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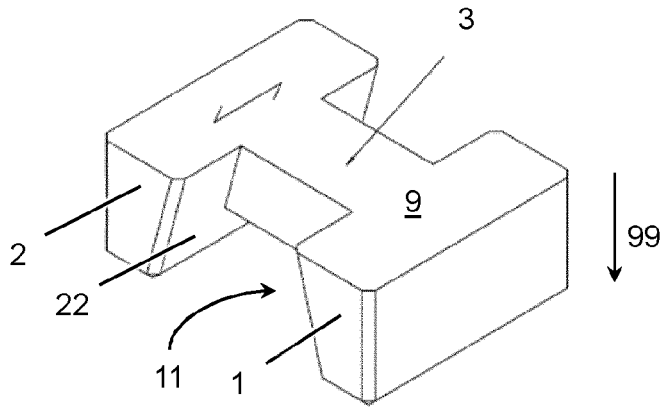
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(54) **H-SHAPED PANEL CONNECTOR**

(57) H-connecter for interconnecting two wood panels, comprising a first web, a second web and a bridge, wherein the bridge connects the first web and the second web, wherein the first web has a first locking flank that is orientated towards the second web, and wherein the second web has a second locking flank that is orientated towards the first web, characterized in that the first locking flank and the second locking flank diverge along an insertion direction of the connector.

Fig. 1



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Description

[0001] The invention relates to H-shaped panel connectors.

Figure 1 is a perspective view of a first embodiment of a connector.

Figure 2 is a top view of the connector of figure 1,

Figure 3 is a side view of the connector of figure 1,

Figure 4 is a sectional view of the connector of figure 1, according to sectional plane A-A indicated in figure 2.

Figure 5 is a sectional view of the connector of figure 1, according to sectional plane B-B indicated in figure 2.

Figure 6 is a perspective view of a panel intended to be connected by the connector of figure 1.

Figure 7 is sectional detail view of the panel of figure 6, according to sectional plane A-A indicated in figure 6.

Figure 8 is sectional detail view of the panel of figure 6, according to sectional plane B-B indicated in figure 6.

[0002] A panel connector according to a first embodiment comprises a first web 1, a second web 2 and a bridge 3, wherein the bridge connects the first web 1 and the second web 2 to one another. The webs 1 and 2 form a keying section each, intended to provide geometrical lock. In top view (see figure 2), i.e. in a view along a connector insertion direction 99, the first web 1, the second web 2 and the bridge 3 form a H-shape.

[0003] The width of the bridge 3 (36 mm in the present case, by way of example) is smaller than the width of the first web 1 and the width of the second web 2 (both 92 mm in the present case, by way of example). Width is measured perpendicularly to the insertion direction 99.

[0004] Height (measured parallel to the insertion direction 99) of the first web 1 and of the second web 2 is the same in the present embodiment (45 mm, by way of example). Height of the bridge 3 (30 mm, by way of example) is smaller than height of the first web 1 and/or of the second web 2. Thus, the first web 1 and the second web 2 project further from the top surface than does the bridge 3. However, the respective heights might also be the same.

[0005] The connector is intended to be accommodated in corresponding recesses 6 of adjacent panels 5, so as to provide a geometrical lock situation between the connector and the adjacent panels 5, that can preferably transfer loads in different directions (e.g. tensile direction, i.e. perpendicular to joint orientation, or shear direction, i.e. parallel to joint orientation). The webs 1 and 2 provide a geometric lock with the respective panel 5 in tensile (i. e. perpendicular) direction and the bridge 3 provides a geometric lock section in shear (i.e. parallel) direction in order to transfer loads during installation and service.

[0006] Figures 6 to 8 show an example of a panel that might be connected by means of the connector. In this context, butt-joint face 51, parallel direction 58 (i.e. parallel with respect to butt-joint face 51) and perpendicular direction 59 (i.e. perpendicular with respect to butt-joint face 51) are emphasized in figure 6.

[0007] In particular, when intended to be connected with the connector, the panels 5 are arranged in butt-joint configuration in a same plane, wherein the respective butt-joint faces 51 are oriented parallel with each other. However, a corner joint configuration might be feasible as well.

[0008] In particular, the connector can be oriented perpendicular to main direction of the butt-joint face 51, i.e. it can be orientated in perpendicular direction 59.

[0009] The first web 1 has a first locking flank 11 that is orientated towards the second web 2, and the second web has a second locking flank 22 that is orientated towards the first web 1. The first locking flank 11 and the second locking flank 22 diverge along the insertion direction 99 of the connector. In particular, they diverge continuously.

[0010] Accordingly, the locking flanks 11 and 22 of the webs 1 and 2, respectively, are inclined in order to provide a wedge-effect with the walls of the recesses 6 in the panels 5, so that the panels 5 are drawn together when the connector is inserted in the insertion direction 99. The locking flanks 11 and 22 diverge in the insertion direction 99, which is the direction in which the connector is intended to be inserted into the panels 5. Accordingly, the locking flanks 11 and 22 converge in a direction opposite to the insertion direction 99, and the distance between the locking flanks 11 and 22 becomes, preferably continuously, larger toward that respective web ends which are leading in the insertion direction 99, i.e. that ends that are intended to be inserted first into the panels 5. The connector has a generally flat top surface 9, wherein the first locking flank 11 and the second locking flank 22 converge as they approach the top surface 9.

[0011] Accordingly, the locking flanks 11 and 22 are inclined, and intended to interfere with corresponding counter-locking flanks of the recesses 6 showing in opposite directions. The inclined locking flanks 11 and 22 are intended to provide a wedge effect acting on the respective panels 5, so that the panels 5 are drawn together and put into pre-stressed condition when the H-shaped connector is pressed inside the recesses 6 of the panels 5.

[0012] In the shown embodiment, the locking flanks 11 and 22 have each an inclination angle α of 75°. This is, however, an example only, and a range of inclination angle α from 85° to 60° could also be envisaged.

[0013] In the shown embodiment, the first locking flank 11 and the second locking flank 22 are generally flat (i. e. without curvature).

[0014] The flank angle of the locking flanks 11 and 22 of the webs 1 and 2 might be the same as the flank angle of the respective counter-flanks of the panels 5. However, the flank angle of the locking flanks 11 and 22 of the webs 1 and 2 can also be slightly different from the flank angle of the respective counter-flanks of the panels 5, which can provide an additional self-locking effect.

[0015] The first web 1, the second web 2 and the bridge 3 are non-monolithic with respect to one another, i.e. they are three parts which are made from different bodies and joined later. This can facilitate manufacturing. However, a monolithic connector can also be envisaged. Preferably the connector is made of wood material, including, but not exclusive, veneer plywood made of birch or beech, CLT (cross laminated timber), GLULAM (glued laminated timber), hard or soft solid timber, molded and/or compressed parts (comprising wooden flakes or chips and organic binder such as glue). The connector can also be made of metal (e.g. extruded aluminum), ceramics, mineral material (e.g. concrete), plastic or elastomer.

[0016] The panels 5 can be made of different wood types, including CLT (cross laminated timber), GLULAM (glued laminated timber), hard or soft solid timber, hybrid wood elements (wood in combination with concrete overlay).

[0017] In the shown first embodiment, the flanks of the bridge 3 are parallel. Alternatively, they can taper in the insertion direction 99, so as to form a wedge. In this case, the bridge 3 tapers along the insertion direction 99 of the connector. This can provide further panel alignment when the connector is inserted.

[0018] Once installed, the connector might self-lock in the final position, due to friction. Optionally, additional securing of the connector, e.g. by screwing, nailing or/and gluing can be envisaged.

[0019] The surface of the first locking flank 11 and/or the second locking flank 22, alternatively or additionally the surface of bridge 3, alternatively or additionally the remaining surfaces of the connector, can be modified to increase friction, e.g. by means of surface roughening or applying coatings (including glue or hard particles), with an aim to retain the connector inside the recesses 6 in case of tensile loads (that tend to push the connector outside of recess 6 due to wedge effect).

[0020] Optionally (not shown here), an interlayer, in particular an elastomeric interlayer, can be placed between the contact surfaces of the connector and the recess 6. In particular, the interlayer can cover the first locking flank 11 and/or the second locking flank 22. This allows for higher tolerances as well as to accommodate small displacements between the panels, which may be beneficial in case of dimensional changes (e.g. due to seismic events).

[0021] Arrangement of connector and panels 5 (including recesses 6) allows easy and fast alignment of panels 5 (into final position with respect to each other). Panels 5 are initially oriented with respective butt-joint faces 51 opposite to each other with at a certain distance, e.g. 10mm, offset parallel and perpendicular to butt-joint direction. During installation, the connector is introduced into the recesses 6 and pressed into the recesses 6 (e. g. by means of hammer blows), thereby exerting a force acting perpendicular to the panel main orientation. Due to interaction of the geometry of the connector (wedge effect) and the recesses 6, the panels 5 are drawn together and aligned to each other to final position. The connection can be unclamped by pulling the connector out of the recesses 6, which allows disassembly of connection.

[0022] Preferably, the connector, in particular its top surface 9, is flush with the panels 5 when installed. However, it can be also be countersunk or projecting. Usually, it is intended that the gap between the panels 5 (at butt joint face) is generally closed after installation of the connector. The maximum gap width between the panels 5 that can be closed and /or the level of pre-stressing after the gap has been closed can be determined by the locking flank angle of the respective locking flank 11, 22 and/or by the level of pressing-in the connector into the recess 6.

[0023] The connector can provide ease of alignment of panels 5 and can allow fastening them in fast and easy manner. The overlapping faces of webs 1 and 2 and recesses can be designed relatively large, therefore providing particularly high loading resistance.

[0024] In order to manufacture the geometry of the recesses 6, at least two options appear feasible. According to option 1, the recesses 6 are directly machined into panels 5. According to option 2, a bigger contour is machined into the panel 5, and a separate inlay that provides the final shape is inserted therein.

Claims

1. Panel connector

comprising a first web (1), a second web (2) and a bridge (3), wherein the bridge (3) connects the first web (1) and the second web (2) to one another, wherein the first web (1) has a first locking flank (11) that is orientated towards the second web (2), and wherein the second web has a second locking flank (22) that is orientated towards the first web (1),
characterized in that

- the first locking flank (11) and the second locking flank (22) diverge along an insertion direction (99) of the connector.

2. Connector according to claim 1,
characterized in that

the first locking flank (11) and the second locking flank (22) are generally flat.

3. Connector according to any of the preceding claims, **characterized in that**
height of the first web (1) and of the second web (2) is generally the same, and height of the bridge (3) is smaller than height of the first web (1) and of the second web (2).

4. Connector according to any of the preceding claims, **characterized in that**
the first web (1), the second web (2) and the bridge (3) are non-monolithic with respect to one another

5. Connector according to any of the preceding claims, **characterized in that**
the connector is made of a wood material.

6. Connector according to any of the preceding claims, **characterized in that**
the bridge (3) tapers along the insertion direction (99) of the connector.

7. Panel (5), in particular wood panel, having a recess (6) for receiving a connector according to any of the preceding claims.

Fig. 1

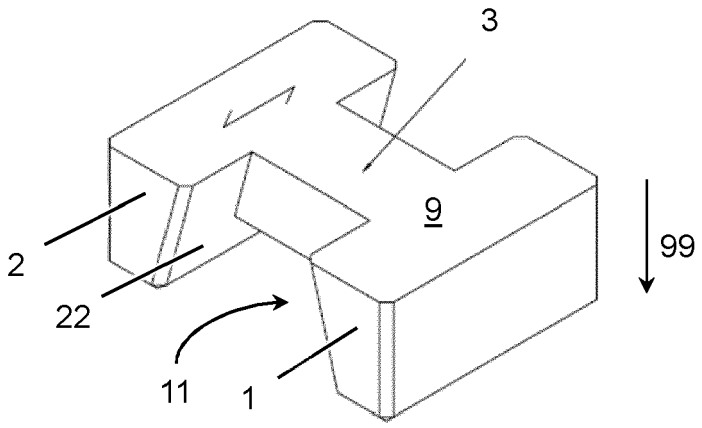


Fig. 2

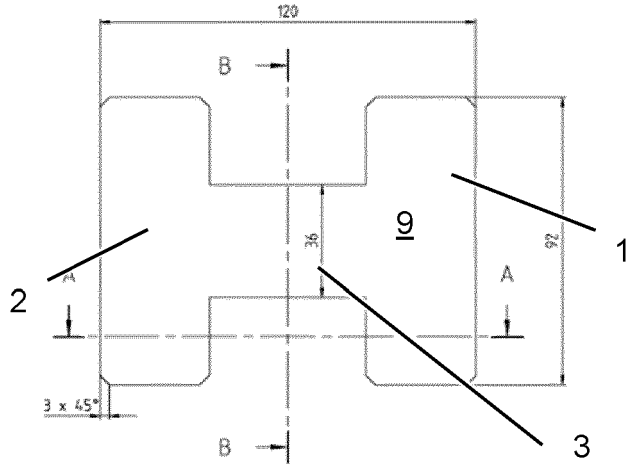


Fig. 5

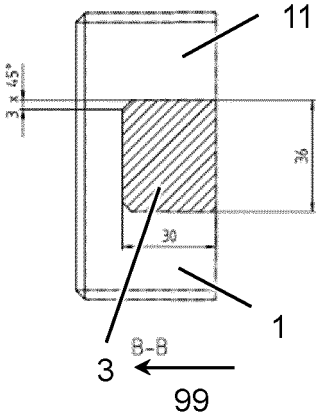


Fig. 3

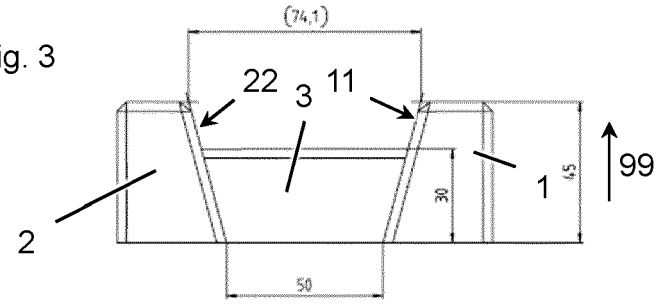


Fig. 4

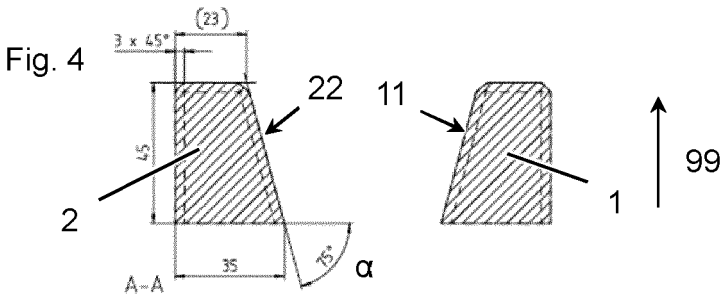


Fig. 6

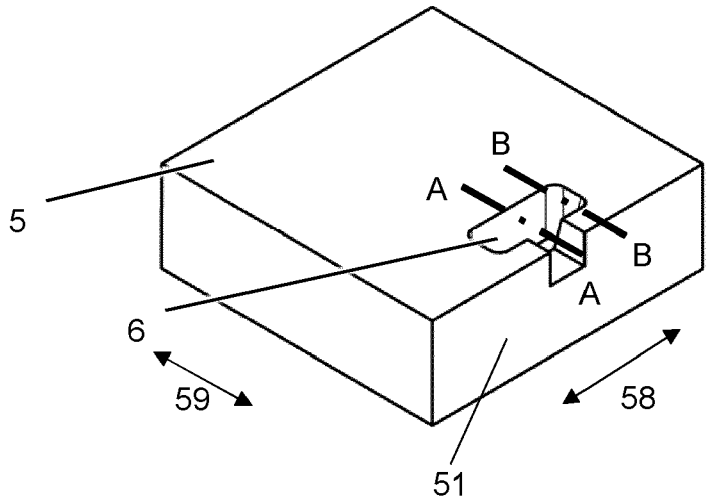


Fig. 7

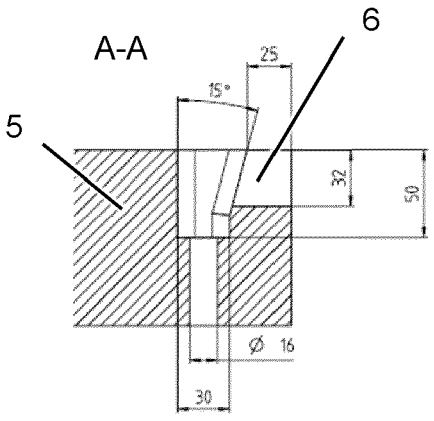
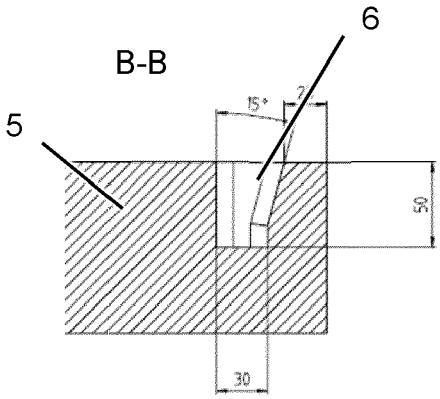


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 21 21 1199

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	DE 10 2004 041830 A1 (GROSSE WERNER [DE]) 2 March 2006 (2006-03-02)	1-3,5-7	INV. E04F13/08
Y	* figures 1-3 *	4	E04F13/10
	* paragraph [0022] - paragraph [0024] *		E04F15/02
	* paragraph [0027] - paragraph [0031] *		E04F15/04
Y	FR 2 554 521 A1 (SCHOUVEY JEAN CLAUDE [FR]) 10 May 1985 (1985-05-10)	4	
	* figures 1-4 *		
	* page 1, line 12 - line 14 *		

TECHNICAL FIELDS SEARCHED (IPC)

E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 May 2022	Estorgues, Marlène

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FR 2554521 A1	10-05-1985	NONE	

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