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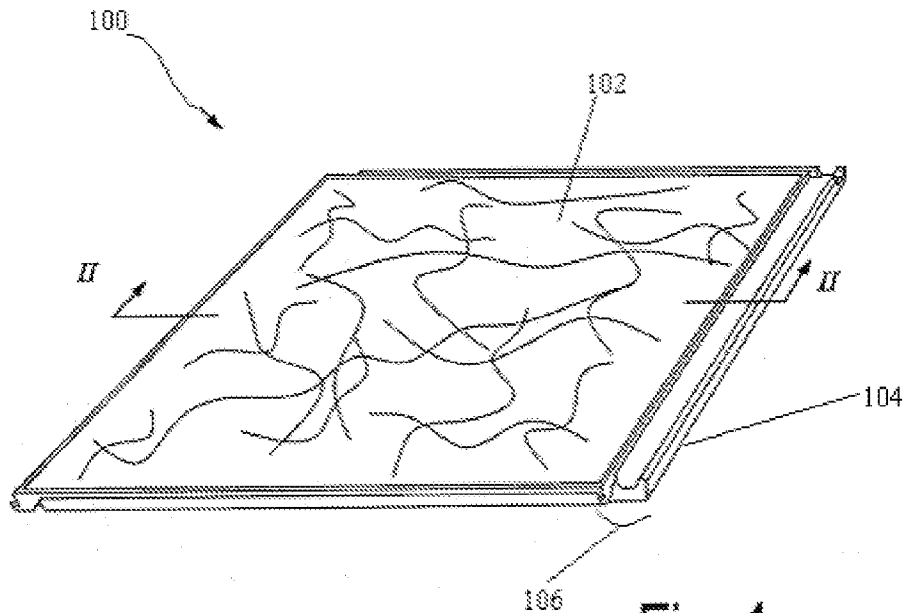


Fig. 1

(57) Abstract: A groutless tile can include a durable component disposed on a surface of a substrate, and a first coupling member disposed on a side edge of the substrate. At least a portion of the surface of the substrate can extend beyond the durable component. The substrate prevents the durable components of adjacent groutless tiles from contacting one another, and can resemble grout in appearance. The first coupling member, and a corresponding second coupling member of an adjacent groutless tile, are configured to couple two adjacent groutless tiles.

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GROUTLESS TILE SYSTEMS AND METHODS FOR MAKING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to United States Patent Application No. 11/701,777, filed 02 February 2007, which is incorporated herein by reference in its entirety as if fully set forth below.

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates generally to floor and wall covering tiles. More particularly, it relates to a tile system that does not require a grout compound to be applied to the tiles after installation.

Description of Related Art

[0002] Ceramic tiles are widely used as a floor and wall covering in both residential and commercial applications. Tile is very versatile, and has been in use as a floor and wall covering for centuries. Tiles are available in a nearly unlimited color palette and can be installed in an equally unlimited number of designs. Tile is often a top choice for floor and wall coverings because of its great durability and aesthetic qualities. While many tiles are manufactured from ceramic compositions (baked clay), they can be made of a variety of natural or synthetic materials including, but not limited to, granite, quartz, marble, soapstone, plastic, wood, or a other suitable material.

[0003] Tile provides a durable component and can be coated to be substantially impervious to water and other liquids. When tiles are installed, they are generally laid side by side on a surface such as a floor or wall. Typically, an adhesive compound is used as a base to attach the tiles to a surface and then grout is spread over and between the tiles to further bind the tiles to the surface and to fill spaces between adjacent tiles. While not impervious to water and moisture, the grout provides a barrier to reduce moisture between and behind the tiles. This step of grouting the tiles is labor

intensive and represents a significant portion of the labor involved in a typical tile installation.

[0004] Due to the time and labor involved in tile installation, it is typically quite costly to have tile professionally installed. Accordingly, many homeowners desire to install tile in their own homes. Unfortunately, this is an extremely tedious process, and many homeowners do not wish to spend the time necessary for a satisfactory installation.

[0005] In recent years, manufactures have attempted to produce do-it-yourself tile solutions that are easier to install. One such attempt is described in United States Publication Number US 2004/0031226 entitled "Pre-glued Tongue and Groove Flooring" by Miller et al. Disclosed therein is a laminated "tile" that uses a pre-applied glue for fastening the tiles together. While this system is easier to install than traditional tiles, it still requires a separate grout to be applied and uses a laminate material rather than a solid tile. A laminate material might not be as durable as more traditional materials such as ceramic or stone tiles. Additionally, the installer is required to apply a messy grout composition to the tiles as part of the installation process.

[0006] A previous attempt to produce an easy to install tile is described in United States Patent Number 2,693,102 entitled "Interlocking Wall Tile." The '102 patent describes a synthetic wall tile system that snaps together. Unfortunately, this tile is not practicable with substantially ridged materials, such as ceramic, granite, or marble. The '102 patent's tiles are molded into a uniform structure of a single material and rigid materials could not be formed into an operable tab structure as taught in the patent. Such a limitation can limit the aesthetic qualities available for the tiles.

[0007] Accordingly, there is a need in the art for a tile system that is simple to install.

[0008] Additionally, there is a need in the art for a tile system that does not require a grout to be applied to the tiles after installation.

[0009] Further, there is a need in the art for an easy to install tile system that makes use of durable tile materials.

[0010] In addition, there is a need in the art for a tile system that primarily utilizes traditional tile materials, but eliminates the need for grout.

BRIEF SUMMARY OF THE INVENTION

[0011] Briefly described, a tile can have at least one coupling member that cooperatively engages a coupling member of an adjacent tile, such that adjacent tiles can be reasonably secured or bound to one another without the use of grout. The cooperative coupling members can include male-type coupling members and female-type coupling members that are designed to secure adjacent tiles.

[0012] A variety of tiling systems can be used. For example, in one exemplary tiling system individual tiles can include all male-type or all female-type coupling members. In another example, the individual tiles can include two male-type coupling members and two female-type coupling members located on either adjacent or opposing edges of the tiles. In yet another example, the individual tiles can have another combination of male-type and female-type coupling members disposed on one or more of the edges of the tiles. The above examples are only intended as illustrations and are not intend to be limiting in any way; on the contrary, a wide variety of alternative exemplary embodiments would be understood to a person of ordinary skill in the art.

[0013] A groutless tile system includes a plurality of groutless tiles. Each groutless tile can include a durable component or layer disposed on a top surface of a substrate, a first coupling member disposed on an edge or side surface of the substrate, and a second coupling member disposed on another side surface of the substrate. At least a portion of the substrate can extend beyond the durable component. The substrate can maintain spacing between the durable components of adjacent groutless tiles. The first coupling member and a corresponding second coupling member of an adjacent tile can be configured to couple two adjacent groutless tiles. At least a portion of the first coupling member can be disposed beneath at least a portion of a durable component of the adjacent tile when two adjacent groutless tiles are coupled.

[0014] In other approaches, the groutless tiles can include a durable component disposed on a surface of a substrate, a first coupling member disposed on an edge of the substrate, and a second coupling member disposed on another edge, such as an opposite edge, of the substrate. The first coupling member and the second coupling member of the substrate can extend beyond the durable component. The first coupling member and the second coupling member of the groutless tile can be configured to couple the groutless tile to an adjacent groutless tile. At least a portion of the substrate can extend vertically to form a substantially continuous surface with the durable component.

[0015] Various other embodiments are directed to a method for making a groutless tile. One such method includes providing a durable component, molding a substrate to receive at least a portion of the durable component, affixing the durable component to the substrate, and milling at least a portion of the substrate to create a first coupling member on a side edge of the substrate and a second coupling member on another edge of the substrate.

[0016] Still other embodiments are directed to floor coverings. Exemplary floor coverings include floor elements that have at least a synthetic support structure and a decorative element. The decorative element can be selected from natural stone, terracotta, ceramic tile or synthetic stone. The decorative element can be supported, either directly or indirectly, by the support structure and at least partially defines the upper side of the floor element. The support structure can have at least at a first pair of opposite sides including coupling parts, which can be realized substantially as a male coupling part and a female coupling part. The coupling parts can be provided with vertically active locking portions, which, when the coupling parts of two such floor elements cooperate with each other, effect a locking in a vertical direction. The coupling parts can also be provided with horizontally active locking portions, which, when the coupling parts of two such floor elements cooperate with each other, effect a locking in horizontal direction. The coupling parts can be of the type allowing that two of such floor elements can be connected to each other at the sides by engaging one of these floor elements with the associated male coupling part, by means of a

rotational and/or planar motion, in the female coupling part of the other floor element. The male coupling part can project at least partially beyond the upper edge of the concerned side. In some instances, the horizontally active locking portion, in a coupled condition of two such floor elements or tiles, is located vertically under a durable component of at least one of the tiles. The durable component can be formed by the decorative element. The vertically active locking portions can substantially have the shape of a tongue and a groove, which in a coupled condition of two of such floor elements or tiles, preferably, wholly or partially, engage vertically under a portion of the synthetic support structure or substrate, whereby this portion of the substrate extends horizontally beyond said durable component or said decorative element of at least one of said tiles. It is possible that contact surfaces are formed between the tongue and the groove. The contact surfaces can prevent or limit vertical motion of two tiles or floor elements in a coupled condition thereof. At least one of the contact surfaces, being located at the top side of the tongue, can be located in a plane (e.g., a horizontal plane), which intersects the decorative element forming the durable component. Instead of being located in a plane, the concerned contact surface might also show a point of contact that is located closest to the durable component and that is located in a horizontal plane that intersects the decorative element forming the durable component.

[0017] Still other embodiments are directed to methods for manufacturing floor elements. The method can include providing a semi-finished product including at least a support structure and a decorative element, and performing a machining treatment on at least an edge portion of the already formed semi-finished product. More particularly, the machining can be done on the edge portions of the support structure of the semi-finished product in order to manufacture at least part of the coupling parts to be formed therein.

[0018] These and other aspects, features and advantages of the present invention will become more apparent upon reading the following specification in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The subject matter that is regarded as the invention is particularly pointed out and distinctly claimed in the claims at the conclusion of the specification. The foregoing and other objects, features, and advantages of the invention are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

[0020] **Fig. 1** is a schematic illustration of a tile in accordance with an embodiment of the present invention;

[0021] **Fig. 2** is a cross-sectional schematic illustration of a tile in accordance with another embodiment of the present invention;

[0022] **Fig. 3** is a cross-sectional schematic illustration of two adjacent tiles in accordance with an embodiment of the present invention; and

[0023] **Fig. 4** is a schematic illustration of a method for making a tile in accordance with an exemplary embodiment of the present invention.

[0024] The detailed description explains the embodiments of the invention, together with advantages and features, by way of example, with reference to the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0025] As used herein, the term “disposed” generally means located either at or upon. Additionally, the term disposed is intended to include an element integrally or detachably connected to another element, as well as objects simply placed on another element. Furthermore, it will be understood that when an element is referred to as being “disposed on” another element, it can be directly on the other element or intervening elements can be present there between. In contrast, when an element is referred to as being “disposed directly on” another element, there are no intervening elements present.

[0026] Referring now to **Figure 1**, a groutless tile in accordance with an exemplary embodiment of the present invention is generally depicted as **100**. The

groutless tile **100** includes a durable surface or component **102** that is disposed on a substrate **104**. The durable surface **102** can be affixed to the substrate **104** using a wide variety of methods (e.g., with an adhesive). The durable surface **102** can be a ceramic composition (baked clay), or it can be formed from a variety of natural or synthetic materials including, but not limited to, granite, quartz, marble, soapstone, plastic, wood, or another suitable material. The substrate **104** can be constructed of a suitable material that is chemical resistant, stain resistant, non-porous, and formable to within sufficient precision. In exemplary embodiments, the substrate **104** is formed from a polymeric material. While the groutless tile **100** is depicted as square shaped, it will be clear that alternatively shaped groutless tiles (e.g., hexagons, octagons, triangles, and the like) are also contemplated.

[0027] In exemplary embodiments, the substrate **104** is designed to have larger dimensions than the durable surface **102** such that the durable surface **102** can be disposed within a groove defined within the substrate **104**. The top surface of the durable surface **102** and the top surface of the substrate **104** can form a continuous surface, if desired. The substrate **104** includes a flange portion **106** disposed along the side edges or walls of the substrate **104**. The flange portion **106** further includes a first coupling member (not shown) and a second coupling member (not shown), which can be disposed on opposing or adjacent sides of the groutless tile **100**. The first coupling member and the second coupling member are designed such that they are operable for coupling together one or more adjacent groutless tiles **100**.

[0028] The groutless tile **100** can also include an underlayment layer that can act as a moisture or sound barrier. Additionally, the underlayment can serve a surface leveling function. Further, the underlayment can serve as a location for applying an adhesive, or as an adhesive itself, for attaching the tiles to an installation surface, such as a floor or a wall. The composition of the underlayment layer can depend upon the intended purpose of the underlayment layer. For example, the underlayment layer can be a multi-layered layment composed of several distinct layers each designed to perform a specific function. The underlayment can be secured to substrate **104** of the groutless tile **100** using an adhesive or other suitable means.

[0029] In an exemplary embodiment, at least a portion of the flange portion **106**, can be formed from a polymeric material and preferably is a polyurethane material, such as ELASTOCASTr70654 by BASF®. ELASTOCASTr70654 is an unpigmented, 77 to 79 Shore D urethane elastomer designed for cross-sections up to three inches, which has some inherent tackiness. It is also contemplated that another polyurethane material can be used in flange portion **106**. The data shown in **Table 1** can be helpful in producing the material used in a flange portion **106** in accordance with an exemplary embodiment. This data is provided by way of example only, and is not intended to limit the scope of the invention.

Table 1. Example polymeric blend for substrate and flange portion of groutless tile.

Mix Ratio @ 105 index:	100 parts of ELASTOCASTr7065R Resin 771. parts of WUC 3192T ISOCYANATE
Specific Gravity:	Resin 1/048 f/cc, 8.72 lbs./gal. @ 77 °F Iso 1.22 g/cc, 10.2 lbs./gal. @ 77 °F
Viscosity:	Resin 1220 cps @ 77 °F Iso 200 cps @ 77 °F
Typical Reactivity:	Hand mixed at 86 °F at 105 index Gel time: 180 to 240 seconds
Recommended processing conditions:	Component temperatures: Resin 75 - 95 °F Iso 75 - 95 °F Mold temperature: 130 - 160 °F Demold time: 10 - 20 minutes

[0030] Alternatively, other polymer variations, such as polyamides, vinyl polymers and polyolefins can be used. Just as with substrate **104**, the flange portion **106** can be made from a material that is chemical resistant, stain resistant, non-porous, and formable to within sufficient precision. Additionally, it can be desirable for the flange portion **106** to have sealing qualities so as to impede the intrusion of moisture between and behind the tiles and/or adherence qualities so as to minimize or prevent movement or displacement of the tiles.

[0031] In order to minimize the used of the polymeric material in substrate **104** and/or flange portion **106**, an optional filler can be used. Specific fillers that can be

implemented include carbonates, such as calcium carbonate (CaCO_3), and the like; oxide materials, such as alumina (Al_2O_3), zirconia, (ZrO_2), sand or silica (SiO_2), and the like; and like materials. In addition, pieces or particles of recycled materials, such as ceramic tile, soda lime silica glass, and the like, can also be used as a filler. It is also possible for a combination of fillers to be used.

[0032] Beyond just reducing the manufacturing costs and/or the final product weight the use of a filler material in substrate **104** and/or flange portion **106** can impart many beneficial properties to the groutless tiles and systems disclosed herein. For example, one or more of the coefficient of thermal expansion (α), ultraviolet light (UV) resistance, color appearance, and tensile strength of the substrate **104** and/or flange portion **106** can be tailored to a particular application or preference by adding the filler to the polymeric composition used to make these components.

[0033] Reference will now be made to **Figures 2-3**, which illustrate the coupling of a first groutless tile **200** with a second groutless tile **300**. A first coupling member **220** and a second coupling member **340** function to connect the first groutless tile **200** and the second groutless tile **300**. The first coupling member **220** of the first groutless tile **200** includes a first bendable portion **222** and a groove **224**. The second coupling member **340** of the second groutless tile **300** includes a tongue **346** and a body portion **348**. The groove **224** of the first coupling member **220** is designed to receive the body portion **348** and the tongue **346** of the second coupling member **340**. Once positioned inside the groove **224** of the first coupling member **220** the body portion **348** and the tongue **346** contacts the first bendable portion **222** and the groove **224**, respectively. In one embodiment, the tongue **346** and the first bendable portion **222** are designed to bend at least the first bendable portion during the coupling of the groutless tile **200** and the second groutless tile **300**. Additionally, the tongue **346** and the first bendable portion **222** are designed such that at least the first bendable portion **222** returns to or towards its normal unbent position once the groutless tile **200** and the second groutless tile **300** are coupled in order to prevent the tiles from separating. A contact surface between said tongue **346** and said groove **224** is also formed at the

top side of said tongue **346**, whereby said contact surface is located in a horizontal plane, which intersects the decorative element forming said durable surface **102**.

[0034] Continuing with reference to **Figure 3**, the first bendable portion **222** includes an enlarged portion on its distal end that has an inclined inner surface. Additionally, the body portion **348** of the second coupling member **340** also includes an inclined surface on its proximal end. The inclined inner surface of the first bendable portion **222** is designed to have a substantially complimentary angle to that body portion **348** of the second coupling member **340**. The first bendable portion **222** is designed to slideably contact the body portion **348** during the coupling of the groutless tile **200** and the second groutless tile **300**. Furthermore, the inclined surfaces of the first bendable portion **222** and body portion **348** are operable for properly positioning and the groutless tile **200** and the second groutless tile **300** during coupling. In exemplary embodiments, the inclined surfaces of the first bendable portion **222** and the body portion **348** function to keep the groutless tile **200** and the second groutless tile **300** properly positioned while the tiles are coupled to one another. Said inclined inner surfaces of both said body portion **348** and said enlarged portion **342** form horizontally active locking portions, which in a coupled condition are located vertically under a durable surface **102** of at least one of said tiles **200-300**.

[0035] In exemplary embodiments, the tongue **346** is located at the distal end of the second coupling member **340** and extends substantially horizontally and outwardly from the second groutless tile **300**. Said tongue **346** of said second coupling member **340** and said groove **224** of the first coupling member **220** are vertically active locking portions and wholly engage vertically under a portion of the synthetic support structure or substrate **104**, whereby this portion of the substrate **104** extends horizontally beyond said durable surface **102** or said decorative element of at least one of said tiles **200-300**.

[0036] In exemplary embodiments, the first groutless tile **200** can be coupled to the second groutless tile **300** by snapping or pushing the second coupling member **340** of the second groutless tile **300** into the first coupling member **220**. In one embodiment, a lateral or horizontal is necessary to properly couple the first groutless

tile **200** and the second groutless tile **300**. Furthermore, during the coupling of the groutless tile **200** and the second groutless tile **300** the second coupling member **340** of the second groutless tile **300** can be locked into position once inserted into the groove **224** of the first coupling member **220**. Additionally, during the coupling of the first groutless tile **200** and the second groutless tile **300** the first bendable portion **222** can be bent to accommodate the insertion of the first body portion **348** into the groove **224**. After the first groutless tile **200** and the second groutless tile **300** are coupled the first bendable portion **222** returns to or towards its normal unbent position and remains in contact with the body portion **348**. In exemplary embodiments, the first groutless tile **200** and the second groutless tile **300** can be separated from one another by pivotally disengaging the first groutless tile **200** from the second groutless tile **300**, preferably without damaging the respective tiles and their coupling members. It is noted that in a completely coupled condition of the respective groutless tiles **200-300**, it is possible that the first bendable portion **222** is bent out of the level under surface of said tiles **200-300**. Such bending out might create an extra firm coupling especially in the horizontal direction, thereby strongly preventing separation of two coupled tiles in said horizontal direction.

[0037] Turning now to **Figure 4**, an illustration of a method for making a tile in accordance with an exemplary embodiment of the present invention is generally depicted as **400**. During the first step in the method **400**, a durable surface **402** is provided and inserted into a mold **404**. Once the durable surface **402** has been positioned in the mold **404** a substrate **406** can be formed around a portion of the durable surface **402**. In one embodiment, the substrate **406** can be a plastic material that is injection molded or reaction injection molded (RIM) around the durable surface **402**. The substrate **406** forms around the durable surface **402** to create the groutless tile **408**. Next the groutless tile **408** is processed through a series of tools **410** that are used to create one or more flanges **412** around the edges of the tile **408**. In one embodiment, the tools **410** can perform a milling process with one or more milling cutter that are positioned at different positions and angles with respect to the groutless tile **408**. As shown in **Figure 4**, the flanges **412** including the first and second

coupling members can extend the entire length of one side of the substrate **406** thereby simplifying the milling process.

[0038] While the exemplary embodiments of the invention have been described, it will be understood that those skilled in the art, both now and in the future, can make various improvements and enhancements, which fall within the scope of the claims that follow. These claims should be construed to maintain the proper protection for the invention first described.

CLAIMS

What is claimed is:

1. A groutless tile system, comprising:
a plurality of groutless tiles, wherein each groutless tile comprises:
a durable component disposed on a surface of a substrate; and
a first coupling member disposed on a side surface of the substrate;
wherein at least a portion of the surface of the substrate extends beyond the durable component;
wherein the first coupling member and a corresponding second coupling member of an adjacent tile are configured to couple two adjacent groutless tiles; and
wherein at least a portion of the first coupling member is disposed beneath at least a portion of a durable component of the adjacent tile when two adjacent groutless tiles are coupled.
2. The groutless tile system of claim 1, wherein the first coupling member further comprises a first bendable portion and a groove operable for coupling the first coupling member to the second coupling member.
3. The groutless tile system of claim 2, wherein the second coupling member further comprises a tongue and a body portion operable for coupling the first coupling member to the second coupling member.
4. The groutless tile system of claim 1, wherein the first coupling member, the durable component, and the second coupling member of the groutless tile form a substantially continuous surface.
5. The groutless tile system of claim 1, wherein at least a portion of the substrate is designed to have a texture and color similar to that of grout.

6. The groutless tile system of claim 1, wherein at least a portion of the substrate, at least a portion of the first coupling member, at least a portion of the second coupling member, or 2 or more of the foregoing comprise a filler.
7. The groutless system of claim 6, wherein the filler comprises a carbonate, an oxide, a recycled post-consumer product, or a combination of 2 or more of the foregoing.
8. The groutless system of claim 7, wherein the filler comprise calcium carbonate (CaCO_3), alumina (Al_2O_3), zirconia, (ZrO_2), sand, silica (SiO_2), recycled ceramic tile, recycled soda lime silica glass, or a combination comprising 2 or more of the foregoing.
9. The groutless tile system of claim 1, wherein the durable component is partially encapsulated in the substrate through the Reaction Injection Molding (RIM) process.
10. The groutless tile system of claim 1, wherein each groutless tile further comprises a layment layer disposed on a surface of the substrate opposite the durable component.
11. The groutless tile system of claim 3, wherein the first bendable portion of the first coupling member is operable for engaging the body portion of the second coupling member.
12. The groutless tile system of claim 1, wherein a lateral force is used to couple the first coupling member and a second coupling member.

13. A groutless tile, comprising:
a durable component disposed on a surface of a substrate;
a first coupling member disposed on an edge of the substrate; and
a second coupling member disposed on another edge of the substrate;
wherein the first coupling member and the second coupling member of the substrate extend beyond a side surface of the durable component;
wherein the first coupling member and the second coupling member of the groutless tile are operable for coupling the groutless tile to an adjacent groutless tile;
and
wherein at least a portion of the substrate extends vertically to form a substantially continuous surface with the durable component.
14. The groutless tile of claim 13, wherein the first coupling member further comprises a first bendable portion and a groove and wherein the second coupling member further comprises a tongue and a body portion.
15. The groutless tile of claim 13, wherein the first coupling member, the durable component, and the second coupling member of the groutless tile form a substantially continuous surface.
16. The groutless tile of claim 13, wherein at least a portion of the substrate is designed to have a texture and color similar to that of grout.
17. The groutless tile system of claim 13, wherein at least a portion of the substrate, at least a portion of the first coupling member, at least a portion of the second coupling member, or 2 or more of the foregoing comprise a filler.
18. The groutless system of claim 17, wherein the filler comprises a carbonate, an oxide, a recycled post-consumer product, or a combination of 2 or more of the foregoing.

19. The groutless system of claim 13, wherein the filler comprises calcium carbonate (CaCO_3), alumina (Al_2O_3), zirconia, (ZrO_2), sand, silica (SiO_2), recycled ceramic tile, recycled soda lime silica glass, or a combination comprising 2 or more of the foregoing.
20. A method for making a groutless tile comprising:
providing a durable component;
molding a substrate to receive at least a portion of the durable component;
affixing the durable component to the substrate; and
milling at least a portion of the substrate to create a first coupling member on an edge of the substrate and a second coupling member on another edge of the substrate.
21. The method of claim 20, wherein the first coupling member further comprises a first bendable portion and a groove and wherein the second coupling member further comprises a tongue and a body portion.
22. The method of claim 20, wherein the affixing and the molding are performed simultaneously.
23. The method of claim 20, wherein molding the substrate comprises molding through a Reaction Injection Molding (RIM) process, thereby at least partially encapsulating the durable component by the molded substrate and/or affixing the durable component to the molded substrate.

24. A groutless tile system, comprising:
a plurality of groutless tiles, wherein each groutless tile comprises:
a durable component disposed on a substrate;
a first coupling member disposed on at least one edge of the substrate,
the first coupling member comprising a first bendable portion and a groove; and
a second coupling member disposed on at least another edge of the
substrate, the second coupling member comprising a tongue and a body portion;
wherein at least a portion of the substrate extends beyond the durable
component;
wherein the first coupling member on a first groutless tile and the second
coupling member of an adjacent, second groutless tile are configured to couple the
first and second groutless tiles; and
wherein at least a portion of the first bendable portion of the first coupling
member is disposed beneath at least a portion of a durable component of the second
groutless tile when the first and second groutless tiles are coupled.
25. The groutless tile system of claim 24, wherein the first coupling member and
the second coupling member prevent both horizontal and vertical movement of the
first and second groutless tiles when coupled.
26. The groutless tile system of claim 24, wherein the first coupling member and
the second coupling member extend an entire length of the edge of the substrate.

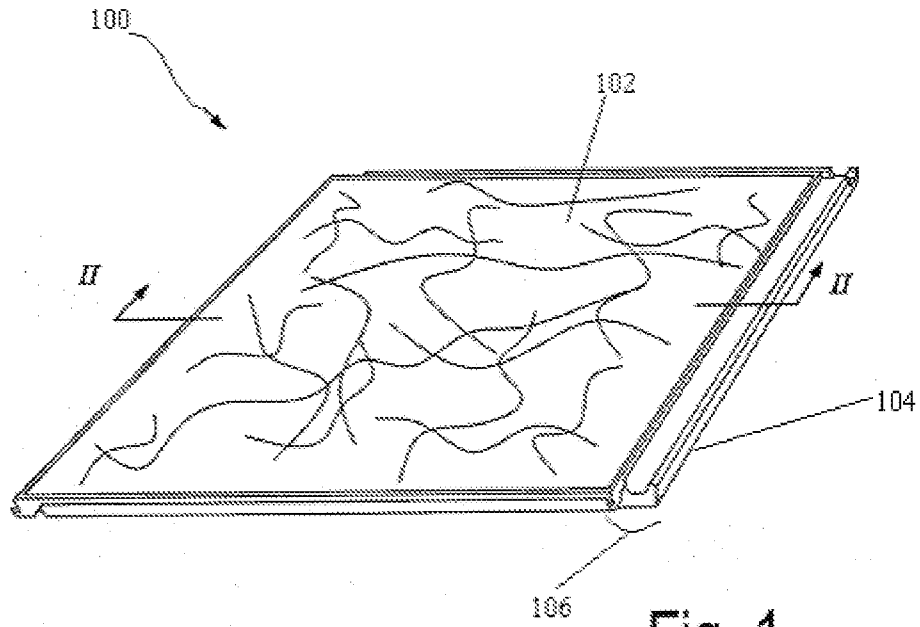


Fig. 1

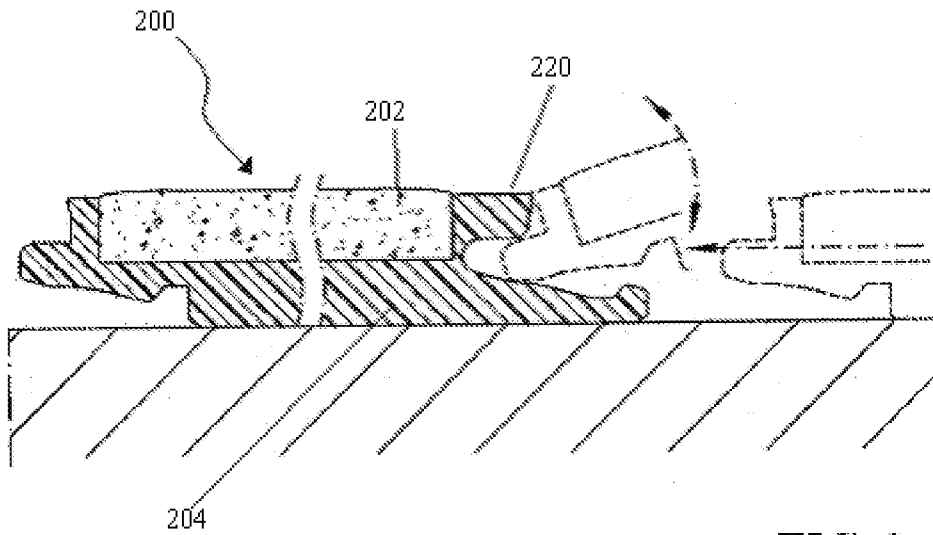


FIG. 2

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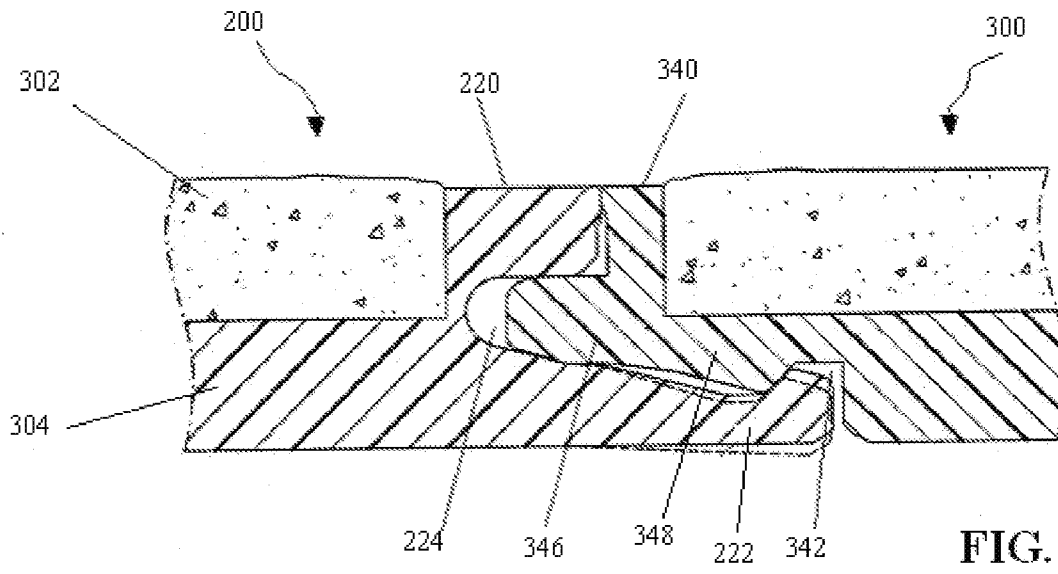


FIG. 3

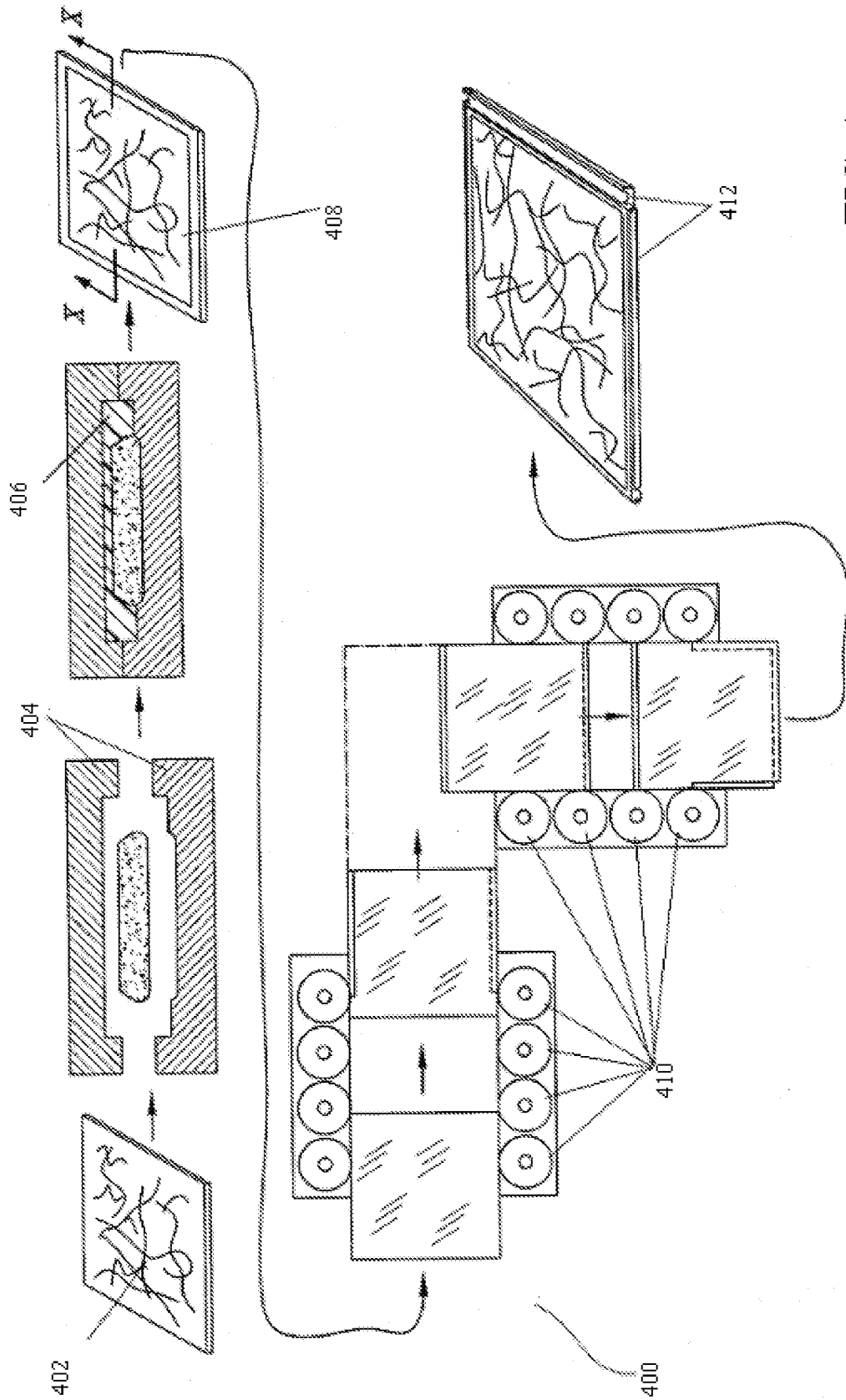


FIG. 4