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(54) **A SELF-SUPPORTING WOOD PANEL SYSTEM**

(57) A self-supporting wood panel system for a building comprising a plurality of self-supporting wall panels (10) of engineered wood and adapted to support the building and, at least one self-supporting transverse panel (30) of engineered wood, and a method of assembling a wood building of a wood panel system. The panel sys-

tem comprises a plurality of wall panels (10) and the at least one transverse panel (30) adapted to rest upon at least two wall panels (10) forming a roof and/or floor of the building. The plurality of wall panels (10) are connectable at their side surfaces (12) to the at least one transverse panel (30) by a plurality of dovetail joints (20).

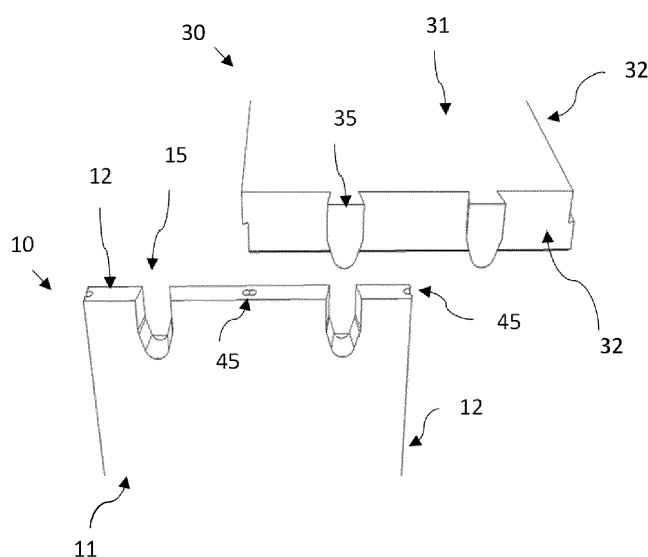


Fig.2

Description

Technical Field

[0001] The present disclosure relates generally to buildings and especially to self-supporting wood panel systems for buildings.

Background

[0002] Using wood as the main construction material in larger official buildings such as office buildings, authority buildings and schools has become more and more popular on recent years. Larger wood constructions commonly make use of different kind of engineered wood or composite wood in order to enhance the strength of the wood construction. Wood is a renewable material and thus enables a sustainable construction. The use of industrial construction methods where industrial prefabricated modules are delivered to the construction site also enhances sustainability and decreases the construction time.

[0003] Even with prefabricated modules, the assembly of wooden structures requires large amounts of screws, angle irons and other types of mechanical connections in metal. In general, even with mechanical connections in metal, it has proven difficult to build wood structures with more than a few floors. In addition to that metal has a negative impact on the environment and is an expensive material, each individual part needs handling and mounting by a construction worker, which increase the cost for the assembly.

Summary

[0004] It is a first object of this disclosure to present a self-supporting wood panel system that mitigates, alleviates or eliminates one or more of the above-identified deficiencies in the art singly or in any combination. Another object of this disclosure is to present a method of assembling a wood building of a wood panel system.

[0005] The first object is solved by providing a self-supporting wood panel system for a building according to claim 1. The self-supporting wood panel system comprises:

- a plurality of self-supporting wall panels of engineered wood and adapted to support the building, and
- at least one self-supporting transverse panel of engineered wood wherein,

each of the plurality of wall panels and each of the at least one transverse panel comprise two main surfaces and a plurality of side surfaces, and
the at least one transverse panel is adapted to rest upon at least two wall panels, and thereby forming a roof and/or

floor of the building, and
the plurality of wall panels is connectable at their side surfaces to the at least one transverse panel by a plurality of dovetail joints, whereby

5 the dovetail joints are configured to fasten the transverse panel to at least two wall panels in extension directions of the transverse panel's main surfaces.

[0006] The construction of dovetail joints is well known in the art. By the use of dovetail joints in the self-supporting wood panel system, the whole panels can be assembled without any additional fastening means whereby a building can be assembled from the self-supporting wood panels in an efficient and environmentally friendly manner.

10 **[0007]** A second object of this disclosure is a method of assembling a wood building by using a wood panel system as described above.

[0008] According to one exemplary embodiment, the engineered wood is a cross-laminated timber (CLT). One exemplary effect of using CLT in the self-supporting panels is that they become a high strength material, whereby a rigid and durable structure and with relative low weight, can be assembled by the wood panel system.

[0009] According to another exemplary embodiment, the wood panel system comprises tail sockets and the tails such that a flushed upper surface is created when the transverse panel is mounted upon the wall panels. When constructing a building with a plurality of floor levels, where the transverse panels becomes floors and ceilings between the different floor levels, the flushed upper surface ensures that all vertical forces in the building are transferred from a wall panel to another. The transverse panel is thereby not subjected to any compression forces from the floors above, which otherwise would weaken the transverse panel and/or would require larger dimensions on the transverse panels.

25 **[0010]** According to one exemplary embodiment, the dovetail joints comprise tail sockets in the respective side surface of the plurality of wall panels, and tails extending in at least two extension directions of the main surfaces of the transverse panel. One exemplary effect thereof is that the tails of the transverse panel can be mounted into the tail sockets of the wall panel with help of the gravity force. The gravity force additionally tightens the connection of the dove tail joints, by pressing the joints in a tighter grip.

[0011] According to one exemplary embodiment, tail sockets extend through at least one of the main surfaces of the wall panels. One exemplary effect thereof is that when the tail sockets extend through one of the main surfaces of the wall panels, the dovetail joints are not in direct contact to the exterior environment. In this case, the dovetail joints are better protected from environmental conditions such as rain, humidity and solar radiation.

30 **[0012]** According to one exemplary embodiment, the dovetail joints are tapered inwards in an assemble direction. The tapered shape towards an assemble direction allows an easier mounting of the wood panel system,

since it is not necessary to precisely align the tails to the tail sockets to connect the dovetail joints.

[0013] According to one exemplary embodiment, the plurality of wall panels are provided with a ledge at their main surface adapted to be directed towards the transverse panel, wherein the ledge is arranged at a maximum distance from the side surfaces corresponding to the thickness of the transverse panel. The ledge on the wall panels has the effect that it distributes the load from the transverse panel along the whole wall panel. Furthermore, the ledge functions as a fire seals and/or noise reducing seal, whereby additional seal-materials can be provided at the ledge in order to enhance these effects. The additional seal materials can be placed directly on the ledge or on a track created for receiving the seal materials.

[0014] According to one exemplary embodiment, the system further comprises first dowels, and the plurality of wall panels comprises first dowel openings aligned with the extension of their main surfaces and arranged at the side surface of the dovetail joints, in between the dovetail joints, and the plurality of wall panels comprises corresponding first dowel openings arranged on an opposite side surface of the dove tail joints and aligned with the extension of their main surfaces such that the first dowels can be arranged in the respective first dowel openings to protrude inside the first dowel openings in a first wall panel and in a first dowel opening in a second wall panel arranged thereupon. The first dowels arranged in the respective first dowel openings of adjacent wall panels tightly fasten both panels on each other. Moreover, the wall panels arranged on top of the other wall panels may reinforce the dovetail joints that secure the transverse panel to the wall panels. According to another exemplary embodiment, the first dowels are tapered from the middle to their ends direction. One exemplary effect is that tapered dowels promote a tight fastening between wall panels.

[0015] According to one exemplary embodiment, the system further comprises second dowels, and the plurality of wall panels comprise second dowel openings transverse to the extension of their main surfaces and the at least one transverse panel comprises corresponding second dowel openings in the plane of its main surfaces. The second dowels may be arranged such that it fasten the transverse panel that for instance may be part of the roof of the building.

[0016] According to another exemplary embodiment, the dowels are made of super-dried wood. The dowels may be previously dried, so its humidity is reduced, therefore shrinking the size of the dowels and facilitating the assembly. The dowels may then naturally recover its humidity and tighten the connection between the wall panels and/or transverse panels. On another exemplary embodiment, the first and/or second dowel openings and the first and/or second dowels comprise a waist in their extension direction. The waist improves the connection to the wall panels and help stabilizing the assembly.

[0017] According to one exemplary embodiment, a building made of the self-supporting wood panel system is assembled according to previous embodiments. In an alternative embodiment, the building comprises a plurality of floor levels, wherein the transverse panels constitute the floors and roof of the building.

Brief description of the drawings

[0018]

Fig. 1 illustrates an overview of a complete building made of self-supporting wood panel system according to one embodiment.

Fig. 2 illustrates a perspective view of the wood panels according to one embodiment.

Fig. 3a illustrates a perspective view of two wall panels generating a corner.

Fig. 3b illustrates a dowel according to one embodiment.

Fig. 4 illustrates a perspective view of a wood panel system showing an assembled floor/roof, according to one embodiment.

Fig. 5 illustrates a perspective view of a wood panel system showing the assembly of a second floor, according to one embodiment.

Fig. 6 illustrates a perspective view of a wood panel system showing a roof having an inclination, according to one embodiment.

Fig. 7 illustrates a perspective view of a wood panel having a flange, according to one embodiment.

Fig. 8 illustrates a perspective view of a wood panel system showing a roof, second dowels and second openings, according to one embodiment.

Fig. 9 shows a flow chart describing the mounting process, according to one embodiment.

Detailed description

[0019] Figure 1 is an overview of one embodiment of a building 1 constructed by a self-supporting wood panel system. The building 1 has a first and a second floor level, walls and a roof. In some embodiments, additional second floor levels can be easily assembled, as described below. Further, the building 1 is modular, which means that an extra floor can be easily assembled by removing the roof and resting the roof upon the extra floor.

[0020] Figure 2 shows a perspective view of a self-supporting wood panel system for building wood struc-

tures, according to one embodiment. The plurality of wall panels 10 comprises two main surfaces 11 and four side surfaces 12. The main surface 11 has a larger area when compared to the side surface 12. Further, the plurality of wall panels 10 comprises a plurality of tail sockets 15 on at least one side surface 12. When mounted, the plurality of wall panels 10 are positioned on substantially vertical direction and the side surface 12 having tail sockets 15 is faced upwards. The self-supporting wood panel system further comprises at least one transverse panel 30. The transverse panel 30 also comprises two main surfaces 31 and four side surfaces 32 and the main surface 31 has a larger area when compared to the side surface 32. The transverse panel 30 is to be positioned on a substantially transverse position in relation to the wall panels 10. When mounted, the transverse panel 30 is arranged preferably on a substantially horizontal position. Both the wall panels 10 and the transverse panel 30 may be any polyhedron having 6 surfaces or faces. On the embodiment shown on Fig. 2, the transverse panel 30 is a floor of the building, but it can also be arranged as the roof of the building in case there is no other level above the current transverse panel 30. Further, the transverse panel 30 comprises a plurality of tails 35 positioned on at least two side surfaces 32. The tails 35 of the transverse panel 30 fit into the tail sockets 15 of the wall panels 10, generating dovetail joints 20. The tails 35 from the transverse panel 30, as well as the tail sockets 15 of the wall panels 10, may be fabricated by using computer-numerical control (CNC) machines. This technique allows a precise fabrication of both the tail sockets 15 and the tails 35.

[0021] The plurality of wall panels 10 further comprise first dowel openings 45 on at least one side surface 12. As shown on Fig. 2, the wall panels 10 have first dowel openings 45 on the same side surface 12 comprising the tail sockets 15 (or the dovetail joints 20, when assembled). The wall panels 10 further comprise first dowel openings 45 on the opposite side surface 12 in relation to the side surface 12 comprising the tail sockets 15.

[0022] Figure 3a shows a perspective view of a connection between two adjacent wall panels 10 on the same floor level. The wall panels 10 further comprise a recess on the side surface 12 such that, when the walls are assembled, the recesses generate first dowel openings 45. The adjacent wall panels 10 are tightened together by the first dowel 40. As shown on Figure 3a, adjacent wall panels 10 can be fastened together generating a corner. The corner is generated by fastened adjacent wall panels 10 that could be arranged at different angles, including acute angles (0 to 89 degrees), right angle (90 degrees) or obtuse angles (91 to 179 degrees). Furthermore, there can be no corner, i.e. the adjacent wall panels 10 may be align on the same plane, therefore comprising a straight angle (180 degrees).

[0023] Figure 3b shows one embodiment of a first dowel 40 and/or a second dowel 60. The first dowel 40 is used to fix adjacent wall panels 10 at their side surface 12 and is made of a wood material different than the

material of the wall panels 10 or the transverse panel 30. This wood material used to fabricate the first dowel 40 has a higher strength when compared to the cross-laminated wood panels 10, 30 and therefore secures that the first dowels 40 can withstand horizontal and vertical forces that the wall panels 10 may be subjected to. The first dowels 40 may not be made of cross laminated timber. Figure 3b shows a first dowel 40 having a waist 80. The first dowel 40 having a waist 80 comprises a "8-shape" or "I-shape" cross-section that simplifies the connection between to wall panels 10 and helps retain the panels in position. Before the assembly, the first dowels 40 are in one embodiment dried so the loss of humidity shrinks them and facilitates assembling. After the assembly, the first dowels 40 can then naturally reabsorb humidity and expand, therefore tightly fixing the wall panels 10 together. The same applies for one embodiment of the second dowels 60.

[0024] Figure 4 shows a perspective view of a wood panel system showing an assembled floor/roof, according to one embodiment. The transverse panel 30 has three side surfaces 32 comprising tails 35, which join the tail sockets 15 on the side surfaces 12 of the wall panels 10. Dovetail joints 20 are thereby generated between the transverse panel 30 and three wall panels 10, generating two corners. Alternatively, the transverse panel 30 may comprise tails 35 on all four side surfaces 32. In this alternative embodiment, the transverse panel 30 may comprise dovetail joints 20 with four wall panels 10, and thereby generating four corners of the building.

[0025] Figure 5 shows an embodiment where a second floor or an additional second floor is to be assembled to a first or second floor. The number of floors can be any number of floors, however it shall be noted that the first floor in one embodiment could be arranged to the sill plate of the building in another way than a second floor to a first floor. However, in another embodiment the first floor is attached to the sill plate in a similar manner as the second floor is attached to the first floor. The dovetail joints 20 secure or fasten the transverse panel 30 upon the wall panels 10. Due to gravity, the tails 35 fit and fasten into the tail sockets 15, thereby generating stable dovetail joints 20 and fastening the wall panels 10 to the transverse panel 30. After the transverse panel 30 is mounted on a first plurality of wall panels 10 by the dovetail joints 20, a second plurality of wall panels 10 can be assembled above the first plurality of wall panels 10.

[0026] The first dowel openings 45 are substantially cylindrical and are adapted to fix one wall panel 10 over the other by using first dowels 40. The first dowels 40 are configured to fit into the first dowel openings 45 of adjacent wall panels 10. Preferably, about half of the extension of the first dowels 40 is inserted into the first dowel opening 45 of one wall panels 10 and about the other half is inserted into the first dowel opening 45 of the adjacent wall panel 10, thereby fixing both panels tightly together. At one side surface 12, the tail sockets 15 and the first dowel openings 45 are preferably arranged in

between each other, i.e. every tail socket 15 is followed by a first dowel opening 45.

[0027] When the next floor is to be assembled, the second plurality of wall panels 10 is mounted above the first plurality of wall panels 10 by inserting the other half of the extension of the first dowels 40 into the first dowel openings 45 on the side surface 12 of the second plurality of wall panels 10. This fastening between wall panels 10 is arranged on a substantially vertical direction and therefore the weight of the upper wall panels 10 reinforces the dovetail joints 20 fastening between the wall panels 10 and the transverse panel 30. Moreover, due to the flush generated by the dovetail joints 20, no compression is transferred from the upper plurality of wall panels 10 to the transverse panel 30. Furthermore, the first dowels 40 are tapered from the middle to its end directions, which facilitates the assembly into the first dowel openings 45.

[0028] On the embodiment of Fig. 5, the transverse panels 30 rest upon two adjacent wall panels 10 by having dovetail joints 20 on each adjacent wall panels 10. The dovetail joints 20 generated between the transverse panel 30 and the adjacent wall panels 10 help supporting the adjacent wall panels 10. The dovetail joints 20 are tapered towards the assembly direction, which facilitates fastening the tails 35 of the transverse panel 30 into the tail sockets 15 of the wall panels 10. Furthermore, the assembly direction is stabilized by the gravity force, which means that the transverse panel 30 may only be removed by lifting at least two side surfaces 32 of the transverse panel 30 simultaneously. On an alternative embodiment, the same stabilization is achieved by fastening wall panels 10 comprising tails 35 to at least one transverse panel 30 comprising tail sockets 15 (not shown).

[0029] Since the tails 35 of the transverse panel 30 extend outwardly in the extension directions of the main surfaces 31, when assembled into the tail sockets 15 of the wall panels 10, a flush is generated between the upper main surface 31 of the transverse panel 30 and the upper side surface 12 of the wall panels 10. In other words, the side surface 32 of the transverse panel 30 abuts the main surface 11 of the wall panels 10. The flushed surface is generated at the upper side surface 12 of the wall panels 10 and the main surface 31 of the transverse panel 30 since the depth of the tail socket 15 is substantially similar or equal to the thickness of the tails 35. This embodiment advantageously allows the assembly of a second plurality of wall panels 10 above the first plurality of wall panels 10 with little or no compression at the transverse panel 30.

[0030] Figure 6 shows a perspective view of a roof of the building, according to one embodiment. The roof comprising transverse panels 30 has an inclination in relation to the ground, i.e., the side surfaces 32 are not located on the same height in relation to the ground. As described on previous embodiments, the transverse panels 30 and wall panels 10 are joined by a plurality of dovetail joints 20. On the roof of this embodiment, the dovetail

joints 20 comprise an angle corresponding to the angle of the roof. Thus, a building having an angled roof can be assembled.

[0031] Figure 7 shows a perspective view of a wall panel 10, according to one embodiment. The wall panel 10 further comprises a ledge 70 at a main surface 11 and positioned at a maximum distance from the side surface 12 having tail sockets 15 corresponding to the thickness of the transverse panel 30. The ledge 70 is positioned such that the transverse panel 30 rests upon the ledge 70 when the transverse panel 30 is assembled upon the wall panel 10. In one exemplary embodiment, the ledge 70 may help absorb rotational forces thereby stabilizing the power distribution. When the wood panel system is assembled, the ledge 70 extends from one side surface 12 to the other side surface 12 of the wood panel 10 in a substantially horizontal position. Furthermore, the ledge 70 functions as a fire seals and/or noise reducing seal, whereby additional seal-materials can be provided at the ledge 70 in order to enhance these effects. Those seals protect the building against fire and to reduce leaking noise from one room or floor to another. The seal materials may be placed directly on the ledge 70 or on a track created for receiving the seal materials.

[0032] Figure 8 shows a building comprising wall panels 10 and transverse panels 30 that function as a roof. Both the at least one transverse panel 30 being the roof and the wall panels 10 further comprise second dowel openings 65. In one exemplary embodiment, the second dowel openings 65 are substantially cylindrical and arranged in a substantially horizontal direction, i.e. they are arranged on the main surface 11 of the wall panels 10 and on the side surface 32 of the transverse panels 30. When mounted, the second dowel opening 65 of the wall panel 10 has a corresponding second dowel opening 65 on the transverse panel 30. Further, both second dowel openings 65 are joined by second dowels 60, whereby the second dowels 60 are adapted to be arranged in the respective second dowel openings 65 such that they protrude inside the second dowel openings 65 in the respective wall panels 10 and the transverse panel 30. The second dowel openings 65 are arranged between the tail sockets 15 of the wall panel 10 and between the tails 35 of the transverse panel 30. Both first dowel openings 45 and second dowel openings 65 can be fabricated using computer-numerical control (CNC) machines. In one embodiment, each floor comprises second dowel openings 65 which may be joined by second dowels 60, thereby increasing the stability of the building.

[0033] Figure 9 is a flowchart describing a method of assembling a wood building by a wood panel system. In the first step 110, a first-floor is mounted by positioning a plurality of self-supporting wall panels 10 of engineered wood in a substantially vertical position. The plurality of wall panels 10 is mounted such that a side surface 12 comprising parts of dovetail joints 20 is facing upwards, creating an upper side surface 12. The plurality of wall panels 10 can comprise 2, 3, 4 or more walls, according

to the size of the building to be mounted. The second step 120 is the assembly of a self-supporting transverse panel 30 on the plurality of wall panels 10. At least one transverse panel 30 may be used, however many transverse panels 30 are usually mounted upon the plurality of wall panels 10. The transverse panel 30 and wall panels 10 are fastened by connecting corresponding parts of dovetail joints 20 of the transverse panel 30 to parts of the dovetail joints 20 of the wall panels 10.

[0034] A second-floor level can optionally be mounted over the first-floor level. In this case, the next step 130 comprises arranging first dowels 40 in first dowel openings 45 at the upper side surfaces 12 of the wall panels 10. As previously described, about half of the extension of the first dowels 40 is inserted into the first dowel opening 45 of the first-floor level wall panels 10. The step 140 comprises arranging a second-floor level of wall panels 10 on top of the first-floor level of wall panels 10, by inserting about the other half of the dowels 40 into the first dowel opening 45 of the second-floor level wall panel 10, thereby fixing both wall panels 10 tightly together.

[0035] Then at step 150, a second-floor level is assembled by mounting at least one self-supporting transverse panel 30 on the plurality of second floor level wall panels 10. As before, corresponding parts of dovetail joints 20 of the transverse panel 30 are connected to corresponding parts of dovetail joints 20 of the second-floor level wall panels 10. The at least one transverse panel 30 assembled above the second-floor level wall panels 10 is the roof of the building. Since the wood panel system is modular, a third and subsequent floors can be assembled by repeating the process from step 130. Therefore, every time a subsequent floor needs to be added, the transverse panel 30 that is the roof is removed for the assembly of the wall panels 10 as previously described. Then, the transverse panel 30 is assembled upon the wall panels 10 of the subsequent floor, thereby generating the roof of the building. This modular process can be repeated for the assembly or disassembly of several floors, according to the size of the building to be constructed.

Claims

1. A self-supporting wood panel system for a building (1) comprising:

- a plurality of self-supporting wall panels (10) of engineered wood and adapted to support the building and;
- at least one self-supporting transverse panel (30) of engineered wood, wherein,

each of the plurality of wall panels (10) and each of the at least one transverse panel (30) comprise two main surfaces (11,31) and a plurality of side surfaces (12,32), and the at least one transverse panel (30) is adapted to

rest upon at least two wall panels (10), and thereby forming a roof and/or floor of the building, and the plurality of wall panels (10) are connectable at their side surfaces (12) to the at least one transverse panel (30) by a plurality of dovetail joints (20), whereby the dovetail joints (20) are configured to fasten the transverse panel (30) to at least two wall panels (10) in extension directions of the transverse panels (30) main surfaces (31).

2. The self-supporting wood panel system according to claim 1, wherein the engineered wood is a cross laminated timber (CLT).
3. The self-supporting wood panel system according to any one of claims 1 or 2, wherein dimensions of tail sockets (15) and tails (35) are such that a flushed upper surface is created when the transverse panel is mounted upon the wall panels.
4. The self-supporting wood panel system according to any one of the preceding claims, wherein the dovetail joints (20) comprise tail sockets (15) in the respective side surface of the plurality of wall panels (10), and tails (35) extending in extension directions of at least two main surfaces (31) of the transverse panel (30).
5. The self-supporting wood panel system according to any one of the preceding claims, wherein the tail sockets (15) extend through at least one of the main surfaces (11) of the wall panels (10).
6. The self-supporting wood panel system according to any one of the preceding claims, wherein the dovetail joints (20) are tapered inwards in an assemble direction.
7. The self-supporting wood panel system according to any one of the preceding claims, wherein the plurality of wall panels (10) are provided with a ledge (70) at their main surface (11) adapted to be directed towards the transverse panel, wherein the ledge (70) is arranged at a maximum distance from the side surfaces (32) corresponding to the thickness of the transverse panel (30).
8. The self-supporting wood panel system according to any one of the preceding claims, wherein the system further comprising first dowels (40), and the plurality of wall panels (10) comprises first dowel openings (45) aligned with the extension of their main surfaces (11) and arranged at the side surface (12) of the dovetail joints (20), in between the dovetail joints (20), and the plurality of wall panels (10) comprises corresponding first dowel openings (45) arranged on an opposite side surface of the dovetail

- joints (20) and aligned with the extension of their main surfaces (11) such that the first dowels (40) can be arranged in the respective first dowel openings (45) to protrude inside the first dowel openings (45) in a first wall panel (10) and in a first dowel opening (45) in a second wall panel (10) arranged thereupon. 5
9. The self-supporting wood panel system according to any one of the preceding claims, wherein the first dowels (40) are tapered from the middle to their ends direction. 10
10. The self-supporting wood panel system according to any one of the preceding claims, wherein the system further comprising second dowels (60), and the plurality of wall panels (10) comprises second dowel openings (65) transverse to the extension of their main surfaces (11) and the at least one transverse panel (30) comprises corresponding second dowel openings (65) in the plane of its main surfaces. 15 20
11. The self-supporting wood panel system according to any one of the preceding claims, wherein the first and/or second dowel opening (45,65) and the first and/or second dowels (40,60) comprises a waist (80) in their extension direction. 25
12. A building made of the self-supporting wood panel system according to any of the preceding claims. 30
13. The building according to claim 12, wherein the building comprises a plurality of floor levels, wherein the transverse panels (30) constitutes the floors in the building. 35
14. A method of assembling a wood building of a wood panel system, wherein the method comprising the steps of: 40
- mounting a first-floor level by:
 - positioning a plurality of self-supporting wall panels (10) of engineered wood in a substantially vertical position, such that a side surfaces (12) comprising a parts of dovetail joints (20) is facing upwards and creating an upper side surface (12); 45
 - assembling a self-supporting transverse panel (30) on the plurality of wall panels (10) by connecting corresponding parts of dovetail joints (20) of the transverse panels (30) to the parts of the dovetail joints (20) of the wall panels (10). 50
15. The method of assembling a wood building according to claim 14, wherein the method further comprises the method step of: 55
- mounting a second-floor level by:

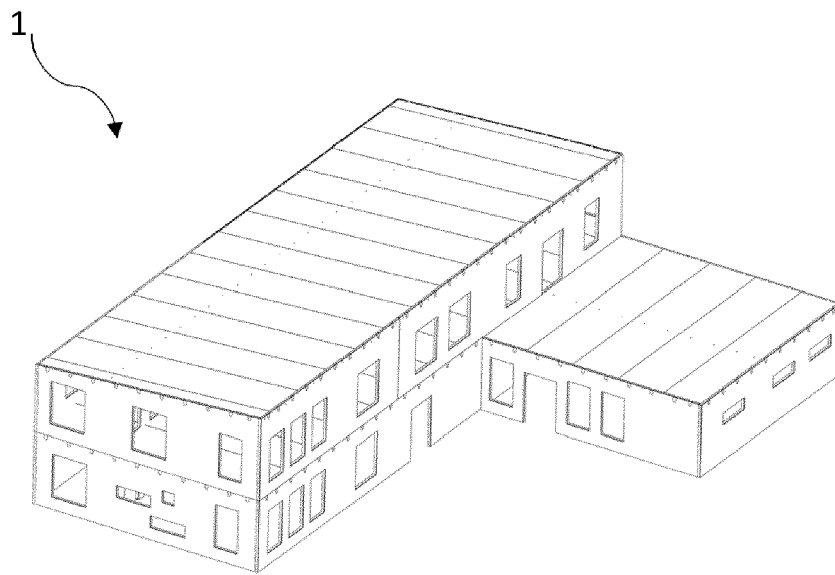


Fig. 1

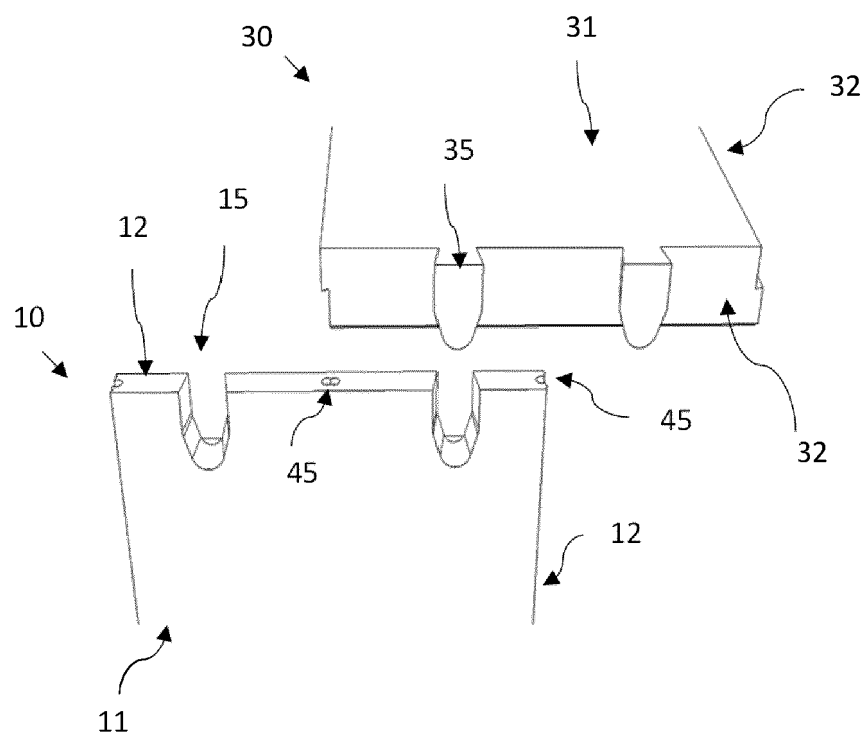


Fig.2

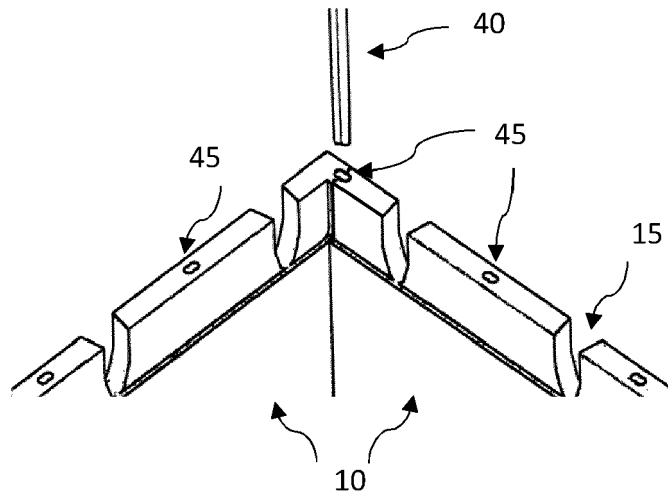


Fig. 3a

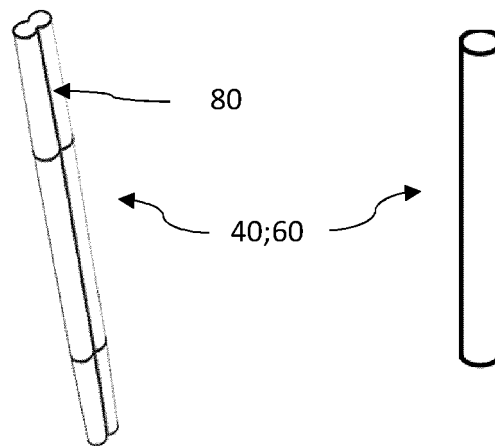


Fig. 3b

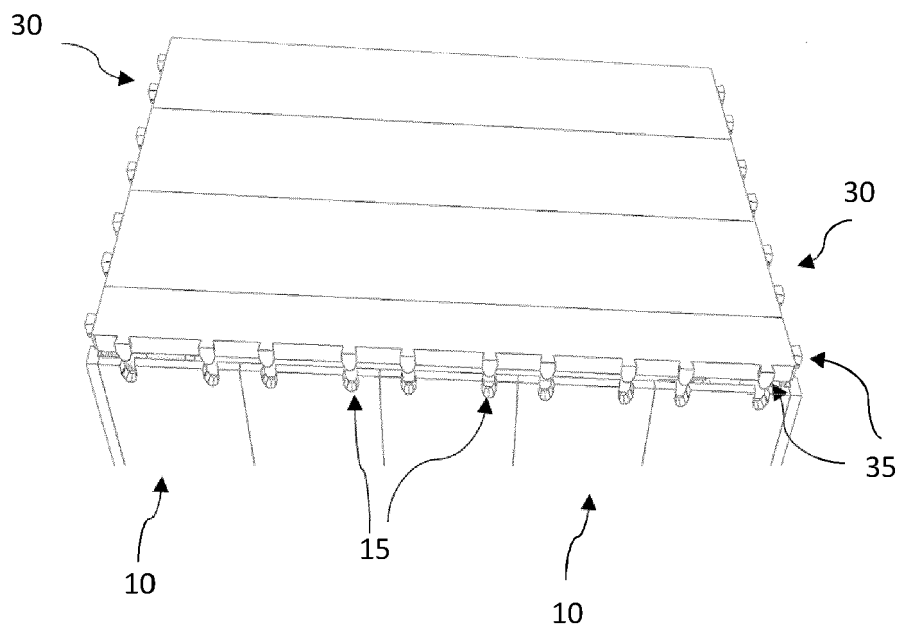


Fig. 4

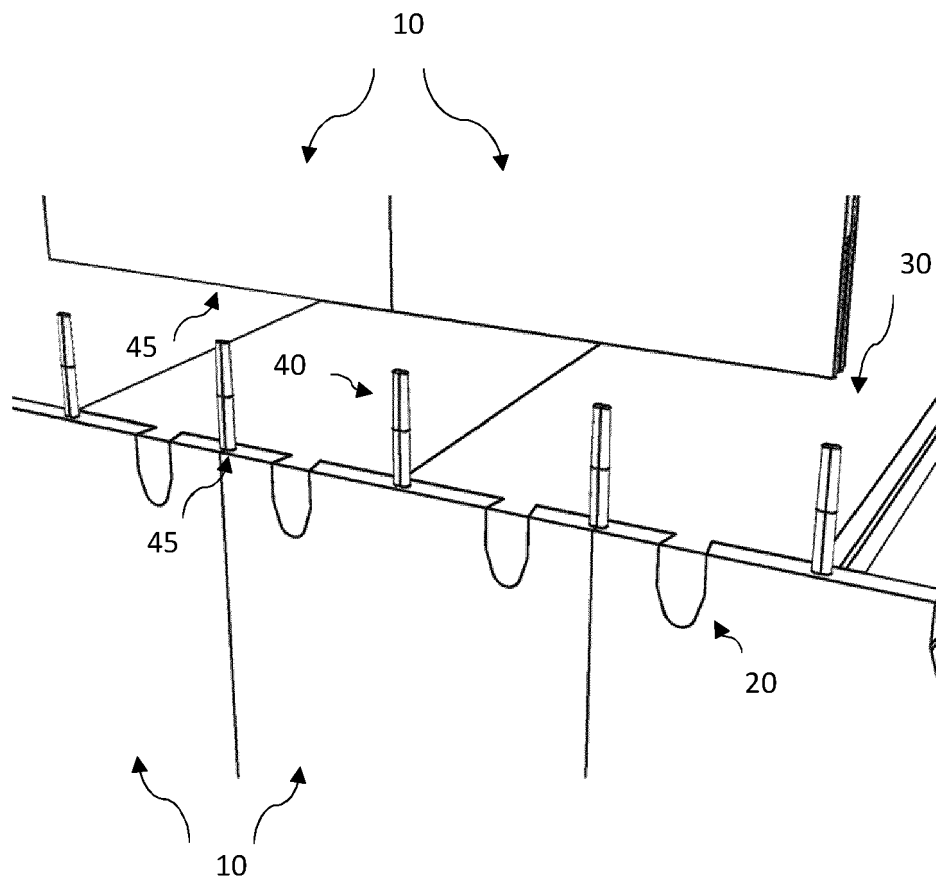


Fig. 5

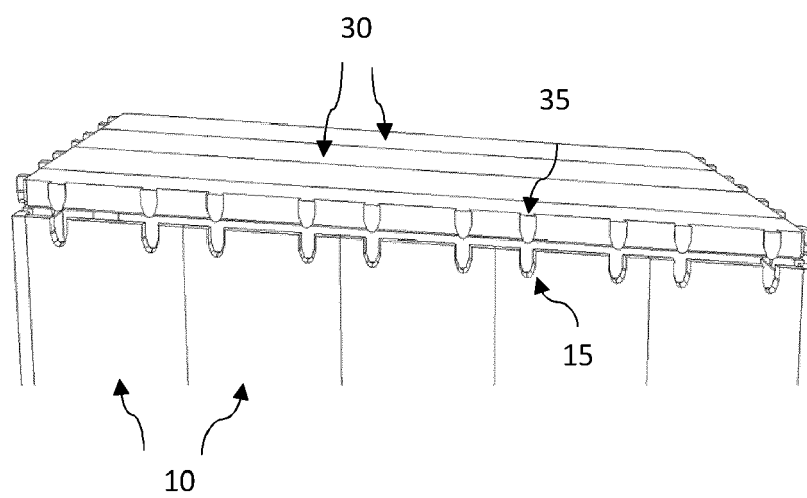


Fig. 6

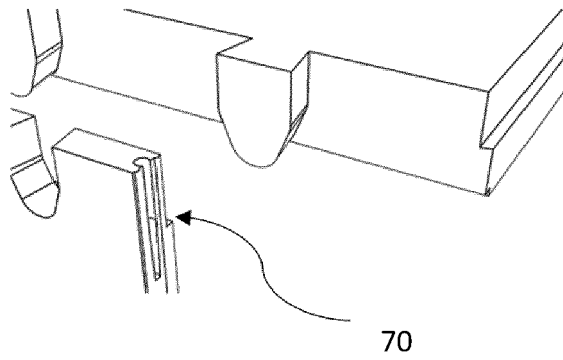


Fig. 7

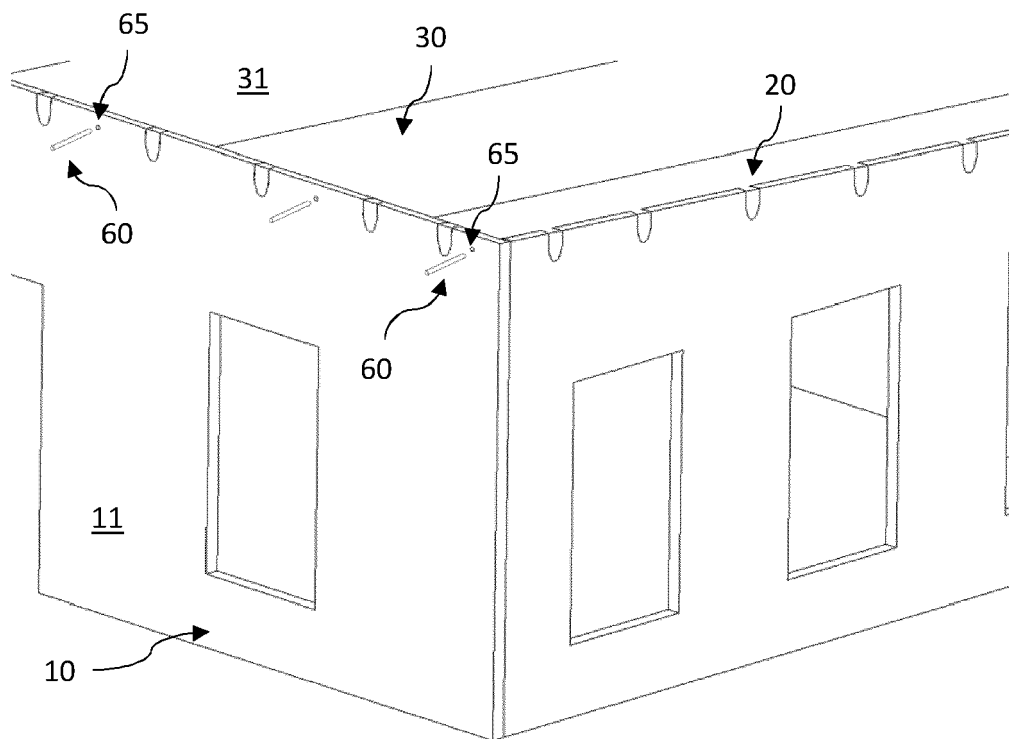


Fig. 8

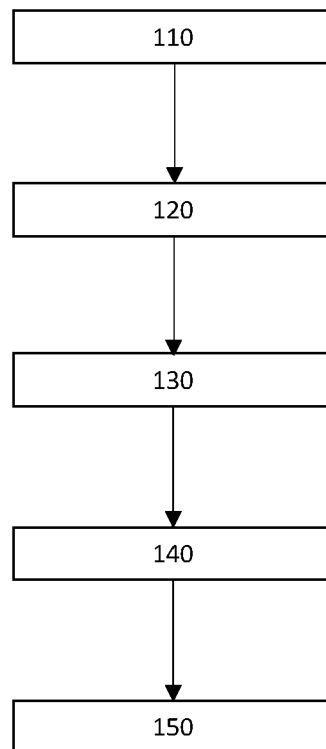


Fig. 9



EUROPEAN SEARCH REPORT

Application Number
EP 21 17 9181

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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 0 890 681 A1 (MOSER KARL [DE]) 13 January 1999 (1999-01-13) * column 1, lines 8-10 * * column 3, lines 35-44 * * column 6, line 34 - column 7, line 10; figure 1 * * column 8, line 56 - column 9, line 12 * -----	1-15	INV. E04B1/10 E04B1/61
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