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(54) FLOOR TILE WITH IMPROVED CONNECTION SYSTEM

(57) A floor tile (10A, 10B) for use in a flooring system, comprises a floor tile body and a female connecting member (20) associated with a lateral edge of the floor tile body. The female connecting member has a curved profile (24), which may include an m-shaped profile, and is configured to mate with an adjacent floor tile. A male connecting member (30) is associated with an opposite

lateral edge of the tile body, the male connecting member having a shape corresponding to a curved profile of a female connecting member of an adjacent tile to thereby mate with the adjacent floor tile. A draft angle of the female connecting member and the male connecting member may be substantially parallel.

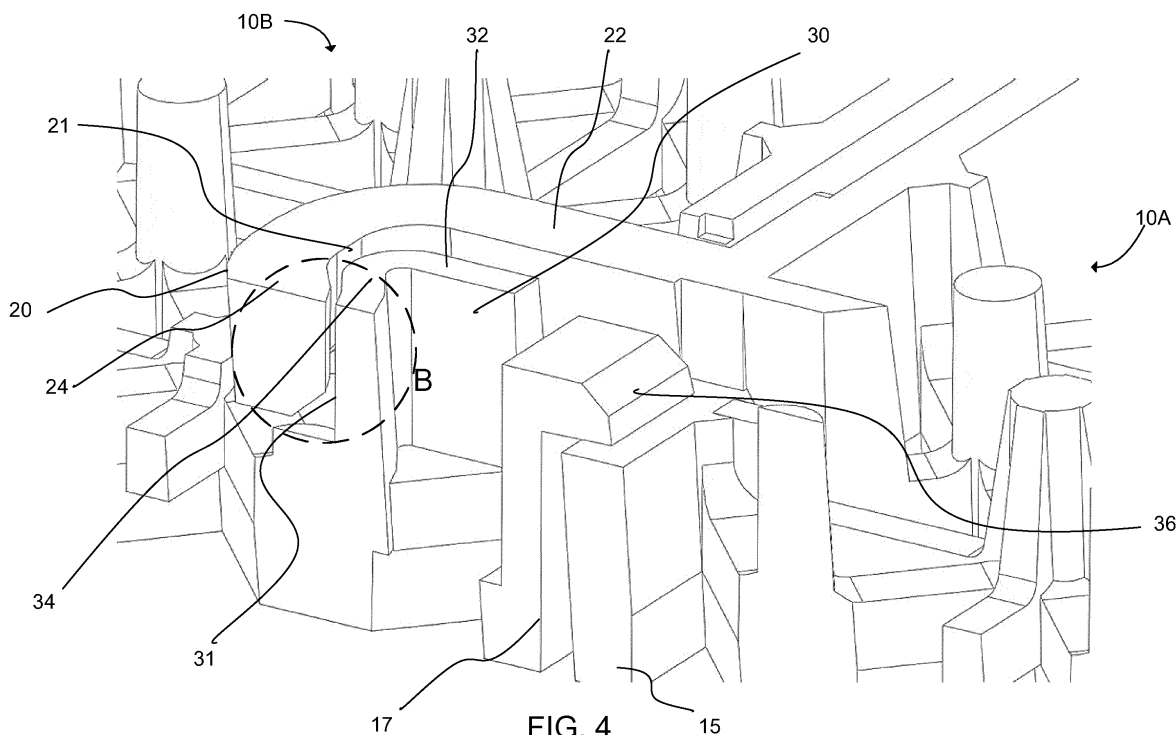


FIG. 4

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Description

Field of the Invention

[0001] The present invention relates generally to modular floor tiles for use in flooring installations.

Background

[0002] Modular flooring systems have been provided for some time for both indoor and outdoor applications. Such systems often include a multitude of similarly shaped tiles that are attached to one another (often by releasable means) to form a substantially continuous sheet of floor tiles that covers a desired area. Modular flooring systems are desirable in that they can be assembled rather quickly and often do not require adhesives or other fasteners to complete the installation process.

[0003] While such systems have found widespread use, there are certain applications in which modular flooring systems remain problematic. As such, modular flooring systems having improved connection systems are desirable.

Brief Description of the Drawings

[0004]

FIG. 1 is a top view of floor tile in accordance with one aspect of the invention;
 FIG. 2 is a closeup bottom view of the floor tiles of FIG. 1;
 FIG. 3 is a bottom perspective view of the floor tiles of FIG. 2;
 FIG. 4 is a cross-sectional view of the floor tiles of FIG. 3, taken along the line A-A of FIG. 3;
 FIG. 5 is side perspective view of a pair of adjacent floor tiles mated in accordance with aspects of the invention; and
 FIG. 6 is a detailed view of the floor tiles of FIG. 4, taken along line B of FIG. 4.

Detailed Description

[0005] Before the present invention is disclosed and described, it is to be understood that this invention is not limited to the particular structures, process steps, or materials disclosed herein, but is extended to equivalents thereof as would be recognized by those of ordinary skill in the relevant arts. It should also be understood that terminology employed herein is used for the purpose of describing particular embodiments only and is not intended to be limiting.

[0006] It must be noted that, as used in this specification and the appended claims, the singular forms "a" and "the" include plural referents, unless the context clearly dictates otherwise. Thus, for example, reference to a

"support member" includes one or more of such support members, unless the context clearly dictates otherwise.

[0007] In describing and claiming the present invention, the following terminology will be used in accordance with the definitions set forth below.

[0008] As used herein, relative terms are used to refer to various components of floor tiles, such as "upper," "lower," "upwardly," "downwardly," etc. It is to be understood that such terms are not used as limitations but rather are used to aid in describing the floor tiles of the present invention in the most straightforward manner. When such terms are used, it is to be understood that they are in reference to the generally accepted orientation of floor tiles when installed or positioned for use. For example, in such an orientation, the floor tile is generally disposed above the subfloor onto which the floor tiles will be installed or placed, with the upper surface of the floor tile exposed upwardly relative to the subfloor.

[0009] In addition, the edges of the tiles described herein are at times discussed using the terms "lateral" edges and "end" edges, in order to most clearly identify the novel features of the invention. It is to be understood that the terms "lateral" edges and "end" edges do not limit the scope of the claims herein, and, in particular, it is maintained by Applicants that any structure identifiable as an "edge" of a tile under consideration is considered to read on the claims herein.

[0010] As used herein, the term "substantially" refers to the complete or nearly complete extent or degree of an action, characteristic, property, state, structure, item, or result. For example, when an object or group of objects is/are referred to as being "substantially" parallel, it is to be understood that the object or objects are either completely parallel or are nearly completely parallel. The exact allowable degree of deviation from absolute completeness may in some cases depend on the specific context. However, generally speaking the nearness of completion will be so as to have the same overall result as if absolute and total completion were obtained.

[0011] The use of "substantially" is equally applicable when used in a negative connotation to refer to the complete or near complete lack of an action, characteristic, property, state, structure, item, or result. For example, an opening that is "substantially free of" material would either completely lack material, or so nearly completely lack material that the effect would be the same as if it completely lacked material. In other words, an opening that is "substantially free of" material may still actually contain some such material as long as there is no measurable effect as a result thereof.

[0012] As used herein, the term "about" is used to provide flexibility to a numerical range endpoint by providing that a given value may be "a little above" or "a little below" the endpoint.

[0013] As used herein, the term "subfloor" is to be understood to refer to a variety of flooring structures over or on which the floor tiles of the present invention are to be laid or installed. As used herein, the term "floor tile" is to

be understood to refer to a variety of modular flooring products having a range of sizes. Reference to a "floor tile" can include reference to products commonly referred to as tiles, planks, pads, sections of sheet flooring products, sections of rolled flooring products, etc., as dictated by the particular embodiment in which reference is being made herein to a "floor tile."

[0014] As used herein, the terms "resilient" and "resiliency" are to be understood to refer to a characteristic of a floor tile that allows the floor tile to compress or deflect in response to a load applied to the floor tile and then return, or "rebound," to the original state of the floor tile. It is to be understood that, when used, herein, the terms "resilient" or "resiliency" are not to be restricted or broadened due to the sometimes erroneous use of such terms in the flooring industry when referring, for example, to floor tiles which are not, in fact, resilient, but tend to either not compress (or deflect) when subjected to a load (e.g., fail to provide shock absorption), or tend to permanently deform after compressing when subjected to such a load (e.g., fail to return to an original state).

[0015] Distances, angles, forces, weights, amounts, and other numerical data may be expressed or presented herein in a range format. It is to be understood that such a range format is used merely for convenience and brevity and thus should be interpreted flexibly to include not only the numerical values explicitly recited as the limits of the range, but also to include all the individual numerical values or sub-ranges encompassed within that range as if each numerical value and sub-range is explicitly recited. As an illustration, a numerical range of "about 1 inch to about 6 inches" should be interpreted to include not only the explicitly recited values of about 1 inch to about 6 inches, but also include individual values and sub-ranges within the indicated range. This same principle applies to ranges reciting only one numerical value and should apply regardless of the breadth of the range or the characteristics being described.

[0016] The present invention provides a floor tile for use in a flooring system including a floor tile body and a female connecting member associated with a lateral edge of the floor tile body. The female connecting member or female connecting member can have a continuously curved profile and can be configured to mate with an adjacent floor tile. A male connecting member can be associated with an opposite lateral edge of the tile body, the male connecting member having a shape or profile operable to receive a continuously curved profile of a female connecting member of an adjacent tile to thereby mate with the adjacent floor tile.

[0017] In accordance with another aspect of the invention, a floor tile for use in a flooring system is provided, including a floor tile body and a female connecting member associated with a lateral edge of the tile body. The female connecting member can be configured to mate with an adjacent floor tile. A male connecting member can be associated with an opposite lateral edge of the tile body, the male connecting member being configured to

mate with an adjacent floor tile.

[0018] In accordance with another aspect of the invention, a floor tile system for use in a flooring installation is provided, including a floor tile body and a female connecting member associated with a lateral edge of the tile body. The female connecting member can be configured to mate with an adjacent floor tile. A male connecting member can be associated with an opposing lateral edge of the tile body, the male connecting member being configured to mate with an adjacent floor tile. The female connecting member can include an m-shaped profile. Both the male and female connecting members can include sidewalls, such as the inside sidewall of the female connecting member and the outside sidewall of the male connecting member. In aspects of the invention, the sidewalls have a draft angle, and the draft angle of the inner sidewall of the female connecting member is the same as or parallel to or substantially parallel to the draft angle of the outer sidewall of the male connecting member. (See FIG. 6 and discussion thereof). In other aspects, the draft angles may be slightly divergent, which may be provided in order to allow release of the tile from a mold, or for other reasons. However, providing connecting members without divergent sidewalls, or with draft angles that are substantially parallel, provides greater surface area for contact, which improves the connection strength of the tiles.

[0019] The floor tile and features thereof of the present disclosure can be used with various floor tiles, including floor tiles with improved grip. For example, the features of the present invention can be combined with a modular tile that includes improved grip and bounce characteristics. The tile can include an upper contact surface having a rib with top edges that are sharp. Protrusions may extend from the upper contact surface to provide grip and increase ball bounce performance. The tile may be made of a composite of rigid plastic and rubber to improve bounce characteristics. In some examples, the tile can include a square or sharp-radius corner of a rib on an upper contact surface. In some examples, the texture or protrusions on the upper contact surface may be etched in a post process, such as laser or chemical etching, and in other examples the protrusions may be added as part of an additive post process or as part of a material composition, such as grains of material to create the protrusions.

[0020] There has thus been outlined, rather broadly, the more important features of the invention so that the detailed description thereof that follows may be better understood, and so that the present contribution to the art may be better appreciated. Other features of the present invention will become clearer from the following detailed description of the invention, taken with the accompanying drawings and claims, or may be learned by the practice of the invention.

[0021] As illustrated generally in the attached figures, in one aspect of the present invention a floor tile 10 for use in a flooring system is provided. The floor tile or plank can include an upper surface 12 operable for use as a portion

of a flooring installation. The floor tile can include a support lattice operable to support the upper surface. The support lattice can include a plurality of support members or rails that can extend from an underside of the upper surface. The plurality of support members can terminate in lower sections that can collectively define a subfloor contact profile. A plurality of interconnecting members can laterally interconnect two or more of the support members.

[0022] As used herein, the term "subfloor profile" is used to indicate the lowermost portions or sections of the floor tile that are configured to contact a subfloor (not shown) on which the present tiles are laid or installed. While the subfloor profile is suitable for resting on a planar subfloor, the subfloor profile is not necessarily planar, but can include a series of lowermost sections aligned in a plane that can rest on the subfloor.

[0023] A plurality of at least partial openings can be formed between the interconnecting members 20 and the support members or rails. The openings can allow the support members and/or the interconnecting members to move or flex in response to a load applied to the upper surface 12 of the floor tile to provide a high level of resiliency to the floor tile. In some embodiments of the invention, the openings can be fully or partially filled with a pliable filler material (not shown) that can serve to dampen noise and vibration within the floor tile without significantly interfering with flexing of the support members and/or the interconnecting members.

[0024] The upper surface 12 of the floor tile shown in the figures generally includes a substantially continuous, uninterrupted plane that can be easily cleaned and maintained, even in areas of heavy soilage, such as cafeterias. In other embodiments (not shown), however, the upper surface can include a textured surface or a surface interrupted by indentations or openings, as a particular application may dictate.

[0025] The body of the floor tiles of the present invention can be formed from a variety of materials. In one embodiment the body is formed from a polymeric material. Examples of suitable polymeric materials include, without limitation, PVC, EVA, EVP, PP, PE, Acrylics, ABS, and derivatives and combinations thereof. The polymeric floor tiles can also include various fillers, additives, etc., as would occur to one having ordinary skill in the relevant art. The present floor tiles are well suited to be formed using extrusion, protrusion and/or pultrusion technology, such processes being relatively well known in the present field of endeavor. Of course, other manufacturing methods, such as injection molding, can also be utilized to form the floor tiles. In one aspect of the invention, the upper surface 12, the support members or rails, and the interconnecting members can be formed as an integral piece. The floor tiles or planks can be provided in a variety of lengths, and can be cut to specific lengths by the installer when installed.

[0026] FIG. 1 illustrates an example of a floor tile according to certain aspects of the present invention,

including floor tile 10 having female connecting members 20 and male connecting members 30. Floor tile 10 also includes a floor tile body 11 and an upper surface 12, which may be the operable surface of the floor tile, or the surface which contacts the user. Floor tile 10, and more specifically the floor tile body 11, also includes lateral edges, including a first lateral edge 15, a second lateral edge 16, a third lateral edge 17, and a fourth lateral edge 18. In certain aspects of the invention, the female connecting members 20 are associated with a lateral edge of the floor tile body 11 and the male connecting members 30 are associated with an opposite lateral edge of the tile body 11. For example, female connecting members 20 can be associated with the first and second lateral edges 15, 16. Male connecting members 30 can be associated with third and fourth lateral edges 17, 18, which are opposite first and second lateral edge 15, 16.

[0027] As further illustrated in FIG. 1, the female connecting member is configured to mate with an adjacent floor tile, and more specifically with a male connecting member of an adjacent floor tile. Female connecting member 20 can have a continuously curved profile. In some examples, female connecting member 20 includes two straight posts 22 connected by a curved profile 24, the posts 22 and curved profile 24 forming a m-shape. As such, the female connecting member can be said to have an m-shaped profile, or having two concave arcs and one convex arc. In other examples, the female connecting member can include other curved profiles, such as a three concave and two convex arcs, or a continuously concave arc, forming a single n-shape or having broken arcs resulting in various other curved profiles. Similarly, the male shaped member 30 includes two straight posts 32 connected by a curved profile 34. The posts 32 and curved profile 34 of the male connecting member 30 are configured to mate with the female connecting member 20.

[0028] Male connection member 30 further includes a clip or tab 36 configured to fit over and snap into a lateral edge of an adjacent floor tile. For example, a plurality of male connecting members 30 associated with a third lateral side 17 of a first floor tile 10 may be disposed adjacent a first lateral side 15 of a second, adjacent floor tile 10. The tab 36 of the plurality of male connecting members 30 snaps or clips over the first lateral side 15 of the second, adjacent floor tile 10.

[0029] FIGS. 2 and 3 further illustrate the floor tile 10 according to certain aspects of the invention, including the engagement of adjacent floor tiles 10A and 10B. First floor tile 10A includes, among other things, female connecting member 20 associated with a first lateral side 15. Second floor tile 10B includes, among other things, male connecting member 30 associated with a third lateral side 17. When first floor tile 10A and second floor tile 10B are disposed next to one another, female connecting member 20 mates with male connecting member 30 to limit the horizontal disassembly of floor tiles 10A and 10B. Moreover, the clip or tab 36 of male connecting member 30,

which again is associated with third lateral side 17 of second floor tile 10B, engages with first lateral side 15 of first floor tile 10A to limit the vertical disassembly of floor tiles 10A and 10B. Similarly, the curved profile of male connecting member 30 is configured to mate with the curved profile of female connecting member 20.

[0030] Further, the disassembly of adjacent floor tiles 10 is limited by a floor engagement system according to certain aspects of the present disclosure. As discussed in greater detail herein, the female and male connecting members 20, 30 of the present invention not only ensure that adjacent tiles can be installed at the correct intervals, but also provide for engagement that resists disassembly or unzipping of the adjacent floor tiles. In some aspects of the present invention, the female and male connecting members 20, 30 of the present invention, including the m-shaped profile and the substantially parallel draft angles or sidewalls, provide for an engagement system that is not only resistant to disassembly, but also is configured to provide for ease of assembly. According to some aspects of the technology, mating or interlocking components can present a challenge for snapping or connecting together, including based on the physical shape and characteristics of the connecting members. The present technology solves many of these issues by providing a connecting system that allows for at least the same resistance to disassembly during normal use (i.e. when the pressure of an athlete stopping on a tile is applied to a system) as existing systems, while providing greater ease of assembly and disassembly.

[0031] As discussed herein, and detailed in the drawings, the contact of male and female connecting members provides not only an initial securing of one floor tile to another, but also provides securing strength for the tiles to remain adjacent and attached when experiencing various loads on the floor tiles. In some existing floor tiles, the strength of the connection between tiles may not be sufficient to withstand certain forces, such as the force created when a heavy athlete quickly stops on the floor. This lateral force can cause connecting members of existing floors to be forced apart, leading the connection to fail and create gaps between the tiles. According to aspects of the present invention, the connection strength between tiles is increased by increasing the amount of surface contact between tiles, including by having a wide tab or clip 36 of male connecting member 30, and also by having a wider surface area of contact between male connecting member 30 and female connecting member 20. The m-shaped profile provides significant increase in surface area for contact, especially compared to various existing products. In some examples, the surface area of contact is increased by having the draft angles of each of the male and female connecting members, or in other words the angle of the sidewalls of each compared to the surface 12 of the floor tile 10, be substantially parallel. In certain aspects, the draft angle of the female connecting member and male connecting member are substantially parallel, as illustrated in FIG. 6 and discussed further with

reference thereto. In some aspects, the draft angle of each is zero. In other aspects, the draft angle may be greater than or less than zero, with reference to the top surface 12 of the tile 10, but the draft angle on the female connecting member 20 is the same as the draft angle on the male connecting member 30. In some aspects, it can be said that the draft angles of the components of the female and male connecting members 20, 30 do not diverge.

[0032] FIG. 4 further demonstrates this concept by illustrating the cross-section of adjacent floor tiles 10A and 10B, taken along axis line A-A of FIG. 3. According to certain aspects of the invention, female connecting member 20 includes sidewalls, and specifically sidewalls associated with posts 22 and curved profile 24. Female connecting member 20 specifically includes an inside sidewall 21 and an outside sidewall opposite the inside sidewall. Similarly, male connecting member 30 includes sidewalls associated with posts 32 and curved profile 34, including outside sidewall 31 and inside sidewall opposite the outside sidewall. As illustrated in FIG. 4, inside sidewall 21 of female connecting member 20 is disposed adjacent outside sidewall 31 of male connecting member 30. In some aspects of the invention, inside sidewall 21 of female connecting member 20 touches or abuts outside sidewall 31 of male connecting member 30 when a load is applied to the adjacent tiles, such as when an athlete stops on the tile. The surface area of the corresponding sidewalls 21, 31 provides frictional resistance to detachment of adjacent floor tiles. The curved profiles of female and male connection members 20, 30 provides greater surface area for sidewalls 21, 31 to create contact. This increase in surface area corresponds to a greater attachment strength of adjacent floor tiles compared to existing floor tile engagement or connection system.

[0033] Moreover, in some aspects of the technology, the sidewalls of the female and male connecting members include a texture which increases the resistance between the components when in contact. For example, in some aspects of the technology the process for ejecting the tile from the mold during fabrication includes an EDM process, or electronic discharge machining. The EDM process can be controlled such that the speed of the process contributes to the resulting surface texture of the fabricated tile. In some aspects of the present technology, it is desirable to use a relatively fast EDM process, resulting in a rougher surface texture, which contributes to the gripping strength of the contact between the female and male components. In other aspects, the texture on the sidewalls of the female and male connecting members can be from an additive post process, from etching such as laser or chemical etching, or from an additive in the material such as grains of material that cause a texture.

[0034] In aspects of the technology, the female and male connecting members 20, 30 may be configured to be flexible compared to the non-flexible nature of the floor tile and pre-existing locking systems for floor tiles. For

example, in some aspects of the present technology, each floor tile may include more than 6 female and male connecting members per lateral side, including exactly 7 connecting members per side, or more than 7 connecting members per side. Due to the flexible nature of the female connecting members 20, a greater number of sets of connecting members may be required to achieve the same or greater attachment strength as traditional connecting systems. However, according to aspects of the present technology, it has been discovered that a greater number of flexible connecting members allows for the same attachment strength under loads, while allowing the tiles to be quickly and easily detached, disassembled or unzipped. This may be desirable as, in some aspects of the technology, floor tiles may need to be assembled and disassembled with ease and speed. As such, it is an advantage of the present technology that the same or greater amount of attachment strength is achieved while providing easier, faster installation and disassembly, including because the force required to detach or unzip two adjacent tiles is less than with traditional locking systems.

[0035] In aspects of the invention, the components comprising the floor tile, including the female and male connecting members 20, 30, can be formed of the same material of the floor tile body 11. In other aspects, the material may be different. In any event, the material may be a pliable material, which can be formed of a relatively more pliable material, including, without limitation, elastomeric materials such as rubber, synthetic rubber, neoprene, PVC, etc., as well as derivatives and combinations thereof. The material can provide a relatively high frictional interface between the floor tile and the subfloor over which the floor tiles of the present invention are laid or installed.

[0036] In some aspects of the present technology a floor tile may include various types of raw material. Rigid plastic may be used, including thermoplastic polyolefin (e.g. polyethylene, polypropylene or a combination of the two). Flexible rubber may be blended with the rigid plastic, which may include a material blend consisting of thermoplastic, elastomer or rubber, or (TPO, TPE, TPV, EPDM) and optional fillers (e.g. polypropylene+calcium carbonate+ethylene propylene rubber). Proportions typically used for most industrial products can range from 20% plastic and 80% rubber all the way to 90% plastic and 10% rubber. In aspects of the present technology, the tile may be composed of as little as 10% and as much as up to 30% rubber.

[0037] According to aspects of the invention, the floor tiles 10A, 10B of the present invention can include a female connecting member 20 that can be associated with a lateral edges 15, 16 of the floor tiles. A male connecting member 30 can similarly be associated with an opposite lateral edges 17, 18 of the floor tile. The female connecting member and the male connecting member can cooperatively provide a lateral joint between two adjacent floor tiles. While the size and shape of the female connecting member can vary, in one aspect of the

invention the female connecting member can have an m-shaped profile, as shown in FIGS. 1-5.

[0038] The m-shaped, and more generally the continuously curved profile, can serve a variety of purposes. For example, by forming the female connecting member 20 with a continuously curved profile, the mating configuration along lateral edges of the tile can be less susceptible to detaching when experiencing lateral forces at the lateral joint, such as from an athlete stopping on a tile. In the case where the mating components are formed with sharp edges or sudden changes in profile, slight movement of the components of the lateral joint could cause gaps to form, allowing moisture to accumulate in the joint and eventually pass below the joint to the underlying subfloor.

[0039] The male connecting member 30 can have a shape corresponding to the continuously curved profile of the female connecting member 20, along with a tab 36. As the male connecting member is inserted within the female connecting member, the tab 36 serves to retain the male connecting member within the female connecting member. In use, an installer can simply press or "snap" the male connecting member within female connecting member to provide a secure lateral connection between adjacent floor tiles.

[0040] The female connecting member 20 and the male connecting member 30 are further shown in FIG. 5 in an engaged, mated relationship. As will be appreciated, the joint formed by the female connecting member and the male connecting member is sufficiently secure to resist the lateral forces caused from use of the floor tiles, such as from an athlete playing a sport on the floor tile.

[0041] As illustrated in FIG. 5, the female connecting member 20 and the male connecting member 30 can share a common size and shape (inverted one from another). However, in one embodiment (not shown), one or the other of the female connecting member and the male connecting member can be sized slightly larger than the other, to provide a press fit tightness to the joint. In this embodiment, the female connecting member is substantially encompassed on all sides by the male connecting member when the two are mated and comprise a lateral joint. That is, substantially all of the exposed surface of the female connecting member is contacted and held by the internal surfaces of the male connecting member.

[0042] Also, in one aspect of the invention, one or both of the female connecting member 20 and the male connecting member 30 can include a pliable material configured to at least partially compress when mated to form a tight joint.

[0043] Now with reference to FIG. 6, a draft angle as described previously herein is illustrated, which may be the angle or slope of certain surfaces of the tile as they relate to the mold from which the tile is created. Specifically, with reference to the inner sidewall 21 of female connecting member 20, the draft angle Θ is the angle between the plane C referencing the inner sidewall 21

and the plane X of the mold (not shown). The angle Θ may be, in some instances, zero. In other instances, the angle Θ may be positive or negative with reference to the plane X. Similarly, with reference to the outer sidewall 31 of the male connecting member 30, the draft angle β is the angle between the plane D of the outer sidewall 31 and the plane X of the mold (not shown). The angle β may similarly be zero in some instances, or may be positive or negative with reference to the plane X. As discussed in greater detail herein, the draft angles β and Θ may be substantially similar, meaning the draft angle of the female and male components 20, 30, or more specifically the side walls of each (21, 31) is substantially the same. In some examples, plane C of inner sidewall 21 is substantially parallel to plane D of outer sidewall 31.

[0044] As illustrated in the drawings, the female and male connecting members can be associated with (e.g., integral or bonded to) the tile, in a number of manners. In some examples, the male connecting member includes a segment that wraps beneath the tile and thereby forms one segment of the engagement material carried by the subfloor contact profile. In other examples, the male connecting material is adjoined to a lateral side of the tile, without extending a great deal beneath the tile.

[0045] The female connecting members 20 and the male connecting members 30 of the present invention can each aid in providing a mating joint between floor tiles that is resistant or impervious to disconnection of the tiles, and also allows for expansion or contraction of floor tiles due to changes in temperature, or normal use of the floor tiles. Thus, the mating joints provided by the present tiles can provide a substantially improved connection system for floor tiles.

[0046] During a typical installation process (not shown in the figures), an installer can place or lay a first tile in position on a subfloor. A second, adjacent tile can be disposed near a lateral edge of the tile, and a male connecting member of one tile can be inserted within a female connecting member of an adjacent tile to laterally connect the tiles one to another. If a length of the tile should need to be adjusted, a simple saw or router cut can be used by the installer to size the length of the tile. This process can be continued until enough modular floor tiles have been assembled to form a substantially continuous sheet that covers the desired area. As the floor tiles are formed from a polymer, installers can easily cut tile lengths or widths to size, as necessary, without requiring a great deal of specialized tooling.

[0047] According to aspects of the present technology, a floor tile for use in a flooring system can include a floor tile body, a female connecting member associated with a lateral edge of the floor tile body, the female connecting member being configured to mate with an adjacent floor tile and having a continuously curved profile, and a male connecting member associated with an opposite lateral edge of the tile body, the male connecting member having a continuously curved profile corresponding to the female connecting member of an adjacent tile to thereby allow

secure lateral mating of the tile with the adjacent floor tile. In some aspects, the female connecting member includes an m-shaped profile. In some aspects, a draft angle of the female connecting member and male connecting member are substantially parallel.

[0048] In yet other aspects of the present technology, the female connecting member and the male connecting member include a pliable material configured to at least partially compress when mated to form a seal with a female connecting member or a male connecting member of an adjacent tile.

[0049] In some aspects, the female connecting member is formed integrally with the floor tile body. The male connecting member can be substantially encompassed on all sides by a female connecting member of an adjacent tile when the male connecting member is mated with the adjacent tile. Furthermore, the male connecting member extends in a downward direction from the floor tile body. The male connecting member can also include a channel formed therein having an open portion exposed in an upward direction.

[0050] In some aspects, the male connecting member can include a channel formed therein having clearance between a tab and the continuously curved profile.

[0051] According to aspects of the present technology, a floor tile system for use in a flooring installation includes at least two floor tiles, each including a tile body. It further includes a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile, and a male connecting member associated with an opposite lateral edge of the tile body. According to aspects of the technology, the male connecting member is configured to mate with the female connecting member.

[0052] As further discussed herein, the curved profile of the female connecting member can comprise an m-shaped profile. A draft angle of the female connecting member and male connecting member can be substantially parallel. In some aspects, the male connecting member comprises a protrusion comprising a curved profile, and the male connecting member further comprises a clip. The clip can be at least as wide as the curved profile. A sidewall of the clip and a sidewall of the protrusion can be configured to contact a sidewall of the female connecting member. For example, in some aspects at least 50% of the sidewall of the male connecting member is in contact with the female connecting member.

[0053] In some aspects, a distance between a top portion of the sidewalls can be substantially the same as a distance between a bottom portion of the sidewalls.

[0054] A method of floor tile engagement is also disclosed herein as an aspect of the present technology, the method including the steps of providing at least two floor tiles, each of the at least two floor tiles comprising a tile body, the tile body having a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile, and a male connecting member associated with an opposite

lateral edge of the tile body. The method further includes engaging the female connecting member of a first of the at least two floor tiles with a male connecting member of a second of the at least two floor tiles.

[0055] According to certain aspects, the method further includes providing a third floor tile and engaging the female connecting member of the third floor tile with the male connecting member of the first tile, and engaging the male connecting member of the third floor tile with the female connecting member of the second tile. 5 10

[0056] In aspects of the technology, as discussed herein, the female connecting member of the method includes an m-shaped profile. The female connecting member and male connecting member may each comprise a sidewall, and a draft angle of each of the sidewalls may be parallel, substantially parallel or may not diverge. The female connecting member and male connecting member may each include a sidewall, and at least 50% of the sidewall of the male connecting member may contact the sidewall of the female connecting member when engaged. 15 20

[0057] It is to be understood that the above-described arrangements are only illustrative of the application of the principles of the present invention. Numerous modifications and alternative arrangements may be devised by those skilled in the art without departing from the spirit and scope of the present invention and the appended claims are intended to cover such modifications and arrangements. Thus, while the present invention has been described above with particularity and detail in connection with what is presently deemed to be the most practical and preferred embodiments of the invention, it will be apparent to those of ordinary skill in the art that numerous modifications, including, but not limited to, variations in size, materials, shape, form, function and manner of operation, assembly and use may be made without departing from the principles and concepts set forth herein. 25 30 35

[0058] One, non-limiting aspect of the present invention will now be described by way of reference to the following clauses: 40

1. A floor tile for use in a flooring system, comprising: a floor tile body; 45

a female connecting member associated with a lateral edge of the floor tile body, the female connecting member being configured to mate with an adjacent floor tile and having a continuously curved profile; and 50
a male connecting member associated with an opposite lateral edge of the floor tile body, the male connecting member having a continuously curved profile corresponding to the female connecting member of an adjacent tile to thereby allow secure lateral mating of the floor tile with the adjacent floor tile. 55

2. The floor tile of clause 1, wherein the female connecting member includes an m-shaped profile.

3. The floor tile of clause 1 or 2, wherein a draft angle of the female connecting member and male connecting member are substantially parallel.

4. The floor tile of clause 1, 2 or 3, wherein the female connecting member and the male connecting member are configured to at least partially flex when mated to form a connection with a female connecting member or a male connecting member of an adjacent tile.

5. The floor tile of clause 1, 2, 3 or 4, wherein the female connecting member is formed integrally with the floor tile body.

6. The floor tile of clause 1, 2, 3, 4 or 5, wherein the male connecting member is substantially encompassed on all sides by a female connecting member of an adjacent tile when the male connecting member is mated with the adjacent tile.

7. The floor tile of clause 1, 2, 3, 4, 5 or 6, wherein the male connecting member extends in a downward direction from the floor tile body.

8. The floor tile of clause 1, 2, 3, 4, 5, 6 or 7 wherein the male connecting member includes a channel formed therein having clearance between a tab and the continuously curved profile.

9. A floor tile system for use in a flooring installation, comprising:

at least two floor tiles, each comprising a tile body;
a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile;
a male connecting member associated with an opposite lateral edge of the tile body; and
wherein the male connecting member is configured to mate with the female connecting member. 5

10. The floor tile system of clause 9, wherein the curved profile of the female connecting member comprises an m-shaped profile.

11. The floor tile system of clause 9 or 10, wherein a draft angle of the female connecting member and male connecting member are substantially parallel.

12. The floor tile system of clause 9, 10 or 11, wherein the male connecting member comprises a protrusion comprising a curved profile, and the male connecting

member further comprises a clip.

13. The floor tile system of clause 12, wherein the clip is at least as wide as the curved profile.

14. The floor tile system of clause 12, wherein a sidewall of the clip and a sidewall of the protrusion are configured to contact a sidewall of the female connecting member.

15. The floor tile system of clause 14, wherein a distance between a top portion of the sidewalls is substantially the same as a distance between a bottom portion of the sidewalls.

16. A method of floor tile engagement, comprising:

providing at least two floor tiles, each of the at least two floor tiles comprising a tile body, the tile body comprising:

a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile; and
a male connecting member associated with an opposite lateral edge of the tile body; and

engaging the female connecting member of a first of the at least two floor tiles with a male connecting member of a second of the at least two floor tiles.

17. The method of clause 16, further comprising providing a third floor tile and engaging the female connecting member of the third floor tile with the male connecting member of the first tile, and engaging the male connecting member of the third floor tile with the female connecting member of the second tile.

18. The method of clause 16 or 17, wherein the female connecting member comprises an m-shaped profile.

19. The method of clause 16, 17, or 18, wherein the female connecting member and male connecting member each comprise a sidewall, and wherein a draft angle of each of the sidewalls is parallel.

20. The method of clause 16, 17, 18 or 19, wherein the female connecting member and male connecting member each comprise a sidewall, and wherein a distance between a top portion of each sidewall is substantially the same as a distance between a bottom portion of each sidewall.

Claims

1. A floor tile for use in a flooring system, comprising: a floor tile body;

a female connecting member associated with a lateral edge of the floor tile body, the female connecting member being configured to mate with an adjacent floor tile and having a continuously curved profile; and
a male connecting member associated with an opposite lateral edge of the floor tile body, the male connecting member having a continuously curved profile corresponding to the female connecting member of an adjacent tile to thereby allow secure lateral mating of the floor tile with the adjacent floor tile.

2. The floor tile of claim 1, wherein the female connecting member includes an m-shaped profile.

3. The floor tile of claim 1, wherein a draft angle of the female connecting member and male connecting member are substantially parallel.

4. The floor tile of claim 1, wherein a) the female connecting member and the male connecting member are configured to at least partially flex when mated to form a connection with a female connecting member or a male connecting member of an adjacent tile; or b) the female connecting member is formed integrally with the floor tile body.

5. The floor tile of claim 1, wherein a) the male connecting member is substantially encompassed on all sides by a female connecting member of an adjacent tile when the male connecting member is mated with the adjacent tile; or b) the male connecting member extends in a downward direction from the floor tile body.

6. The floor tile of claim 1, wherein the male connecting member includes a channel formed therein having clearance between a tab and the continuously curved profile.

7. A floor tile system for use in a flooring installation, comprising: at least two floor tiles, each comprising a tile body;

a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile;
a male connecting member associated with an opposite lateral edge of the tile body; and
wherein the male connecting member is configured to mate with the female connecting member.

8. The floor tile system of claim 7, wherein the curved profile of the female connecting member comprises an m-shaped profile.
9. The floor tile system of claim 7, wherein a draft angle of the female connecting member and male connecting member are substantially parallel. 5
10. The floor tile system of claim 7, wherein the male connecting member comprises a protrusion comprising a curved profile, and the male connecting member further comprises a clip. 10
11. The floor tile system of claim 7, wherein the clip is at least as wide as the curved profile; or wherein a sidewall of the clip and a sidewall of the protrusion are configured to contact a sidewall of the female connecting member, wherein preferably a distance between a top portion of the sidewalls is substantially the same as a distance between a bottom portion of the sidewalls. 15
20
12. A method of floor tile engagement, comprising:
 - providing at least two floor tiles, each of the at least two floor tiles comprising a tile body, the tile body comprising: 25
 - a female connecting member associated with a lateral edge of the tile body, the female connecting member comprising a curved profile; and 30
 - a male connecting member associated with an opposite lateral edge of the tile body; and engaging the female connecting member of a first of the at least two floor tiles with a male connecting member of a second of the at least two floor tiles. 35
13. The method of claim 12, further comprising providing a third floor tile and engaging the female connecting member of the third floor tile with the male connecting member of the first tile, and engaging the male connecting member of the third floor tile with the female connecting member of the second tile. 40
45
14. The method of claim 12, wherein the female connecting member comprises an m-shaped profile.
15. The method of claim 12, wherein the female connecting member and male connecting member each comprise a sidewall, and wherein a draft angle of each of the sidewalls is parallel or wherein the female connecting member and male connecting member each comprise a sidewall, and wherein a distance between a top portion of each sidewall is substantially the same as a distance between a bottom portion of each sidewall. 50
55

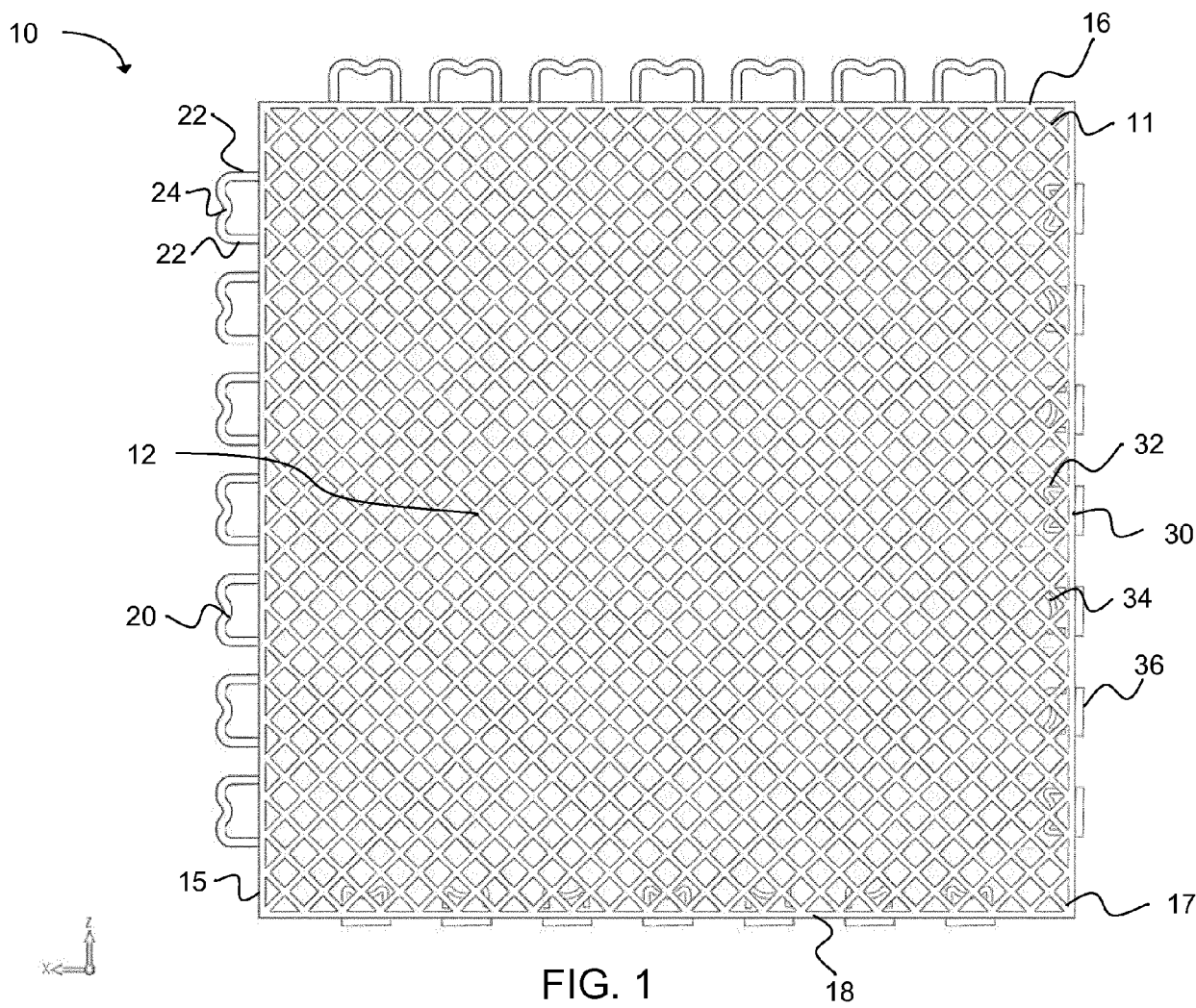
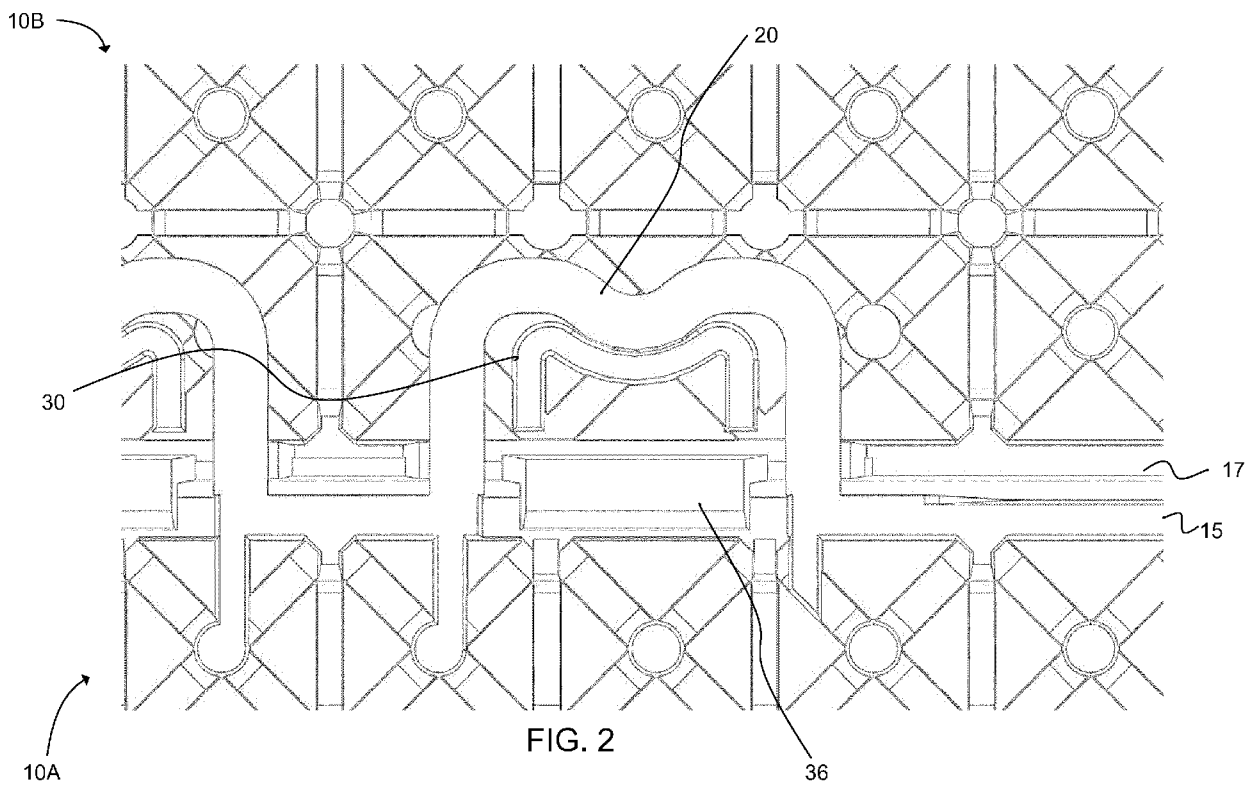


FIG. 1



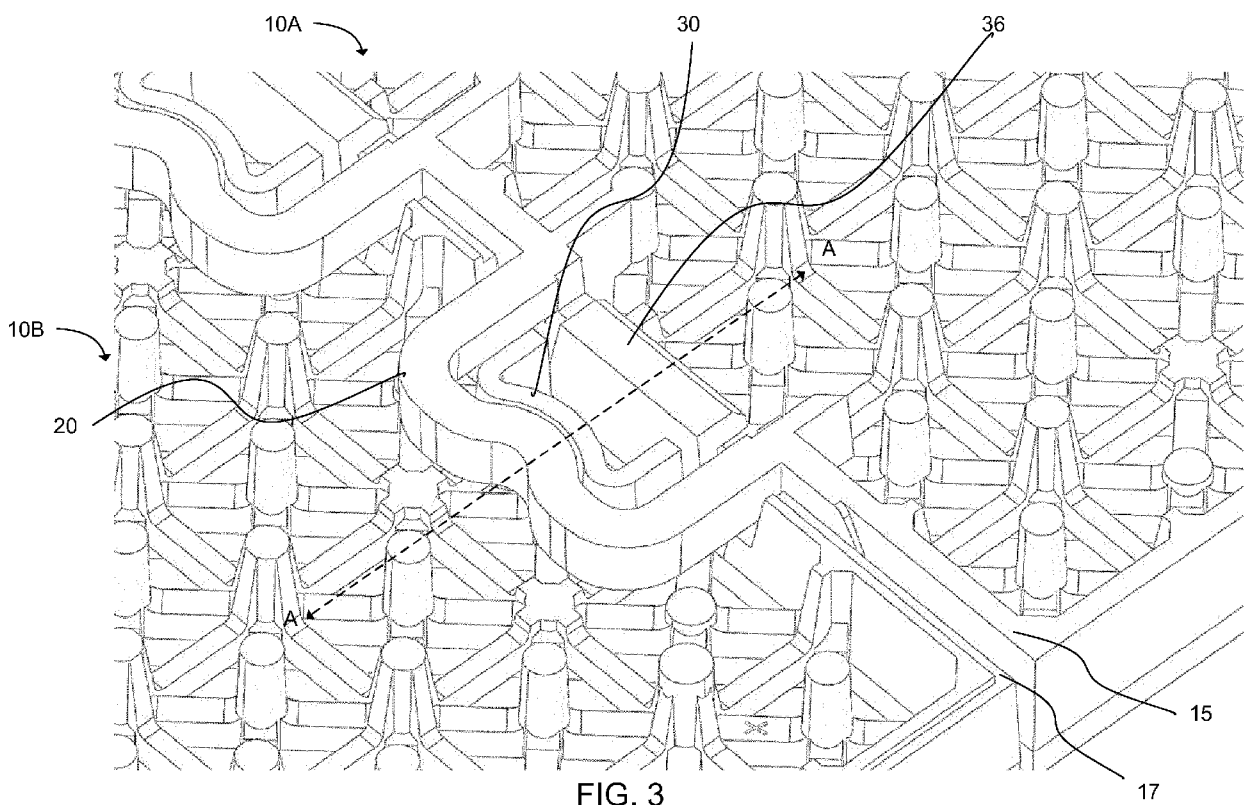
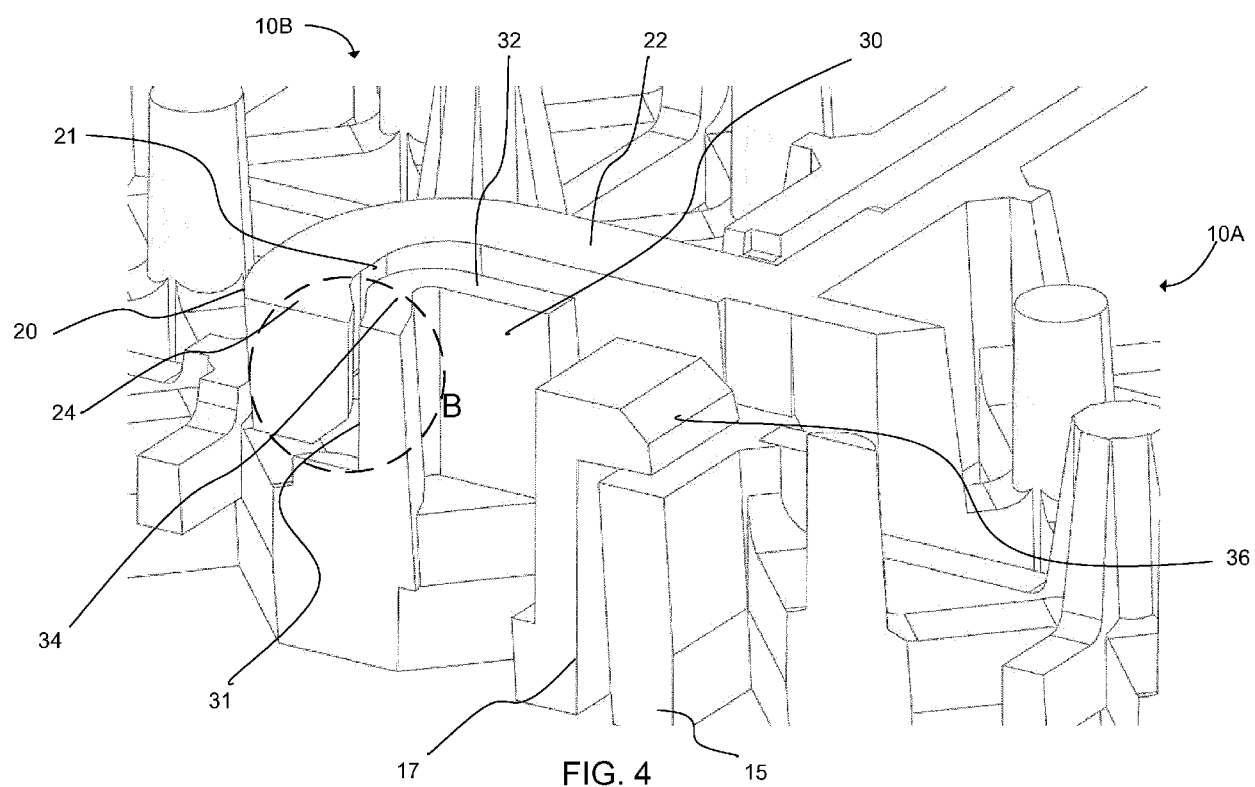
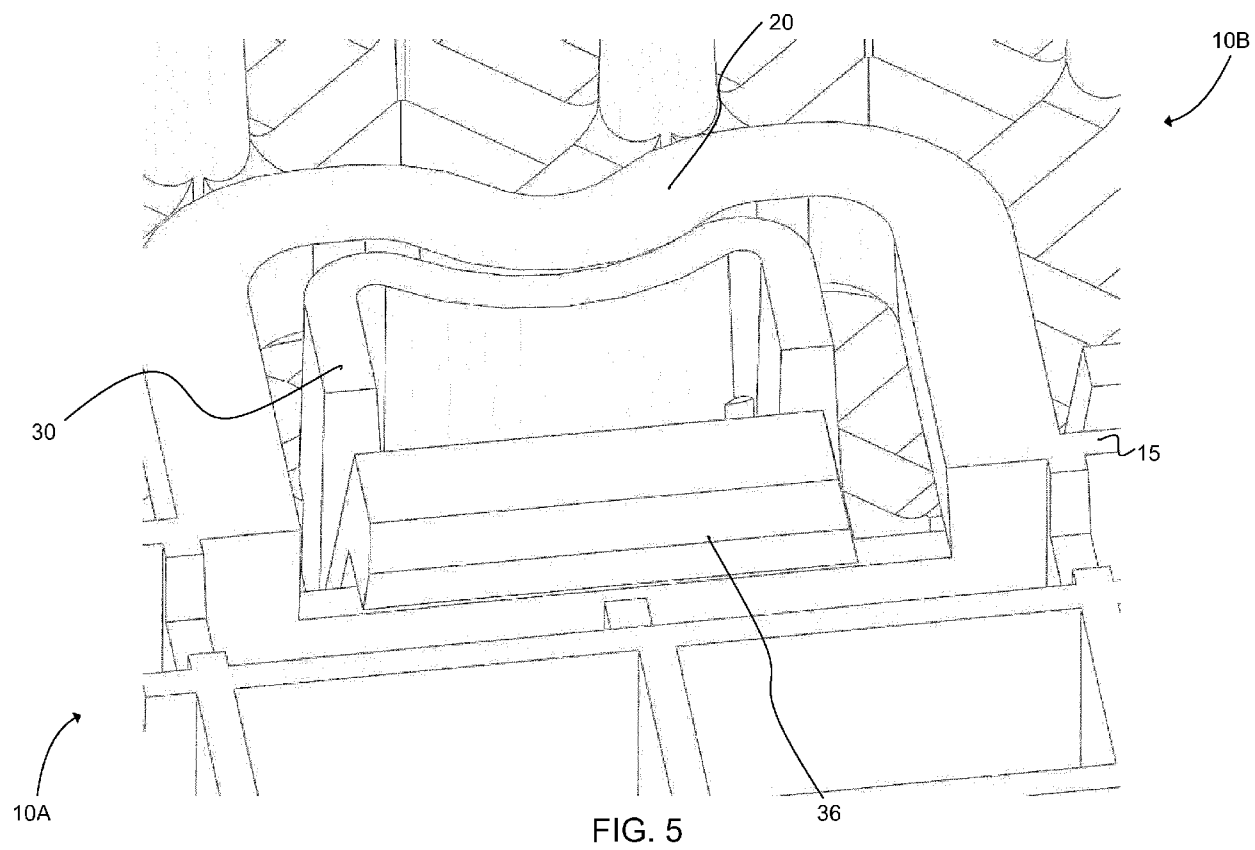


FIG. 3





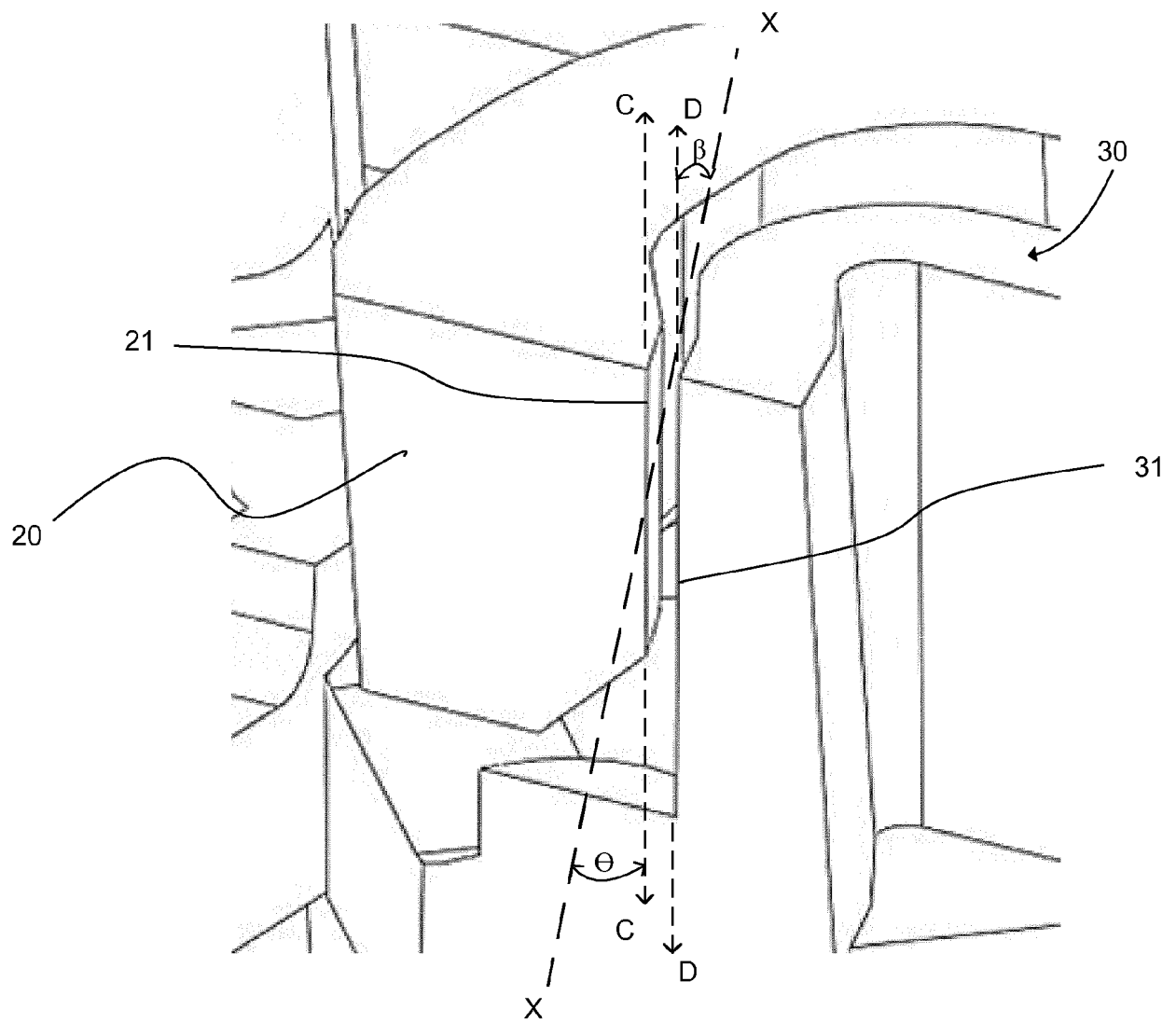


FIG. 6