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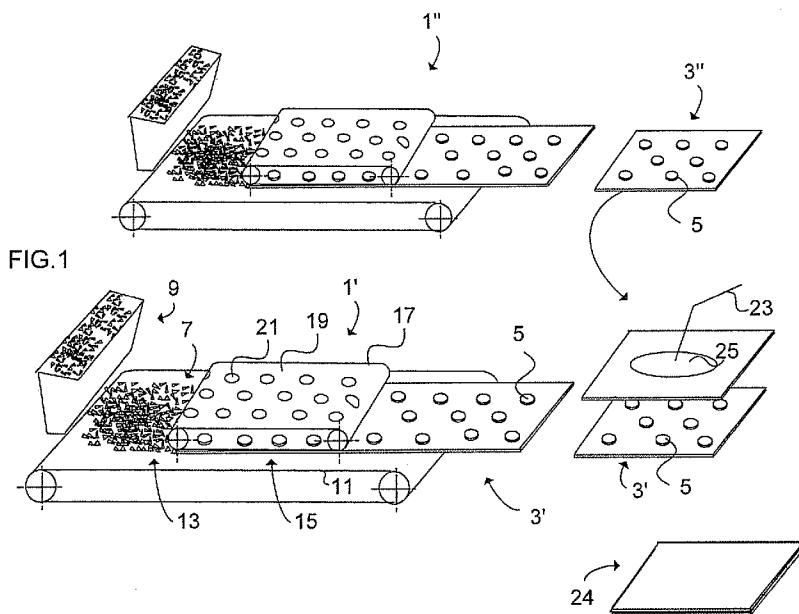
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(54) Title: METHOD FOR MANUFACTURING A WOOD-BASED FURNITURE COMPONENT COMPRISING AN INTEGRAL SPACER



(57) Abstract: The present invention relates to a method for manufacturing a wood-based furniture component (24). The method comprises steps in which chips (7) are distributed forming a chip mat (13), the chip mat (13) is compressed by means of a tool surface (19) comprising one or more gaps (21) for forming one or more projecting chip segments (53), forming spacers (5, 63, 71), the finish-pressed chipboard (3) is fed out and the projecting chip segments (53) of the finish-pressed chipboard (53) are joined to another furniture component structural element (3', 47, 49, 73).

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METHOD FOR MANUFACTURING A WOOD-BASED FURNITURE  
COMPONENT COMPRISING AN INTEGRAL SPACER

Technical field

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The present invention relates to a method for manufacturing a wood-based furniture component according to the preamble of claim 1.

The invention may relate to the chipboard manufacturing industry, but is not  
10 limited to this and may also relate to other types of wood-based boards, such as medium-density fiberboard (MDF) and oriented strand board (OSB). Wood-based boards are in turn used in furniture manufacturing, for example.

Background of the invention

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Chipboards are nowadays manufactured for the furniture industry, for example as homogeneous boards of unprocessed wood chips. The unprocessed wood chips may be of wood and/or other lignocellulose material and may be composed, for example, of blade-chopped chips from round timber, sawdust or  
20 splinter chips. Other chip material may include flax straw, hemp and bagasse. The chipboards are manufactured under pressure and heat with adhesive as binder. After pressing the board acquires a fixed structure and is then cooled. The board has an upper side and an underside for applying suitable surface layers, such as paint, veneers etc. The board can then be used as a furniture  
25 component in kitchen fixture carcasses (flat-pack furniture), such as cupboard doors, bookshelves, table tops, laminar fabrications for cupboard carcasses etc.

There is a need, however, to reduce the weight of the finished furniture

component and to reduce the quantity of wood chips and adhesive in the manufacturing process and to speed up the chipboard manufacturing process. At the same time there is a desire to simplify the chip handling before building up the chip mat for compression, which should involve less complicated and hence more cost-effective processing equipment. In addition the lower weight of the finished furniture component should mean cheaper and more environmentally friendly transport.

There is also a need in the case of furniture chipboards to provide spacers adapted to the chipboard without the need to enlarge the production line with further apparatus for the manufacture of such spacers. Spacers currently take the form of cardboard-based spacers inserted between two furniture components, such as two chipboards, in order to make the furniture chipboard light. Producing such cardboard-based spacers requires further manufacturing equipment.

Fiberboards with reinforcements are currently manufactured in various ways. US 4,904,517, for example, describes boards with ribbed reinforcement. The rib reinforcement comprises longitudinal parallel ribs projecting from the board and made from the same fiber material as the board itself and as integral parts thereof. The area of the channels has a density which is 15% lower than the density of the rest of the board and the channels have a fiber orientation which is largely the same as for the board. In this way a reinforced board is obtained.

In one known method for manufacturing hollow chipboards, so-called tubular chipboards, the chip mat on compression encloses heated, continuous parallel rods in a so-called extruded rod-pressing. The finished board comprises

parallel ducts giving the board a lower weight than one which is homogeneous. The rods produce hollow cavities and give off heat for hardening the chip material. These boards have a long pressing time due to the relatively large thickness of the finished board.

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Known methods consequently suffer from various disadvantages. It may be the complicated process equipment, inefficient handling of the process equipment in the manufacturing process, the lack of flexibility on a production line, long pressing time etc. It is desirable for the finished chipboard to be of simple construction, low in weight and inherently rigid.

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#### Disclosure of the invention

The object is achieved, in the method described in the introductory part, by a method characterized by the steps specified in claim 1.

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This affords a chipboard spacer which is designed for joining to another furniture structural element, whilst making the chipboard more rigid, but without having to make the furniture chipboard thicker. By using the same type of chip raw material (such as woodchips and adhesive) for the spacer as that used for the part of the chipboard not comprising said spacers, it is possible to manufacture a reinforced furniture chipboard (constituting a wood-based furniture component) having an integral spacer, without expensive supplementary process equipment, in one and the same manufacturing process.

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The wood-based furniture component can therefore be used as a table top in a table comprising table legs, or as a door leaf comprising two outer plane surfaces (or decorative surfaces). The wood-based furniture component may therefore comprise table legs mounted on the chip segments or may comprise

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another chipboard mounted on the chip segments.

The step involving distribution of the chips preferably also involves distribution of the chips so that the chip mat comprises one or more raised  
5 areas.

It is thereby possible to produce spacers integrally with the chipboard, said spacers having a substantial height above the face of the chipboard, resulting in a satisfactory interval between the surface of the chipboard (adjoining the  
10 spacers) and the surface of the spacers for joining to another furniture component, such as a laminar element or another furniture component structural element (such as a table leg).

The other furniture component structural element suitably consists of a laminar  
15 element.

In this way a hollow furniture chipboard has been produced having a first side and a second side, which furniture chipboard can advantageously be used as a cupboard door or other furniture panel where a plane front and rear side are  
20 required. The laminar element at the same time serves to reinforce the furniture chipboard. The cavities, which are defined by internal surfaces of the chipboard and the laminar element facing one another and exposed surfaces of said spacers have thereby been produced cost-effectively, resulting in an inherently rigid furniture panel which is lightweight and which requires a  
25 smaller quantity of raw material (such as wood chips and adhesive) than a conventional furniture chipboard. The part of the chipboard not enclosing said spacers is therefore thinner than a conventional homogeneous chipboard. Such a thinner chipboard part can be manufactured more cost-effectively since the

process pressing time is considerably reduced, which in turn leads to a higher capacity (manufacture of more furniture chipboards per unit time on one and the same production line).

- 5 The laminar element is preferably manufactured in the same way as the chipboard and the projecting chip segments of the laminar element are then joined to projecting chip segments of the chipboard.

A hollow wood-based furniture component can thereby be manufactured with one and the same process equipment for manufacturing both the chipboard and the laminar element, which is cost-effective. Spacers of the chipboard are joined to spacers of the laminar element, so that the thickness of the furniture chipboard can be determined from the thickness of parts of the chipboard and of the laminar element not comprising said spacers and the height of said spacers. In this way it is possible to produce a furniture chipboard with cavities, using a small quantity of chips and making the furniture chipboard lightweight. Joining can preferably be performed by means of adhesive bonding. Other methods of joining may include screwing, nailing, plugging or stapling. In adhesive bonding surfaces of the projecting chip segments of the chipboard and of the laminar element are bonded together. Types of adhesive may include thermoplastic adhesives such as PVA or molten adhesive. Alternatively thermosetting plastic adhesives may be used, such as UF adhesive, UMF, FF (phenol) or PMDI adhesive. Other examples are tannin-based adhesive. The edge areas of the finished wood-based furniture component may be provided with thinner edge strips (the thickness of the edge strip corresponding to the thickness of the spacers) comprising filler material fitted into the cavities in said edge areas. Alternatively the edge areas may be provided with more robust spacing material for fasteners, such as screw

fasteners, hinges etc. In this way, with reinforced fixing, the fasteners can be fixed to edge areas of the furniture component. If a hollow furniture chipboard is required having a thickness of 18 mm, parts of the chipboard and/or of the laminar element not comprising spacers can be produced with a thickness of 3  
5 mm and the spacers can be produced with a height of 6 mm each.

The other furniture component structural element is suitably a furniture leg.

In this way the chipboard can be manufactured with spacers at the corners of  
10 the chipboard, said spacers also serving to reinforce the chipboard, and the furniture legs being fitted to the corners. Using the height of the spacers, the furniture legs can be made shorter, thereby using a smaller quantity of material for the furniture legs, which is cost-effective. Shorter furniture legs also mean  
15 less bulky packaging for transporting non-ready assembled furniture including furniture legs, such as a table.

The side of the chipboard remote from the side comprising the projecting chip segments is preferably plane.

20 The chipboard can thereby be used for producing an item of furniture or a wood-based furniture component having a plane surface, such as a table surface or a laminar surface.

The joining is suitably done while the chipboard is still warm after the  
25 compression step.

In this way residual heat can be used for setting of the joined adhesive without introducing any additional heat, which is cost-effective. Joining immediately

after the compression step also gives a more manageable product right from the outset. The product at the same time becomes more rigid for handling than a single warm board.

- 5 Projecting chip segments of the chipboard are preferably boss-shaped.

Predefined points on the furniture chipboard can thereby be determined according to the required rigidity of the furniture chipboard, whilst the quantity of raw material (consisting of chip material and adhesive) for building up the  
10 chipboard can be minimized.

Projecting chip segments of the chipboard suitably consist of channels.

In this way a continuous pressing equipment (a so-called contipress) can be  
15 used, in which the channels are made to extend in the feed direction of the continuous pressing equipment. Such a method of producing spacers is time-saving and thereby cost-effective.

The projecting chip segments of the first chipboard preferably consist of  
20 strands which are wider than the intervening gap between the strands.

Wood chips can thereby be spread out on the chip mat with a predefined thickness for building up integral spacers according to the desired height and/or extent of said spacers.  
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The compression step is suitably performed by means of an intermittent load press.

In this way a number of chipboards can be manufactured in one and the same process, which is cost-effective. Chipboards can be produced in one manufacturing step as boards of large format, which are sawn to size for laminar components according to the particular requirements or directly as laminar components for end user purposes. The pressing tool of the intermittent load press can advantageously be designed with spikes for forming locating holes in the chipboards, which locating holes may be used for positioning of the other furniture component structural element against the chipboards.

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#### Description of the drawings

The present invention will be explained in more detail below with reference to schematic drawings attached, in which:

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Fig. 1 shows an embodiment in which so-called continuous pressing equipment is used for manufacturing chipboards comprising bosses;

Fig. 2 shows an example of a chipboard manufactured by means of the continuous press in Fig. 1;

Fig. 3 shows an example of a chipboard manufactured by means of an intermittent load press shown in Fig. 6a;

Fig. 4 shows an example of chipboard manufactured by means of the continuous press in Fig. 1;

Fig. 5 shows the joining (stack bonding) of spacers of the finish-pressed

chipboards with spacers of other finish-pressed chipboards in a stack;

Figs. 6a-6c show an example of the manufacture of a chipboard comprising integral spacers;

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Figs. 7a-7c show cross sections of different embodiments of hollow wood-based furniture components comprising chipboards manufactured according to the procedure in Figs. 6a-6c;

10 Fig. 8 shows the manufacture of chipboards in an intermittent load press according to a further embodiment;

Fig. 9 shows an embodiment in which the recess in a tool surface has inclined walls;

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Fig. 10 shows the insertion of an edge element in an edge area of the finished furniture chipboard;

20 Figs. 11a-11b show an embodiment in which a chipboard is manufactured including channels, which chipboard is joined to another furniture component structural element, in this a similar chipboard; and

Figs. 12a-12b show an embodiment in which a chipboard is manufactured comprising spacers which are joined to four furniture legs.

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#### Description of the preferred embodiments

The present invention will now be described as an exemplary embodiment. For

the sake of clarity, components of no importance for the invention have been omitted from the drawing. The same parts shown in different figures may in some cases have the reference numeral omitted, but correspond to those bearing a reference numeral.

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Fig. 1 shows an embodiment in which a first so-called continuous pressing equipment 1' is used for manufacturing chipboards 3' comprising bosses 5 (spacers). Wood chips 7 are fed via a distributing arrangement 9, which distributes adhesive-coated wood chips 7 out on a belt 11. The adhesive-coated wood chips 7 are spread out in a layer forming a chip mat 13. The chip mat 13 is pre-pressed in a preliminary press (not shown) and hot pressed in a hot press 15 under pressure and heat (approximately 180-250 °C). The hot press 15 comprises a forming belt 17 having a tool surface 19 comprising gaps 21 for forming the bosses 5 on the one side of the finish-pressed chipboard 3'.

15

The wood chips 7 may be raw wood material (chips or wood fibers) and/or other lignocellulose material and may consist, for example, of blade-chopped chips from round timber, sawdust or splinter chips. Other chip material may include flax straw, hemp and bagasse. After pressing, the chipboard 7 is cut and acquires a fixed structure.

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Another pressing equipment 1'', identical to the first continuous pressing equipment 1', is used for manufacturing another (a second) chipboard 3'' in parallel with the manufacture of the first chipboard 3' described. A robotic arm 23 uses a suction cup 25 to turn the first chipboard 3' described on the second chipboard 3'', so that the bosses 5 on each chipboard 3', 3'' end up against one another, where they are joined together by means of adhesive. Use is made of the solid structure in lifting by the robotic arm 23 and the residual heat after

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hot pressing is utilized for the adhesive setting process when joining together. This speeds up the joining process and there is no need to supply further heat. A hollow wood-based furniture component (furniture chipboard) 24 has thereby been produced having a first and a second side, which furniture chipboard can advantageously be used as a cupboard door or other furniture chipboard where a plane front and rear side are required. The other chipboard 3'' at the same time serves to reinforce the wood-based furniture component (the furniture chipboard). The hollow cavities, which are defined by internal surfaces of the two chipboards facing one another and exposed surfaces of said spacers have thereby been produced cost-effectively, resulting in an inherently rigid furniture panel which is lightweight and which requires a smaller quantity of raw wood material (wood chips) 7 than a conventional furniture chipboard. The wood-based furniture component (the furniture chipboard) 24 thereby acquires an upper side and an underside for the application of a suitable surface layer, such as paint, veneers etc. The board can then be used for an item of furniture, such as a cupboard door or table top.

Fig. 2 shows an example of a chipboard 3 manufactured by means of the continuous press 1' in Fig. 1. The chipboard 3 is shown in a front view from below. The bosses 5 on the chipboard 3 are placed in parallel rows with every other row offset in the longitudinal direction L of the rows by a distance equal to half the interval between two bosses 5. The chipboard 3 is manufactured as a laminar component for end user purposes. Offsetting every other row in the direction L affords an inherently rigid chipboard, since each boss which ends up in the center of four surrounding bosses acts as a reinforcement.

Fig. 3 shows an example of a chipboard 3 in a view from below (the underside is defined as the side of the chipboard 3 which has spacers) manufactured by

means of an intermittent load press (see also Figs. 6a-6c). The chipboard 3 is produced comprising strands 27 constituting spacers. The strands 27 of the chipboard 3 are joined to another furniture component, such as a laminar element (not shown, see Fig. 7b for clarification) forming a furniture chipboard 24. The strands 27 are wider than the intervening gap between the strands 27. Wood chips 7 are spread out on the chip mat 13 with a predefined thickness for building up the strands 27 according to the desired height and/or extent of said spacers. The chipboard 3 is produced in large format, which after manufacture is sawn into sizes for end user purposes (according to dashed lines).

Fig. 4 shows another example of chipboard 3 manufactured by means of the continuous press 1' in Fig. 1. The bosses 5 are placed in such a way that the centermost row of bosses 5 has an interval between the two nearest bosses equal to twice the interval between the nearest bosses in adjacent rows. The tool surface 19 is provided with spikes for forming two locating holes 29 in the chipboard 3, which locating holes 29 are used for positioning a second chipboard, so that the bosses on the chipboards end up in position for joining together. That is to say the locating holes 29 in the two chipboards 3 must end up in line with one another when joining together.

Fig. 5 shows the joining of spacers (bosses 5) of the finish-pressed chipboards 3 with spacers (bosses 5) of other finish-pressed, largely identical chipboards 3 in a stack (stack bonding) in a joining apparatus 31, viewed from the side. The joining apparatus 31 comprises guides 33 for aligning the stack of chipboards 3 so that the bosses assume the correct position for joining.

Figs. 6a-6c show an example of the manufacture of a chipboard 3 comprising

integral spacers in the form of bosses 5. The chipboard 3 is shown from the side. The chipboard 3 is manufactured in an intermittent load press 35. The intermittent load press 35 comprises an upper forming tool part 37 having projecting press members 39. The intermittent load press 35 further comprises  
5 a perforated plate 41 having holes 43. Once the chip mat 13 has been applied on a level bottom plate 45 of the intermittent load press 35, the perforated plate 41 is placed over the chip mat 13. A further quantity of adhesive-coated wood chips 7 is poured into the holes 43 in the perforated plate 41. Under heat, the pressing members 39 of the forming tool part 37 are lowered down into the  
10 holes 43, so that the forming tool part 37 compresses the chip mat 13 via the perforated plate 41 and by means of the projecting pressing members 39 compresses the bosses 5 integrally produced with the chip mat 13. The completed compression is shown in Fig. 6b. Fig. 6c shows the released chipboard 3 comprising bosses for joining to another furniture component  
15 structural element according to the next manufacturing step, which is shown for various furniture components of furniture chipboards in Figs. 7a-7c.

In Fig. 7a the bosses 5 of the finish-pressed chipboard 3 are joined to bosses 5 of a largely similar chipboard 3' (another furniture component structural  
20 element), forming a furniture chipboard 24'. In Fig. 7b the bosses 5 of the finish-pressed chipboard 3 are joined to a substantially plane laminar element 47 (as an example of another furniture component structural element), forming a different type of furniture chipboard 24''. In Fig. 7c the bosses 5 of the finish-pressed chipboard 3 are joined to a door skin 49 (yet another example of  
25 a furniture component structural element) comprising a decoration in the form of a mirror 51, forming a different type of furniture chipboard 24'''.

The last manufacturing step involving the joining of another furniture

component to the spacers according to one embodiment is described in connection with the explanation of Fig. 12a below, in which the other furniture component structural element consists of four furniture legs. The chipboard and the furniture legs form the wood-based furniture component.

5

In all examples according to Figs. 7a-7c and Fig. 12a the spacers produce an interval from the side of the chipboard 3 nearest the spacers to the joining surface of the spacers, with the result that the furniture chipboard 24 can be made stronger whilst saving on material costs.

10

That is to say the method for manufacturing a furniture chipboard 24 comprises steps in which wood chips 7 are distributed forming a chip mat 13 so that the chip mat 13 comprises one or more raised areas, following which the chip mat 13 is compressed by means of a tool surface (such as the tool surfaces of the pressing element 39 and the perforated plate 41 compressing the chip mat 13), having one or more gaps (the holes 43) for forming multiple projecting chip segments 53, forming said spacers 8 (the bosses 5), following which the finish-pressed chipboard 3 is fed out and the projecting chip segments 53 of the finish-pressed chipboard 3 are joined to another furniture component structural element.

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Fig. 8 also shows an intermittent load press 35 for manufacturing four similar chipboards 3. These chipboards 3 are joined together in pairs via their spacers (in this case bosses 5). Hollow cavities 55 (see Fig. 7a), which are defined by internal surfaces of the chipboards 3 facing one another and exposed surfaces of said spacers, have thereby been produced cost-effectively, resulting in an inherently rigid furniture chipboard which is lightweight and which requires a smaller quantity of wood chips than a conventional furniture chipboard. The

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part of the chipboard 3 not enclosing said spacers is therefore thinner than a conventional solid chipboard. Such a thinner chipboard section can be manufactured more cost-effectively, since the process pressing time is considerably reduced, which in turn leads to a higher capacity (manufacture of  
5 more furniture chipboards per unit time on one and the same production line). Further cost efficiency is achieved in that the intermittent load press 35 in Fig. 8 simultaneously produces four chipboards 3, thereby increasing the capacity of the production line.

10 Fig. 9 shows an embodiment in which the recess 57 in a tool surface has inclined walls 59. This produces a relief angle, which facilitates the removal of the press tool from the finish-pressed chipboard 3.

Fig. 10 shows the insertion of an edge element in an edge area of the finished  
15 furniture chipboard. Edge finishing often occurs in the conventional manufacture of furniture chipboards and an edge strip is applied to the edge of the chipboard. According to the embodiment in Fig. 10, edge strips are adhesively bonded on with a protuberance which is fitted into the hollow cavities between the two chipboards joined together. This protuberance serves  
20 for reinforcing purposes for fitting hinges, fittings etc. to the furniture chipboard 24.

Figs. 11a-11b show an embodiment in which a chipboard 3 is manufactured including channels 63 (spacers), the channels 63 of which chipboard 3 are  
25 joined to another furniture component structural element, in this case a similar chipboard 3' (see Fig. 11b). In this way a hollow furniture chipboard 24 has been produced. The chipboards 3 and 3' are manufactured in a continuous press comprising a pressing belt 65 having continuous forming surfaces 67,

which project from the belt 65 and together with the distribution arrangement 9 create said channels 63 during the pressing process. Suitable sizes of chipboards are produced by means of the saw blade 69. The chip mat is compressed under a supply of heat.

5

Figs. 12a-12b show an embodiment in which a chipboard 3 is manufactured comprising spacers constituting a framework 71, which spacers are joined to four furniture legs 73. The chipboard 3 comprising spacers and the furniture legs 73 form a furniture chipboard, which can be used as table furniture, for example.

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The present invention is not limited to the exemplary embodiments described above, combinations of the embodiments described and similar solutions falling within the scope of the invention. Other methods of joining the finish-pressed chipboard to another furniture component structural element may involve joining by adhesively bonding together under the action of two steel bands etc.

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## Patent claims

1. A method for manufacturing a wood-based furniture component (24), the method comprising the following steps:

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- distribution of chips (7) forming a chip mat (13);
- compressing of the chip mat (13) by means of a tool surface (19) comprising one or more recesses (21) for forming one or more projecting chip segments (53), forming spacers (5, 63, 71);
- feeding the finish-pressed chipboard (3) out; and
- joining the projecting chip segments (53) of the finish-pressed chipboard (3) to another furniture component structural element (3', 47, 49, 73).

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2. The method as claimed in claim 1, characterized in that the step involving the distribution of chips (7) also involves distributing chips (7) so that the chip mat (13) comprises one or more raised areas.

20

3. The method as claimed in claim 1 or 2, characterized in that the other furniture component structural element consists of a laminar element (3', 47, 49).

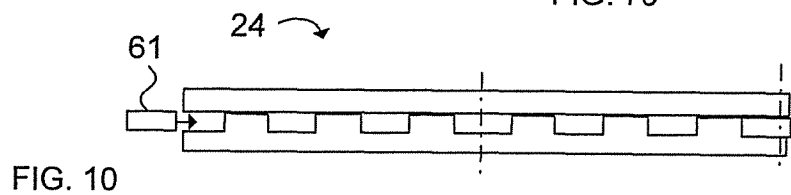
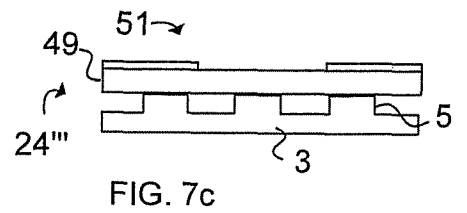
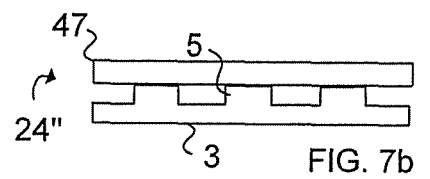
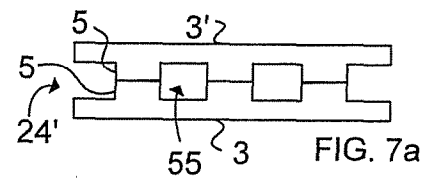
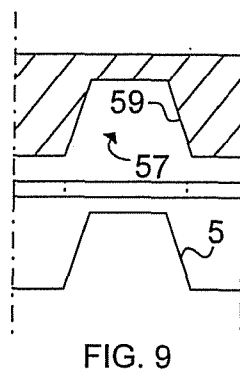
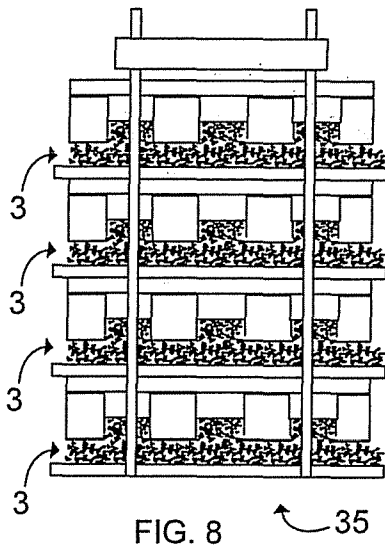
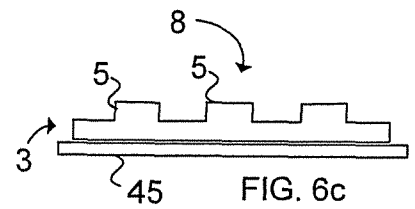
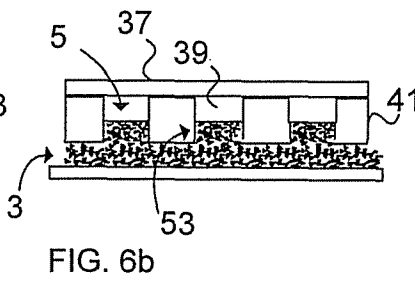
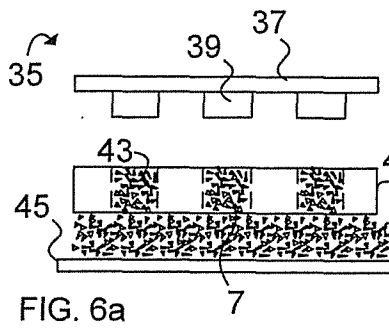
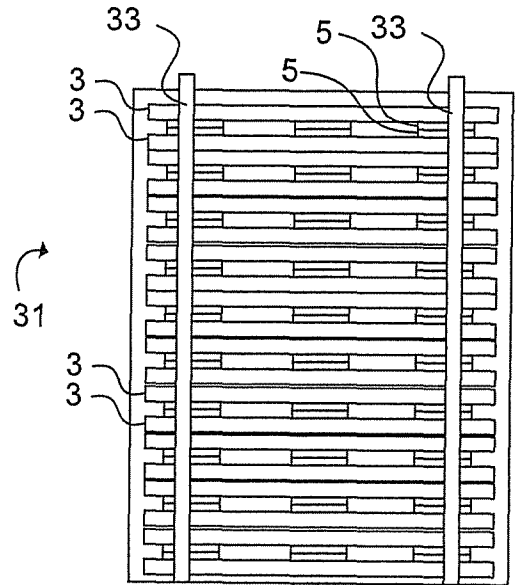
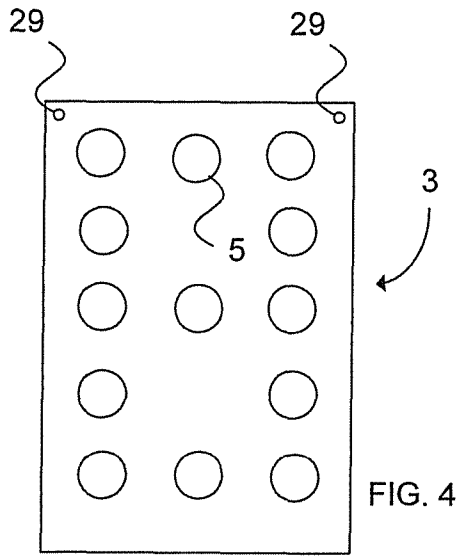
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4. The method as claimed in claim 3, characterized in that the laminar element (3') is manufactured in the same way as the chipboard (3) and projecting chip segments (53) of the laminar element (3') are then joined to projecting chip segments (53) of the chipboard (3).

30

5. The method as claimed in claim 1 or 2, characterized in that the other furniture component structural element is a furniture leg (73).
6. The method as claimed in one of claims 1 to 5, characterized in that the side of the chipboard (3) remote from the side comprising projecting chip segments (53) is plane.
7. The method as claimed in one of the preceding claims, characterized in that the compression step is performed by means of hot-pressing and joining is performed whilst the chipboard (3) is still warm after the compression step.
8. The method as claimed in one of the preceding claims, characterized in that the projecting chip segments (53) of the chipboard (3) are boss-shaped.
9. The method as claimed in one of claims 1 to 7, characterized in that the projecting chip segments of the chipboard (3) consist of channels (63).
10. The method as claimed in one of claims 1 to 7, characterized in that the projecting chip segments (53) of the chipboard (3) consist of strands which are wider than the intervening gap between the strands.
11. The method as claimed in one of the preceding claims, characterized in that the compression step is performed by means of an intermittent load press.





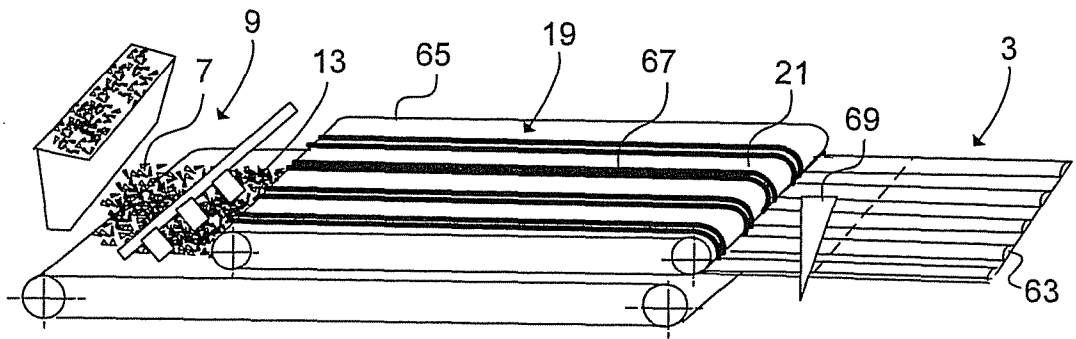


FIG. 11a

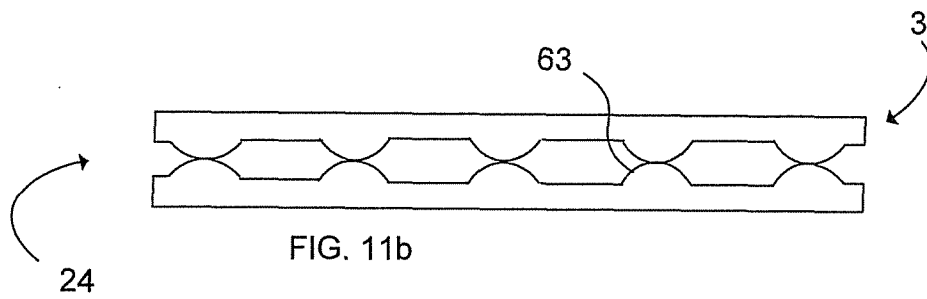


FIG. 11b

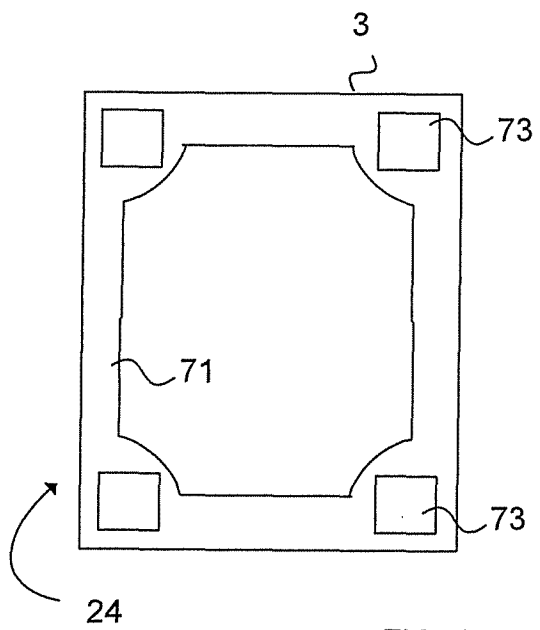


FIG. 12b

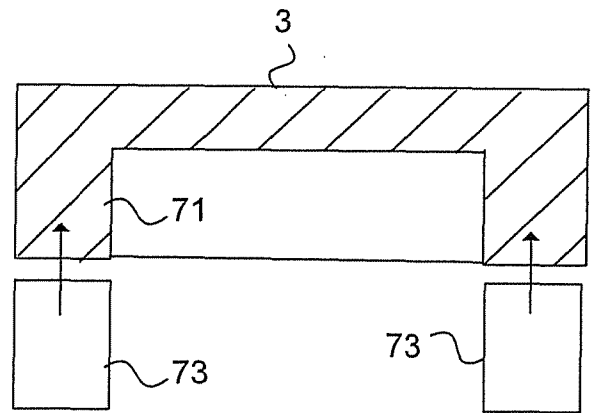


FIG. 12a

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2008/050885

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC: see extra sheet According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
IPC: B27N, B32B, A47B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPO-INTERNAL, WPI DATA, PAJ		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6203738 B1 (VADERS, DENNIS H.), 20 March 2001 (20.03.2001), column 1, line 7 - line 17; column 4, line 22 - line 31, claim 1	1-11
Y	--	7
Y	FR 2657041 A1 (R.O.L. ROUGIER OCEAN LANDEX), 19 July 1991 (19.07.1991), page 2, line 28 - line 33	7
A	US 6579483 B1 (VADERS, DENNIS H.), 17 June 2003 (17.06.2003), figures 4-6, abstract	1-11
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search		Date of mailing of the international search report
18 November 2008		19-11-2008
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer  John Sjöberg/Eö Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE2008/050885

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	DE 20209282 U1 (PFLEIDERER TÜREN GMBH & CO. KG), 10 October 2002 (10.10.2002), page 2, line 9 - line 11, abstract  --	1-11
A	DE 19910718 A1 (ROSS DESIGN GMBH), 21 Sept 2000 (21.09.2000), column 1, line 21 - line 33, abstract  --	1-11
A	WO 2005046950 A1 (SWEDWOOD INTERNATIONAL AB), 26 May 2005 (26.05.2005), page 15, line 3 - line 12, abstract  -- -----	1-11

**International patent classification (IPC)****B27N 3/02** (2006.01)**A47B 96/20** (2006.01)**B27N 3/08** (2006.01)**B32B 21/02** (2006.01)**B27N 5/00** (2006.01)**Download your patent documents at [www.prv.se](http://www.prv.se)**

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Cited literature, if any, will be enclosed in paper form.

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Information on patent family members

01/11/2008

International application No.

PCT/SE2008/050885

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