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(54) **EXTRUDED ALUMINUM DECK PLANK WITH LIGHTING AND HEATING FEATURES**

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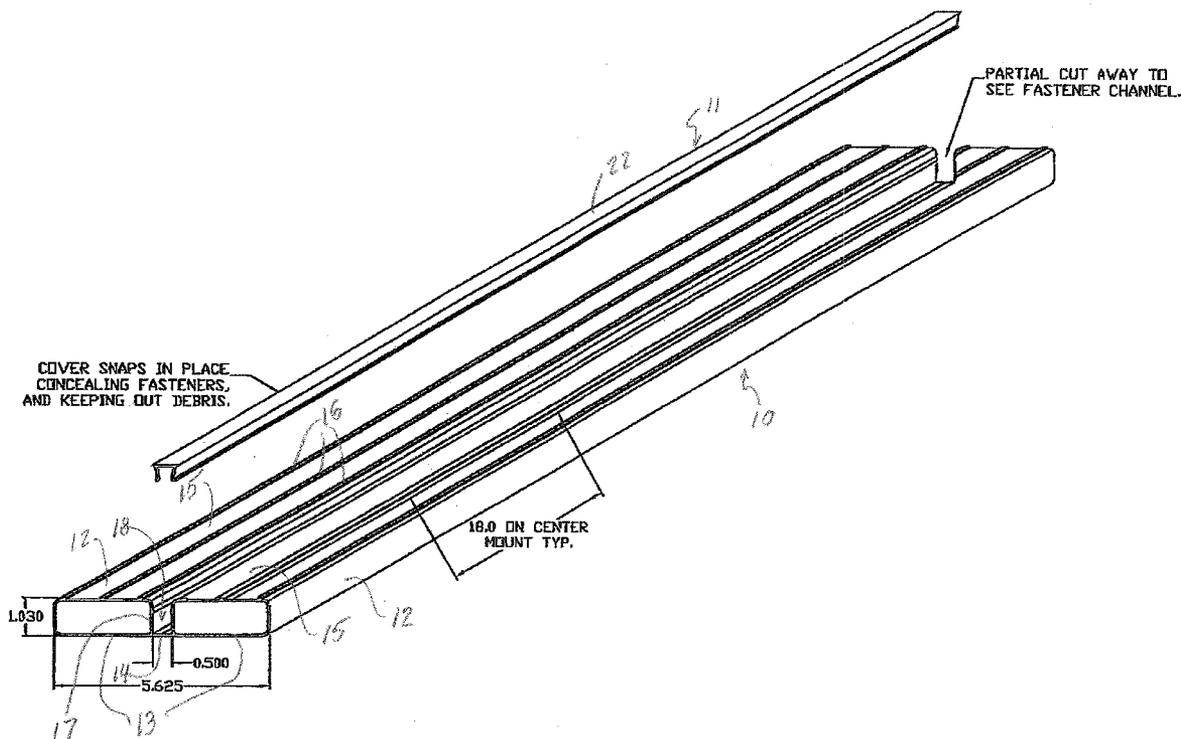
(57) **ABSTRACT**

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An extruded aluminum deck plank includes a pair of longitudinally extending parallel tubular plank halves interconnected by a web extending between the lower walls of the plank halves. The inner side walls of the plank halves and the web define a U-shaped channel adapted to receive fasteners that are inserted vertically into the channel, through the web and into underlying deck plank supports. A closure strip for the channel snaps into the top of the channel to provide a smooth top surface for the deck plank and to close off the channel. The channel may be lighted and/or heated with an appropriate energy source enclosed in the channel.

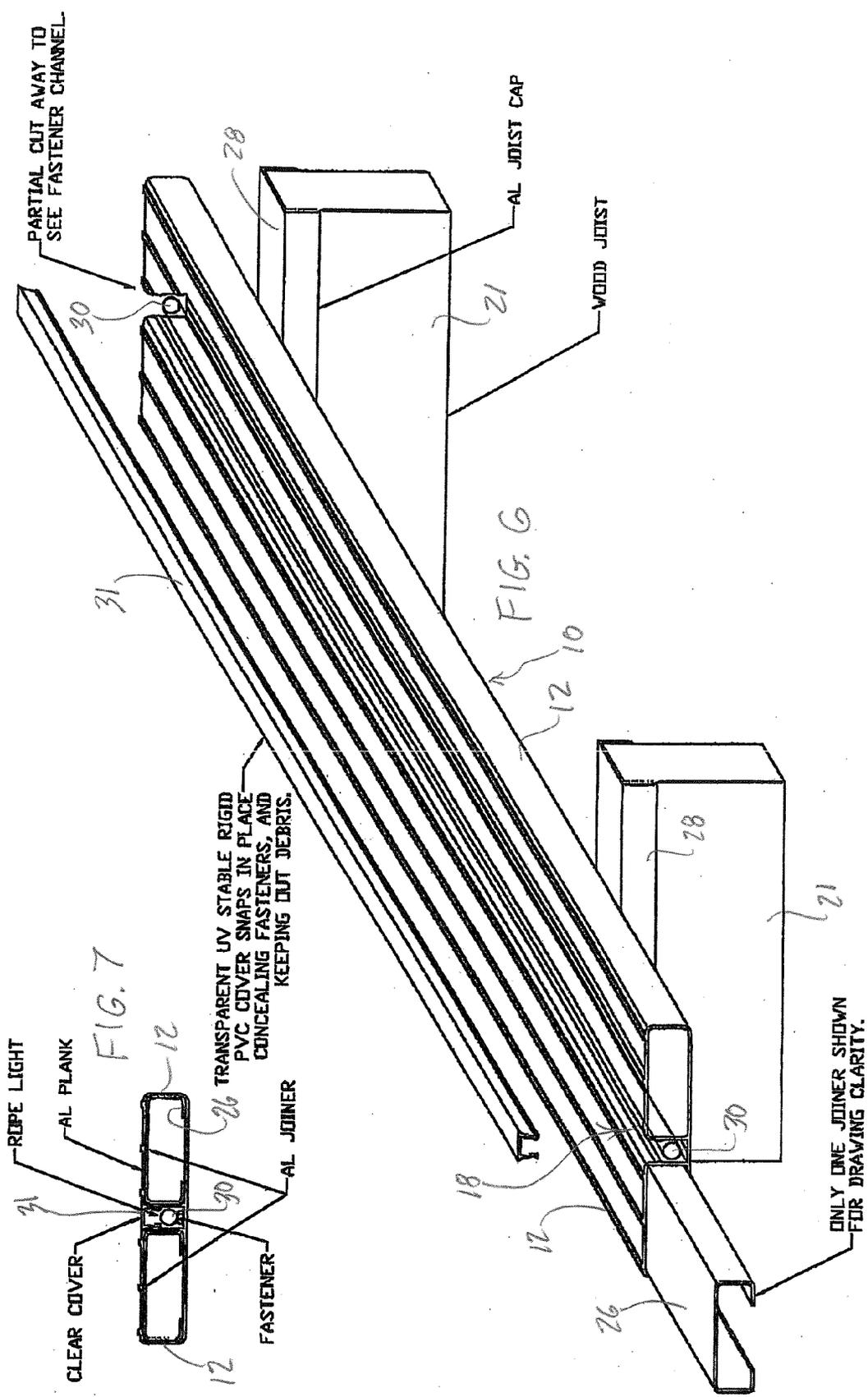
**Related U.S. Application Data**

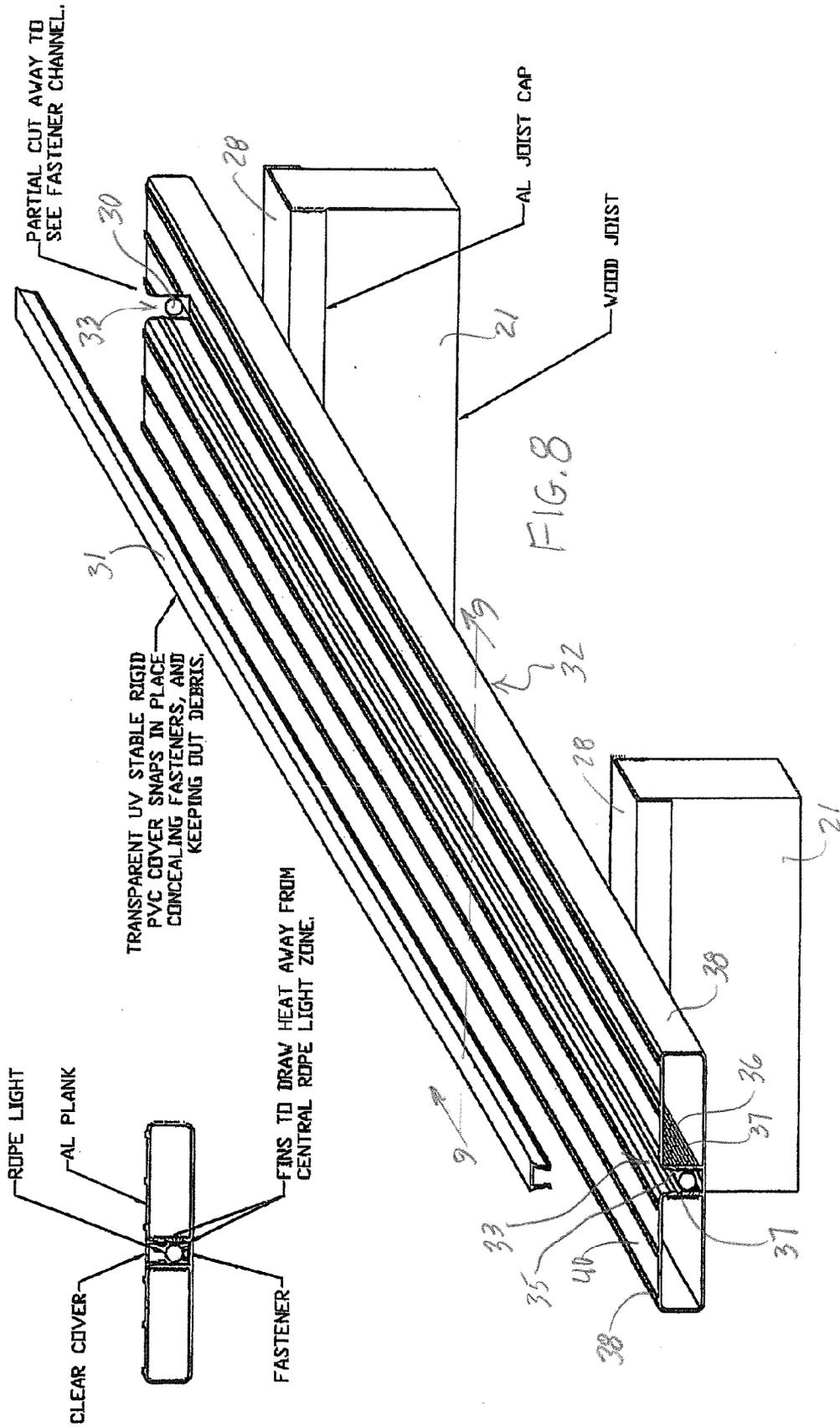
(60) Provisional application No. 61/239,474, filed on Sep. 3, 2009, provisional application No. 61/243,342, filed on Sep. 17, 2009, provisional application No. 61/247,353, filed on Sep. 30, 2009.













**EXTRUDED ALUMINUM DECK PLANK WITH LIGHTING AND HEATING FEATURES**

**CROSS REFERENCE TO RELATED APPLICATION**

**[0001]** This application relates to and claims priority from U.S. Provisional Application Ser. No. 61/239,474, filed Sep. 3, 2009; Ser. No. 61/243,342, filed Sep. 17, 2009; and Ser. No. 61/247,353, filed Sep. 30, 2009.

**BACKGROUND OF THE INVENTION**

**[0002]** The subject invention pertains to planks for use in the construction of decks, piers and the like and, more particularly, to an extruded aluminum deck plank that provides simple and effective arrangements for attaching side-by-side to an underlying wooden support and for attaching the planks end-to-end.

**[0003]** It is well known in the art to use extruded aluminum planks in structures such as bleachers. In these structures, the extruded aluminum planks may serve both as the seat member and the foot rest. However, typical attachment of these extruded members to underlying supports require complex fastening systems.

**[0004]** It is also well known in the art to make deck planks from plastic extrusions. Such plastic extrusions are commonly used for decks and piers, but have typically not found successful use in bleachers where the loads are greater and typically more concentrated. Furthermore, plastic is not considered to be as durable as aluminum, particularly in outdoor applications.

**SUMMARY OF THE INVENTION**

**[0005]** In accordance with the present invention, an extruded aluminum deck plank utilizes two rectangular plank halves extruded together and connected at their lower surfaces with a narrow web. The lower plank half walls and connecting web are coplanar and the connecting web is provided with holes for the receipt of screws or other connectors driven through the connecting web and into an underlying wooden support member. Inner side walls of the plank halves form, with the connecting web, a U-shaped channel that is closed (after fastening) with a long aluminum closure strip that is snapped into the channel and has an upper surface generally coplanar with the upper surfaces of the plank halves.

**[0006]** The closure strip has a generally inverted U-shape cross section and the upper surface of the closure strip joins two integrally formed downwardly depending side walls that engage the side surfaces of the U-shaped channel with engaging ribs to hold the closure strip in place.

**[0007]** Provision is also made for connecting the deck planks end-to-end with splice pieces inserted into and joining the ends of longitudinally adjacent plank halves.

**[0008]** In an alternate embodiment of the invention, the U-shaped channel is provided with a string of LED lights and the closure strip is made from a transparent or other light-transmitting plastic material.

**[0009]** In a modified deck plank, an extruded cross section is provided that imparts a longitudinal rib surface along the surfaces of the U-shaped channel as well as the corresponding inside surfaces of the plank halves. The ribs provide a heat sink for heat generated by the string of LED lights and the heat is conducted away from the ribs to the plank surfaces to

inhibit the formation of ice and to dry accumulated moisture. A strip of heat tape may be used instead for heating.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0010]** FIG. 1 is an exploded perspective view of the deck plank and closure strip of the present invention.

**[0011]** FIG. 2 is an enlarged cross section taken on line 2-2 of FIG. 1.

**[0012]** FIG. 3 is a vertical section taken through the closure strip shown in FIG. 1;

**[0013]** FIG. 4 is a sectional view, similar to FIG. 2, showing the closure strip in place;

**[0014]** FIG. 5 is a perspective view similar to FIG. 1, showing a spliced connection for joining the ends of two deck planks;

**[0015]** FIG. 6 is a perspective view similar to FIG. 1 showing another embodiment of the invention;

**[0016]** FIG. 7 is a vertical section similar to FIG. 4 showing details of the FIG. 6 embodiment;

**[0017]** FIG. 8 is a perspective view of the modified plank, similar to FIGS. 1 and 5; and,

**[0018]** FIG. 9 is an enlarged vertical cross sections taken on line 9-9 of FIG. 8.

**DETAILED DESCRIPTION OF THE INVENTION**

**[0019]** Referring initially to FIG. 1, an extruded aluminum deck plank 10 is shown with a closure strip 11 before the strip is attached to the plank. The closure strip in this embodiment is also an aluminum extrusion. The extruded plank includes two rectangular plank halves 12 whose horizontal lower walls 13 are joined by a connecting web 14 to form a coplanar lower surface. The upper walls 15 of the plank halves 12 are provided on their outside surfaces with longitudinal ribs 16 to enhance the footing of persons walking on the upper surfaces 15 of the planks 10.

**[0020]** The narrow connecting web 14 forms with the interior side walls 17 of the plank halves a U-shaped channel 18. Suitable fasteners, such as screws 20, may be inserted through holes in the connecting web 14 and driven into an underlying wooden support 21 as shown in FIG. 7 This arrangement is shown in FIG. 4.

**[0021]** Once a deck plank 10 has been fastened to one or more suitable wooden joists or supports 21, the U-shaped channel 18 is closed by pressing the closure strip 11 into the channel 18 where it is snapped and locked into position. When locked in place, the horizontal upper surface 22 of the closure strip lies generally coplanar with the upper surfaces 15 of the plank halves 12.

**[0022]** As best seen in FIG. 2, the transition between the upper walls 15 of the plank halves 12 and the surfaces of the interior side walls 17 are rounded. The closure strip 11 has an inverted U-shaped cross section including downwardly depending side walls 23 that are slightly rounded and outwardly concave to match and receive the rounded interface. Lower ends of the closure strip side walls 23 are provided with oppositely facing longitudinal detent ribs 24 that are adapted to override horizontally extending locking ribs 25 on the side walls 17 of the plank halves. The closure strip 11 snaps into position to provide a continuous upper surface, concealing the fasteners 20 and keeping debris out of the channel 18. The tight fitting closure strips 11 also add to and enhance the stiffness of the deck plank 10.

[0023] As shown in FIG. 5, if it is necessary join plank halves 12 end-to-end, short splice members 26 are inserted into the adjoining open ends of the plank halves 12 where they may be secured in place with horizontal end fasteners, such as sheet metal screws 27. The splice or joint members 26 also comprise aluminum extrusions and have a C-shaped cross section.

[0024] Although the splice pieces 26 used to join the ends of adjacent longitudinally extending planks 10 are preferably made of aluminum extrusions, they could be made of plastic or wood. However, aluminum extrusions are still preferred because of their enhanced strength and durability as compared to plastic or wood materials.

[0025] As also best seen in FIG. 5, the tops of the wooden supports 21 (which may comprise conventional 2x8 wood joists) may be covered with an aluminum joist cap 28. In such case, the fasteners 20 would be driven into the wooden joists through holes in the joist cap 28, as well as the connecting web 14.

[0026] Referring to FIGS. 6 and 7, the utility and safety of the extruded planks may be substantially enhanced by placing a string of LED lights 30 in the U-shaped channel 18 after it has been fastened with fasteners 20 to the underlying wooden support 21. The extruded aluminum closure strip 11 of the previously described embodiment is replaced by a transparent or other light-transmitting plastic closure strip 31.

[0027] By using the embodiment of FIGS. 6 and 7 in the construction of a pier, for example, the LED lights 30 provide a safety feature as well as an esthetic addition. Piers made with planks containing LED light strings provide guidance for both users on the pier or users of a boat to help locate the edge of the pier in poor light or dark conditions.

[0028] A modified deck plank 33 is shown in FIGS. 8 and 9. It has been found that the string of LED lights 30 placed in the channel 18 and enclosed by the transparent and UV-stable closure strip 11 generates considerable heat in use. To capture and distribute the heat, the side surfaces 34 of the U-shaped center channel 33 are provided with longitudinal ribs 35 to create a heat sink. Similarly, the opposite inside surfaces 36 of the plank halves 38 are provided with longitudinal ribs 37 that enhance the heat sink and heat distribution properties of the modified plank 32.

[0029] In the embodiment best shown in FIG. 9, internal longitudinal ribs 35 are somewhat smaller and more closely spaced than the longitudinal ribs 37 on the adjacent inside surfaces of the plank halves 38. The heat flowing to the heat sink provided by the ribs is conducted away from the central U-shaped channel 33 and conducted to the main body of the plank 32. In particular, the upper surfaces 40 of the plank halves 38 are warmed sufficiently to prevent freezing and the accumulation of ice and to dry any water that may accumulate thereon.

[0030] Heat may also be provided by substituting a heat tape for the light string 30. This would, of course, eliminate the lighting feature, but still utilize the heating feature.

What is claimed is:

- 1. An extruded aluminum deck plank comprising:
  - a pair of longitudinally extending parallel tubular plank halves, said plank halves being laterally spaced apart and each plank half having upper and lower walls connected by outer and inner side walls,
  - an integral connecting web coplanar with the lower wall of the plank halves and extending between and connecting the plank halves, the web and the opposed inner side surfaces of the inner side walls defining a U-shaped channel, the channel adapted to receive fasteners inserted vertically into the channel, through the web and into underlying deck plank supports, and
  - a closure strip for the channel having an inverted U-shaped cross section, the closure strip having a generally planar upper surface and downwardly depending side walls, the closure strip closing the channel with the upper surface of the strip generally coplanar with the upper surfaces of the plank halves, and the side walls of the strips in locked engagement with the opposed inner side surfaces of the channel.
- 2. The deck plank as set forth in claim 1 wherein the closure strip is aluminum.
- 3. The deck plank as set forth in claim 2 wherein the closure strip comprises an aluminum extrusion.
- 4. The deck plank as set forth in claim 1 wherein the closure strip is plastic.
- 5. The deck plank as set forth in claim 4 wherein the closure strip comprises a plastic extrusion.
- 6. The deck plank as set forth in claim 1 comprising an energy source enclosed in the channel.
- 7. The deck plank as set forth in claim 6 wherein the closure strip comprises transparent plastic, and the energy source comprises a light string extending along the channel.
- 8. The deck plank as set forth in claim 6 wherein the energy source comprises a heat tape extending along the channel.
- 9. The deck plank as set forth in claim 6 wherein the inner and outer side surfaces of the inner side walls are provided with longitudinally extending ribs to enhance heat transfer from the channel to the interior of the plank halves.
- 10. The deck plank as set forth in claim 9 wherein the longitudinal ribs on the inner side surfaces are smaller than the longitudinal ribs on the outer side surfaces.
- 11. The deck plank as set forth in claim 1 including holes for the fasteners in the web extending along the channel.
- 12. The deck plank as set forth in claim 1 wherein the opposed inner surfaces of the inner side walls have a longitudinally extending locking rib positioned to be overridden by longitudinally extending oppositely facing detent ribs on the closure strip to provide the locked engagement.
- 13. The deck plank as set forth in claim 1 including splice pieces inserted into the interior of longitudinally adjacent deck planks to join the planks together.
- 14. The deck plank as set forth in claim 13 wherein the splice pieces comprise aluminum extrusions.
- 15. The deck plank as set forth in claim 14 wherein the extrusions have a C-shaped cross section.

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