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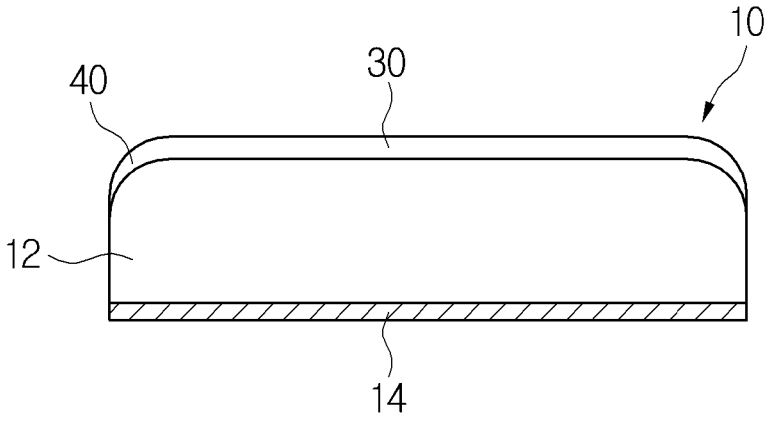
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(54) Title: FLOORING USING PVC AND METHOD OF CONSTRUCTING THE FLOORING



(57) Abstract: The present invention relates to PVC resin flooring in which a tile is molded out of PVC, that is, vinyl chloride resin, and the four-sided edges of the tile are molded into curved surfaces. The PVC resin flooring constructed in a floor includes a resin tile configured to include a base layer and a surface layer, wherein the surface layer comprises a dimension stabilization layer, a balance layer, a printing layer, a transparent layer, and a protection layer sequentially stacked on a top surface of the base layer, the base layer and the surface layer are made of PVC resin and jointed, and the four-sided edges of the resin tile are molded into curved surfaces; and a grouting constructed in a gap between the resin tiles, wherein the resin tile is constructed by coating an adhesive on a construction floor, the resin tiles are spaced apart from one another at intervals, and construction is finished by filling the gap between the resin tiles with the grouting.

Description

Title of Invention: FLOORING USING PVC AND METHOD OF CONSTRUCTING THE FLOORING

Technical Field

[1] The present invention relates to flooring using Polyvinyl Chloride (PVC) and a method of constructing the flooring, and more particularly, to PVC flooring in which a tile is molded out of PVC, that is, vinyl chloride resin, and the four-sided edges of the tile are molded into curved surfaces, thereby enabling a grouting construction, and a method of constructing the flooring.

[2] Furthermore, the present invention relates to PVC flooring having a beautiful external appearance, facilitating construction, and capable of preventing a tile from being deviated even when the tile is contracted or expanded, in such a manner that tiles are adhered with a gap interposed therebetween and constructed by coating an adhesive on a construction floor so that grouting construction is performed and a method of constructing the flooring.

Background Art

[3] In general, a tile is a product having a flat panel shape that is fabricated in order to cover surfaces, such as a floor or a wall. A tile is classified into an interior tile, an exterior tile, a mosaic tile, an acid-resisting tile, a floor tile, and a saltpan tile depending on its use and is made of a ceramic material, a stoneware material, a semi-ceramic material, a pottery material, a clay material, and synthetic resin depending on materials. A tile is constructed by wet and dry construction methods.

[4] From among the wet and dry construction methods, the dry construction method is to construct tiles by using an adhesive. In this method, a polishing work and an alien substance removal work are performed on a floor or wall body, an adhesive is coated on the floor or wall body, and tiles are adhered to a top surface of the floor or wall body. Here, a resin tile made of synthetic resin not a ceramic tile is used.

[5] A conventional resin tile used in the dry construction method is fabricated by forming a base layer by pressing a PVC resin compound by a calender, fabricating a printing hiding layer by rolling the soft or hard PVC resin compound including calcium carbonate, that is, a filler, and then forming a printing ink layer by using transfer paper that has been directly subject to gravure printing on the printing hiding layer.

[6] Next, a pattern protection layer for protecting the printing ink layer and a back layer are fabricated by rolling a soft or semi-hard PVC resin compound. The back layer, the base layer, the printing hiding layer, and the pattern protection layer are stacked and

pressed by a veneer board role or a press, thereby completing the conventional resin tile.

[7] In this method of constructing flooring, the wet construction method is disadvantageous in that a construction period is long because a curing time is necessary and only a skilled worker can perform a work easily. Furthermore, the dry construction method is advantageous in that a construction period is short and construction is convenient, but is disadvantageous in that various productions are impossible because tiles are adhered together and constructed without a gap therebetween.

[8] This is because the tile is thin and the edge of the tile is angular and thus boundaries, such as the printing layer and the protection layer, appear when resin tiles are spaced apart from one another at intervals, resulting in a poor external appearance.

[9] Furthermore, this tile is problematic in that the protection layer is peeled off over time because the boundary of the surface layer is stepped on by a walker.

Disclosure of Invention

Technical Problem

[10] The present invention has been made in view of the above problems, and it is an object of the present invention to provide flooring capable of giving various productions, preventing the deviation of a tile, and having a beautiful external appearance by spacing the tiles apart from one another in a wet construction method and performing grouting construction on a gap between the tiles and a method of constructing the flooring.

[11] Another object of the present invention is to provide flooring having a beautiful external appearance, in which when a base layer and a surface layer are compressed, the four-sided edges of a tile are molded into curved surfaces so that the boundary of the surface layer is not seen after construction, the tiles are constructed so that they can be spaced apart from one another, and grouting construction can be performed on a gap between the tiles and a method of constructing the flooring.

[12] Yet another object of the present invention is to provide flooring in which the edges of a tile that forms flooring are molded into curved surfaces, the portions are not broken or torn, and a protection layer is not peeled off although there are many walkers and a method of constructing the flooring.

Solution to Problem

[13] The present invention provides flooring constructed in a floor, including a resin tile configured to include a base layer and a surface layer, wherein the surface layer includes a dimension stabilization layer, a balance layer, a printing layer, a transparent layer, and a protection layer sequentially stacked on a top surface of the base layer, the base layer and the surface layer are made of PVC resin and jointed, and the four-sided

edges of the resin tile are molded into curved surfaces; and a grouting constructed in a gap between the resin tiles, wherein the resin tiles are constructed by coating an adhesive on a construction floor, the resin tiles are spaced apart from one another at intervals, and construction is finished by filling the gap between the resin tiles with the grouting.

[14] Furthermore, the present invention provides a method of constructing natural resin flooring, including a construction preparation step of performing a polishing work on a construction floor and removing alien substances from the construction floor, an adhesive coating step of coating an adhesive on the construction floor, a resin tile adhesion step of adhering resin tiles, each formed by sequentially stacking and jointing a base layer, a foundation layer, a dimension stabilization layer, a balance layer, a printing layer, a transparent layer, and a protection layer made of PVC resin, to the adhesive, wherein the resin tiles are adhered together with a gap interposed between the resin tiles, and a grouting construction step of constructing a grouting in the gap between the resin tiles.

Advantageous Effects of Invention

[15] First, the present invention is advantageous in that an external appearance is beautiful because the four-sided edges of a tile are molded into curved surfaces and a protection layer can be prevented from being deviated although many walkers step on the tiles after construction.

[16] Second, in accordance with the present invention, the boundary of a surface layer is not seen after construction because the four-sided edges of a tile that forms flooring are molded into curved surfaces, and a protection layer is not peeled off because a walker does not step on the boundary of the surface layer. Furthermore, tiles can be constructed so that the tiles are spaced apart from one another.

[17] Third, the present invention is advantageous in that grouting construction used in only a wet construction method can be performed, a tile can be prevented from being deviated even when the tile is contracted and expanded depending on a temperature change, various productions are possible by using a grouting, and construction is convenient.

Brief Description of Drawings

[18] FIG. 1 is a perspective view of natural resin flooring in accordance with the present invention,

[19] FIG. 2 is an exploded sectional view of a resin tile that is applied to the present invention,

[20] FIG. 3 is one side view of the resin tile that is applied to the present invention,

[21] FIG. 4 is one side view of a molding die for molding the resin tile in accordance with

the present invention,

[22] FIG. 5 is one side view of an example of a molding apparatus for molding the resin tile that is applied to the present invention,

[23] FIG. 6 is a cross-sectional view of a process of constructing the resin tile in accordance with the present invention, and

[24] FIG. 7 is an exploded view of some major parts of the present invention.

[25] <Description of reference numerals of principal elements in the drawings>

[26] 10: tile 12: base layer

[27] 14: base layer 20: grouting

[28] 30: surface layer 31: dimension stabilization layer

[29] 32: upper balance layer 33: printing layer

[30] 33: transparent layer 34: protection layer

Mode for the Invention

[31] Some embodiments of the present invention are described in detail below with reference to the accompanying drawings.

[32] FIG. 1 is a perspective view of natural resin flooring in accordance with the present invention, FIG. 2 is an exploded sectional view of a resin tile that is applied to the present invention, and FIG. 3 is one side view of the resin tile that is applied to the present invention.

[33] Furthermore, FIG. 4 is one side view of a molding die for molding the resin tile in accordance with the present invention, FIG. 5 is one side view of an example of a molding apparatus for molding the resin tile that is applied to the present invention, FIG. 6 is a cross-sectional view of a process of constructing the resin tile in accordance with the present invention, and FIG. 7 is an exploded view of some major parts of the present invention.

[34] The natural resin flooring 1 of the present invention includes a tile 10 made of PVC resin and a grouting 20 filled between the tiles after the resin tiles 10 are adhered and constructed.

[35] The grouting 20 is made of white cement, epoxy resin, or another filling material. The white cement is constructed by mixing it up with water, and the epoxy resin is constructed directly or by using a gun.

[36] The resin tile 10 basically includes a base layer 12, a foundation layer 14 compressed onto the bottom of the base layer 12, and a surface layer 30 stacked on a top surface of the base layer 12. The surface layer 30 includes a dimension stabilization layer 31, a balance layer 32, a printing layer 33, a transparent layer 34, and a protection layer 35.

[37] The base layer 12 is fabricated by molding PVC resin by using a press or roll compression method.

[38] The dimension stabilization layer 31 of the surface layer 30 functions to reinforce the resin tile 10 and prevent a change of dimensions. The dimension stabilization layer 31 is fabricated by molding PVC resin and may be made of glass fiber or fabrics if necessary. The dimension stabilization layer 31 also functions to prevent a phenomenon in which a gap between the resin tiles 10 is widened in use.

[39] The foundation layer 14 provided at the bottom of the base layer 12 and the balance layer 32 provided on a top surface of the dimension stabilization layer 31 function to balance the tile 10, that is, the bottom of the base layer 12, reinforce reality, provide surface physical properties, and prevent the bending of the tile. The foundation layer 14 is made of PVC resin.

[40] The printing layer 33 can have a variety of patterns and designs and may have engravings and embossed carvings according to circumstances. The printing layer 33 can have a variety of colors, and a design or figure desired by a user may be printed on the printing layer 33.

[41] The transparent layer 34 functions to protect the printing layer 33. The transparent layer 34 is fabricated by molding PVC resin, and the protection layer 35 may be made of a thermosetting or ultraviolet (UV) composite.

[42] Meanwhile, the PVC resin used in the present invention is vinyl chloride resin, and vinyl chloride resin refers to a homopolymer or a copolymer including vinyl chloride of 50% or higher. Vinyl chloride resin is characterized in that it has low crystallinity and it is difficult to adhere at the time of processing. However, vinyl chloride resin is a soft product and used in sheets or films for packaging and agriculture. In the case of a hard product, vinyl chloride resin is fabricated by molding.

[43] Molding in the present invention is performed by a pair or more of arranged rolling rollers or a press. In the present invention, an apparatus, such as that shown in FIGS. 4 and 5, can be used. This is described later.

[44] The base layer 12, the foundation layer 14, the dimension stabilization layer 31, the balance layer 32, and the transparent layer 34 are molded by rolling a PVC resin compound.

[45] In other words, in the tile of the present invention, the base layer 12 is molded by rolling a PVC resin compound by using a plurality of arranged rolling rollers. The foundation layer 14, the dimension stabilization layer 31, the balance layer 32, and the transparent layer 34 are molded by rolling a soft or hard PVC resin compound including calcium carbonate, that is, a filler. The printing layer 32 is formed by gravure printing.

[46] The tiles of the present invention which are consecutively and individually molded and fabricated by rolling rollers or a press are jointed by molding apparatuses that are disposed consecutively to the rolling rollers and press.

[47] Here, a molding die 100 for compressing the tiles in such a way as to compress the tiles has a square container form including a top wall 120 and a side wall 140 as shown in FIG. 4. An edge portion at which the top wall 120 meets the side wall 140 is molded into a curved line 160.

[48] This form is for molding each of the four-sided edges of the tile 10 into a curved surface 40 when completing the tile 10 by compression.

[49] The tile 10 having the above form is one of major characteristics of the present invention. This tile 10 makes beautiful its external appearance and also enables the grouting 20 to be constructed. That is, when an end portion of the surface layer 30 of the tile 10 is placed at a side portion of the tile 10, the boundary of the surface layer 30 is not seen after construction, so that the tile 10 has a beautiful external appearance. For this reason, the tiles 10 can be constructed so that they are spaced apart from one another. Furthermore, the tiles 10 can be prevented from being deviated by constructing the grouting 20 in a gap between the tiles 10, and an external appearance of the flooring can have a variety of productions.

[50] FIG. 5 is a schematic diagram of a molding apparatus for driving the molding die 100. In this molding apparatus, the base layer 12 and the surface layer 30 are placed on a transfer table 220, and the molding die 100 compresses and molds tiles while being raised or lowered by an elevation unit in the state in which the molding die 100 is fixed to the elevation unit 240. The elevation unit can include a cylinder or another mechanical device.

[51] The molding apparatus of FIG. 5 is only an embodiment. The tile of the present invention can be molded by a molding apparatus and die having other forms and other driving means, but the four-sided edges of the tile must be molded into curved surfaces.

[52] A process of constructing the flooring in accordance with the present invention is described below.

[53] First, in the present invention, the tile 10 is molded by using natural resin, that is, PVC resin.

[54] The base layer 12, the foundation layer 14, the dimension stabilization layer 31, the balance layer 32, and the transparent layer 34 are molded by a work using rolling rollers or a press work and are then jointed by the molding apparatus or another molder connected consecutively to the rolling rollers or press.

[55] The printing layer 32 and the protection layer 35 are printed by consecutive processes, and a thermosetting or ultraviolet (UV)-curing composite is coated on the printing layer 32 and the protection layer 35.

[56] Here, the four-sided edges of the tile 10 are rounded, that is, molded into the curved surfaces 40. Accordingly, the boundary of the surface layer 30 stacked on the based

layer 12 is not seen, and the boundary of the surface layer 30 is not stepped on although a walker steps on the tile 10. As a result, damage to the printing layer 33, the transparent layer 34, and the protection layer 35 can be prevented.

[57] The construction of the flooring, that is, the tile 10, is started by making uniform a construction floor. If the construction floor is not uniform, a worker prepares for construction by performing a polishing work and removing alien substances.

[58] After removing alien substances, a worker coats an adhesive on the construction floor and adheres the tile 10 of the present invention to the adhesive. Here, a worker performs construction so that the tiles are spaced apart from one another and performs the grouting 20 on a gap between the tiles 10.

[59] The tiles 10 can be adhered together and constructed without a gap between the tiles 10 depending on construction conditions.

[60] In the step of constructing the grouting 20, white cement or epoxy resin is used. The grouting 20 is filled up to the top of the surface layer 30 configured to have an edge molded into the curved surface 40 and a boundary placed on the side of the tile 10, that is, the boundary of the protection layer 30, thereby preventing a peeling-off phenomenon and the deviation of the tiles.

Claims

[Claim 1] Polyvinyl Chloride (PVC) resin flooring constructed in a floor, the PVC resin flooring comprising:
a resin tile configured to comprise a base layer and a surface layer, wherein the surface layer comprises a dimension stabilization layer, a balance layer, a printing layer, a transparent layer, and a protection layer sequentially stacked on a top surface of the base layer, the base layer and the surface layer are made of PVC resin and jointed, and four-sided edges of the resin tile are molded into curved surfaces; and
a grouting constructed in a gap between the resin tiles,
wherein the resin tiles are constructed by coating an adhesive on a construction floor, the resin tiles are spaced apart from one another at intervals, and construction is finished by filling the gap between the resin tiles with the grouting.

[Claim 2] The PVC resin flooring of claim 1, wherein:
the grouting is filled between the gap between the resin tiles,
the four-sided edges of the resin tile are molded into the curved surfaces, and
the grouting is formed to cover up to a top surface of the surface layer.

[Claim 3] The PVC resin flooring of claim 1, wherein the grouting is made of white cement or epoxy resin.

[Claim 4] A method of constructing natural resin flooring, comprising:
a construction preparation step of performing a polishing work on a construction floor and removing alien substances from the construction floor;
an adhesive coating step of coating an adhesive on the construction floor;
a resin tile adhesion step of adhering resin tiles, each formed by sequentially stacking and jointing a base layer, a foundation layer, a dimension stabilization layer, a balance layer, a printing layer, a transparent layer, and a protection layer made of Polyvinyl Chloride (PVC) resin, to the adhesive, wherein the resin tiles are adhered together in a state in which a gap is interposed between the resin tiles; and
a grouting construction step of constructing grouting in the gap between the resin tiles.

[Claim 5] The method of claim 4, wherein the resin tile is adhered to the adhesive

in a state in which four-sided edges of the resin tile are molded into curved surfaces.

[Claim 6] The method of claim 4, wherein an edge portion of the resin tile at which upper and side plates of the resin tile are met are compressed by a molding die having a curved line so that the four-sided edges of the resin tile are molded into the curved surfaces.

[Claim 7] The method of claim 4, wherein the grouting filled between the resin tiles is filled up to the protection layer that is a highest layer of the resin tile.

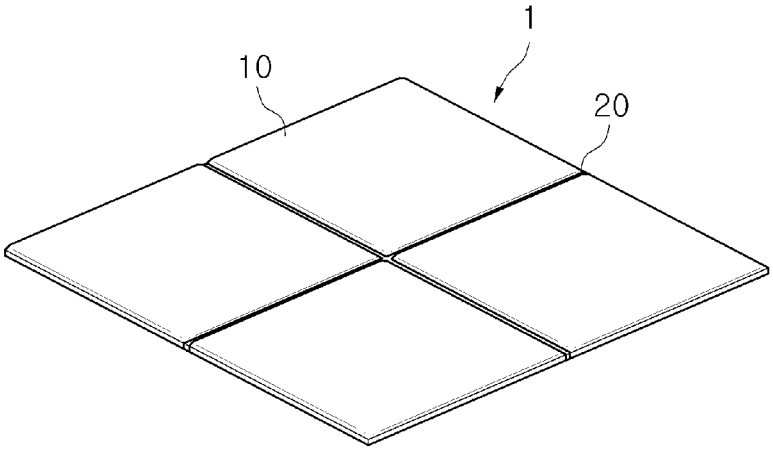
[Claim 8] Flooring constructed in a floor, comprising:
a resin tile configured to comprise a base layer and a printing layer and a transparent layer sequentially stacked on a top surface of the base layer, wherein one or more of the base layer, the printing layer, and the transparent layer are made of Polyvinyl Chloride (PVC) resin and four-sided edges of the resin tile are molded into curved surfaces; and
a grouting constructed in a gap between the resin tiles,
wherein the resin tile is constructed by coating an adhesive on a construction floor, the resin tiles are spaced apart from one another at intervals, and construction is finished by filling the gap between the resin tiles with the grouting.

[Claim 9] The flooring of claim 8, wherein a protection layer is stacked over the transparent layer.

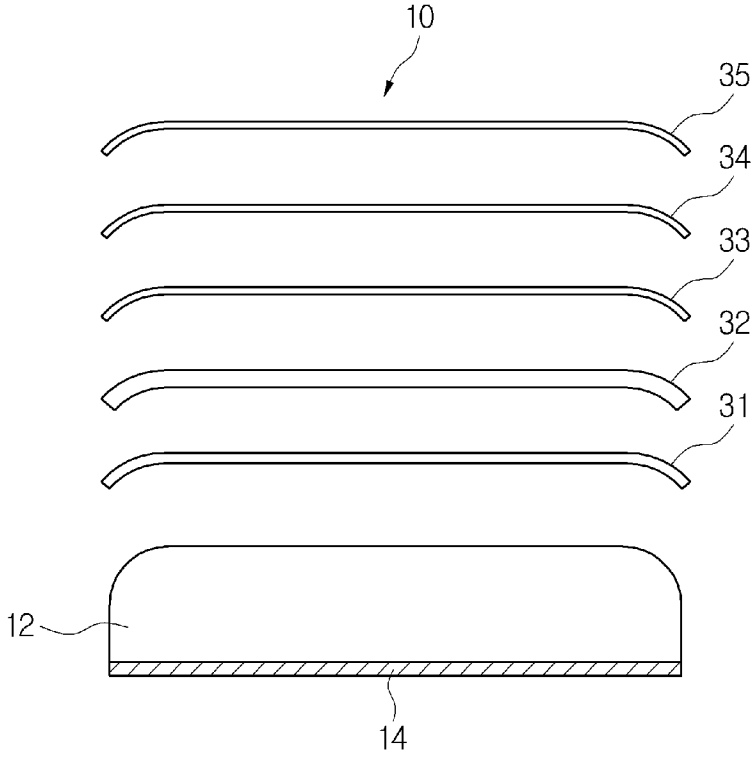
[Claim 10] The flooring of claim 8, wherein a dimension stabilization layer and a balance layer are stacked between the base layer and the printing layer.

[Claim 11] The flooring of claim 8, wherein a base layer is disposed under the base layer.

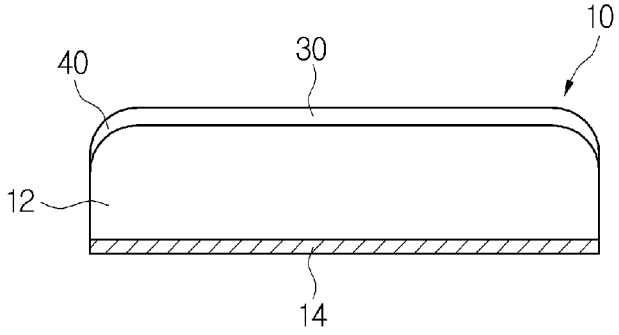
[Fig. 1]



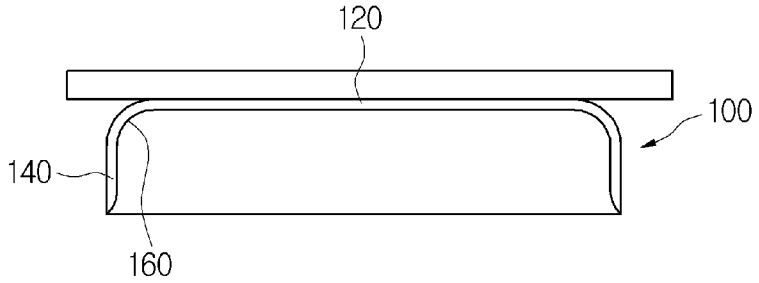
[Fig. 2]



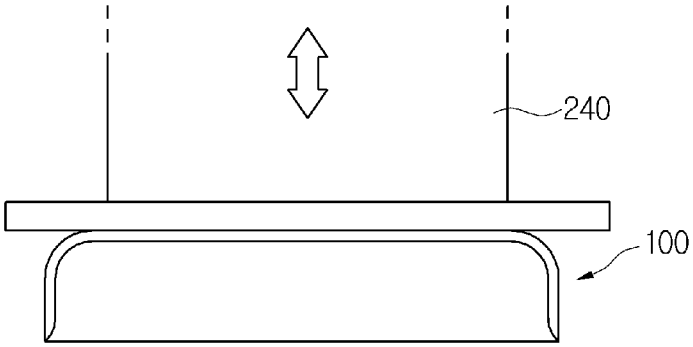
[Fig. 3]

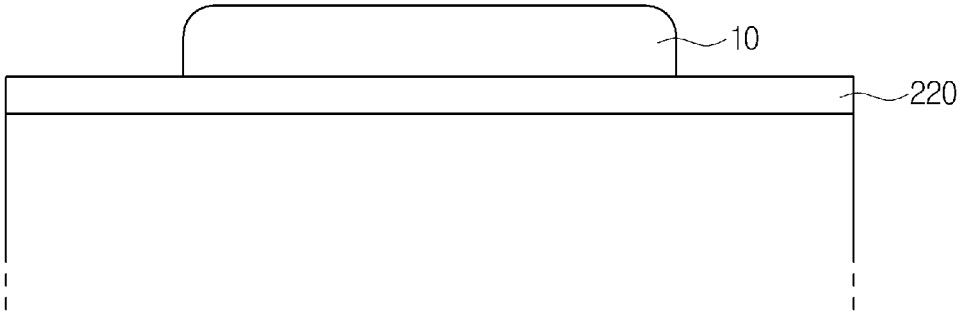


[Fig. 4]

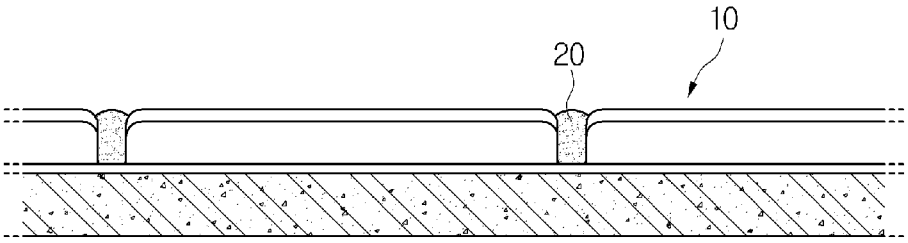


[Fig. 5]

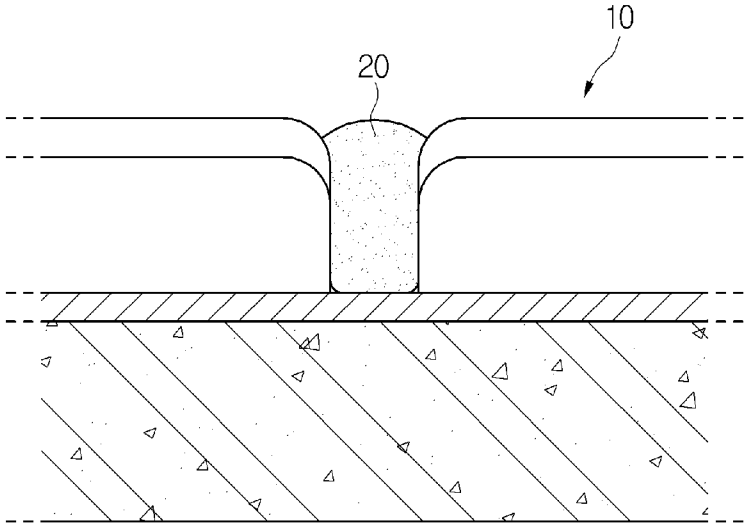




[Fig. 6]



[Fig. 7]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR20 13/000051

A. CLASSIFICATION OF SUBJECT MATTER

E04F 15/02(2006.01)i, E04F 15/10(2006.01)1, E04F 15/14(2006.01)1

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: E04F15/022; E04F15/02; E04F15/10; E04F15/00; B32B3/02; B32B21/08; B32B23/02; E04C2/26

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KFPO internal) & keywords: PVC, flooring, tile, grout, dimension stabilization, balance, printing, transparent layer, protection layer, curved surface

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010-0146895 A1 (DEMPSEY et al.) 17 June 2010 See paragraphs [0004], [0023]-[0024] , [0030], [0039]-[0042] , [0049]	8-9,11
Y	and figures 1A, 3.	1-7,10
Y	KR 10-2009-0095824 A (LG HAUSYS LTD.) 10 September 2009 See paragraphs [20]-[28] and figures 1-4.	1-7,10
A	KR 10-2003-0040947 A (W00JIN CORP.) 23 May 2003 See page 2, claim 2 and figures la-lb.	1-11
A	US 5030502 A (TEARE, JOHN W.) 09 July 1991 See column 4, line 54 - column 4, line 68 and figures 5-6.	1-11
A	KR 10-2006-0071465 A (LG CHEMICAL LTD.) 27 June 2006 See claims 1, 3-4 and figures 1-2.	1-11

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 April 2013 (25.04.2013)	**26 April 2013 (26.04.2013)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City' 302-70 1' Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer cHo,. „ y™ Goo Telephone No. 82-42-481-8288

Form PCT/ISA/210 (second sheet) (My 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2013/000051

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