(12) UK Patent Application (19) GB (11) 2550327 (13) A

(43) Date of A Publication 22.11.2017

(21) Application No: 1607377.7

(22) Date of Filing: 28.04.2016

(71) Applicant(s):
Neptune (Europe) Ltd
Blagrove, SWINDON, Wilts, SN5 8YG, United Kingdom

(72) Inventor(s):
John Edwin Sims-Hilditch

(74) Agent and/or Address for Service:
Neptune (Europe) Ltd
Blagrove, SWINDON, Wilts, SN5 8YG, United Kingdom

(51) INT CL:
A47B 13/08 (2006.01) ***B27M 3/00*** (2006.01)

(56) Documents Cited:
WO 2011/027993 A2
CN 201683400 U
CN 101069971 A
FR 002469279 A1
Stack Lab
Post City
KR20030009923
CN 201700680 U
CN 105150295 A
DE 102011050874 A1
US 20140370231 A1

(58) Field of Search:
INT CL **A47B, B27D, B27G, B27M**
Other: **EPODOC & WPI**

(54) Title of the Invention: **A table**
Abstract Title: **Table top comprising layers of orthogonally arranged wooden beams**

(57) Disclosed is a cross bonded table top comprising a plurality of layers 1,2,3 of wooden beams. The wooden beams in each layer are arranged side-by-side. In an upper and lower layer the wooden beams have a longitudinal orientation, and in a middle layer the wooden beams have a transverse orientation, such that wooden beams in adjacent layers have an orthogonal orientation. The beams may all have the same end grain direction, which may be a substantially vertical end grain direction. There may be an odd number of layers, which may comprise three layers, five layers, or seven layers. The layers may have a depth greater than 3mm and less than 50mm. The table top may consist of hardwood. Also disclosed is a table comprising a table top as described above, and a method for constructing a cross laminated table top by gluing a first layer of wooden beams with a longitudinal orientation to a second layer of wooden beams with a transverse orientation, and then gluing a third layer of beams with a longitudinal orientation to the second layer of beams with a transverse orientation.

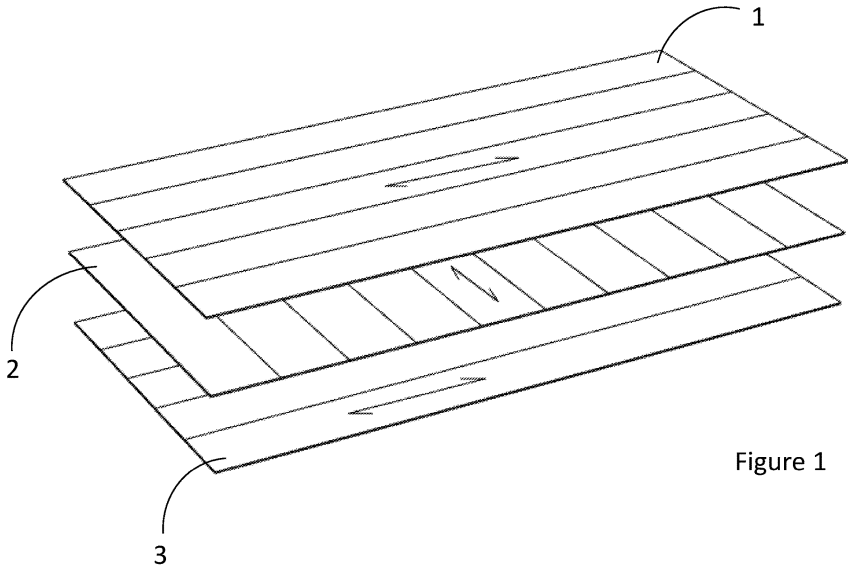


Figure 1

GB 2550327 A

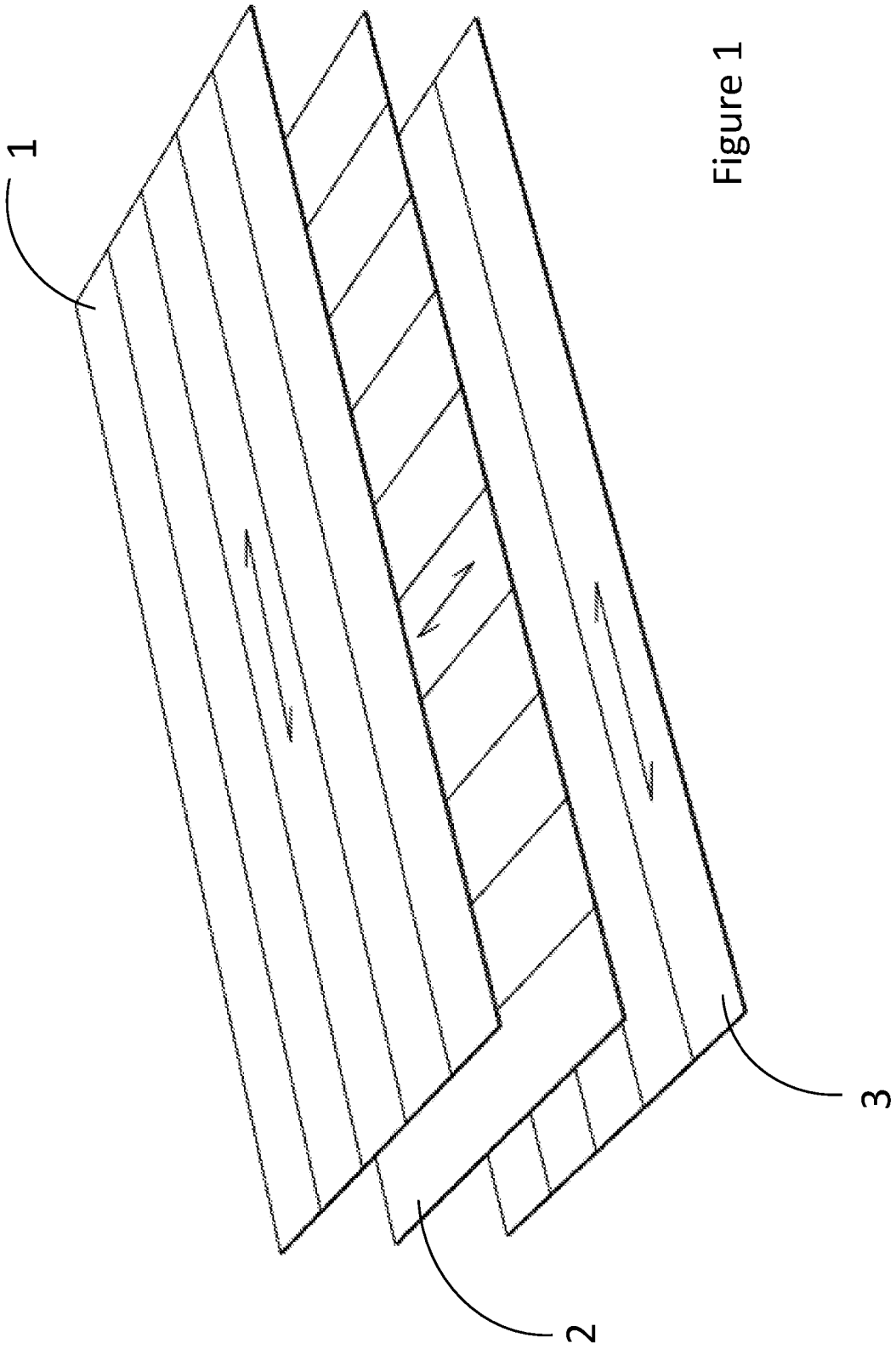


Figure 1

A Table

Field of the Invention

The present invention concerns tables. More particularly, but not exclusively, this invention concerns table tops and methods of manufacturing table tops.

Background of the Invention

Table tops are frequently constructed from wood. Wood is strong (particularly in the grain direction), abundantly available and can be worked with simple tools.

Wooden table tops frequently comprise a single wooden layer formed of hardwood or softwood. Such a table top is aesthetically desirable.

Wooden table tops also frequently comprise wooden veneers containing an inner layer of medium-density fibrewood (MDF) or other filler. Such table tops are lightweight and comparatively cheap to produce and imitate the appearance of a solid wooden table top.

Wood is susceptible to distortion when exposed to moisture and/or temperature change. A quarter sawn cut (having vertical end grain) taken from the centre of a tree trunk is relatively warp stable and strong compared to a flat sawn cut (having a transverse end grain direction) taken from the outer annulus of the tree trunk. Hardwood such as oak has a smaller cell size and greater inherent warp resistance than softwood such as pine. Product quality has therefore depended principally on the selection of wood and the particular cut.

Wooden veneer table tops are often weaker and more prone to humidity-induced warping than equivalent solid wooden table tops. A wooden veneer table top typically has end panels, which enclose the MDF and wooden layers, to support the structure (aiding stability and strength) and conceal the MDF. Wooden veneers are often treated to increase water-resistance. It is generally not possible to sand a wooden veneer table top to remove defects without destroying the article.

Recent developments in the field have focussed on the application of end panels to a table-top structure. EP0446160A1 discloses cross-pieces and an outer trim strip for reducing distortion.

The prior art does not disclose a strong and warp-resistant wooden table top, having the versatility of laminated MDF but the aesthetic of a solid wooden table top.

The present invention seeks to mitigate the above-mentioned problems. Alternatively or additionally, the present invention seeks to provide an improved table top.

Summary of the Invention

According to a first aspect of the invention there is provided a table top comprising a plurality of wooden beams arranged side-by-side in an upper layer, a plurality of wooden beams arranged side-by-side in a middle layer and a plurality of wooden beams arranged side-by-side in a lower layer, wherein, the middle layer has a transverse orientation and the upper and lower layers each have a longitudinal orientation, so that successive layers are oriented orthogonally to each other.

Providing such a table top can reduce distortion upon contact with moisture and/or exposure to a high or low temperature compared to known table tops of the prior art. Providing such a table top can maximise tensile strength in every direction compared to a standard solid wooden table top and compared to other known table tops of the prior art. Providing such a table top can allow greater scope for sanding or other surface treatment compared to known table tops of the prior art.

The beams may all have the same end grain direction. The beams may have a substantially vertical end grain direction.

The table top preferably has an odd number of layers. It may be that the table top has three layers, those being the described upper, middle and lower layers. It may be that the table top has five layers, wherein there is a layer between the upper and middle layers, and a layer between the lower and middle layers. Alternatively, in the arrangement of five layers, the middle layer may be adjacent the upper layer, with three layers between the middle layer and lower layer. Alternatively, in the arrangement of five layers, the middle layer may be adjacent the lower layer, with three layers between the middle layer and upper layer.

It may be that the table top has seven layers, wherein there are two layers between the upper and middle layers and two layers between the middle and lower layers. It may be that the orientation of each successive layer alternates between a transverse and longitudinal orientation.

It may be that the upper layer has a depth of greater than 3 mm. It may be that the upper layer has a depth of greater than 5 mm. It may be that the upper

layer has a depth of greater than 10 mm. It may be that the upper layer has a depth of greater than 20 mm.

It may be that the upper layer has a depth of less than 50 mm. It may be that the upper layer has a depth of less than 40 mm. It may be that the upper layer has a depth of less than 30 mm. It may be that the upper layer has a depth of less than 20 mm.

It may be that the lower layer has a depth of greater than 3 mm. It may be that the lower layer has a depth of greater than 5 mm. It may be that the lower layer has a depth of greater than 10 mm. It may be that the lower layer has a depth of greater than 20 mm.

It may be that the lower layer has a depth of less than 50 mm. It may be that the lower layer has a depth of less than 40 mm. It may be that the lower layer has a depth of less than 30 mm. It may be that the lower layer has a depth of less than 20 mm.

It may be that the middle layer has a depth of greater than 3 mm. It may be that the middle layer has a depth of greater than 5 mm. It may be that the middle layer has a depth of greater than 10 mm. It may be that the middle layer has a depth of greater than 20 mm.

It may be that the middle layer has a depth of less than 50 mm. It may be that the middle layer has a depth of less than 40 mm. It may be that the middle layer has a depth of less than 30 mm. It may be that the middle layer has a depth of less than 20 mm.

The table top may comprise hardwood and may preferably comprise oak.

Each wooden beam in the middle layer may be bonded to one or more of the wooden beams in the upper layer at the adjoining faces with glue, preferably epoxy glue. Each wooden beam in the middle layer may be bonded to one

or more of the wooden beams in the lower layer at the adjoining faces with glue, preferably epoxy glue. The process of joining may be similar to 'cold moulding'.

The table top may have a middle layer comprising twice the number of wooden beams as in the top and/or lower layers.

The table top may have a middle layer comprising eight to 12, preferably 10 wooden beams and top and lower layers each comprising four to six, preferably five wooden beams.

According to a second aspect of the invention, there is provided a method of constructing a table top wherein: a first layer is formed by joining wooden beams side by side in a longitudinal orientation with glue, preferably epoxy glue; a second layer is formed, in a transverse orientation, by fixing, one at a time, wooden beams to the first layer with glue, preferably epoxy glue; a third layer is formed, in a longitudinal orientation, by fixing, one at a time, wooden beams to the second layer with glue, preferably epoxy glue; wherein, each wooden beam has a substantially vertical end grain direction.

According to a third aspect of the invention, there is provided a table comprising a table top according to the first aspect of the invention. It may be that the table top is supported by a timber frame.

It will of course be appreciated that features described in relation to one aspect of the present invention may be incorporated into other aspects of the present invention. For example, the method of the invention may incorporate any of the features described with reference to the apparatus of the invention and *vice versa*.

Description of the Drawings

An embodiment of the present invention will now be described by way of example only with reference to the accompanying schematic drawings of which:

Figure 1 is an exploded plan view of a table top according to an example embodiment of the invention.

Detailed Description

A table top according to an embodiment of the invention is made, from oak hardwood beams. It has overall width 50 cm, length 100 cm and depth 12 cm and comprises three layers: an upper 1, middle 2 and lower layer 3.

Each of the upper 1 and lower 3 layers comprises five longer wooden beams extending, side by side, across the length of the table top. The middle layer 2 comprises 10 shorter wooden beams extending, side by side, across the width of the table top. Each wooden beam has a substantially vertical end grain direction. Thus the table top comprises a middle layer 2 of wooden beams arranged transversely, in between an upper 1 and a lower 3 layer of wooden beams arranged longitudinally (a cross-bonded configuration).

The table top is created using a cold-moulding technique. First, the lower layer 3 is formed by fixing together five long wooden beams side by side at their adjoining edges with epoxy glue. The lower layer 3 serves as a mould. Then, one at a time, 10 short wooden beams are placed on, and affixed to, the mould to form the

middle layer 2. The wooden beams are affixed with epoxy glue. Finally, one at a time, five long wooden beams are placed on, and affixed to, the middle layer 2 to form the upper layer 1. The wooden beams are affixed with epoxy glue.

The table top of this example embodiment is subsequently fitted within a timber frame to form a table.

Whilst the present invention has been described and illustrated with reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not specifically illustrated herein.

Where in the foregoing description, integers or elements are mentioned which have known, obvious or foreseeable equivalents, then such equivalents are herein incorporated as if individually set forth. Reference should be made to the claims for determining the true scope of the present invention, which should be construed so as to encompass any such equivalents. It will also be appreciated by the reader that integers or features of the invention that are described as preferable, advantageous, convenient or the like are optional and do not limit the scope of the independent claims. Moreover, it is to be understood that such optional integers or features, whilst of possible benefit in some embodiments of the invention, may not be desirable, and may therefore be absent, in other embodiments.

Claims

1. A table top comprising a plurality of wooden beams arranged side-by-side in an upper layer (1), a plurality of wooden beams arranged side-by-side in a middle layer (2) and a plurality of wooden beams arranged side-by-side in a lower layer (3), wherein, the middle layer (2) has a transverse orientation and the upper (1) and lower (2) layers each have a longitudinal orientation, so that successive layers are oriented orthogonally to each other.

2. A table top according to claim 1, wherein the beams all have the same end grain direction.

3. A table top according to claim 2, in which the beams have a substantially vertical end grain direction.

4. A table top according to any preceding claim having an odd number of layers.

5. A table top according to any preceding claim having three layers.

6. A table top according to any of claims 1 to 4 having five layers wherein there is a layer between the upper and middle layers and a layer between the lower and middle layers.

7. A table top according to any of claims 1 to 4 having seven layers wherein there are two layers between the upper and middle layers and two layers between the lower and middle layers.

8. A table top according to any preceding claim wherein the upper layer (1) has a depth of greater than 3 mm and less than 50 mm.

9. A table top according to any preceding claim wherein the lower layer (3) has a depth of greater than 3 mm and less than 50 mm.

10. A table top according to any preceding claim wherein the middle layer (2) has a depth of greater than 3 mm and less than 50 mm.

11. A table top according to any preceding claim consisting of hardwood.

12. A table top according to any preceding claim wherein each wooden beam in the middle layer (2) is bonded to one or more of the wooden beams in the upper layer (1) at their adjoining faces with glue, and, each wooden beam in the middle layer (2) is bonded to one or more of the wooden beams in the lower layer (3) at their adjoining faces with glue.

13. A table top according to any preceding claim wherein the middle layer (2) comprises twice the number of wooden beams as in the top (1) and/or lower (3) layers.

14. A method of constructing a table top wherein: a first layer is formed by joining wooden beams side by side in a longitudinal orientation with glue, preferably epoxy glue; a second layer is formed, in a transverse orientation, by fixing, one at a time, wooden beams to

the first layer with glue, preferably epoxy glue; a third layer is formed, in a longitudinal orientation, by fixing, one at a time, wooden beams to the second layer with glue, preferably epoxy glue; wherein, each wooden beam has a substantially vertical end grain direction.

15. A method of constructing a table top substantially as herein described with reference to the accompanying drawing.

16. A table top substantially as herein described with reference to the accompanying drawing.

17. A table including a table top as claimed in any of claims 1 to 13.

18. A table as claimed in claim 17, wherein the table top is supported by a timber frame.

Intellectual Property Office

Application No:	GB1607377.7	**Examiner:**	Mr David Smitten
Claims searched:	1-18	**Date of search:**	7 September 2017

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	X: 1-14, 17 & 18	CN201700680 U (SUINING COUNTY HAODING BOARD CO) - See particularly the abstract, claim 2, and figure 1.
X	X: 1-14, 17 & 18	CN201683400 U (FUJIAN YONGLIN BAMBOO IND CO) - See particularly the abstract, and figure 4.
X	X: 1-14, 17 & 18	WO2011/027993 A2 (SD CORP) - See particularly the abstract, and figure 7.
X	X: 1-14, 17 & 18	CN105150295 A (LIU) - See particularly the abstract, and figure 1.
X	X: 1-14, 17 & 18	FR2469279 A1 (DEGUT) - See particularly the abstract, and figures 1 & 2.
X	X: 1-14, 17 & 18	CN101069971 A (LIN) - See particularly the abstract, and figures 1 & 2.
X	X: 1-14, 17 & 18	KR20030009923 A (NAT FORESTRY COOPERATIVES FEDE) - See particularly the abstract, and figure 2.
A	-	US2014/370231 A1 (WALLACE) - See particularly the abstract, and figures 8-10.
A	-	DE102011050874 A1 (TEAM 7 NATUERLICH WOHNEN) - See particularly the abstract, and figure 1.
Y	Y: 1, 4, 5 & 17	Stack Lab Undated - Available from http://www.stacklab.ca/2012/12/richmond-station-is-open-1/ - see particularly the second paragraph and the cross laminated timber table in the seventh image.
Y	Y: 1, 4, 5 & 17	Post City Dated 15 October 2012 - Available at http://www.postcity.com/Eat-Shop-Do/Eat/October-2012/First-Look-Richmond-Station-the-highly-

Intellectual Property Office

		anticipated-restaurant-from-Ryan-Donovan-and-Carl-Heinrich/ - see particularly the cross laminated timber table in the third image.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

Worldwide search of patent documents classified in the following areas of the IPC

A47B; B27D; B27G; B27M

The following online and other databases have been used in the preparation of this search report

EPODOC & WPI

International Classification:

Subclass	Subgroup	Valid From
A47B	0013/08	01/01/2006
B27M	0003/00	01/01/2006