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(54) LAMINATED INDOOR FLOORING BOARD AND METHOD OF MAKING SAME

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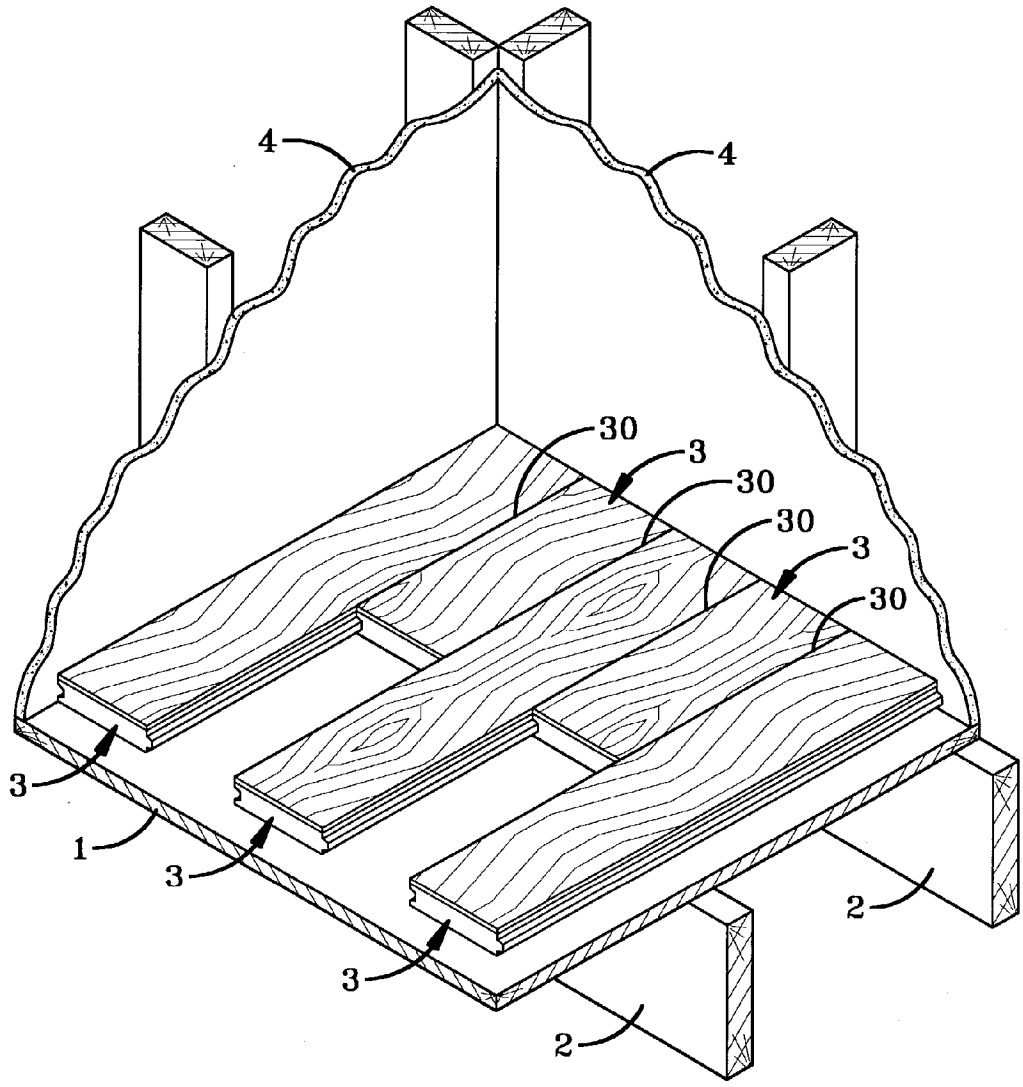
(57) **ABSTRACT**

A laminated board for indoor use has a substrate formed of a mixture of sawdust and plastic particles joined together by a binder, with a thin strip of natural hardwood secured to one surface of the substrate by an adhesive. A groove is formed along one side of the substrate and a complementary tongue along an opposite side to provide a tongue and groove joint when joining adjacent board in an indoor flooring assembly. The substrate is extruded from a mixture of the sawdust and plastic particles and then cut to size.



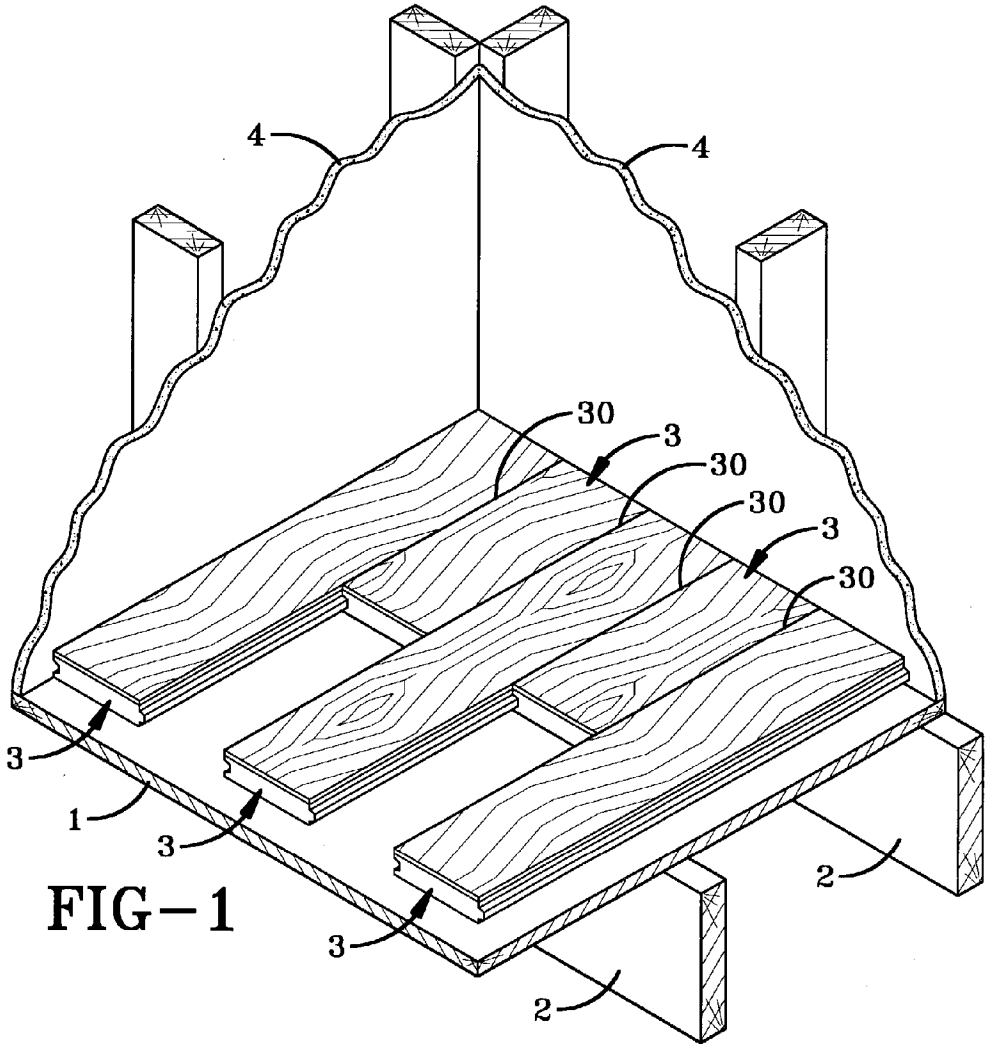



FIG-1

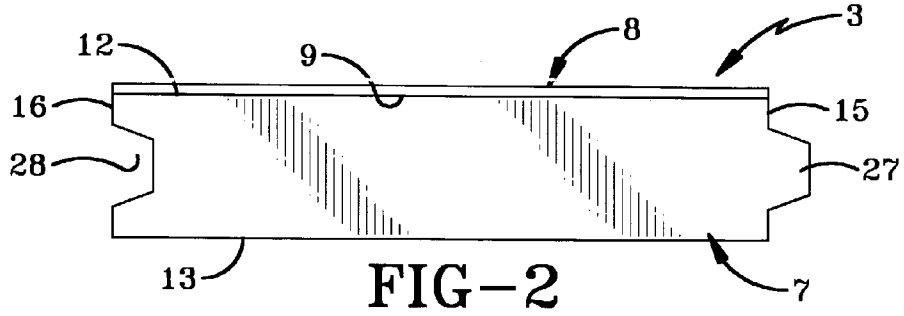



FIG-2

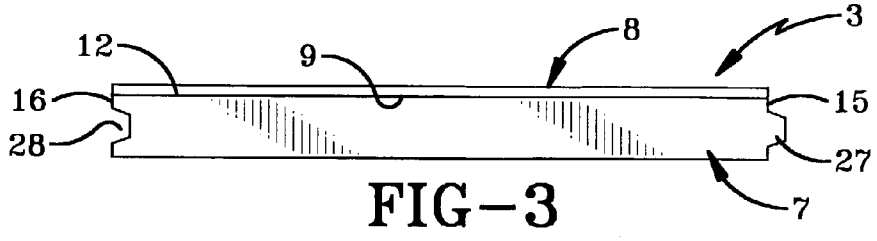



FIG-3

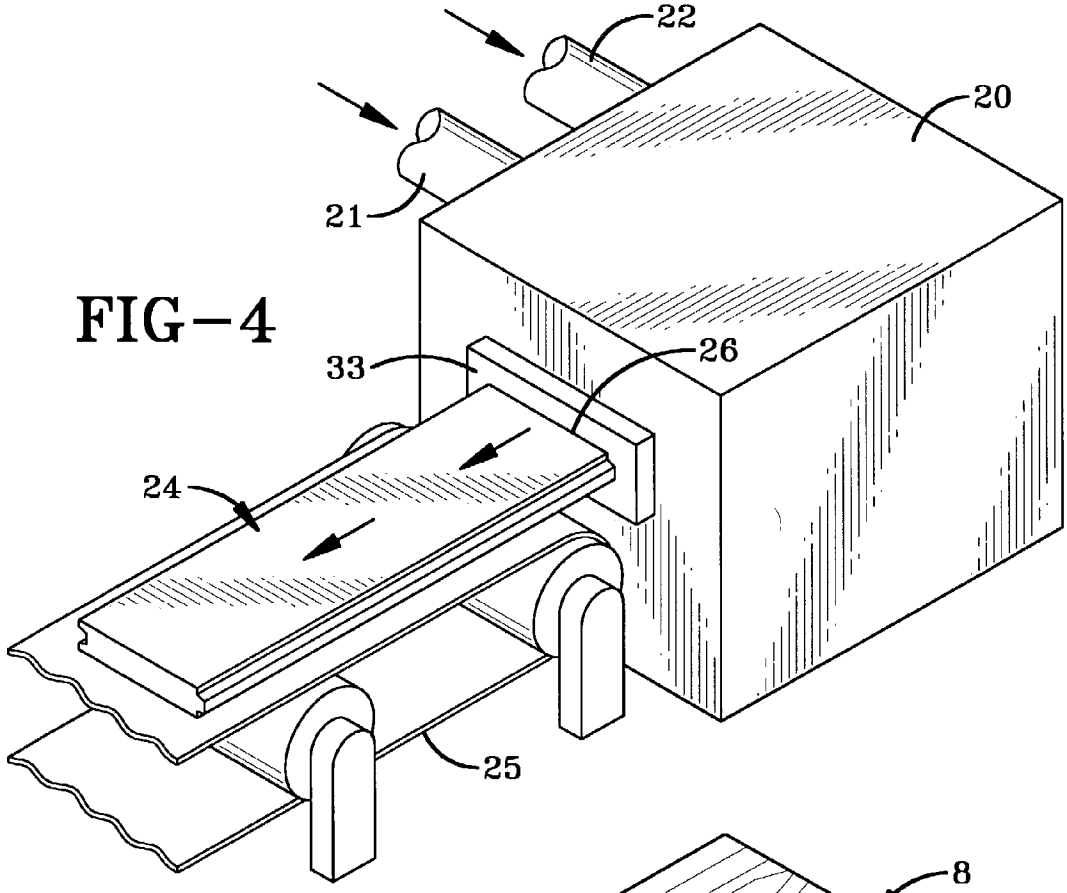



FIG-4

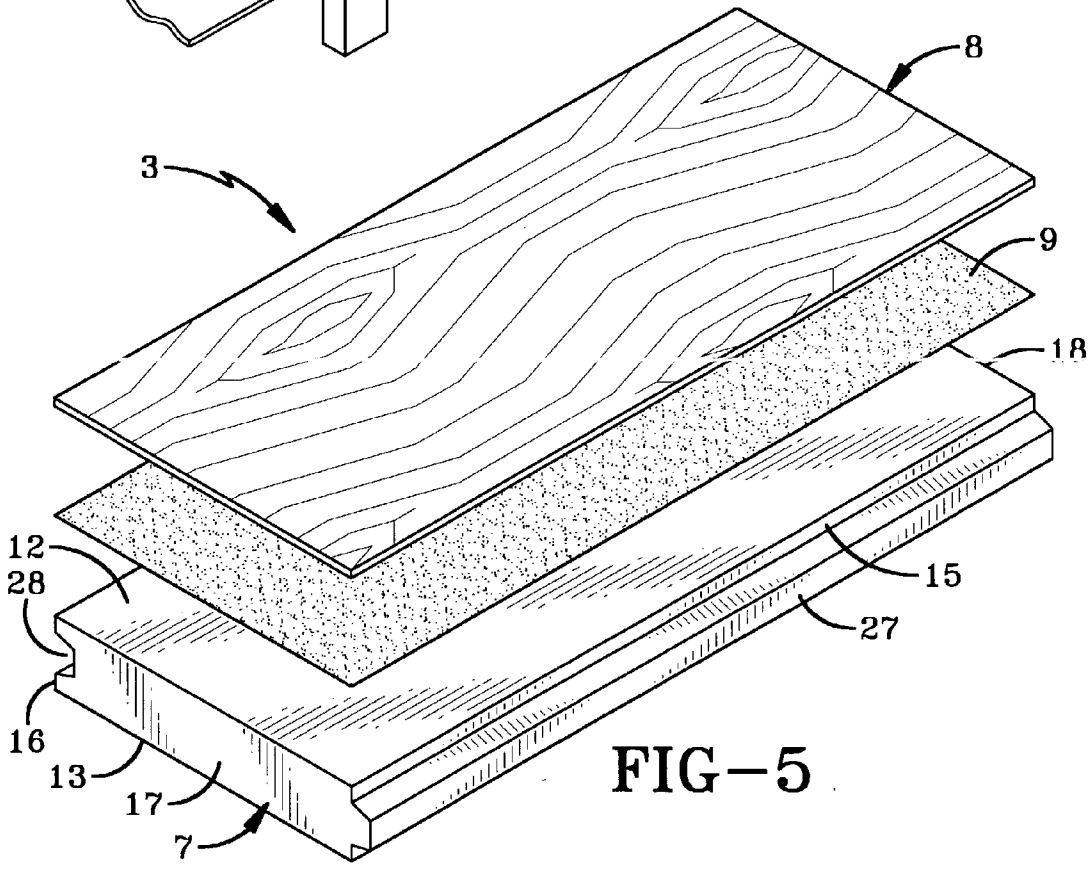



FIG-5

# LAMINATED INDOOR FLOORING BOARD AND METHOD OF MAKING SAME

## CROSS REFERENCE TO RELATED APPLICATION

[0001] This is a standard utility patent application based on provisional patent application serial No. 60/383,947, filed May 28, 2002.

## BACKGROUND OF THE INVENTION

[0002] 1. Technical Field

[0003] The invention relates to indoor flooring and in particular to a board for use in constructing the same. More particularly, the invention relates to such an indoor flooring board having a substrate formed of a mixture of saw dust and plastic particles with a thin strip of a natural hardwood secured thereto.

[0004] 2. Background Information

[0005] Boards have been constructed of a mixture of plastic particles and saw dust and are molded or extruded into elongated board shapes, some of which have a vinyl covering for use in outdoor applications such as decks. These outdoor board decks are resistant to moisture and do not require periodic staining or painting and provide a relatively long lasting deck construction. However, these artificial floor boards do not have an aesthetically pleasing top surface for indoor floor use, and thus have not found widespread application for indoor use to replace existing hardwood floors.

[0006] Existing hardwood floors for indoor use are formed of boards of either solid strips of hardwood such as maple, cherry, walnut, poplar, and the like which are applied to a sub-flooring, usually by nails, screws, staples, etc. and are usually provided with tongue and groove side edges for securing the adjacent boards to each other to prevent shifting and movement of the boards. Although these types of solid hardwood floor boards are satisfactory, they are relatively expensive due to the required thickness of the board in order to provide for a solid floor construction.

[0007] Other types of indoor simulated hardwood floors have been developed wherein a thin strip of natural hardwood is laminated to a substrate formed of a less expensive particle board or plywood, which laminate is then secured to a sub-flooring by screws, staples, nails, etc. These laminates also may be provided with tongue and groove side surface joints to increase stability and rigidity thereof. These natural wood laminates however, are not as strong as solid natural wood board and can retain moisture in the particle board substrate which can then distort and warp the board. Likewise, these particle board laminates do not provide as high as insulation value as desired in many cold weather areas. Plus, the tongue and groove joints in the particle board substrate is not as strong as in the solid natural wood board.

[0008] Therefore, the need exists for an improved indoor floor board which is less expensive than full thickness hardwood boards, yet provides the strength, rigidity, ease of installation, and aesthetically pleasing as that provided by the full thickness hardwood board.

## BRIEF SUMMARY OF THE INVENTION

[0009] The laminated floor board of the present invention includes a substrate formed of a mixture of sawdust and plastic particles such as polyethylene or polyurethane, which are mixed with wood saw dust as a binder and then preferably extruded into an elongated board configuration called artificial wood block, and which may include tongue and groove formations in the side surfaces thereof to provide a rigid joint when two adjacent boards are placed in abutting relationship.

[0010] Another feature of the invention is to provide a laminate formed of a thin strip of natural hardwood such as cherry, walnut, poplar, hickory, oak, etc. which is bonded by an adhesive to one surface of the artificial wood block for forming the floor board which is intended for indoor use, and which has strength, rigidity, and durability similar to that of a full thickness hardwood floor board.

[0011] A further feature of the invention is to form the substrate having a thickness within the range of ⅛ inch and between 2-20 times greater than the thickness of the hardwood laminate to provide the desired strength to the laminate board and the desired durability to the finished top surface thereof.

[0012] A further aspect of the invention is to secure the laminate to the substrate with a variety of adhesives such as hot melt adhesive, acrylic adhesive, rubber cement, contact adhesive, epoxy, and/or a hot liquid plastic all of which could be used to form a secure bond between the laminate and substrate.

[0013] Another feature of the invention is extruding the substrate in a continuous extrusion process, either in the desired length or in a continuous length which is then severed into the desired length board after which the natural wood laminate is secured thereto, either while the laminate is still in a heated state or in a cold state depending upon the particular type of adhesive used therefore.

[0014] The foregoing advantages, construction and operation of the present invention will become readily apparent from the following description and accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0015] **FIG. 1** is a fragmentary diagrammatic perspective view showing a typical indoor floor installation;

[0016] **FIG. 2** is an end elevation of the improved laminated indoor floor board of the present invention;

[0017] **FIG. 3** is an end view of a thinner floor board of the present invention then that shown in **FIG. 2**;

[0018] **FIG. 4** is a diagrammatic perspective view showing one method of forming the laminated floor board of the present invention; and

[0019] **FIG. 5** is an exploded perspective view of the laminated indoor floor board of the present invention.

[0020] Similar numerals refer to similar parts throughout the drawings.

## DETAILED DESCRIPTION OF THE INVENTION

[0021] **FIG. 1** depicts a usual indoor flooring installation wherein sub-flooring sheets **1** are placed across spaced floor joists **2** on which are placed a plurality of the improved laminated indoor boards indicated generally at **3**, extending

from walls **4**. The improved laminated floor board is shown in an exploded condition in **FIG. 5** and includes a substrate indicated generally at **7**, and a top laminate indicated generally at **8**, which are bonded together by an adhesive layer **9**. Substrate **7** has an elongated generally rectangular configuration with top and bottom surfaces **12** and **13** respectively, opposite longitudinally extending side surfaces **15** and **16** and end surfaces **17** and **18**.

[**0022**] Substrate **7** is formed of a mixture of sawdust and plastic particles which are usually waste materials from other manufacturing processes. These particles preferably are fed to an extruder **20** (**FIG. 4**) through fill pipes **21** and **22** where they are mixed and heated and then extruded as an elongated strip **24** of the substrate. Strip **24** may be fed onto a conveyor **25** for subsequent movement to a work station where they are cut to a desired length. If desired, a severing mechanism could be located at outlet **26** of the extruder to form the desired length board at that time for subsequent movement along conveyor **25** to a work station where laminate **8** is applied thereto by adhesive **9**. One type of plastic particle found satisfactory is polyethylene or polyurethane and when mixed with sawdust and an appropriate binder, all of which are well known in the art, form a solid rigid substrate **7**.

[**0023**] As shown in **FIGS. 2 and 3**, side surface **15** preferably is formed with a tongue **27** which is complementary in shape and size to a groove **28** formed in side surface **16** so as to form a secure joint **30** when two boards are placed in an abutting side-to-side relationship as shown in **FIG. 1**. Tongue **27** and groove **28** are complementary in shape and size to each other to form a mating relationship and, in the preferred embodiment, will have a truncated configuration as shown particularly in **FIGS. 2 and 3**. When substrate **7** is extruded, as shown in **FIG. 4**, tongue and grooves **27** and **28** can easily be formed in the side surfaces by providing extrusion dye **33** with the cross-sectional configuration of the final extruded strip **24**. However, if desired, substrate **7** can be formed with flat sides or other configurations which are either extruded or formed thereon after the elongated substrate has been manufactured. As discussed above, substrate **7** can be formed of various materials, one example of which is shown in U.S. Pat. No. 4,045,603, in order to form the desired hardness, rigidity, and moisture resistant material and are similar in many respects to the outdoor plastic and composite boards used for outdoor decking materials.

[**0024**] In further accordance with the invention, top surface laminate **8** is a strip of natural hardwood such as cherry, hickory, oak, poplar, birch, etc., relatively thin with respect to the overall thickness of board **3**. Laminate **8** is secured to top surface **12** of substrate by various bonding materials and techniques. Laminate **8** preferably is secured to substrate **7** by adhesive strip **9** with a sufficient bonding pressure being applied between substrate **7** and laminate **8** to provide a permanent bond therebetween. Various types of adhesives can be used such as a hot melt adhesive, acrylic adhesive, rubber cement, contact adhesive, epoxy, hot liquid plastic, or the like, all of which can achieve the desired bonding between laminate **8** and substrate **7**. If desired, laminate **8** can be placed on top of the heated elongated strip **24** and secured thereto by the heated plastic material itself from which the substrate is formed, avoiding any additional adhesive being applied therebetween. However, for many applications a separate adhesive layer is desired.

[**0025**] Substrate **7** preferably has a thickness approximately 2-20 times greater than the thickness of laminate **8** as shown in **FIGS. 2 and 3**, and could have a range of thickness between ⅛-2 inches and 2-20 times the thickness of the laminate in order to provide floor board **3** with the desired durability, strength and rigidity as that of a full thickness natural hardwood board.

[**0026**] Boards **3** are mated together preferably by tongue and groove joints, as shown in **FIG. 1**, and then secured to sub-flooring **1** by nails, staples, or other fasteners as are the usual solid hardwood floor boards. This provides a very attractive upper surface due to the top laminate of natural wood as well as a durable surface. Furthermore, this layer of natural wood is rigidly secured to an extremely firm and sturdy substrate which is unaffected by moisture and has relatively limited movement when walked upon and which provides good insulation for the finished floor.

[**0027**] While embodiments of the invention have been described, the invention is not limited thereto, but can have other modifications and arrangement without affecting the concept of the invention.

[**0028**] In the foregoing description, certain terms have been used for brevity, clearness, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

[**0029**] Moreover, the description and illustration of the invention is an example and the invention is not limited to the exact details shown or described.

**1**. A laminated indoor flooring board comprising:

an elongated generally rectangular substrate having top and bottom surfaces and a pair of side surfaces, said substrate being formed of a mixture of sawdust, plastic particles, and a binder; and

a laminate bonded to the top surface of said substrate, said laminate being an elongated sheet of natural hardwood.

**2**. The board defined in claim 1 in which a longitudinally extending groove is formed in one side of the substrate and a complementary shaped longitudinally extending tongue is formed in the other side of said substrate.

**3**. The board defined in claim 2 in which the sidewall groove has an inwardly extending truncated configuration and the tongue has a complementary shaped outwardly extending truncated configuration.

**4**. The board defined in claim 1 in which the substrate has a thickness between ½-2 inches and 6 times greater than the thickness of the laminate.

**5**. The board defined in claim 4 in which the substrate has a thickness generally 6 times greater than the thickness of the laminate.

**6**. The board defined in claim 1 in which the plastic particles in the substrate include high density polyethylene and/or polyurethane.

**7**. The board defined in claim 1 in which an adhesive bonds the laminate to the substrate.

**8**. The board defined in claim 6 in which the adhesive is selected from the group consisting of a hot melt adhesive, acrylic adhesive, rubber cement, contact adhesive, epoxy, and hot liquid plastic.

**9**. The board defined in claim 1 in which the laminate is natural wood.

**10**. An indoor floor comprising a plurality of elongated rectangular laminated boards placed in an abutting side-to-side relationship, each of said boards having a substrate with top and bottom surfaces and a pair of opposed side surfaces, with one of said sides being formed with a groove and the other side being formed with a tongue received in the groove of an adjacent board to join said adjacent boards, said substrate being formed of plastic particles, sawdust, and a binder; and a laminate thinner than the substrate bonded to the top surface of each of the substrates, said laminate being formed of a natural hardwood.

**11**. The floor as defined in claim 10 in which a sub-flooring sheeting is supported on and extends across a plurality of spaced floor joists; and in which a plurality of the laminated boards are secured to said sub-flooring.

**12**. The floor as defined in claim 10 in which the plastic particles in the substrate include high density polyethylene and/or polyurethane.

**13**. The floor as defined in claim 10 in which the adhesive is selected from the group consisting of a hot melt adhesive, acrylic adhesive, rubber cement, contact adhesive, epoxy, and hot liquid plastic.

**14**. The floor as defined in claim 10 in which the laminate is natural wood.

**15**. A method of forming a laminated indoor floor board comprising the steps of:

forming a mixture of sawdust and plastic particles;

extruding an elongated substrate of said sawdust and plastic particle mixture, said substrate having top and bottom surfaces and a pair of spaced sidewalls;

forming a strip of natural hardwood; and

bonding said hardwood strip to the top surface of the substrate.

**16**. The method defined in claim 15 including the step of forming a groove along one side of the substrate and a complementary shaped tongue along the other side of the substrate during the extruding step.

**17**. The method defined in claim 15 including the step of applying an adhesive between the substrate and hardwood strip to bond said strip to the substrate.

**18**. The method defined in claim 17 including the step of selecting the adhesive from the group consisting of a hot melt adhesive, an acrylic adhesive, a rubber cement, a contact adhesive, an epoxy, and a hot liquid plastic.

**19**. The method defined in claim 15 including the step of selecting the hardwood strip from the group consisting of maple, oak, hickory, poplar, and cherry.

**20**. The method defined in claim 15 including the step of forming the substrate between ⅛-2 inches and 2-20 times thicker than the laminate.

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