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(54) **HARDWOOD FLOORING**

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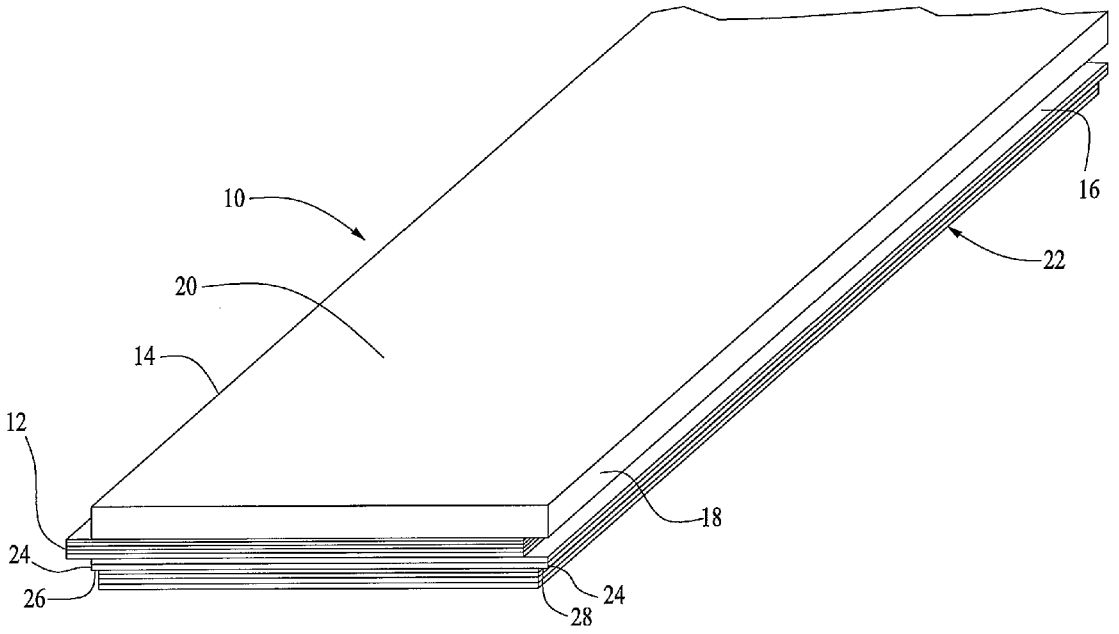
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(57) **ABSTRACT**

An elongated flooring board for use in forming a warp-resistant hardwood surface that can be repeatedly refinished, adhesively bonded to concrete or nailed to a subfloor. The flooring board is comprised of an upper hardwood layer and a plurality of lower softwood layers adhesively bonded together and to the upper layer. The hardwood upper layer is at least 7 mm. in thickness and the lower softwood layers collectively define a thickness of at least about 15 mm.



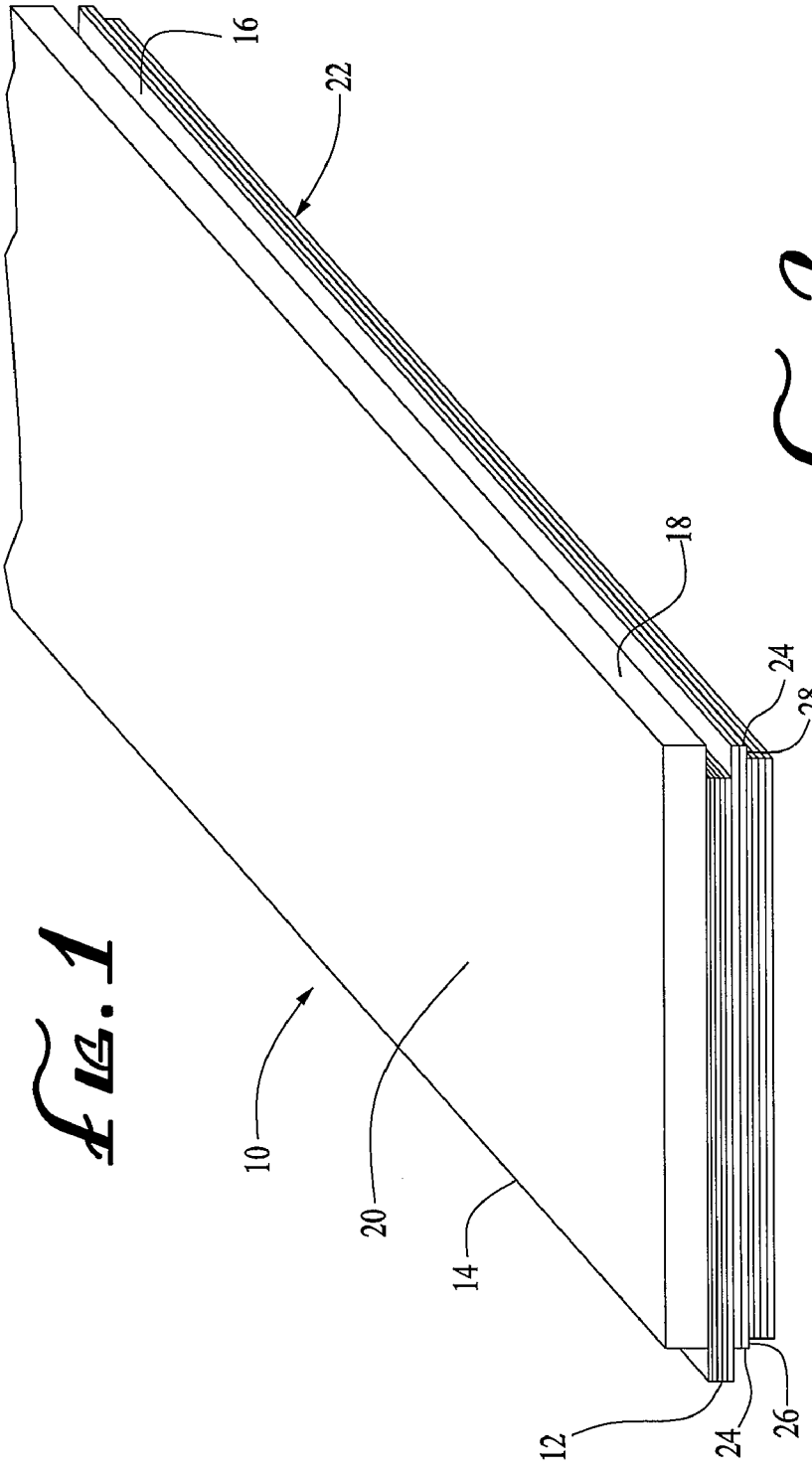


FIG. 1

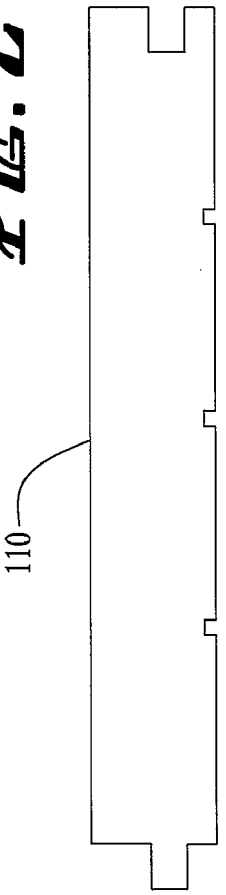


FIG. 2

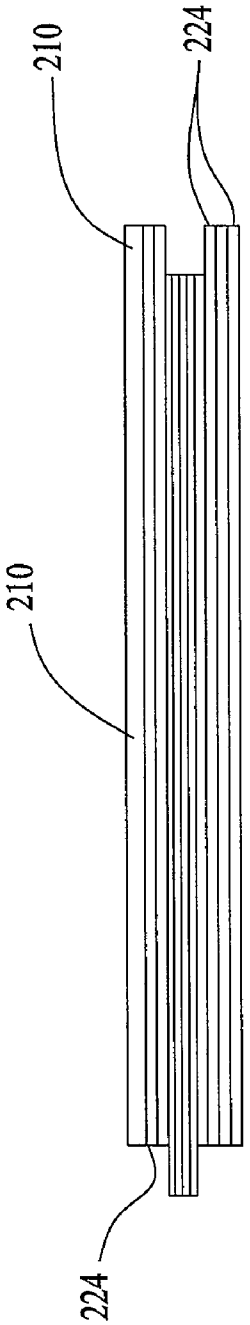


FIG. 3

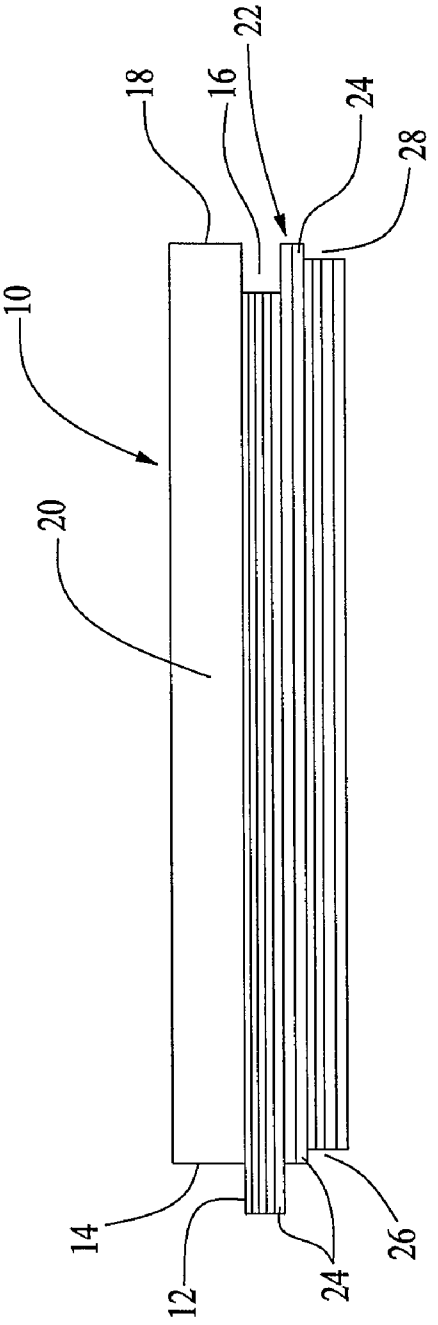


FIG. 4

HARDWOOD FLOORING

BACKGROUND OF THE INVENTION

[0001] The present invention relates to hardwood flooring surfaces and, more particularly, to a flooring surface formed of individual multi-layer flooring boards having an upper hardwood layer. Hardwood flooring is typically formed of a plurality of adjacent boards of solid hardwood, such as oak, secured together to form the flooring. Hardwood flooring is a very popular, albeit expensive, flooring surface for commercial and residential buildings. Typical solid hardwood flooring boards are of random length, about 18 millimeters (mm.) thick and 90-125 mm. wide and are provided with mating tongues and grooves on opposed sides to form an interlocking flooring. Such a solid hardwood flooring is very attractive and durable in that it can be repeatedly sanded due to its thickness to restore its finish. However, it cannot be glued directly to concrete. Solid hardwood flooring expands and contracts under variations in temperature and the adhesive securing the wood to the concrete does not move with the wood, causing the wood to pop off or separate from the concrete. As a result, a plywood subfloor is required. To reduce the costs of such flooring, a laminate construction has been developed which is known as engineered flooring and is comprised of several thin lower layers of softwood, such as plywood, and a single upper layer of hardwood, all bonded together by a suitable adhesive. The multiple layers of bonded softwood allow for some relative movement between the individual layers, preventing the flooring from popping off the concrete surface. As with solid hardwood floors, the individual laminated planks can be secured together by a tongue in groove configuration and nails are driven at an angular inclination so as to pass between adjacent portions of the individual planks to secure the planks together.

[0002] While the above-described engineered flooring provided a flooring having the appearance of a solid hardwood floor that could be adhesively secured to a concrete surface without warping, it had a significant limitation. As a hardwood floor wears, it must be periodically sanded and refinished. While the overall thickness of engineered flooring is typically about 15 mm., the maximum thickness of the upper hardwood layer that can be utilized in such a construction is only about 5 mm. If a thicker upper layer of hardwood is used in an effort to increase the longevity of the product, the resultant planks have been found to warp. This occurs because the upper layer of solid wood is stronger than the softwood layers and thus does not move with the softwood layers as they expand and contract. Thus, while having the same appearance as solid hardwood flooring, engineered flooring has a much shorter life as its ability to be refinished is substantially diminished due to the relatively thin hardwood veneer. The present invention is directed to a product having the advantages of both solid hardwood flooring and engineered flooring. It has the same appearance and durability as solid hardwood flooring and can be adhesively bonded to concrete without warping and without the need for a separate plywood subfloor.

SUMMARY OF THE INVENTION

[0003] Briefly, the present invention is directed to a wood flooring having a hardwood upper surface and comprised of a plurality of elongated multi-layer flooring boards. Each of the boards can define tongue and groove lateral edges for joining adjacent boards together in the formation of the flooring, and includes an upper hardwood layer and a plurality of softwood layers disposed therebelow. The softwood layers are adhesively bonded together and to the hardwood layer. The hardwood layer is at least about 7 mm. in thickness and the softwood layers collectively define a thickness of about 15 mm. So configured, the flooring boards of the present invention provide a hardwood flooring that can be adhesively bonded in a secure disposition to a concrete surface without warping over time and without the need for a separate subfloor and which has a sufficiently thick upper layer of hardwood so as to allow for repeated refinishing of the flooring. The flooring boards of the present invention also allow for the securement of the flooring to a flooring substrate with nails in the same manner as a conventional solid hardwood floor. A cutout area may be provided along one of the edges of the flooring boards in the softwood layers adjacent to the underside of the tongue projecting laterally therefrom to allow for the expansion and contraction of the bottom softwood layers which will tend to undergo move movement than the upper softwood layers due to adhesion attachment of the bottom softwood layers to the concrete.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. **1** is a perspective view of a flooring board of the present invention.

[0005] FIG. **2** is an end view of a conventional solid hardwood flooring board.

[0006] FIG. **3** is an end view of a prior art laminated flooring board having a hardwood upper layer.

[0007] FIG. **4** is an end view of a flooring board of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] Referring now in detail to the drawings, the flooring boards **10** of the present invention are similar in overall shape to a conventional hardwood flooring board **110** illustrated in FIG. **2**. As with conventional hardwood flooring boards, boards **10** can be provided in any desired length and width, with lengths being random and widths of 90-125 mm. being typical. In the preferred embodiment of the invention, a tongue **12** projects laterally from one edge **14** of board **10** and an elongated groove **16** is provided in the opposing edge **18** for receiving the tongue of an adjacent board as in conventional tongue and groove flooring. As seen in FIG. **4**, the flooring board **10** further comprises an upper hardwood layer **20** disposed atop and adhesively bonded to a stack **22** of adhesively bonded softwood layers **24**. The individual layers **24** of a softwood are typically formed of plywood and will be hereinafter referred to as plywood, although layers **24** could be formed of a wide variety of softwood materials, including pressboard. A standard adhesive of the type used in the formation of plywood and in the formation of engineering flooring can be used for the bonding together of the individual plywood layers **24** and for the securement of the upper hardwood layer **20** to the stack **22** of plywood layers. The upper hardwood layer **16** is at least about 7 mm. thick. The individual layers **24** of plywood are about 1-2 mm. in thickness and the stack **22** defines a thickness of 15 mm. For reasons to be explained, a cutout area **26** is preferably provided in the adhesively bonded layers of plywood adjacent to the underside of tongue **12**. Through the aforesaid configuration, a

hardwood flooring can be formed by securing together the individual flooring boards **10** in a conventional manner utilizing the tongues and grooves provided on the lateral edges thereof.

[0009] FIG. **3** illustrates an example of tongue and groove engineered flooring **210** of the type discussed above that is found in the prior art. As also noted above, the upper hardwood layer **210** is a maximum of about 5 mm. thick, and more typically 2-3 mm. in thickness to prevent the product from warping due to the fact that the upper layer of solid wood is substantially stronger than the softwood (e.g. plywood) layers **224**. As a result of the relatively thin upper hardwood layer **210**, engineered flooring has a relatively short life span due to its inability to be repeatedly refinished. By increasing the thickness of the hardwood layer **20** in the present invention to at least 7 mm., the flooring boards of the present invention can be refinished as often as conventional hardwood flooring as the extent to which solid hardwood flooring can be sanded is limited by the nails used to secure adjacent flooring boards to each other and to the subfloor. One cannot sand beyond the top of the nail heads. It has been found unexpectedly that by also increasing the thickness of the stack of laminated plywood layers from about 12 mm. to 15 mm., the strength of the laminated stack is sufficiently increased to prevent warping of the entire floorboard **10**.

[0010] The flooring boards of the present invention are also well suited for use on a flooring substrate. In such applications, a nail **40** is typically angled at about 45 degrees so as to pass through the tongue and the lower portion of the flooring as seen in FIG. **3** as in the securement of solid hardwood flooring. In so doing, the nail will pass through approximately the same amount of material as would a nail in the application of a solid hardwood flooring. When securing flooring boards **10** on a concrete surface, only a suitable adhesive is used. If desired, an adhesive also could be used in lieu of nails when securing the flooring boards **10** of the present invention to a wooden subfloor.

[0011] In addition to the above, a cutout area **26** can be provided along edge **14** of the flooring boards **10** in the plywood layers adjacent the underside of the tongue **12** projecting laterally therefrom to allow for the expansion and contraction of the bottom plywood layers in stack **22** which will tend to more movement than the upper plywood layers in the event of an adhesive attachment of the bottom layer to a concrete surface. An identical cutout area **28** can be provided along opposed edge **18** as seen in FIGS. **1** and **4**. Cutout areas **26** and **28** preferably are about 2 mm. deep.

[0012] Various other changes and modifications can be made in carrying out the present invention without departing from the spirit and scope thereof. Insofar as these changes and modifications are within the purview of the appended claims, they are to be considered as part of the present invention.

I claim:

1. An elongated flooring board for use in forming a warp-resistant hardwood flooring surface on concrete, said flooring board comprising an upper layer formed of a hardwood material, a plurality of lower non-hardwood layers disposed below and adhesively bonded to each other and to said upper layer to define said flooring board and wherein said upper layer is at least about 7 mm. in thickness and said plurality of lower layers collectively define a thickness of at least about 15 mm.

2. The flooring board of claim **1** wherein said non-hardwood layers are formed of plywood.

3. The flooring board of claim **1** wherein said non-hardwood layers are formed of pressboard.

4. An elongated flooring board for use in forming a hardwood flooring surface that is warp-resistant when adhesively bonded to concrete and capable of multiple refinishing operations, said flooring board comprising an upper layer formed of a hardwood material, a plurality of lower non-hardwood layers disposed below and adhesively bonded to each other and to said upper layer to define said flooring board and wherein said upper layer is at least about 7 mm. in thickness.

5. The flooring board of claim **4** wherein said plurality of lower layers collectively define a thickness of about 15 mm. and are formed of plywood.

6. The flooring board of claim **4** wherein said plurality of lower layers collectively define a thickness of about 15 mm. and are formed of pressboard.

7. An elongated flooring board for use in forming a hardwood flooring surface that can be repeatedly refinished and resists warping when adhesively bonded to concrete or nailed to a subfloor, said board defining opposed lateral edges, a tongue member extending outwardly from one of said edges and a groove formed within the other of said edges and wherein said flooring board further comprises an upper layer formed of a hardwood material and a plurality of lower non-hardwood layers disposed below and adhesively bonded to each other and to said upper layer to define said flooring board and wherein said upper layer is at least about 7 mm. in thickness and said plurality of lower layers collectively define a thickness of at least about 15 mm.

8. The flooring board of claim **7** wherein said non-hardwood layers are formed of plywood.

9. The flooring board of claim **7** wherein said non-hardwood layers are formed of plywood.

10. The elongated flooring board of claim **7** including opposed cutout areas in said side walls, one of said cutout areas being adjacent and below said tongue member.

11. The flooring board of claim **13** wherein each of said cutout area defines a depth of about 2 mm.

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