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(54) **LAMINATE FLOORING PANEL BEVEL AND
METHOD OF MANUFACTURING SAME**

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(57) **ABSTRACT**
A laminate panel with a beveled edge in the clear covering over the decorative layer. The bevel in the clear covering is produced by heating a roller and bringing it into operable contact with the clear covering adjacent the edge of the laminate panel. The heated roller melts the clear covering and produces the bevel as the laminate panel is moved past the roller while the roller rotates about its axis.

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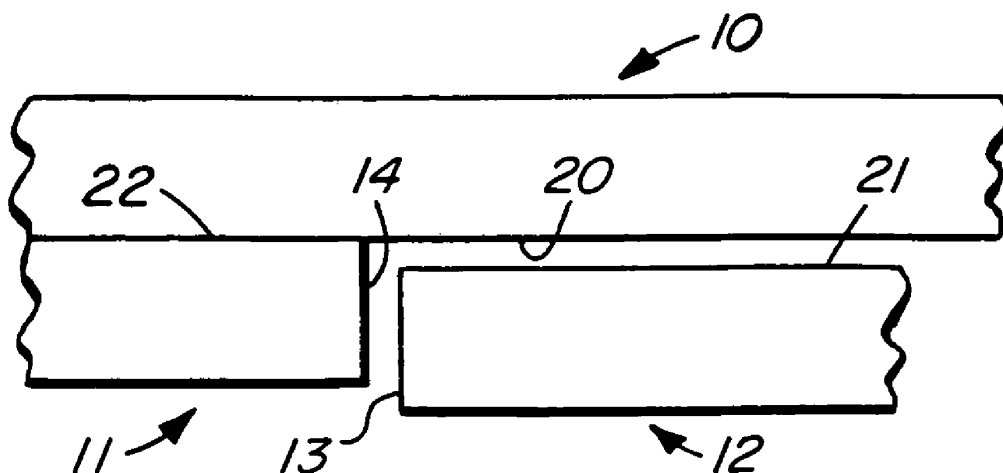


FIG. 1

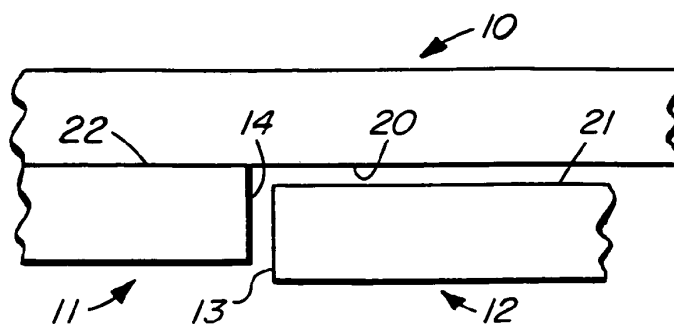


FIG. 2

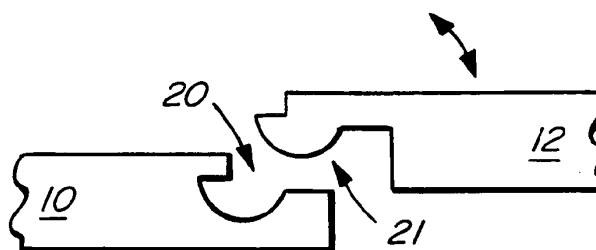


FIG. 3A

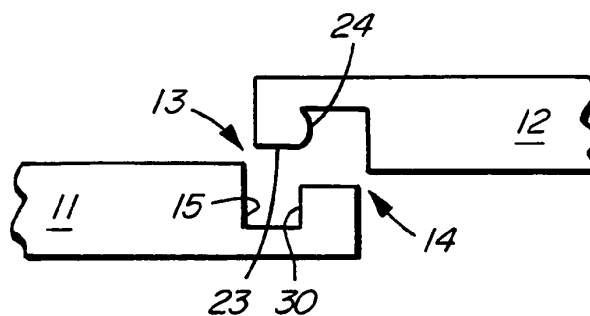
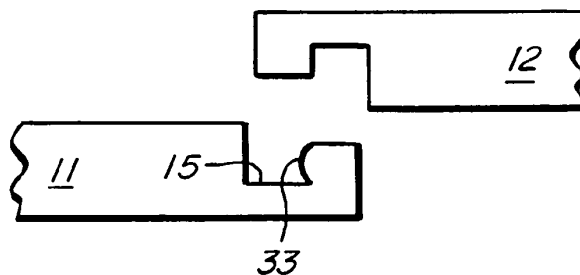


FIG. 3B



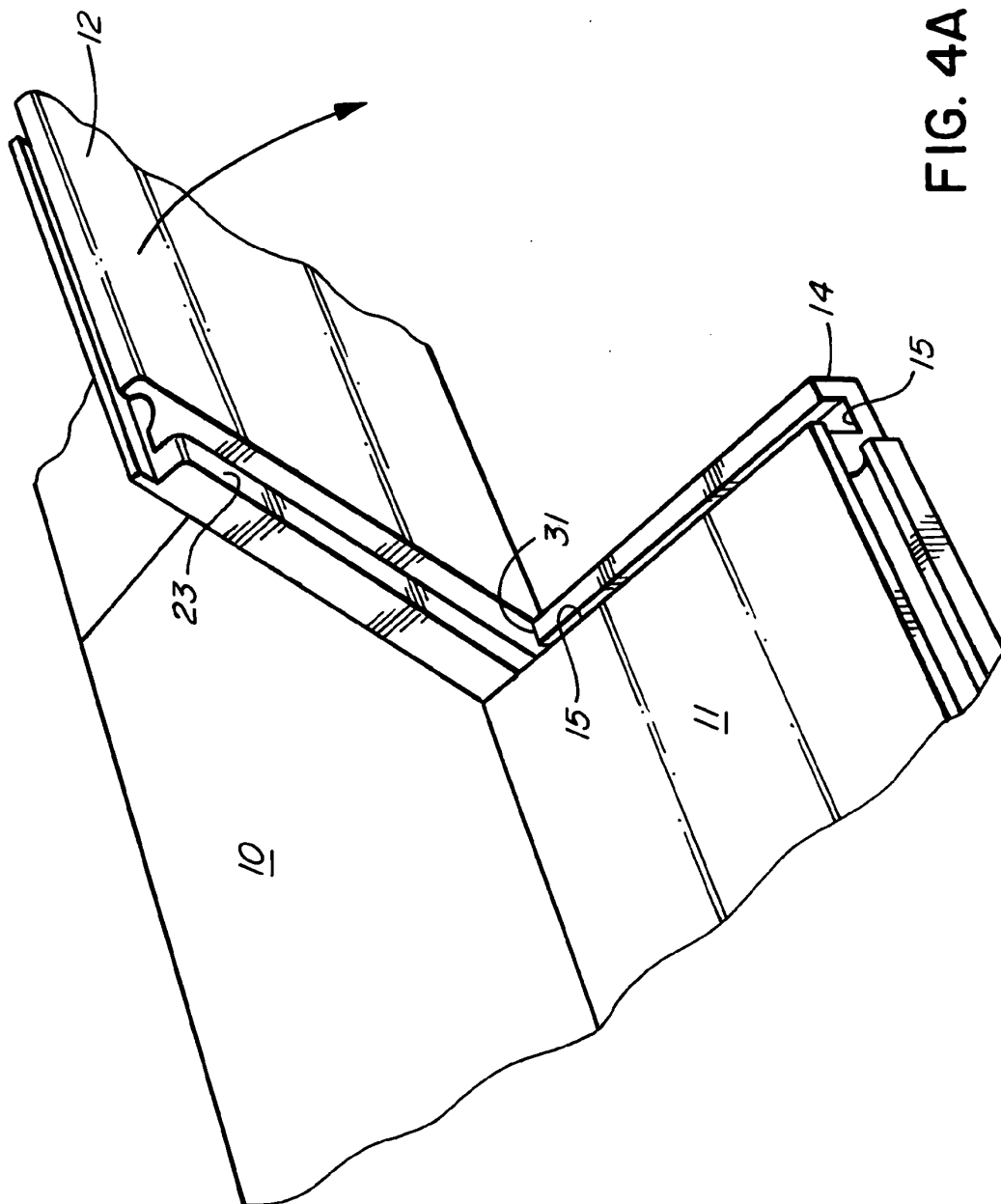


FIG. 4A

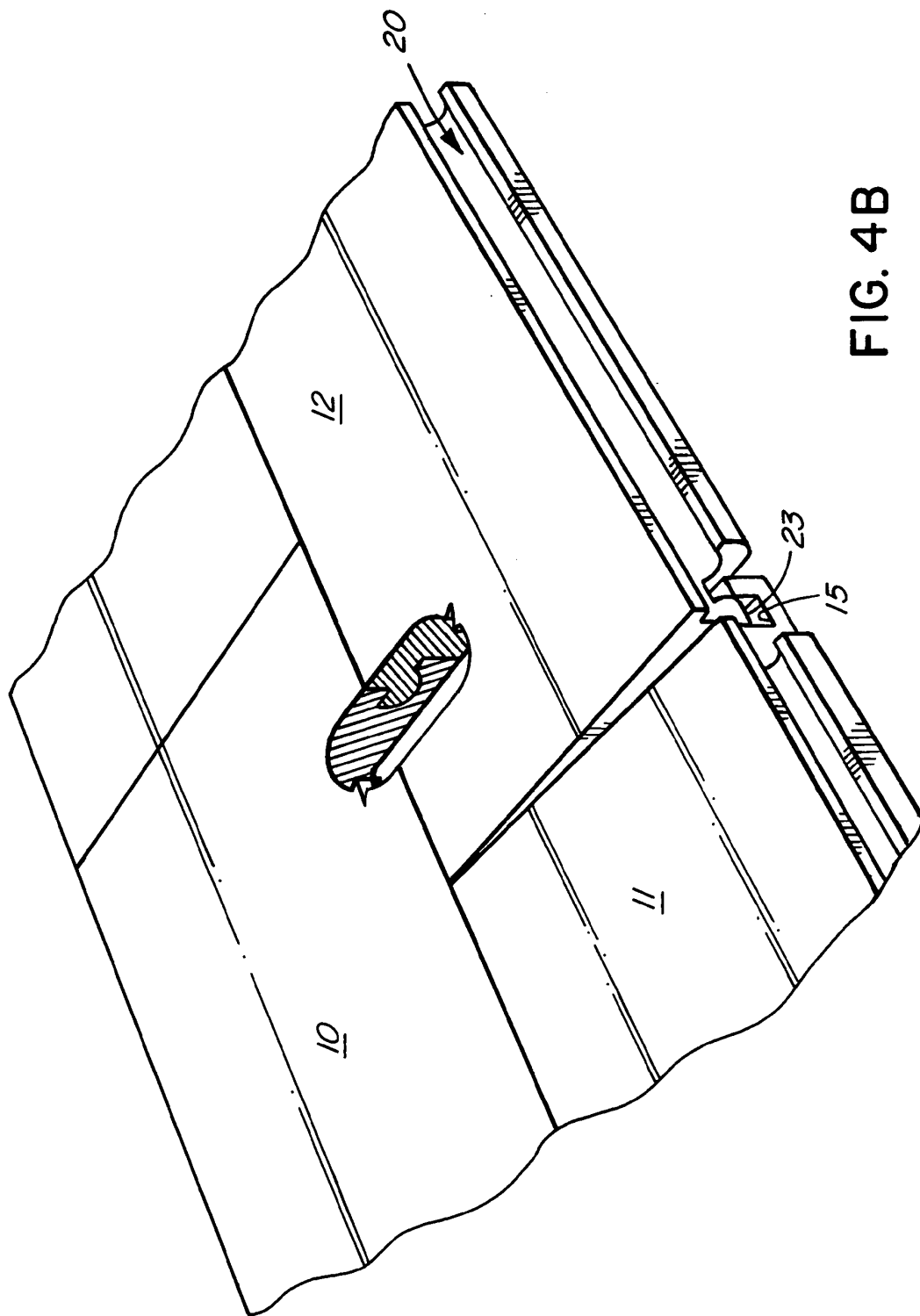


FIG. 4B

FIG. 5

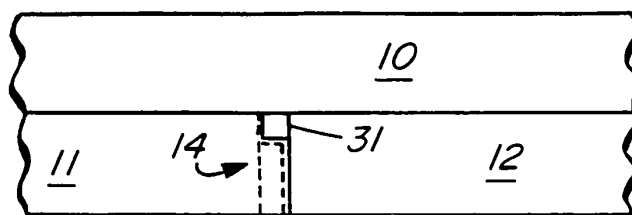


FIG. 6A

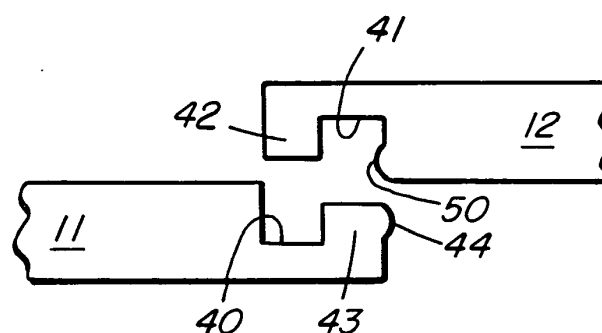


FIG. 6B

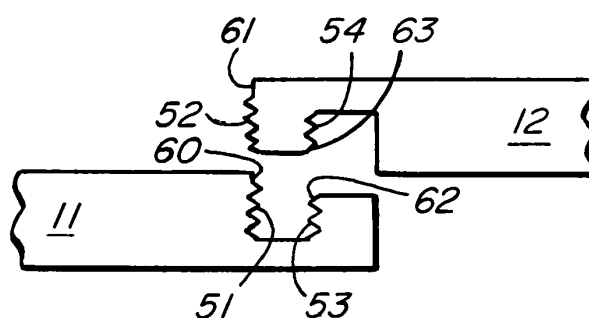


FIG. 6C

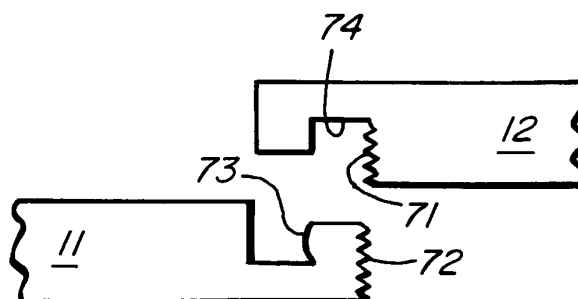


FIG. 6D

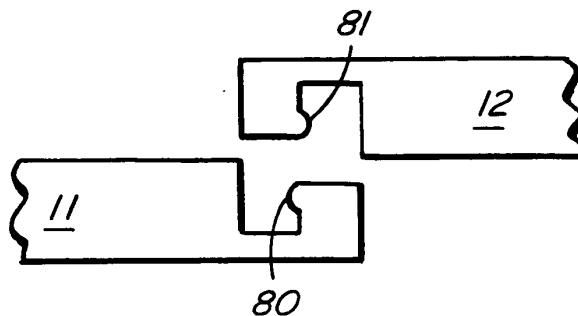


FIG. 7A

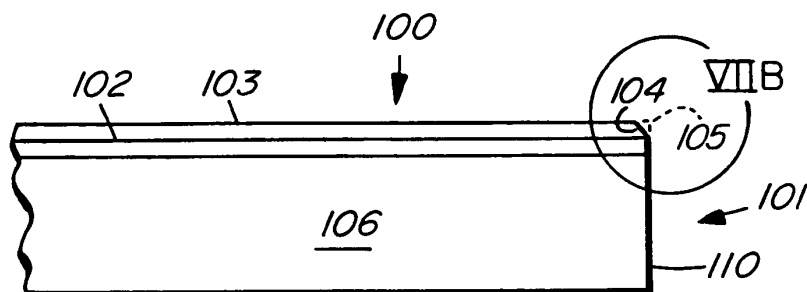
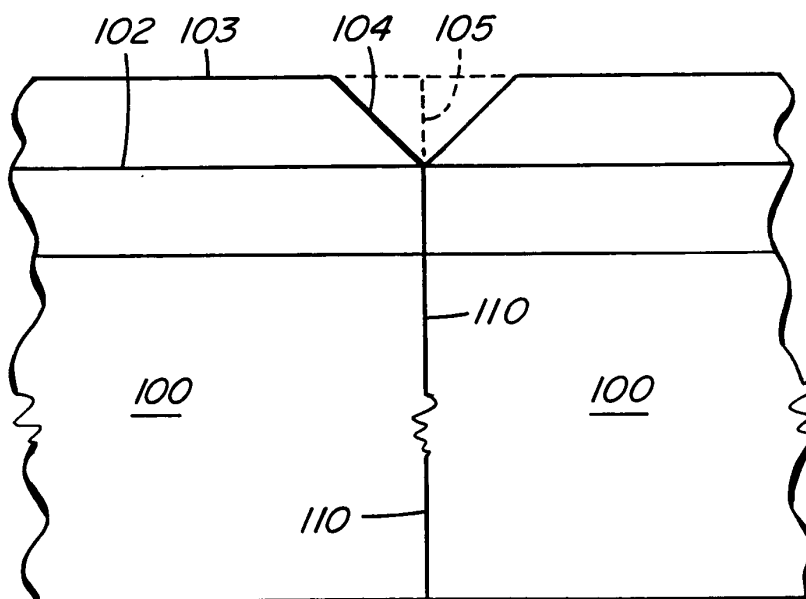


FIG. 7B



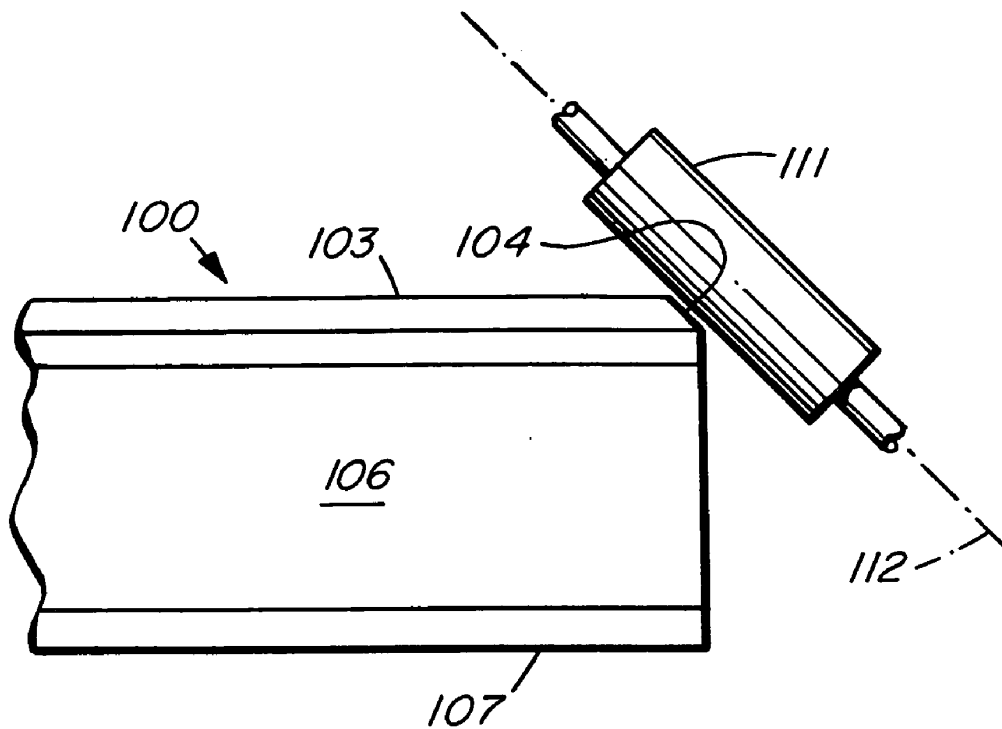


FIG. 8

LAMINATE FLOORING PANEL BEVEL AND METHOD OF MANUFACTURING SAME

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part of application Ser. No. 11/136,326 entitled IMPROVED CONNECTION FOR LAMINATE FLOORING, filed May 23, 2005 and co-pending herewith.

INTRODUCTION

[0002] This invention relates to a method for manufacturing beveled edges for use on laminate flooring and, more particularly, to a method of using heat treatment applied to a clear top layer covering the decorative top layer of such laminate flooring.

BACKGROUND OF THE INVENTION

[0003] With the introduction of laminate floor tiles which can be installed relatively easily by a non-commercial user, a number of patents have been obtained for the various techniques used in joining adjacent pieces of the tiles and which patents cover, generally, different tongue and groove attachment techniques. In joining such adjacent pieces of tiles, it is preferred to form a small beveled edge in the top surface of each of the adjoining tiles along the joining edges. The beveled edges, being adjacent to each other, prevent damage to the edges or corners of the tiles when they are assembled or disassembled and further assist in joining adjacent tiles since, for example, any tilting or rotation of the tiles during the joining operation will be facilitated in using a beveled edge and the joint thereafter obtained will provide additional assembly integrity to the joined tiles.

[0004] Heretofore, the technique used to create a bevel in the top surface of the laminate flooring has used a planing operation to remove the top edge of the laminate flooring at an angle thereby forming the beveled top edge. However, the removal of material of the laminate flooring thereafter required a further operation to apply the decorative layer and the cover over the decorative layer to the beveled edge previously planed. This operation is tedious and time consuming. In a further operation according to the prior art, a wedge shaped press would form a beveled edge at the desired location in the laminate flooring and the laminate flooring was thereafter then cut along the center line of the wedge shaped recess. While this process facilitated the beveled edge manufacturing operation, the pressing operation was inconsistent with the result that adjoining pieces of laminate flooring might not have matching beveled edges. Likewise, the position of the subsequent cutting operation needed to be precisely determined.

[0005] U.S. Pat. No. 3,907,624 teaches a laminate flooring panel with a shaped and beveled edge which is typically formed by a die. A first operation supplied hardenable material to the edge of the flooring and a hot air jet is used to dry the hardenable material on the edge as it moves past the die. The die is not heated and the top clear covering is not beveled by the die.

[0006] United States application serial number 2005/0025934 teaches a bevel which includes a decorative layer provided by transfer printing to the bevel by way of a heated

pressing roll. There is no teaching of a pressing roll used to melt the clear top overlying the paper pattern on the edge.

SUMMARY OF THE INVENTION

[0007] According to one aspect of the invention, there is provided a method of forming a bevel in the top surface of a panel of laminate flooring comprising a covering over a layer of said panel and a clear top layer over said covering, said method comprising melting said clear top layer along an edge of said panel so as to form a beveled edge extending upwardly and inwardly from said edge towards said top surface of panel of laminate flooring.

[0008] According to a further aspect of the invention, there is provided a panel of laminate flooring which has at least one beveled edge along an edge of said panel, said laminate flooring having a top surface which includes a covering of a layer of said laminate flooring and a clear top layer over said covering, said beveled edge being formed in said clear top layer, said beveled edge extending upwardly and inwardly from said edge of said panel to said top surface of said panel of laminate flooring.

BRIEF DESCRIPTION OF THE SEVERAL VIEW OF THE DRAWINGS

[0009] Specific embodiments of the invention will now be described, by way of example only, with the use of drawings in which:

[0010] **FIG. 1** is a diagrammatic plan view of three adjacent pieces of flooring which are intended to be joined together to form a connection on both the long and short sides of the three pieces;

[0011] **FIG. 2** is a diagrammatic side view of a connection commonly used to join the long sides of the three adjacent pieces of flooring;

[0012] **FIGS. 3A and 3B** are diagrammatic side views of two connections according to the invention used for joining the short sides of the three adjacent pieces of flooring;

[0013] **FIGS. 4A and 4B** are diagrammatic isometric views of the adjacent pieces of flooring during an assembly operation;

[0014] **FIG. 5** is a bottom view of the three pieces of adjacent flooring following assembly;

[0015] **FIGS. 6A, 6B, 6C and 6D** are diagrammatic side views of alternate embodiments of the connection between the short sides of adjacent pieces of flooring according to the invention;

[0016] **FIGS. 7A** is a diagrammatic side views of a first panel of laminate flooring particularly illustrating the beveled edge on the first panel which is intended to be adjacent a second panel joined to the first panel;

[0017] **FIG. 7B** is an enlarged diagrammatic view of the area VII-B-VII-B of **FIG. 7A** and further illustrates two joined panels with adjacent beveled edges; and

[0018] **FIG. 8** is a diagrammatic side view illustrating one method of melting the clear cover of the panel to form the beveled edge.

DESCRIPTION OF SPECIFIC EMBODIMENT

[0019] Referring now to the drawings, three(3) adjacent pieces of laminate flooring, namely first piece 10, second piece 11 and third piece 12 are illustrated in FIG. 1 which pieces are illustrated in their unassembled condition and which pieces 10, 11, 12 are intended to be joined together in an integral assembly on the top of a floor and which pieces illustrate the connection and the operation of the connection procedure according to the invention.

[0020] Each of the three pieces 10, 11, 12 have short and long edges, the short edges of first piece 10 not being illustrated for efficacy. Third piece 12 has a short edge 13 and second piece 11 has a short edge 14. First piece 10 has a long edge 20 which is intended to be connected to long edge 21 of third piece 12 and which long edge 20 is shown already connected to second piece 11 along long edge 22.

[0021] The connection area along the long edges 20, 21 of the first and third pieces 10, 12 are illustrated in greater detail in FIG. 2 where the edge 20 is shown with a female receiving configuration adapted to receive the male configuration 21 of piece 12. A connection of this nature is illustrated and described in Terback U.S. Pat. No. 4,426,820, the contents of which are incorporated by reference.

[0022] The connection takes place by tilting the third piece 12 upwardly as also illustrated in FIG. 4A relative to first piece 10 until the male configuration 21 enters the female configuration 20. Ordinarily and according to the prior art, third piece 12 would then be tilted down to its normal horizontally assembled condition and the piece 12 would then be tapped manually by hand or with a mallet until it reached contact with the short edge 14 of second piece 11 while relative movement between first and third pieces 10, 12, respectively, occurs with third piece 12 moving towards second piece 11 while first piece 10 remains stationary. However, the connection between the two short sides 13, 14 according to the invention is illustrated in FIGS. 3A, 4A and 4B. It will be appreciated that the two sides 13, 14 are also a male and female connection with edge 14 being a female connection 15 which receives male connection 23. Male connection 23 has a rounded edge or protuberance 24 which the receptacle 30 of connection 15 is designed to squeeze while it enters the connection 15. It will be appreciated that sliding the two short edges 13, 14 towards each other will result in interference between the two edges 13, 14 and that unless the piece 12 is tilted upwardly relative to the piece 11 and then tilted downwardly to the horizontal position as illustrated in FIG. 4B, the connections on the short edges 13, 14 will not be joined.

[0023] Referring to FIG. 4A, when piece 12 is tilted upwardly and the protuberance 23 is initially positioned into receptacle 15, the subsequent tilt of piece 12 downwardly as illustrated by the arrows in FIG. 4A results in the protuberance or male connection 23 being received along the length of the female receptacle 15. While the piece 12 is being tilted downwardly to assume its generally horizontal position as shown in FIG. 4B, the protuberance 24 will press on the receptacle 30 and draw the adjacent pieces closer together so that the final connection between the two adjacent pieces 11, 12 has considerable integrity.

[0024] A small cutaway portion 31 on the edge 14 (FIGS. 4A and 5) allows the initial entry of the male protuberance

23 without interference with the edge 14. Thus, piece 12 can be positioned with male protuberance 23 within the groove 15 of edge 14.

Operation

[0025] In operation, it will be assumed that the first and second pieces 10, 11 illustrated in FIG. 1 have already been joined together and are existing horizontally on the floor on which they are laid. It is now desired to connect a third piece 12 to both of the previously laid pieces 10, 11.

[0026] The long edge 21 of third piece 12 will be brought into proximity with the long edge 20 of first piece 10. Third piece 12 will be tilted upwardly to the position generally illustrated in FIG. 4A and the male connection 21 will be inserted into the female connection 20 (FIG. 2). At the same time, the third piece 12 will be moved relative to first piece 10 until male protuberance 23 passes by the outside of edge 14 due to the cutaway area 31 (FIGS. 4A and 5) and is positioned directly above the female receiving area or groove 15 of edge 14 (FIG. 4A).

[0027] Third piece 12 will then be tilted downwardly to the horizontal position with the male connection 21 rotating relative to the female connection 20 and the male protuberance 23 being acted upon by the edge 30 of groove 15 (FIG. 3A) as the third piece 12 moves downwardly as indicated by the arrows in FIG. 4A until a position resembling that illustrated in FIG. 4B is reached with the male protuberance being entirely received by female groove 15. Third piece 12 is then moved into the horizontal position and the connection is complete.

[0028] Various embodiments of the tongue and groove connections on the short edges of third piece 12 and second piece 11 are readily contemplated. Referring initially to FIG. 3B, it will be seen that the rounded edge shown at 24 in FIG. 3A may instead appear as a rounded edge 33 on the female groove 15 as illustrated in FIG. 3B. This rounded edge 33 will serve the same function as rounded edge 24, namely creating a force between the male and female connections 23, 15 which will ensure integrity of the final connection between third piece 12 and second piece 11.

[0029] A further embodiment is illustrated in FIG. 6A. Rather than a single female groove 40 in second piece 11, there is a second female groove 41 in third piece 12. As the second piece 12 is tilted downwardly relative to first piece 10 and second piece 11, protuberance 42 will enter into female groove 40 in second piece 11 and protuberance 43 will enter into female groove 41 in third piece 12. An interaction will occur between the rounded edge 44 of protuberance 43 and the inside of female groove 41 in third piece 12. Indeed, as the rounded edge 44 proceeds into groove 41, an interaction will occur between rounded edge 44 and rounded edge 50 of second piece 12 thus, again, ensuring joint integrity when the connection process is complete.

[0030] Yet a further embodiment of the connection between the short edges of second and third pieces 11, 12 is illustrated in FIG. 6B. In this embodiment, a series of serrated edges 51, 52, 53, 54 are appropriately formed in the male and female connections. Such serrations 51, 52, 53, 54 may be formed between only one pair of surfaces such as

those surfaces **60, 61** or, alternatively, on surfaces **62, 63** or, alternatively, on both sets of surfaces as illustrated. The serrated surfaces allow the entry of the male protuberance into the female groove but resist separation and thereby increase joint integrity.

[0031] Yet a further embodiment of the invention is illustrated in **FIG. 6C**. In this embodiment, a pair of serrated edges **71, 72** act against each other during assembly while, simultaneously, a rounded edge **73** acts on the inside of the female groove **74**. Again, the function of the interference between the serrated edges **71, 72** and the rounded edge **73** with groove **74** is intended to tighten the joint during assembly and ensure joint integrity.

[0032] Yet a further embodiment of the invention is illustrated in **FIG. 6D**. In this embodiment, the two rounded edges **80, 81** act against each other during assembly and when assembled, provide an interference and, therefore a locking integrity to maintain the boards in their assembled position.

[0033] It will also be appreciated that while the female groove is generally described as being formed in the short edge of the second piece of flooring with the male protuberance extending from the short edge of the third piece of flooring, the positions could, of course, be reversed with the female connection being formed in the third piece and the male protuberance being formed in the edge of the second piece.

[0034] Although the invention has been described as being particularly useful in association with laminate flooring, it is apparent that it would also have value for connecting solid wood flooring and engineered wood flooring as well as virtually any flooring made from wood based materials.

[0035] With reference now to **FIGS. 7 and 8**, a typical laminate floor panel is generally illustrated at **100**. The laminate floor panel **100** has a high density fiberboard (HDF) core **106** which provides the strength and durability of the panel **100**. A joint generally illustrated at **101** can take the form of any of the joints illustrated and described in this application as well as additional joints not set forth in the present application. The joint between the panels forms no part of the present invention.

[0036] The laminate floor panel **100** has a covering or "decor layer" **102** which is typically decorative and can take the form of a design or decorative color which may be impregnated with a melamine resin to give color-fastness and color clarity. The HDF core **106** is typically composed of cellulose fibers combined with synthetic resins or other suitable materials which are subjected to bonding under heat and pressure. The HDF fiberboard layer **106** typically has a density greater than 50 pounds per cubic foot or 800 kg per cubic meter.

[0037] A clear wear layer or covering **103** is provided to protect the decor layer **102**. The wear layer **103** is transparent and made from an alpha cellulose paper impregnated with a melamine/formaldehyde resin. The combination is highly durable and provides resistance to the stains, heat, scratches and abrasion to which a floor panel is typically subjected after installation. A backing or balancing layer **107** (**FIG. 8**) on the bottom of the panel **100** may also be used to provide dimensional stability and such a backing layer

107 will typically use a melamine moisture barrier which allows added protection of the panel **100**.

[0038] A bevel **104** is provided on each of the joined panels **100** in the decorative or wear layer **103** as is seen more clearly in **FIG. 7B**. The bevel **104** allows for the panels **100** to be more easily joined and also prevents damage to the ends **110** and top surface of the joined panels **100** both when the panels **100** are joined in the assembly process and when the panels **100** are assembled and under operating and wear conditions.

[0039] Referring now to **FIG. 8**, a method of manufacturing the panel **100** and, more particularly, the bevel **104** uses a hot roller **111** which is brought into contact with the wear layer **103** when the layer **103** has a squared end as illustrated in broken lines **105** in **FIG. 7A and 7B**. The hot roller **111** rotates about its axis **112** and the panel member **100** is moved relative to the roller **111** while the pressure and temperature applied to the clear wear layer **103** by the roller **111** melts the layer **103** and provides the bevel **104**. The hot roller **111** maintains its temperature during the rolling process until the entire edge of the panel **100** is provided with the desired bevel **104**.

[0040] Many modifications may readily be envisioned to the process just described. The roller **111** may move relative to the panel **100** while the panel member **100** is maintained in its stationary position. Indeed, rather than a heated roller **111**, a heated die and shoe could likewise be used to provide the necessary bevel **104** while relative movement takes place between the heated die and shoe and the panel member **100**. However, it is the wear layer **103** which is intended to be melted and formed into the required bevel **104**.

[0041] Many further embodiments will readily occur to those skilled in the art to which the invention relates and the specific embodiments described should be considered as illustrative of the invention only and not as limiting its scope as defined in accordance with the accompanying claims.

I claim:

1. A method of forming a bevel in the top surface of a panel of laminate flooring comprising a covering over a layer of said panel and a clear top layer over said covering, said method comprising melting said clear top layer along an edge of said panel so as to form a beveled edge extending upwardly and inwardly from said edge towards said top surface of panel of laminate flooring.

2. A method according to claim 1 wherein said clear top layer is melted using a heated roller applied to said clear top layer and moving said panel of laminate flooring past said heated roller while said heated roller rotates in operable contact with said clear top layer.

3. A method according to claim 1 wherein said clear top layer is melted by a heated roller having an axis of rotation, said roller rotating about said axis and being in operable contact with said clear top layer, said axis of said roller being held stationary and said panel of laminate flooring being moved past said roller.

4. A method according to claim 1 wherein said clear top layer is melted by a heated die brought into contact with said clear top layer while relative movement occurs between said panel of laminate flooring and said heated die.

5. A panel of laminate flooring which has at least one beveled edge along an edge of said panel, said laminate flooring having a top surface which includes a covering of a layer of said laminate flooring and a clear top layer over said covering, said beveled edge being formed in said clear

top layer, said beveled edge extending upwardly and inwardly from said edge of said panel to said top surface of said panel of laminate flooring.

6. A piece of laminate flooring as in claim 5 wherein said clear top layer is melted by a heated roller.

7. A piece of laminate flooring as in claim 5 wherein said clear top layer is melted by a heated die.

* * * * *