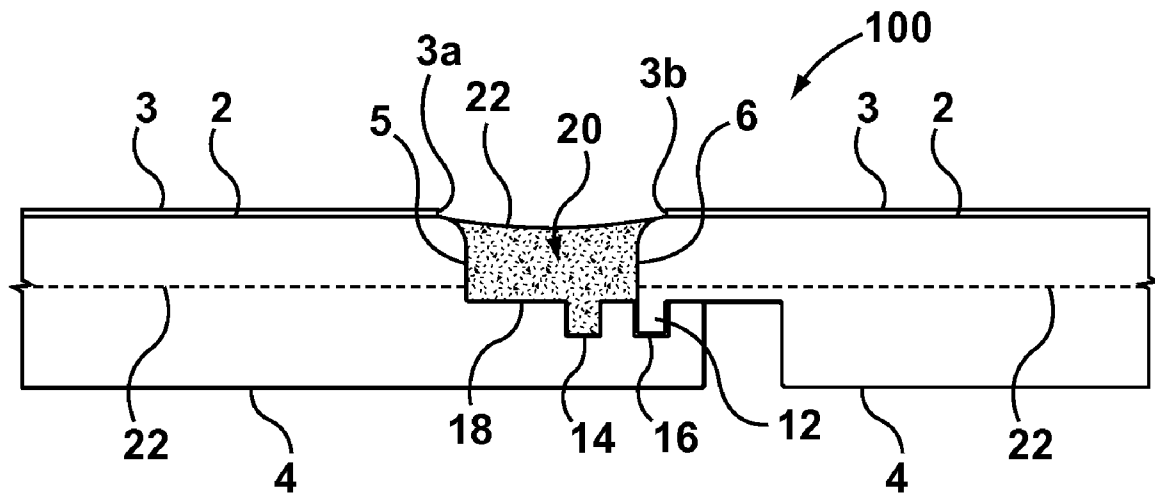




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(19) **United States**(12) **Patent Application Publication**
Wilson et al.(10) **Pub. No.: US 2012/0240502 A1**(43) **Pub. Date: Sep. 27, 2012**(54) **FLOATING, GROUTABLE VINYL FLOOR
TILE**(76) Inventors: **Steven Wilson**, Brampton (CA);
Frank Yoo, North York (CA)(21) Appl. No.: **13/052,499**(22) Filed: **Mar. 21, 2011****Publication Classification**(51) **Int. Cl.**
E04F 15/022 (2006.01)
E04F 15/14 (2006.01)(52) **U.S. Cl.** **52/416**(57) **ABSTRACT**

A vinyl-based floor tile is disclosed for constructing a floating and groutable floor covering. The vinyl-based floor tile has a decorative upper surface and a lower surface for support the floor tile. On one edge of the floor tile is a male coupling member having a vertical insert and an opposing edge has a female coupling member that has two or more grooves for accepting the vertical insert of a male coupling member of an adjacent floor tile. The grooves determine the width of a grouting channel that is formed between the edges of the adjacent tiles and a grout-accepting surface on the top surface of either the male or female coupling member. The decorative upper surface of the tile can have a removable protective layer that protects the vinyl tile during the installation and grouting process.



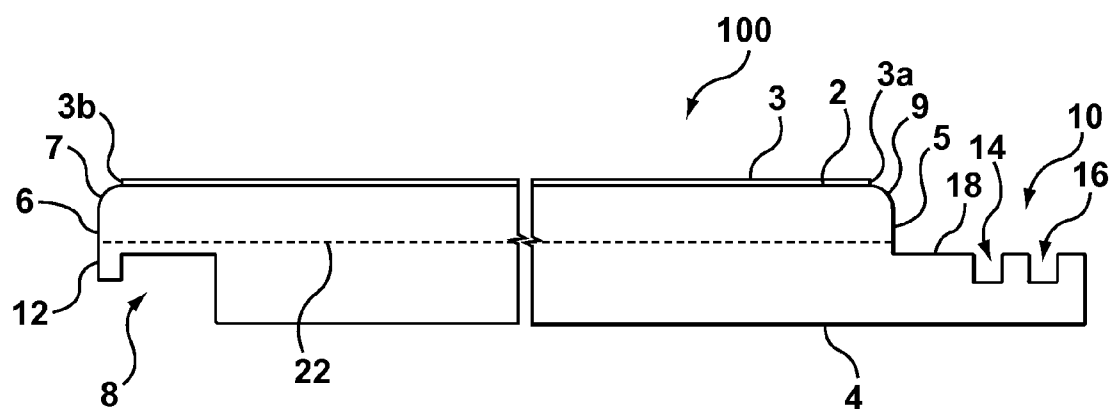


FIG. 1

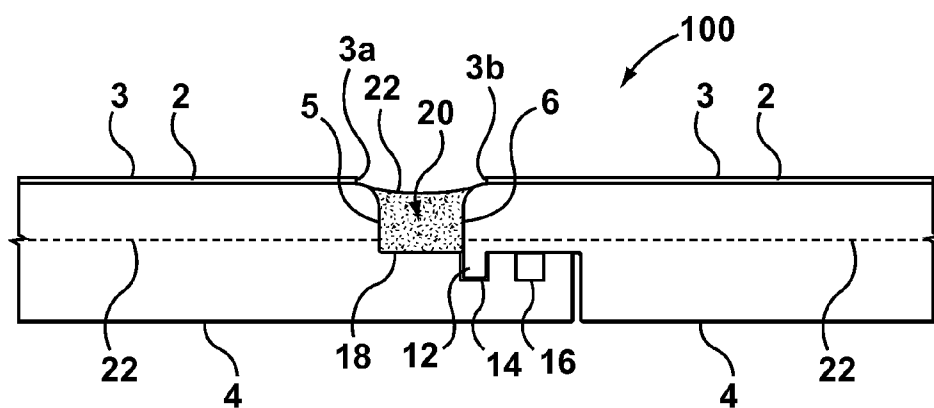


FIG. 2

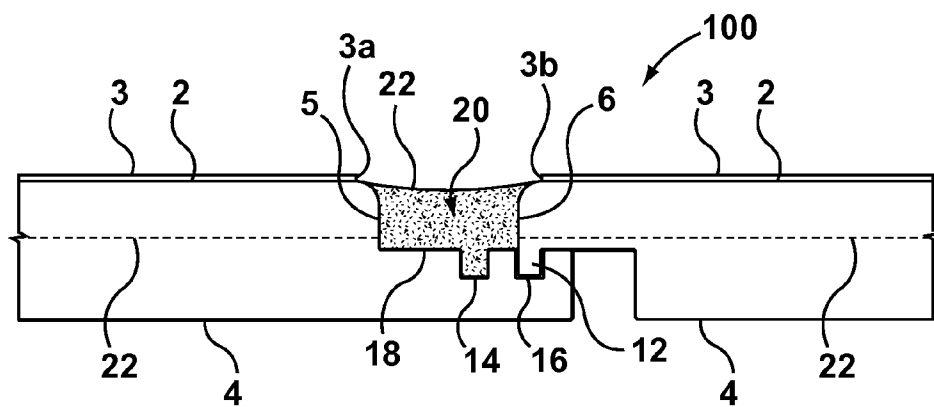
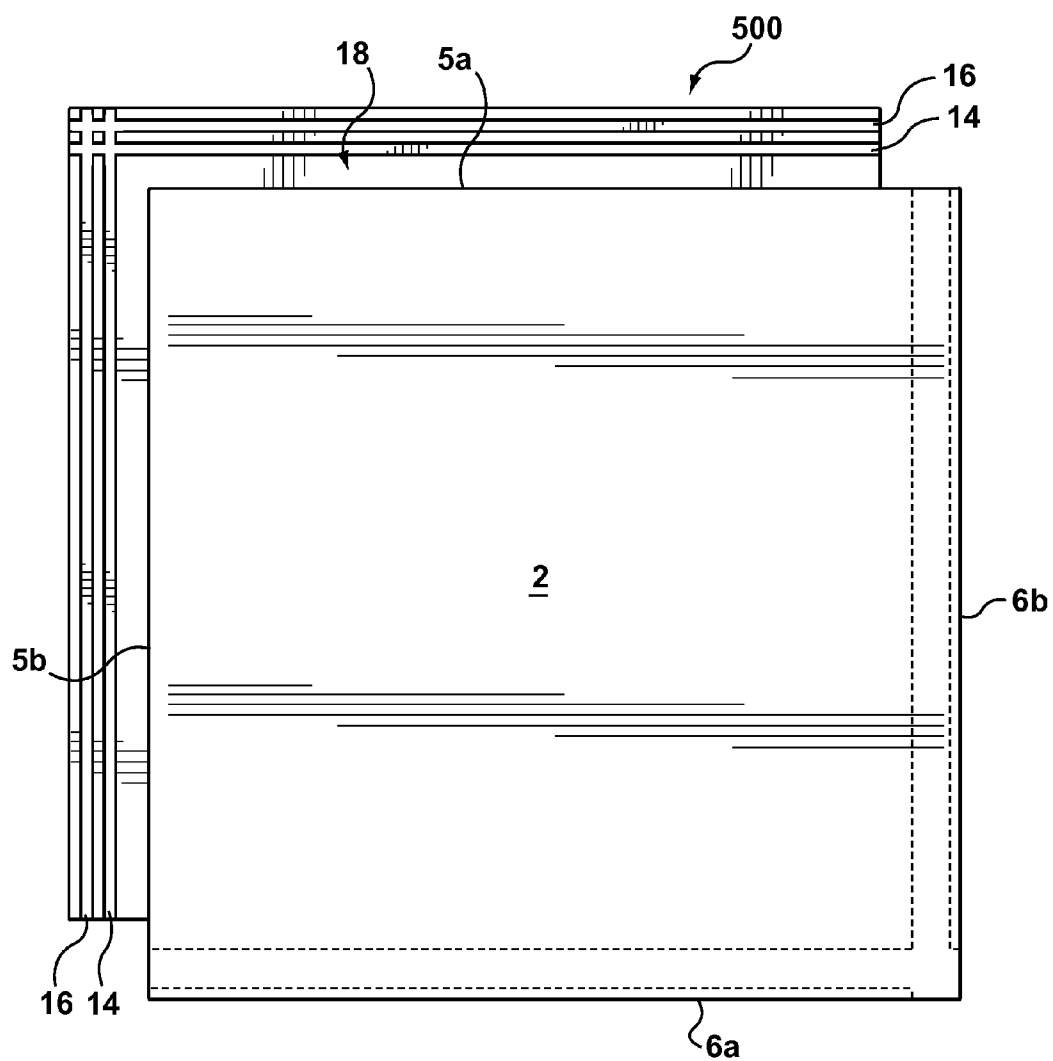
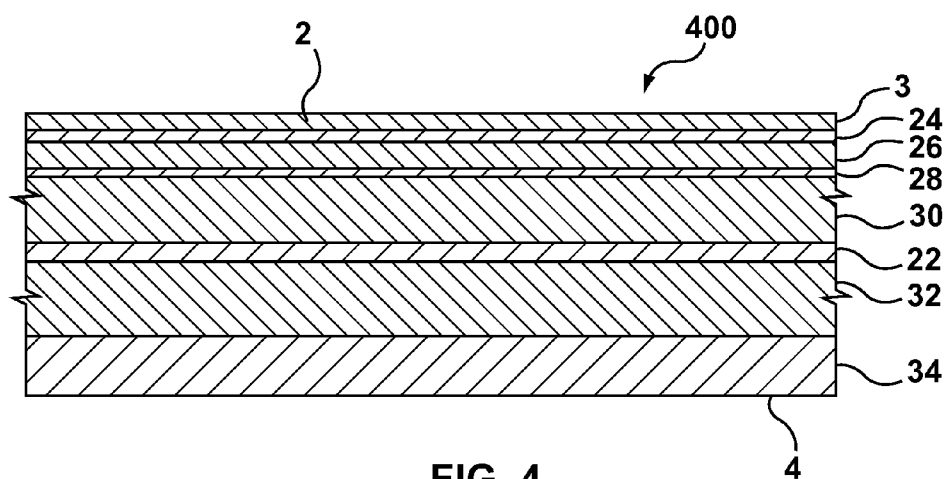


FIG. 3



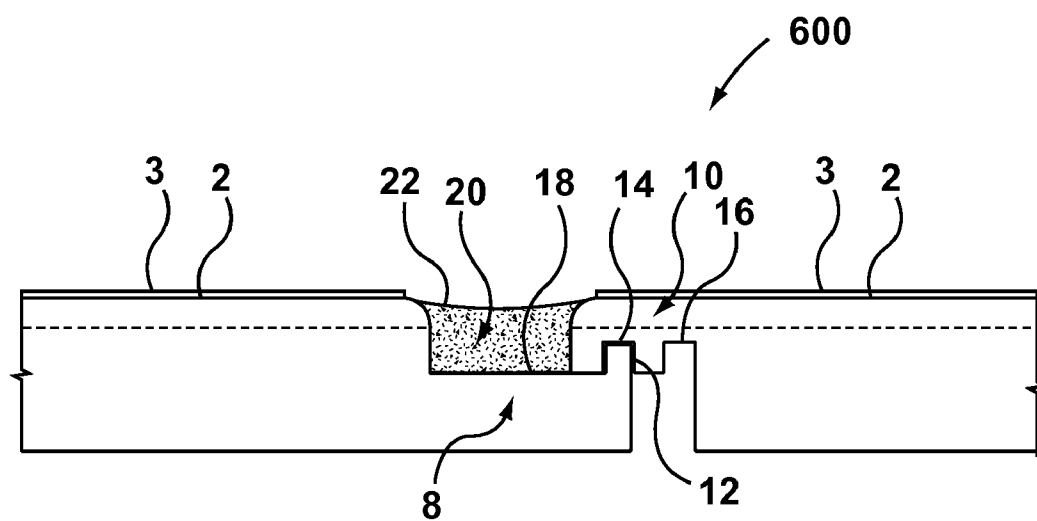


FIG. 6

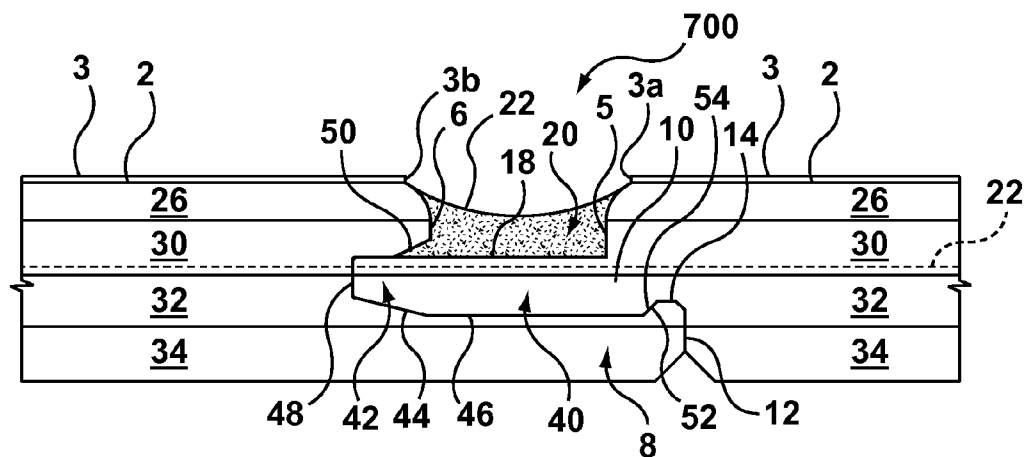


FIG. 7

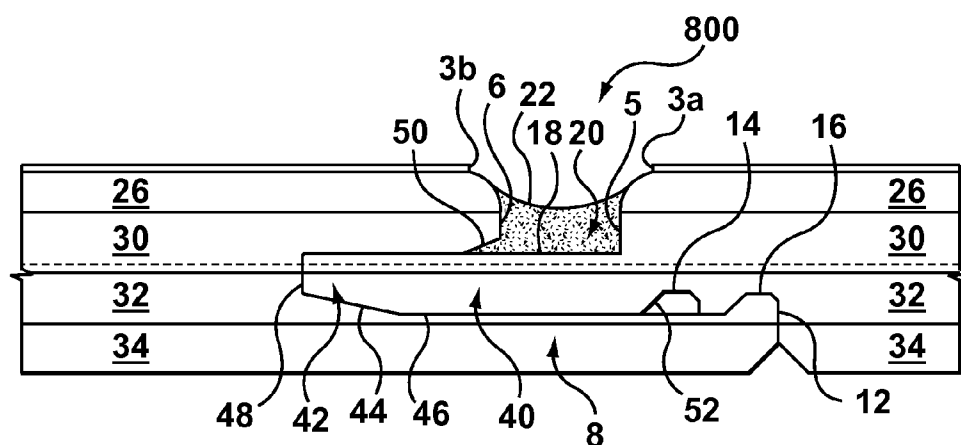


FIG. 8

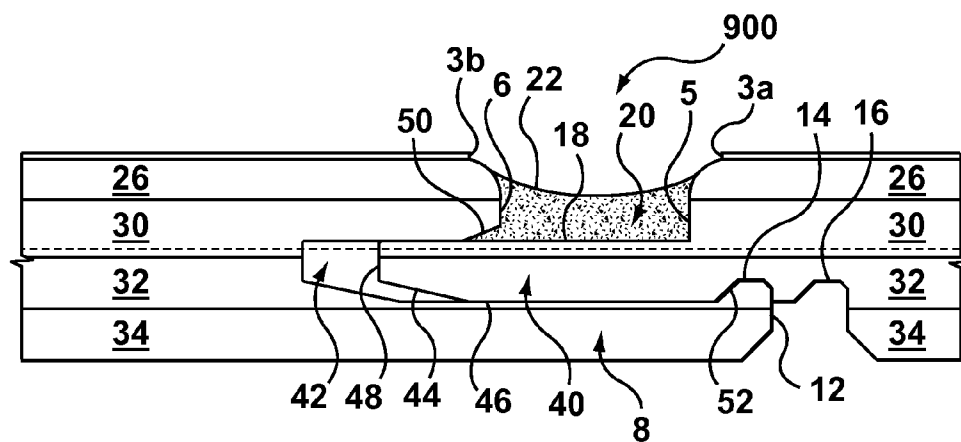


FIG. 9

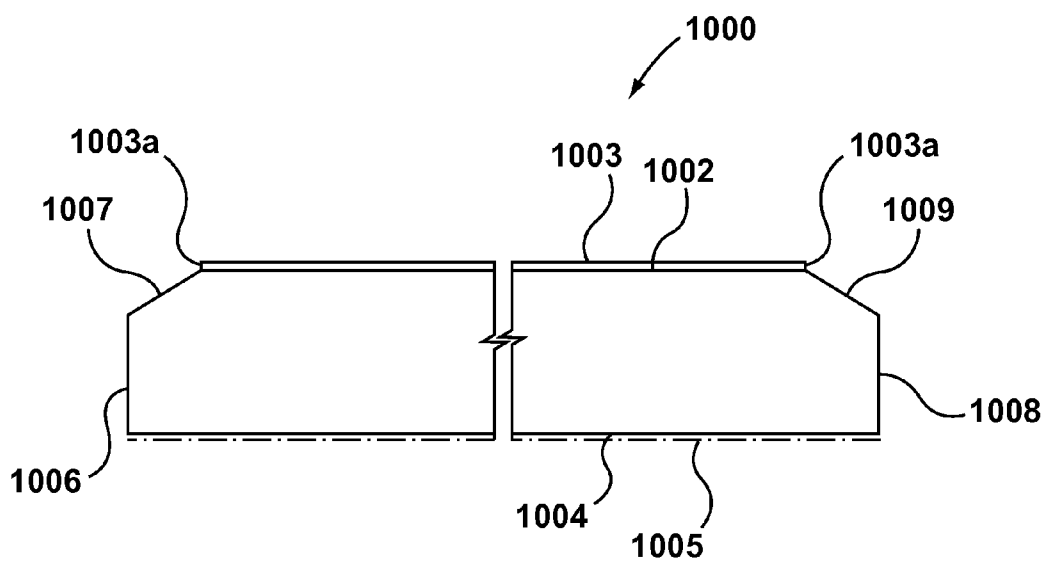


FIG. 10

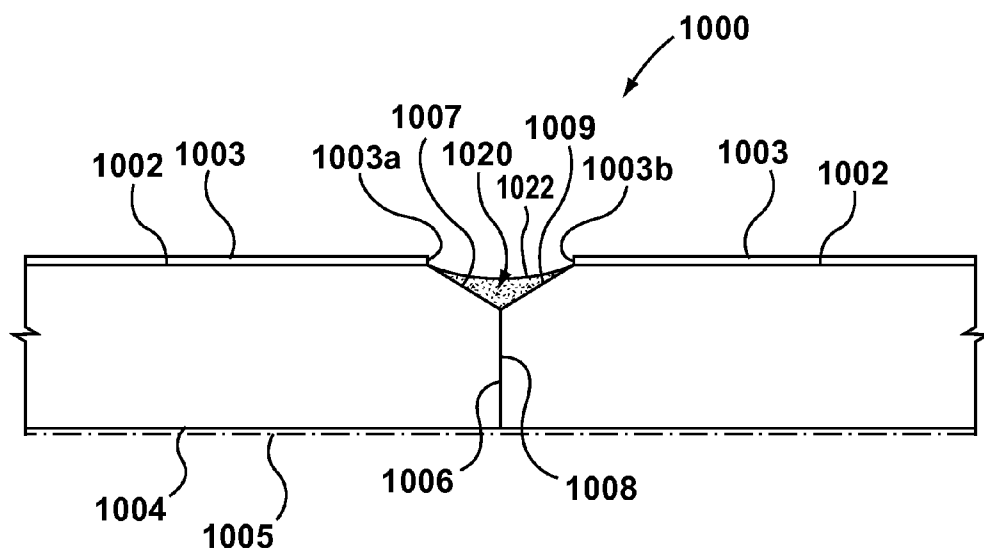


FIG. 11

FLOATING, GROUTABLE VINYL FLOOR TILE

FIELD

[0001] The present disclosure relates generally to a vinyl floor tile. More particularly, the disclosure relates to a floating luxury vinyl floor product that can be grouted.

BACKGROUND

[0002] Groutable vinyl tiles are becoming an increasingly popular low-cost alternative to real ceramic tiles. A luxury vinyl tile can have the look and feel of a ceramic tile without the cost and installation of real ceramic tiles that can be prone to cracking or chipping. Luxury vinyl tiles are manufactured to have a durable and decorative surface and can replicate the look of natural stone, ceramic, marble or concrete. Current groutable vinyl tiles on the market typically either include a recessed edge around the tile to form a shallow grout channel or have a rounded edge that requires spacing the tiles to form the grout channel.

[0003] Currently available vinyl floor tile products rely on using an adhesive that can be prone to bonding failures due to temperature and moisture. Many products are required to be fully glued down to the subfloor by using an adhesive applied to the subfloor or a pre-applied adhesive backing on the tile. These products require additional labor and materials, such as floor patch and adhesive, to adequately prepare the subfloor and install the tile. Floating vinyl floor tile products (i.e. those not glued or fastened to the subfloor) do not require as much subfloor preparation, but floating products also typically rely on using glue to adhere overlapping edges of the tiles in order to connect adjacent floor tiles. Since both of these products rely on adhesive, the floor covering can be prone to damage due to expansion and contraction from heat and also moisture. Installation using vinyl flooring adhesive can also be messy and is not particularly environmentally friendly.

[0004] Although groutable vinyl tiles are a practical alternative to ceramic, installing and grouting these tiles can prove to be challenging and labor intensive process. Both the adhesive and floating vinyl tiles require using a spacer to provide a standard grout width between all of the tiles. Using a spacer increases the time required to install the floor since it requires careful placement of the spacers to maintain a uniform grout channel width between all of tiles and the spacers must be removed prior to grouting.

[0005] Applying the grout into the channel is also a difficult and labor intensive process. It can be difficult to align the grout into the channel and maintain even grout edges between all of the tiles. This can be especially challenging for the inexperienced do-it-yourself installer. Current installation of groutable vinyl tiles typically requires working with around 15 square feet at a time to remove excess grout and clean each tile surface. Grouting material that dries on the vinyl tile surface is a common problem with groutable vinyl products and produces what is commonly referred to as a "haze" that diminishes the visual appeal of the decorative surface of the tile.

SUMMARY

[0006] According to a first aspect, a vinyl-based floor tile is provided for making a floating and groutable floor covering where the vinyl-based floor tile joins with an adjacent floor tile to define one of at least two possible grouting channel

widths without the use of spacers. The floor tile comprises a decorative upper surface and a lower surface for supporting the floor tile; a first edge of the floor tile between the decorative upper surface and the lower surface, the first edge having a male coupling member having a vertical insert; a second edge of the floor tile between the decorative upper surface and the lower surface, the second edge opposite the first edge, the second edge having a female coupling member extending from the second edge wherein a top surface of at least one of the male coupling member and the female coupling member define a grout accepting surface, the female coupling member defining at least two grooves, wherein at least one of the two grooves receives the vertical insert from the male coupling member of an adjacent floor tile thereby forming a grouting channel between the second edge, the grout accepting surface and the first edge of the adjacent floor tile, and wherein a width of the grouting channel between the first edge of the adjacent tile and second edge is determined by one of the at least two grooves that receives the vertical insert from the adjacent floor tile.

[0007] According to another aspect, a vinyl-based floor tile is provided that has a removable protective layer that covers the decorative surface of the vinyl-based floor tile during installation. According to yet another aspect, the vinyl-based floor tile further comprises a glass filament layer, wherein the glass filament layer extends into at least one of the male coupling member and the female coupling member to provide increased rigidity to the corresponding coupling member.

[0008] According to another aspect, a vinyl-based floor tile is provided for making a floating and groutable floor covering, the floor tile comprising a decorative upper surface and a lower surface for supporting the floor tile; at least one edge of the floor tile between the decorative upper surface and the lower surface; and a beveled edge between the at least one edge and the decorative upper surface, wherein the beveled edge forms a grout accepting groove when the at least one edge is abutted to an adjacent floor tile.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] For a better understanding of the various embodiments described herein and to show more clearly how they may be carried into effect, reference will now be made, by way of example only, to the accompanying drawings which show at least one exemplary embodiment, and in which:

[0010] FIG. 1 is a side cross-sectional view of a groutable vinyl tile 100 according to one embodiment;

[0011] FIG. 2 is a side cross-sectional view of a narrow grouting channel between adjoining groutable vinyl tiles according to the embodiment shown in FIG. 1;

[0012] FIG. 3 is a side cross-sectional view of a wide grouting channel between adjoining groutable vinyl tiles according to the embodiment shown in FIG. 1;

[0013] FIG. 4 is side cross-sectional view illustrating the composition of layers of an embodiment of a groutable vinyl tile;

[0014] FIG. 5 is a top plan view of a groutable vinyl tile according to the embodiment shown in FIG. 1;

[0015] FIG. 6 is a side cross-sectional view of an adjoining groutable vinyl tile according to an alternative embodiment;

[0016] FIG. 7 is a side cross-sectional view of adjoining groutable vinyl tile according to another alternative embodiment having a fixed grout width;

[0017] FIG. 8 is a side cross-sectional view of adjoining groutable vinyl tile according to another alternative embodiment having a variable grout width illustrating a narrow grouting channel;

[0018] FIG. 9 is a side cross-sectional view of adjoining groutable vinyl tile according to the embodiment of FIG. 8 illustrating a wide grouting channel;

[0019] FIG. 10 is a side cross-sectional view of groutable vinyl tile having beveled top edges that define the grouting channel according to another embodiment

[0020] FIG. 11 is a side cross-sectional view of abutting groutable vinyl tile having beveled top edges that define the grouting channel.

DESCRIPTION OF VARIOUS EMBODIMENTS

[0021] It will be appreciated that for simplicity and clarity of illustration, where considered appropriate, numerous specific details are set forth in order to provide a thorough understanding of the exemplary embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the embodiments described herein. Furthermore, this description is not to be considered as limiting the scope of the embodiments described herein in any way, but rather as merely describing the implementations of various embodiments described herein.

[0022] The term vinyl tile or vinyl-based tile is used herein to refer to any resilient floor tile product that may be composed, at least partially, of vinyl, such as PVC for example, or other thermoplastic resins.

[0023] Reference is first made to FIG. 1, shown is a side cross-sectional view of a groutable vinyl tile 100 according to one embodiment. Vinyl tile 100 has a decorative upper surface 2 that is wear resistant and decorative to imitate ceramic, stone, marble or other material. Vinyl tile 100 also has a lower surface 4 for supporting vinyl tile 100 on a sub-floor. Vinyl tile 100 is designed as a floating floor such that lower surface 4 supports the vinyl tile on the subfloor without the use of adhesive or nails. Floating floors are typically faster, cheaper and easier to install since they do not require extensive sub-floor preparation or need to be adhered to the subfloor.

[0024] Vinyl tile 100 has edge 6 between the lower surface 4 and decorative upper surface that has a male coupling member 8 for joining with female coupling member 10 on opposing edge 8 of an adjacent vinyl tile 100. Male coupling member 8 has vertical insert 12 for mating with one of two grooves 14 and 16. Vertical insert 12 can be shaped to interlock with grooves 14 and 16 using methods known in the art. For example, vertical insert 12 can form a pressure fit within grooves 14 and 16 or vertical insert 12 can be shaped to have a locking protrusion that mates with a projection within grooves 14 and 16. The corners 7 and 9 between edges 5 and 6 can be rounded off, as shown in FIG. 1, or in alternative embodiments, corners 7 and 9 can be chamfered.

[0025] The upper surface of female coupling member 10 has a grout-accepting surface 18, that along with edges 6 and 8 form grouting channel 20 when joining with an adjacent flooring tile. In other embodiments grout-accepting surface 18 can be on the male coupling member, such as, for example, the vinyl floor tile embodiment shown in FIG. 6. Grout-accepting surface 18 and edges 6 and 8 can be manufactured

to improve bonding with grouting material to strengthen the chemical bond between vinyl floor tile 100 and grouting material. For example, these surfaces may be textured to improve bonding with grouting material.

[0026] Removable protective layer 3 can also cover decorative upper surface 2. Removable protective layer 3 can be a waterproof plastic sheet that is applied to vinyl tile 100 during manufacturing. When applying grout to vinyl tile 100, removable protective layer 3 prevents grout from drying directly on decorative upper surface 2 to prevent damage to decorative upper surface 2, such as, for example, creating a haze on decorative upper surface 2. Edges 3a and 3b of removable protective layer 3 can also provide a top edge for grouting channel 20 that will provide a uniform straight line, aligned with edges of vinyl tile 100 to simplify application of grouting material to grouting channel 20. After installation and grouting of vinyl tile 100, removable protective layer 3 can be removed.

[0027] Vinyl tile 100 can include glass filament layer 22 that can be used to provide increased strength and rigidity to either male coupling member 8 or female coupling member 10. As shown in FIG. 1, male coupling member 8 is thinner than other portions of vinyl tile 100 but includes glass filament layer 22 to provide strength to what would otherwise be a thinner and weaker portion of vinyl tile 100 that would be susceptible to breaking. Glass filament layer 22 also helps reduce the amount of expansion and contraction of vinyl tile 100 that is a common cause of bonding and separation issues with many existing vinyl products.

[0028] Reference is next made to FIG. 2, shown is a side cross-sectional view of a narrow grouting channel 20 between adjoining groutable vinyl tiles according to the embodiment shown in FIG. 1. Grouting channel 20 shown in FIG. 1 has a 3 millimeter grout width that is determined by vertical insert 12 mating with groove 14 of female coupling member 10. Mating of vertical insert 12 with groove 14 mechanically bonds an adjacent floor tile without the use of an adhesive, improving the ease and speed at which vinyl tile 100 can be installed compared to other vinyl floor products. Since groove 14 determines the width of grouting channel 20, there is no need to use spacers to fix the size of the grouting channel.

[0029] After vinyl tile 100 has been mechanically connected in the installation process, grouting material 22 is then applied into grouting channel 20 to provide an appearance similar to grouted ceramic tiles. Grouting material 22 can also be used to form a chemical bond between adjacent vinyl tiles 100 that strengthens the mechanical bond formed between vertical insert 12 and one of grooves 14 and 16. Grouting material 22 can vary depending on the application and can be an epoxy, acrylic, urethane, Portland cement or latex based grouting material specifically for use with groutable vinyl tile. Use of both mechanical bonding and chemical bonding provides a stronger bond between adjacent vinyl tiles than existing vinyl products that mainly rely on adhesive. Using mechanical bonding to lay the floor is faster and more cost efficient since no adhesive is required. Combining the mechanical bonding with chemical bonding using grouting material 22 increases the strength between adjacent floor tiles reducing failures, such as separation between vinyl tiles and cracking of grouting material.

[0030] Reference is next made to FIG. 3, shown is a side cross-sectional view of adjoining groutable vinyl tiles according to the embodiment shown in FIG. 1. Grouting channel 20 shown in FIG. 3 has a 5 millimeter grout width that is deter-

mined by vertical insert 12 mating with groove 16 of female coupling member 10. FIGS. 2 and 3 illustrate that variable grout widths of grouting channel 20 can be achieved based on which groove 14, 16 mates with vertical insert 12. Other embodiments could design female coupling member to include more than two grooves to provide multiple grout widths. Grout widths of 3 mm and 5 mm are provided as examples and any width or combination of widths can be designed by varying the position and width of grooves on female coupling member 10.

[0031] Reference is next made to FIG. 4, shown is side cross-sectional view illustrating the composition of layers of an embodiment of a groutable vinyl tile 400. As described above, decorative upper surface 2 can be covered by removable protective layer 3 that can be removed after installation to protect decorative upper surface 2 during installation. The top layer of vinyl tile 400 that is exposed to foot traffic is top coat layer 24 that can be made from, but is not limited to, polyurethane, aluminum oxide or ceramic to form a protective clear film layer for durability and protection against rips, tears and gouges. Below top coat layer 24 is wear layer 26 that provides a clear layer that makes vinyl tile 400 easy to clean and resist scratches and scuffs. Wear layer 26 can be made from urethane or enhanced urethane products as is known in the art. A thicker wear layer 26 provides greater resistance to scratches and scarring.

[0032] Print film layer 28 is below wear layer 26 and provides the design of vinyl tile 400. Print film layer 28 provides the pattern, color and style to replicate tile, stone or marble. A rotogravure printing process, among others, can be used to produce print film layer 28. Next, silencing layer 30 is disposed below print film layer 28 and is typically composed of a cushioned vinyl foam that dampens sounds, provides cushioning and indentation recovery.

[0033] The next layer below silencing layer 30 is glass filament layer 22 that provides strength to vinyl tile 400 to minimize contraction and expansion while still maintaining some flexibility to ease the installation process. Minimizing contraction and expansion also helps to prevent cracking or separation of grout between vinyl tiles and separation of the tiles themselves. Glass filament layer 22 also provides increased rigidity to coupling members 8, 10 that would otherwise be weak and prone to damage. Glass filament layer 22 typically includes a matrix of fine glass fibers.

[0034] Below glass filament layer 22 is core sheet 32 that helps provide vinyl tile 400 with structure and strength. The bottom-most layer is balance layer 34 that supports vinyl tile 400 on a subfloor to allow vinyl tile 400 to float on the subfloor (i.e. not adhered with adhesive or nails). Both core sheet 32 and balance layer 34 are typically composed of PVC.

[0035] Dimensions of an exemplary embodiment of vinyl tile 400 can include a wear layer with a thickness between 0.01 mm and 1 mm, a silencing layer with a thickness of approximately 1 mm, and a core sheet 32 and balance layer 34 with a combined thickness of approximately 2.75 mm. These dimensions are provided as examples and can be varied as is known in the art. Use of glass filament layer allows for thinner and lighter construction of vinyl tile 400 resulting in a thickness typically between 3 mm to 6 mm. Alternative tile constructions can also mount the vinyl tile to a MDF or HDF backer board similar to a laminate construction. The thickness of the backer board can be 6 to 15 mm with an attached vinyl tile of between 2 mm and 6 mm.

[0036] Reference is next made to FIG. 5, shown is a top plan view of a groutable vinyl tile 500 according to the embodiment shown in FIG. 1. Groutable vinyl tile 500 is shown having two edges 5a and 5b having female coupling members and two edges 6a and 6b having male coupling members. Alternative embodiments may have only a single male and female coupling member on opposing edges of the tile. Other embodiments may only include the coupling members on portion of the edge of the tile rather than over the entire edge as is shown in FIG. 5.

[0037] Reference is next made to FIG. 6, shown is a side cross-sectional view of an adjoining groutable vinyl tile 600 according to an alternative embodiment. Groutable vinyl tile 600 is a variant where the upper surface of male coupling member 8 has grout-accepting surface 18 and an upwardly oriented vertical insert 12. Female coupling member 10 has downward opening grooves 14, 16 for accepting vertical insert 12 to form grouting channel 20.

[0038] Reference is next made to FIG. 7, shown is a side cross-sectional view of adjoining groutable vinyl tile 700 according to another alternative embodiment having a fixed grout width. Male coupling member 8 is supported on the subfloor and has an upward facing vertical insert 12 for coupling with groove 14 of female coupling member 10. Male coupling member 8 can be comprised of the core sheet 32 and balance layer 34. Female coupling member 10 has an upper insert 40 extending from edge 5 that mates with an insert-accepting groove 42 in edge 6. The upper surface of upper insert 40 has a grout-accepting surface 18 that forms the lower surface of grouting channel 20. Upper insert 40 preferably is formed from a layer of vinyl tile 600 containing glass filament layer 22 to provide strength and rigidity to upper insert 40.

[0039] Upper insert 40 can have a chamfered edge 44 between the lower edge 46 and extending edge 48 of upper insert 40. Insert-accepting groove 42 can also have a mating chamfered edge 50 so that upper insert 40 can be inserted at a downward angle during the installation process. Similarly, vertical insert 12 can have chamfered edge 52 to allow angled insertion with chamfered edge 54 of groove 14. In other embodiments the chamfered edges can instead be rounded to ease with installation or manufacture of vinyl tile 700.

[0040] Reference is next made to FIG. 8, shown is a side cross-sectional view of adjoining groutable vinyl tile 800 according to another alternative embodiment having a variable grout width. Groutable vinyl tile 800 is similar to the fixed grout width tile shown in FIG. 7 but female coupling member 10 has grooves 14 and 16 that can accept vertical insert 12 from male coupling member 8 to determine the width of grouting channel 20. FIG. 8 illustrates the narrow grouting channel 20 width by mating vertical insert 12 with groove 16 whereas FIG. 9 illustrates the wide grouting channel 20 width by mating vertical insert 12 with groove 14.

[0041] Reference is next made to FIG. 10, shown is a side cross-sectional view of groutable vinyl tile 1000 having beveled edges 1007, 1009 defining grouting channel 20 according to another embodiment. Vinyl tile 1000 has a decorative upper surface 1002 that can be covered by removable protective layer 1003 to protect decorative upper surface 1002 from damage during installation and grouting, and when installation and grouting are complete removable protective layer 3 can be removed. Lower surface 1004 supports vinyl tile 1000 on a sub-floor and can have a non-slip backing 1005. Using non-slip backing 1005 allows vinyl tile 1000 to float on the subfloor but still prevents vinyl tile 1000 from shifting during

installation and grouting or from heavy foot traffic after vinyl tile **1000** is installed. Non-slip backing **1005** can be composed of a high friction material, such as, for example, rubber or plastic, and can be patterned to increase friction with the subfloor.

[0042] Reference is next made to FIG. **11**, shown is a side cross-sectional view of groutable vinyl tile **1000** shown in FIG. **10** abutting with an adjacent groutable vinyl tile **1000**. Opposing edges **1006** and **1008** between decorative upper surface **1002** and lower surface **1004** have top beveled edge portions **1007** and **1009**, respectively. Beveled edge portions **1007**, **1009** form a grouting channel **1020** when abutted to an adjacent vinyl tile **1000**. Since abutting tiles form grouting channel **1020**, there is no need for using spacers to determine the grout size, thus simplifying the installation of vinyl tile **1000**. Application of grouting material **1022** can also provide a chemical bond between adjacent vinyl tiles **1000**.

[0043] The width of grouting channel **1020** can be determined during manufacture of vinyl tile **1000** by varying the degree of beveling of top edges **1007** and **1009**. Similarly, the depth of grouting channel **1020** can also be varied to provide more or less surface area for bonding with grouting material **1022** to achieve the required strength. The surface of top edges **1007** and **1009** can also be treated or patterned during the manufacturing process to increase bonding with grouting material **1022**.

[0044] Removable protective layer **1003** has edges **1003a** and **1003b** that also help define a top edge for grouting channel **1020** that can provide a uniform straight line, aligned with edges of vinyl tile **1000** to simplify application of grouting material to grouting channel **20**. After installation and grouting of vinyl tile **1000**, removable protective layer **3** can be removed.

[0045] While the exemplary embodiments have been described herein, it is to be understood that the invention is not limited to the disclosed embodiments. The invention is intended to cover various modifications and equivalent arrangements included within the scope of the appended claims, and scope of the claims is to be accorded an interpretation that encompasses all such modifications and equivalent structures and functions.

1. A vinyl-based floor tile for making a floating and groutable floor covering, the floor tile comprising:

- a decorative upper surface and a lower surface for supporting the floor tile;
- a first edge of the floor tile between the decorative upper surface and the lower surface, the first edge having a male coupling member having a vertical insert;
- a second edge of the floor tile between the decorative upper surface and the lower surface, the second edge opposite the first edge, the second edge having a female coupling member extending from the second edge wherein a top surface of at least one of the male coupling member and

the female coupling member define a grout accepting surface, the female coupling member defining at least two grooves, wherein at least one of the two grooves receives the vertical insert from the male coupling member of an adjacent floor tile thereby forming a grouting channel between the second edge, the grout accepting surface and the first edge of the adjacent floor tile, and wherein a width of the grouting channel between the first edge of the adjacent tile and second edge is determined by one of the at least two grooves that receives the vertical insert from the adjacent floor tile.

2. The vinyl-based floor tile of claim **1** wherein the decorative upper surface has a removable protective layer for protecting the decorative surface during installation.

3. The vinyl-based floor tile of claim **2** wherein the protective layer defines a top edge of the grouting channel to allow for precise placement of grouting material in the grouting channel.

4. The vinyl-based floor tile of claim **1** further comprising a glass filament layer, wherein the glass filament layer extends into at least one of the male coupling member and the female coupling member to provide increased rigidity to the corresponding coupling member.

5. The vinyl-based floor tile of claim **1** wherein the grouting channel is configured to receive grouting material to chemically bond the floor tile with the adjacent floor tile.

6. The vinyl-based floor tile of claim **1** wherein a first groove of the at least two grooves determines the width of the grouting channel to be 3 millimeters and a second groove of the at least two grooves determines the width of the grouting channel to be 5 millimeters.

7. A vinyl-based floor tile for making a floating and groutable floor covering, the floor tile comprising:

- a decorative upper surface and a lower surface for supporting the floor tile;
- at least one edge of the floor tile between the decorative upper surface and the lower surface; and
- a beveled edge between the at least one edge and the decorative upper surface, wherein the beveled edge forms a grout accepting groove when the at least one edge is abutted to an adjacent floor tile.

8. The vinyl-based floor tile of claim **7** wherein the decorative upper surface has a removable protective layer for protecting the decorative surface during installation.

9. The vinyl-based floor tile of claim **8** wherein the protective layer defines a top edge of the grouting channel to allow for precise placement of grouting material in the grouting channel.

10. The vinyl-based floor tile of claim **7** wherein the lower surface has a non-slip backing applied thereon.

11. The vinyl-based floor tile of claim **10** wherein the non-slip backing is patterned.

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