistance and the dampness resistance of the base material plate. The difference with the present invention is the panel comprising a multi-layer structure (not disclosed).

Document D4 WO2013061182 discloses a binder for manufacturing laminated products. Said binder comprises magnesium oxide and magnesium sulfate and is characterised by its water resistance behaviour. The subject matter of claim 1 over D4 is considered to be not novel

Document D5 CN105712693 discloses a decorative panel comprising a composition of inorganic adhesive includes magnesium oxide, magnesium sulfate and salt. Since claim 1 is not clear, the subject matter of claim 1 over D5 is considered to be not novel

Document D6 CN105462299 discloses an aqueous wall body coating. The difference with the present invention is the panel comprising a multi-layer structure (not disclosed).

Document D7 CN105440958 discloses a mineral binder comprising magnesium sulfate, magnesium oxide and magnesium chloride. The difference with the present invention is the panel comprising a multi-layer structure (not disclosed).

### **Inventive step**

The technical features of the present claims are described in the documents D1-D3. Unless the applicant is able to show by appropriate comparison tests that a panel as claimed in the present application has an effect over a panel disclosed in the prior art, the evidence contained in the present application cannot be taken into consideration for the evaluation of inventive step. Whenever a comparative test is made, the comparison must be done over the technically closest prior art, in a comparable type of use.

### **Re Item VIII**

#### **Certain observations on the international application**

##### **Clarity**

Claim 1 of the present application does not clearly define the subject-matter for which protection is sought. The term "mineral material" is very broad, undefined and can be any mineral material. The disclosure that said mineral material primary comprises magnesium oxide or hydroxide with a suitable binder does not overcome said objection. It is not clear from the claim how primary must be interpreted. Furthermore what material is further present in the binder (page 3). According to the application the invention is in the mineral material and or binder. since there is not sufficient information disclosed in the claim, the claim is unclear and essential features are missing. The applicant is invited to clarify the claim by specifying the different materials present making use of the description and examples disclosed in the application.

Claim 4 of the present application does clearly define the subject-matter for which protection is sought. The standard test method used to determine the density parameter is not disclosed in the claim.

**WRITTEN OPINION  
(SEPARATE SHEET)**

Application number  
NL2019107

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Claim 6 of the present application does clearly define the subject-matter for which protection is sought. Said claim defines result to be achieved. The applicant is invited to characterise and to specify said different parameters and to include the method which is used to determine said different parameters.

Claim 8 of the present application does clearly define the subject-matter for which protection is sought. The applicant is invited to specify the backing layer.