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(54) **A construction and manufacturing process of a wooden floorboard**

Herstellungsverfahren einer Parkettplatte

Procédé de fabrication d'une planche de parquet

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Description

Field of Invention

[0001] The present invention generally relates to the special construction and manufacturing process of engineered wooden- floorboard which could simultaneously perform surface durability, structural-integrity, stability and mechanical strength, compared to other existing wooden-floorboards either manufactured in solid or in engineered wood process.

Background of Invention

[0002] Presently, the available options for floorboards are either in solid-wood flooring; engineered wood flooring, or High DensityFiberboard with a thin slice of wood (or plastic) lamination.

[0003] Solid-wood flooring is generally known for their more expensive cost; their heavier weights ; their lack of stability due to the nature of the solid-wood itself; and also their random, irregular length and width normally available, because of the method of their manufacturing.

[0004] Although they are structurally suitable for various different types of installation, quite often one or other disadvantageous factor described above might prove to be prohibitive.

[0005] Engineered-Wood Flooring is generally produced more for aesthetic installation, with limited engineered and structural merits. They are not produced with the intended surface-durability, structural-integrity, stability or mechanical strength, unless otherwise intended.

[0006] Laminate Flooring is mass-produced mostly for aesthetic and economical installation only, and works more like a floor-covering product than real wood flooring.

[0007] In European patent application EP 1 170 439, which has an earlier priority date than the priority date of the present application, but which was published after the priority date of the present application, a wooden floor board is described that comprises a top layer that is composed of a set of wooden strips, wherein elastomer membranes are placed between the strips to allow dimensional variations. The substrate of the wooden strips comprises a finger joint at one end and a groove on the other end side to allow the floor board to be connected to other floor boards that have similar finger joints and grooves. In French patent FR 1 070 192 a wooden floor board is disclosed wherein wooden strips of a top layer comprise finger joints for interconnecting the wooden strips.

[0008] The invention is created to answer requirements of engineered wood flooring with all the merits of durability, structural-integrity, stability and mechanical strength; but without the cost, weight, and disadvantages of solid-wood flooring; and with comparable aesthetics and beauty against any other pre-finished, engineered wood-floorings in market. Product dimension could also be made uniform for the ease of transportation, handling, storage and installation.

Summary of Invention

[0009] All the merits offered in the present invention are obtained by specifically having a particularly extreme thickness for the top layer (wear-layer) of the floorboard; by designing and inventing a unique method for the joints between the wooden-strips of the top layer assembly; and by choosing a specific bonding material and substrate material to be used in the product.

[0010] The object of the invention is to provide a wooden-floorboard having a surface-durability as the Solid Wood Flooring; having structural-integrity and mechanical strength as the Solid Wood Flooring; with a lighter weight and a more compatible cost.

[0011] The manufacturing, conditioning and assembling processes used the Engineered Wood Flooring process so as to make a high stability of the product as the *Engineered Wood Flooring* products.

[0012] The invention consists in the construction and manufacturing process of a wooden floorboard, as defined in claim 1.

Brief Description of Drawing

[0013]

Figure 1 is a top view of finished wooden-floorboards of the invention.

Figure 2 is a bottom view of finished wooden-floorboards of the invention

Figure 3 is a detail of top-layer joint profiling, before being split, of the wooden-floorboards of the invention.

Figure 4 is a detail of finished top-layer joint, when being split into 2 pieces, of the wooden-floorboards of the invention.

Figure 5 is a side view of finished wooden-floorboards of the invention.

Detailed Description of the Invention

[0014] The present invention is created to diminish the drawbacks of many kinds of wooden-floorboards presently existed, by creating a unique product which could simultaneously perform high surface-durability; structural-integrity; and good mechanical strength; and also could perform high stability with competitive price with other wooden-floorboard products from the same class.

[0015] Unlike the solid wood flooring, the present invention can be manufactured with uniform sizes, and the finishing process is held in the manufactory itself, so as to completely provide the ease of packing, transportation, handling, storage and installation.

[0016] The present invention relates to a engineered wood flooring consisting of an assembly of top-layer (wear-layer) with an extreme thickness of between 5,0-9,0 mm ($\pm 0,20-0,35''$) and a substrate of between 5,0-10 mm ($\pm 0,20-0,40''$) custom rotary-cut plywood

with special veneer composition and glue bonding.

[0017] As will be define below, a unique method has been found and designed for creating an assembly between wooden-strips of the invention.

[0018] In general, a conventional joining method is called butt-joint. In this method, we only need to solely joint the edges of the wooden-strips without any profiling, so that in this kind of joint, there will be no adequate strength since the area of glue-contact is as thick as the wood-strips themselves. When the surface of the wood-strips is worn-out and re-sandpaper, the joint becomes weaker as the surface of the wood-strips is dropped and the glue-contact area will be smaller.

[0019] A unique method for joining, invented and designed for the present invention, needs some mechanical processes for creating profiles, and the edges of the wood-strips to be joined, as a finger-joint profile and a high-scoring profile, are as can be seen from Fig. 3.

[0020] Finger-joint profile is designed for providing strong finger-joints between the wooden-strips when completed. This method is chosen in order to increase the surface of glue-contact area when compared to a conventional butt-joint, and on completion, it gives twice as much as area of glue-contact compared to conventional butt-joint.

[0021] After all profiles are ready, the assembly is done using a PVAc (Poly Vynil Acetat). This in turn creates very strong glue bonding and even stronger than the wood-strips themselves.

[0022] The high-scoring profile applied to the present joining method is intended to obtain and to maximize the thickness of the top layer (wear-layer) so as to achieve an extra-thick layer, which practically similar to the wear-layer thickness of solid wood flooring of comparable thickness.

[0023] The finger-joint profile made with around 10,0-12,0 mm ($\pm 0,40''-0,47''$) high for creating a strong joint, meets a high scoring made to around 3,55-7,55 mm ($\pm 0,14''-0,30''$) thick will provide not only an extreme thickness for the layer, but also a surface which is able to resist worn-out or re-sandpaper until the high-scoring is dropped; and even when it happens, the remaining joint area on the below finger-joint profile will still has a glue-contact area of more than 50% of the total width of the original joining area.

The Assembly

[0024] The wood-strips being finished to be joined and split into top layer (wear-layer) will be assembled together by using a substrate of custom plywood consisting of 4 until 6 rotary-cut veneers, laid up from top to bottom with alternating "short-long-short" pattern of grain direction, thus the lowermost veneer of the plywood, which will be the "back" of the finished floorboard, is long grain aligned with the grain direction of the top layer (wear-layer).

[0025] Veneers are bonded to each other using heat-cured Phenol Formaldehyde Resin glue. After hot

pressed under high temperature. The resulted plywood has between $\pm 6,0-11,0$ mm ($\pm 0,24-0,44''$) thick before process and will get further finishing process.

[0026] The final assembly between the top layer (wear-layer) and the substrate plywood is done by cold pressing under high pressure, utilizing the similar PVAc (*Poly Vynil Acetat*) class B-4 exterior glue-bonding, like the top-layer assembly. After the final assembly, the edges of the floorboards are machined to create the tongue and groove profiles, as well as machined on the backside to create 6 pieces of narrow grooves across the width of the backside at an equidistant of 313,0 mm ($\pm 12,32''$), meant to balance the stresses within the floorboard assembly.

[0027] Finishing is done using the U.V. (ultra-violet) cured Acrylic lacquer in smooth, fine texture surface type.

[0028] There are several dimension of the finished floorboard of the present invention:

1. L X W X H = 2,200 X 57 X 19 mm ($\pm 86, 6$ X 2,25 X 0,75")
2. L X W X H = 2,200 X 60 X 19 mm ($\pm 86, 6$ X 2,36 X 0,75")
3. L X W X H = 2,200 X 83 X 19 mm ($\pm 86, 6$ X 3,27 X 0,75")
4. L X W X H = 2,200 X 90 X 19 mm ($\pm 86, 6$ X 3,54 X 0,75")
5. L X W X H = 2,200 X 57 X 14 mm ($\pm 86, 6$ X 2,25 X 0,55")
6. L X W X H = 2,200 X 60 X 14 mm ($\pm 86, 6$ X 2,36 X 0,55")
7. L X W X H = 2,200 X 83 X 14 mm ($\pm 86, 6$ X 3,27 X 0,55")
8. L X W X H = 2,200 X 90 X 14 mm ($\pm 86, 6$ X 3,54 X 0,55")
9. L X W X H = 2,200 X 57 X 10 mm ($\pm 86, 6$ X 2,25 X 0,39")
10. L X W X H = 2,200 X 60 X 10 mm ($\pm 86, 6$ X 2,36 X 0,39")
11. L X W X H = 2,200 X 83 X 10 mm ($\pm 86, 6$ X 3,27 X 0,39")
12. L X W X H = 2,200 X 90 X 10 mm ($\pm 86, 6$ X 3,54 X 0,39") (L X W X H = Length X Width X Height of the product)

[0029] With all construction and manufacturing process of the wooden floorboard of the present invention, the need of a wooden floorboard with all advantages mentioned above will be achieved.

[0030] Various modifications, dimensions or even variations of the invention will be acceptable as long as they are within the scope of this invention as being claimed in the appended claims.

Claims

1. A construction and manufacturing process of a wooden floorboard, wherein the wooden floor board

is an engineered wooden floorboard, having a top layer consisting of wooden strips, wherein the top layer has a thickness between 5,0 - 9,0 millimeters, **characterized in that** the process comprises a step of making joints between wooden strips to obtain a layer, wherein in the making of joints between the wooden strips, each edge of said wooden strips undergoes a mechanical process to create finger joint profiles and high-scoring profiles, wherein the edges of the wooden strips are joined, and wherein the process further comprises the step of splitting the layer of joined wooden strips through the center line thereof to obtain two top layers.

2. The construction and manufacturing process according to claim 1, wherein the wooden floor board has a substrate of custom plywood with finished thickness between 5,0-10 mm.
3. The construction and manufacturing process of wooden floor board according to claim 2, wherein the process comprises a step of assembling veneer thickness and grain directions to obtain the substrate of plywood.
4. The construction and manufacturing process of wooden floor board according to any of claims 1 to 3, wherein in the step of making of joints between the wooden-strips, each edge of wooden-strip undergoes a machining to create a finger-joint profile between 10,0-12,0 mm deep and a high-scoring profile between 3,55-7,55 mm thick.
5. The construction and manufacturing process of wooden floor board according to any of claims 1 to 4, wherein in the joints with finger-joint profiles and high-scoring profiles the glue-contact area is increased twice or more, as compared to conventional butt-joints.
6. The construction and manufacturing process of wooden floor board according to any of claims 1 to 5, wherein the backside of the wooden-floorboard is machined to create 6 pieces of narrow grooves across at an equidistant of 313,0 mm, meant to balance the stresses within the floorboard.

Patentansprüche

1. Konstruktions- und Herstellungsverfahren für eine Holzfußbodendiele, wobei die Holzfußbodendiele eine konstruierte Holzfußbodendiele ist, die eine aus Holzstreifen bestehende obere Schicht hat, wobei die obere Schicht eine Dicke von zwischen 5,0 und 9,0 mm hat, **dadurch gekennzeichnet, dass** das Verfahren ei-

nen Schritt zur Herstellung von Verbindungen zwischen Holzstreifen unter Erhalt einer Schicht umfasst, wobei bei der Herstellung von Verbindungen zwischen den Holzstreifen jede Kante der Holzstreifen ein mechanisches Verfahren zur Bildung von Zinkenfugenprofilen und Profilen mit starkem Kerbschnitt durchläuft, wobei die Kanten der Holzstreifen verbunden werden und wobei das Verfahren außerdem den Schritt des Aufspaltens der Schicht aus verbundenen Holzstreifen durch die Mittellinie derselben unter Erhalt von zwei oberen Schichten umfasst.

2. Konstruktions- und Herstellungsverfahren gemäß Anspruch 1, wobei die Holzfußbodendiele ein Substrat aus üblichem Sperrholz mit einer fertig bearbeiteten Dicke von zwischen 5,0 und 10 mm hat.
3. Konstruktions- und Herstellungsverfahren für eine Holzfußbodendiele gemäß Anspruch 2, wobei das Verfahren einen Schritt des Zusammenbringens von Furnier- Dicke- und- Längs- bzw. Maserungs- Richtung unter Erhalt des Sperrholzsubstrats umfasst.
4. Konstruktions- und Herstellungsverfahren für eine Holzfußbodendiele gemäß einem der Ansprüche 1 bis 3, wobei im Schritt der Herstellung von Verbindungen zwischen den Holzstreifen jede Holzstreifenkante eine spanende Bearbeitung unter Herstellung eines Zinkenfugenprofils mit einer Tiefe von zwischen 10,0 und 12,0 mm und ein Profil mit starkem Kerbschnitt mit einer Dicke von zwischen 3,55 und 7,55 mm zu bilden.
5. Konstruktions- und Herstellungsverfahren für eine Holzfußbodendiele gemäß einem der Ansprüche 1 bis 4, wobei in den Verbindungen mit Fingerzinkenprofilen und Profilen mit starkem Kerbschnitt die Leimkontaktfläche im Vergleich zu herkömmlichen Stoßfugen um das Zweifache oder mehr erhöht ist.
6. Konstruktions- und Herstellungsverfahren für eine Holzfußbodendiele gemäß einem der Ansprüche 1 bis 5, wobei die Rückseite der Holzfußbodendiele einer spanenden Bearbeitung unterzogen wird, um sechs Stück enger Rillen von einer Seite zur anderen mit einem gleichen Abstand von 313,00 mm zu bilden, die dazu bestimmt sind, die Spannungen innerhalb der Fußbodendiele auszugleichen.

Revendications

1. Procédé de réalisation et de fabrication d'une planche de parquet en bois, dans lequel la planche de parquet en bois est une planche de parquet en bois

usinée, présentant une couche supérieure composée de lames de bois, dans lequel la couche supérieure présente une épaisseur entre 5,0 - 9,0 millimètres,

caractérisé en ce que le procédé comprend une étape consistant à réaliser des assemblages entre des lames de bois afin d'obtenir une couche, dans lequel, lors de la réalisation des assemblages entre les lames de bois, on soumet chaque bord des lames de bois à un traitement mécanique afin de créer des profils d'assemblage à entures multiples et des profils élevés anti-rayures, dans lequel les bords des lames de bois sont assemblés, et dans lequel le procédé comprend en outre l'étape consistant à diviser la couche de lames de bois assemblées le long de sa ligne médiane afin d'obtenir deux couches supérieures.

2. Le procédé de réalisation et de fabrication selon la revendication 1, dans lequel la planche de parquet en bois présente un substrat en contreplaqué personnalisé avec une épaisseur de finition d'entre 5,0 - 10 mm.
3. Le procédé de réalisation et de fabrication de planche de parquet en bois selon la revendication 2, dans lequel le procédé comprend une étape consistant à assembler des épaisseurs de placage et des fils du bois afin d'obtenir le substrat en contreplaqué.
4. Le procédé de réalisation et de fabrication de planche de parquet en bois selon l'une quelconque des revendications 1 à 3, dans lequel, dans l'étape consistant à réaliser des assemblages entre les lames de bois, chaque bord de lame de bois est soumis à un usinage pour créer un profil d'assemblage à entures multiples d'une profondeur d'entre 10,0 - 12,0 mm et un profil élevé anti-rayures d'une épaisseur d'entre 3,55 - 7,55 mm.
5. Le procédé de réalisation et de fabrication de planche de parquet en bois selon l'une quelconque des revendications 1 à 4, dans lequel, au niveau des assemblages avec des profils d'assemblage à entures multiples et des profils élevés anti-rayures, on augmente de deux fois ou plus la surface de contact de la colle par rapport à des assemblages à plat joint traditionnels.
6. Le procédé de réalisation et de fabrication de planche de parquet en bois selon l'une quelconque des revendications 1 à 5, dans lequel la face arrière de la planche de parquet en bois est usinée pour créer 6 morceaux de rainures étroites en travers à une équidistance de 313,0 mm, destinés à équilibrer les contraintes au sein de la planche de parquet.

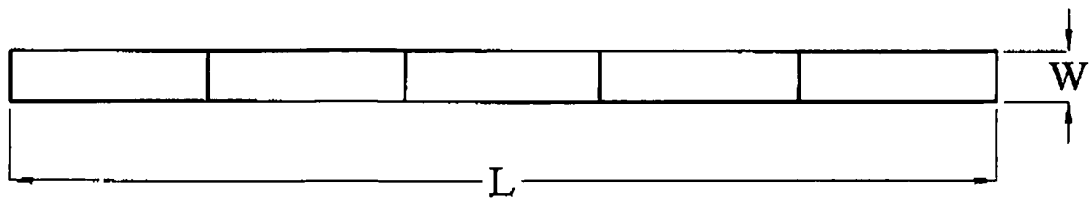


Fig. 1

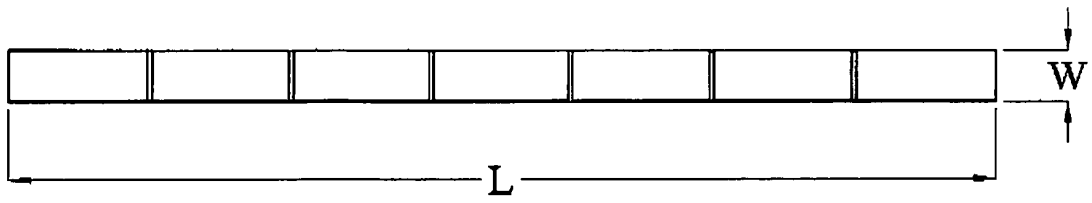


Fig. 2

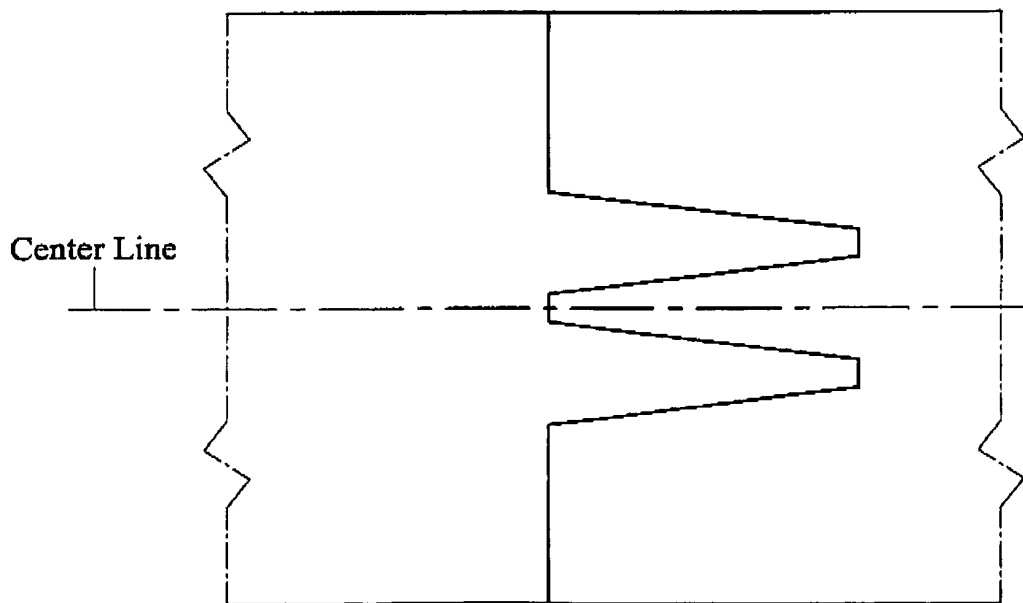


Fig. 3

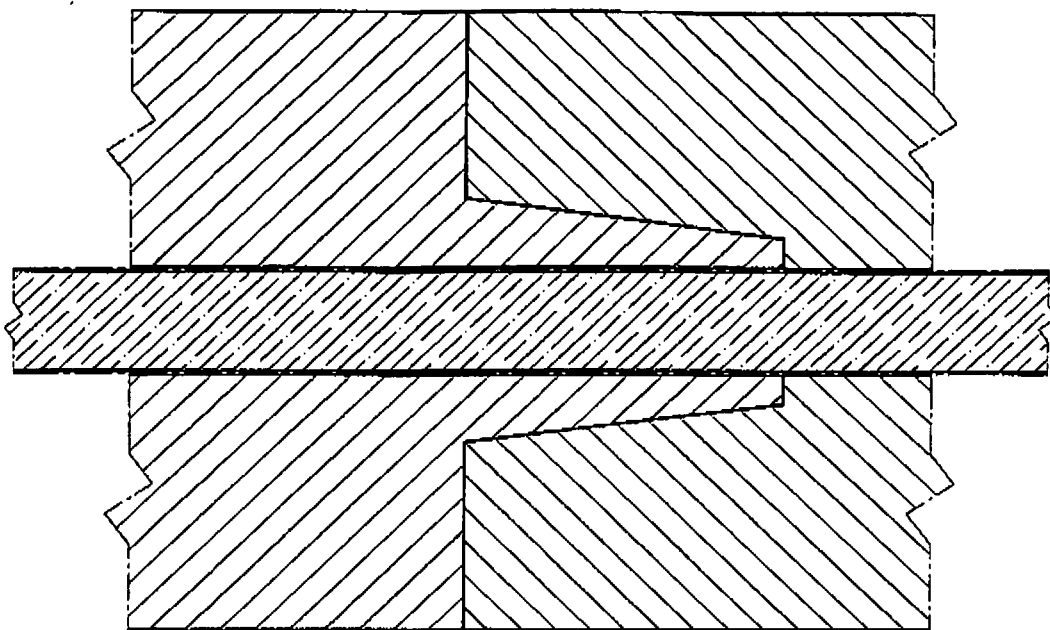


Fig. 4

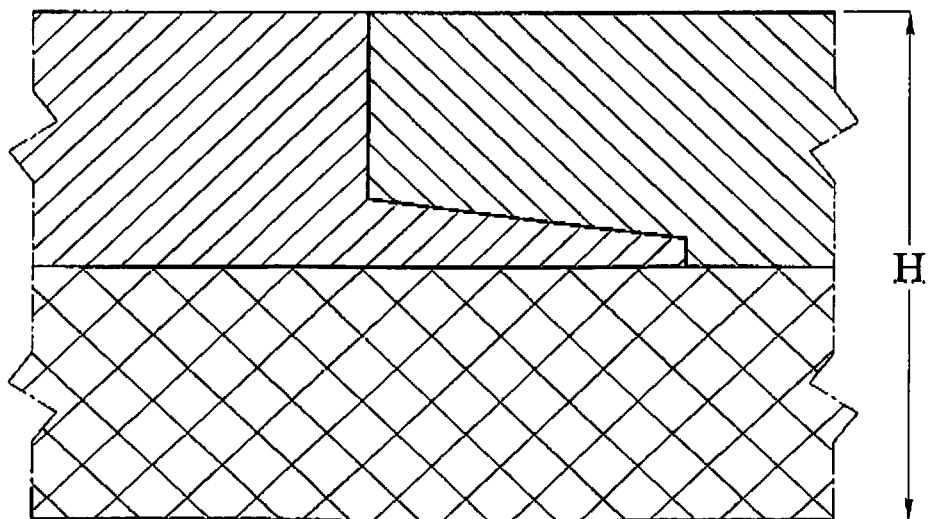


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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