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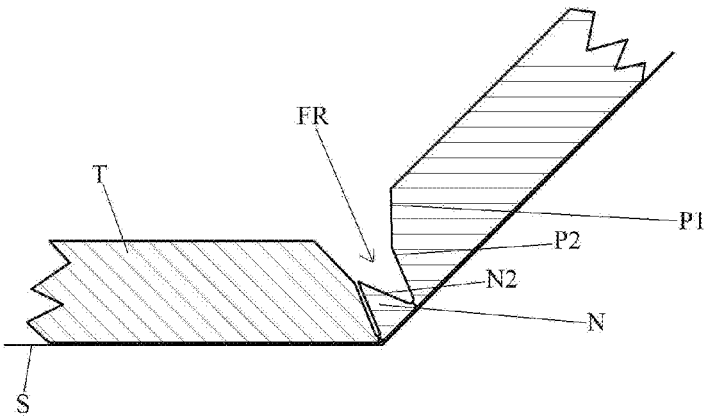
(54) **Method to obtain ninety degree bendings on veneered panels**

(57) The present invention relates to a method used to obtain ninety degree bendings on panels with composite structure, formed of a bearing board coated with a thin layer of valuable wood, according to appropriate modes to preserve the integrity of the thin layer; a further object of the present invention is the panel obtained with such method.

Fig. 2B



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Description

[0001] The present patent application for industrial invention relates to a method to obtain ninety degree bendings on veneered panels, together with the veneered panel obtained with said method.

[0002] The peculiarities and advantages of the present invention will be more evident after a short description of the prior art.

[0003] As it is known, in the field of furniture and wood interior decoration large use is made of panels provided with a thin layer of valuable wood applied on the front of a bearing board made of non-valuable wood or synthetic materials (such as chipboard, plywood, medium density MD).

[0004] In particular, similar panels are used to make doors, parts of furniture, wooden paneling and other interior decoration articles.

[0005] The artefacts obtained with said panels with composite structure are provided with an external surface of valuable wood and therefore have a very pleasant aesthetical aspect, without having to bear high costs for raw material.

[0006] Certainly, the use of said panels with composite structure must be extremely convenient and efficacious, in view of the fact that it is practically generalized among manufacturers of furniture and similar articles.

[0007] However, within such a "successful" technology, one very critical aspect can be noted.

[0008] Such a drawback occurs whenever one of said panels of composite structure is used to obtain a part of a furniture piece bent at ninety degrees.

[0009] In such a circumstance, in fact, a V-milling with 90° top angle is made on the bearing board of such a panel, basically affecting the entire thickness of the board, but not the thin layer of valuable wood.

[0010] Reference is made to the drawing attached to the present description, in which fig. 1A shows that said V-milling is obtained on the board (T) from the rear to the front and that, once it is made, it is defined by the two inclined lateral borders (B1, B2) disposed at 45° with respect to the longitudinal axis of symmetry of the milling (F) and converging towards said front layer (S).

[0011] Because of the presence of said intermediate milling (F), the sections (T1, T2) of the bearing board (T) lying on the right and left of the same can be rotated one against the other, until their inclined borders (B1, B2) touch mutually, thus allowing the sections to be disposed at 90°, as shown in fig.1B of said drawing.

[0012] The specific problem arising from such a traditional method refers to the excessive tension to which said thin layer (S) is subjected when 90° bending is performed on the two sections (T1, T2) of the bearing board (T).

[0013] Such high tension easily causes a sort of weakening of the coating layer (S), which is followed by the occurrence of anti-aesthetical surface microcracks on the sharp corner of such a 90° bent panel.

[0014] In particular, such a lamentable problem occurs because the longitudinal profile (L) of said coating layer (S) adapted to be disposed on the sharp corner of the 90° bent panel must perform a "stressing" hinge function with respect to said large rotation made by the two sections (T1, T2) of the board (T).

[0015] A careful evaluation of the prior art has led to the development of the present invention.

[0016] Having understood that the occurrence of said microcracks on the front of the thin layer (S) was due to excessive tension exerted on it during ninety degree bending of the bearing board (T), a new method to obtain a similar bending has been devised.

[0017] In fact, as illustrated hereinafter in detail, the peculiarity of the new method consists in the generation of less critical tension for the thin layer (S) of a panel with composite structure during ninety degree bending of the bearing board (T).

[0018] For purposes of clarity, the description of the invention continues with reference to the additional enclosed drawing, which is intended for purposes of illustration only and not in a limiting sense, wherein:

- figures from 2A to 2C are diagrammatic views that show the three steps of the new method of the invention used to obtain ninety degree bending of a panel with composite structure;
- figures from 3A to 3D are diagrammatic views that show the four steps of another embodiment of the new method of the invention used to obtain ninety degree bending of a panel with composite structure.

[0019] Referring to figs. 2A to 2C, the method of the invention is implemented on a panel with composite structure formed of a bearing board made of non-valuable material (T) coated with a thin valuable wood layer (S).

[0020] Also in this case, the board (T) is provided with milling (FR) obtained starting from the back side, meaning the side that is not coated with said valuable wood layer (S).

[0021] Milling (FR) basically affects the entire thickness of said board, in such a way to separate two side-by-side sections.

[0022] In such a circumstance, the authentic peculiarity of the new method of the invention is that a special "W"-shaped cross-section is given to said milling (FR).

[0023] Now referring to fig. 2A, it can be noted that said milling (FR) is defined by two lateral borders, opposite to its Y-Y axis of symmetry, which are provided with a special profile, basically a broken line profile.

[0024] The first section (P1) of each of said lateral borders intersects said Y-Y axis of symmetry with a 45° angle, whereas the second section (P2) intersect it with a 22.5° angle.

[0025] So, a 90° convergence angle is established between the two first portions (P1) of said opposite borders, whereas a 45° convergence angle is established between the two second sections (P2) of the same.

[0026] In the space comprised between said two second sections (P2) of the borders of the milling (FR), an overturned V-shaped rib (N) is obtained, with lateral sides (N2) inclined by 22.5° with respect to the Y-Y axis of symmetry of the milling (FR).

[0027] Because of this, they are symmetrically interfaced with the corresponding second sections (P2) of said lateral sides of the milling (FR).

[0028] Moreover, it must be noted that the length of said second sections (P2) of the lateral borders of the milling (FR) exactly corresponds to the length of said inclined sides (N2) of the central rib (N).

[0029] To bend the panel by 90°, the two sections of the board (T) are rotated towards said central rib (N), in such a way that said second sections (P2) of the lateral borders of the milling (FR) touch, from opposite sides, against the inclined sides (N2) of the rib (N).

[0030] A similar rotation also brings in mutual contact the first sections (P1) of the lateral borders of the milling (FR); a similar operational sequence can be observed by reference to figs. 2B and 2C.

[0031] According to the above indications, it is understood that the valuable wood layer (S) is subjected to lower tension, basically halved, with respect to the tension that occurs in the same situation in case of the prior art.

[0032] This is due to the fact that said layer (S) is no longer subjected to single 90° bending in correspondence of only one point, but to two successive 45° bendings in correspondence of two close points (L1), which practically coincide with the intersection points between the second sections (P2) of said borders of the milling (FR) and the corresponding sides (N2) of the central rib (N).

[0033] In order to additionally reduce the tension suffered by said coating layer (S), the method of the invention can be implemented according to an additional embodiment, as shown in figs. 3A to 3D.

[0034] To that end, the milling (FR) of the board (T) is given a different configuration to generate the formation of two identical overturned V-shaped ribs (N) in a position comprised between the "broken line" lateral borders of the milling (FR) and lying from opposite sides with respect to said axis of symmetry (Y-Y) of the same.

[0035] In such a case, the first section (P1) of each of said lateral borders of the milling (FR) intersects said Y-Y axis of symmetry with a 45° angle, whereas the second section (P2) of the same borders intersects it with a 15° angle.

[0036] Each of said two ribs (N) is provided with lateral sides (N1, N2) inclined by 15°with respect to the Y-Y axis of symmetry of the milling (FR).

[0037] So the external sides (N2) of the ribs (N) are symmetrically interfaced with corresponding second sections (P2) of said lateral borders of the milling (FR), forming a 30° convergence angle with them.

[0038] Also in this case, of course, the length of said second sections (P2) of the lateral borders of the milling (FR) exactly corresponds to the length of said sides (N2) of the two ribs (N).

[0039] To bend the panel by 90°, the two sections of the board (T) are rotated towards the two side-by-side ribs (N), in such a way that said second sections (P2) of the lateral borders of the milling (FR) touch, from opposite sides, against the external sides (N2) of the ribs (N).

[0040] Because of such a rotation, both the symmetrically opposite internal sides (N1) of the two ribs (N) and the first sections (P1) of the lateral borders of the milling (FR) are brought in mutual contact.

[0041] Obviously, in such a case, the valuable wood layer (S) applied to the board (T) is subjected to even lower tension.

[0042] This is due to the fact that said layer (S) is no longer subjected to single 90° bending in correspondence of only one point, but to three 30° bendings in correspondence of three close points (L1), which coincide respectively with the intersection point between the internal sides (N1) of the two side-by-side ribs (N) and with the intersection points between the second sections (P2) of said borders of the milling (FR) and the corresponding external sides (N2) of the two ribs (N).

Claims

1. Method to obtain 90° bendings on panels with composite structure composed of a bearing board (T) coated with a valuable wood layer (S), **characterized in that** it provides for the realization, starting from the uncoated back side of the board (T), of milling (FR) that basically affects the entire thickness of the board (T) and is defined by two lateral borders, opposite to the Y-Y axis of symmetry of the milling (FR), which are provided with a broken line profile, each of them being composed, from the back to the front of the board (T), of a first section (P1) that intersects the Y-Y axis of symmetry at a 45° angle and a second section (P2) that intersects it at 22.5° angle; it being also provided that, in the space comprised between the two lateral borders, an overturned V-shaped rib (N) is obtained, with lateral sides (N2) inclined by 22.5° with respect to the Y-Y axis of symmetry of the milling (FR) and provided with exactly the same length as the second sections (P2) of the lateral borders of the milling (FR).

2. Panel with composite structure composed of a bearing board (T) coated with a valuable wood layer (S), **characterized in that** it is provided, starting from the uncoated back side of the board (T), with milling (FR) that basically affects the entire thickness of the same and is defined by two lateral borders, opposite to the Y-Y axis of symmetry of the milling (FR), which are provided with broken line profile, each of them being composed, from the back to the front of the board (T), of a first section (P1) that intersects the

Y-Y axis of symmetry at a 45° angle and a second section (P2) that intersects it at a 22.5° angle; it being also provided that, in the space comprised between the two lateral borders, an overturned V-shaped rib (N) is obtained, with lateral sides (N2) inclined by 22.5° with respect to the Y-Y axis of symmetry of the milling (FR) and provided with exactly the same length as the second sections (P2) of the lateral borders of the milling (FR).

3. Method to obtain 90° bendings on panels with composite structure composed of a bearing board (T) coated with a valuable wood layer (S), **characterized in that** it provides for realization, starting from the uncoated back side of the board (T), of milling (FR) that basically affects the entire thickness of the same and is defined by two lateral borders, opposite to the Y-Y axis of symmetry of the milling (FR), which are provided with broken line profile, each of them being composed, from the back to the front of the board (T), of a first section (P1) that intersects the Y-Y axis of symmetry at a 45° angle and a second section (P2) that intersects it at a 15° angle; it being also provided that, in the space comprised between the two lateral borders, two identical overturned V-shaped ribs (N) are obtained, with lateral sides (N1, N2) inclined by 15° with respect to the Y-Y axis of symmetry of the milling (FR) and provided with exactly the same length as the second sections (P2) of the lateral borders of the milling (FR).

4. Panel with composite structure composed of a bearing board (T) coated with a valuable wood layer (S), **characterized in that** it is provided, starting from the uncoated back side of the board (T), with milling (FR) that basically affects the entire thickness of the same board (T) and is defined by two lateral borders, opposite to the Y-Y axis of symmetry of the milling (FR), which are provided with broken line profile, each of them being composed, from the back to the front of the board (T), of a first section (P1) that intersects the Y-Y axis of symmetry at a 45 angle and a second section (P2) that intersects it at a 15° angle; it being also provided that, in the space comprised between the two lateral borders, two identical side-by-side overturned V-shaped rib (N) are obtained, with lateral sides (N1, N2) inclined by 15° with respect to the Y-Y axis of symmetry of the milling (FR) and provided with exactly the same length as the second sections (P2) of the lateral borders of the milling (FR).

Fig. 1A

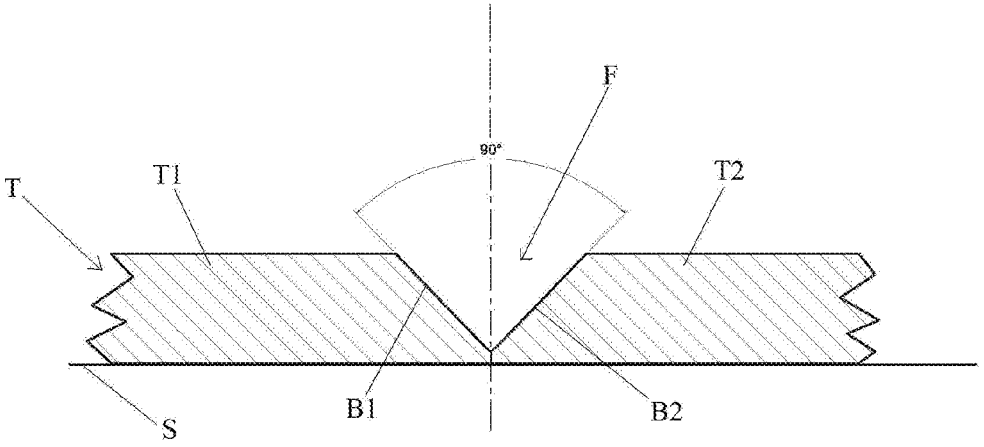


Fig. 1B

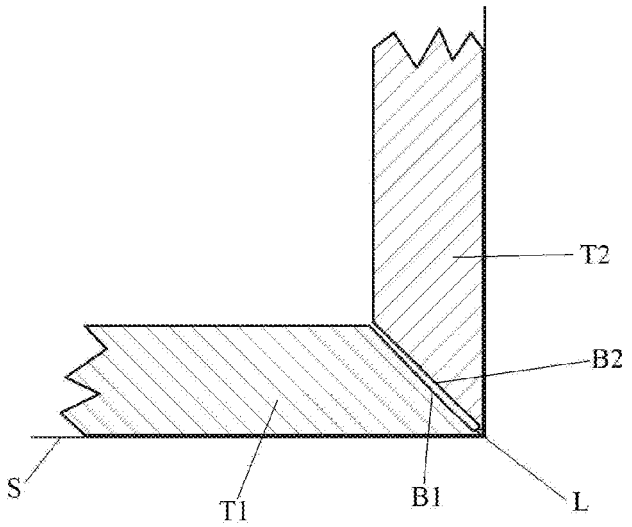


Fig. 2A

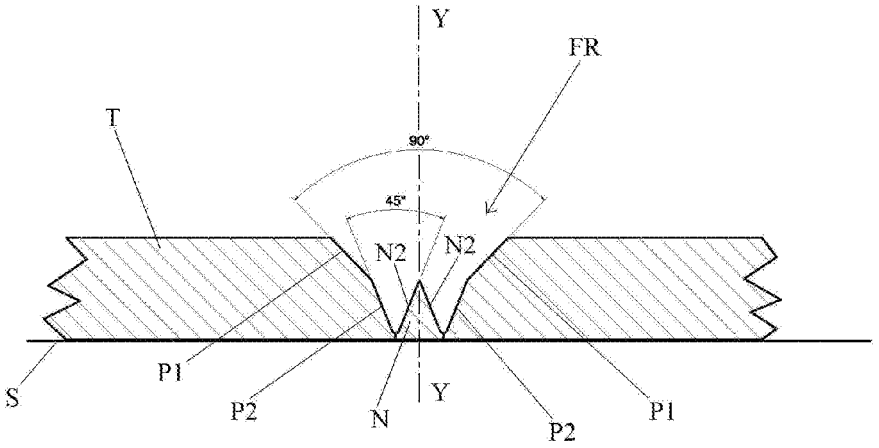


Fig. 2B

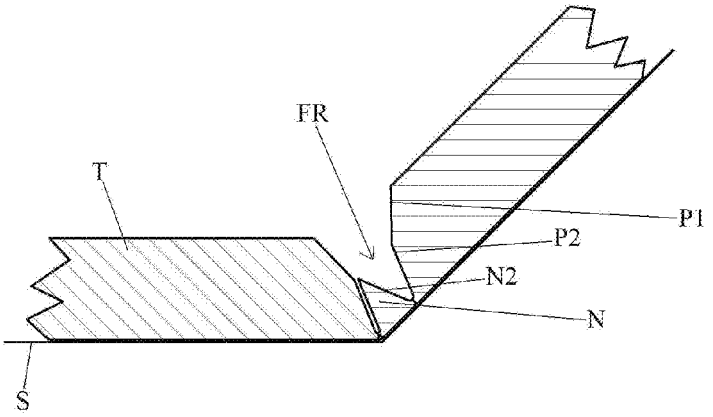


Fig. 2C

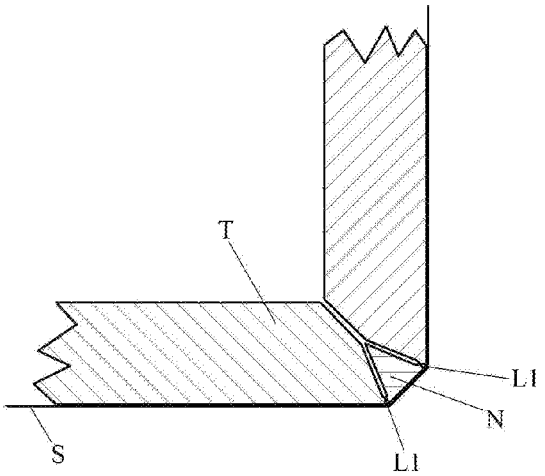


Fig. 3A

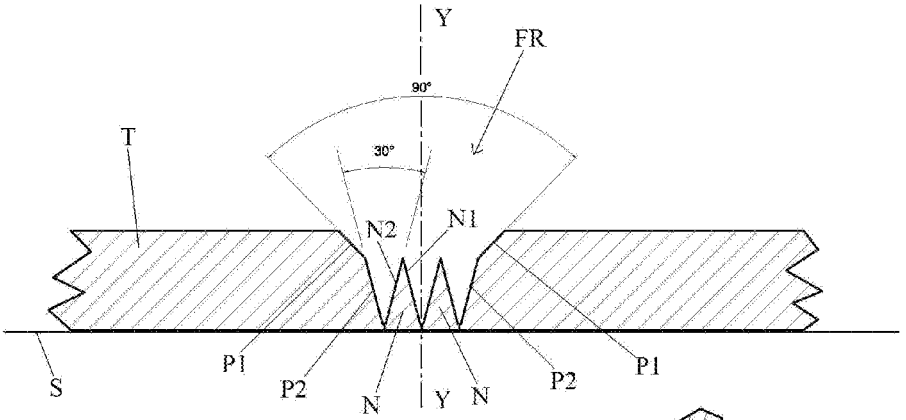


Fig. 3B

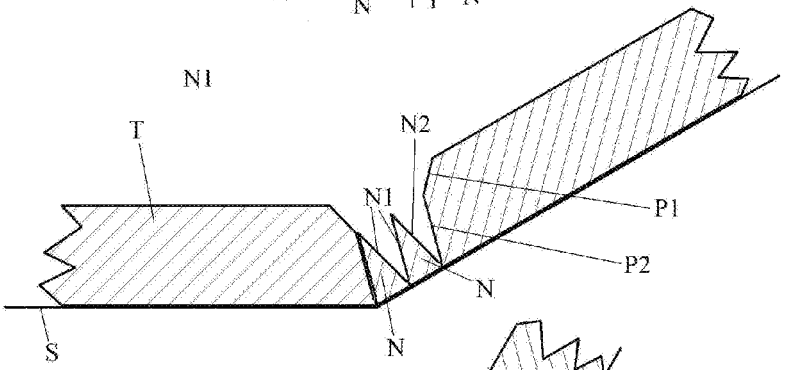


Fig. 3C

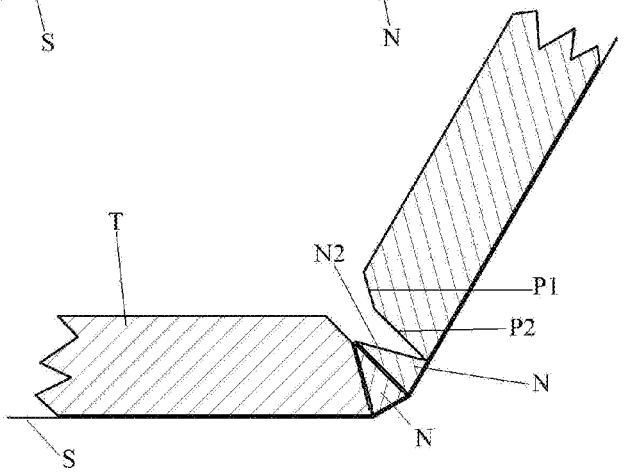
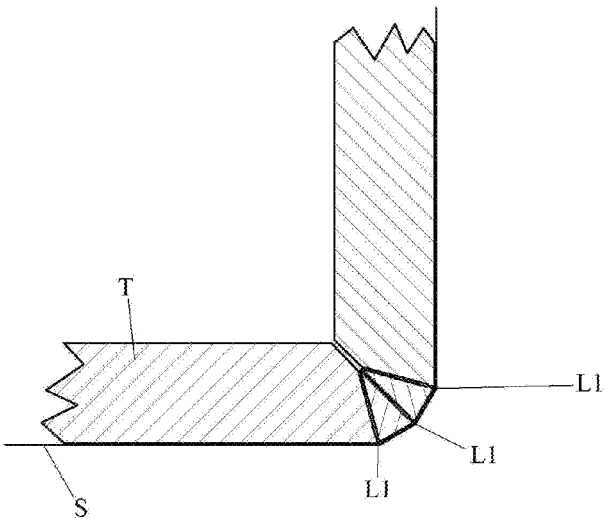


Fig. 3D



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EUROPEAN SEARCH REPORT

Application Number
EP 11 16 0715

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 811 099 A2 (KNAUF GIPS KG [DE]) 25 July 2007 (2007-07-25) * abstract * * figures * -----	1-4	INV. B27D5/00 B27G5/00 B32B3/02
A	US 2001/031336 A1 (BORN DAVID W [US]) 18 October 2001 (2001-10-18) * abstract * * figure 8 * -----	1-4	

TECHNICAL FIELDS SEARCHED (IPC)

B27F
B29C
E04C
E04F
B27D
B27G
B32B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 July 2011	Hamel, Pascal

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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27-07-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1811099 A2	25-07-2007	NONE	
US 2001031336 A1	18-10-2001	US 2003021957 A1	30-01-2003