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(71) Applicant: **Hüsler Silkwood GmbH**
47229 Duisburg (DE)

(72) Inventor: **Hüsler, Baltasar**
6376 Emmetten (CH)

(74) Representative: **Demski, Siegfried**
Demski & Nobbe
Patentanwälte
Tonhallenstraße 16
47051 Duisburg (DE)

(54) Wood deck with boards and connectors

(57) The wood deck is made of deck boards (90) and deck board connectors (60). Each deck board has a lip (96) extending along each side thereof. A pair of wings, a riser and the sole plate of a board connector define a pair of oppositely facing board receiving slots for receiving the lips of a pair of adjacent deck boards. Each deck board is preferably made of torrefied wood. The deck board connectors have bosses on their riser for maintaining a desired spacing between deck boards. Each deck board connector has drainage channels in its sole plate, on each side of the riser for draining any moisture that may seep between deck boards. Each deck board connector also has aeration gaps under its sole plate for drying any moisture that may seep beneath the boards. The wood deck is thereby less susceptible of retaining moisture under or between the deck boards.

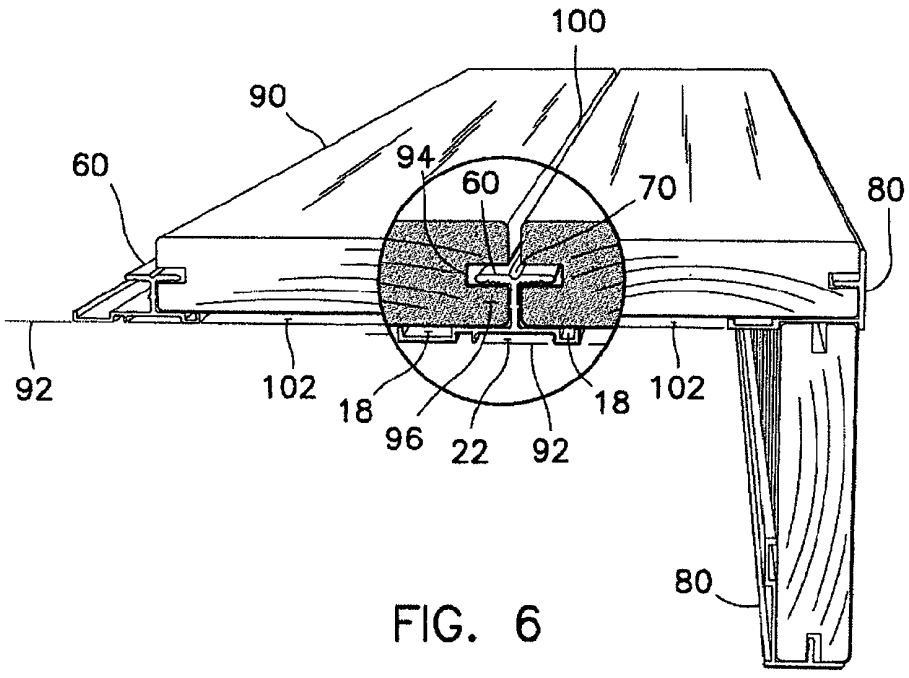

FIG. 6

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Description

[0001] The present invention pertains to wood decks and more particularly the invention pertains to decks made of wood boards, and connectors retaining the boards to a framing structure without fastener extending through the boards.

[0002] Wood has always been a highly valued construction material. With proper treatment, wood is a long lasting building material. Wood has traditional characteristics that many home owners value over cement, steel, plastic and glass. Wood can be a sustainable resource if care is given to reforestation. Therefore, buildings and inside furnishings made of wood, collectively represent a sought-after commodity.

[0003] The use of solid wood as building material represents drawbacks, however, when exposed to the elements; such as in the case of outside decks, balconies and ship decks. The two main issues reside in the fact that wood that is exposed to recurrent or constant moisture will decay and rot. Furthermore, wood that is exposed to fluctuating temperatures and moisture can warp, expand or shrink. Rotting of a wood board not only deteriorates its appearance, it also weakens it; exposing the wood board to breakage under pressure and chipping of its surface. Warping of the wood leads to unevenness of the surface, especially when many wood boards are used side by side; which therefore present the risk of injury by tripping. Warping also leads to loosening of the nails and screws holding the boards, again producing the risk of injury by tripping.

[0004] A number of inventions have been developed in the past to obviate the need of installing fasteners through the exposed surfaces of deck boards. For examples, the following documents disclose a series of T-shaped connectors that are fastened to the sub-frame of a deck and wherein the bar of the T engages into opposite grooves on the sides of adjacent deck boards for retaining the deck boards to the sub-frame. These mouldings and extrusions are described in the following documents:

US Patent 582,645 issued to J.W. Heaton on May 18, 1897;
US Patent 1,888,611 issued to S.J. Wolfson on Nov. 22, 1932;
US Patent 1,889,138 issued to S.J.Wolfson on Nov. 29, 1932;
US Patent 4,599,842 issued to J. Counihan on July 15, 1986;
US Patent 8,006,458 issued to O. Olofsson et al. on Aug. 30, 2011;
US Patent 8,011,153 issued to B.K. Orchard on Sept. 6, 2011;

[0005] Each of these mouldings and extrusions are used full length along a deck board or as spaced-apart short retaining clips.

[0006] Although the mouldings and extrusions of the prior art deserve undeniable merits, there remains several deficiencies with these board retainers.

[0007] The retaining strips of the prior art do not provide any way to evacuate water seeping between the joints of the boards, thereby creating a cause for collecting moisture beneath the deck boards. A second disadvantage with the retaining strips of the prior art is that the underside of the boards are in direct contact with the sub-floor. When the deck is installed on a concrete surface for example, the variations in temperature between the wood boards and the cement sub-floor create a cause for collecting condensation and moisture beneath the boards. Another inconvenience with the retaining strips of the prior art is that they become visible between the deck boards when the wood boards shrink from exposure to the elements and aging.

[0008] In another piece of prior art;

[0009] German Patent DE 20 2004 011 578 U1 issued to Anton Bernauer on Oct. 28, 2004; there is illustrated therein a wood floor that has a trough under every joint between the floor boards. Although drainage is provided under the joints of the boards, these boards are installed flat against the sub-floor, creating a cause for collecting condensation and moisture. Also, the boards are installed with fasteners perforating the exposed surface of the boards.

[0010] In view of the above, there is still a need in the construction industry for a deck board retaining connector that provides drainage and aeration under the boards for removing any condensation and water seeping between the deck boards.

[0011] In the present invention, however, there is provided deck boards and connectors that are used to build a long-lasting wood deck. The board connectors have spacer bosses, ventilation gaps and drainage channels therein to ensure that the deck boards are not exposed to stagnant moisture.

[0012] In one aspect of the present invention, there is provided a deck board connector having an elongated strip-like shape and a cross-section comprising a sole plate; a riser extending vertically from the sole plate; a pair of wings extending in opposite directions from the riser in parallel alignment with the sole plate. The pair of wings, the riser and the sole plate define a pair of oppositely facing board-receiving slots, for receiving a pair of adjacent deck boards therein. Each of the board-receiving slots has a tapering upper wall and indentations along the upper wall for retaining the deck board therein. The construction of a deck using the deck board connectors is more easily done by securing each board into a respective board receiving slot in a parallel alignment with the connectors, and without using any fastener perforating the exposed surfaces of the deck boards.

[0013] In another aspect of the present invention, the head portion of the board connector has a colorable groove therein registering with a spacing between deck boards. This groove can be painted to match the colour of the deck boards.

[0014] In yet a further aspect of the present invention, there is provided a first and second deck board connectors being removably engaged to each other. Each of the first and second deck board connectors has an elongated strip-like shape and a cross-section comprising; a sole plate; a riser extending vertically from the sole plate; a pair of wings extending in opposite directions from the riser in parallel alignment with the sole plate. The wings define a head portion of the deck board connector. The deck board connector also has a head-portion-receiving groove in a bottom surface of its sole plate and the head-portion-receiving groove is defined by a resilient lip. The head-portion-receiving groove has dimensions for snappily receiving and retaining the head portion of a deck board connector therein. In the present combination, the head portion of the second deck board connector is removably engaged into the head-portion-receiving groove of the first deck board connector.

[0015] In yet a further aspect of the present invention, there is provided a wood deck made of deck boards and deck board connectors. Each deck board has a lip extending along both sides thereof; each of the connectors has an elongated strip-like shape and a pair of oppositely facing board receiving slots for receiving the lips of a pair of adjacent deck boards. The deck boards are preferably made of torrefied wood. Each deck board connector has spacer bosses on the riser thereof for maintaining a desired spacing between adjacent deck boards. The deck board connectors have drainage channels in the sole plates thereof for draining any moisture that may seep between the deck boards. The deck board connectors also have aeration gaps in the sole plates thereof for drying any moisture that may seep beneath each board. The wood deck is thereby less susceptible of retaining moisture under or between the deck boards.

[0016] This brief summary has been provided so that the nature of the invention may be understood quickly. A more complete understanding of the invention can be obtained by reference to the following detailed description of the preferred embodiments thereof in connection with the attached drawings.

[0017] The preferred embodiments of the present invention are illustrated in the accompanying drawings; in which:

FIG. 1 is a cross-section view of a board-joining connector according to a first preferred embodiment of the present invention;

FIG. 2 is a cross-section view of an edge-closing connector according to a second preferred embodiment of the present invention;

FIG. 3 is a cross-section view of a board-joining connector according to a third preferred embodiment of the present invention;

FIG.4 is a cross-section view of three board-joining connectors according to the third preferred embodiment engaged to each other, prior to installation on a deck;

FIG. 5 is a cross-section view of an edge-closing connector according to a fourth preferred embodiment of the present invention;

FIG. 6 is a cross-section view of a deck made of wood boards, board joining connectors and edge-closing connectors according to the preferred embodiments, with a magnified portion of a joint between adjacent boards.

[0018] Referring firstly to FIG. 1, there is illustrated therein a board-joining connector 10 according to the first preferred embodiment of the present invention. The board-joining connector 10 has a strip-like form with a cross-section defining a sole plate 12, a riser 14 and two wings 16 atop the riser 14.

[0019] The sole plate 12 has two drainage channels 18 therein, one at each side of the riser 14. Each drainage channel 18 has a fastener-guiding groove 20 therein. The sole plate 12 also has aeration gaps 22 in the bottom surface thereof. The aeration gaps 22 are defined by parallel resting pads 24. The upper surface of the sole plate 12 has parallel board support pads 30.

[0020] Each wing 16 defines, with the corresponding board support pads 30 and riser 14, a board-receiving slot "A". The upper wall of each wing 16 has gripping indentations 40 on its lower surface. The indentations are set on a tapering surface such as to retain a board that is pushed into the board-receiving slot "A". This feature is advantageous during the installation of a wood deck to ensure that each board is set parallel to each other and to the board-joining connector 10, especially if the board is being worked one end at the time, by a single worker for example. Also to facilitate board installations, the riser 14 has a spacer gauge or boss 42 on each side thereof to maintain a desired spacing between boards.

[0021] In FIG. 2 there is illustrated an edge-closing connector 50 according to the second preferred embodiment of the present invention. The edge-closing connector 50 has basically the same structure as a one-half portion of the board-joining connector 10 according to the first preferred embodiment. The edge-closing connector 50 further has a drilling surface 52 to receive spaced-apart nails 54 or self-tapping screws, to retain the edge-closing connector 50 to a deck board. The edge-closing connector 50 is preferably used along the perimeter of a deck.

[0022] The board-joining connector 60 according to the third preferred embodiment of the present invention is illustrated in FIG. 3. This board-joining connector 60 has basically the same elements as in the board-joining connector 10 according to the first preferred embodiment with some additional characteristics. The width "B" of the

head portion 62 is a force fit into a receiving groove 64 having a dimension "C" in the sole plate 12 of the board-joining connector 60. The receiving groove 64 is defined on one side by a resilient lip 66 and on the other side by a wing-receiving recess 68.

[0023] The head portion 62 of one board-joining connector 60 can be snappily engaged into the receiving groove 64 of another connector 60. After manufacturing, the board-joining connectors 60 can be attached to each other, as shown in FIG. 4, to facilitate shipping, handling and storage, and to further facilitate the cutting of the connectors as a bundle to desired lengths.

[0024] In another characteristic, the sole plate has a narrower drainage channel 18 on one side thereof so to increase the dimension of the aeration gap under the boards as it will be explained later.

[0025] A further characteristic of the board-joining connector 60 according to the third preferred embodiment of the present invention, is that the head portion 62 has a concave rounded colorable groove 70 along a centerline or a median thereof. This rounded groove 70 gives a client the option of painting the groove 70 a same colour as the deck boards, or leaving the groove a natural colour of an aluminum extrusion for example. The rounded colorable groove 70 has a cross-section that is a segment of a circle so that it is specially adapted to easily guide the tip of a felt marker without damaging the felt tip, or to easily guide the wheel of a strip painting implement therealong. It will be understood that the width of the rounded colorable groove 70 is basically a same dimension as the width defined by both board spacers 42.

[0026] The edge-closing connector 80 according to the fourth preferred embodiment of the present invention has a vertical riser 14' that extends above the wing 16 so to cover a substantial thickness of a deck board. The edge-closing connector 80 also has an aeration gap 22 that has a width "D" that is sufficient for receiving the edge of a deck board 90 therein, as illustrated in FIG. 6.

[0027] In FIG. 6 the line 92 represents a deck-supporting structure. Each board 90 has a groove 94 along its sides. The groove 94 defines two lips 96. It will be appreciated that the lower lip 96 has a thickness that is a precise fit into the board-receiving slot "A".

[0028] Each joint 100 between boards 90 has a moisture receiving and draining channel 18 on each side thereof. The space directly under a joint 100 has an aeration space 22 between the board-joining connector 60 and the supporting structure 92. A similar ventilation space 102 is formed under a substantial portion of each board 90 so that moisture does not accumulate against the underside of the boards 90.

[0029] Because of the board spacers 42 moisture does not accumulate between the edges of adjacent boards 90. Also because of the aeration gaps 22 and 102, the deck boards 90 are only supported along their edges, allowing a certain degree of flexibility along the central portion thereof. Because of the air spaces 22, 102 under the boards, the wood deck has shock absorption capability for conveying a feeling of softness even when the deck and connectors are mounted directly to a concrete floor for example.

[0030] In a preferred arrangement, the wood boards 90 are made of thermally modified wood, such as torrefied wood for example. During the torrification of wood, the wood is exposed to an oxygen deprived or low oxygen environment, in temperatures of at least 200 degrees Celsius for at least 10 minutes, preferably however, 40 minutes to 80 minutes. Through the process of torrification, the moisture, oxygenates, and organic acids are eliminated from the wood. Any protein substances that offer nutrition to living organisms, along with the organisms themselves, are destroyed. Furthermore, through the process of thermal modification, the wood reaches a point where it does not, when exposed to weathering, warp, swell, tear or recede and the surface of the wood becomes water repellent. Through these favourable features of the torrification process, it is possible to provide a long-lasting and high quality deck covering.

[0031] The board connectors 10, 50, 60 and 80 are preferably mabe of extruded aluminum, although other materials such as extruded plastic may also be used. The board connectors 10, 50, 60 and 80 can be used full length along a deck or as spaced-apart short clips, depending on the type of support structure that is used. For example, the board connectors are used full length for building a second floor balcony for example or a ship deck where it is important to obtain a floor that is impermeable to rain, dust and dirt. Clip-like short-length connectors may be used for building a backyard deck of a single story house for example, where permeability is desired. In the former applications, the spacing 100 between boards 90 are preferably filled with a sealant such as caulking.

Claims

1. A deck board connector having an elongated strip-like shape and a cross-section; said cross-section comprising;
   a sole plate;
   a riser extending vertically from said sole plate;
   a pair of wings extending in opposite directions from said riser in parallel alignment with said sole plate;
   said pair of wings, said riser and said sole plate defining a pair of oppositely facing board receiving slots for receiving a pair of adjacent deck boards;
   each of said board receiving slots having a tapering upper wall and indentations along said upper wall for retaining said deck board therein.

2. The deck board connector as claimed in claim 1, further having drainage channels in said sole plate on each side of said riser.

3. The deck board connector as claimed in claim 1 or

2, further having aeration gaps under said sole plate.

4. The deck board connector as claimed in claim 1, 2 or 3, wherein said wings define a head portion thereof, and said head portion has a colorable groove along a centerline thereof.

5. The deck board connector as claimed in one of the claims 1 to 4, wherein said groove has a cross-sectional shape of a segment of a circle, and/or said groove further has a head-portion-receiving groove in a bottom surface of said sole plate and said head-portion-receiving groove has same dimensions as said head portion.

6. The deck board connector as claimed in one of the claims 1 to 5, wherein said head-portion-receiving groove is defined by a resilient lip.

7. The deck board connector as claimed in one of the claims 1 to 6, having a board spacer on each side of said riser for maintaining a desired spacing between adjacent deck boards.

8. The deck board connector as claimed in one of the claims 1 to 7, wherein a combined thickness of said board spacers is a same dimension as a width of said colorable groove.

9. A first and second deck board connectors being removably engaged to each other; each of said first and second deck board connectors having an elongated strip-like shape and a cross-section; said cross-section comprising;
a sole plate;
a riser extending vertically from said sole plate;
a pair of wings extending in opposite directions from said riser in parallel alignment with said sole plate;
said pair of wings defining a head portion thereof, and
a head-portion-receiving groove in a bottom surface of said sole plate
and said head-portion-receiving groove being defined by a resilient lip and wherein said head portion of said second deck board connector being removably engaged into said head-portion-receiving groove of said first deck board connector.

10. A wood deck made of deck boards and deck board connectors; said deck boards having a lip extending along each side thereof; each of said connectors having an elongated strip-like shape and a cross-section; said cross-section comprising;
a sole plate;
a riser extending vertically from said sole plate;
a pair of wings extending in opposite directions from said riser in parallel alignment with said sole plate;
said pair of wings, said riser and said sole plate defining a pair of oppositely facing board receiving slots for receiving said lips of a pair of adjacent positioned deck boards;
each of said board receiving slots having a tapering upper wall and indentations along said upper wall for retaining said deck board therein.

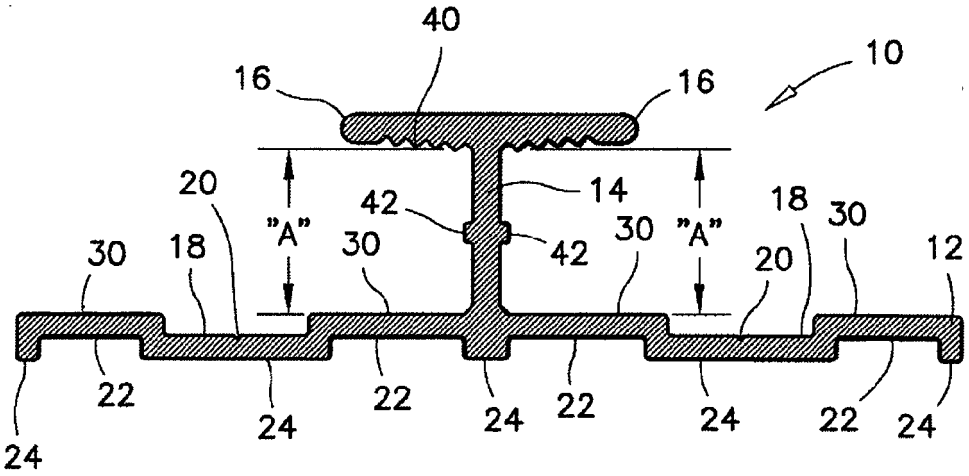
11. The wood deck as claimed in claim 10, wherein said deck boards are made of torrefied wood, and/or said deck boards further having drainage channels in said sole plate on each side of said riser, and/or said deck boards further having aeration gaps under said sole plate.

12. The wood deck connector as claimed in claim 10 or 11, wherein said wings define a head portion thereof, and said head portion has a colorable groove along a centerline thereof, and/or the wood deck further having edging connectors along a perimeter thereof, and/or ventilation spaces under a central region of each of said deck boards.

13. The wood deck as claimed in one of the claims 10 to 12, wherein said groove has a cross-sectional shape of a segment of a circle.

14. The wood deck as claimed in one of the claims 10 to 13, having board spacers on both sides of said riser for maintaining a desired spacing between adjacent deck boards.

15. The wood deck as claimed in one of the claims 10 to 14, wherein a combined thickness of said board spacers is a same dimension as a width of said colorable groove.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16
16
10
20
"A"
42
14
"A"
18
30
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42
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22
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22
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24
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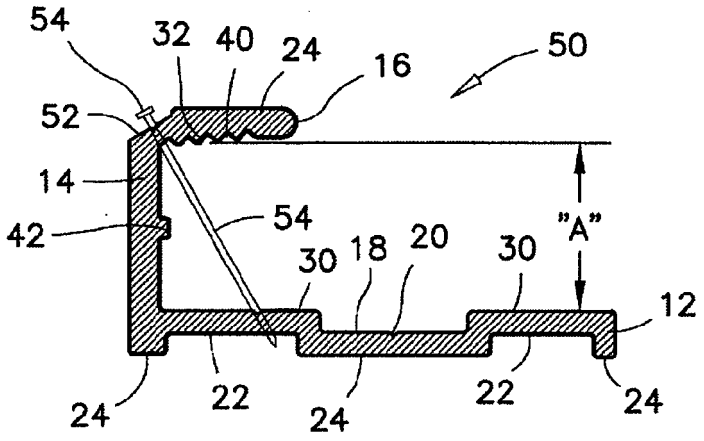
24

FIG. 1


54
32
40
24
16
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14
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"A"
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12
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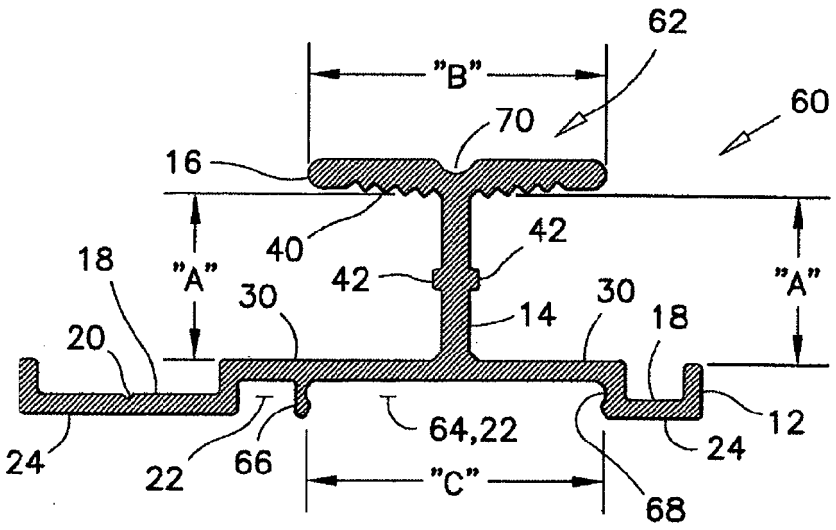
22
24
22
24

FIG. 2


62
"B"
60
70
16
40
42
42
18
"A"
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18
"A"
20
12
64,22
24
24
22
66
"C"
68

FIG. 3

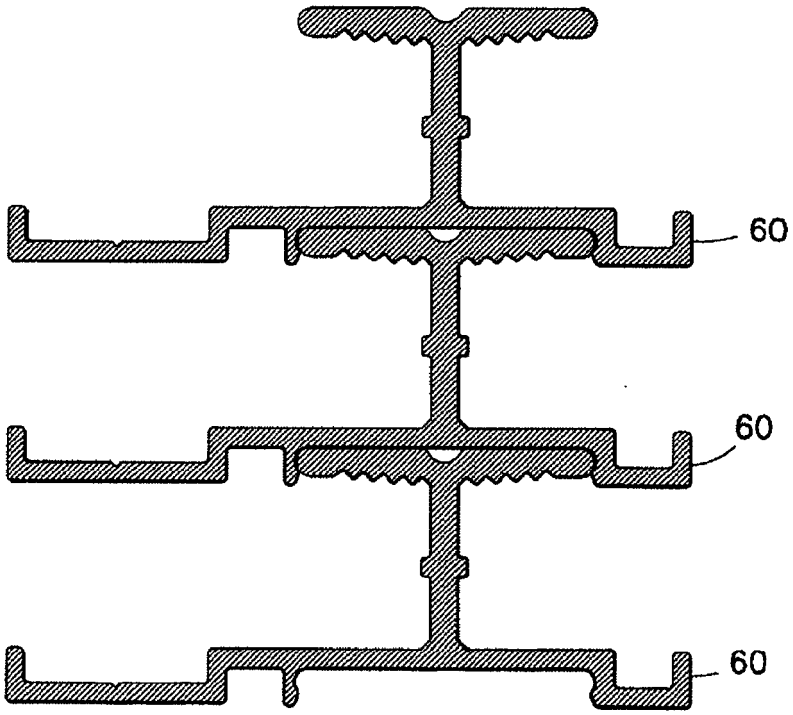
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FIG. 4

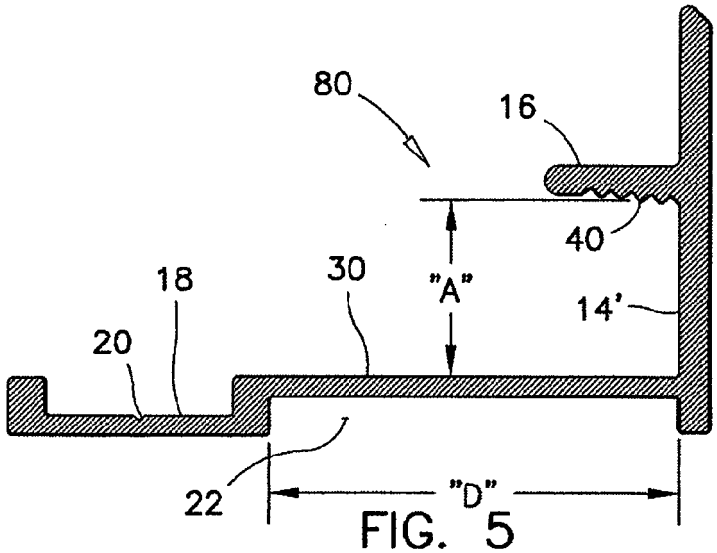
80
16
40
"A"
30
18
20
14'
22
"D"

FIG. 5

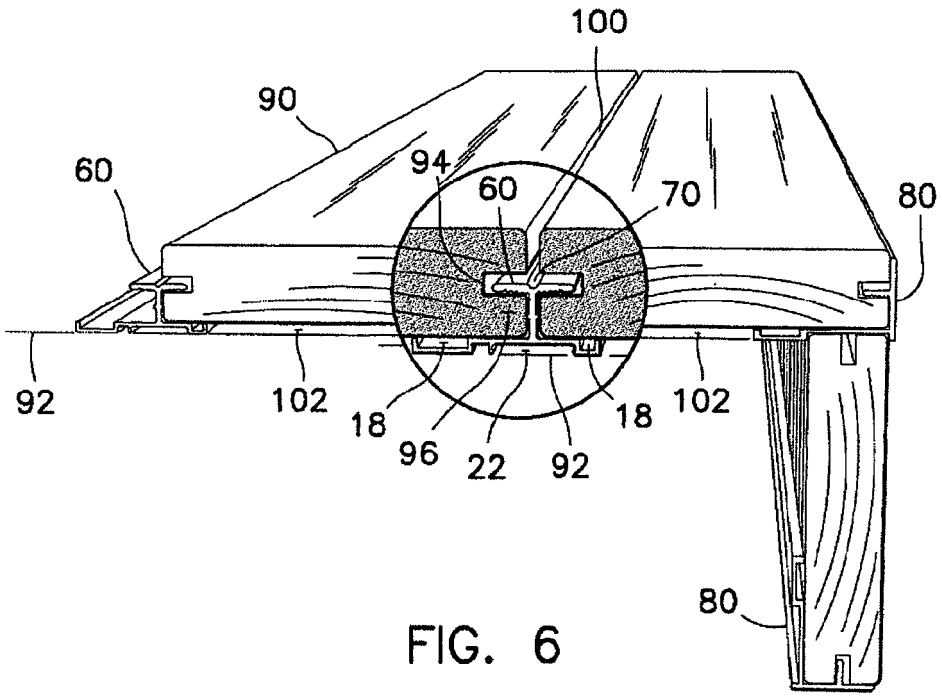
100
90
94
60
60
70
80
92
102
18
96
22
92
18
102
80

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 14 00 0353

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 June 2014	Bourgoin, J

CATEGORY OF CITED DOCUMENTS

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