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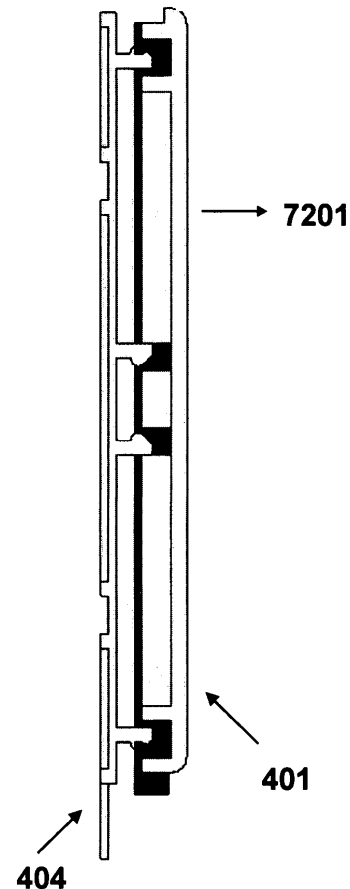
(71) Applicant: **R H R Solutions Limited**  
**Sheffield, S9 1XU (GB)**

(72) Inventors:  
• **Rippin, Daniel John**  
**Nottingham NG10 3QU (GB)**  
• **Henderson, Mark**  
**Loughborough LE12 9TQ (GB)**

(74) Representative: **Chapman, Paul Nicholas et al**  
**Atkinson Burrington Limited**  
**28 President Buildings**  
**President Way**  
**Sheffield S4 7UR (GB)**

(54) **Apparatus for releasable fixation of tiles to a tile support board**

(57) A tile (401) having a front face (202) for displaying and an underside (203) for securing to a tile support surface, the underside having a closed path seal wall (204) extending backwards. The seal wall is configured to provide a seal between the tile and a tile support surface to prevent substance ingress interior of the closed path of the seal wall. A tile having a seal wall also configured to provide a seal between the tile and a second like tile. A tile having an underside that presents tile coupling means configured to communicate with tile support coupling means to provide a first releasable coupling arrangement. A tile support board (404) having a rear face for securing to a support surface and a front face providing a tile support surface and presenting tile support coupling means, such that the tile may be releasably coupled to the tile support board.



*Figure 7D*

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## Description

### Background of the Invention

#### 1. Field of the Invention

[0001] The present invention relates to tiling apparatus, in particular to tiling apparatus comprising a tile having a seal wall, a tile support board, and coupling means to releasably couple the tile to the tile support board.

#### 2. Description of the Related Art

[0002] A first method of tiling a surface, such as an interior wall, involves ensuring the surface to be tiled is suitably clean and flat. A starting point on the surface is then selected and tiles adhered to the surface in a pattern radial from the starting point. Tiles are aligned in a spaced apart arrangement providing gaps between neighbouring tiles into which grout, sealant or other filler is applied. A variety of different tools or aids may be utilised, for example a tile cutter may be used to trim tiles when accommodating obstructions or tiling around recesses, and tile spacers may be used to ensure uniform grouting gaps. This method requires a degree of skill to produce an array of tiles that is securely bonded and aesthetically pleasing.

[0003] A tiling system is disclosed in United Kingdom Patent No. GB 2 368 855. The tiling system comprises a support matrix and tiles that are removably locatable on the matrix. The support matrix defines an array of aperture and tiles are secured to the matrix by means of projections configured to engage with the apertures. A tile removal tool may be provided.

#### Brief Summary of the Invention

[0004] According to a first aspect of the present invention there is provided a tile having: a front face for displaying, and an underside for securing to a tile support surface, wherein the underside has a closed path seal wall extending backwards and the seal wall is configured to provide a seal between the tile and a tile support surface to prevent substance ingress interior of the closed path of the seal wall.

[0005] According to a second aspect of the present invention the seal wall of the tile is also configured to provide a seal between the tile and a second like tile.

[0006] According to a third aspect of the present invention there is provided a tile wherein the tile has: a rectangular shape with four edges only, and a thickness provided by a perimeter side wall extending backwards from the front face, wherein the seal wall extends along the underside of the tile interior of the perimeter side wall from a first edge of the tile around a first corner to a second different edge of the tile, adjacent the first edge, to provide a first pair of adjacent edges of the tile with a seal underhang providing a tile overhang, and the seal wall widens from the underside of the tile to the exterior of the perim-

eter side wall and extends from a third different edge of the tile, adjacent the second edge, around a second corner to a fourth different edge of the tile, adjacent the first edge, to provide a second different pair of adjacent edges of the tile with a seal overhang.

[0007] According to a fourth aspect of the present invention a first tile and a second like tile are locatable relative to each other such that the seal overhang of a first of the tiles extends under the tile overhang of the second of the tiles to abut against the seal underhang of the second of the tiles to form a seal between the first tile and the second tile.

[0008] According to a fifth aspect of the present invention the underside of the tile presents tile coupling means, and the tile coupling means are configured to communicate with tile support coupling means to provide a first releasable coupling arrangement.

[0009] According to a sixth aspect of the present invention there is provided a tile support board having a rear face for securing to a support surface and a front face providing a tile support surface, wherein the front face of the tile support board presents tile support coupling means, and the tile support coupling means are configured to communicate with tile coupling means to provide a first releasable coupling arrangement.

[0010] According to a seventh aspect of the present invention the underside of the tile has a peripheral groove having opposing inside walls and a base wall, and the seal wall of the tile has a first profile along an inside wall of the peripheral groove; the front face of the tile support board has a plurality of projections having an outer surface having a second profile, and the seal wall of the tile and the projections of the tile support board are configured such that the first profile and the second profile are arranged to releasably couple with a positive mechanical fit.

#### Brief Description of the Several Views of the Drawings

##### [0011]

*Figure 1* shows a wall having a pattern of tiles adhered thereto;

*Figure 2* shows a tile having a seal wall extending from the underside of the tile;

*Figures 3A and 3B* show features of the tile of *Figure 2* in further detail;

*Figure 4* shows a tile and a tile support board to which the tile is arranged to be releasably coupled;

*Figures 5A, 5B and 5C* show features of the tile of *Figure 4* in further detail;

*Figures 6A and 6B* show features of the tile support board of *Figure 4* in further detail;

*Figures 7A, 7B, 7C and 7D* illustrate the operation of the releasable coupling arrangement of the tile and tile support board of *Figure 4*;

*Figure 8* shows a perspective view of the tile of *Figure*

4 coupled to the tile support board of *Figure 4*;  
*Figure 9* shows features of the tile support board of  
*Figure 4* in further detail;  
*Figure 10* shows a plurality of like tile support boards  
 connected together to form a larger tile support  
 board;  
*Figure 11* shows a plurality of tiles coupled to the tile  
 support board of *Figure 10*;  
*Figure 12* illustrates a seal between neighbouring  
 tiles of the arrangement shown in *Figure 11*;  
*Figures 13A* and *13B* show the tile support board of  
*Figure 4* and an edging strip;  
*Figures 14A* and *14B* illustrate an accessory tile and  
 accessory removably connectable to the accessory  
 tile;  
*Figure 15* shows the interior of a kitchen.

### Written Description of the Best Mode for Carrying Out the Invention

#### Figure 1

[0012] A tiled wall is shown in *Figure 1*. Tiles, such as tile **101**, are arranged in a regular pattern upon wall **102**. A number of the tiles are to be removed, by a building operative **103**, and replaced with a new tile, such as tile **104**.

[0013] In accordance with conventional practice, the tiles to be removed were previously adhered directly to the wall **102**. Removing one of these tiles involves prising the tile away from the wall, typically using a tool, until the adhesive bond between the tile and wall breaks. This action may undesirably damage the tile being removed and/or neighbouring tiles. Often, following removal of a tile, a rough patch of cured adhesive is left behind that needs to be levelled off before a replacement tile or other finish can be provided in that area. The condition of the wall may also have been adversely affected by factors such as the ambient humidity and temperature, and impact damage sustained by the tiled wall.

[0014] Thus, stripping a wall of tiles and preparing the wall for different decoration can be an untidy and drawn-out task.

[0015] In addition, when applying the tiles onto a substrate surface, attention is often given to achieving an aesthetically pleasing finish. For example, strict adherence to a particular design of a pattern of different tiles may be sought or neatness of placement may be desired. Tiles may be aligned with an edge or guide, and orienting tiles with respect to the edge of a wall corner or another tile for example, may involve corrective adjustment of individual tiles when first applied to the base surface. This aspect of tiling is often a tiresome hindrance to efficient completion.

#### Figure 2

[0016] A tile is shown in *Figure 2*. Tile **201** has a front

face **202** for displaying and an underside **203** for securing to a tile support surface. The underside **203** of the tile **201** has a closed path seal wall **204** extending backwards and having an outer side wall **205**. The seal wall **204** forms a loop surrounding an internal zone of the underside **203** of the tile **201**. The seal wall **204** is configured to provide a seal between the tile **201** and a tile support surface, to prevent substance ingress interior of the outer side wall **205** of the seal wall **204**. Thus, the seal wall of the tile serves to inhibit substance ingress interior of the closed path of the seal wall.

[0017] The tile **201** has a thickness provided by a perimeter side wall **206** extending backwards from the front face **202**.

[0018] Tile **201** has a rectangular shape, a square shape, with four edges **207**, **208**, **209**, **210** only.

[0019] In plan view of the front face **202** of the tile **201**, it looks as though seal wall **204** has the same perimeter shape and dimensions as the front face **202** of the tile **201**, but that the relative positions of each are offset

[0020] The seal wall **204** is positioned relative to the front face **202** of the tile **201** such that in plan view of the front face **202** of the tile **201**, there is a tile underhang and a tile overhang relative to the seal wall **204**. In plan view of the underside **203** of the tile **201**, the tile underhang is seen as a seal overhang relative to the tile, and the tile overhang is seen as a seal underhang relative to the tile.

[0021] The terms "overhang" and "underhang" are used as though describing a layer of wares loaded on a pallet. Ideally, the load is flush with the edges of the pallet. The term "overhang" is used where the load protrudes over an edge of the pallet and the term "underhang" is where the load does not extend to an edge of the pallet.

[0022] The seal wall **204** extends along the underside **203** of the tile **201**, interior of the perimeter side wall **206**, from a first edge **207** of the tile **201** around a first corner **211** to a second different edge of the tile **208** adjacent the first edge **207**. This provides a first pair of adjacent edges of the tile **201** with a seal underhang, or when viewed from the other side a tile overhang. This will be described in further detail with reference to *Figures 3A*, *3B*, *5A-5C* and *12*.

[0023] The seal wall **204** widens from the underside **203** of the tile **201** to the exterior of the perimeter side wall **206** and extends from a third different edge **209** of the tile **201**, adjacent the second edge **208**, around a second corner **212** to a fourth different edge **210** of the tile **201**, adjacent the first edge **207**. This provides a second different pair of adjacent edges of the tile **201** with a seal overhang, or when viewed from the other side a tile underhang. This will also be described in further detail with reference to *Figures 3A*, *3B*, *5A-5C* and *12*.

[0024] The seal wall **204** may be considered to provide a first corner **211** of tile **201** with a full, or complete, seal underhang, and to provide a second corner **212** of tile **201**, diagonally opposite the first corner **211**, with a full, or complete, seal overhang. The other diagonally oppo-

site corners **213**, **214** may be considered to have a partial, or incomplete, seal overhang.

[0025] In an alternative arrangement, the length dimension of the seal overhang and the length dimension of the seal underhang of a tile are equal.

[0026] It is to be appreciated that the front face of a tile may have a decorative profile, texture and/or graphic decoration. The front face of a tile may have one or more recesses into which a functional or decorative component, for example a ceramic or glass decorative tile, may be secured. The additional component may be secured to the tile by means of adhesive or a mechanical fixing.

#### Figures 3A and 3B

[0027] A perspective view of tile **201** is shown in *Figure 3A*. First edge **209**, corner **214**, fourth edge **210** and the seal wall **204** are shown in further detail.

[0028] It can be seen that the perimeter side wall **206** of the tile extends backwards from the front face **202** to provide a thickness to the tile **201**. The perimeter side wall **206** is also shaped to provide a seal support wall **301**. The seal support wall **301** extends backwards from a position interior of the edges of the front face **202** of the tile **201**.

[0029] The seal wall **204** extends along the underside of the seal support wall **301**. In this example, the length of the seal wall **204** that provides the seal underhang **302** extends along the seal support wall **301** with the seal wall flush with the perimeter side wall **206** and with a uniform depth.

[0030] At the turn of corner **214** to fourth edge **210**, the seal wall **204** extends upwards along the exterior of the perimeter side wall **206**. In this example, the seal overhang **303** has a uniform width and depth.

[0031] A perspective view of tile **201** is shown in *Figure 3B*. First edge **209**, corner **214** and fourth edge **210** and the seal wall **204** are shown in further detail. It can be seen that the seal underhang **302** provides a tile overhang **304**. The tile **201** also has an overall depth **305**. In this example, the overall depth comprises the thickness **306** of the tile **201**, a depth **307** of the perimeter side wall **206** and a depth **308** of the seal wall **204**.

[0032] According to tile **201**, the length of the seal wall **204** providing the seal overhang **303** extends upwards of the perimeter side wall **206** to overlap the thickness **306** of the tile **201**. This feature will be described in further detail with reference to *Figure 12*.

[0033] As previously mentioned the seal wall **204** of the tile **201** is configured to provide a seal between the tile **201** and a tile support surface to prevent substance ingress interior of the closed path of the seal wall. The seal overhang and seal underhang of tile **201** also provides for a seal between neighbouring like tiles **201** to be formed. Two such tiles are locatable relative to each other such that the seal overhang of a first of the tiles extends under the tile overhang of the second of the tiles to abut against the seal underhang of the second of the

tiles to form a seal between the first tile and the second tile. In this example, the seal underhang extends under, and in contact with, the tile overhang.

[0034] Thus, the tiles are individual components of a modular tiling system.

[0035] Tile **201** may be secured directly to a base support surface, such as a wall. Such an application would accommodate a tile having a seal wall that takes the shape of a slab, or of a picture frame. The feature to be achieved is that the seal wall encloses an internal zone of the underneath of the tile. The seal wall functions to provide a barrier against substance ingress, in particular, liquid ingress into the enclosed area of the underside of the tile.

[0036] Alternatively, a tile may be secured to an intermediate surface, such as a tile support board, which is secured directly to a base support surface, such as a wall.

#### Figure 4

[0037] *Figure 4* shows a cross-section view of a tile **401**, having a front face **402** for displaying and an underside **403** for securing to a tile support surface. The underside of the tile **401** presents tile coupling means, and the tile coupling means are configured to communicate with tile support coupling means to provide a first releasable coupling arrangement.

[0038] *Figure 4* also shows a cross-section view of a tile support board **404**, which has a rear face **405** for securing to a support surface and a front face **406** providing a tile support surface. The rear face **405** of tile support board **404** is continuous to prevent substance ingress from the rear face **405** into the tile support board **404**, and vice versa.

[0039] The front face **406** of the tile support board **404** presents tile support coupling means, and the tile support coupling means are configured to communicate with tile coupling means to provide a first releasable coupling arrangement.

[0040] Thus, tile **401** is arranged to be releasably coupled to the tile support board **404**. The first coupling arrangement provides for a tile to be connected to the tile support board, disconnected and reconnected to the tile support board if desired. A tile may be disengaged from the tile support board and be relocated elsewhere on the tile support board. A tile may be removed from the tile support board and may be replaced by a different tile. This arrangement allows for different patterns and arrays of tiles to be displayed on the tile support board. For example, the effect of a brick wall may be achieved.

[0041] The underside of tile **401** is also provided with a seal wall **407** arranged to provide a seal underhang, providing a tile overhang, as indicated at **408**, and arranged to provide a seal overhang, as indicated at **409**.

[0042] In the example shown in *Figure 4*, tile **401** presents a connection recess **410** and the tile support board **404** presents a connection projection **411**. The connection projection **411** of the tile support board is con-

figured to be received within the connection recess **410** of tile **404**, to releasably couple the tile **401** to the tile support board **404** with a positive mechanical fit an interference or friction fit. A positive mechanical fit may provide tactile feedback to a user to indicate entry into and exit from the engaged arrangement, and provides an initial resistance functions to prevent undesired release of a tile from a tile support board.

#### **Figures 5A, 5B and 5C**

**[0043]** Tile **401** is shown in further detail in *Figures 5A, 5B and 5C*.

**[0044]** *Figure 5A* shows the underside **403** of the tile **401** in further detail. The underside **403** of the tile **401** has a peripheral groove **501** having an inside outer wall **502**, an inside inner wall **503** opposing the inside outer wall **502**, and a base wall **504**.

**[0045]** It can be seen that the seal wall **407** takes the form of a frame. The tile **401** has a recessed tile sector **505** interior of the peripheral groove, defining an inner peripheral groove wall **506** that has discontinuities, such as those indicated at **507**. This feature will be described in further detail with reference to *Figures 7A-7D*.

**[0046]** The peripheral groove **501** of tile **401** is shown in further detail in *Figure 5B*, which illustrates a part of the tile **401** having a seal underhang. It can be seen that the seal wall **407** has a first profile along an inside wall of the peripheral groove **501**.

**[0047]** According to the construction of tile **401**, the seal wall **407** is fabricated from a different material to the rest of the tile **401**. Tile **401** defines a first outer seal support wall **508**, providing the inside outer wall **502**, and a second inner seal support wall **509**, providing the inside inner wall **503** and the inner peripheral groove wall **506**. In an alternative arrangement, the seal support walls **508**, **509** are integrated with the seal wall **407**. According to the construction of tile **401**, the seal wall is fabricated from a first plastic material and the rest of the tile is fabricated from a second plastic material. Preferably, and in this example, both the first material and the second material are waterproof and fireproof. ABS (Acrylonitrile Butadiene Styrene) fireproof plastic may be used. The first material may also be more compliant than the second material. The seal wall is preferably fabricated from a rubber or other elastomeric material.

**[0048]** As shown in *Figure 5B*, the seal wall **407** extends along the bottom of the first outer seal support wall **508**, upwards inside along the inside outer wall **502** and onto the base wall **504**. According to this example, the seal wall **407** continues downwards along the inside inner wall **503** and extends along the bottom of the second inner seal support wall **509**. In an alternative arrangement, this feature is omitted such that the seal wall **407** extends along the bottom of the first outer seal support wall **508** only.

**[0049]** According to the construction of tile **401**, there is a discontinuity in the seal wall **407**, dividing the seal

on the base wall **504** of the peripheral groove **501**. In an alternative arrangement, the seal wall **407** extends continuously from the inside outer wall **502** along the base wall **504** onto the inside inner wall **503** of the peripheral groove **501**.

**[0050]** According to the construction of tile **401**, the seal wall **407** has a first profile along the inside outer wall **502** of the peripheral groove **501**. In this example, the first profile has a substantially "P" shaped cross-section however, an alternative shape may be utilised. The peripheral groove **501** of tile **401** is also shown in further detail in *Figure 5C*, which illustrates a part of the tile **401** having a seal overhang.

#### **Figures 6A and 6B**

**[0051]** Tile support board **404** is shown in further detail in *Figures 6A and 6B*.

**[0052]** *Figure 6A* shows a perspective view of the tile support board **404**. The front face **406** of the tile support board **404** has a cell wall **601** extending forwards and interior of which is a recessed cell **602**. The tile support board **404** may present one or more cells, and in this example presents a 2 x 2 matrix of cells, each having a square shape.

**[0053]** The rear face **405** of the tile support board **404** has a connection channel **603** that extends between the edges of the tile support board. This feature will be described in further detail with reference to *Figures 9, 13A and 13B*.

**[0054]** The tile support board **404** also has a connection lug **604** that extends from an edge thereof. This feature will be described in further detail with reference to *Figures 9, 13A and 13B*.

**[0055]** *Figure 6B* shows cell wall **601** in further detail. According to the construction of tile support board **404**, the front face is substantially planar, such that the cell wall **601** has an inside wall **605** and an outside wall **606**. The cell wall **601** has a second profile along the outside wall **606**. In this example, the second profile has a substantially "P" shaped cross-section. However, the orientation of the second profile is the reverse of the orientation of the first profile of tile **401**, hence, one of the first profile and the second profile has a substantially "P" shaped cross-section and the other has a substantially upside-down "P" shaped cross-section.

**[0056]** As with the first profile, an alternative second profile may be used. For example, the first profile and the second profiles may each have a substantially "L" shaped cross-section. Alternatively, other complementary first and second profiles may be utilised; the feature to be achieved is that the profiles allow the two components to be releasably connected.

**[0057]** The projection **411** of the tile support board **404**, shown in *Figure 4*, forms part of the cell wall **601**.

**[0058]** Thus, the peripheral groove **501** of the tile **401** couples with the cell wall **601** of the tile support board **404**. The tile **401** is arranged to be coupled to the tile

support board **404** such that the seal wall **407** of the tile **401** encircles the cell wall **601** of the tile support board **404**.

[0059] Depending on the relative dimensions of the tile and the tile support board, the seal wall of the tile may encircle only one cell, or more than one cell of the tile support board.

[0060] The square shape of the peripheral groove **501** of tile **401** and the square shape of cell **602** of tile support board **404** allows the tile **401** to be oriented in up to four different orientations.

#### **Figures 7A, 7B, 7C and 7D**

[0061] *Figures 7A, 7B, 7C and 7D* illustrate the operation of the releasable coupling arrangement of the tile and tile support board of *Figure 4*.

[0062] *Figure 7A* shows the tile **401** and the tile support board **404** in a disengaged arrangement. However, the tile **401** is aligned for coupling to the tile support board **404**. It can be seen that the cell wall **601** of cell **602** the tile support board **404** is aligned with peripheral groove **501** of the tile and also a first discontinuity **701** in second inner seal support wall **509**. Similarly, the cell wall **702** of cell **703** is aligned with peripheral groove **501** of the tile and also a second discontinuity **704** in second inner seal support wall **509**.

[0063] *Figure 7B* shows the tile **401** being coupled to the tile support board **404**. To connect the tile and tile support board, the tile **401** and tile support board **404** are brought together, as indicated by arrow **7101**. It can be seen that as the tile **401** is being pushed towards the tile support board **404**, the cell wall **601** of cell **602** is being moved into engagement with the peripheral groove **501** of the tile **401**.

[0064] *Figure 7C* shows the tile **401** and the tile support board **404** in an engaged arrangement. In the engaged arrangement, the seal wall **407** of the tile **401** forms a seal with the front face **406** of the tile support board **404**.

[0065] The complementary profiles of the first profile of the tile **401** and the second profile of the tile support board **404** maintain the tile **401** and the tile support board **404** in the engaged condition. However, although cell walls **601** and **702** are received within discontinuities **701**, **704** of the second inner seal support wall **509**, the discontinuities **701**, **704** are not profiled to engage with the cell walls **601**, **702**. In an alternative arrangement, the cell walls of a tile support board may engage with discontinuities of an underside wall of the tile.

[0066] The coupling between the tile **401** and the tile support board **404** is releasable.

[0067] Under a pulling force applied to the tile **401** from the engaged arrangement with the tile support board **404**, above a release force threshold, the tile **401** will disengage from the tile support board **404**, as illustrated in *Figure 7D*. Thus, to disconnect the tile and tile support board, the tile **401** and tile support board **404** are separated apart together, as indicated by arrow **7201**.

[0068] The magnitude of the release force threshold at and/or above which a tile releases from a tile support board may be sufficiently low to allow manual release. This feature is advantageous when manually relocating tiles when forming a tile display. Alternatively, the magnitude of the coupling arrangement release force threshold may be sufficiently high such that manual release is inhibited, requiring a tool (not shown) to be used. Such a tool may comprise a suction cup or a lever. Thus, the magnitude of the coupling arrangement release force threshold may be selected to prevent unintentional removal of a tile from a tile support board.

[0069] According to one arrangement, the seal wall **407** of tile **401** is fabricated from a first material, the connection projections of the tile support board **404** are fabricated from a second material, and one of the first material and the second material is more flexible than the other. This feature facilitates releasable coupling and reduces the incident of damage to the tile and tile support board during engagement/disengagement. Preferably, the seal wall of the tile is arranged to flex.

#### **Figure 8**

[0070] *Figure 8* shows a perspective view of tile **401** coupled to tile support board **404**. It can be seen that the tile **401** encloses the 2 x 2 matrix of cells of the tile support board.

#### **Figure 9**

[0071] *Figure 9* shows connection channel **603** and connection lug **604** of tile support board **404** in further detail.

[0072] Connection channel **603** has a depth **901** and a width **902**. Similarly, connection lug **604** has a depth **903** and a width **904**. The depth **903** and width **904** dimensions of the connection lug **604** are equal to or less than the corresponding depth **901** and width **902** dimensions of the connection channel **603**, such that the connection lug **604** may be fully received within the connection channel **603**.

[0073] This feature enables two like tile support boards to be connected together and flush with each other by means of the connection lug of one tile support board being connected into the connection channel of the other tile support board.

#### **Figure 10**

[0074] *Figure 10* shows a plurality of like tile support boards **404** connected together to form a larger tile support board **1001**. Thus, the tile support boards are individual components of a modular tiling system. This feature enables a tile support board to be built up from smaller tile support boards. Alternatively, a large tile support board may be provided that can be reduced in size. The tile support board may be cut in any direction and still

provide connection channels and connection lugs.

**[0075]** According to a specific arrangement, a tile support board having a width dimension of 300mm and a length dimension of 300mm and presenting a regular 6 x 6 matrix of cells is provided.

**[0076]** The tile support board **404** may be fabricated from a plastic sheet, along which snap lines are marked. Snap lines may extend between cells of the tile support board, allowing the tile support board **404** to be reduced in size by increments. The tile support board **404** may be fabricated from a material that can be cut using a readily available tool, such as a knife.

### Figure 11

**[0077]** *Figure 11* shows a plurality of like tiles **401** coupled to the tile support board **1001** of *Figure 10*. Due to the seal overhang and seal underhang of each of the like tiles, to ensure a continuous seal around each tile, the position and orientation of the first tile coupled to a tile support board should be selected to allow the subsequent tiles to be located such that each tile makes a seal with a neighbouring tile.

**[0078]** Thus, tile **401** may be located upon tile support board **1001** with first corner **211**, having a full seal underhang, in the corner of the tile support board **1001**. This will enable second and third tiles to be located next to tile **401** with the tile overhang of each of the second and third tiles overlapping the seal overhang of tile **401**.

**[0079]** A fixed relationship between the tile coupling means and the tile support coupling means provides for a tile to be quickly and conveniently coupled to a tile support board.

**[0080]** The arrangement of the cells of the tile support board **404** and the tile **401** is such that insert components may be located within cells of the tile support board, over which tiles may be coupled. Together the tile and tile support board create an enclosed cell. The cell of the tile support board extends into the internal zone of the underside of the mounted tile that is surrounded by the closed path seal wall. Thus, the seal wall functions to prevent water and other substance ingress into the cell of the tile support board.

**[0081]** Insert components may be electrical components, which may be electrically connected to an electrical circuit by means of a flexicircuit cable running between the tile support board and a tile.

**[0082]** Insert components may take the form of a solid insert, which may be located within a cell, for example to provide a mounting substrate for a mechanical fixing for an attachment to be secured to the tiling system. Thus, a mechanical fixing, such as a screw, may extend through a tile into the tile support board. In some applications, an attachment may be connected to a mounted tile.

**[0083]** Insert components may take the form of electrical wiring, electrical connectors, switch plates, electrical lighting, speakers, heating components, pipes or sensors.

**[0084]** *Figure 11* shows an electrical insert component **1101**, located within a cell **1102**. An electrical connector **1103** connects the insert component **1101** to an external electrical power source. Electrical connector **1103** also connects to a second different electrical insert component **1104**, located in a second cell **1105** of the tile support board **1001**. Thus, electrical connections can be made to connect an insert component into an electrical circuit and electrical connections can be made to provide a connection path between insert components.

**[0085]** Electrical connectors that may be accommodated within the tiling system include: laminated flexible electrical circuits and electrical connectors in the form of rigid strips with inlaid electrical tacks.

**[0086]** The arrangement of the tile support board **1001** allows an insert component to be hidden from view behind an opaque tile **401**.

**[0087]** According to one specific arrangement, the tile support board **404** has a width dimension of 100mm, a length dimension of 100mm and a section of 2mm. The tile support board **404** is provided with a 2 x 2 matrix of square cells having a width dimension of 40mm, a length dimension of 40mm and cell walls with a depth of 5mm. The distance between cells is 10mm and the distance between cell walls and the edges of the tile support board **404** is 5mm. The tile **401** has a width dimension of 100mm, a length of 100mm a section of 2mm, which may be reduced to 1mm locally, if required to accommodate an insert component between the tile **401** and the tile support board **404** when in the engaged arrangement. The tile **401** has an overall depth of 5mm. The dimensions of the tile support board **404** are such that it will allow tiles having a width dimension of 50mm and a length dimension of 50mm to be coupled thereto. The tile support board **404** will therefore allow tiles having a width dimension that is any increment of 50mm and a length dimension that is any increment of 50mm to be coupled thereto. The distribution of the cells across the tile support board is such that a regular pattern is formed when like tile support boards are connected to form a larger tile support board. The gaps between the cells form a regular pattern of channels into which may be run electrical connections between insert components, for example.

**[0088]** The material from which a tile support board and/or a tile is fabricated may be selected according to the type of insert component that is to be located within the tiling system. A protective shield may be located between an insert component and a tile or tile support board. Such a protective shield, for example used to protect cables, may be releasably clipped into place and may be secured to either to an insert component, a tile or tile support board. A shield or bridge may be placed over a component located in an access channel.

**[0089]** Components may also be incorporated in or secured to a tile. Fixings and/or components may be secured to the front face and/or rear face of a tile, and may be secured by means of adhesive or a mechanical fixing, such as a clip. For example, an electrical socket or com-

munication network connection may be integrated with a tile or a tile itself may incorporate or be an audio speaker or visual display. A tile may incorporate or be an electrical switch, for example to allowing on/off switching of low voltage insert components, and such a tile may utilise a rocker element or light/touch sensitive functionality. The rear of a tile may hold a lighting element, such as a diffuser, to allow back lighting of a tile or tile display. Thus, insert components received within an insert region may be secured to the rear of a tile.

[0090] The tile may be manufactured using a moulding process. A two stage moulding process may be performed, a first stage to produce the body of the tile and a second stage to produce the seal wall.

### Figure 12

[0091] Figure 12 illustrates a seal between neighbouring tiles **1201**, **1202** of the arrangement shown in Figure 11. It can be seen that the tile overhang **1203** of tile **1201** overlaps the seal overhang **1204** of tile **1202**. The seal overhang **1204** of tile **1202** abuts the seal underhang **1205** of tile **1201** to form a seal between the two tiles **1201**, **1202**.

[0092] The seal between the two tiles **1201**, **1202** functions to prevent substance ingress to the underside of the tiles **1201**, **1202**.

[0093] It can be seen that the seal between the two tiles **1201**, **1202** presents a gap between the two tiles **1201**, **1202**, where the surface of the seal is exposed. Grout, sealant or other filler may be applied to the exposed part of the seal, or the seal may act as grout and therefore may be coloured for decorative effect.

[0094] The depth of the seal overhang **1204** of tile **1202** may be dimensioned such that the tile overhang **1203** of tile **1201** compresses the seal overhang **1204**. The compressed seal provides a more robust seal between the two tiles **1201**, **1202**. A similar arrangement may be provided between the seal overhang of one tile and the seal underhang of another tile, by providing one or both of the seal overhang and seal underhang with a greater width dimension.

[0095] According to the example illustrated in Figure 12, the seal wall of tiles **1201**, **1202** have an outer side wall that extends perpendicular to the plane of the tile. However in other arrangements, the outer side wall of the seal wall of like tiles may have a different profile, and the seal wall may be chamfered.

### Figures 13A and 13B

[0096] Figures 13A and 13B show tile support board **404** and an edging strip **1301**. The edging strip **1301** functions to provide a tidy border to the tile support board **404** and mounted tile(s).

[0097] Figure 6A shows the underside **405** of the tile support board **404**. The underside **405** of tile support board **404** has a matrix of connection channels, such as

connection channel **603**, extending at 90° to each other, and a plurality of connection lugs, such as connection lug **604**. It can be seen that the connection channels extend fully between opposite edges of the tile support board, however, connection lugs are provided each of two adjacent edges only of the tile support board, along extending from the edge of

[0098] The edging strip **1301** has a side wall **1302** and a plurality of connection lugs, such as connection lug **1302**, which are distributed along the length of the edging strip **1301** at positions that coincide with the positions of the connection channels of the tile support board **404**. The connection lugs of edging strip **1301** extend perpendicular to the side wall **1302**. Thus, the edging strip **1301** and the tile support board **404** are connectable in the same way as the tile support board **404** is connectable to a second like tile support board, as shown in Figure 13A.

[0099] The edging strip **1301** may be arranged to fit under a tile overlap of a tile. The edging strip **1301** may be configured to provide a gap between a tile coupled to the tile support board **404** and the side wall **1302**, into which grout, sealant or other filler may be applied.

[0100] Connection lug **604** is configured to be removable from the tile support board **404**. The connection lug **604** may be configured to be snapped off from the tile support board **404**, for convenience of use, or otherwise removed with a tool. Connection lugs may be removed from a tile support board to accommodate a corner between support surfaces, for example, or to provide a straight edge as an alternative to providing a border by using an edging strip. It can be seen that a connection lug can be removed to expose a connection channel along an edge of the tile support board.

[0101] Figure 13B shows a different perspective view of the arrangement shown in Figure 13A.

[0102] The connection lugs of edging strip **1301** may be removable and may be movable along the edging strip **1301** to accommodate different spacing between channels of a tile support board.

[0103] The connection lugs of edging strip **1301** function to provide a barrier to substance ingress into the channels of a tile support board.

[0104] The edging strip **1301** may be provided with a length of seal wall to provide a barrier against water or other substance between the edging strip **1301** and the tile support board and/or tiles.

### Figures 14A and 14B

[0105] Figures 14A and 14B illustrate an accessory tile and accessory removably connectable to the accessory tiles.

[0106] The front face **402** of tile **401** may be provided with an attachment member to which an accessory may be connected.

[0107] Figures 14A and 14B show neighbouring accessory tiles **1401** and **1402**, each of which have an at-

tachment member **1403** of the front face **1404**, **1405** respectively thereof. In the illustrated example, the attachment member **1403** extends forwards from the front face takes the form of a horseshoe shaped lip.

**[0108]** An accessory rail **1406** is also shown in *Figures 14A* and *14B*. Each end of the accessory rail **1404** is provided with an accessory insert plate **1407**. To connect the accessory rail **1406** to the tiles **1401**, **1402**, the accessory insert plates **1407** are slid into the attachment members **1404**, as shown in *Figure 14A*.

**[0109]** *Figure 14B* shows the accessory rail **1406** in the connected arrangement, in which the accessory insert plates **1407** are inserted into the attachment members **1404**. When the tiles **1401**, **1402** are vertical with edge **1408** uppermost, the accessory rail **1406** rests within the accessory insert plates **1407**. To disconnect the accessory rail **1406** from the accessory tiles **1401**, **1402** the accessory insert plates **1407** of the accessory rail **1406** are slid out from the attachment members **1404**.

**[0110]** A tile may be provided with one or more different arrangements of attachment member.

**[0111]** An attachment member may take the form of a cylindrical member extending forwards and having a side wall that is threaded. An accessory may be provided with a complementary rotating end cap that has an internal wall that is threaded. Thus, the end cap may be screwed onto and unscrewed from the cylindrical attachment member. The end cap may be movable along an accessory.

**[0112]** An attachment member may take the form of a press-stud member, a clip, for example configured to receive a strip light or a bracket.

**[0113]** Alternative accessory attachments include: toilet paper holders, soap dishes, hooks and clips.

**[0114]** Preferably, the coupling arrangement between a tile and an accessory or insert component allows an attachment to be releasably coupled to the tile.

*Figure 15*

**[0115]** *Figure 15* shows a view of the interior a kitchen **1501**. A tile support board (not shown) extends across wall **1502**. An arrangement of tiles, such as tile **1503**, are shown coupled to the tile support board. In this example, the tile support board is fabricated from recyclable plastic.

**[0116]** A tile support board may be secured to a wall by means of adhesive, cement or a mechanical fixing. In some applications, adhesive may be preferred on the basis that an aperture may allow water ingress between the tile support board and a tile. Alternatively, a mechanical fixing, such as a screw, may be used and sealant, such as waterproof sealant, applied over the fixing.

**[0117]** The front face of tile **1503** presents a display surface replicating that of a traditional ceramic tile. The display surface of a tile may be configured to receive printed or transfer applied graphics or other indicia. The tile may be manufactured using an in mould decoration process.

**[0118]** Tiles of different shapes may be coupled to the tile support board.

**[0119]** Different tiles may be provided for practical and/or novelty purposes. Tiles that may be provided include: magnetic tiles, tiles that present a corkboard, chalkboard or other notice board surface, tiles that present an advent calendar, tiles that present or a simple game board, for example on which to play noughts and crosses.

**[0120]** Tiles may have surface colouring or the material from which the tile is fabricated may be coloured or contain decorative items or particles, such as foil shapes. The tile may be transparent, translucent or opaque. As previously mentioned, back lighting for one or more tiles may be provided. A tile may incorporate a design that becomes visible or more visible when illuminated from behind. Tiles may be provided with an antibacterial coating on the display surface. Tiles may be provided that can be washed by hand or in a dishwasher.

**[0121]** The described tiling system provides a convenient method of securing tiles to a wall. Once a tile support board is installed on a wall, tiles may be secured thereto and removed as required. The tiling system enables a tile display to be changed quickly and easily. For example, a tile support board may be installed in a bathroom of a house for sale, and the purchasers of the house can choose whatever style of tile to use in the bathroom. The tiles can subsequently be easily removed and replaced with new tiles that co-ordinate with new decoration. In a further example, a tile support board may be installed in a kitchen of a house and have a tile coupled thereto that incorporates an electrical socket. By releasing and relocating the tile on the tile support board the electrical socket can be repositioned to accommodate a new appliance or wall fitting.

**[0122]** Substance ingress between a tile support board and a tile is undesirable, particularly when electrical components are inserted between the tile support board and tiles coupled thereto. Water and other liquid ingress is a particular problem. The present invention provides a tile that provides a seal between the tile and a tile support surface and like tiles. The present invention provides tiles and tile support boards that may be tessellated to achieve an aesthetic finish to an interior or exterior surface.

## Claims

### 1. A tile having:

a front face for displaying, and an underside for securing to a tile support surface, wherein the underside has a closed path seal wall extending backwards, and the seal wall is configured to provide a seal between the tile and a tile support surface to prevent substance ingress interior of the closed path of the seal wall.

2. A tile as claimed in claim 1, wherein the seal wall is configured to provide a seal between the tile and a second like tile.

3. A tile as claimed in claim 1 or claim 2, wherein the tile has:

a rectangular shape with four edges only, and a thickness provided by a perimeter side wall extending backwards from the front face, wherein

the seal wall extends along the underside of the tile interior of the perimeter side wall from a first edge of the tile around a first corner to a second different edge of the tile, adjacent the first edge, to provide a first pair of adjacent edges of the tile with a seal underhang providing a tile overhang, and

the seal wall widens from the underside of the tile to the exterior of the perimeter side wall and extends from a third different edge of the tile, adjacent the second edge, around a second corner to a fourth different edge of the tile, adjacent the first edge, to provide a second different pair of adjacent edges of the tile with a seal overhang, whereby

one corner of the tile has a full seal underhang and the diagonally opposite corner of the tile has a full seal overhang.

4. Tiling apparatus comprising:

a first tile as claimed in claim 2, and  
a second tile as claimed in claim 2, wherein the first tile and the second tile are locatable relative to each other such that the seal overhang of a first of the tiles extends under the tile overhang of the second of the tiles to abut against the seal underhang of the second of the tiles to form a seal between the first tile and the second tile, whereby the first tile and the second tile form individual components of a modular tiling system.

5. Tiling apparatus as claimed in claim 4, wherein the first tile and the second tile are locatable relative to each other such that the seal overhang of a first of the tiles extends under and in contact with the tile overhang of the second of the tiles to abut against the seal underhang of the second of the tiles to form a seal between the first tile and the second tile.

6. Tiling apparatus comprising a tile as claimed in claim 1, wherein the underside of the tile presents tile coupling means, and the tile coupling means are configured to communicate with tile support coupling means to provide a first releasable coupling arrange-

ment.

7. Tiling apparatus comprising a tile support board having a rear face for securing to a support surface and a front face providing a tile support surface, wherein the front face of the tile support board presents tile support coupling means, and the tile support coupling means are configured to communicate with tile coupling means to provide a first releasable coupling arrangement.

8. Tiling apparatus comprising:

a tile as claimed in claim 6, and  
a tile support board as claimed in claim 7, wherein

the underside of the tile has a peripheral groove having opposing inside walls and a base wall, and the seal wall of the tile has a first profile along an inside wall of the peripheral groove; the front face of the tile support board has a plurality of projections having an outer surface having a second profile, and

the seal wall of the tile and the projections of the tile support board are configured such that the first profile and the second profile are arranged to releasably couple with a positive mechanical fit.

9. Tiling apparatus as claimed in claim 8, wherein the seal wall is fabricated from a first material, the projections of the tile support board are fabricated from a second material, and one of the first material and second material is more compliant than the other of the first material and second material.

10. Tiling apparatus as claimed in claim 8, wherein one of the first profile and the second profile has a substantially "P" shaped cross-section and the other has a substantially upside-down "P" shaped cross-section.

11. Tiling apparatus as claimed in claim 8, wherein the front face of the tile support board has a cell wall extending forwards and interior of which is a recessed cell, and the tile is arranged to be coupled to the tile support board such that the seal wall of the tile encircles the cell wall of the tile support board.

12. Tiling apparatus as claimed in claim 11, wherein the front face of the tile support board has a plurality of cell walls extending forwards and interior of which is a recessed cell, such that the tile support board has a plurality of cells, and the tile has a recessed tile sector interior of the peripheral groove, defining an inner peripheral groove

wall that has discontinuities located to accommodate pairs of opposed corners of cell walls such that the tile is arranged to be coupled to the tile support board such that the seal wall of the tile encircles a plurality of cells of the tile support board.

13. Tiling apparatus as claimed in claim 12, wherein the front face of the tile support board has a 2 x 2 matrix of cells, and the tile is arranged to be coupled to the tile support board such that the seal wall of the tile encircles the 2 x 2 matrix of cells of the tile support board. 5
14. Tiling apparatus as claimed in any of claims 11 to 13, wherein a projection of the tile support board forms part of a cell wall. 10
15. Tiling apparatus as claimed in claim 1, wherein the tile has a recessed tile sector interior of the seal wall. 15
16. Tiling apparatus as claimed in claim 1, wherein the tile and seal wall are fabricated from a plastic material. 20
17. Tiling apparatus as claimed in claim 16, wherein the tile is fabricated from a first plastic material, and the seal wall is fabricated from a second plastic material, and the second plastic material is more compliant than the first plastic material. 25
18. Tiling apparatus as claimed in claim 16, wherein the tile is fabricated from a fire-resistant plastic. 30
19. Tiling apparatus as claimed in claim 16, wherein the seal wall is fabricated from a waterproof material. 35
20. Tiling apparatus as claimed in claim 1, wherein the seal wall has a different colour to that of the rest of the tile. 40
21. Tiling apparatus as claimed in claim 8, wherein the rear face of the tile support board has a matrix of connection channels that extend between the edges of the tile support board. 45
22. Tiling apparatus as claimed in claim 21, wherein the tile support board has connection lugs that extend from an edge thereof and that are dimensioned to connect into the connection channels 50
23. Tiling apparatus as claimed in claim 22, wherein the connection lugs can be manually removed from the tile support board.
24. Tiling apparatus as claimed in claim 21, further comprising an edging strip having connection lugs that are dimensioned to connect into the connection channels of the tile support board. 55

25. Tiling apparatus as claimed in claim 3, wherein the seal overhang of the second pair of adjacent edges extends upwards along the exterior of the perimeter side wall to a depth that is greater than the mathematical result of subtracting the depth of the tile overhang along the first pair of adjacent edges from the overall depth of the tile.

26. Tiling apparatus comprising:

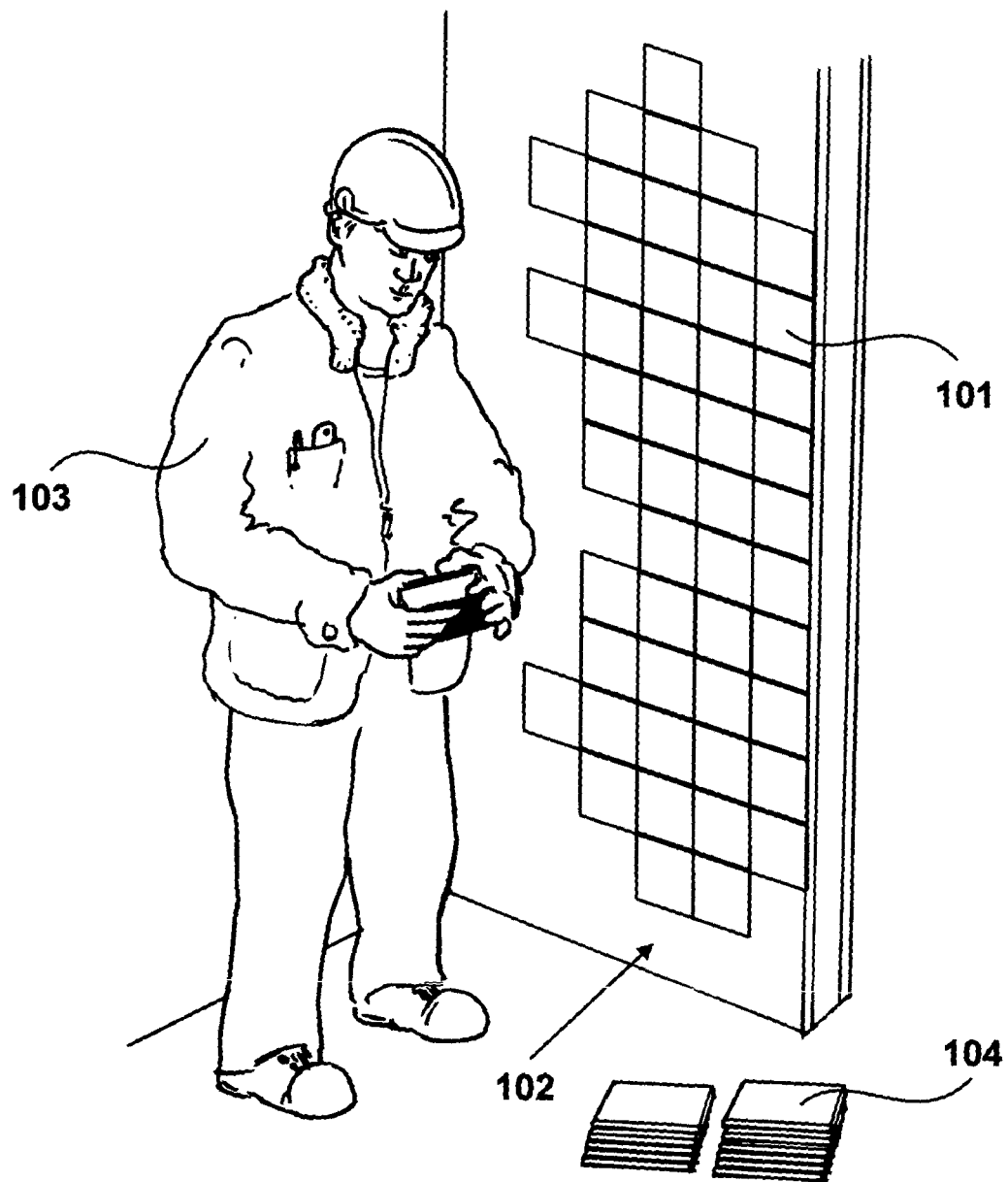
a first tile as claimed in claim 25, and  
a second tile as claimed in claim 24, wherein the first tile and the second tile are locatable relative to each other such that the seal overhang of a first of the tiles extends under and in contact with the tile overhang of the second of the tiles to abut against the seal underhang of the second of the tiles to form a seal between the first tile and the second tile, such that the seal overhang is compressed to increase the effectiveness of the seal.

27. Tiling apparatus as claimed in claim 1, wherein the tile is provided with an attachment member, by means of which an accessory may be connected to the tile.

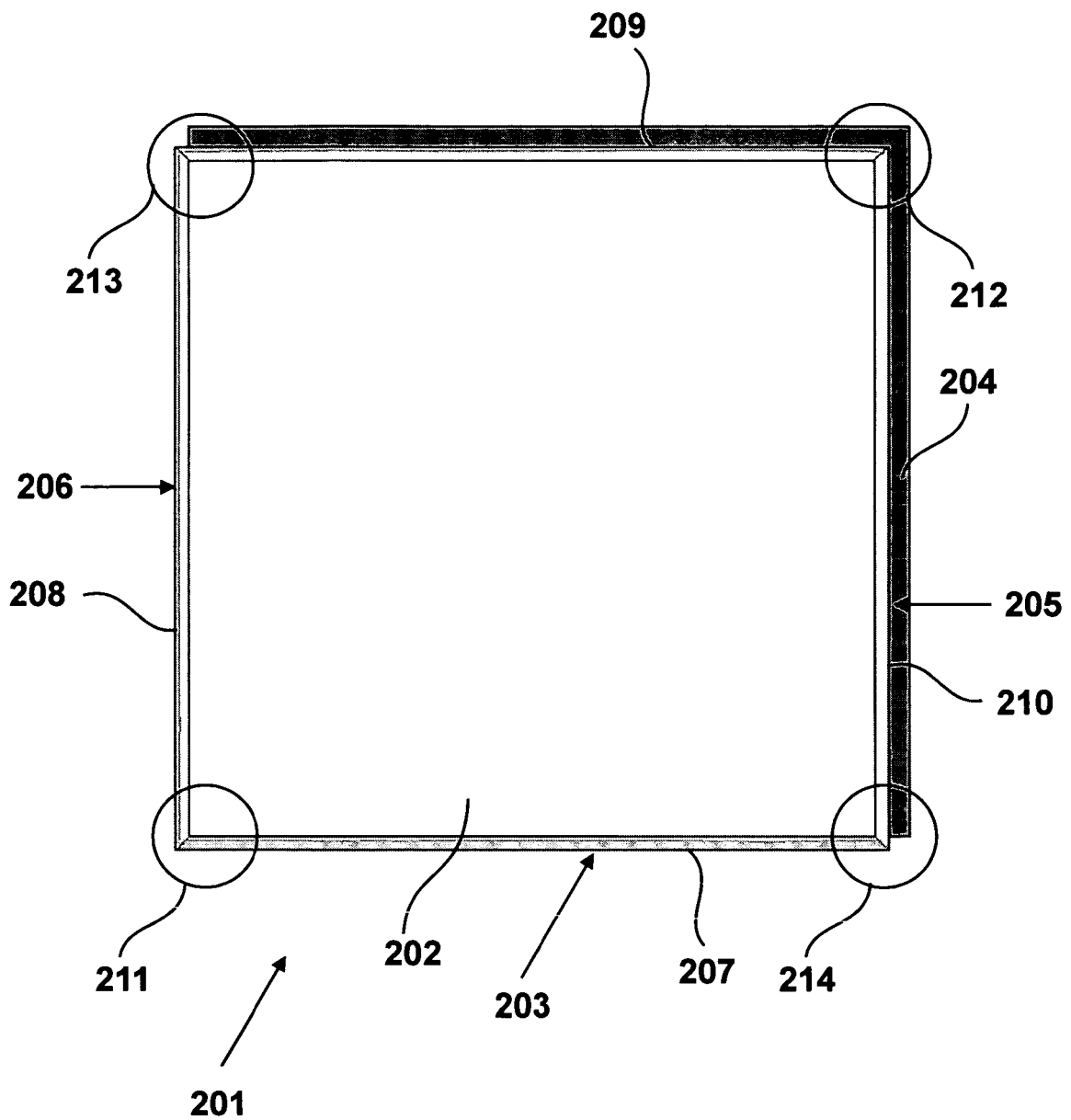
28. Tiling apparatus as claimed in claim 11, wherein the cell is configured to receive an insert component.

29. Tiling apparatus as claimed in claim 28, wherein the tile is opaque, such that an insert component can be hidden from view behind the tile.

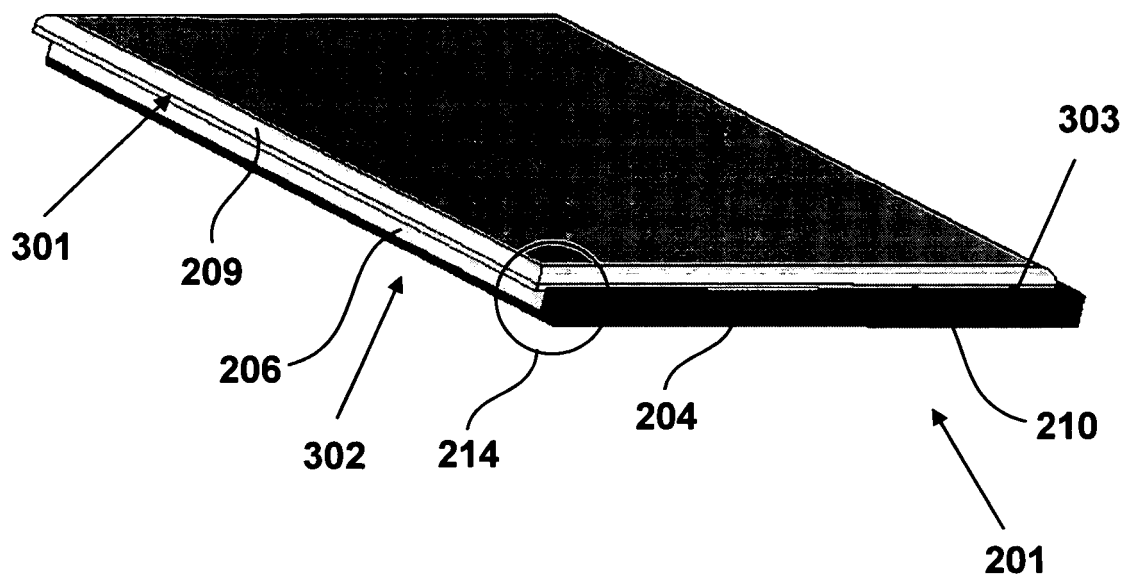
30. Tiling apparatus as claimed in claim 17, wherein the tile is manufactured by a two stage moulding process.



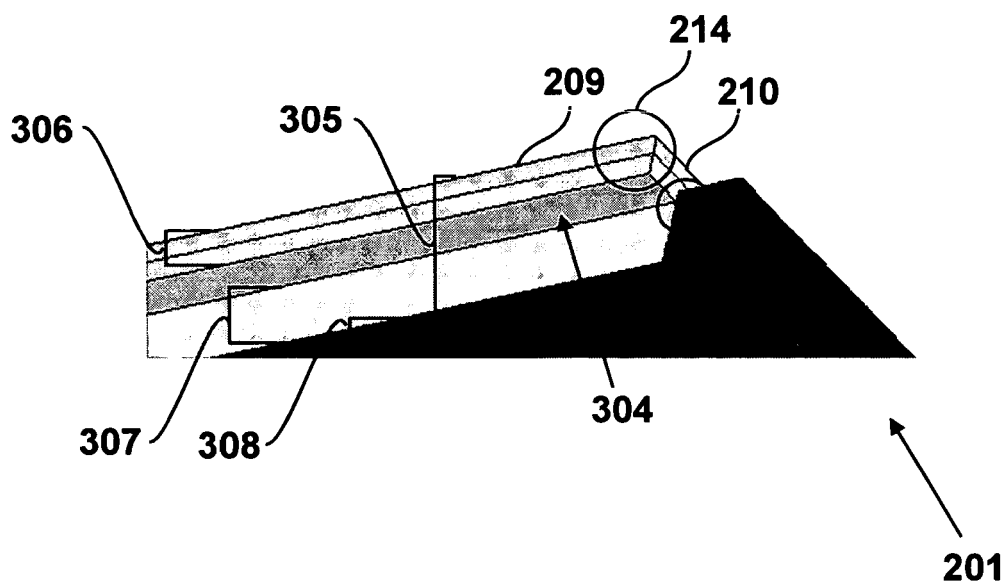
*Figure 1*



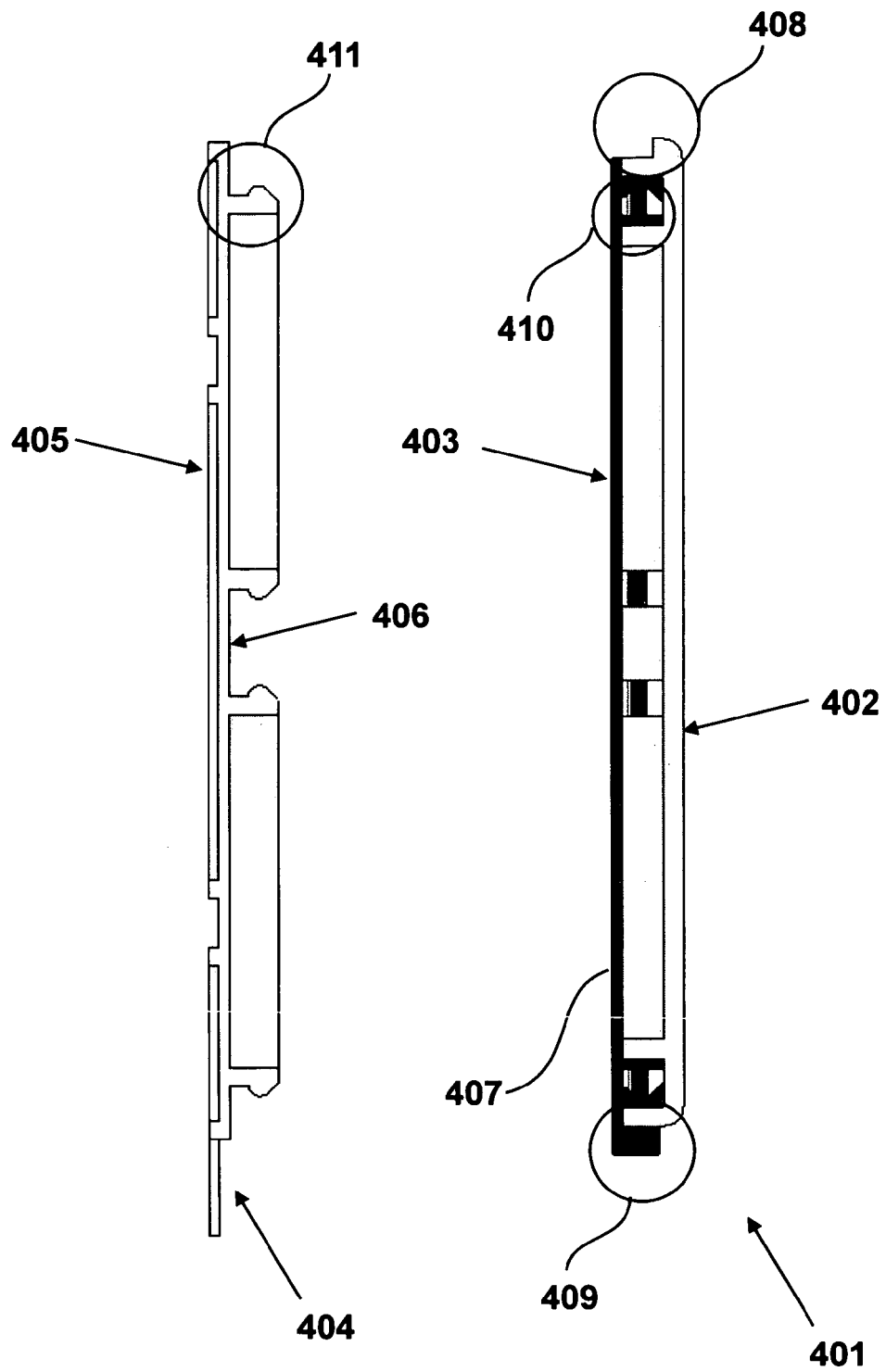
*Figure 2*



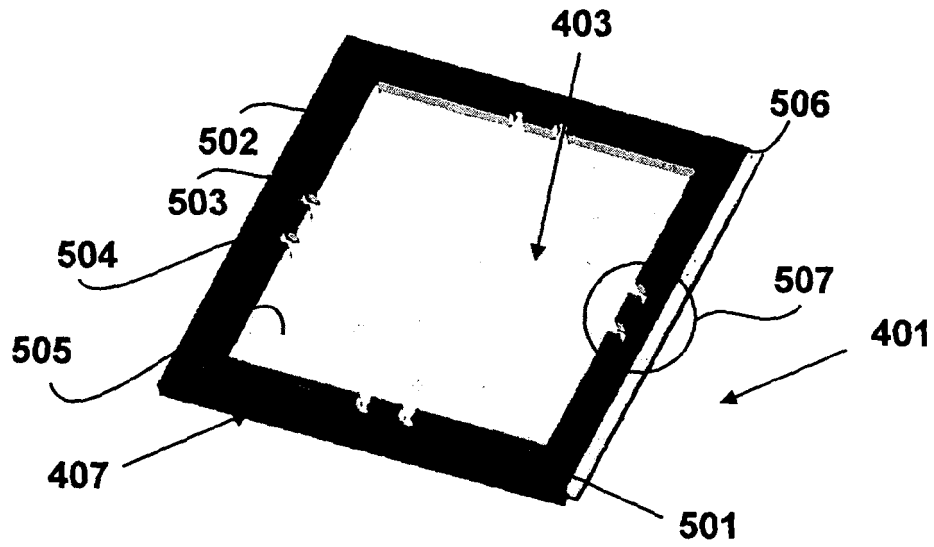
*Figure 3A*



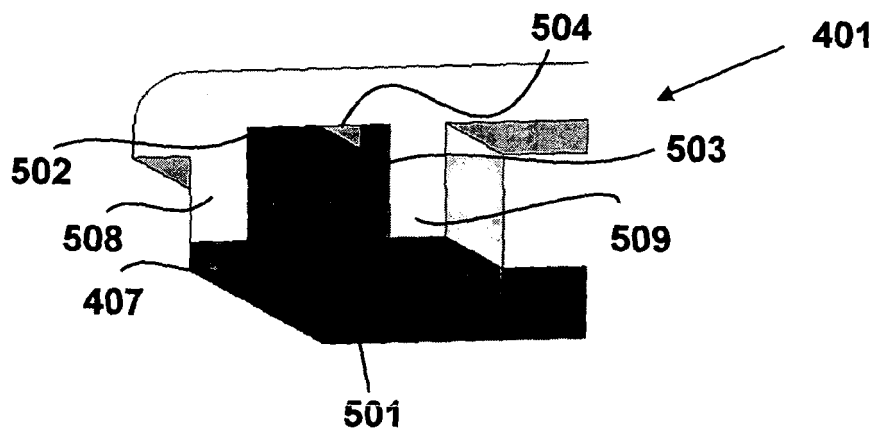
*Figure 3B*



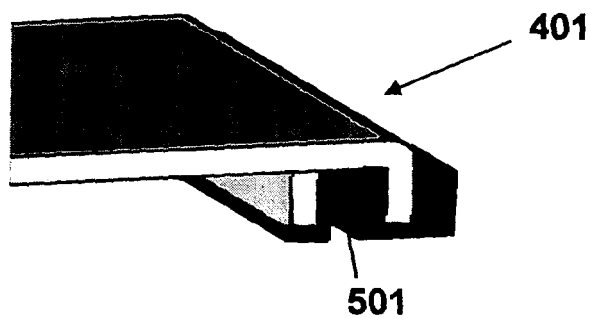
*Figure 4*



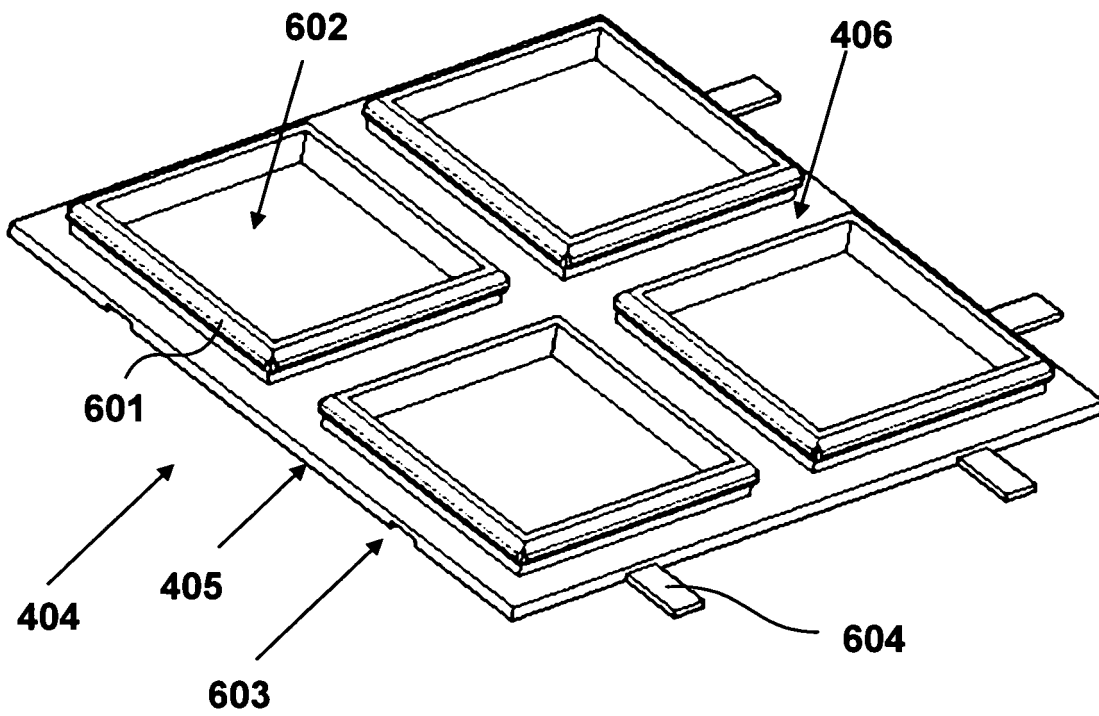
*Figure 5A*



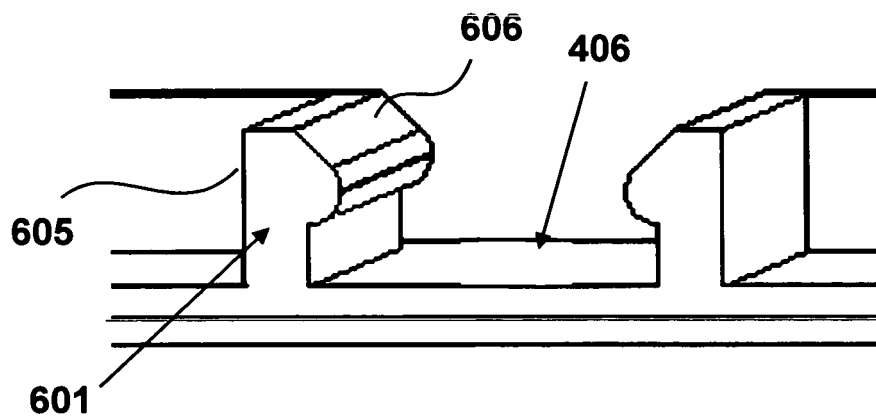
*Figure 5B*



*Figure 5C*



*Figure 6A*



*Figure 6B*

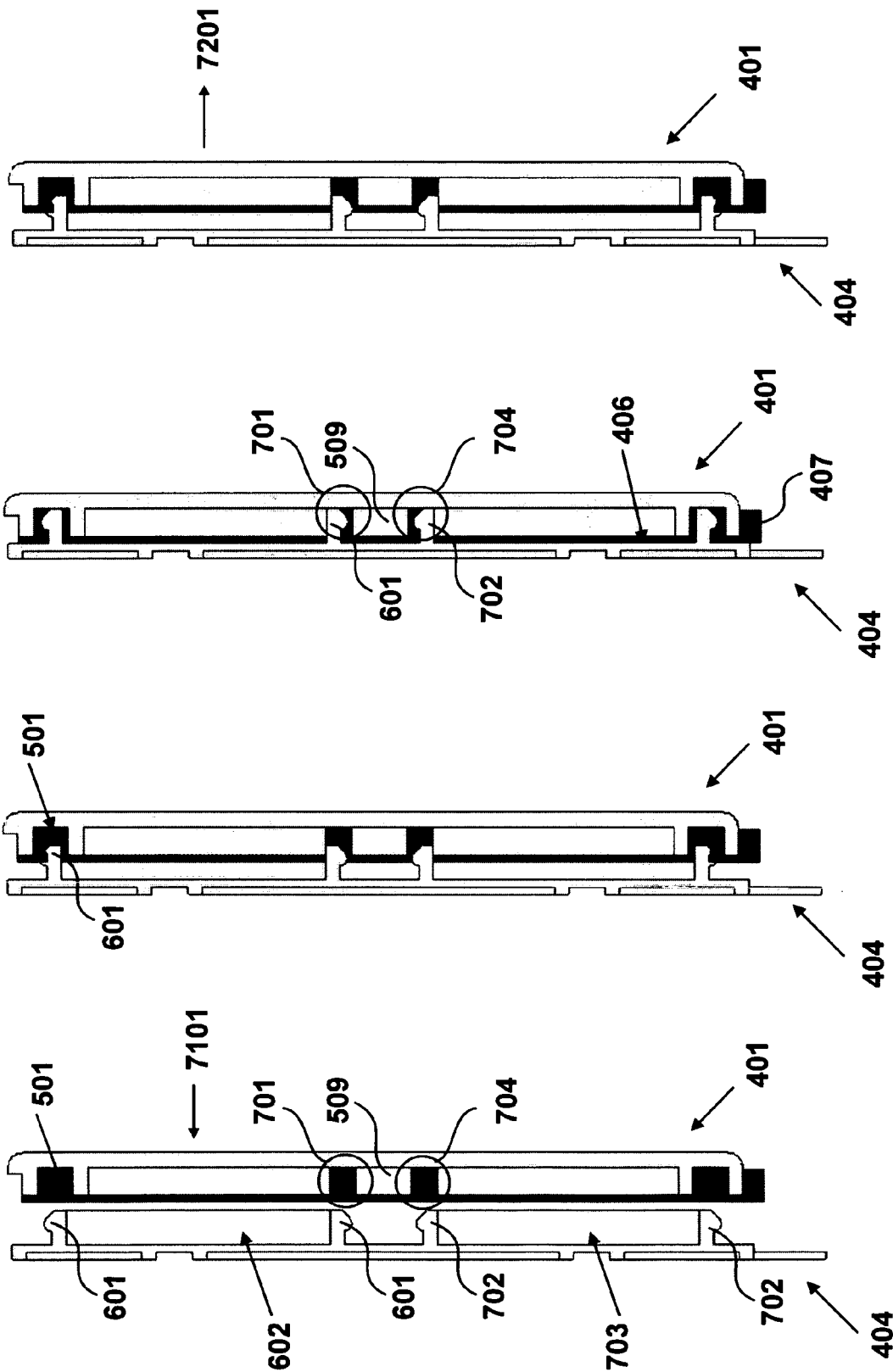
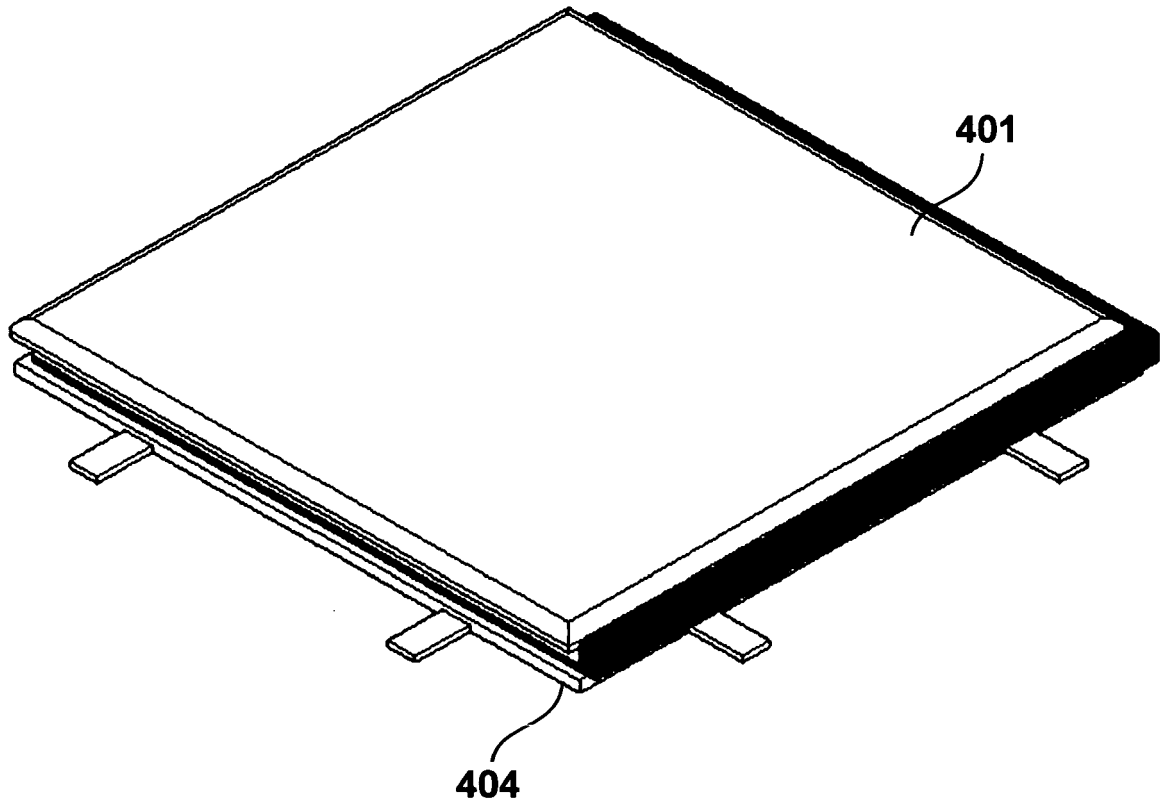
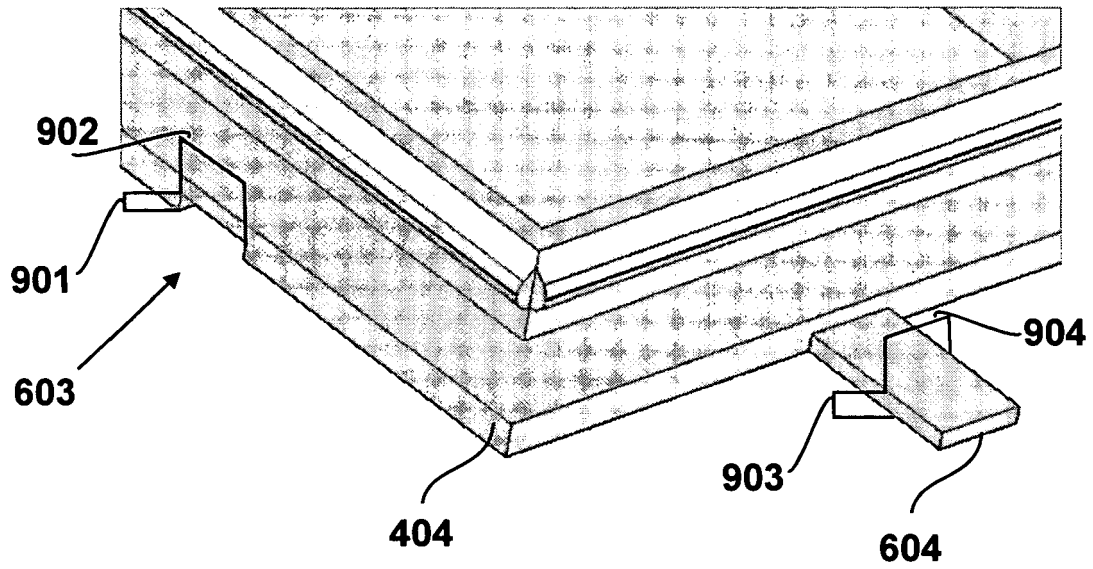


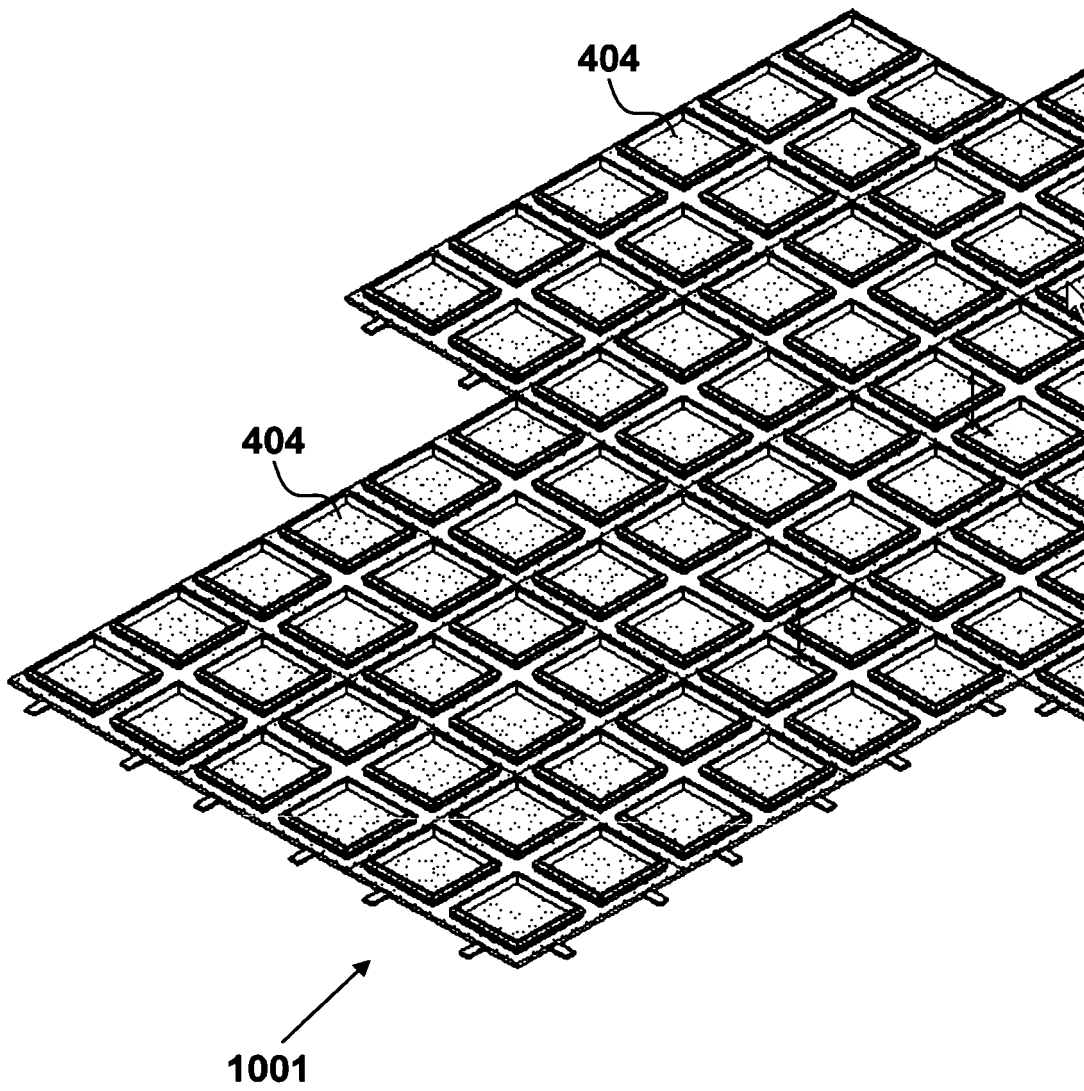
Figure 7A    Figure 7B    Figure 7C    Figure 7D



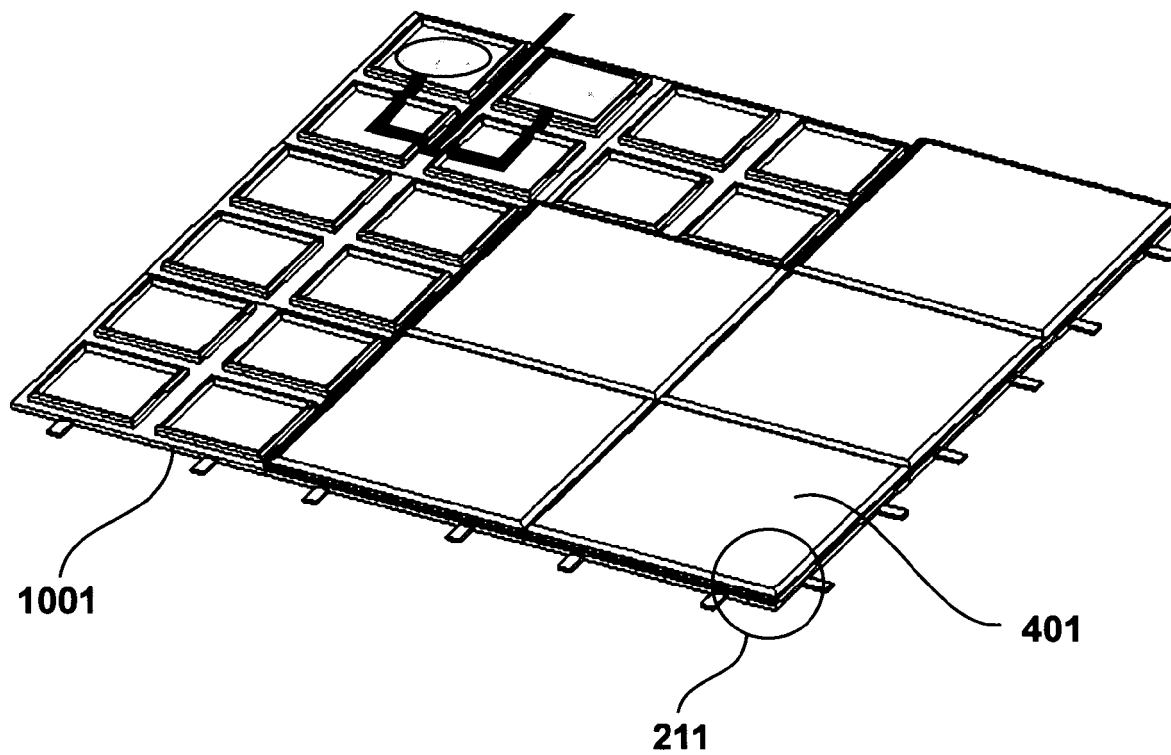
*Figure 8*



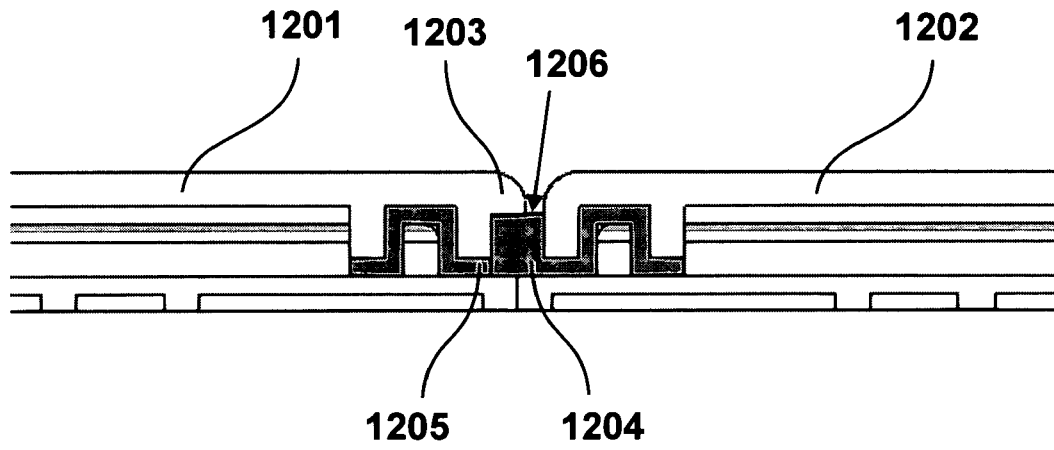
*Figure 9*



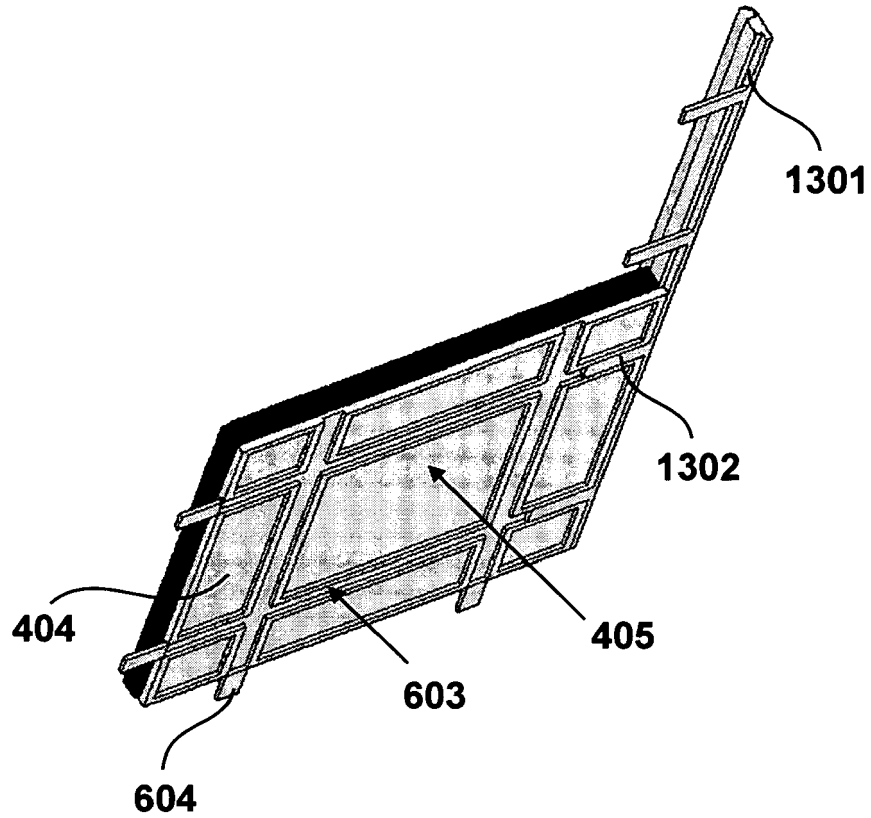
*Figure 10*



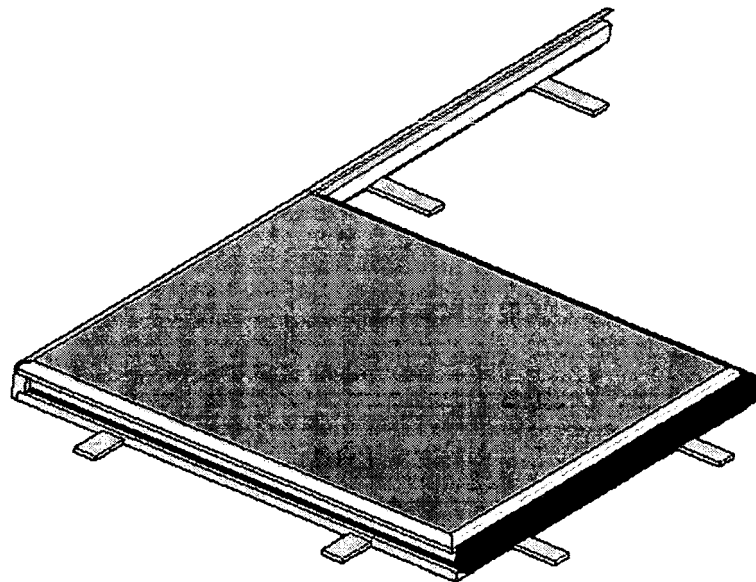
*Figure 11*



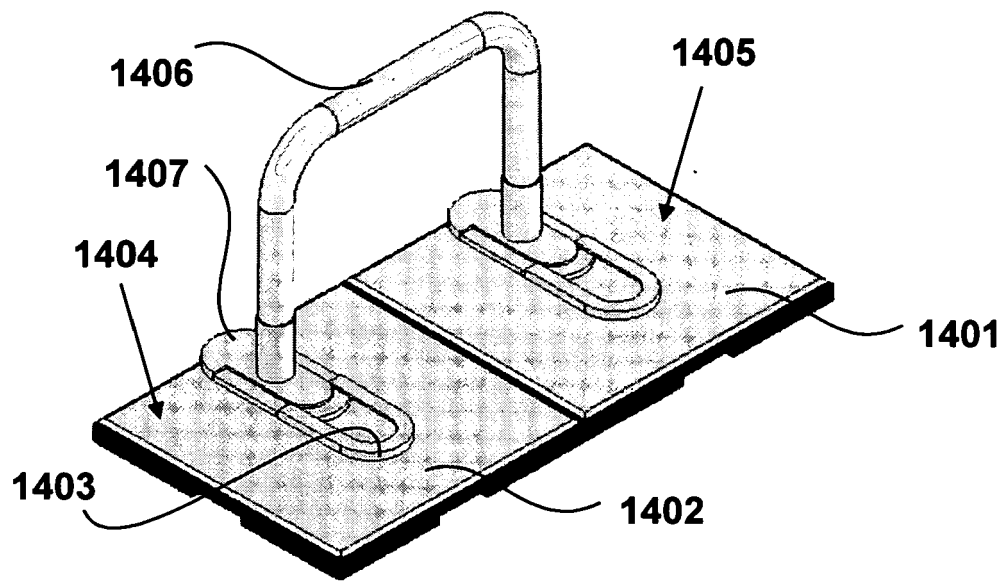
*Figure 12*



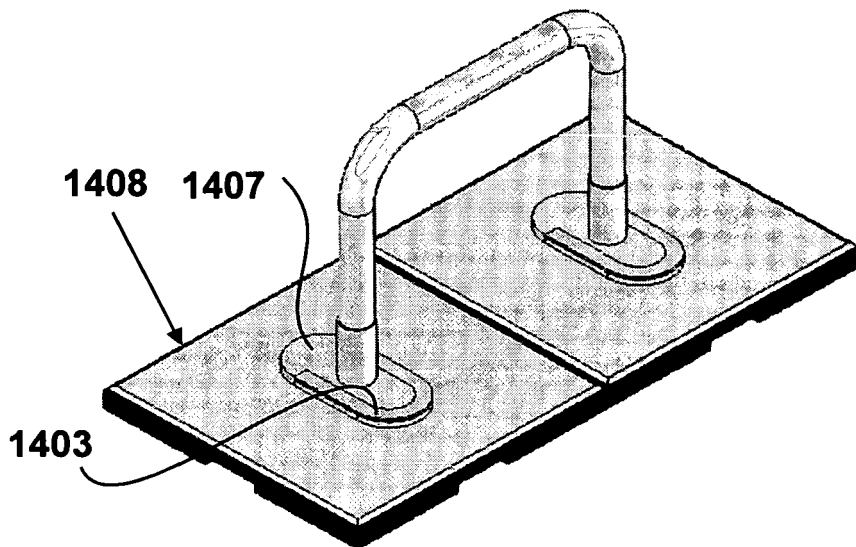
*Figure 13A*



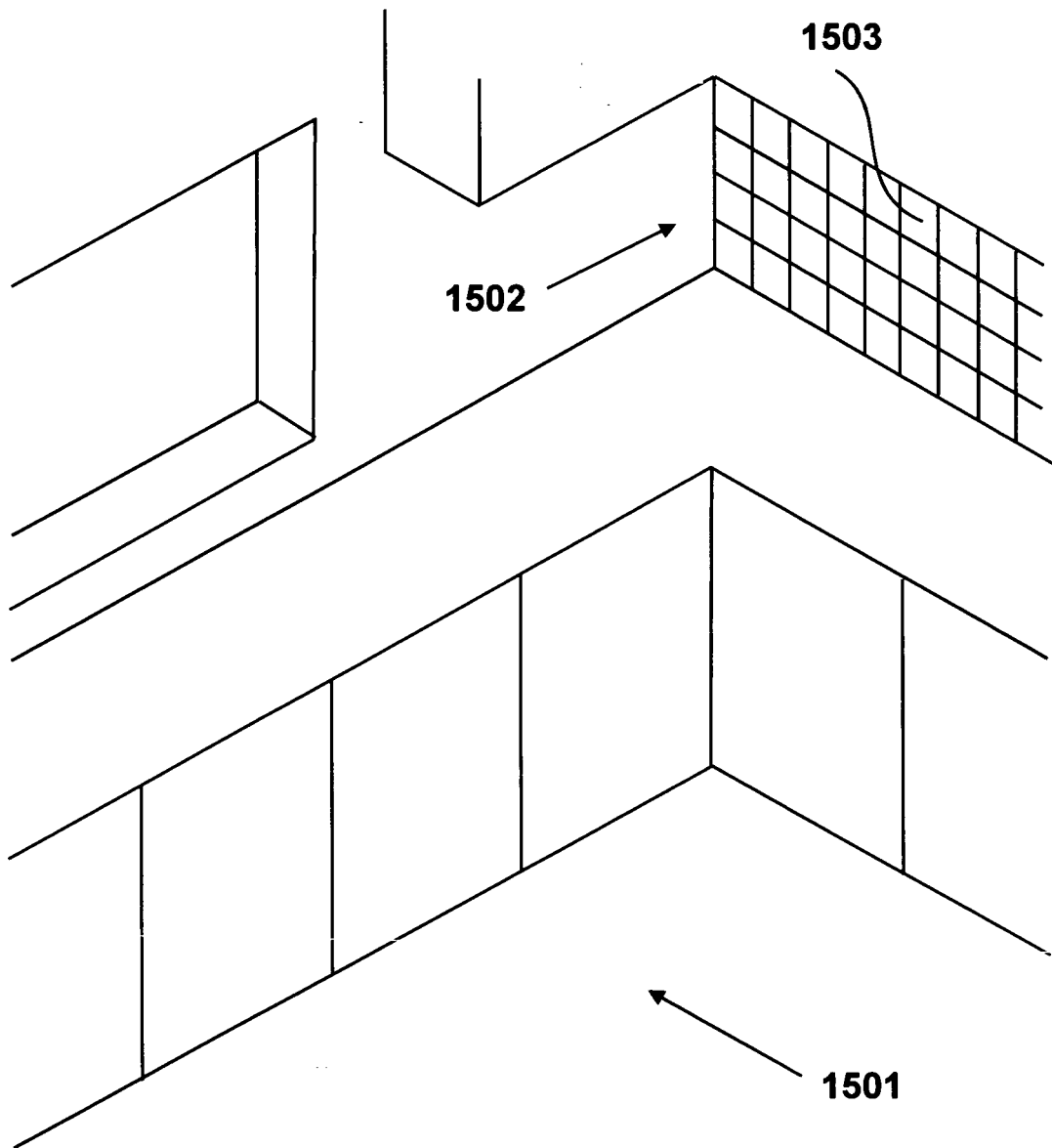
*Figure 13B*



*Figure 14A*



*Figure 14B*



*Figure 15*

**REFERENCES CITED IN THE DESCRIPTION**

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