Title: DEVICES, SYSTEMS AND METHODS FOR EXTERIOR FLOORING

Abstract: Novel devices, systems, and methods for providing exterior flooring that can be installed over existing exterior surfaces (30-102), such as surfaces of an outdoor deck, are provided herein. In some aspects, a joint device or joint member for an exterior floor covering (70) can include a body portion (24-92) and at least one tongue portion (26-90) extending from the body portion (24-92). The joint device (16-86) can be adapted to connect adjacent floor panels (72) and secure the floor panels (72) to an underlying surface (30-102). The joint device (16-86) can, but is not required to pass liquid (L-R) there between. The joint device (16-86) and adjacent floor panels (12-14-82-84) can be made of water resistant materials. The joint device (16-86) can further include an optional opening (94) adapted to receive an attachment member for attaching portions of the joint member (16-86) to an underlying surface (30-102).
Description

Title of Invention: Devices, systems and methods for exterior flooring.

TECHNICAL FIELD

[0001] The subject matter disclosed herein relates generally to novel devices, systems, and methods. More particularly, the subject matter disclosed herein relates to novel devices, systems, and methods for providing exterior flooring that can be installed over existing exterior surfaces, such as surfaces of an outdoor deck.

BACKGROUND

[0002] Easy to assemble, or "do it yourself" (DIY) floor panels have increased in popularity for use as replacements for interior parquet floors, linoleum sheet floors, and wall-to-wall carpets. Such floor panels offer consumers durable and aesthetically pleasing products at affordable price points. In conventional systems, opposing first and second edges of a floor panel are provided with a groove and a tongue, respectively, such that adjacent floor panels can directly engage and lock together. For example, a tongue of a first floor panel can engage and lock directly with a groove of a second floor panel. All four edges of a conventional floor panel can lock directly with one or more adjacent panels forming joints directly therebetween.

[0003] Conventional floor panels, systems, and methods have several disadvantages rendering them unsuitable for outdoor use and are therefore, unsuitable for use in exterior floor covering applications. For example, one disadvantage of conventional floor panels, systems, and methods is that there is no effective manner in which the panels can be secured for outdoor use. A first type of conventional floor panels for interior use, is known e.g. from WO 96/27721. These floor panels can be pulled together tight on all four sides forming substantially gap-free joints therebetween without the need of glue. A second type of conventional floor panels is installed using the conventional method of gluing panels together. A floor covering installing using such method may not be resistant to adverse weather, may be insufficient to secure the panels to exterior surfaces on windy days or during cleaning, and/or may be ineffective when exposed to the elements during outdoor use. There is no effective manner, neither with the first type nor with the second type of conventional floor panels, in which water from rain, melted snow, ice or moisture and/or liquid from outdoor weather conditions, can leave the surface of the floor panels or effectively penetrate the joint between adjacent panels. Thus, when used in an outdoor environment, water will pool on the surface of conventional floor panels which can create an undesirable and
potentially dangerously slippy surface. Large quantities of moisture and/or liquids resulting from weather or outdoor environmental conditions could also accumulate on surfaces of floor panels and cause adverse effects such as swelling and/or buckling of the floor panels. Accordingly, a need remains for devices, systems, and methods for establishing suitable floor coverings adapted for exterior or outdoor use.

One proposed method of using conventional floor panels exterior to the home (e.g. outdoors) includes installing the floor panels at a sloped angle or incline, thereby allowing water to run off the surface at an angle. This method is impractical as it would require installing floor panels over an existing outdoor structure (e.g. a wood deck) where a sloped surface is not needed, nor desired. In addition, this option requires significant and costly modifications to the existing structure being covered by the floor panels. This method also presents a further challenge and is disadvantaged as outermost floor panels can be installed with a perimeter transition or end molding, which would effectively dam the water and prevent it from running off of the sloped surface. As an alternative to a floor covering, conventional wooden decks or outdoor floors can be replaced with new wood or a wood plastic composite structure. However, this option is typically not suitable for DIY’ers and can be expensive. To date, an effective method for joining floor panels for outdoor use is missing, an effective joining device, in particular a device that is structurally stable and/or easy to assemble for use in exterior floor coverings is lacking in the art.

DE 101 62 275 CI, WO 98/58142 and US 2007/094,985 A1 disclose a connecting element or joint device for connecting flooring panels with a core of MDF or HDF (Medium or High Density Fiberboard). These connecting elements and panels are not suitable for outdoor use. Water would either pool on the surface of the floor covering or damage the core material of the panels. The connecting element has limited dimensions and seems rather unstable. To protect the joint from water ingress and subsequent damage because of swelling of the MDF/HDF core material, the US 2007/094,985 A1 proposes an overlap between the edges of the panels and the connecting elements. Such protection could be suitable for indoor use in the case water is spilled on the floor, but seems inadequate under outdoor weather conditions. The flooring panels are installed floatingly over an existing underground and require perimeter transition or end moldings, that could dam water.

US 4,599,841, US 7,409,803 and US 5,694,730 disclose a spline or joining device for joining wood boards. The spline of US 5,694,730 provides drainage of water through holes. The disclosed splines leave the wooden material of the boards exposed at the edge. The obtained floor covering would not be suitable for outdoor use. Evacuation of drained water seems complicated. The joint created between two boards by means of the spline would seem to have limited strength. The US 7,409,803 relates to a newly
installed deck comprising joint devices in between the wooden boards. The deck needs to be installed on joists and the wooden boards and joint devices are not suitable for being installed over an existing underground as a floor covering.

US 1,723,306 discloses a strip or joining device for joining wooden bodies. The strip provides for a mutual locking of bodies both in a horizontal direction perpendicular to the strip or the lateral edges of the bodies and in the plane of said bodies, and in a vertical direction perpendicular to the plane of locked together bodies. These strips and panels are not suitable for outdoor use. Water would either pool on the surface of the floor covering or damage the core material of the panels. The connecting element has limited dimensions and seems rather unstable.

Despite the availability of various devices, systems, and methods in the marketplace, a need remains for devices, systems, and methods for providing exterior floor coverings. In particular, a need exists for providing a joint between edges of floor panels such that water can efficiently pass therebetween for preventing pools of water from accumulating on the surface of provided floor coverings.

**SUMMARY**

In accordance with this disclosure, devices, systems, and methods for exterior flooring are provided and described herein. Devices, systems, and methods described herein can provide improved capabilities of securing exterior flooring elements to an existing or underlying outdoor structure. In some aspects, devices systems, and method described herein can provide improved and efficient draining or moisture channeling capabilities from surfaces of a floor covering and can be well suited for a variety of exterior/outdoor applications such as an exterior floor covering installed over an existing real wood or non-wood deck, or over portions of an existing deck such as what can be done with an exterior area rug. It is, therefore, in the first place, an object of the present invention to provide alternative joint devices, systems, and methods for exterior flooring. According to preferred embodiments joint devices, systems, and methods are obtained which offer beauty, ease of installation, and/or an alternative to replacing and/or refinishing an existing outdoor surface such as an aged wood deck, which, in accordance with the prior art, would be done for example, by washing, sanding, and staining an aged wood deck.

One or more of these and other objects of the present disclosure as can become apparent from the disclosure herein are achieved, at least in whole or in part, by the subject matter disclosed herein.

According to a first independent aspect of the invention, it relates to a joint device for an exterior floor covering, wherein said floor covering is assembled at least from a plurality of panels and joint devices; the joint device comprising: a body portion; at
least one tongue portion and/or groove portion extending from, respectively in the body portion; said tongue portion preferably being adapted to engage a lateral edge of at least one of said panels; said joint device being adapted for securing portions of said exterior floor covering to portions of an underlying surface. The joint device, more particularly at least said body portion and/or said tongue portion, is preferably disposed between at least two of said panels. Said joint device is preferably adapted for outdoor use, e.g. because it is made of or comprises a material that can withstand heavy weather conditions, for example a plastic or a metal or a wood plastic composite material.

[0012] Preferably said tongue portion is adapted to engage with a groove portion disposed within said panel, more particularly along a lateral edge of said panel, or vice-versa.

[0013] Preferably said joint member comprises first and second tongue portions, preferably at opposite sides of said body portion, wherein said tongue portions are adapted to engage first and second groove portions, preferably disposed within first and second floor panels, respectively.

[0014] The joint device of the first aspect allows installation of flooring panels over existing surfaces, such as over a patio and/or real wood or non-wood type deck surfaces. The joint device can be secured to the existing surface, and therefor transition or end moldings along the perimeter could be dispensed with.

[0015] Preferably the joint device is adapted to drain liquid from between adjacent floor panels. According to a first possibility the joint device comprises at least one, and preferably multiple sections made from a porous material. According to a second possibility the joint device comprises at least one, and preferably multiple openings or through-holes. According to a third possibility the joint devices are positioned end-to-end with a gap in between. Of course the joint device might be adapted in still other ways to allow liquid to drain. Preferably said liquid is drained into a collection space, wherein said collection space is preferably available below the joint device, preferably below said body portion. A spacer can be disposed in the collection space or adjacent thereto. Preferably a porous spacer, a spacer that is liquid permeable, or a spacer having openings is applied. It is clear that such arrangement can effectively drain liquid from the top of the floor covering to underneath the joint member and/or panels.

[0016] Preferably, the joint member comprises a long edge facing, preferably abutting, the lateral edge of an adjacent floor panel. Preferably both long edges of the joint member face and, preferably abut the lateral edges of floor panels in adjacent rows. In accordance with this preferred embodiment, preferably a contact surface is formed between the long edge of the joint member and the respective lateral edge of the adjacent floor panel. It is clear that in accordance with this preferred embodiment, the joint member preferably does not overlap said lateral edge of the adjacent floor panel.
In accordance with this preferred embodiment, the upper surface of the adjacent floor panel is completely adjacent the upper surface of said joint member. Herein the upper surface of said joint member may be at any level compared with the upper surface of the adjacent floor panel, though preferably with a highest point at the same level or below the upper surface of the adjacent floor panel. In such case, it is obtained that water or other liquid on the upper surface of the floor panel is less obstructed from flowing towards the upper surface of said joint member. It is clear that the upper surface of the joint member might but need not be level. The upper surface of the joint member might be provide with a inclined or bending surface portion directed downwardly from the lateral edge of the adjoining floor panel inwardly. Any porous section or opening, when available, is preferably situated in the upper surface of the joint member at a level below the upper surface of the adjacent floor panel.

[0017] Preferably the joint device further comprises at least one opening adapted to receive an attachment member for securing portions of the joint device or joint member to the underlying surface. According to a first possibility said opening is provided in said body portion. According to a second possibility said opening is disposed in a foot portion extending away from the body portion. Preferably the opening is arranged such that it is covered by one of the panels adjacent the joint device.

[0018] Clearly, according to the first independent aspect of the invention, the joint member comprises one or more coupling portions, such as tongue portions and/or groove portions for engaging with a lateral edge of the floor panels. Preferably said coupling portions do not intersect with possible openings or porous sections in the joint member and/or do not intersect with a longitudinal plane through the central axis of said joint member and perpendicular to the plane of the floor panels. The central axis can be defined as the longitudinal axis going through the center of gravity of the cross-section of the joint member. The avoidance of the intersecting geometry leads to a more stable joint member.

[0019] Preferably said joint device or joint member is configured to elevate portions of at least one of said floor panels. Preferably such joint device comprises a lower portion extending underneath at least one of said panels, to thereby, preferably directly, support said panel in a position in which the panel is elevated from the underlying surface, in other words, in a position where a distance is maintained between the bottom of the panel of the floor covering and the underlying surface, e.g. between the bottom of the panel and the to be renovated surface of an existing deck. This distance can serve to drain water. The created space underneath the elevated floor panel may be filled with a spacer material able to drain or absorb, preferably temporarily, the drained liquid. It is possible that the lower portion is elevated itself from the underlying surface, for example because it comprises a leg portion, and preferably also a foot.
portion, by which it is supported on the underlying surface.

Preferably said tongue portion is included in an upper portion of said joint device. Preferably said tongue portion or upper portion interacts at least with the same panel as said lower portion, when available.

It is clear that the present invention according to a second independent aspect also related to a joint system that applies the joint device or joint member of the first aspect. Preferably such joint system comprises: a first panel; a second panel; and a joint member disposed between the first floor panel and the second floor panel; wherein the first and second floor panel are completely spaced apart; wherein the joint member is adapted to completely separate the first floor panel from the second floor panel while securing the first and second floor panels to each other and to portions of an underlying surface. With "completely spaced apart", it is meant that the respective floor panels are free from overlapping edge portions.

Preferably a portion of the joint member is visible between the first and second floor panels when viewed from above.

Preferably an attachment device is disposed below the first floor panel and/or the second floor panel, and is, hence, not visible from above.

It is clear that the joint member or joint device is preferably adapted to drain liquid to a collection space. Preferably the joint member comprises a plurality of openings, preferably slotted openings, adapted to pass liquid through portions of the joint member. Preferably, at least one collection space is provided below portions of each of the first floor panel, the second floor panel, and the joint member. A spacer material can be disposed in said collection space. Such spacer could be liquid permeable.

Preferably, the first and second floor panels are weatherproof.

Preferably the first and second floor panel and/or said joint member are elevated from the underlying surface and/or do not directly touch said underlying surface.

Preferably said joint member comprises first and second tongue portions, preferably at opposite sides of said body portion, wherein said tongue portions engage first and second groove portions, preferably disposed within first and second floor panels, respectively.

According to a special embodiment of said second aspect the joint system may comprise an end member disposed about an outermost panel of the system.

It is clear that the invention, according to a third independent aspect, also relates to floor coverings that apply the joint system of the second aspect. Preferably, such floor covering comprises: a plurality of floor panels adapted to be arranged in parallel rows over a portion of an outdoor surface; a plurality of joint members disposed between at least one or more of the parallel rows of the floor panels, wherein the joint members are adapted to secure the plurality of floor panels together and to the outdoor surface;
and wherein the plurality of floor panels do not directly touch the outdoor surface, or, in other words, wherein the plurality of floor panels are elevated from the outdoor surface.

[0030] Preferably said joint members are adapted to pass a liquid between the parallel rows of floor panels.

[0031] According to a special embodiment a first panel of said plurality of floor panels is disposed at an angle to at least a second floor panel or of said plurality of floor panels.

[0032] Preferably, each joint member of said plurality of joint members is attached to the outdoor surface via at least one attachment member, such as a screw, a nail or similar.

[0033] Preferably said joint members of the plurality of joint members are aligned end-to-end, wherein the aligned ends are preferably spaced apart.

[0034] Said floor covering may further comprise a plurality of end members disposed about a perimeter of said floor covering.

[0035] In accordance with a fourth independent aspect the invention relates to a joint member for an exterior floor covering, the joint member comprising: a body portion; at least one tongue portion extending from the body portion; and at least one opening extending through the body portion, wherein the opening is configured to pass a liquid directly from an upper surface of the exterior floor covering through the body portion of the joint member. The joint member may comprise weatherproof material, such as a plastic material or a wood plastic composite material. Preferably said joint member comprises a plurality of openings disposed along a length of said body portion. Preferably said at least one opening comprises a diameter that is configured to be approximately equal to or less than a width of a gap between adjacent floor panels.

[0036] The opening may further show one or more of the following properties:
- the opening comprises a channel;
- the opening comprises a slot;
- the opening comprises a tapered inner wall;
- an attachment member is disposed in a portion of the opening.

[0037] The joint member of the first or fourth aspect may further show one or more of the following properties:
- the joint member comprises a decorative upper surface;
- the joint member comprises metal;
- the joint member comprises silver (Ag) ions added either during or after manufacture;
- the joint member is anti-microbial;
- the joint member comprises a surfactant;
- the joint member comprises at least one groove;
- the joint member comprises a flexible material;
the joint member is plastic;
- the joint member comprises a material that is rollable such that the joint member can be provided in a roll;
- the joint member comprises a stiff material;
- the joint member is metal;
- the joint member can be cut to a desired length;
- the joint member allows for expansion of the adjacent floor panels, preferably in that it provide for a gap or other movement space between all laterally facing edges of at least one of the adjacent floor panels and said joint member.

[0038] It is clear that the joint member of the fourth independent aspect may show the features of the joint member of the above first aspect or the preferred embodiments thereof, though not necessarily.

[0039] Said body portion may be centrally located between first and second tongue portions.

[0040] Preferably said tongue portion comprises a web portion adapted to engage with a recess portion in a groove of a first panel; said recess portion preferably being correspondingly shaped.

[0041] The joint member of the fourth aspect is preferably adapted to connect a first floor panel to a second floor panel over an existing outdoor surface.

[0042] The joint member may comprise an inclined upper surface configured to align with a first upper surface of a first floor panel and a second upper surface of a second floor panel for providing the floor covering with a continuous upper surface between panels. Preferably a portion of the inclined upper surface of the joint member is configured to slope downwardly from the first upper surface of the first floor panel towards the hole or opening.

[0043] According to a preferred embodiment, said opening extends between an inclined upper surface of the joint member and a collection area, and wherein the inclined upper surface is wider than the collection area.

[0044] According to a fifth independent aspect the invention relates to a joint system that comprises the joint member of the fourth aspect. The joint system preferably comprises: at least a first floor panel; at least a second floor panel; a joint member disposed between the first floor panel and the second floor panel; and wherein the joint member is adapted to pass liquid between the first floor panel and the second floor panel. Preferably, each of the first floor panel, the second floor panel, and the joint comprise weatherproof material. Preferably the first and the second panels comprise the same weatherproof material as the joint member. It is of course also well possible that the first and second panels comprise a first weatherproof material, and that the joint member comprises a second weatherproof material that is different from the first
weatherproof material.

[0045] Preferably, the first floor panel and the second floor panel are disposed over a substantially planar outdoor surface.

[0046] Preferably, the plurality of floor panels are arranged in parallel rows and, preferably, the joint system further comprises a plurality of joint members disposed between the parallel rows of floor panels.

[0047] Preferably, the joint system comprises a spacer disposed between the first and second floor panels and the outdoor surface.

[0048] The first floor panel and the second floor panel may comprise male profiles, e.g. substantially formed as a tongue, at the lateral edge adjacent the joint member, and possibly also at the opposite lateral edges. Instead of a male profile at the opposite lateral edge, the first and second panel may comprise a female profile, e.g. substantially formed as a groove. According to an alternative embodiment, the first and second floor panel comprise female profiles, e.g. substantially formed as a groove, at the lateral edge adjacent the joint member, and possibly also at the opposite lateral edges. Instead of a female profile at the opposite lateral edge, the first and second panel may comprise a male profile, e.g. substantially formed as a tongue.

[0049] According to a sixth independent aspect, the invention relates to a floor covering obtainable with the joint systems of the fifth aspect. Preferably the floor covering of the sixth aspect comprises: a plurality of floor panels to be arranged in parallel rows over a portion of an underlying, e.g. outdoor, surface; and a plurality of joint members disposed between the parallel rows of the floor panels, wherein the joint members are adapted to pass a liquid between the parallel rows of floor panels. It is clear that the joint members may be adapted to pass a liquid because the joint members comprise one or more porous sections, such as openings, and/or because they are positioned end-to-end with an intermediate opening or gap.

[0050] According to a first preferred embodiment of the sixth independent aspect, the joint member comprises a long edge facing, preferably abutting, the lateral edge of an adjacent floor panel. Preferably both long edges of the joint member face and, preferably abut the lateral edges of floor panels in adjacent rows. In accordance with this preferred embodiment, preferably a contact surface is formed between the long edge of the joint member and the respective lateral edge of the adjacent floor panel. It is clear that in accordance with this preferred embodiment, the joint member preferably does not overlap said lateral edge of the adjacent floor panel. In accordance with this preferred embodiment, the upper surface of the adjacent floor panel is completely adjacent the upper surface of said joint member. Herein the upper surface of said joint member may be at any level compared with the upper surface of the adjacent floor panel, though preferably with a highest point at the same level or below the upper
surface of the adjacent floor panel. In such case, it is obtained that water or other liquid on the upper surface of the floor panel is less obstructed from flowing towards the upper surface of said joint member, from where it can be drained. It is clear that the upper surface of the joint member might but need not be level. The upper surface of the joint member might be provide with a inclined or bending surface portion directed downwardly from the lateral edge of the adjoining floor panel inwardly. Any porous section or opening in the joint member is preferably situated in the upper surface of the joint member at a level below the upper surface of the adjacent floor panel.

According to a second preferred embodiment of said sixth aspect of the invention, the upper surfaces of each of the plurality of floor panels connect directly to angled upper surfaces of each of the plurality of joint members such that the plurality of floor panels and joint members form a continuous upper surface of the floor covering. Of course this second preferred embodiment may be combined with the above first preferred embodiment.

According to a third preferred embodiment of said sixth aspect of the invention, the joint member comprises one or more coupling portions, such as tongue portions and/or groove portions for engaging with a lateral edge of the floor panels. Preferably said coupling portions do not intersect with possible openings or porous sections in the joint member and/or do not intersect with a longitudinal plane through the central axis of said joint member and perpendicular to the plane of the floor panels. The central axis can be defined as the longitudinal axis going through the center of gravity of the cross-section of the joint member. The avoidance of the intersecting geometry leads to a more stable joint member.

It is clear that said floor covering may be arranged over the entire outdoor surface.

According to the above sixth independent aspect it is not necessary so that the joint members are secured to the underlying surface. The floor covering may be configured to float over said underlying surface. Preferably the floor panels and/or the joint members, or at least a portion thereof, are elevated above the underlying surface. In this way a collector space for drained liquid may be created. This collector space may be partly or wholly filled with a spacing material, that is preferably liquid permeable.

According to a special embodiment said joint member is provided with coupling means allowing for a connection with a plurality of panels in said adjacent rows, wherein these panels are provided, preferably at their lateral edge, with coupling means cooperating therewith. Said coupling means may be basically shaped as a tongue and/or a groove, preferably provided with locking means. Said coupling means and locking means may provide for a connection with an adjacent floor panel wherein the floor panel and the joint member become locked both in a vertical direction perpendicular to the plane of the floor panel, as in a horizontal direction perpendicular to the lateral
edge of the floor panel and in its plane. Preferably, said coupling means and locking means of said joint member do not intersect with any means that provide for the passing of water through the joint member, such as an opening or porous section. It is clear that the joint member may be provided with a groove at one long edge and a tongue at the opposite long edge, or with a groove at both long edges, or with a tongue at both long edges. The floor panels in the rows adjacent the respective joint member should then be formed with cooperating coupling means in that they preferably also are provided with a groove at one lateral edge and a tongue at the opposite lateral edge, a tongue at both lateral edges or, respectively, a groove at both lateral edges. It is also possible to work with two types of floor panels and/or joint members, wherein these types differ from each other at least in the configuration of the coupling means.

According to a particular embodiment, the floor panels may comprise coupling means at the short sides, e.g. adapted to be engaged by means of a downward motion. Such downward motion may be obtained by means of a so-called fold-down motion, wherein the panel is rotated down into the plane around its longitudinal edge and automatically a downward motion comes into existence at the short sides. This rotation might in the same time result in an engagement or connection at said longitudinal edge, e.g. with the there available joint member, more particularly with the tongue or groove portions thereof. Preferably, the engagement of the short sides results in a prevention of separation of the connected panels in a horizontal direction in the plane of the panels and perpendicular to said short sides. Preferably, but not necessarily, the engagement also results in a prevention of separation of the connected panels in a vertical direction perpendicular to the plane of the panels. It is noted that this particular embodiment is useful whether or not the joint member is adapted for allowing liquid to pass between the parallel rows of floor panels. Therefore, it is remarked that, in accordance with a deviating embodiment, the invention independently relates a floor covering comprising: a plurality of floor panels to be arranged in parallel rows over a portion of an underlying, e.g. outdoor, surface; and a plurality of joint members disposed between the parallel rows of the floor panels, wherein the joint members are adapted such that a floor panel can be connected thereto with its longitudinal edge by means of a rotational movement along said edge, and wherein the short sides of the floor panels are adapted to mutually engage with a downward movement. The coupling means at the long sides for connecting the lateral longitudinal edge of the floor panel to the joint member are preferably formed as in the above special embodiment. The coupling means at the short sides are preferably formed as a lower hook portion at one short side, and an upper hook portion at the opposite short side of the floor panels, wherein the lower hook portion and upper hook portion engage over and after each other to thereby at least create said prevention of horizontal separation. Of course undercuts and corre-
sponding engaging parts maybe provided on said hook portions to thereby at least create said prevention of vertical separation at said short sides. The undercut and/or said corresponding engaging part may be formed as a separate element introduced in said hook elements.

[0057] According to a seventh independent aspect the invention relates to a floor covering comprising a plurality of floor panels arranged over an underlying surface, wherein the bottom of the floor panels is elevated from the underlying surface, thereby preferably creating a collector space for liquid drained from the top surface of the floor covering.

[0058] Preferably said collector space comprises a spacer material, wherein said spacer is preferably liquid permeable. Said spacer may or may not cover the entire underlying surface. Said spacer may be composed from panels, mats, boards, etcetera. Preferably said spacer occupies at least the majority of said collector space.

[0059] Preferably said spacer supports said floor panels in that it is at least positioned between the bottom of said floor panels and the underlying surface.

[0060] Preferably, said spacer material exhibits a compressive strength modulus of 35 MPa or more. Such material is ideal for supporting said floor panels.

[0061] Preferably said floor panels have a thickness of 15 millimeter or less, and even better 10 millimeter or less. It is not excluded to practice the invention of all aspect, especially the seventh aspect, with floor panels of 5 millimeter or less. Panels of 15 millimeter or less are prone to bending when elevated and stepped upon. However according to the above preferred embodiment of seventh aspect of the invention the panels can be supported by said spacer material.

[0062] Preferably, said spacer material comprises openings, e.g. cells or holes extending from the underlying surface to said floor panels. According to a first preferred embodiment said spacer material comprises a honeycomb structure, with cells extending, preferably orthogonally, from the underlying surface to said floor panels. Honeycomb structures exhibit an excellent compressive strength, which can easily be 35 MPa or more. The cell structure allows an excellent permeability for liquids. According to a second preferred embodiment, said spacer material may comprise a mat shaped underlayment that allows for water and liquids with similar viscosity, to flow through it. Examples of such mat shaped underlayment are matrices of tangled monofilaments, preferably comprising polymeric filaments, such as polypropylene filaments. Such underlaments comprise voids enabling water to flow through it.

[0063] Preferably the material of the spacer has a low ability or no ability to absorb water or similar liquids. Preferably the spacer material stores water or liquid only to an extent of 10% or less of its own weight, and even better 5% or less. This means that a spacer material weighing 1 kilogram, can only weigh at maximum 1.1 kg by absorbing water, or even better only at maximum 1.05 kg. For the material of the spacer preferably a
polymer, for example, generally a polyolefine, or, more specifically, polypropylene, may be selected.

[0064] Preferably the floor covering of the seventh aspect comprises the joint devices or joint members and/or the other features of the first till sixth aspect, and/or one or more of their preferred embodiments. Preferably said joint member or joint device separates the edges of two adjacently arranged floor panels, such that the joint between the floor panels is liquid permeable. Such can best be attained by one or more porous sections or openings in said joint devices or joint members, or by an opening between two joint-devices arranged end-to-end. Preferably said collector space is at least available underneath said joint device or joint member.

[0065] The optional joint members applicable in combination with the seventh aspect are preferably longer than a length of the panels, such that each panel is or can be supported over a substantial part of its respective edge by means of one and the same joint member or joint device. It is clear that such joint members or joint devices are preferably at least applied at both longitudinal edges of the panels, and that, such joint member has preferably a length of at least 90% of the length of the longitudinal edge of the panels or longer.

[0066] It is clear that according to a variant, the floor covering of the seventh aspect may be assembled from floor panels directly cooperating with each other at one or more of their edges, and thus, in that case preferably without the joint devices or joint members of the first till sixth aspect. To enable such assembly the floor panels may be provided at the respective edges with coupling means, preferably substantially having a tongue and groove form, which in addition may be lockable to one another to prevent the separation of the tongue and groove. For example, the tongue and groove may yield an alignment of the panels in a vertical direction perpendicular to the plane of coupled panels, and locking means, preferably provided on said tongue and groove, may lock two of such panels together in a horizontal direction in the plane of the panels and perpendicular to the respective edge. Such tongues and grooves and locking means are for example known from WO 96/27721 and WO 97/47834.

[0067] As stated before, the spacer material may be assembled from a plurality of panels or mats, either directly cooperating with each other at their edges, or not. Several of such panels or mats may be separated by a gap, e.g. underneath the optional joint device or joint member.

[0068] Said floor panels may be floatingly arranged over said collector space, and, as the case may be, over said spacer material, such that said floor panels may float independently from said collector space and/or spacer material. According to a variant the floor panels, or at least the optional joint members or joint devices, are secured to the underlying surface, either directly or indirectly, e.g. with the intermediate of at least
said possible spacer material.

[0069] The invention as defined in the first, second, third, fourth, fifth, sixth and/or seventh aspect or the preferred embodiments thereof, can be applied with a several types of floor panels.

[0070] According to a first possibility the invention is applied in combination with floor panels that comprise one or more layers of a compact laminate material. That is the floor panels can include a multi-layered structure comprised of materials such as compact laminate, where there is no fiberboard core, but rather many layers of thermosetting resin impregnated paper sheets bonded together. Such floor panels are e.g. known from WO 2013/050910. Any single or multi-layered structure comprising any material(s) is contemplated and can be provided herein.

[0071] According to a second possibility, the invention is applied with floor panels that comprise a decorative surface layer, such as a high pressure laminate, a veneer, a printed pattern, adhered to a particle or wood fibre board such as TRICOYA®, designed and manufactured by MEDITE®. A paper backing may be used and is contemplated herein. The floor panels can comprise a multi-layered stack including a paper backing layer that can be approximately 0.1 mm to 0.5 mm thick, a TRICOYA® core layer that can be approximately 6 to 8 mm thick and disposed over the paper backing, and a laminate decor layer that can be approximately 0.35 mm to 0.5 mm thick and disposed over the core layer. However, any materials and/or thicknesses are contemplated herein.

[0072] According to a third possibility, the invention according to any of the preceding aspects, or a combination thereof, is applied floor panels having a core comprising a wood particle board or wood fibreboard having a thickness swelling when submersed for 24 hours of less than approximately 12% or even of less than approximately 8%, measured for example in accordance with EN317. Preferably use is made of a board consisting of glued acetylated wood particles or fibers. The acetylation of wooden particles or fibers results in a lower possible thickness swelling of the particles or fibers, and therefore to a more moisture resistant board. For the glue preferably use is made of an urea-formaldehyde glue, a melamine-urea- formaldehyde or a methyl disocyanate based glue, such as methylene diphenyl diisocyanate based glue. In a preferred aspect, use is made of a board sold under the TRICOYA® brand as described in WO 2012/168446. The latter leading back to the aforementioned second possibility.

[0073] The floor panels used with the invention can comprise any size, shape, dimension, color, surface design, and/or finish (e.g., stain or abrasion resistant surface finishes including aluminum oxide $\alpha_{2}O_{3}$ finishes). The floor panels can comprise substantially rectangular shaped floor planks having a surface design that preferably emulates wood and/or wood grain. Alternatively, the floor panels can comprise substantially square
shaped floor planks having a surface design that emulates stone, tile, or brick. Alternatively, the floor panels comprise shapes having more or less than four sides, such as circular, non-circular, triangular, pentagonal, hexagonal, or octagonal shapes, or any other suitable regular or irregularly shaped panel, as desired. Any combination of shape, surface design, and/or finish is contemplated herein.

The invention is in the first place meant for floor panels having an overall thickness between approximately 2 mm and 18 mm (e.g., including overall thickness of all layers where multiple layers are used). For example, the floor panels can be approximately 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, or 15 mm thick. The joint devices, systems and floor coverings according to any aspect of the invention show that floor panels having such limited thickness can be applied as an outdoor floor covering, while existing deckings comprise thicker panels.

The upper surface of the floor panels may be provided with lowered edges at one or more sides. In the case of rectangular, oblong floor panels, preferably the upper surface edges of two opposite longitudinal sides are lowered, thereby creating a chamfer with a straight or bent surface. Preferably the decorative surface extends uninterruptedly from the upper surface to and over said lowered edge.

**BRIEF DESCRIPTION OF THE DRAWINGS**

A full and enabling disclosure of the present subject matter including the best mode thereof to one of ordinary skill in the art is set forth more particularly in the remainder of the specification, including reference to the accompanying figures, in which:

Figure 1 is a top perspective view illustrating a joint device or a joint member and system of floor panels for an exterior floor covering according to the invention;

Figures 2A and 2B are sectional views illustrating the joint device and system of floor panels of Figure 1;

Figure 3 is a sectional view illustrating an end member for joint devices and systems of floor panels according to the invention;

Figure 4 is a side view illustrating exterior floor coverings according to the invention;

Figure 5 is a top perspective view illustrating a further embodiment of a joint device and system of floor panels for an exterior floor covering according to the invention;

Figure 6 is a sectional view illustrating the joint device and system of floor panels of Figure 5;

Figure 7 is a schematic top view illustrating a floor covering or joint system comprising a plurality of joint devices according to the invention;

Figure 8 in a view similar to that of Figure 1 illustrates a variant;

Figure 9 in a view similar to that of Figure 7 further illustrates the variant of Figure
Figures 10A and 10B are cross-sectional views of a joint device and system of floor panels for an exterior floor covering similar to that of Figure 8;

Figures 11 and 12 are views of exterior floor coverings comprising joint devices according to the invention;

Figures 13A and 13B are cross-sectional views of further embodiments of a joint device and system of floor panels according to the invention;

Figure 14 and 15 show a special embodiment, amongst others according to the seventh aspect of the invention; and

Figure 16 and 17 show possible coupling means for application at the short sides of the floor panels.

**DETAILED DESCRIPTION**

The subject matter disclosed herein is directed to devices, systems, and methods for floor coverings, in particular exterior floor coverings, including, for example, a jointed floor covering suitable for outdoor use and installation over existing surfaces such as patio and/or real wood or non-wood type deck surfaces. Novel joint devices or joint members provided herein can be disposed between adjacent floor panels and can be temporarily or permanently secured to existing surfaces via optional attachment members. Novel joint devices or joint members can, but do not have to be, adapted to connect and pass liquid or moisture between adjacent panels.

In some aspects, novel joint devices or joint members described herein can comprise one or more openings, holes, pores, slots, channels, or porous section or area adapted to drain liquid. In other aspects, multiple joint devices or members can be provided between panels and spaced apart such that liquid can drain therebetween. In some aspects, liquid can be collected on an upper surface of the joint member and be drained or channeled through the joint member and out of the underlying flooring (e.g., decking) via openings or pores disposed within the body of the joint member. In further aspects, joint devices or members can comprise a porous body of material and/or porous sections of material incrementally spaced down the body of the joint member. The porous sections of material or body of material can be configured for draining liquid.

Novel joint devices or joint members can comprise a body portion and at least an opening or a hole through which at least one mechanical coupling member can be positioned. Notably, novel joint devices or joint members can be configured to hold the panels securely down over an existing underlying surface, while allowing a very small degree of movement of each panel. In some aspects, adjacent floor panels are not jointed or directly affixed to each other, but are rather held in place via novel joint
members or devices described herein. In some aspect, first and second floor panels are
completely spaced apart via a gap, and the novel joint member or device is positioned,
at least partially, or wholly, within the gap.

[0094] In some aspects, novel joint devices or joint members can comprise a collection
space for drained liquids, which can be disposed below the body portion. In some
aspects, the collection space is defined by a liquid permeable spacer material. Novel
joint members can, but do not have to include openings for draining liquids.

[0095] Notably, the joint device or member can extend in length and/or width to fill,
preferably uniformly fill, a gap between adjacent panels. In one embodiment, the joint
member can be disposed longitudinally between adjacent first and second rectangular
floor panels. At least a portion of a joint member can be positioned in a portion of a
groove of one or more floor panels. In some aspects, the joint can, but does not have to
allow liquid to drain from an upper surface of the floor panels towards a lower surface
of the floor panels. In such cases the joint device may allow water to pass through, and
may serve as a connector for long sides of adjacent panels. In one such embodiment
the joint member can be disposed longitudinally between adjacent first and second
rectangular floor panels. At least a portion of a joint member can be positioned in a
portion of a groove of one or more floor panels. The joint can advantageously allow
water to drain from an upper surface of the panel members towards a lower surface of
the panel members which could rest on a preexisting exterior structure, or be elevated
from an underlying surface, such as a deck or patio surface. In the latter case, an em-

[0096] bodiment of the seventh independent aspect of the invention can be obtained.

[0096] Notably, floor panels can be elevated above and not directly supported by portions of
an underlying preexisting exterior structure, such as an outdoor deck or patio surface.
Floor panels can be elevated over and/or above existing surfaces (e.g., not directly
resting on the existing structure or surface) via a novel joint member and/or porous
spacer member as described further below.

[0097] Notably, devices or members provided herein can allow consumers to quickly and
easily refinish exterior surfaces themselves, that is, the devices, systems, and methods
disclosed herein can advantageously allow consumers to complete one or more "do it
yourself" (DIY) projects.

[0098] Reference will be made in detail to possible aspects or embodiments of the subject
matter herein, one or more examples of which are shown in the figures. Each example
is provided to explain the subject matter and not as a limitation. In fact, features il-

[0099] lustrated or described as part of one embodiment can be used in another embodiment to
yield still a further embodiment. It is intended that the subject matter disclosed and en-
visioned herein covers such modifications and variations.

[0099] As illustrated in the various figures, some sizes of structures or portions are ex-
aggerated relative to other structures or portions for illustrative purposes and, thus, are provided to illustrate the general structures of the present subject matter. Furthermore, various aspects of the present subject matter are described with reference to a structure or a portion being formed on other structures, portions, or both. As will be appreciated by those of skill in the art, references to a structure being formed "on" or "above" another structure or portion contemplates that additional structure, portion, or both may intervene. References to a structure or a portion being formed "on" another structure or portion without an intervening structure or portion are described herein as being formed "directly on" the structure or portion. Similarly, it will be understood that when an element is referred to as being "connected", "attached", or "coupled" to another element, it can be directly connected, attached, or coupled to the other element, or intervening elements may be present. In contrast, when an element is referred to as being "directly connected", "directly attached", or "directly coupled" to another element, no intervening elements are present.

Furthermore, relative terms such as "on", "above", "upper", "top", "lower", or "bottom" are used herein to describe one structure's or portion's relationship to another structure or portion as illustrated in the figures. It will be understood that relative terms such as "on", "above", "upper", "top", "lower" or "bottom" are intended to encompass different orientations of the component in addition to the orientation depicted in the figures. For example, if a component or feature in the figures is turned over, structure or portion described as "above" other structures or portions would now be oriented "below" the other structures or portions. Likewise, if components in the figures are rotated along an axis, structure or portion described as "above", other structures or portions would be oriented "next to" or "left of" the other structures or portions. Like numbers refer to like elements throughout.

Unless the absence of one or more elements is specifically recited, the terms "comprising", "including", and "having" as used herein should be interpreted as open-ended terms that do not preclude the presence of one or more elements.

As used herein the terms "weatherproof" and "waterproof" are synonymous terms used interchangeably to describe materials that are inherently, or have been treated to become, resistant to penetration by water and wetting. Such terms can be water impermeable. Weatherproof and waterproof materials can comprise natural or synthetic materials that can include, be laminated to, and/or be coated with a waterproofing material such as plastic, resin, rubber, polyvinyl chloride (PVC), polyurethane (PU), silicone elastomer, fluropolymers, wax, or any other suitable material. In some aspects, weatherproof materials can include an extruded plastic, such as an extruded Acrylonitrile Styrene Acrylate (ASA) plastic. Weatherproof materials can also include a metal or metallic materials which can optionally be extruded, anodized and/or plated.
Figures 1 through 7 illustrate embodiments of devices, systems, and methods according to the present invention.

Figure 1 is a top perspective view of a system generally designated 10 for an exterior floor covering. System 10 can comprise at least a first floor panel 12, a second floor panel 14, and a joint device disposed therebetween. The joint device or joint member 16 can be adapted to fill a gap between adjacent edges of first and second floor panels 12 and 14, respectively, and can be configured to effectively drain liquid between the panels. The joint device 16 can, but does not have to include openings and/or porous body sections for channeling and/or draining liquids. In some aspects, the joint device 16 can comprise one or more openings for receiving a mechanical coupling member for securing first and second floor panels 12 and 14 to an underlying structure or surface. In some aspects, the joint device or joint member 16 can be configured to hold the panels down or securely to an underlying surface while allowing a very small degree of movement of each panel.

In some aspects, the joint device can be configured to elevate first and second floor panels 12 and 14 above an underlying structure or surface, such as an outdoor patio or deck, in which case an embodiment of the seventh aspect is obtained. That is, first and second floor panels 12 and 14 do not directly touch and/or may not be directly supported or disposed over the underlying surface. One or more gaps or spaces provided by elevating first and second floor panels 12 and 14 can allow liquid to collect therein and subsequently drain or pass through portions of the underlying structure, such as by allowing liquid to drain through cracks between adjacent decking panels or planks. First and second floor panels 12 and 14 and the joint device can comprise weatherproof materials suitable for outdoor use. In one embodiment, the joint device between adjacent panels can comprise a discrete joint member that can be separate and distinct from first and second floor panels 12 and 14.

In some aspects, the joint device between panels 12 and 14 can comprise a joint member, generally designated 16. Joint member 16 can be configured to hold the panels together and over the underlying surface while allowing a very small degree of movement between each panel. In some aspects, panels 12 and 14 are not jointed or directly affixed to each other, but rather are held in place via joint member 16. In some aspects, joint member 16 can comprise a clip adapted to secure and completely separate adjacent panels.

In some aspects, a plurality of joint members 16 can be used end-to-end between panels 12 and 14, and can be spaced apart and/or otherwise configured to drain liquid between spaces between the ends of the joint members 16.

First and second floor panels 12 and 14 can comprise non-structural (i.e., structural sub-flooring required) components such that when joined via joint member 16, floor
panels 12, 14, and joint member 16 can collectively provide a floor covering similar to an exterior area rug configured for application or installation directly over an existing exterior surface. In some aspects, floor panels 12 and 14 can lock together without requiring glue and without being glued to the surface of the underlying exterior floor structure or surface. Thus, system 10 can advantageously comprise a mobile and re-usable floor covering that can quickly and easily become assembled and disassembled without requiring application or removal of glued components. In other aspects, portions of system 10 can but do not have to be mechanically coupled to portions of the underlying exterior floor structure as described further below.

First and second floor panels 12 and 14 can comprise a single layer structure that can consist entirely of any substantially weather and water-resistant, water impervious, or waterproof material, a plastic material, a compact laminate, a laminate material, or a wood plastic composite material suitable for exterior use. In other aspects, first and second floor panels 12 and 14 can comprise a multi-layered structure, as indicated by the phantom lines in Figure 1, where each layer can be the same material and/or different materials. Each entire first and second floor panel 12 and 14, and/or portions thereof, can comprise at least one layer of weatherproof plastic or composite material capable of withstanding exterior environmental conditions such as, for example, PVC or a wood plastic composite material.

In some aspects, first and second floor panels 12 and 14 can comprise a multi-layered structure where the panels 12, 14 include a core or base layer and a surface layer. One or more optional abrasion resistant layers are also contemplated. The base layer can comprise the same or a different material(s) than the surface layer. The surface layer can comprise a decorative layer adapted to emulate wood, stone, tile, brick, etc. In some aspects, the base layer can comprise a plastic material, a composite material, or a cellulosic material, such as wood particles, impregnated with a resin, such as a thermoplastic material. The surface layer can comprise a layer of weatherproof decorative plastic, composite, or thermosetting material that can optionally be glued or laminated on top of the base layer, where used.

In some aspects, first and second floor panels 12 and 14 can comprise one or more layers of a compact laminate material. That is, in some aspects, first and second floor panels 12 and 14 can include a multi-layered structure comprised of materials such as compact laminate, where there is no fiberboard core, but rather many layers of laminate bonded together. Any single or multi-layered structure comprising any material(s) is contemplated and can be provided herein.

In some aspects, floor panels 12 and 14 can for example comprise a high pressure laminate adhered to a particle board such as TRICOYA®, designed and manufactured by MEDITE®. A paper backing may be used and is contemplated herein. In some
aspects, first and second floor panels can comprise a multi-layered stack including a paper backing layer that can be approximately 0.1 mm to 0.5 mm thick, a TRICOYA® core layer that can be approximately 6 to 8 mm thick and disposed over the paper backing, and a laminate decor layer that can be approximately 0.35 mm to 0.5 mm thick and disposed over the core layer. However, any materials and/or thicknesses are contemplated herein.

[013]  In some aspects, a core of floor panels 12 and 14 can comprise a wood particle or wood fibreboard having a thickness swelling when submersed for 24 hours of less than approximately 12% or even of less than approximately 8%, measured for example in accordance with EN317. Preferably use is made of a board consisting of glued acetylated wood particles or fibers. The acetylation of wooden particles or fibers results in a lower possible thickness swelling of the particles or fibers, and therefore to a more moisture resistant board. For the glue preferably use is made of an urea-formaldehyde glue, a melamine-urea-formaldehyde or a methyl diisocyanate based glue, such as methylene diphenyl diisocyanate based glue. In a preferred aspect, use is made of a board sold under the TRICOYA® brand as described inWO 2012/168446.

[0114]  First and second floor panels 12 and 14 can comprise any size, shape, dimension, color, surface design, and/or finish (e.g., stain or abrasion resistant surface finishes including aluminum oxide A1203 finishes). In some aspects first and second floor panels 12 and 14 can comprise substantially rectangular shaped floor planks having a surface design that preferably emulates wood and/or wood grain. In other aspects, first and second floor panels 12 and 14 can comprise substantially square shaped floor planks having a surface design that emulates stone, tile, or brick. First and second floor panels 12 and 14 can comprise shapes having more or less than four sides, such as circular, non-circular, triangular, pentagonal, hexagonal, or octagonal shapes, or any other suitable regular or irregularly shaped panel, as desired. Any combination of shape, surface design, and/or finish is contemplated herein.

[0115]  First and second floor panels 12 and 14 can comprise any width and/or length, such as panels having at least one side measuring approximately 2 centimeters (cm) or more, approximately 10 cm or more, approximately 20 cm or more, approximately 1 foot (ft.) or more, or more than 1 ft. in length and/or width. In further aspects, floor panels 12 and 14 can also be between approximately 2 and 15 inches wide, for example, approximately 3, 5, 8, or 12 inches in width. Floor panels 12 and 14 can for example be between approximately 2 and 20 feet in length, such as approximately 4, 8, 12, and 16 feet in length. In yet further aspects, first and second floor panels 12 and 14, respectively, can for example comprise a width of approximately 100 mm or more and a length that is approximately 1000 mm or more, such as panels that are approximately 150 mm x 1235 mm. First and second floor panels 12 and 14 can also comprise for
example a width that can be approximately 100 mm or more and a length that can be approximately 2000 mm or more, such as panels that are approximately 150 mm x 2425 mm. Any dimension of length and/or width is contemplated herein.

Floor panels 12 and 14 can comprise for example an overall thickness between approximately 2 mm and 18 mm (e.g., including overall thickness of all layers where multiple layers are used). For example, floor panels 12 and 14 can be approximately 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, or 15 mm thick. Any dimension of panel thickness is contemplated herein.

Still referring to Figure 1, a novel joint member 16 can be disposed between portions of first and second floor panels 12 and 14, for example, in a gap between panels. In some aspects, multiple joint members 16 can be assembled end-to-end between panels (e.g., Figure 7), and can be configured to drain liquid between adjacent ends. In some aspects, the ends of joint members 16 can comprise porous sections of material and/or be configured to form an opening when assembled end-to-end, such that liquid can drain therebetween. Joint member 16 can be adapted to secure adjacent panels together and/or to portions of an underlying surface while allowing a very small degree of movement of each panel. In some aspects, adjacent panels may not be directly affixed to each other, but can rather be held in place via joint member 16. Joint member 16 can, but does not have to comprise liquid channeling capabilities.

In some aspects, at least one joint member 16 can be disposed along and/or adjacent at least one lateral edge of each panel in system 10. However, more than one joint member 16 can be disposed along and/or adjacent more than one lateral edge of each panel in system 10. For example, a first joint member 16 can be disposed adjacent a first lateral edge of at least one panel in system 10. In other aspects, two joint members 16 (e.g. a first joint member and a second joint member) can be disposed adjacent opposing first and second lateral edges of at least one panel in system 10. In yet further aspects, more than two joint members 16 (e.g., a first, a second, a third, a fourth, etc. joint member) can be disposed adjacent more than two lateral edges of at least a first panel of system 10. Joint member 16 can be configured to engage portions, for example, lateral edge portions, of one or more floor panels within system 10.

In some aspects, joint member 16 can be configured to elevate first and second floor panels 12 and 14 over an underlying surface (30, Figures 2A and 2B), in which case an embodiment in accordance with the seventh aspect of the invention is attained. Notably, elevating first and second floor panels 12 and 14 over portions of the underlying surface 30 can provide a space for liquid to collect and subsequently drain from portions of the underlying surface 30. That is, liquid that may be collected from an upper surface of a floor covering comprised of one or more floor panels (e.g., 12 and 14) and/or joint members 16 can optionally become channeled between portions of
the panels. System 10 can advantageously provide a jointed floor covering system suitable for exterior use and suitable for simple, DIY installation over an existing outdoor surface or structure.

[0120] In some aspects, joint member 16 can at least partially or entirely comprise a flexible material. In some aspects, joint member 16 can be rollable such that it can be provided in a roll and subsequently cut to size. Joint member 16 can in some aspects comprise at least partially or entirely a plastic material or a wood plastic composite material that can be adapted to bend or flex along between first and second floor panels 12 and 14. This can be advantageous as portions of the underlying surface may not be substantially flat. In some aspects, joint member 16 can comprise an ASA plastic material that is weather resistant, UV resistant (e.g., resistant to ultra violet (UV) light or sunlight) and heat resistant, thereby being advantageous for use in outdoor applications. In some aspects, joint member 16 can be provided via extruding ASA plastic. Joint member 16 and/or first and second floor panels 12 and 14 can be adapted to be water impervious and fade resistant when exposed to sunlight. This can be advantageous, as floor panels within system 10 can maintain a given color point over time and not appear substantially faded or weathered soon after initial installation.

[0121] It is also within the scope of the invention to manufacture the joint member 16 out of a solid, yet flexible and/or bendable material as noted previously, such as a natural or synthetic rubber. In this embodiment, the joint member 16 can flex or bend to allow for situations where the subsurface may not be completely flat.

[0122] In yet further aspects, joint member 16 can also at least a partially or entirely comprise a stiff material.

[0123] In some aspects, joint member 16 can for example be a metal or metal alloy material, such as aluminum (Al), alloys thereof, or any stamped or rolled metal, plastic or composite material or any other suitable material adapted to withstand exterior environmental conditions. Joint member 16 can include an extruded material or metal (e.g., extruded Al), an anodized material or metal (e.g., anodized Al), and/or a plated material or metal. Whether joint member 16 is a stiff or flexible material, joint member 16 can in some aspects be cut to any desired length or lengths suitable, for example, for a number of different lengths or the entire length of the surface below. The length of joint member 16 is therefore not limited to being the length of the floor panels described herein. In some aspects, joint member 16 can for example comprise a length of approximately 1 to 6 meters (m), or values or sub-ranges thereof, such as approximately 2 m, approximately 2.5 m, or more than approximately 4 m. Preferably, said joint member 16 is longer than the length of one of the first and second panels 12-14.

[0124] Portions of joint member 16 can be adapted to fittingly engage and/or lock within
portions of floor panels within system 10. That is, in some aspects, adjacent panels
within system 10 may not directly engage each other, but only portions of joint
members 16. Still referring to Figure 1, each of first and second floor panels 12 and 14
can comprise opposing edges disposed on outermost opposing lateral sides where each
lateral edge is provided with at least one groove, generally designated 18. In some
aspects, the at least one groove 18 can be longitudinally disposed along a length of
opposing long edges of first and second floor panels 12 and 14, for example, where the
panels are rectangular in shape. Groove 18 can be provided in first and second floor
panels 12 and 14 via any suitable mechanical processing techniques including, for
example, machining, milling, drilling, or any other suitable mechanical material
removal process. According to a variant, the groove 18 may be provided with a
molding process, preferably the same molding process in which the board of the panel
is produced.

Groove 18 can comprise a void adapted to engage a projection portion of joint
member 16, where groove 18 can be defined by at least an upper groove definition 20
and a lower groove definition 22. In some embodiments, upper and lower groove
definitions 20 and 22 can be identical in length. In other aspects, lower groove definition
22 can extend further in length than upper groove definition 20 to provide for
improved and more efficient locking and/or rotatable click assembly with a locking
member, such as a tongue or projection of joint member 16. In some aspects, groove
18 can extend the full length of the long edges along each of the first and second floor
panels 12 and 14. In other aspects, groove 18 can be intermittently spaced along
portions of the long edges along the length of panels 12 and 14.

It is within the scope of the invention to design joint member 16 to permit assembly
of system 10, namely assembly of the joint member to the lateral edge of one or both
of the first and second panels 12-14, via solely rotational movement, solely vertical
movement, solely horizontal movement or any combination of rotational, horizontal,
and vertical movements. That is, joint member 16 can be designed such that first and
second floor panels 12 and 14 can rotationally engage and lock with portions of joint
member 16, engage and lock via solely vertical movement, engage and lock via solely
horizontal sliding movement (e.g., horizontally tapping, pushing, or sliding portions of
panels against portions of joint member), or any combination thereof. Moreover, the
joint between either of the panels 12 and 14 and the joint member 16 may be designed
to include "play" and/or "pretension" where, after assembly, the panels 12 and 14 may
be slightly displaced relative to each other along the length of the joint.

With respect to floor panels 12 and 14, portions of groove 18 can be configured to
engage and/or lockingly engage a correspondingly shaped portion of locking member
or tongue of joint member 16. As described further below with respect to Figures 2A
and 2B, joint member 16 can comprise a body portion 24 that can be disposed between one or more locking portions or projections, such as for example one or more tongue portions 26. In some aspects, body portion 24 can be centrally disposed with respect to two tongue portions 26. In other aspects, body portion 24 can be non-centrally disposed with respect to tongue portions 26. In some aspects, joint member 16 can comprise two opposing tongue portions 26 adapted to engage opposing lateral edges or faces of opposing first and second floor panels 12 and 14.

[0128] Each tongue portion 26 provided on joint member 16 can be adapted to lock with, such as by engaging or matingly engaging, grooves 18 disposed in adjacent first and second floor panels 12 and 14, respectively. Locking engagement between joint member 16 and grooves 18 of adjacent panels can be achieved for example by engagement or frictional engagement between protrusions of joint member 16 and recesses, preferably correspondingly shaped recesses, of groove 18. In some aspects, tongue portions 26 of joint member 16 can click or snap into respective grooves 18 of floor panels 12 and 14. Tongue portions 26 can, but do not have to extend the full length of groove 16. In some aspects as illustrated by Figures 2A and 2B, joint member 16 can comprise more than one opposing tongue portion 26, and each tongue portion 26 can comprise a different length. In other aspects, each tongue portion 26 can be identical in length.

[0129] Notably, joint member 16 can be, but does not have to be a watertight joint and can instead allow water or other liquids to pass between floor panels 12 and 14 and may be, therefore, unexpected in light of conventional floor panel designs consisting substantially of tight fitting and watertight joints. Joint member 16 can, but does not have to comprise one or more slots, apertures, holes, or openings (94, Figure 5) disposed along its length. In other aspects, liquid can be collected on an upper surface of joint member 16 and be drained or channeled through the joint member 16 and out of the underlying flooring (e.g., decking) via openings or pores disposed within the body of the joint member 16. In further aspects, joint member 16 can comprise a wholly porous body of material or a body having multiple porous sections of material incrementally spaced down the body of the joint member where indicated by openings 94. The porous sections of material or body of material can be configured for draining liquid.

[0130] Where used, openings (94, Figure 5) can be formed in joint member 16 during a molding process or openings can be mechanically formed via machining, drilling, punching, stamping, or any other mechanical process for removing material from a structure. Openings (94, Figure 5) can be disposed within a body portion 24 of joint member 16 and can extend between upper and lower surfaces of joint member and into a collection space, area, or liquid permeable spacer (100, Figure 5) comprising a collection space disposed between first and second floor panels 12 and 14, such that
liquid can be collected and drained from the underlying surface 30.

Figures 2A and 2B illustrate cross-sectional views of system 10 described in Figure 1. As previously noted, system 10 can comprise a floor covering joint system for covering outdoor surfaces or existing outdoor floor structures such as patios or decks. For example, system 10 can be disposed over an underlying surface 30. Notably, joint member 16 can be adapted to secure panels to underlying surface 30 via mechanically coupling thereto. Underlying surface 30 can comprise an existing outdoor surface such as a deck, for example a deck comprising a plurality of deck planks. Notably, system 10 can be easily installed directly over portions of underlying surface 30 via clicking, engaging, or locking edges of opposing panels to joint member 16, without requiring removing, refinishing, sanding, painting, staining, etc. of underlying surface 30. Thus, consumers can quickly and easily enjoy a new deck without having to destroy and/or replace the old deck and start over.

As described above, system 10 can comprise at least a first floor panel 12, second floor panel 14, and joint member 16 disposed therebetween. First and second floor panels 12 and 14 can comprise "female" or grooved profiles or edges (e.g., groove 18). Joint member 16 can comprise two "male" or tongued profiles or edges (e.g., tongue portions 26). Joint member 16 can also be adapted to join panels having two "male" profiles and/or a first panel having a "male" profile and a second floor panel having a "female" profile as described in commonly assigned, co-pending U.S. Application Serial No. 13/542,275 filed on July 5, 2012. Systems described herein can also comprise a plurality of panels and joint members as shown and described in Figures 4 and 7. Notably, each of first and second floor panels 12 and 14, respectively and joint member 16 can comprise a weatherproof material suitable for outdoor use. In some aspects, portions of first and second floor panels 12 and 14 and joint member can each comprise plastic.

As Figures 2A and 2B illustrate, first and second floor panels 12 and 14, respectively, can comprise substantially flat upper surfaces 12' and 14'.

Alternatively, and as described in aforementioned co-pending and commonly assigned U.S. Application Serial No. 13/542,275 first and second floor panels 12 and 14 can comprise non-flat upper surfaces, or portions thereof can be non-flat. In yet further embodiments, first floor panel 12 can comprise a substantially flat upper surface and a portion of second floor panel 14 can comprise a different, non-flat upper surface. Panels having the same and/or different substantially flat or non-flat surfaces are contemplated herein.

Figure 2A illustrates floor panels 12 and 14 can have squared, straight or sharp edges 28A. Figure 2B illustrates floor panels 12 and 14 having rounded or soft edges 28B. Body portion 24 of joint member 16 can be centrally or non-centrally disposed.
between sharp or soft edges 28A and 28B of adjacent floor panels. In some aspects, at least an upper surface of body portion 24 can be visible when viewed from above. One or more gaps can be disposed between body portion 24 of joint member 16 and at least one floor panel (e.g., gaps G3 in Figures 2A and 2B). In other aspects, body portion 16 can be substantially flush between first and second floor panels 12 and 14, but still not be water tight. That is, joint member 16 can, but does not have to, allow small amounts of liquid to pass therebetween. For illustration purposes, first and second floor panels 12 and 14 have edges that can be sharp and/or soft, however, panels can comprise any shape, -configuration, and/or cross-sectional shape of edges. First and second floor panels 12 and 14 can, but do not have to have edges that are the same shape.

In some aspects, joint member 16 can comprise a weatherproof spacer for providing one or more gaps between first floor panel 12 and second floor panel 14. In some aspects, gaps can be configured for draining liquid. In other aspects, gaps can allow panels to swell and/or flexibly move or incorporate "play" as needed. For example, a first gap G1 can be disposed between portions of joint member 16 and groove 18 of second floor panel 14. As noted earlier, and in some aspects joint member 16 can comprise one or more tongue portions 26. Tongue portions 26 can be disposed on opposing edges or surfaces of body portion 24 of joint member 16. Opposing tongue portions 26 can, but do not have to comprise different lengths. Opposing tongue portions 26 can, but do not have to comprise the same length as the length of corresponding grooves 18. In some aspects, a first tongue portion 26 engaging first floor panel 12 can be longer than a second tongue portion 26 engaging second floor panel 14. A first gap G1 can be disposed between the shorter tongue portion 26 and second floor panel, as tongue portion 26 may extend and stop short of substantially the full length of groove 18 of second floor panel 14.

Notably, joint member 16 can comprise one or more leg portions 32 adapted to elevate lower surfaces 12" and 14" of first and second floor panels 12-14, respectively above underlying surface 30. Leg portions 32 can extend from body portion 24, for example, from opposing support portions 34. In some aspects, support portions 34 can be configured to engage and support lower surfaces 12" and 14" or portions of lower surfaces 12" and 14" of respective first and second floor panels 12 and 14. Elevating first and second floor panels 12 and 14 above underlying surface 30 can provide one or more liquid permeable collection spaces generally designated 36. Collection spaces 36 can be open (i.e., comprised of air), which liquid can permeate and flow through. In other aspects, a liquid permeable material (e.g., spacer 100, Figure 6) can be provided within a portion of at least one collection space 36. It is clear that here, an embodiment of the seventh aspect of the invention is obtained.

In some aspects, liquid can be drained from upper surfaces 12' and 14' of respective
first and second floor panels 12 and 14, between joint member (e.g., where joint member is porous and/or has openings as described in Figures 5-7) and be collected into collection spaces 36. Any liquid can then subsequently be drained, removed, and/or evaporated from portions of underlying surface 30. This can be advantageous as liquid can be channeled away and prevented from collecting or pooling on upper surfaces of the floor covering or joint system 10. In some aspects, liquid which can be funneled and collected in collection spaces 36 can subsequently be drained between adjacent planks of a deck, where the deck is the underlying surface 30. In further aspects, liquid may not drain through joint member 16, but can be physically removed via sweeping, blowing, etc. or allowed to evaporate from portions of underlying surface 30. Notably, joint member 16 can comprise an upper surface 16' having portions that are sloped, inclined, curved, and/or non-flat to improve the liquid channeling abilities of system 10, as liquid can more effectively flow, drain, and/or be swept away from the curved surfaces.

[0139] Collection spaces 36 can comprise a gap having, for example, a height of approximately 0.5 mm to approximately 10 mm and any dimension or subrange therebetween. The height of collection space 36 can include a measurement of the distance between the bottom surfaces 12" and 14" of first and second floor panels 12 and 14 and the uppermost surface of underlying surface 30, such as along the left hand side of Figures 2A and 2B. The height of collection space 36 can further include a measurement of the distance between the bottom surface of joint member 16 and the uppermost surface of underlying surface 30 as seen in the middle portion of Figures 2A and 2B. The height of collection space 36 can also include a measurement of the distance between the bottom surface of first or second floor panels 12 and 14 and an upper surface of foot portion 38 as seen in the right hand side of Figures 2A and 2B. Collection space 36 can have a height of any suitable dimension for collecting and subsequently draining or removing liquid, such as rain water. In some aspects, collection space 36 can have a height of approximately 2 mm to 5 mm, approximately 5 mm, approximately 5 mm to 7 mm, or greater than approximately 7 mm.

[0140] Leg portions 32 of joint member can comprise laterally extending foot portions 38 which can be substantially parallel to portions of tongue portions 26 and support portions 34. Foot portions 38 can be substantially parallel to leg portions 32. At least one foot portion 38 can be physically and mechanically connected, coupled, or joined with underlying surface 30. This can be advantageous, as system 10 can provide a floor covering having improved stability over underlying surface 30. In some aspects, system 10 can remain substantially stationary when installed over an underlying surface 30 and can also be easily removed and reinstalled over another surface. System 10 can comprise a mobile and jointed floor covering system. This can be advantageous...
as consumers can install attractive and secure flooring systems over an existing surface 30 that can resist movement when exposed to heavy rains and winds. System 10 can also be removed for cleaning purposes and/or for installation over another, different surface where desired.

Notably, the at least one foot portion 38 can be mechanically coupled to underlying surface 30 via any suitable fastener, attachment member, connector, glue, and/or adhesive. In some aspects, the at least on foot portion 38 can be provided with one or more openings or holes through which at least one optional mechanical coupling member 40 can be positioned. For example, in some aspects, a plurality of holes can be spaced along a length of joint member 16 and a plurality of optional mechanical coupling members 40 can be disposed therein. In some aspects, coupling member 40 can comprise a wood screw or an anchor screw that can be approximately 5 mm x 35 mm or 5 mm x 40 mm and stainless steel. In other aspects coupling member 40 can comprise a nail, rivet, bolt, clip, hook, clamp, dowel, key, latch, pin, lug or any other suitable fastener is contemplated. In some embodiments, portions of joint member 16 can be glued, soldered, or welded to portions of underlying surface 30, and can be either used alone or in combination with optional coupling member 40.

Coupling member 40 can be disposed through portions of joint member 16 and underlying surface 30 for physical and mechanical linkage therebetween. Notably, coupling member 40 can be disposed below a portion of second floor panel 14 such that coupling member 40 is not visible from above. This can improve the aesthetic appearance and feel of system 10, as consumers will not be required to look at and/or traverse the plurality of coupling members 40.

As Figures 2A and 2B further illustrate that, in some aspects, the joint member can comprise an upper portion and a lower portion with body portion 24 disposed therebetween. Upper portion of joint member 16 can include one or more tongue portions 26. Lower portion of joint member 16 can include support, leg, and/or foot portions 34, 32, and 28 respectively. Upper portion and lower portions of joint member 16 can be adapted to retain portions of opposing floor panels therebetween. That is, lower groove definitions 22 of first and second floor panels 12 and 14, respectively, can be disposed about and/or retained by upper and lower portions of joint member 16, that is, between opposing tongue portions 26 and opposing support portions 34. Each panel can then be fixedly held between upper and lower portions of joint member 16, and can be disposed over or above portions of underlying surface 30.

Still referring to Figures 2A and 2B, portions of upper surface 16' of joint member 16 can be co-planar or non-planer with portions of upper surfaces 12' and 14' of first and second floor panels members 12 and 14, respectively. In some aspects, upper surface 16' of joint member can be disposed along a different, lower plane than upper surfaces
12’ and 14’ of first and second floor panels 12 and 14, respectively. Thus, a second gap generally designated G2 can be disposed between opposing lateral edges of first and second floor panels 12 and 14. That is, the floor covering system 10 can provide a second gap G2 to allow for swelling and/or play between panels.

One or more third gaps generally designated G3 can be disposed between body portion 24 of joint member 16 and first and/or second floor panels 12 and 14. Third gaps G3 can be disposed proximate the interface of joint member 16 and floor panels to allow for swelling and/or play between panels. In some aspects, joint member 16 can, but does not have to be water permeable, porous, and/or include porous body sections for draining liquid.

It is clear that in the case of Figures 2A and 2B gaps G1, G2, and G3 are available between all laterally facing edges of the floor panel 14 and the joint member 16. These gaps allow for a movement space, such that the panel 14 can expand towards the joint member 16.

Referring to Figure 3, floor covering or joint system 10 can further comprise an optional end component disposed about a portion of an outermost, end floor panel 50. End component, or end member generally designated 52 can be configured to engage, clip, click, snap, or lock about a portion of end floor panel 50. End member 52 can comprise a perimeter transition component for placement about a portion of the perimeter of the floor covering system 10, for example, about outermost floor panels within system 10. End member 52 can comprise an elongated strip (e.g., Figure 7) which can be rollable and can be cut to size. End member 52 can comprise any suitable ridged, partially rigid, or flexible material such as an extruded metal or plastic. In some aspects, end member 52 can comprise a first retention portion 54 and a second retention portion 56. First and second retention portions 54 and 56 can be adapted to retain portions of floor panel 50 therebetween, for example, by engaging, snapping, and/or locking about opposing surfaces of floor panel 50. Notably, second retention portion 56 can be at least partially inclined or downwardly tapered for increasing an amount of force or friction applied by second retention portion 56 to end floor panel 50.

End floor panel 50 can be disposed over underlying surface 30, in some aspects, disposed above an underlying surface 30 such as above a surface of an existing deck. End member 52 can comprise at least a first leg portion 58. Notably, first leg portion 58 can be adapted to engage a second floor panel that is angled with respect to floor panel 50 (Figure 4), or first leg portion 58 can be configured to raise or elevate a portion of floor panel 50 above underlying surface 30 forming a collection space 60 therebetween. Liquid, such as melting snow or rain water, can collect and subsequently be drained, removed from, and/or evaporated from collection spaces 60.
End member 52 can further comprise a second leg portion 62 extending from first retention portion 54. First and second leg portions 58 and 62 can in some aspects be substantially parallel to each other. First and second leg portions 58 and 62 can be substantially orthogonal to each of first and second retention portions 54 and 56, respectively. Collection spaces 60 can be disposed between portions of end floor panel 50 and underlying surface 30. This can advantageously provide a space or area for liquid, such as rain, to be funneled and subsequently drained between portions of underlying surface 30.

A foot portion 64 can extend from second leg portion 62. Foot portion 64 can be substantially parallel to first and second retention portions 54 and 56, respectively. Foot portion 64 can be substantially orthogonal to first and second leg portions 58 and 62, respectively. Foot portion 64 can be substantially parallel with and disposed along a portion of the upper surface of underlying surface 30.

Notably, foot portion 64 can be fixedly mounted to a portion of underlying surface 30. This can advantageously anchor end member 52 over portions of underlying surface 30 to prevent substantial movement therebetween. Thus, gusty winds, adverse weather, or mere foot traffic would be prevented from unintentionally removing portions of system 10 from portions of underlying surface 30. In some aspects, foot portion 64 can be provided with an aperture or hole through which a coupling member 40 can be positioned. For example, in some aspects, a plurality of holes can be spaced along a length of end member 52 and a plurality of optional mechanical coupling members 40 can be disposed therein. In some aspects, coupling member 40 can comprise a wood screw or anchor screw. In other aspects coupling member 40 can comprise a nail, rivet, bolt, clip, hook, clamp, dowel, key, latch, pin, lug or any other suitable fastener.

In further embodiments, portions of end member 52 can be glued, soldered, or welded to portions of underlying surface 30 and can be either used alone or in combination with optional coupling member 40. Coupling member 40 can be disposed through portions of end member 52 and underlying surface 30 for physical and mechanical linkage therebetween. Notably, coupling member 40 can be disposed below a portion of end floor panel 50 such that coupling member 40 is not visible when viewed from above. This can improve the aesthetic appearance and feel of system 10 while also improving the stability of system, as consumers will not be required to look at and/or traverse a plurality of coupling members 40.

Referring now to Figure 4, a floor covering or joint system generally designated 70 is shown. System 70 can comprise a plurality of panels 72 having a plurality of joint members 16 and/or end members 52 disposed therebetween. Notably, portions of joint members 16 and end members 52 can be mechanically coupled to portions of un-
derlying deck panels or planks designated D1 to D6 via one or more coupling members. Mechanical coupling can be advantageous for several reasons, including for example stabilizing floor covering system 70 in case of inclement weather. Coupling members 40 can extend through portions of joint members 16 or end members 52 and portions of deck planks D1 to D6. Deck planks D1 to D6 can be any suitable size or shape. In some aspects, deck planks D1 to D6 can be approximately two feet ('') x 4'. In some aspects, deck planks D1 to D5 can comprise gaps or spaces therebetween such that liquid, including rain water R, can be channeled between panels 72 and can drain from the gaps or spaces between deck planks D1 to D5.

In some aspects, panels 72 can comprise long and short sides (e.g., rectangular panels) and can have a longitudinal axis. In one embodiment, a longitudinal axis of panels 72 can be substantially orthogonal to a longitudinal axis of the underlying surface, such as underlying deck planks D1 to D6 (see also Figure 7). In other embodiments, the longitudinal axis of panels 72 can be substantially parallel to the longitudinal axis of deck planks D1 to D6. In yet further embodiments, the longitudinal axis of panels 72 can be angled with respect to the longitudinal axis of deck planks D1 to D6, for example, at any angle between approximately 1° and 89°, such as between approximately 15° and 25°, between approximately 25° and 45°, or between approximately 45° and 75°. Changing the angle at which the longitudinal axis of panels 72 are installed with respect to the longitudinal axis of deck planks may improve the efficiency at which liquid, such as rain water R, can be drained from deck planks. For example, rain water R may drain more efficiently when the longitudinal axis of panels 72 is substantially orthogonal to the longitudinal axis of deck planks D1 to D6, as a number of gaps between adjacent and underlying deck planks that become disposed below each panel 72 can be increased or maximized, allowing more rain water R to drain more efficiently from between adjacent, underlying deck planks.

Deck planks D1 to D6 can be supported by one or more optional deck structures or supports designated S1 to S3. Supports S1 to S3 can comprise any suitable structure and may not be required. In some aspects, supports S1 to S3 can for example comprise 4’ x 4’ posts driven into the ground or underlying surface (not shown). One or more supports S1 to S3 can be disposed adjacent an exterior wall W, such as an exterior wall or siding of a house. Notably system 70 can be installed over an existing exterior structure, and can allow liquid such as rain water R to drain from portions of the existing structure.

Notably, at least one panel of the plurality of panels 72 can be installed at an angle with respect to at least one other panel of the plurality of panels 72 to cover angled surfaces. The angled panels can be directly adjacent to each other or non-adjacent. For example, one or more stairs are shown as disposed between supports S2 and S3. The
stairs can be covered by one or more panels 72. At least one panel can be substantially orthogonal to at least one other panel. For illustration purposes, substantially orthogonal panels over substantially orthogonal deck surfaces have been shown, however, installing system 70 over inclined surfaces such as over portions of handicap ramps or other angled surfaces is also contemplated herein. A first panel of the plurality of panels 72 can be installed at any angle with respect to at least one other panel of the plurality of panels 72. In an alternative, a plurality of panels can be installed at a plurality of angles within system 70. For example, one or more panels 72 can be angled with respect to one or more other panels 72 between approximately 0 and 20°, between approximately 20° and 45°; between approximately 45° and 75°; or more than approximately 75°.

[0157] Notably, end members 52 proximate supports S2 and S3 can be adapted to engage more than one panel 72. For example, end member 52 can engage and/or lock about at least a first and a second panel of the plurality of panels 72, where the first and second floor panels are substantially orthogonal to each other between portions of the respective end members 52. End members 52 can also be installed adjacent each other, as illustrated proximate support S2 and deck plank D3.

[0158] Figures 5 to 7 illustrate further embodiments of joint systems for exterior floor coverings and joint devices. For example, Figure 5 is a top perspective view of a system 80 for an exterior floor covering. System 80 can comprise at least a first floor panel 82, a second floor panel 84, and a joint disposed therebetween. The joint can be adapted to fill a gap between adjacent edges of first and second floor panels 82 and 84, respectively, and can be configured to effectively drain liquid between the panels. First and second floor panels 82 and 84 can be disposed over and/or above an underlying structure or surface, such as an outdoor patio or deck. That is, first and second floor panels 82 and 84 do not directly touch the underlying surface or structure. One or more gaps or spaces provided by elevating first and second floor panels 82 and 84 can be at least partially filled with an optional spacer material or spacer 100.

[0159] Spacer 100 can be disposed between portions of panel 82 and 84 and an underlying structure or surface 102. In some aspects, spacer 100 can comprise a porous, liquid permeable material and/or a mesh type structure adapted to allow liquid to drain or pass therebetween to portions of underlying surface 102 from which it can evaporate or drain, such as by allowing liquid to drain through cracks between adjacent decking panels or planks. First and second floor panels 82 and 84 and a joint device can comprise weatherproof materials suitable for outdoor use. In one embodiment, the joint between adjacent panels can comprise a discrete joint device or member that can be separate and distinct from first and second floor panels 82 and 84. In some -aspects, the joint between panels 82 and 84 can comprise a joint member, generally designated 86.
[0160] First and second floor panels 82 and 84 can be similar in form and function to previously described floor panels 12 and 14 (Figure 1). First and second floor panels 82 and 84 can comprise a single layer structure that can consist entirely of any substantially weather and water-resistant, water impervious, or waterproof material, a plastic material, or a wood plastic composite material suitable for exterior use. In other aspects, first and second floor panels 82 and 84 can comprise a multi-layered structure, as indicated by the broken lines in Figure 1, where each layer can be the same material and/or different materials. Each entire first and second floor panel 82 and 84, and/or portions thereof, can comprise at least one layer of weatherproof plastic or composite material capable of withstanding exterior environmental conditions such as, for example, PVC or a wood plastic composite material. In some aspects, floor panels 82 and 84 can comprise a high pressure laminate adhered to a particle board such as TRICOYA®, designed and manufactured by MEDITE®.

[0161] Referring to Figures 5 and 6, joint member 86 can engage, click, snap and/or lock about portions of first and second floor panels 84 and 86. Portions of joint member 86 can be adapted to fittingly engage and/or snap or lock within portions of panels within system 80. Each of first and second floor panels 82 and 84 can comprise opposing edges disposed on outermost opposing lateral sides where each lateral edge is provided with at least one groove, generally designated 88. In some aspects, the at least one groove 88 can be longitudinally disposed along the length of opposing long edges of first and second floor panels 82 and 84, for example, where the panels are rectangular in shape. Groove 88 can be provided in first and second floor panels 82 and 84 via mechanical processing techniques including machining, milling, drilling, or any other suitable mechanical material removal process.

[0162] Each groove 88 of floor panels 82 and 84 can comprise a void adapted to engage a projection or tongue portion 90 of joint member 86, where groove 88 can be defined by at least an upper groove definition and a lower groove definition. Joint member 86 can comprise one or more tongue portions 90 which can extend outwardly from a body portion 92 of joint member, in opposite directions away from body portion 92. That is, tongue portions 90 can be disposed along opposing sides of joint member 86. In some aspects, joint member 86 can comprise a longitudinal strip or body having a substantially U-shaped cross-section, where body portion 92 can be centrally disposed between two leg portions with outwardly projecting and opposing tongue portions 90 extending therefrom. First and second floor panels 82 and 84 and joint member 86 can each be located a distance away from an underlying surface 102 and may not directly touch underlying surface 102. For example, floor panels 82 and 84 and joint member 86 can be disposed a distance above underlying surface 102. In some aspects, spacer 100 can comprise a collection space disposed between lower surfaces 82” and 84” of
first and second floor panels 82 and 84, respectively, and underlying surface 102. Spacer 100 can also be disposed between portions of lower surface of joint member 86 and underlying surface 102. Spacer 100 can provide a collection area or space into which liquid from surfaces of system 80 can be funneled and drained. Notably, lower surfaces 82" and 84" of first and second floor panels can be co-planar with lower surface 86" of joint member 86.

[0163] Body portion 92 of joint member 86 can comprise an upper surface 92' that is non-planar with respect to upper surfaces 82' and 84' of first and second floor panels 82 and 84, respectively. In some aspects, upper surface 92' of joint member 86 is disposed on a lower plane than upper surface 82' and 84' of first and second floor panels 82 and 84, respectively. Tongue portions 90 of joint member 86 can also be disposed on a higher plane than upper surface 92' of body of joint member 86.

[0164] In some aspects, joint member 86 can comprise at least partially or entirely a flexible material. In some aspects, joint member 86 can be rollable such that it can be provided in a roll and subsequently cut to size. Joint member 86 can in some aspects comprise at least partially or entirely a plastic material or a wood plastic composite material that can be adapted to bend or flex along between first and second floor panels 82 and 84. This can be advantageous as portions of the underlying surface may not be substantially flat. Joint member 86 can comprise a natural or synthetic rubber material or an ASA plastic material that can be weather resistant, UV resistant (e.g., resistant to ultra violet (UV) light or sunlight) and heat resistant, thereby being advantageous for use in outdoor applications.

[0165] In further aspects, joint member 86 can comprise at least a partially or an entirely rigid or stiff material. For example, joint member can comprise a metal such as Al or alloys thereof. In some aspects, joint member 86 can be extruded. In other aspects, joint member 86 can comprise an anodized or plated metal, such as Al. Joint member 86 can be adapted to be water impervious and first and second floor panels 82 and 84 can be adapted to be fade resistant when exposed to sunlight. This can be advantageous, as floor panels within system 80 can maintain a given color point over time and not appear substantially faded or weathered soon after initial installation.

[0166] Notably, one or more holes or openings 94 can be provided in body 92 of joint member 86. Liquids, such as rainwater, cleaning solution, or melting snow, can be channeled directly from upper surfaces of adjacent first and second floor panels 82 and 84 downwardly between panels via openings 94. The liquid can pass into spacer 100 and eventually evaporate or drain from underlying surface 102 via cracks, pores, or gaps in underlying surface. Each joint member 86 can comprise a plurality of holes or openings 94 for effectively allowing large amounts of liquid to drain between first and second floor panels 82 and 84 from an upper surface of system 80 to prevent accu-
mulation of liquid on the upper surface of the panels. Notably, joint member 86 can join or connect opposing edges of adjacent first and second floor panels 82 and 84 while at the same time allowing liquid to pass between the respective panels. Joint member 86 can be provided in a gap between first and second floor panels 82 and 84 thereby spacing the adjacent floor panels apart. System 80 can advantageously provide a jointed floor covering system adapted for outdoor use.

Each opening 94 can, for example, be the same width or diameter and/or different widths or diameters defined by at least one inner wall 96. The width or diameter of opening 94 can be approximately equal to or less than a width or diameter of body portion 92 of joint member 86. The gap space or between opposing grooves 88 of adjacent panels 82 and 84 can be longer in width and/or wider than the width or diameter of opening 94. Opening 94 can extend between upper surface 92’ of body of joint member 86 and spacer 100 for passing funneled liquid into a collection area provided within portions of spacer. That is, spacer 100 can comprise a porous, liquid permeable, and/or mesh structured material having spaces therein for collecting liquid and eventually draining the collected liquid from portions of underlying surface 102. Openings 94 can comprise angled or tapered inner walls 96 and/or substantially straight inner walls 96 that can be configured to funnel liquid into a collection area comprised of spacer 100.

System 80 can optionally be attached and/or secured in place as a floor covering system. An optional mechanical coupling member or attachment member 98 can be inserted within a portion of opening 94 for allowing system 80 to be temporarily or permanently secured to underlying structure or surface 102 when so desired (e.g., during inclement weather, while sweeping, cleaning, high-power blowing, or power-washing panels). Liquid can still advantageously drain into opening 94 and out of the underlying structure 102 by flowing about attachment member 98. For example, where opening 94 comprises an elongated opening or slot, attachment member 98 can be secured within a portion of the slot such that the remaining portion of the slot can open into spacer. This can allow liquid to flow along inner walls 96, around attachment member 98, and then out from portions or areas around attachment member 98 which discharge liquid into a collection area comprising a water permeable spacer 100.

Openings 94 can be spaced apart at uniform and/or non-uniform intervals along a length of joint member 86. Openings 94 can facilitate effective draining of liquid, such as water from surfaces of adjacent floor panels. Joint member 86 and adjacent panels 82 and 84 can each comprise weatherproof materials suitable for use in outdoor applications. In some aspects, joint member 86 can comprise an extruded metal or plastic with an optional surfactant added thereto. A surfactant can advantageously prevent dirt or other debris from collecting inside openings 94. Joint member 86 can further include
anti-microbial properties and be optionally treated with an anti-microbial agent to prevent or slow the growth of mold or mildew. For example, anti-microbial agents can comprise any suitable material such as metal ions, (e.g., silver (Ag) ions) which can be applied either during or after manufacture of joint member.

In some aspects, the metal ions can be applied via spraying, dipping, and/or curtain coating portions of joint member 86. In further aspects, metal ions can be disposed within the weatherproof material or resin during manufacture.

Openings 94 can comprise an opening of any size, shape, orientation, and/or configuration. In some aspects, openings 94 can comprise liquid permeable and/or porous sections of material or porous body regions for draining water. That is, pores on the order of micrometer sized to millimeter sized can be disposed in areas and can collectively form "openings" 94 for effectively draining water. In other aspects, openings 94 can comprise elongated channels or slotted openings or areas disposed along the length of joint member 86. Slots can allow a larger quantity of liquid to collect and drain between panels and/or allow collected liquid to drain about attachment member 98 such that system 80 can be permanently or temporarily secured and attached to the underlying floor, while still being able to effectively drain liquid between panels.

In some aspects, system 80 can be assembled over existing outdoor surfaces to provide a weatherproof floor covering that is aesthetically appealing, easy to install, and durable. System 80 can comprise a floor covering adapted to easily cover at least a portion of an existing wooden deck such that the deck can be effectively covered without having to wash, sand, stain and/or re-finish the surface of the wooden deck. When covering an existing structure such as a wooden deck with the floor covering system 80, the existing deck should be structurally sound and relatively flat. Any rotted or warped boards may first need to be replaced.

In some aspects, joint member 86 can be installed at an angle and rotated to click and/or otherwise lock into grooves 88. In further aspects, joint member 86 can be tapped into grooves 88. Adjacent first and second floor panels 82 and 84 and joint member 86 can be unlocked and locked (e.g., re-joined) together multiple times such that system 80 can comprise a mobile and reusable floor covering. Joint member 86 can optionally comprise a decorative surface or surface design such that joint member 86 can also emulate the appearance of wood, wood grain, stone, tile, or brick surfaces.

It is also within the scope of the subject matter herein to manufacture the joint member 86 out of a solid, yet flexible and/or bendable material as noted previously, such as a natural or synthetic rubber. In this embodiment, the joint member 86 can flex or bend to allow for situations where the subsurface is not completely flat.

As Figure 6 illustrates, attachment member 98 can extend through portions of joint member 86, spacer 100, and underlying surface 102. Spacer can comprise any suitable
thickness, for example, from approximately 0.5 mm to 10 mm and any measurement or sub-range of measurements therebetween. For example, spacer 100 can comprise a thickness of approximately 2 mm, approximately 5 mm, between approximately 2 mm and 5 mm, or more than approximately 5 mm thick. As spacer 100 is optional, it may also be included in the embodiments shown in Figures 1, 2A and 2B and/or may not be included in the embodiment shown in Figures 5 and 6. Spacer 100 can comprise an entangled mesh or net product for example, produced from an extruded polymer matrix of tangled monofilaments, which are heat-welded at the junctions. In one embodiment, spacer 100 can comprise the QUIETQURL® RF product (with the fiberglass mat removed) available from Keene Building Products of Mayfield Heights, Ohio and described in US 7,096,630 and US 8,146,310, or another tangled net of preferably polymeric monofilaments. Spacer 100 can also include a ventilated molding material, for example as shown and described in U.S. Patent No. 7,793,483.

[0176] Figure 7 is a schematic top view of a floor covering or joint system generally designated 110. System 110 can comprise a plurality of joint members 86 according to the invention. Notably, a plurality of adjacent floor panels P and a plurality of joint members 86 can be adapted to assemble together as indicated by the double sided arrows to cover an existing exterior floor structure or surface such as unsightly or aged surfaces of an outdoor patio or outdoor deck. The plurality of panels and joint members 86 can be parallel to each other and arranged such that their longitudinal axes are disposed along a same axis or direction. End members 52 are also schematically illustrated and are configured to assemble to outermost floor panels P. For illustration purposes, only two underlying deck planks designated D are shown, however, system 110 can be assembled over an entire deck or outdoor patio surface.

[0177] Notably, the plurality of panels P does not directly touch portions of deck planks D. That is, the plurality of panels can be elevated over or disposed a distance away from deck planks D. Optional spacer 100 (Figure 6) can be disposed between portions of the plurality of panels P and the deck planks D. It is clear that Figure 6 illustrate an embodiment of the seventh aspect of the invention as mentioned in the introduction.

[0178] Floor panels P can be assembled with joint members 86 by rotating or tapping tongue portion (90, Figure 6) of joint member 86 into grooves of adjacent floor panels P. Floor panels P can comprise non-structural (i.e., structural sub-flooring required) components such that when joined via joint member 86, panels P and joint member 86 can collectively establish a floor covering similar to an exterior area rug configured for application or installation directly over an existing exterior surface. Notably, portions of system 110 can be anchored to underlying deck planks D by securing attachment members such as screws into openings 94 of joint members 86. Openings 94 can provide spaces into which water or a liquid L can collect and evaporate or drain from
gaps between deck planks D. That is, each floor panel P can be surrounded and configured to engage one, two, or more than two joint members 86 along one, two, or more than two edges. Notably, joint member 86 can be configured to engage adjacent grooves of adjacent panels P and lock the panels together. In some aspects, short sides of adjacent panels P can directly lock or join to each other via locking or clicking together on short sides. For example, panels P can comprise tongue portions 112 adapted to engage groove portions 114 and lock short sides of panels P together. Adjacent panels P can be directly locked or joined via engagement between the adjacent tongue 112 and groove 114 portions. Thus, in one embodiment, a first floor panel of the plurality of panels P can connect directly to at least one other panel along a first edge and directly to at least one joint member 86 along a second edge. For panels disposed in the center or middlemost region of system 110, a first floor panel of the plurality of panels P can connect directly to at least one other panel and at least two joint members 86. In further embodiments, as discussed above, short sides can optionally also connect to joint member 86 such that it is possible for at least one panel of the plurality of panels P to be connected on all sides directly to joint members 86.

According to a particular embodiment, panels P may comprise tongue portions 112 and groove portions 114 at said short sides, adapted to be engaged by means of a downward motion of said tongue portions into said groove portions. Such downward motion may be obtained by means of a so-called fold-down motion, wherein the panel is rotated down into the plane around its longitudinal edge. This rotation might in the same time result in an engagement or connection at said longitudinal edge, e.g. with the there available joint member, more particularly with the tongue or groove portions thereof. Preferably the engagement of the short sides results in a prevention of separation of the connected panels in a horizontal direction in the plane of the panels and perpendicular to said short sides. Preferably, but not necessarily, the engagement also results in a prevention of separation of the connected panels in a vertical direction perpendicular to the plane of the panels.

Still referring to Figure 7, system 110 can comprise intermediate joint members 86 disposed between and substantially parallel to long sides or edges of adjacent, rectangular shaped panels P. Joint members 86 can longitudinally align and/or abut end-to-end along the length of system 110 forming long channels for effectively draining liquid between panels P along the length of system 110. In other aspects, joint members 86 can be spaced apart when assembled end-to-end, and/or have ends configured to form an opening when assembled end-to-end for draining liquid therebetween. Deck planks D can comprise a longitudinal axis along a first axis XI or along a first direction.

Panels P, end members 52 and/or joint members 86 can comprise a longitudinal axis
disposed along a second axis $X_2$ or a second direction. First and second axes $X_1$ and $X_2$ can be angled and/or substantially orthogonal to each other such that a longitudinal axis of panels P can be substantially orthogonal the longitudinal axis of deck planks D. This can increase the efficiency at which liquid can drain from system 110, as openings 94 can be disposed over a large number of gaps between underlying adjacent deck planks D.

[0182] In sum, novel devices, systems, and methods are disclosed herein. Liquid, such as rain water, melted snow, or water used to clean the novel devices and systems, can be channeled into collection areas where it can collect and either subsequently drain between boards, cracks, or pores of the underlying deck or patio structure, be cleaned or blown out, or from where it can evaporate. In some aspects, a liquid permeable spacer can define and/or be disposed within the collection space. Such devices and systems can be impervious to liquids and therefore, suitable for exterior, outdoor use. The novel devices, systems, and methods can be installed quickly and easily over existing structures or surfaces without having to replace or refinish the existing surface. Notably, devices, systems, and methods disclosed herein are configured for DIY projects thereby saving the time and expense associated with hiring a contractor or contacting out a job. The novel devices, systems, and methods can be configured to replace floor panels that are angled with respect to each other. In each embodiment disclosed herein, novel devices and systems can include providing floor panels spaced apart from and not directly touching the underlying surface or structure, an optional spacer or portion of a joint member can be disposed therebetween.

[0183] It is clear that the embodiments illustrated in the figures 1 to 7 comprise the features of the first, second and third aspect of the invention, as described in the introduction.

[0184] Figures 8 through 12 illustrate preferred embodiments of joint devices, systems, and methods according to the present invention as disclosed and described herein. Figure 8 is a top perspective view of a system 10 for an exterior floor covering. System 10 can comprise at least a first floor panel 12, a second floor panel 14, and a joint disposed therebetween. The joint can be adapted to discharge water from surfaces of the first and second floor panels 12 and 14, respectively, and can be configured to effectively drain water between the panels.

[0185] First and second floor panels 12 and 14 and the joint can comprise weatherproof materials suitable for outdoor use. In one embodiment, the joint between adjacent panels can comprise a discrete joint device or member that can be separate and distinct from first and second floor panels 12 and 14. In one aspect, the joint between panels 12 and 14 can comprise a joint member, generally designated 16.

[0186] In one aspect, a portion of joint member 16 can be adapted to extend between upper surfaces and lateral edges of first and second floor panels 12 and 14. That is, a first
portion of joint member 16 can be disposed between and fit at least substantially or entirely flush against a portion of lateral sides or edges of adjacent panels and a second portion of joint member 16 (e.g., an upper surface) can extend from and/or be disposed adjacent and fit at least substantially or entirely flush against upper surfaces of each of panels 12 and 14 such that the exterior floor system comprises a substantially uniform upper surface. Moreover, dirt or debris can easily be swept or cleaned from the substantially uniform upper surface of system 10 such that dirt is prevented from becoming trapped by joint member 16 and/or clogged within one or more openings or holes 28 disposed in joint member 16.

In one aspect, joint member 16 can comprise at least partially or entirely a flexible material. In one aspect, joint member 16 can be reliable such that it can be provided in a roll. Joint member can in one aspect comprise at least partially or entirely a plastic material or a wood plastic composite material that can be adapted to bend or flex along between first and second floor panels 12 and 14. This can be advantageous as portions of the underlying surface may not be substantially flat. Joint member 16 can also comprise at least partially or entirely a stiff material. In one aspect, joint member 16 can for example be a metal material, such as aluminium (Al) or any stamped or rolled metal, plastic or composite material or any other suitable material adapted to withstand exterior environmental conditions. Joint member 16 can include an extruded material or metal (e.g., extruded Al), an anodized material or metal (e.g., anodized Al), and/or a plated material or metal.

Whether joint member 16 is a stiff or flexible material, joint member 16 can in one aspect be cut to any desired length or lengths suitable, for example, for a number of different lengths or the entire length of the decking below. The length of joint member 16 is therefore not limited to being the length of the floor panels described below, but can be longer than the length of the floor panels.

First and second floor panels 12 and 14 can comprise any size, shape, dimension, color, surface design, and/or finish (e.g., stain or abrasion resistant surface finishes including aluminum oxide $\text{Al}_2\text{O}_3$ finishes). In one aspect first and second floor panels 12 and 14 can comprise substantially rectangular shaped floor planks having a surface design that e.g. emulates wood and/or wood grain. In other aspects, first and second floor panels 12 and 14 can comprise substantially square shaped floor planks having a surface design that emulates stone, tile, or brick. First and second floor panels 12 and 14 can comprise shapes having more or less than four sides, such as circular, triangular, pentagonal, hexagonal, or octagonal shapes, or any other suitable regular or irregularly shaped panel, as desired. Any combination of shape, surface design, and/or finish is contemplated herein. First and second floor panels 12 and 14 can comprise any width and/or length, such as panels having at least one side measuring ap-
proximately 2 centimeters (cm) or more, approximately 10 cm or more, approximately 20 cm or more, approximately 1 foot (ft.) or more, or more than 1 ft. in length and/or width. Typical thicknesses of floor panels 12 and 14 can be from approximately 4 - 15 mm, typically approximately 6, 8, 10 or 12 mm. Typical widths of floor panels 12 and 14 can also be between approximately 3 and 12 inches, preferably, approximately 3, 5, 8, or 12 inches. Typical lengths of floor panels 12 and 14 can be between approximately 2 and 20 feet, preferably 4, 8, 12, and 16 feet.

In one aspect, first and second floor panels 12 and 14 can comprise a single layer structure consisting entirely of any substantially weather and water-resistant, preferably water impervious or water-proof material, a plastic material, or a wood plastic composite material. These materials can be suitable for exterior use. In other aspects, first and second floor panels 12 and 14 can comprise a multi-layered structure, as indicated by the broken lines, where each layer consists of the same material and/or different materials. Each entire first and second floor panel 12 and 14, and/or portions of first and second floor panels 12 and 14 can comprise a weatherproof plastic or composite material capable of withstanding exterior environmental conditions such as, for example, PVC or a wood plastic composite material. In one aspect, first and second floor panels 12 and 14 can comprise a multi-layered structure where the panels 12, 14 can include a base layer and a surface layer. The base layer can comprise the same or a different material(s) than the surface layer. In one aspect, the base layer can comprise a plastic material, a composite material, or a cellulosic material, such as wood particles, impregnated with a resin, such as a thermoplastic material. The surface layer can comprise a layer of weatherproof decorative plastic, composite, or thermosetting material that can optionally be glued on top of the base layer, where used. Any single or multi-layered structure comprising any material(s) is contemplated herein.

Still referring to Figure 8, each of first and second floor panels 12 and 14 can comprise opposing edges disposed on outermost opposing lateral sides where each lateral edge is provided with at least one groove, generally designated 18. In one aspect, the at least one groove 18 can be longitudinally disposed along the length of opposing long edges of first and second floor panels 12 and 14, for example, where the panels are rectangular in shape. Groove 18 can be provided in first and second floor panels 12 and 14 via mechanical processing techniques including machining, milling, drilling, or any other suitable mechanical removal process. Groove 18 can comprise a void adapted to engage a projection portion of joint member 16, where groove 18 can be defined by at least an upper groove definition 20 and a lower groove definition 22. Lower groove definition 22 can extend further in length than upper groove definition 20 to provide for improved and more efficient locking and/or rotatable click assembly with a locking member, such as a tongue or projection of joint member 16. In one
aspect, groove 18 can extend the full length of the long edges along each of the first and second floor panels 12 and 14, or groove 18 can be intermittently spaced along portions of the long edges along the length of panels 12 and 14.

[0192] Although the subject matter has been described and shown as being assembled through a relative rotational movement of panels 12 and 14 and joint member 16, other assembly motions are possible. For example, it is considered within the scope of the invention to design joint member 16 to permit assembly via solely vertical movement, solely horizontal movement or any combination of horizontal, vertical and rotational movement. Moreover, the joint between either of the panels 12 and 14 and the joint member 16 may be designed to include "play" and/or "pretension" where, after assembly, the panels 12 and 14 may be displaced relative to each other along the length of the joint.

[0193] Groove 18 can be configured to engage with a correspondingly shaped portion of locking member or tongue of joint member 16. As described further below with respect to Figures 10A and 10B, joint member 16 can comprise a body portion 24 disposed between one or more locking portions or projections, such as for example one or more tongue portions 26. In one aspect, body portion 24 can be centrally disposed with respect to two tongue portions 26. Each tongue portion 26 provided on joint member 16 can be adapted to lock with, such as by matingly engaging, grooves 18 disposed in adjacent first and second floor panels 12 and 14, respectively. Locking engagement between joint member 16 and grooves 18 of adjacent panels can be achieved for example by frictional engagement between protrusions of joint member 16 and correspondingly shaped recesses of groove 18. In one aspect, tongue portions 26 of joint member 16 can click or snap into respective grooves 18 of floor panels 12 and 14.

[0194] Notably, joint member 16 does not have to be a watertight joint and can instead allow water or other liquids to pass between floor panels 12 and 14 and is, therefore, unexpected in light of conventional floor panel designs consisting of substantially tight fitting and watertight joints. Joint member 16 can comprise one or more slots, openings, or holes 94 disposed along its length. Holes 94 can be formed in joint member 16 during a molding process or holes can be mechanically formed via machining, drilling, punching, stamping, or any other mechanical process for removing material from a structure. Holes 94 can be disposed within body portion 24 and can extend from an upper surface (16', Figure 10A) of joint member 16 through body portion 24 and into a collection space or area (36, Figure 10A) disposed between first and second floor panels 12 and 14.

[0195] Upper surface 16' can define at least one or a plurality of holes 94 such that water can be channeled directly from adjacent panels downwardly along the continuous upper surface 16' disposed between panels. Holes 94 can be adapted to effectively
allow a liquid, such as rain or water, to drain between first and second floor panels 12 and 14 from an upper surface of the floor covering and prevent accumulation of liquid on the surface of the panels. Notably, joint member 16 can join or connect edges of adjacent first and second floor panels 12 and 14 while at the same time allowing liquid to pass between the respective panels. Joint member 16 can be provided in a gap between first and second floor panels 12 and 14, thereby spacing the adjacent floor panels apart. Joint member 16 can comprise a plastic spacer for substantially filling the gap between first and second floor panels 12 and 14 such that upper surfaces of each of the floor panels 12, 14 and joint member 16 are adjacent.

System 10 can advantageously provide a jointed floor covering system having a substantially continuous and uniform upper surface and not, therefore, a substantially fragmented, divided, or uneven surface because of the gaps or spaces disposed between adjacent floor panels.

Figure 9 is a top view of a system, generally designated 30, for providing a floor covering comprising a plurality of adjacent floor planks or floor panels 72 with a plurality of joint members 16 disposed between each of the adjacent panels 72. Floor panels 72 can be similar in form and function to previously described first and second floor panels 12 and 14. For illustration purposes, rectangular shaped panels 72 are shown, however, panels 72 can comprise any suitable shape such as substantially square, circular, triangular, hexagonal, etc.

Notably, floor panels 72 and joint members 16 can be adapted to assemble together and cover an existing exterior floor structure or surface such as unsightly or aged surfaces of an outdoor patio or outdoor deck. Floor panels 72 can be assembled by rotating or tapping tongue portion (26, Figure 10A) of joint member 16 into grooves 18 of adjacent floor panels 72. Floor panels 72 preferably comprise non-structural (i.e., structural sub-flooring required) components such that when joined via joint member 16, panels 72 and joint member 16 can collectively establish a floor covering similar to an exterior area rug configured for application or installation directly over an existing exterior surface. In one aspect, panels 72 can lock together without requiring glue and without being glued to the surface of the underlying exterior floor structure or surface. Thus, system 80 can comprise a mobile and re-usable floor covering that can quickly and easily become assembled and disassembled without requiring application or removal of glued components.

Each of the plurality of adjacent floor panels 72 can comprise grooves 18 disposed along at least a portion of at least first and second lateral sides along opposing lateral edges. As illustrated, grooves 18 can be disposed along portions of first and second long sides or long edges of panels 72 alone; however, grooves 18 could also be disposed along portions of third and fourth opposing short edges (e.g., short sides or...
edges) as well, either alone or in combination with grooved long edges.

System 80 can comprise at least one joint member 16 disposed between inwardly facing grooves 18 of adjacent long edges of adjacent panels 72. At least one other joint member 16 could optionally be disposed between grooves of adjacent short edges of adjacent panels 72, where short edges comprise grooves. That is, each floor panel 72 can be surrounded and configured to engage one, two, or more than two joint members 16 on one, two, or more than two edges. Notably, joint member 16 can be configured to engage adjacent grooves 18 of adjacent panels 72 and lock the panels 72 together.

As Figure 9 illustrates, at least one short side of a first panel of the plurality of panels 72 can comprise a tongue 112 configured to engage or lock with an adjacent and outwardly facing groove 114 disposed on an adjacent short side of a second panel of the plurality of panels 72. As such, short sides of adjacent panels 72 can directly lock or join to each other via locking or clicking together on short sides. Adjacent panels 72 can be directly locked or joined via -engagement between the adjacent tongue 112 and groove 114 portions. Thus, in one embodiment, a first panel of the plurality of panels 72 can connect directly to at least one other panel along a first edge and directly to at least one joint member 16 along a second edge. For panels disposed in the center or middlemost region of system 80, a first panel of the plurality of panels 72 can connect directly to at least one other panel and at least two joint members 16.

In further embodiments, as discussed above, short sides can optionally also connect to joint member 16 such that it is possible for at least one panel of the plurality of panels 72 to be connected on all sides directly to joint members 16. The plurality of panels 72 and joint members 16 can be installed together by rotating or tapping respective components in any direction indicated by the arrows.

System 80 can further comprise perimeter transition or end components 52 disposed about the perimeter of the outermost floor panels 72. In one aspect, end components 52 can comprise projections or tongues adapted to engage grooves 112 and 114 along respective long and short edges to produce or define the finished floor covering such that grooves disposed along the perimeter are covered. End components 52 could also comprise grooves (not shown) adapted to engage an intervening joint member 16 such that water can drain close to the perimeter of the floor covering system.

Still referring to Figure 9, system 80 can comprise intermediate joint members 16 disposed between and substantially parallel to long sides or edges of adjacent, rectangular shaped panels 72. Joint members 16 can longitudinally align and/or abut end-to-end along the length of system 80 forming long channels for effectively draining liquid between panels 72 along the length of system 80. As noted above, joint member 16 can comprise holes 94 spaced at intervals along the length of joint member 16. Holes 94 can facilitate effective draining of liquid, such as water from surfaces of
adjacent panels 72. Joint member 16 and adjacent panels 72 can each comprise weatherproof materials suitable for use in outdoor applications. In one aspect, joint member 16 can comprise a resin material with an optional surfactant added thereto. A surfactant can advantageously prevent dirt or other debris from collecting inside holes 94. Joint member 16 can further include anti-microbial properties and be optionally treated with an anti-microbial agent to prevent or slow the growth of mold or mildew. For example, anti-microbial agents can comprise any suitable material such as metal ions, (e.g., silver (Ag) ions) which can be applied either during or after manufacture of joint member. In one aspect, the metal ions can be applied via spraying, dipping, and/or curtain coating joint member 16. In further aspects, metal ions can be disposed within the weatherproof material or resin during manufacture.

[0205] Holes 94 can comprise an opening of any size, shape, orientation, and/or configuration. For example and in one aspect, holes 94 can comprise elongated channels or slotted openings or areas disposed along the length of joint member 16, as designated by the broken lines A. Slots can allow a larger quantity of water to collect and drain between panels 72 and/or allow collected water to drain about an attachment member (e.g., 98, Figure 10B) such that system 80 can be permanently or temporarily secured and attached to the underlying floor, while still being able to effectively drain water between panels.

[0206] In one aspect, system 80 can be assembled over existing outdoor surfaces to provide a weatherproof floor covering that is aesthetically appealing, easy to install, and durable.

[0207] System 80 can comprise a floor covering adapted to easily cover at least a portion of an existing wooden deck such that the deck can be effectively covered without having to wash, sand, stain and/or re-finish the surface of the wooden deck. When covering an existing structure such as a wooden deck with the floor covering system 80, the existing deck should be structurally sound and relatively flat. Any rotted or warped boards should first be replaced.

[0208] Figures 10A and 10B illustrate various cross-sectional views of system 10 described in Figure 8. System 10 can comprise a floor covering or joint system for covering outdoor surfaces or existing outdoor floor structures. As described above, system 10 comprises at least a first panel 12, second panel 14, and joint member 16 disposed therebetween. First and second panels 12 and 14 can comprise “female” or grooved profiles or edges. Joint member 16 can comprise two “male” or tongued profiles or edges. Joint member 16 can also be adapted to join panels having two “male” profiles (see e.g., Figure 13A) and/or a first panel having a female profile and a second panel having a male profile (see e.g., Figure 13B). Systems described herein can also comprise a plurality of panels and joint members as shown and described in Figure 9.
Notably, each of first and second floor panels 12 and 14, respectively and joint member 16 can comprise a weatherproof material suitable for outdoor use. As Figure 10A illustrates, first and second floor panels 12 and 14 can comprise a substantially flat upper surface. Alternatively, and as illustrated in Figure 10B, at least a portion of first and second floor panels 12 and 14 can comprise a non-flat upper surface 116. At least a portion of the panels can comprise an upper surface 116 that is inwardly sloped and/or at least partially concave. Non-flat upper surface 116 can advantageously promote water flow into joint member 16 or system 10 for flowing between adjacent panels.

In one aspect joint member 16 can comprise a weatherproof spacer for providing a gap between first panel 12 and second panel 14 allowing liquid L to drain therebetween. Liquid L can effectively pass through the channel, slot, any size or shape of opening, such as hole 94 within joint member 16. Joint member 16 can comprise an upper surface 16' that is adjacent and substantially an aligned continuous extension of the upper surfaces of adjacent panels. Notably, the continuous upper surfaces of panels 12, 14 and joint member 16 can provide a substantially uniform surface. Upper surface 16' can be configured to align with the upper surface 116 of first floor panel 12 and/or second floor panel 14 for providing the floor covering with a continuous upper surface between floor panels and over the gap between floor panels.

Upper surface 16' can comprise a slightly angled, inclined or sloped surface that can slope inwardly towards a center of joint member 16 and downwardly towards hole 94 such that hole 94 can more effectively receive and drain or discharge liquid L. As Figure 10A illustrates, hole 94 can comprise substantially straight and/or substantially vertical walls. Alternatively, as Figure 10B illustrates, hole 94 can comprise substantially tapered inner walls 118 which taper inwardly and/or outwardly. For illustration purposes, tapered inner walls 118 are shown as inwardly tapered such that hole 94 is wider at the top allowing for more efficient collection and draining of liquid L. Upper surface 16' can comprise a sloped surface that continuously slopes downwardly from upper surfaces of adjacent floor panels and can be shallow enough that a broom or cleaning implement can easily brush dirt and debris away from the surface such that it does not become trapped over joint member 16 and/or within holes 94. Upper surface 16' can guide liquid L towards hole 94 and drain liquid L between panels. Hole 94 can extend in length from upper surface 16' of joint member 16 to a collection space or area 36 disposed below joint member 16. Collection area 36, for example and without limitation, can comprise a void or gap disposed between first and second panels 12 and 14. Collection area 36 can be disposed between lower groove definitions 22 of adjacent first and second panels 12 and 14, respectively. Liquid L can be channeled into collection area 36 where it can collect and either subsequently drain
between boards, cracks, or pores of the underlying deck or patio structure, be cleaned or blown out, or from where it can evaporate.

[0211] Hole 94 can comprise a width or diameter that is approximately equal to or less than a width or diameter of the space or gap between lower groove definitions 22 of adjacent panels 12 and 14. Notably, the gap between opposing upper groove definitions 20 of adjacent panels 12 and 14 can be longer in width or wider than the gap between opposing lower groove definitions 22 of adjacent panels 12 and 14 such that larger portions of liquid can be funneled into collection area 36. That is, hole 94 can extend between upper surface 16' of joint member 16 and collection area 36 such that upper surface 16' is wider than the space defined by collection area 36 (e.g., gap between adjacent lower groove definitions 22) such that more liquid can be funneled into collection area 36 via the longer or wider upper surface 16'. As Figure 10B illustrates, joint 16 can comprise tapered inner walls 118 which are also configured to funnel water into collection area 36.

[0212] Figure 10B illustrates a novel embodiment of system 10, in which system can be optionally attached and/or secured in place as a floor covering. Notably, an attachment member 40 can be inserted within a portion of hole 94 for allowing the system 10 to be temporarily or permanently secured to an underlying structure when desired (e.g., during inclement weather, while sweeping, high-power blowing, or power-washing panels). Liquid L can still advantageously drain into hole 94 and out of the underlying structure (e.g., 30, Figure 4) by flowing about attachment member 40. For example, where hole 94 comprises an elongated opening or slot (e.g., A, Figure 2), attachment member 40 can be secured within a small portion of the slot such that the remaining portion of the slot can open into collection area 36. This can allow liquid L to flow along tapered inner walls 118, around attachment member 40, and then out from portions or areas around attachment member 40 which discharge liquid L into collection area 36.

[0213] As described above, joint member 16 can be configured to lock and/or click into portions of adjacent floor panels 12 and 14. In one aspect, the one or more tongue portions 26 of joint member 16 can comprise a protruding lower web portion 120 configured to engage a correspondingly shaped recess portion of groove 18. In one aspect, joint member 16 can be installed at an angle and rotated to click and/or otherwise lock into groove 18. In further aspects, joint member 16 can be tapped into groove 18. Adjacent first and second floor panels 12 and 14 and joint member 16 can be unlocked and locked (e.g., rejoined) together multiple times such that system 10 can comprise a mobile and reusable floor covering. Joint member 16 can optionally comprise a decorative surface or surface design such that joint member 16 can also emulate the appearance of wood, wood grain, stone, tile, or brick surfaces. Joint 16 and
panels 12 and 14 can comprise the same or different materials. Preferably, joint member 16 and panels 12 and 14 can comprise a weatherproof plastic or wood plastic composite material. Adjacent first and second floor panels 12 and 14 can advantageously lock to joint member 16 comprising holes 94, thereby providing an aesthetically pleasing and easy to install outdoor floor covering capable of discharging liquid and water from the surface of the floor covering. This floor covering can therefore render refinishing aged exterior surfaces (e.g., washing, sanding, and re-staining an aged wooden deck) obsolete.

[0214] It is also within the scope of the invention to manufacture the joint member 16 out of a solid, yet flexible and/or bendable material as noted previously, such as a natural or synthetic rubber. In this embodiment, the joint member 16 can flex or bend to allow for situations where the subsurface is not completely flat.

[0215] Figures 11 and 12 illustrate system 80 comprising a floor covering that is disposed over an existing outdoor structure or surface such as an existing and aged wooden deck 30. System 80 can comprise a floor covering adapted to be installed over outdoor surfaces such as deck 30 to relieve homeowners from the expense and time it takes to re-finish aged decks and by providing an attractive, durable, and easy to install covering over the aged structure.

[0216] Notably, system 80 can be used outdoors and comprise a weatherproof material to withstand rain R and any other outdoor environmental element and weather condition. Rain R or other liquid can be effectively drained and pass between panels 72 via passing into holes (94, Figures 10A/10B) of joint member 16. The rain R can then pass out of cracks, gaps, or pores of the underlying structure, for example, rain R can ultimately be discharged from between boards of the underlying deck structure 60. As Figure 4 illustrates, system 80 can comprise a floor covering provided and installed over a portion of the surface of deck 30, such as what could be provided with an exterior area rug.

[0217] As Figure 12 illustrates, system 80 can comprise a floor covering that can be installed over the entire surface of deck 30 to provide an attractive deck covering as an alternative to washing, sanding, and staining deck 30. It is also noted that having a joint member staggering from the deck 30 short ends will support the evenness between the short side joints.

[0218] Figures 11 and 12 illustrate a floor covering comprised of system 80. The floor covering can comprise a plurality of floor panels 72 arranged in parallel rows over a portion of the surface of outdoor deck 30. The floor covering can also comprise a plurality of joint members 16 disposed between the parallel rows of the floor panels 72. Joint members 16 can be arranged end-to-end between the parallel rows of floor panels 72 and can be adapted to pass a liquid (e.g., rain R) between the parallel rows of
floor panels 72. Upper surfaces of each of the plurality of floor panels can connect directly to angled upper surfaces 116 (Figures 10A/10B) of each of the plurality of joint members 16 such that the plurality of floor panels 72 and joint members 16 form a continuous upper surface of the floor covering. Liquid can be efficiently drained from the upper surface of the floor covering via the network of spaced apart rows of joint members 16.

[0219] As Figure 12 further illustrates, in order to provide an increased opportunity for any collected water or moisture to evaporate, an optional undersurface spacer 100 can be provided between a portion of floor panels 72 and the surface of the outdoor deck 30. As spacer 100 is optional, it may also be included in embodiment shown in Figure 11, and/or may not be included in the embodiment shown in Figure 12. Spacer 100 can comprise an entangled net product for example, produced from an extruded polymer matrix of tangled monofilaments, which are heat-welded at the junctions. A preferred spacer 100 can comprise the QUIET QURL® RF product (with the fiberglass mat removed) available from Keene Building Products of Mayfield Heights, Ohio. Spacer 100 can also include a ventilated molding material, for example as shown and described in U.S. Patent No. 7,793,483.

[0220] Figures 13A and 13B illustrate further embodiments of cross-sectional views of a joint device and system, generally designated 80. The systems 80 of Figures 13A and 13B can comprise floor covering or joint systems for covering outdoor surfaces or existing outdoor floor structures. The systems 80 can be similar in form and function to system 10 described in figures 8 to 12, but systems 80 can be used for joining two panels having male edges or profiles (e.g., tongued profiles) or a first panel having a female profile and a second panel having a male profile.

[0221] Referring to Figure 13A, system 80 can comprise at least a first panel 12, a second panel 14, and a joint member 16 disposed therebetween. Joint member 76 can be similar to previously described joint member 16, however, instead of one or more tongue portions for joining panels having female profiles (e.g., panels 12 and 14, Figure 10A), joint member 16 can comprise one or more grooved portions 78 for joining adjacent panels having male profiles. Each of first and second floor panels 12 and 14, respectively and joint member 16 can comprise a weatherproof material suitable for outdoor use. As Figure 13A illustrates, first and second floor panels 12 and 14 can comprise an edge having a tongue 122 thereby constituting a male profile or male edge profile. At least a portion of tongue 122 can be configured to join and/or engage a portion of joint member 16. For example, tongue 122 of first panel 12 can be configured to engage a first groove portion 78 of joint member 16 and tongue 122 of second panel 14 can be configured to engage an opposing groove portion 78 of joint member 16. Each groove portion 78 can comprise one or more recesses 124 adapted to
receive one or more correspondingly shaped web portions 120 of tongues 122. Joint member 16 can comprise a body having two female edges or female profiles (e.g., grooves 78) configured to join panels with correspondingly shaped panels comprising male edges. Joint member 16 can comprise at least one opening 94 for passing a liquid L between first and second panels 12-14. Opening 94 can comprise a circular hole, a channel, a slot, or any opening adapted to drain water between panels.

[0222] Joint member 16 can comprise upper groove definitions 20 and lower groove definitions 22 disposed about each groove 78. Lower groove definitions 22 can optionally extend further in length than upper groove definitions 20 for extending about and receiving tongue portions 122. An upper surface of joint member 16 can extend from the upper surfaces of panels 12 and 14, and can incline or slope inwardly towards opening 94 to facilitate improved draining of liquid L. Liquid L can collect and/or drain from a collection area 36 disposed between panels 12 and 14. Collection area 36, for example and without limitation, can comprise a void or gap disposed between first and second panels 12 and 14. Collection area 36 can be disposed between tongue portions 122 of adjacent first and second panels 12 and 14, respectively. Liquid L can be channeled into collection area 36 where it can collect and either subsequently drain between boards, cracks, or pores of the underlying deck or patio structure, be cleaned or blown out, or from where it can evaporate. Joint member 16 can comprise a bottom surface having a first portion that is co-planar with bottom surfaces of panels 12 and 14 and a second portion that is non-planar and/or disposed above the bottom surfaces of adjacent panels 12 and 14 thereby defining collection area 36.

[0223] Referring to Figure 13B, system 10 can comprise at least a first panel 12, a second panel 14, and a joint member 16 disposed therebetween. Joint member 16 can be similar to previously described joint member 16, however, joint member 16 can be adapted to join panels having both male and female profiles. That is, joint member 16 can comprise a first edge or profile comprising a female profile and a second edge comprising a male profile. For example, joint member 16 can comprise a tongue portion 26 and a groove portion 78. At least portion of a tongue portion 26 of joint member 16 can be configured to engage at least a portion of one or more grooves 18 disposed along an edge of first panel 12. In addition, at least a portion of groove portion 18 of joint member 16 can be configured to engage a portion of a tongue 122 disposed along an edge of second panel 14. Thus, customized floors having either all female edges or profiles, all male profiles, or combinations thereof can be joined and assembled using joint devices and systems described herein.

[0224] Notably, each of first and second floor panels 12 and 14, respectively and joint member 16 can comprise a weatherproof material suitable for outdoor use. Joint member 16 can comprise at least one opening 94 for passing a liquid L between first
and second panels 12 and 14. Opening 94 can comprise a circular hole, a channel, a
slot, or any opening adapted to drain water between panels. Liquid L can collect and/or
drain from a collection area 36 disposed between panels 12 and 14. Collection area 36
can be disposed between tongue and groove portions 26 and 78, respectively, of the
joint member 16 or of adjacent first and second panels 12 and 14. Liquid L can be
channeled into collection area 36 where it can collect and either subsequently drain
between boards, cracks, or pores of the underlying deck or patio structure, be cleaned
or blown out, or from where it can evaporate. Joint member 16 can comprise a bottom
surface where at least a portion is co-planar with bottom surfaces of panels 12 and 14.

[0225] It is clear that figures 1 to 7 illustrate preferred embodiments of the first, second and
third independent aspect of the invention as mentioned in the introduction. Figure 10B
illustrates a preferred embodiment the first and second independent aspect of the
invention as mentioned in the introduction. Figures 5 to 13B illustrate preferred emb-
bodyments of the fourth, fifth and sixth independent aspect.

[0226] Figures 14 and 15 illustrate an embodiment, amongst others with the features of the
seventh aspect. The floor covering 70 comprises a plurality of floor panels 72 arranged
over an underlying surface 30, wherein the bottom of the floor panels 12-14 is elevated
over a distance T1 from the underlying surface 30, thereby creating a collector space
36 for liquid drained from the top surface 116 of the floor covering. The distance T1 is
preferably at least 20% of the thickness T2 of the floor panel, and, preferably less than
200% of this thickness T2. This range of elevation is in general preferable within the
seventh aspect and the other independent aspects of the invention.

[0227] The embodiment of Figures 14 and 15 comprises a first particularity in that it
comprises first and second joint members 16-17 at opposing longitudinal lateral edges,
respectively, of the floor panels 12-14. The first and second joint members 17
comprise tongue portions 26 for engagement in a groove 18 at the respective lateral
edge. The first and second joint member 16-17 comprise, and, in this case, are
basically formed as a tongue 126 and groove 128, respectively, wherein the tongue 126
of a similar panel 14 can be engaged into the groove 128, in this case by means of a ro-
tational movement W along their longitudinal axis. The tongue 126 and the groove 128
are provided with locking means or locking parts 130 and their engagement results in a
locking of the first and second joint member 16-17 both in a direction R1 perpen-
dicular to the plane of the floor panels 12-14 and in a direction R2 perpendicular to
the longitudinal axis of said joint members and in the plane of the panels 12-14. The
engagement of the tongue 126 and the groove 128 separates the first and second floor
panels 12-14 with a portion having an upper surface 16' with a highest point at a lower
level than the upper surface 116 of the adjacent floor panels 12-14.

[0228] The first and second joint member 16-17 are connected by a portion 132 extending
underneath the floor panel 12 in between opposing lateral edges of the floor panel.

[0229] It is clear that also the joint members and joint devices of the first till sixth aspect could in fact be assembled from several, preferably two joint members, in a similar way as described above.

[0230] The embodiment of Figures 14 and 15 also comprises a second particularity, which can be put to practice independently from said first particularity. Said second particularity is related to the joint member 16 or the joint members 16 and 17 comprising one or several support portions 35 supporting an internal part of the bottom of the floor panels 12-14. In this example the first and second joint members 16 and 17 are connected by a portion 132 extending underneath the bottom of the floor panel 12. Said portion 132 forms at least one support portion 35, and, in this case, two support portions 35 with a leg portion 33 and a foot portion 39 in between. Such profile forming said first and second joint member 16-17 as well as the portion 132 connecting both joint members 16-17 can be formed in one piece, preferably in the same material, by means of an extrusion technique.

[0231] It is noted that the foot portions 38-39 can be used to secure the joint members 16-17 to the underlying surface 30. Of course such joint members 16-17 could be adapted to pass liquids in between rows of adjacent panels 12-14.

[0232] Figure 16 shows a possible practical embodiment for the short sides of the floor panels 12. The short sides, shown here, allow to directly join two of such floor panels 12 together at these edges. One short side of the floor panels has been provided with a downwardly extending tongue portion 112 formed by an upper hook element 134, while the opposite short side has been provided with an upwardly facing groove portion 114 formed by a lower hook element 136. These tongue portions 112 and groove portions 114 are adapted to be engaged by means of a downward motion of the tongue portion 112 into the groove portion 114. This engagement results in the panels 12 being prevented from separation in the horizontal direction R2 in the plane of the panels 12 and perpendicular to the plane of the panels. In this case, separation in the vertical direction R1 perpendicular to the plane of the panels is not prevented.

[0233] Figure 17 shows a similar embodiment where also separation in the vertical direction R1 perpendicular to the plane of the panels 12 is prevented. The upper hook element 134 and the lower hook element 136 are provided with an undercut 138 and a corresponding engaging part 140. In this case, the undercut 138 is formed as a separate element 142 introduced in an excavation 144 in a lateral surface of the lower hook element 136. In this example, the separate element 142 is resiliently displaceable to allow the downward motion of said tongue portion 112 in said groove portion 114, and the introduction of said engaging part 140 in the undercut 138.

[0234] Figure 16 and 17 further illustrate floor panels that comprise a compact laminate
material. That is the floor panels include a plurality of layers 146 of thermosetting resin impregnated paper sheets bonded together. The upper surface 116 is formed by a thermosetting resin impregnated decorative paper layer 148 and a thermosetting resin impregnated transparent paper layer 150. The bottom surface may comprise a backing layer 152 also formed from a thermosetting resin impregnated paper layer. The thermosetting resin may for each layer independently be selected from the list consisting of phenolformaldehyde, ureaformaldehyde and melamineformaldehyde. For the core paper sheets 146 preferably phenolformaldehyde or melamineformaldehyde is selected. For the decorative paper layer 148 and the transparent paper layer 150 preferably melamineformaldehyde resin is selected, because of its colorless or quasi colorless nature. It should be remarked that the use of phenolformaldehyde at least in the surface layer, namely in the decorative paper layer and/or in the transparent layer, has an upside in that it provides for a better protection of the decorative layer against UV radiation from the sun. The possible color of the resin can be taken into account and compensated for when designing the print of the decorative paper layer. Of course, the use of phenolformaldehyde in the surface layer of a laminate panel, at least above the decorative layer is advantageous with any kind of floor panel that can be exposed to sunlight. It is clear that the invention according to an independent special aspect relates to a floor panel comprising a core and a surface layer applied to said core, wherein said surface layer comprises a decorative layer, preferably formed at least by a print, and a transparent wear layer, with as a characteristic that the surface layer comprises phenolformaldehyde at least above said decorative layer. It is clear that the decorative layer is preferably formed by a resin impregnated printed paper sheet, though not necessarily. The print could be applied to said core without the intermediate of a paper, for example by printing on liquidly applied ground layers on said core. Preferably said phenolformaldehyde is at least applied as an impregnated transparent paper sheet. The resin for the impregnation of the possible decorative paper sheet may comprise melamineformaldehyde and/or phenolformaldehyde.

It is noted that, in the case of Figures 1 to 3, 5 to 6 and 14 to 15 the highest point of the upper surface of the joint member is at a lower level than the upper surface of the adjacent floor panels. In the case of Figures 10A, 10B, 13A and 13B the highest point of the upper surface of the joint member is at the same level as the upper surface of the adjacent floor panels. In the cases where the joint member comprises coupling means, such as tongue portions 26-90 or groove portions 78, these portions do not intersect with the opening 94, nor do such coupling means intersect with a longitudinal plane through the central axis of said joint member 16-86 and perpendicular to the plane of the floor panels.

It is further noted that, e.g. in the embodiments of Figures 10A, 10B, 13A, 13B, the
joint member comprises a long edge facing, and in these cases, abutting, the lateral edge of an adjacent floor panel. Here, both long edges of the joint member face and, abut the lateral edges of floor panels in adjacent rows. A contact surface 152 is formed between the long edge of the joint member and the respective lateral edge of the adjacent floor panel. The joint member does not overlap said lateral edge of the adjacent floor panel.

[0237] Embodiments of the present invention shown in the drawings and described above are exemplary of numerous embodiments that can be made within the scope of the appended claims. It is contemplated that the novel devices, systems, and methods described herein can comprise numerous configurations other than those specifically disclosed.
Claims

[Claim 0001] A joint device for an exterior floor covering, the joint device (16-86) comprising: a body portion (24-92); at least one tongue portion (26-90) extending from the body portion (24-92), the tongue portion (26-90) preferably being adapted for positioning between one or more panels (12-14-82-84) of an exterior floor covering (70); and wherein the joint device (16-86) is adapted for outdoor use and adapted for securing portions of the exterior floor covering (70) to portions of an underlying surface (30-102).

[Claim 0002] The joint device of claim 1, wherein the joint device (16) is adapted to drain liquid (L-R) from between adjacent floor panels (12-14-82-84).

[Claim 0003] The joint device according to any of the preceding claims, wherein the joint device (16) comprises at least one porous section.

[Claim 0004] The joint device according to any of the preceding claims, wherein the body portion (24-92) is adapted to pass liquid (L-R) into a collection space (36) below the joint device (16-86).

[Claim 0005] The joint device according to any of the preceding claims, wherein the collection space (36) is disposed below the body portion (24-92) of the joint device (16-86).

[Claim 0006] The joint device according to claim 4 or 5, wherein a spacer (100) is disposed in the collection space (36).

[Claim 0007] The device according to any of the preceding claims, further comprising at least one opening (94) adapted to receive an attachment member (40) for securing portions of the joint member (16-86) to the underlying surface (30).

[Claim 0008] The joint device according to any of the preceding claims, wherein the body portion (24-92) is disposed between and upper portion and a lower portion of the joint member (16-86).

[Claim 0009] The joint device according to any of the preceding claims, wherein the joint member (16-86) comprises upper and lower portions configured to support and/or elevate portions of the panel therebetween;

[Claim 0010] The joint device according to any of the preceding claims, wherein the body portion (24-92) comprises a lower body portion, wherein said lower body portion comprises a support portion (34) elevated by first and second leg portions, wherein preferably, first and second foot portions (38) extend from the first and second leg portions (32).

[Claim 0011] A joint system comprising: a first floor panel (12); a second floor panel
(14); and a joint member (16-86) disposed between the first floor panel (12) and the second floor panel (14) such that the first and second floor panels (12-14-82-84) are completely spaced apart; wherein the joint member (16-86) is adapted to completely separate the first floor panel (12) from the second floor panel (14) while securing the first and second floor panels (12-14) to each other and to portions of an underlying surface (30).

[Claim 0012] The joint system according to claim 11, wherein the joint member (16-86) is adapted to drain liquid from between the first floor panel (12) and the second floor panel (14).

[Claim 0013] The joint system according to any of claims 11 and 12, wherein the joint member (16-86) comprises at least one, but preferably multiple porous section.

[Claim 0014] The joint system according to any of claims 11 to 13, wherein at least one collection space (36) is provided below portions of each of the first floor panel (12), the second floor panel (14), and the joint member (16).

[Claim 0015] The joint system according to any of claims 11 to 14, wherein the joint member (16-86) is adapted to drain liquid (L-R) collected from surfaces of the first floor panel (12) and the second floor panel (14) into the collection space (36).

[Claim 0016] The joint system according to any of claims 11 to 15, wherein the first and second panels (12-14) do not directly touch the underlying surface (30), and wherein, preferably the joint member (16-86) does not directly touch the underlying surface (30-102).

[Claim 0017] The joint system according to any of claims 11 to 16, wherein a spacer (100) is disposed in the collection space (36), and wherein the spacer (100) is preferably liquid permeable.

[Claim 0018] The joint system according to any of claims 11 to 17, wherein the joint member (16-86) comprises first and second tongue portions (26-90) adapted to engage first and second groove portions (18-88) disposed within the first and second floor panels (12-14-82-84), respectively.

[Claim 0019] The joint system according to any of the claims 11 to 18, further comprising an end member (52) disposed about an outermost panel (50) of the system (10-80).

[Claim 0020] The joint system according to any of the claims 11 to 19, wherein a portion of the joint member (16-86) is visible between the first and second floor panels (12-14-82-84) when viewed from above, and wherein an attachment device (40) is preferably disposed below the
first floor panel (12) or the second floor panel (14), and is not visible from above.

[Claim 0021] The joint system according to any of claims 11 to 20, wherein said joint member (16-86) comprises the features of any of the claims 1 to 10.

[Claim 0022] A floor covering comprising: a plurality of floor panels (72) adapted to be arranged in parallel rows over a portion of an outdoor surface (30-102); a plurality of joint members (16-86) disposed between at least one or more of the parallel rows of the floor panels (12-14-82-84-72), wherein the joint members (16-86) are adapted to secure the plurality of floor panels (72) together and to the outdoor surface (30-102); and wherein the plurality of floor panels (72) do not directly touch the outdoor surface (30-102).

[Claim 0023] The floor covering according to claim 22, wherein the joint members (16-86) are adapted to pass a liquid (L-R) between the parallel rows of floor panels (72).

[Claim 0024] The floor covering according to any of claims 22 or 23, wherein a first floor panel (12-82) of the plurality of floor panels (72) is disposed at an angle to at least a second floor panel (14-84) of the plurality of panels (72).

[Claim 0025] The floor covering according to any of claims 22 to 24, wherein joint members (16-86) of the plurality of joint members (16-86) are aligned end-to-end, and wherein the aligned ends of the plurality of joint members (16-86) are preferably spaced apart.

[Claim 0026] A joint member for an exterior floor covering, the joint member (16-86) comprising: a body portion (24-92); at least one tongue portion (26-90) extending from the body portion (24-92); and at least one opening (94) extending through the body portion (24-92), wherein the opening (94) is configured to pass a liquid (L-R) directly from an upper surface of the exterior floor covering (70) through the body portion (24-92) of the joint member (16-86).

[Claim 0027] The joint member according to claim 26, wherein the tongue portion (26-90) comprises a web portion (120) adapted to engage with a correspondingly shaped recess portion (124) in a groove (18-88) of a first floor panel.

[Claim 0028] The joint member according to claim 26 or 27, wherein the joint member (16-86) is adapted to connect a first floor panel (12) to a second floor panel (14) over an existing outdoor surface (30-102).

[Claim 0029] The joint member according to any of the claims 26 to 28, further
comprising an inclined upper surface configured to align with a first upper surface of a first floor panel and a second upper surface of a second floor panel for providing the floor.

[Claim 0030] The joint member according to claim 29, wherein a portion of the inclined upper surface (16) of the joint member (16-86) is configured to slope downwardly from the first upper surface of the first floor panel (12) towards the hole (94).

[Claim 0031] The joint member according to any of the claims 26 to 30, wherein the opening (94) extends between an inclined upper surface of the joint member (16-86) and a collection area (36), and wherein the inclined upper surface is wider than the collection area (36).

[Claim 0032] The joint member according to any of the claims 26 to 31, wherein the joint member (16-86) further comprises the features of any of the claims 1 to 10.

[Claim 0033] A joint system comprising: at least a first floor panel (12); at least a second floor panel (14); a joint member (16-86) disposed between the first floor panel (12) and the second floor panel (14); and wherein the joint member (16-86) is adapted to pass a liquid (L-R) between the first floor panel (12) and the second floor panel (14), and wherein each of the first floor panel (12), the second floor panel (14), and the joint comprise a weatherproof material.

[Claim 0034] The system of claim 33, wherein the first floor panel (12) and the second floor panel (14) are disposed over a substantially planar outdoor surface (30-102).

[Claim 0035] The system according to claim 33 or 34, further comprising a plurality of floor panels (72) arranged in parallel rows.

[Claim 0036] The system according to claim 35, further comprising a plurality of joint members (16-86) disposed between the parallel rows of floor panels (72).

[Claim 0037] The system according to any of claims 33 to 36, wherein the joint member (16-86) comprises an angled upper surface (16') that connects to an upper surface (116) of each of the first and second floor panels (12-14), wherein said angled upper surface (16') preferably slopes downwardly towards at least one opening (94).

[Claim 0038] The system according to any of claims 33 to 37, wherein the joint member (16-86) comprises first and second tongue portions (26-90) for connecting to first and second grooves (18-88) disposed in edges of the first and second floor panels (12-14).
[Claim 0039] The system according to any of claims 33 to 38, wherein the first floor panel (12) and the second floor panel (14) comprise male profiles and/or female profiles.

[Claim 0040] A floor covering comprising: a plurality of floor panels (72) adapted to be arranged in parallel rows over a portion of an outdoor surface (30-102); and a plurality of joint members (16-86) disposed between the parallel rows of the floor panels (72), wherein the joint members (16-86) are adapted to pass a liquid (L-R) between the parallel rows of floor panels (72).

[Claim 0041] The floor covering according to claim 40, wherein upper surfaces (116) of each of the plurality of floor panels (72) connect directly to angled upper surfaces of each of the plurality of joint members (16-86) such that the plurality of floor panels (72) and joint members (16-86) form a continuous upper surface of the floor covering.

[Claim 0042] Floor covering comprising a plurality of floor panels (72) arranged over an underlying surface (30-102), wherein the bottom of the floor panels (72) is elevated from the underlying surface (30-102), thereby creating a collector space (36) for liquid (L-R) drained from the top surface of the floor covering.

[Claim 0043] The floor covering according to claim 42, characterized in that said collector space (36) comprises a spacer material (100), wherein said spacer is liquid permeable.

[Claim 0044] The floor covering according to claim 43, characterized in that said spacer (100) occupies at least the majority of said collector space.

[Claim 0045] The floor covering according to claim 43 or 44, characterized in that said spacer (100) supports said floor panels (72) in that it is at least positioned between the bottom of said floor panels (72) and the underlying surface (30-102).
FIG. 1
FIG. 7