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(71) Applicant (for all designated States except US): **VER-
MALA B.V.** [NL/NL]; Utrechtseweg 4, NL-3927 AV
Renswoude (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **VAN HEUGTEN,
Pieter, Johannes, Maria** [NL/NL]; Heiligenbergerweg 4,
NL-3833 AC Leusden (NL).

(74) Agent: **WINCKELS, J.H.F.**; Johan de Wittlaan 7,
NL-2517 JR Den Haag (NL).

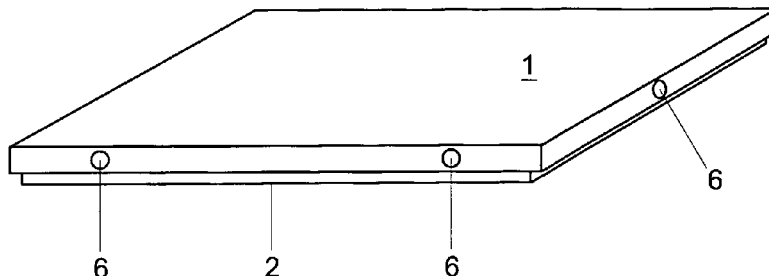
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ning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR MANUFACTURING A TILE, TILE, AND METHODS FOR LAYING AND REMOVING A TILE
FLOOR



(57) Abstract: A method for manufacturing a tile, wherein in a first manufacturing step a loose tile is manufactured, and in a second manufacturing step a back of the loose tile is provided with a backing layer from damping material, such that a loose tile with a backing layer is obtained. The invention further concerns a tile obtained with the method according to the invention and a method for laying and a method for removing a tile floor provided with such tiles.

Title: Method for manufacturing a tile, tile, and methods for laying and removing a tile floor.

The invention relates to a method for manufacturing a tile.

From practice, it is known to manufacture tiles by sawing tiles from natural stone, by firing tiles in a kiln or by a process as described in the American patent US-A-3 344 011. In the method described in the American
5 patent, first a mold is provided which comprises a bottom and a number of upstanding side edges, after which a filler having an aggregate distributed therein is introduced into the mold. The filler can be an organic resin, such as, for instance, epoxy, and the aggregate can be, for instance, marble chips. The end result of the known method for manufacturing a tile is a tile whose
10 upper surface has a circumferential edge which is formed by the upstanding edges of the mold and a variant inner surface. The bottom wall of the known tile can be manufactured, according to the American publication, from wood, metal, synthetic organic resins, such as, for instance, polyvinyl chloride, saran, polyethylene, polypropylene, polystyrene, with a preference
15 expressed for high impact-type resins, such as, for instance, nylon and polyester.

Further, American patent US-A-4 832 995 describes panels by means of which a tile wall or a tile floor can be rapidly assembled. Each panel contains a number of tiles and a backing layer which connects the tiles with
20 each other. Between the tiles, a jointing material has already been applied, so that with the aid of the panels, a floor or wall can be rapidly provided with a tile facing.

The insight underlying the present invention is that it would be particularly favorable when a tile floor could be simply laid and also
25 removed again, for instance when moving house. To date, the tiles of the known tile floors have been connected with the substrate by means of an adhesive. As a consequence, removing a tile floor is not possible without thereby destroying the tiles. The object of the present invention is to provide

a method for manufacturing tiles, as well as tiles, and a method for laying, and removing, a tile floor, all these subjects being based on the common inventive concept that a tile that is removable and simple to lay for amateurs would create a new area of application for tiles.

5 To that end, the invention provides a method for manufacturing a tile, wherein in a first manufacturing step a loose tile is manufactured, and in a second manufacturing step a back of the loose tile is provided with a backing layer from damping material, such that a loose tile with a backing layer is obtained.

10 As with the method according to the invention loose tiles with a backing layer are obtained, an amateur can simply place these loose tiles on a floor surface. This does not require the use of an adhesive to bond the tiles to the substrate, since the backing layer creates a considerable friction between the substrate and the tile, so that shifting of the tiles is prevented
15 altogether or to a considerable extent. As the backing layer moreover consists of damping material, the tiles can also be used in apartments and blocks of flats without the downstairs neighbors thereby experiencing nuisance. Another advantage of the tiles obtained with the method is that the tiles can be removed from the floor substrate again without damage.

20 Since loose tiles are involved and not panels, handling the tiles when laying the floor is simple.

 The invention also relates to a tile obtained with the method according to the invention. Furthermore, the invention relates to a tile assembly comprising a tile and a backing layer, the tile being a loose tile, such as, for
25 instance, a flagstone, where, after the manufacture of the tile, the damping backing layer has been provided on the back thereof.

 Furthermore, the invention concerns a method for laying a tile floor using such tiles, wherein the tiles provided with a backing layer are placed loosely on a substantially flat substrate, whereafter a removable jointing
30 material is applied between the tiles. Such a floor has the above-described

advantages of damping well, being simple to place, and the possibility of simple removal of the floor tiles in that they have been placed loosely on the substrate. The invention also provides a method for removing the tiles, which is characterized in that the jointing material is removed and the floor
5 tiles are taken off the substrate. In that case, the jointing material may be removed first, after which the floor tiles are taken off the substrate. In an alternative embodiment, the tiles can also be taken off the substrate with jointing material adhering to them, after which the individually obtained tiles are stripped of clinging jointing material.

10 In order to further simplify laying the tiles, according to a further elaboration of the invention, the tiles can be provided on the side edges with spacer lugs to provide for a uniform joint width between the tiles.

According to an alternative further elaboration of the invention, such a uniform joint width can also be obtained in that, before applying the
15 removable jointing material, spacers are placed between the tiles.

The damping material from which the backing layer is manufactured can be a foamed plastic layer, such as, for instance, a PVC layer. However, according to the invention, it is preferred for the damping material to be bitumen, optionally modified with filler. As filler, for instance lime can be
20 used.

According to a further elaboration of the invention, the damping material can be applied to the back of the tile in the form of a layer cut to size prior to placement. It is then preferred that the width and length dimensions of the layer to be provided on a tile are slightly smaller than the
25 width and length dimensions of the respective tile. What is thus accomplished is that tolerance when placing the damping material on the tile is somewhat wider, which simplifies the manufacture of the tile.

According to a further elaboration of the invention, the backing layer is heated, whereby the layer, under the influence of the heating, obtains
30 adhesive properties, so that a fixed bond between the layer and the tile is

obtained. For instance in the case of bitumen, but also in the case of some synthetic resins, heating leads to the adhesive properties mentioned and therefore there is no need to separately apply glue to the tile or the backing layer to effect the adhesion between these two.

5 According to a further elaboration of the invention, it is particularly favorable when the heating of the layer is effected in that the tile has been heated before the layer is applied, whereafter the layer is placed on the back of the tile so that this layer obtains an increased temperature and hence the adhesive properties referred to. This variant is of advantage in particular
10 when heating has been effected in that, prior to the application of the layer, the tile has traversed a baking or glazing step in a baking or glazing oven. Under those circumstances, the tile is warm anyway in view of the preceding baking or glazing process. Such a variant therefore has energy-technical advantages. In that variant, too, it is of particular advantage
15 when the backing layer that is applied has slightly smaller dimensions than the tile, in view of the slightly wider application tolerances when applying the damping layer to the back of the tile. According to an alternative further elaboration, the heating of the layer can also be effected in that the side of the layer to be adhered to the tile is heated prior to application of the layer,
20 so that this side obtains adhesive properties, whereafter the layer is placed by that side on the back of the tile.

 According to an alternative elaboration of the invention, the layer on the back of the tile can be formed by applying the layer material in liquid form onto the back of the tile. In that case, before the liquid layer material
25 is applied to the back of the tile, a temporary casting mold can be placed on the back of the tile, which extends along the peripheral edges of the tile. It is also possible that, instead of on the back, strips are placed against the peripheral edges of the tile, thereby forming a casting mold. The height of the casting mold will preferably correspond to the height of the layer to be
30 created. According to a further elaboration of this variant, with the aid of a

squeegee, the liquid layer material can be smoothed out so as to form a layer of a substantially constant thickness. The liquid layer material can for instance be formed by molten bitumen, optionally modified with filler. The filler can for instance be lime.

5 Finally, according to a third further elaboration of the method according to the invention, before applying the backing layer onto the tile, the back of the tile and/or the side of the layer facing the tile can be provided with an adhesive. Such a method has the advantage of a greater freedom of choice as regards the layer material, since the layer material
10 does not itself need to have adhesive properties.

As regards the method for placing tiles on a substrate to form a tile floor, it is to be noted that after placing the tiles, a removable jointing material is applied between the tiles. This removable jointing material can for instance be formed by a very loose grout which is of such a composition
15 that after hardening it readily allows of pulverization. Incidentally, according to an alternative further elaboration, the removable jointing material can also be formed by a cement remaining flexible.

The tiles can for instance be manufactured from natural stone or comprise fired tiles. Also glass as a tile material is one of the possibilities.
20 The methods for manufacturing a tile will be further clarified hereinafter on the basis of an exemplary embodiment, with reference to the drawing.

Fig. 1 shows a perspective view of a tile which has been manufactured with the method according to the invention;

Fig. 2 shows a bottom plan view of the tile represented in Fig. 1;

25 Fig. 3 shows an exemplary embodiment of a method for applying a backing layer to a tile.

The exemplary embodiment of a tile or tile assembly represented in Fig. 1 shows a tile 1, on the back of which a backing layer 2 from damping material has been provided. The material can be, for instance, bitumen,
30 optionally modified with filler, such as, for instance, lime. Layer 2 has width

and length dimensions that are slightly smaller than the width and length dimensions of the respective tile 1. Thus, the tile can for instance project on each side by 1-3 mm with respect to the backing layer. This makes it simpler to place a layer of backing material on the tile 1 for manufacturing a tile according to the invention, in that the positioning of the layer 2 is less critical. As already described above, the layer 2 can be adhered to the tile 1 in that the layer 2 and/or the tile 1 is/are heated before placement of the layer 2 onto the tile 1. To that end, the backing layer material should obtain adhesive properties under the influence of heating. This holds for bitumen and for some plastics. However, there are also plastics where such a manner of adhesion is not an option. With such plastics, use can be made of a separate adhesive which is applied to the back of the tile 1 and/or a side of the backing layer 2 facing the tile.

A third manner of providing a backing layer on a tile is represented in Fig. 3. Fig. 3 shows a tile 1 on which a temporary mold 3 has been placed. The mold 3 comprises a number of peripheral edges extending along the side edges of the tile 1. Liquid backing material 4 is deposited onto the tile 1 in the space bounded by the mold and subsequently distributed over the bottom surface of the tile 1 with a squeegee 5 so as to form a layer 2 having a substantially constant thickness. To that end, the squeegee 5 moves back and forth in the directions T and T'.

Optionally, the tiles 1 may be provided with spacer lugs 6 on their side edges, so as to provide for a uniform joint width between the tiles when the tiles are placed on a substrate. The lugs 6 are represented in the exemplary embodiments of Figs. 1 and 2. It will be clear that also tiles without such spacer lugs fall within the framework of the concept of the invention. Other variants also fall within the scope of the invention. For instance, the invention relates not only to rectangular or square tiles but also to tiles having a different shape. Of importance is that the tiles can be laid loosely as a result of the presence of the backing layer 2, which preferably has a

high coefficient of friction, thereby preventing the tiles shifting. Moreover, it is important that the backing layer 2 has damping properties, so that use of the tiles in apartments or blocks of flats is possible without causing sound nuisance. As already indicated above, the jointing material that is applied
5 between the tiles placed on a substrate is formed by a flexible cement or by a grout which has such a structure that it readily allows of pulverization when the floor is to be removed from the substrate again.

In the foregoing, reference has been made to the back and the front of the tiles. It will be clear that in a condition of the tiles when placed on a
10 substrate, the back forms the underside of the tile and the front the upper side of the tile.

CLAIMS

1. A method for manufacturing a tile, wherein in a first manufacturing step a loose tile is manufactured, and in a second manufacturing step a back of the loose tile is provided with a backing layer from damping material, such that a loose tile with a backing layer is obtained.
- 5 2. A method according to claim 1, wherein the damping material is bitumen, optionally modified with filler.
3. A method according to claim 1 or 2, wherein the damping material is applied to the back of the tile in the form of a layer cut to size before placement.
- 10 4. A method according to claim 3, wherein the width and length dimensions of the layer to be applied to a tile are somewhat smaller than the width and length dimensions of the respective tile.
5. A method according to claim 3 or 4, wherein the layer is heated, whereby the layer obtains adhesive properties under the influence of the
15 heating, so that a fixed connection between the tile and the layer is obtained.
6. A method according to claim 5, wherein the heating of the layer is effected in that the side of the layer to be adhered to the tile is heated prior to placement of the layer, so that this side obtains adhesive properties,
20 whereafter the layer is placed by that side onto the back of the tile.
7. A method according to any one of claim 1-5, wherein the heating of the layer is effected in that the tile has been heated before the layer is applied, whereafter the layer is placed so that this layer obtains an increased temperature and hence said adhesive properties.
- 25 8. A method according to claim 7, wherein the tile has been heated in that, prior to application of the layer, the tile has traversed a baking or glazing step in a baking or glazing oven.

9. A method according to claim 1 or 2, wherein the layer is formed on the back of the tile by applying the layer material in liquid form to the back of the tile.
10. A method according to claim 9, wherein, before the liquid layer material is applied to the back of the tile, a temporary casting mold is placed on the back of the tile, which extends along the side edges of the tile.
11. A method according to claim 9 or 10, wherein by means of a squeegee, the liquid layer material is smoothed out to form a layer having a substantially constant thickness.
12. A method according to any one of claims 9-11, wherein the liquid layer material is bitumen, optionally modified with filler.
13. A method according to any one of claims 1-4, wherein, before applying the backing layer onto the tile, the back of the tile and/or the side of the layer facing the tile is/are provided with an adhesive.
14. A tile obtained with the method according to any one of the preceding claims.
15. A tile assembly comprising a tile and a backing layer, wherein the tile is a loose tile, such as, for instance, a flagstone, where, after the manufacture of the tile, the damping backing layer has been applied to the back thereof.
16. A method for laying a tile floor using tiles according to claim 14 or 15, wherein the tiles provided with a backing layer are placed loosely on a substantially flat substrate, whereafter a removable jointing material is applied between the tiles.
17. A method according to claim 16, wherein the tiles are provided with spacer lugs on the side edges for forming a uniform joint width between the tiles.
18. A method according to claim 16, wherein, before applying the removable jointing material, spacers are placed between the tiles to form a uniform joint width between the tiles.

19. A method according to any one of claims 16-18, wherein the removable jointing material is a cement remaining flexible, such as, for instance, silicone paste.

20. A method according to any one of claims 16-18, wherein the removable
5 jointing material is a very loose grout of such a composition that, after hardening, it readily allows of pulverization.

21. A method for removing a tile floor laid using the method according to any one of claims 16-20, wherein the jointing material is removed and the floor tiles are taken off the substrate.

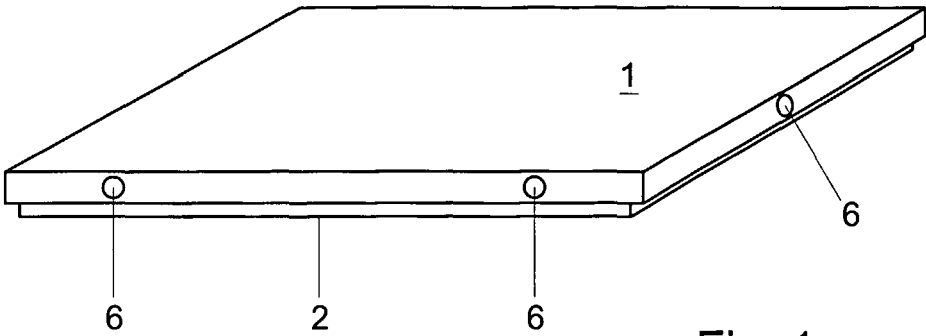


Fig. 1

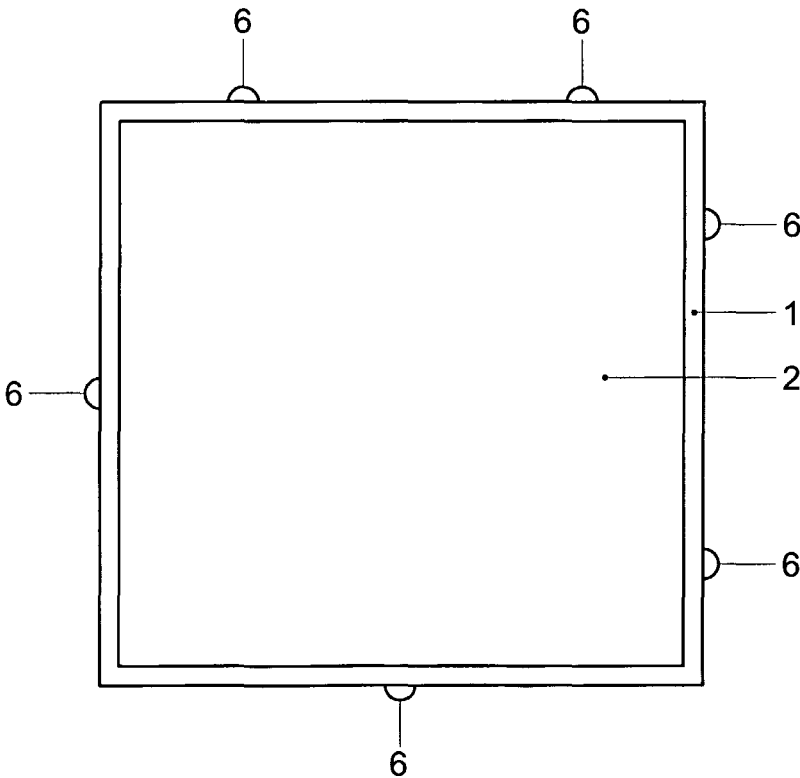


Fig. 2

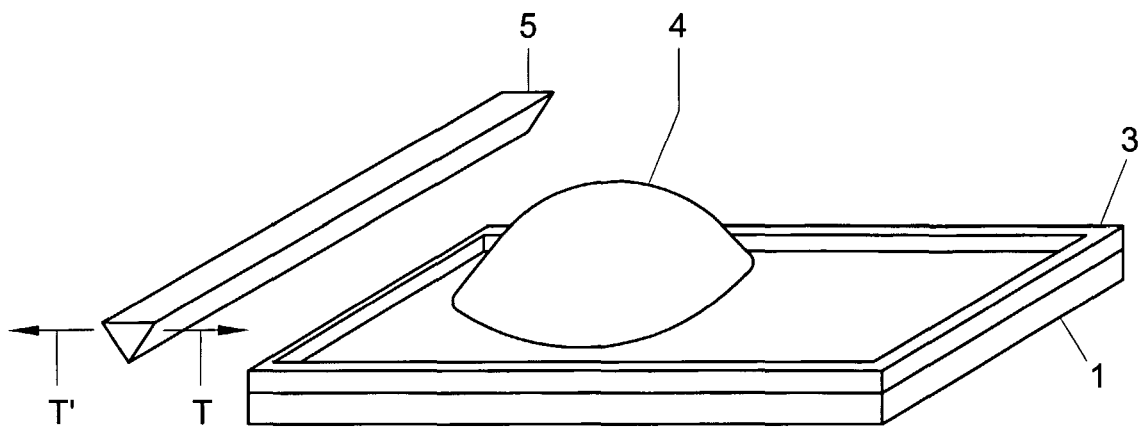


Fig. 3

INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/NL2004/000837

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B28B11/04 E04F15/08 E01C5/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B28B E01C E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 682 415 A (DUCROCQ GERARD) 16 April 1993 (1993-04-16) page 3, line 6 - page 4, line 3; claims 4-6; figures 1-3 -----	1,2,9-15
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X	DE 298 05 940 U (KORZILIUS MARK) 16 July 1998 (1998-07-16) the whole document -----	14-17, 19,21

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Orij, J

MightySlab Distribution Co

INTERNATIONAL SEARCH REPORT

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