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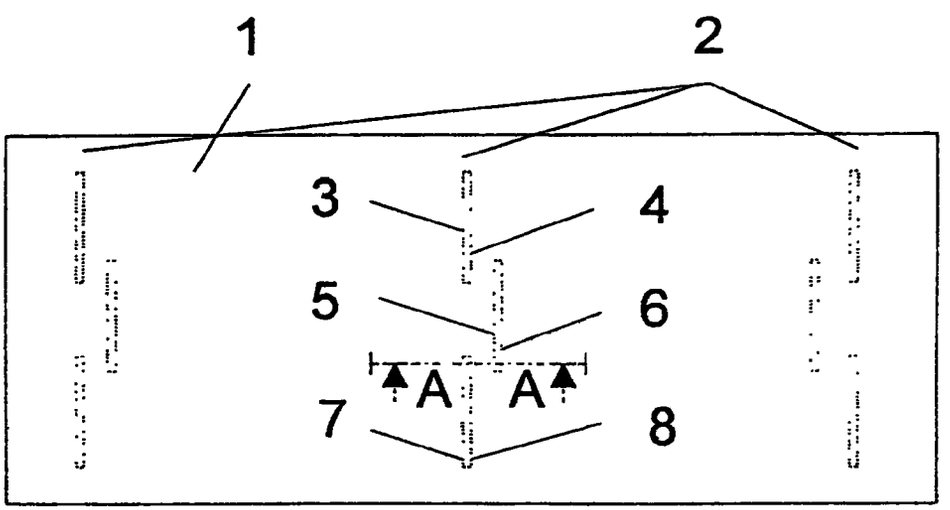
(54) Structure for preventing warping of solid-wood board

(57) Structure (2) for preventing warping of solid-wood board (1,1'), said structure consisting of a slot array fitted in the board and a stiffening element array fitted therein. The slot array consists of two or more successive sub-slots (3,5,7) of a length substantially shorter than the length of the slot array as a whole, in which the stiffening elements (4,6,8) forming the stiffening element array are fitted. Any two successive sub-slots are placed at a distance from each other with respect to their longitudinal centre axis. Moreover, any two successive sub-slots are disposed in an overlapping arrangement relative to each other so that a portion of one sub-slot lies longitudinally side by side with a portion of another sub-slot successive to it.

FIG. 1



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Description

Scope of invention

[0001] The present invention relates to a structure for preventing warping of solid-wood board.

Prior art

[0002] Solid-wood board consisting of one or more layers of wooden laths or equivalent glued together side by side is a very sturdy structure and is applicable for use for many different purposes, e.g. as table board or as raw material for the furniture industry.

[0003] A problem with the use of this type of solid-wood board is the warping of the board, which is caused by drying of the board and other reasons. Due to warping, the board becomes unfit for use in many cases.

[0004] One solution to prevent the warping of solid-wood board is to make slots in the lower surface of the board. In each slot, a bar-like stiffening element made e.g. of iron is fitted.

[0005] A drawback with this prior-art solution is that, especially due to the gradual changes occurring in the wood as a result of changes in temperature and humidity and to the fact that the stiffening bar is of a length extending across the entire board, the stiffening bar frequently comes loose from the slot, thus making the board useless. Moreover, the ends of the slot and the stiffening part extend across the whole width of the board and therefore reach the very edges of the board, which is a flaw in the appearance of the board.

Object of the invention

[0006] The object of the present invention is to eliminate the drawbacks of prior art and achieve a structure for preventing the warping of solid-wood board, a structure that is considerably better than prior-art solutions.

[0007] In the solution of the invention, each slot is divided into sub-slots, of which any two successive ones are placed at a distance from each other in the lateral direction. In addition, successive slots overlap each other as specified in the claims.

[0008] With the solution of the invention, a structure is achieved that prevents warping of the board significantly better than prior-art solutions. Each one of the sub-slots is considerably shorter than a slot extending across the whole board, which means that an individual sub-slot as well as the stiffening element placed in it are subject to a smaller force. As the sub-slots and the stiffening elements in them additionally overlap in successive sub-slots, the solution of the invention is considerably more resistant to the forces tending to warp the board than prior-art solutions, and the board is therefore less liable to be broken. Moreover, the final result is a board of neater appearance because the slots closest to the board edge do not extend right to the edge.

Brief description of drawings

[0009] In the following, the invention will be described in detail by the aid of a few examples by referring to the attached drawings, wherein

Fig. 1 presents a rectangular sheet of solid-wood board provided with stiffening structures according to the invention,

Fig. 2 presents a magnified longitudinal cross-section along line A - A,

Fig. 3 presents a longitudinal cross-section of another sheet of board provided with stiffening structures according to the invention,

Fig. 4 presents a longitudinal cross-section of a third sheet of board provided with stiffening structures according to the invention,

Fig. 5 presents a longitudinal cross-section of a fourth sheet of board provided with stiffening structures according to the invention.

Description of a preferred embodiment of the invention

[0010] Fig. 1 presents a rectangular sheet of solid-wood board 1 about 2000 mm long and 1000 mm wide, with three stiffening structures 2 in the lower surface of the board 1, designed to prevent warping of the wooden board. Each stiffening structure 2 consists of three successive sub-slots 3, 5 and 7 made in the lower surface of the board 1, with a stiffening element 4, 6 and 8 fitted in each sub-slot. The stiffening element is of a size approximately equal to the size of the sub-slot and it may consist of e.g. an upright flat-iron bar.

[0011] The sub-slots 3, 5 and 7 are of a length considerably smaller than the total width of the board 1, e.g. about one third of the width of the board 1. Thus, in the case of Fig. 1, if the board width is 1000 mm, the lengths of the sub-slots 3, 5 and 7 may be e.g. 350 mm, 300 mm and 350 mm. In addition, the sub-slots are disposed in an overlapping arrangement so that the longitudinal centre axes 9 and 10 (Fig. 2) of any two successive sub-slots are at a small lateral distance d from each other, and that the end of each sub-slot extends past the next end of a successive sub-slot; for instance, the lower end of sub-slot 5 extends below the upper end of sub-slot 7. In the overlapping portions of the sub-slots there are two flat iron bars, so the stiffening structure is considerably stronger than it would be without an overlap. The length of the overlapping portion of the sub-slots is e.g. about 60 mm, and the distance d between the centre axes of the sub-slots may likewise be e.g. 60 mm. Furthermore, as can be seen from Fig. 1, the outermost

subslots 3 and 7 do not extend to the edge of the board 1, so there are no sub-slot ends at the board edge that would need to be covered for reasons of appearance.

[0012] Fig. 1 further shows that, e.g. in the case of three sub-slots, the sub-slots 3, 7 located farthest apart may again be placed on the same longitudinal axis 9. In addition, in structures near the edge of the board, the sub-slots 3 and 5 lying on the same axis are preferably placed closest to the edge of the board 1 while the middlemost sub-slot 5 is placed farthest away from the edge of the board 1.

[0013] As illustrated by Fig. 2, the depth of the sub-slots 3, 5 and 7 must equal at least half the thickness of the board 1; for instance, if the thickness of the board is 25 mm, the depth of the sub-slots may be e.g. 16 mm. A sufficient stiffening effect of the stiffening structure is achieved, for example, if the width of the sub-slots is 4 mm and the stiffening element fitted inside the sub-slot has e.g. a width of 3 mm and a height of 13 mm. The stiffening element is fastened to the sub-slot e.g. using hardenable sealing material, which can be smoothed on the lower surface of the board so as to form a smooth and even surface with the lower surface of the board 1.

[0014] The board 1 presented in Fig. 2 consists of single-layer solid-wood board in which the wooden laths 11 are glued together in one layer. It is also possible to use multiple-layer boards, as in Fig. 3, in which a corresponding stiffening structure has been made in two-layer board 1' with wooden laths 12 glued together in two layers. In this case it is possible to embed the sub-slots in the middle portion of the board 1' by machining half-slots 5', 5", 7', 7" in the inner surface of each one of the two board layers as illustrated by Fig. 4, in which case the stiffening structures will not be visible from either side of the board. Moreover, in this case the centre axes 9', 10' of the sub-slots can be located at the middle of the board in its height direction. Another possibility, as illustrated by Fig. 5, is to glue two board halves provided with a stiffening structure according to the invention together, with the stiffening structures opposite to each other, thus also producing a structure in which the sub-slots are invisible. In such a structure, the sub-slots 15', 15", 17', 17" and the stiffening iron bars 16', 16", 18', 18" placed in them may be located oppositely as in Fig. 5 or in positions different from those of the stiffening structures in the opposite board half.

[0015] It is obvious to a person skilled in the art that different embodiments of the invention are not restricted to the examples presented above, but that they may be varied within the scope of the claims presented below. The number of stiffening structures 2 naturally depends on the size of the sheet of board, and so do the number of subslots needed and their dimensions as well as the number of stiffening bars or equivalent needed and their dimensions. Furthermore, the shape of the sheet of board need not be limited to rectangular sheets only, but the same stiffening structure may also be applied to sheets of solid-wood board of a circular shape as well as other shapes.

Claims

1. Structure (2) for preventing warping of solid-wood board (1,1'), said structure consisting of a slot array fitted in the board and a stiffening element array fitted therein,
characterised in that

   the slot array consists of two or more successive sub-slots (3,5,5',5",7,7',7",15',15",17'17") of a length substantially shorter than the length of the slot array as a whole, in which the stiffening elements (4,6,8,16', 16",18',18") forming the stiffening element array are fitted,

   of which sub-slots any two successive sub-slots are placed at a distance from each other with respect to their longitudinal centre axis (9,9',10,10'), and

   of which sub-slots any two successive sub-slots are disposed in an overlapping arrangement relative to each other so that a portion of one sub-slot lies longitudinally side by side with a portion of another sub-slot successive to it.

2. Structure as defined in claim 1, **characterised** in that a sub-slot (3,7) lying near the edge of the board (1) is at a distance from the edge of the board.

3. Structure as defined in claim 1, **characterised** in that the lateral distance (d) between the centre axes of successive sub-slots is in the range of 10 - 100 mm, e.g. 60 mm.

4. Structure as defined in claim 1, **characterised** in that the length of the overlapping portions of successive sub-slots is in the range of 10 - 100 mm, e.g. 60 mm.

5. Structure as defined in claim 1m **characterised** in that, in their depth direction, the sub-slots extend at least halfway through the thickness of the board.

6. Structure as defined in claim 1, in which the board (1') consists of at least two layers placed one over the other, **characterised** in that the sub-slots (5',5",7,7', 7",15',15",17'17") and the stiffening elements (6,8,16', 16",18'18") are fitted inside the board.

7. Structure as defined in claim 6, **characterised** in that the sub-slots (15',15",17',17") and the stiffening elements (16',16",18',18") are fitted in the inner surface of a board layer, said surface being fitted

against another board layer.

8. Structure as defined in claim 7, **characterised** in that the sub-slots and stiffening elements in the inner surface of a board layer fitted against another board layer are disposed directly oppositely to the sub-slots and stiffening elements in the inner surface of the opposite board layer.

9. Structure as defined in claim 7, **characterised** in that the sub-slots and stiffening elements in the inner surface of a board layer fitted against another board layer are disposed in different locations than the sub-slots and stiffening elements in the inner surface of the opposite board.

10. Structure as defined in claim 1, **characterised** in that the stiffening element is a bar-like body preferably made of metal, which has a substantially rectangular longitudinal cross-section and is placed in an upright position in the sub-slot.

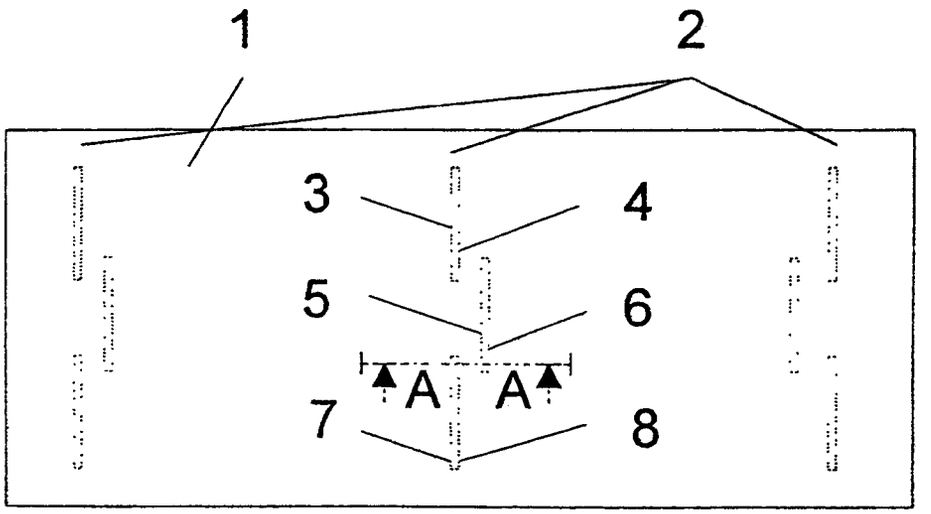

FIG. 1

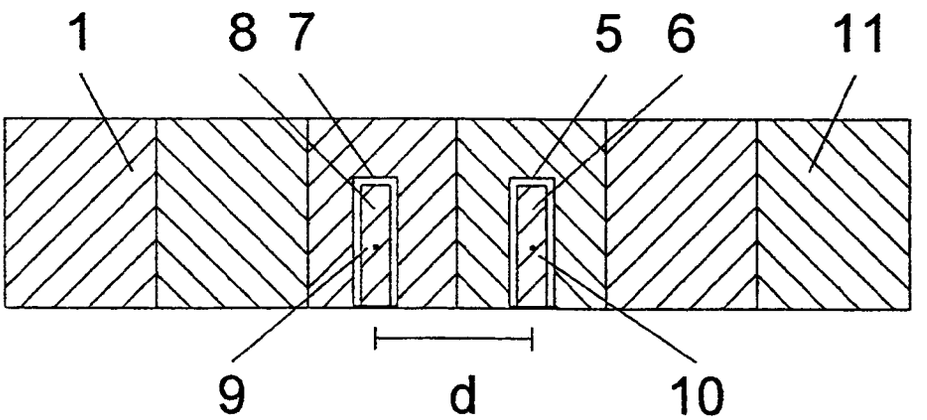

FIG. 2

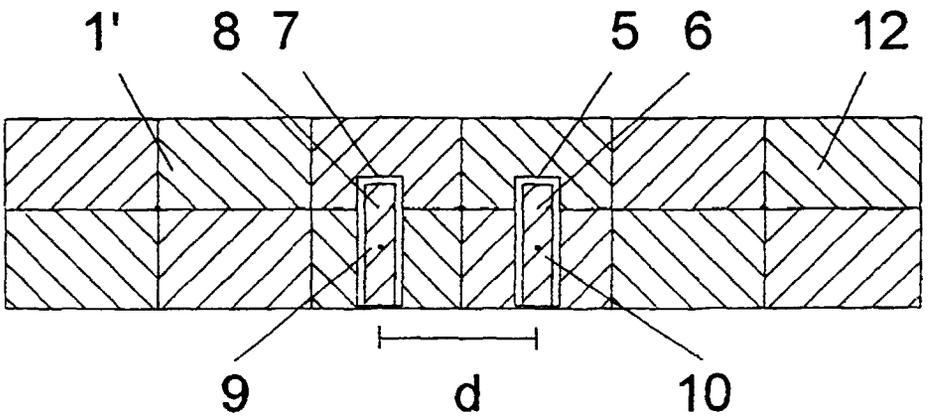

FIG. 3

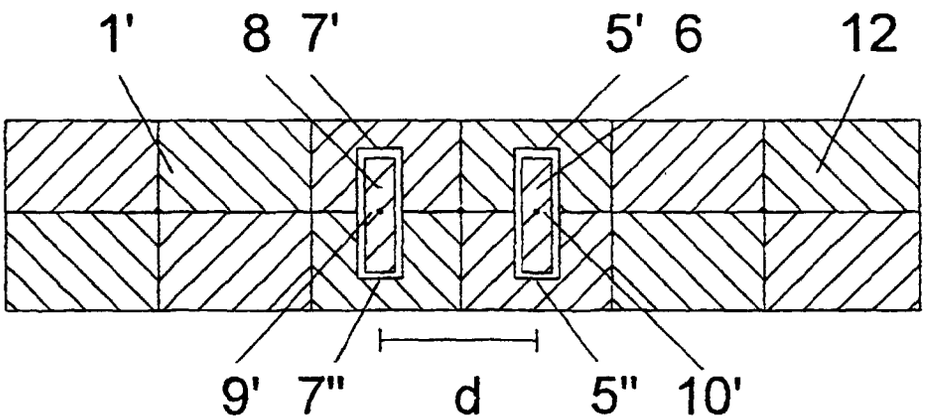

FIG. 4

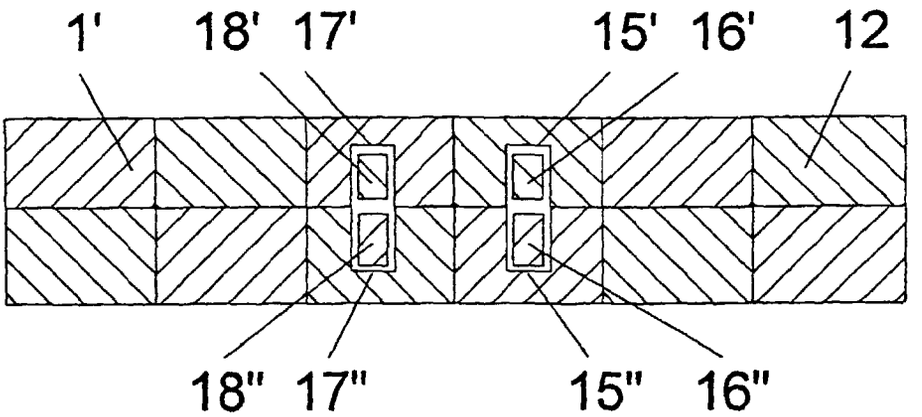

FIG. 5