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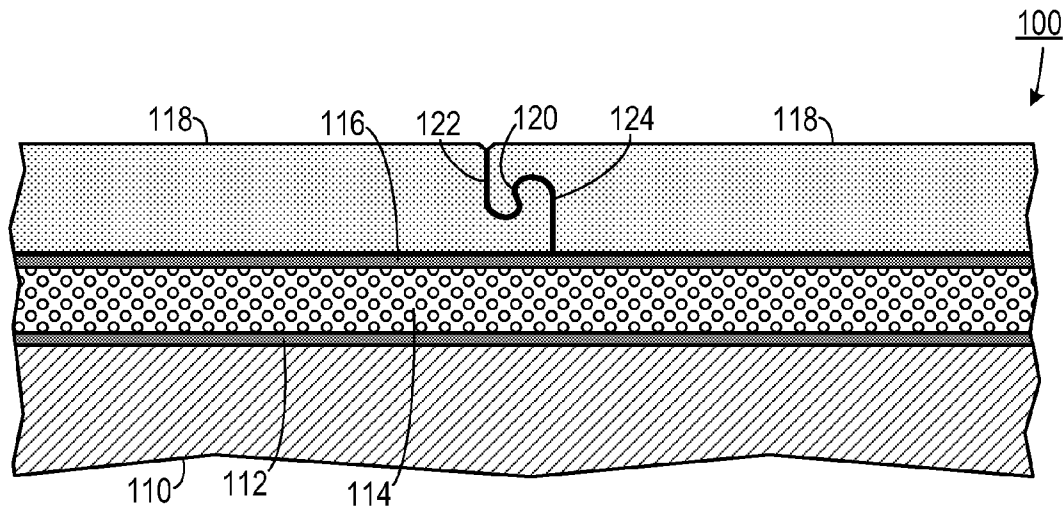
(19) **United States**(12) **Patent Application Publication**
Ford et al.(10) **Pub. No.: US 2015/0047282 A1**(43) **Pub. Date: Feb. 19, 2015**(54) **FLOORING AND UNDERLAYMENT
INCLUDING EXTRUDED SHEET MATERIAL
WITH EXPANDED MICROSPHERES****Publication Classification**

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Richard Allgood, Lawrenceville, GA (US)(73) Assignee: **PAK-LITE, INC.**, Suwanee, GA (US)(21) Appl. No.: **13/965,885**(22) Filed: **Aug. 13, 2013**(57) **ABSTRACT**

A flooring for covering a floor substrate includes a hybrid underlayment and a plurality of interlocking synthetic tiles. The hybrid underlayment is coupled to the floor substrate with a first adhesive layer. The hybrid underlayment includes an extruded thermoplastic sheet having a plurality of gas-filled expanded thermoplastic microspheres distributed throughout the thermoplastic sheet. Each of the plurality of interlocking synthetic tiles is coupled to the hybrid underlayment with a second adhesive layer.



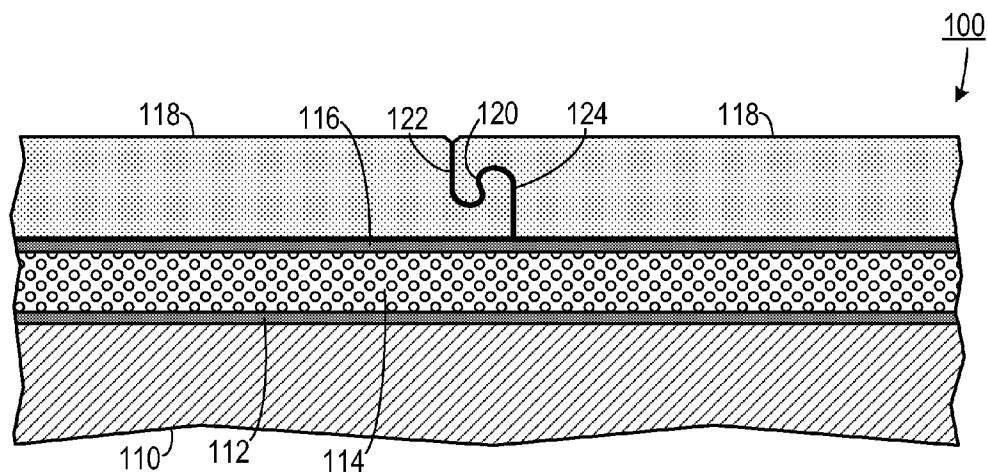


FIG. 1

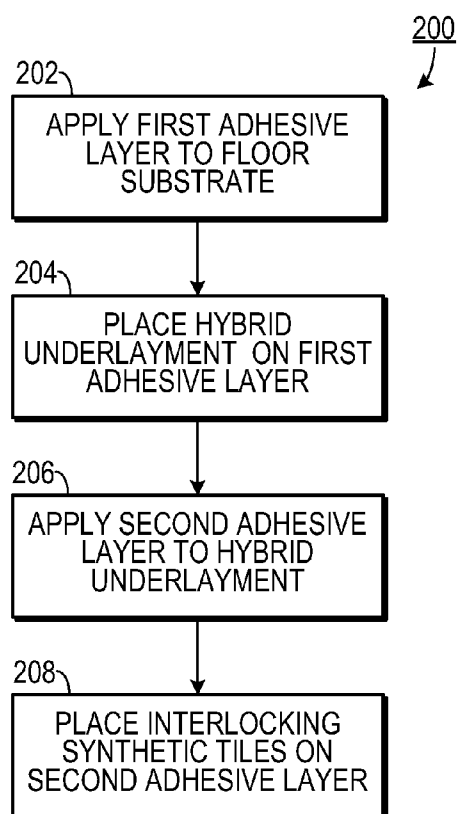


FIG. 2

FLOORING AND UNDERLAYMENT INCLUDING EXTRUDED SHEET MATERIAL WITH EXPANDED MICROSPHERES

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to flooring systems and, more specifically, to a flooring system for interlocking tiles.

[0003] 2. Description of the Related Art

[0004] Luxury vinyl tiles are increasingly used in high end flooring applications. Such tiles, while made of vinyl, often have a texture and color corresponding to other flooring materials, such as ceramic tiles and wood. They are frequently (but not always) less expensive than the floorings materials they resemble. They also tend to be lighter and easier to install than other flooring materials and often are more resistant to scuffs and stains.

[0005] Luxury vinyl tiles typically have complementary locking surfaces on their edges so that adjacent tiles are locked to each other along their edges. Most installers of luxury vinyl tiles place an underlayment between the subfloor and the tiles. This underlayment improves the acoustics and feel of the tiles by absorbing movement between the tiles and the floor substrate as users walk across the surface of the tiles.

[0006] Typical underlayments tend to be resilient, which allows for dampening of the effects of people walking on the floor. However, the locking surfaces along the edge of a tile tend to be weaker than the rest of the tile. Therefore, when one's heel, or other pressure source, is applied to the locking joint between two tiles, the locking surfaces become weakened due to the resilience of the underlayment. Through enough use, the locking surfaces can become degraded and even break.

[0007] Therefore, there is a need for a flooring system with an underlayment that reduces stress on the locking surfaces of vinyl tiles.

SUMMARY OF THE INVENTION

[0008] The disadvantages of the prior art are overcome by the present invention which, in one aspect, is a flooring for covering a floor substrate that includes a hybrid underlayment and a plurality of interfacing synthetic tiles. The hybrid underlayment is coupled to the floor substrate with a first adhesive layer. The hybrid underlayment includes an extruded thermoplastic sheet having a plurality of gas-filled expanded thermoplastic microspheres distributed throughout the thermoplastic sheet. Each of the plurality of interfacing synthetic tiles is coupled to the hybrid underlayment with a second adhesive layer.

[0009] In another aspect, the invention is a floor, which includes a substrate. A hybrid underlayment is coupled to the floor substrate with a first adhesive layer. The hybrid underlayment includes an extruded sheet that includes thermoplastic and a plurality of gas-filled expanded thermoplastic microspheres having a pre-expansion particle size within a range of 28 μm to 38 μm and distributed throughout the thermoplastic. A plurality of luxury vinyl tiles, each of which is coupled to the hybrid underlayment by a second adhesive layer.

[0010] In yet another aspect, the invention is a method of installing a floor on a floor substrate, in which a first adhesive layer is applied to the floor substrate. A hybrid underlayment is placed on the first adhesive layer. The hybrid underlayment

includes an extruded thermoplastic sheet having a plurality of gas-filled expanded thermoplastic microspheres distributed therein. A second adhesive layer is applied to the hybrid underlayment. A plurality of interfacing synthetic tiles is placed on the second adhesive layer.

[0011] These and other aspects of the invention will become apparent from the following description of the preferred embodiments taken in conjunction with the following drawings. As would be obvious to one skilled in the art, many variations and modifications of the invention may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWINGS

[0012] FIG. 1 is a schematic drawing of one embodiment of a flooring system.

[0013] FIG. 2 is a flow chart showing one embodiment of a method of installing a floor.

DETAILED DESCRIPTION OF THE INVENTION

[0014] A preferred embodiment of the invention is now described in detail. Referring to the drawings, like numbers indicate like parts throughout the views. Unless otherwise specifically indicated in the disclosure that follows, the drawings are not necessarily drawn to scale. As used in the description herein and throughout the claims, the following terms take the meanings explicitly associated herein, unless the context clearly dictates otherwise: the meaning of "a," "an," and "the" includes plural reference, the meaning of "in" includes "in" and "on."

[0015] As shown in FIG. 1, one embodiment of a flooring system **100** includes a flooring substrate **110**, which can be a plywood subfloor. A first adhesive layer **112** is disposed on the substrate **110** and a hybrid underlayment **114** is disposed on the first adhesive layer **112** so that the hybrid underlayment **114** is coupled to the substrate **110**. A second adhesive layer **116** is disposed on the hybrid underlayment **114** and a plurality of interlocking synthetic tiles **118** (such as luxury vinyl tiles) is secured to the hybrid underlayment **114** with the second adhesive layer **116**. Typically, the tiles **118** interface each other along a joint **120**, which could be as simple as a butt-joint. In one embodiment, the tiles **118** have complementary-shaped locking edges **122** and **124** that allow for the interlocking of adjacent tiles at a joint **120**.

[0016] The hybrid underlayment **114** includes a thermoplastic sheet in which a plurality of gas-filled expanded thermoplastic microspheres distributed throughout the thermoplastic sheet. In one embodiment, the thermoplastic is polyethylene (which could be either HDPE or LDPE, depending on the specific application). In other embodiments, the thermoplastic can include such plastics as: polypropylene, acrylonitrile butadiene styrene, ethylene-vinyl acetate, polystyrene, poly vinyl chloride, thermoplastic polyolefin, polyethylene terephthalate, polyvinyl fluoride and combinations thereof.

[0017] In one embodiment, the microspheres have a pre-expansion particle size within a range of 28 μm to 38 μm and expand when heated to a temperature of about 200° C. In one embodiment, the microspheres include Expancel® 930-MB-120 microspheres available from AkzoNobel. In one method of making the underlayment, microsphere pellets are combined with thermoplastic and the combination is heated to

about 200° C., during which time the microspheres expand. The combination is then extruded in sheet form.

[0018] It has been found that the hybrid underlayment 114 provides good support to the joints 120 between adjacent tiles 118, thereby reducing stress at the locking surfaces 122 and 124. This can result in less wear on the locking surfaces 122 and 124 and an extended lifespan for the tiles 118.

[0019] As shown in FIG. 2, in one method 200 of installing a floor on a floor substrate, a first adhesive layer is applied to the floor substrate 202. A hybrid underlayment is placed on the first adhesive layer 204. The hybrid underlayment includes an extruded thermoplastic sheet having a plurality of gas-filled expanded thermoplastic microspheres distributed therein. A second adhesive layer is applied to the hybrid underlayment 206. A plurality of interlocking synthetic tiles is placed on the second adhesive layer 208.

[0020] The above described embodiments, while including the preferred embodiment and the best mode of the invention known to the inventor at the time of filing, are given as illustrative examples only. It will be readily appreciated that many deviations may be made from the specific embodiments disclosed in this specification without departing from the spirit and scope of the invention. Accordingly, the scope of the invention is to be determined by the claims below rather than being limited to the specifically described embodiments above.

1. A flooring underlayment for covering a floor substrate, comprising:

- (a) an extruded thermoplastic sheet; and
- (b) a plurality of gas-filled expanded thermoplastic microspheres distributed throughout the thermoplastic sheet.

2. The flooring of claim 1, wherein the thermoplastic comprises polyethylene.

3. The flooring of claim 1, wherein the thermoplastic comprises a plastic selected from a list consisting of: polypropylene, acrylonitrile butadiene styrene, ethylene-vinyl acetate, polystyrene, poly vinyl chloride, thermoplastic polyolefin, polyethylene terephthalate, polyvinyl fluoride and combinations thereof

4. The flooring of claim 1, wherein the microspheres comprise microspheres have a pre-expansion particle size within a range of 28 μm to 38 μm .

5. The flooring of claim 1, further comprising interfacing synthetic tiles that comprise interlocking vinyl tiles.

6. The flooring of claim 1, wherein the interfacing synthetic tiles comprise luxury vinyl tiles.

7. A floor, comprising:

- (a) a substrate;
- (c) a hybrid underlayment, disposed above the substrate, the hybrid underlayment including an extruded sheet that includes thermoplastic and a plurality of gas-filled expanded thermoplastic microspheres having a pre-expansion particle size within a range of 28 μm to 38 μm and distributed throughout the thermoplastic; and
- (e) a plurality of luxury vinyl tiles, disposed above the hybrid underlayment.

8. The floor of claim 7, wherein each of the plurality of luxury vinyl tiles interlock with at least one adjacent luxury vinyl tile.

9. A method of installing a floor on a floor substrate, comprising the steps of:

- (b) placing a hybrid underlayment that includes an extruded thermoplastic sheet having a plurality of gas-filled expanded thermoplastic microspheres distributed therein above the floor substrate; and (d) placing a plurality of interfacing synthetic tiles above the hybrid underlayment.

10. The method of claim 9, wherein the thermoplastic comprises polyethylene.

11. The method of claim 9, wherein the thermoplastic comprises a plastic selected from a list consisting of: polypropylene, acrylonitrile butadiene styrene, ethylene-vinyl acetate, polystyrene, poly vinyl chloride, thermoplastic polyolefin, polyethylene terephthalate, polyvinyl fluoride and combinations thereof

12. The method of claim 9, wherein the microspheres comprise microspheres have a pre-expansion particle size within a range of 28 μm to 38 μm .

13. The method of claim 9, wherein the interfacing synthetic tiles comprise interlocking tiles.

14. The method of claim 9, wherein the interfacing synthetic tiles comprise luxury vinyl tiles.

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