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Lin

(54) **TILES, ROOF AND BUILDING STRUCTURE**

(76) Inventor: **Chi Kin Lin**, Hong Kong (CN)

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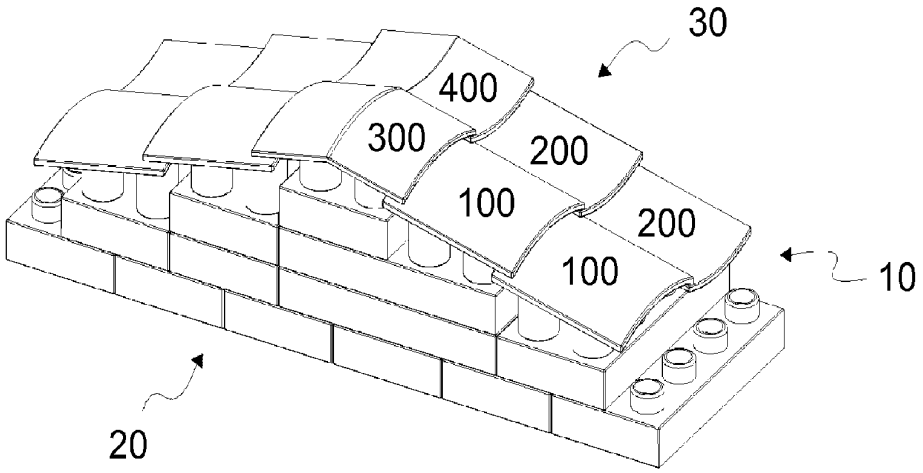
(57) **ABSTRACT**

Tiles comprising a mating surface and a roofing surface, wherein the roofing surface is elevated above the mating surface and is shaped to guide or direct a liquid to flow from an upstream first end to a downstream second end under the influence of gravity when the mating surface rests on a leveled surface, and wherein the mating surface comprises a mating or coupling means which is adapted to make complementary mating or coupling engagement with a support member or a support surface having a complementary mating or coupling means.



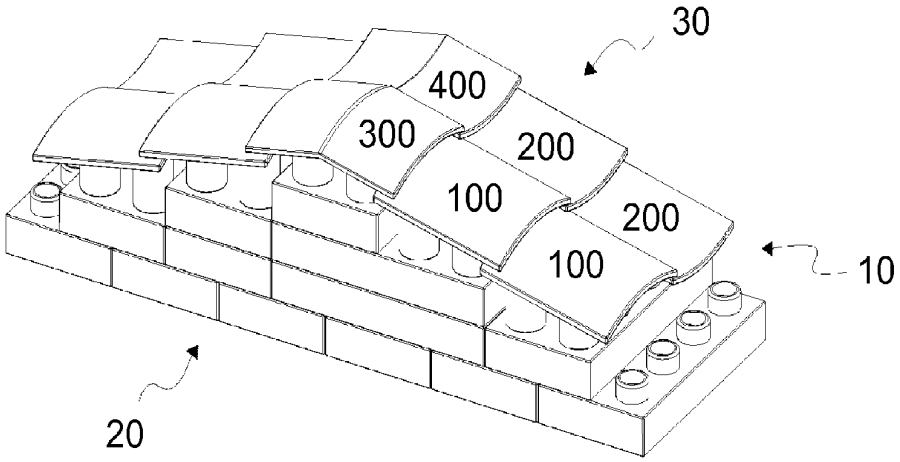


Figure 1

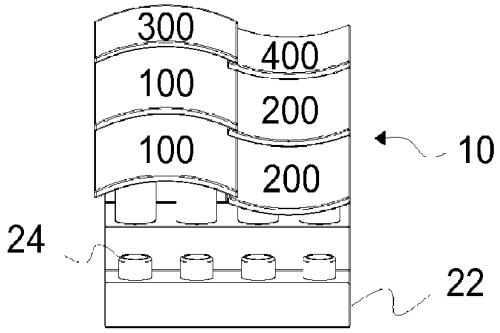


Figure 1A

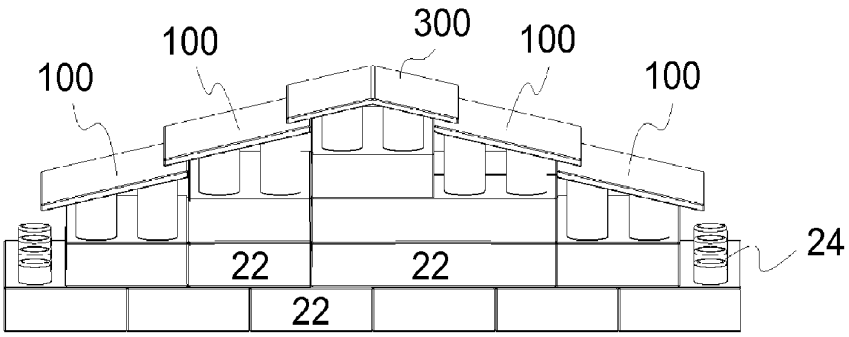


Figure 1B

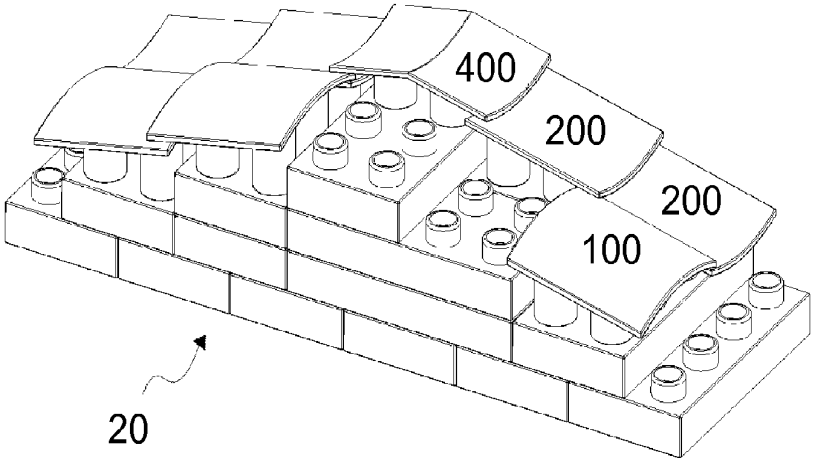


Figure 2

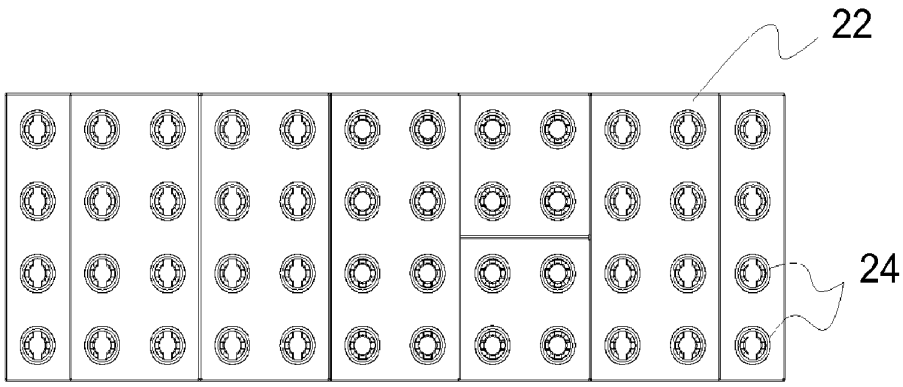


Figure 2A

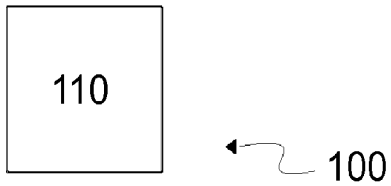


Figure 3

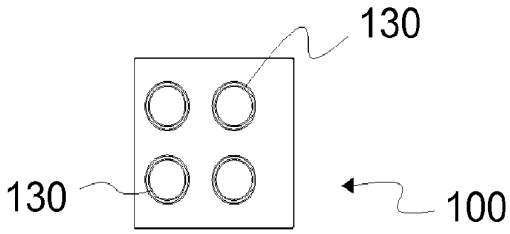


Figure 3A

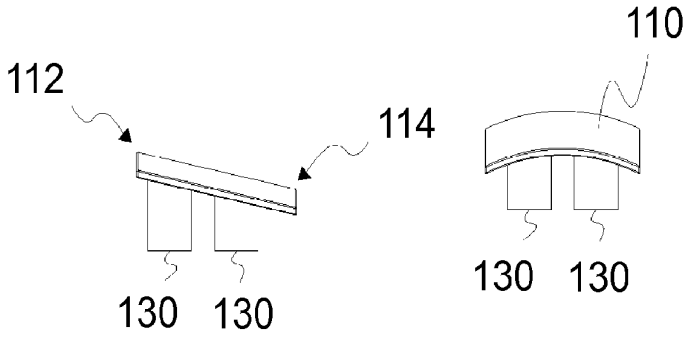


Figure 3B

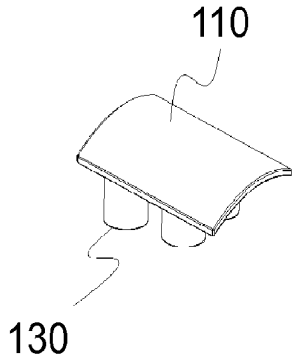


Figure 3C

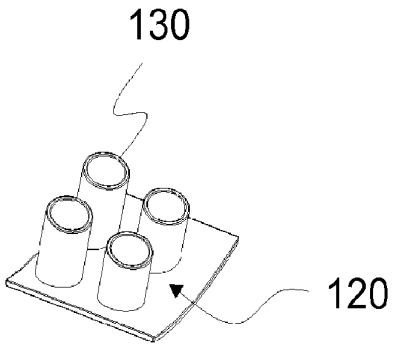
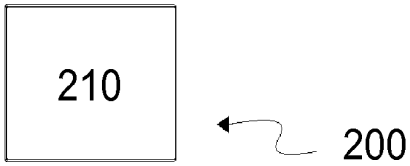


Figure 3D



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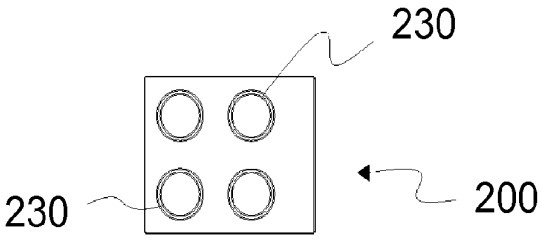

Figure 4A

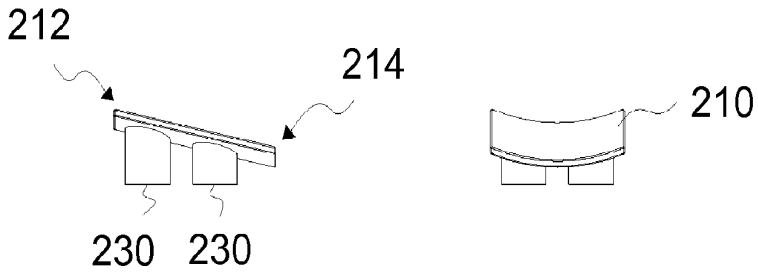

Figure 4B

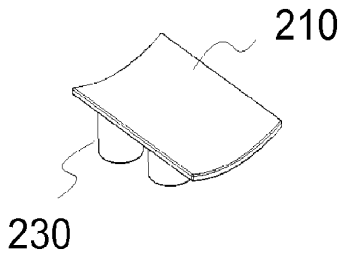

Figure 4C

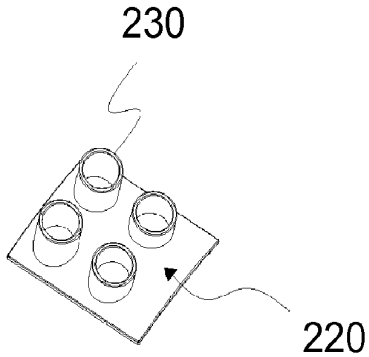

Figure 4D

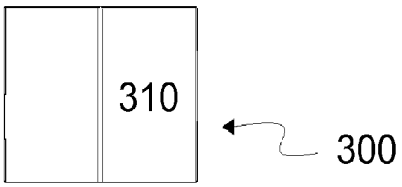

Figure 5

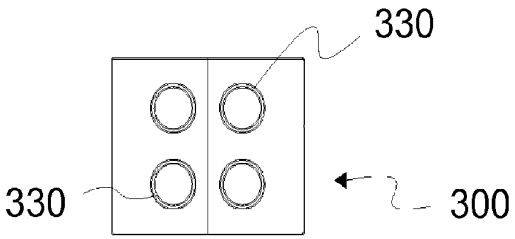

Figure 5A

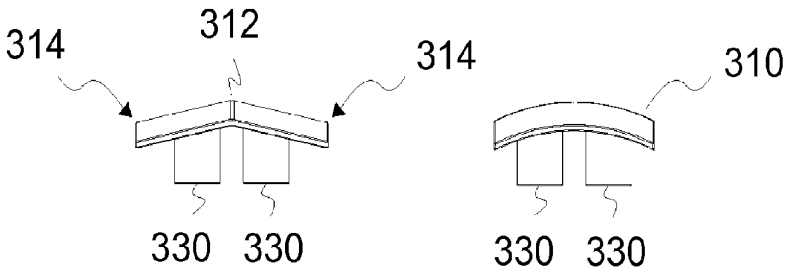

Figure 5B

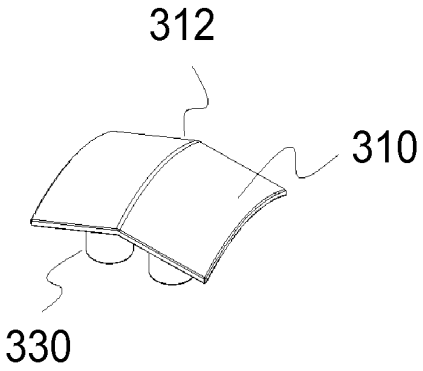

Figure 5C

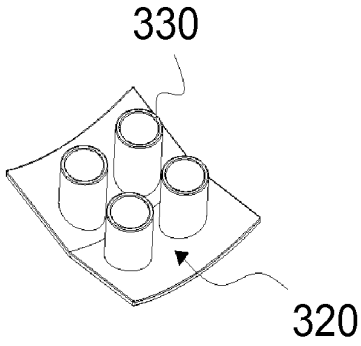

Figure 5D

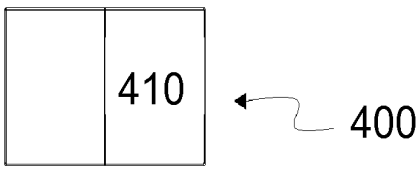

Figure 6

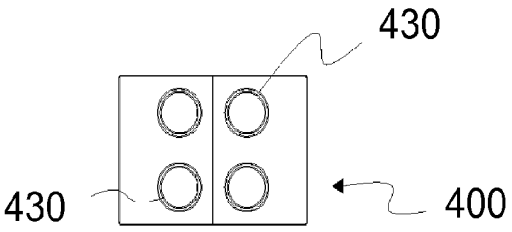

Figure 6A

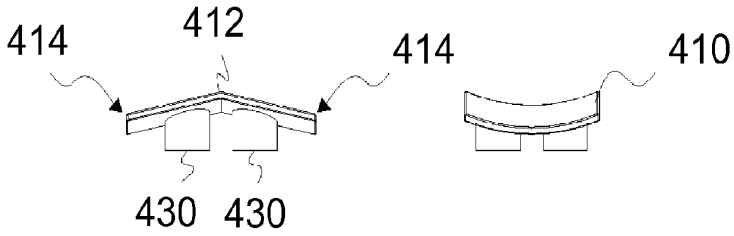

Figure 6B

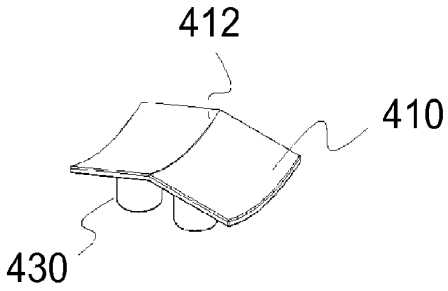

Figure 6C

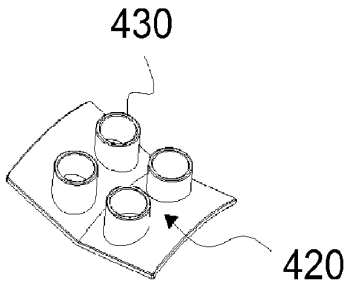

Figure 6D

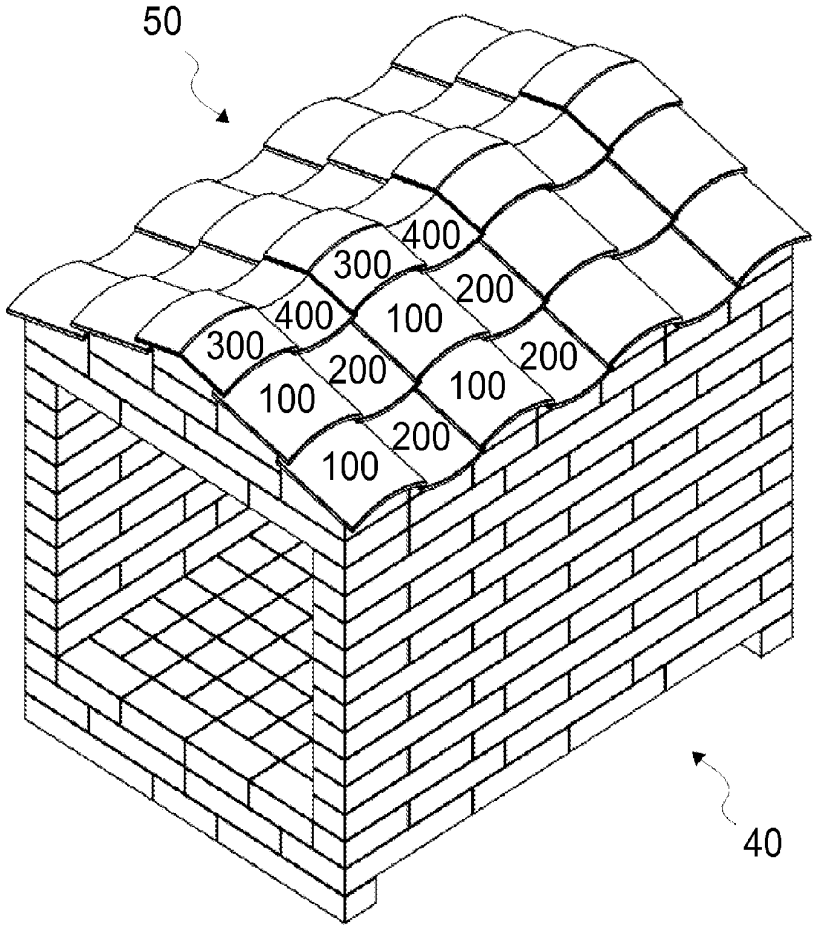

Figure 7

TILES, ROOF AND BUILDING STRUCTURE

FIELD OF THE INVENTION

[0001] The present invention relates to roof tiles, and more particularly to modular roof tiles having a mating surface for mated insertion onto the support surface of a structure for rapid assembly. The present invention also relates to roofs and building structures comprising roof tiles.

BACKGROUND OF THE INVENTION

[0002] Roofs are present in many building structures to shield against adverse weathering such as rain, heat and snow or hail. Conventional roofs typically comprise a sloped roof surface arrange to drain rain water and the sloped surface is typically elevated above a support surface to provide thermal insulation. Such typical roofs have been disclosed in US patent numbers U.S. Pat. No. 5,660,004 and U.S. Pat. No. 7,866,092.

[0003] A typical roof is constructed from an ensemble of roof panels or roof tiles. Exemplary roof panels and roof tiles are disclosed for example in US patent numbers U.S. Pat. No. 4,890,432, U.S. Pat. No. 6,519,905 and U.S. Pat. No. 7,003,922. For example, the roofing system of U.S. Pat. No. 6,519,905 is adapted to be supported on a support surface, and the system comprises a plurality of panels arranged in partially overlapping relation to form a roof. Each of the panels has first and second side edges, an upper and lower surface providing a series of barrels and pans, a first side region defining a portion of a barrel and a first cylindrical mating surface, and a second-side region defining a portion of a pan and a second cylindrical mating surface, wherein the panels are arranged in overlapping relation so that the first and second mating surfaces are sealing engaged.

[0004] The roofing system of U.S. Pat. No. 4,890,432 comprises an interlocking roof tile formed as a single integral member having at least two tile elements lying in different planes so that a step is formed between them. The tile elements are offset from each other both along a row direction and transverse to a row direction so that one tile element will lie in a row above and laterally offset from each other.

[0005] The roofing system of U.S. Pat. No. 7,003,922 discloses an extruded concrete interlocking roof tile having upper and under surfaces, upper and lower edges, two opposite side edges, with the upper surface having a recess extending transversely between two opposite edges adjacent the upper edge for receiving a lower edge region of an adjacent tile in an overlapping relationship, and in that an integral spacer acts between the recess floor and the under-surface of the adjacent tile.

[0006] Roof tiles of known roofing systems are typically laid and fastened on a roofing frame having a predefined inclination and the roof tiles are also arranged such that adjacent roof tiles are also interlocked. While such roof tiles have been used for a long time, it is appreciated that improvements are desirable.

SUMMARY OF THE INVENTION

[0007] There is provided a tile comprising a mating surface and a roofing surface, wherein the roofing surface is elevated above the mating surface and is shaped to guide or direct a liquid to flow from an upstream first end to a downstream second end under the influence of gravity when the mating surface rests on a leveled surface, and wherein the mating surface comprises a mating or coupling means which is adapted to make complementary mating or coupling engagement with a support member or a support surface having a complementary mating or coupling means.

[0008] In an example, the first end and the second end of the roofing surface are at different elevation levels relative to the leveled surface and collectively define a draining slope on the roofing surface when the mating surface rests on the leveled surface.

[0009] The mating or coupling means on the support member or the support surface may comprise a coupling or engagement surface on which there is formed a plurality of coupling or engagement members, the plurality of coupling or engagement members being distributed in a regular matrix having a uniform spacing along first and second orthogonal axes; and wherein the mating or coupling means on the mating surface of the tile comprises a plurality of coupling or engagement members which is adapted to enter into complementary mating engagement with the plurality of coupling or engagement members on the support member or the support surface.

[0010] The plurality of coupling or engagement members on the mating surface of the tile may be distributed in a matrix. Usually, the matrix has a uniform spacing along first and second orthogonal axes. The uniform spacing is typically the same as that on the matrix on the coupling or engagement surface of the support member or the support surface.

[0011] In general, the roofing surface is elevated above the mating surface by an elevation means, the elevation means defining the elevation of the first end and the elevation of the second end when the mating surface makes mating or coupling engagement with the support member or the support surface.

[0012] To promote structural integrity as well as reliability, the mating or coupling means on the mating surface may be an integral part of the elevation means.

[0013] As an example, the elevation means may comprise a plurality of elevation members which extends downwardly from the roofing surface, and wherein the mating or coupling means of the tile is defined collectively by the free ends of the plurality of elevation members.

[0014] Each elevation member of the tile may comprise a supporting column. The supporting columns of the tile may collectively define the elevation means and each supporting column defining an axial bore which is adapted for making individual mated engagement or coupling with a coupling or engagement member on the support member or support surface.

[0015] The downstream second end of the roofing surface may overhangs or project beyond the mating surface of the tile.

[0016] The roofing surface typically comprises first and second lateral sides which interconnect the upstream first and downstream second ends of the roofing surface, the lateral sides overhanging or projecting beyond the mating surface of the tile.

[0017] The first and second lateral sides of the roofing surface may be adapted to overlap with lateral sides of adjacent tiles when the tiles are mounted on the support member or the support surface to form a roof.

[0018] In general, the roofing surface may either be a liquid repelling surface or a liquid collection surface, the liquid repelling surface being adapted to direct a liquid collected by the roofing surface to be dispersed towards the lateral sides of

the roofing surface when flowing from the upstream first end to the downstream second end, and the liquid collection surface being adapted to direct a liquid collected by the roofing surface to be concentrated in a portion of the roofing surface intermediate the first and second lateral sides of the roofing surface when flowing from the upstream first end to the downstream second end.

[0019] The roofing surface may have a uniformly arcuate profile between the upstream first and the downstream second ends.

[0020] The roofing surface may be either convexly or concavely curved along an axis of symmetry, the axis of symmetry extending between the upstream first and the downstream second ends and is intermediate the first and second lateral sides of the roofing surface.

[0021] The roofing surface typically comprises an upstream first end, a downstream second end and a downstream third end, the upstream first end being intermediate the downstream second and third ends; wherein the upstream first end is a liquid dividing ridge adapted to divide liquid falling on the roofing surface to flow either towards the downstream second end or the downstream third end.

[0022] The upstream first end may extend orthogonally across the lateral sides of the roofing surface.

[0023] The upstream first end may be about midway between the downstream second and third ends.

[0024] The roofing surface and the mating surface may be integrally moulded as a single piece.

[0025] The roofing surface and the mating surface may be moulded of hard plastics.

[0026] There is also provided set of tiles comprising a first type of tiles each having a liquid collection surface and a second type of tiles each having a liquid repelling surface. The first and second types of tiles are such that lateral sides of adjacent tiles of different types will overlap with a lateral side portion of a tile of the first type immediately underneath an overlapping lateral side portion of a tile the second type when mounted on a support member or a support surface.

[0027] The overlapping side portions may be complementarily curved such that liquid repelled by a tile of the second type will be collected by a tile of the first type when mounted on a support member or a support surface.

[0028] A roof may comprise a plurality of tiles described herein and assembled on a support member or a support surface, wherein the tiles are assembled to form a corrugated roof comprising a plurality of alternately disposed liquid repelling ridges and liquid collecting channels.

[0029] Each liquid repelling ridge may be assembled from a plurality of tiles each having a liquid repelling surface, and each liquid collecting channel is assembled from a plurality of tiles each having a liquid collection surface.

[0030] In the example, a tile of the first type or a tile of the second type in the roof is overhung by three adjacent tiles while overhanging another three adjacent tiles.

[0031] As shown in the examples, there is described a building structure comprising a roof constructed from a plurality of tiles disclosed herein.

[0032] The roof may be supported on a base structure. The base structure may comprise a mating surface for making mating engagement with the mating surfaces on the roofing tiles.

[0033] The base structure may be constructed from a plurality of building blocks each having an upper mating surface, the upper mating surface comprising a plurality of upper mating protrusions arranged in a matrix or an array, the matrix or array having uniform spacing along first and second orthogonal axes.

BRIEF DESCRIPTION OF DRAWINGS

[0034] Embodiments of the present invention will be explained below by way of example and with reference to the accompanying drawings or figures, in which:—

[0035] FIG. **1** is a perspective view showing a model building structure comprising roof tiles according to several embodiments of the present invention,

[0036] FIGS. **1**A and **1**B are respectively front and side views if the model building structure of FIG. **1**,

[0037] FIG. **2** is a perspective view of the model building structure of FIG. **1** with two of the roof tiles removed to expose part of the building roof support base,

[0038] FIG. **2**A is a top plan view of the model building structure of FIG. **1** with all roof tiles removed to expose the building roof support base,

[0039] FIGS. **3**, **3**A, **3**B, **3**C and **3**D are respectively top plan, bottom plan, side elevation top perspective and bottom perspective of a first exemplary embodiment of a roof tile of the present invention,

[0040] FIGS. **4**, **4**A, **4**B, **4**C and **4**D are respectively top plan, bottom plan, side elevation top perspective and bottom perspective of a second exemplary embodiment of a roof tile of the present invention,

[0041] FIGS. **5**, **5**A, **5**B, **5**C and **5**D are respectively top plan, bottom plan, side elevation top perspective and bottom perspective of a third exemplary embodiment of a roof tile of the present invention, and

[0042] FIGS. **6**, **6**A, **6**B, **6**C and **6**D are respectively top plan, bottom plan, side elevation top perspective and bottom perspective of a fourth exemplary embodiment of a roof tile of the present invention.

[0043] FIG. **7** is a perspective view showing a dog house.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0044] The model building structure **10** shown in FIGS. **1**, **1**A and **1**B depicts an exemplary embodiment of a building structure comprising a building roof structure assembled from a plurality of roof tiles. The model building structure **10** comprises a building roof structure **30** which is supported on a building roof support base **20**. The building roof support base **20** is assembled from a plurality of modular building blocks. The modular building blocks are arranged such that building roof support base **20** has a stepped descending profile of gradually descending from the middle highest portion towards both sides.

[0045] Each of the building roof support building blocks **22** forming the building roof support base **20** includes an upper mating surface on which there is formed a plurality of building upper mating protrusions **24** and a lower mating surface for making mating engagements with building blocks underneath. The building upper mating protrusions are arranged into an array or matrix, for example, an array or matrix of 2×4 cylindrical protrusions with uniform spacing such that the longitudinal and transversal separation between adjacent protrusions is constant or uniform. The building roof support base **20** structure is formed by stacking of modular building blocks into a tapered support surface. To form such a tapered

support structure, it is only necessary to gradually reduce the number of building blocks when built towards the top portion of the structure.

[0046] As shown in FIG. **2**A, the building upper mating protrusions which are exposed on the top surface of the base structure are evenly distributed on the top surface with a uniform longitudinal and transverse spacing identical to that of an individual building block.

[0047] The roof shown in FIGS. **1**, **1**A, **1**B is constructed from 4 embodiments of roof tiles according to the present invention. Each of the roof tiles comprises a roofing surface and a slope defining mating surface.

[0048] In a first embodiment of roof tiles as depicted in FIGS. **3**-**3**D, the roof tile **100** is moduled of hard plastics and comprises a roofing surface **110** and a mating surface **120**. The mating surface is underneath the roofing surface and includes an elevation mechanism to support and elevate the roofing surface so that the roofing surface is at a predetermined slope when the mating surface rests on a leveled support surface.

[0049] The roofing surface of the roof tile of FIG. **3** is configured as a water repelling surface and includes a downstream end **114** and an upstream end **112**, the upstream end being elevated above the downstream end. The water repelling surface comprises a convexly curved surface which extends between the upstream and downstream ends with a constant or substantially constant curvature. The curvature of the convexly curved surface is symmetrical or substantially symmetrical about an axis of symmetry which extends between the upstream and downstream ends and passes through the middle of the water repelling surface. The axis of symmetry at the middle of the water repelling surface also defines a water dividing line on the convexly curved surface such that when water drops on one lateral side of the axis of the water dividing line, the water will flow towards that a lateral extremity on that lateral side and vice versa.

[0050] The mating surface **120** comprises a matrix of 2×2 tubular elements **130** as an example of plurality of downwardly extending mating elements which are formed on the underside of the water repelling surface. The tubular elements are distributed at nodes of a regular grid formed from an intersection of orthogonal axes such that the spacing between adjacent tubular elements on a same axis is the same. As shown in the side and elevation views of FIG. **3**B, the length of the tubular elements at the downstream end is shorter than that at the upstream end while tubular elements at the same axial distance from the upstream or downstream ends are of the same length. This arrangement of the tubular elements defines the slope of the roofing surface as well as providing distributed support to the roofing surface. Where there are more than two tubular elements distributed along the long of an axis, the heights of the tubular elements between the downstream and upstream ends (or along the direction of axis of symmetry) are gradually changed to define the slope and to provide distributed support.

[0051] In addition to defining the slope of the roofing surface and providing distributed support to the roofing surface, each tubular element is also a mechanical mating element adapted for making mating connection with a complementarily shaped mating element formed on the building roof support base **20**. More particularly, each tubular element is adapted to fit on a vertically extending protrusion form the building roof support base, and the fitted engagement between the tubular elements and the complementary protrusions collectively form a detachable mating engagement. As shown in FIG. **3**A, the periphery of the roofing surface **110** overhangs the ensemble of the mating elements to provide extra or overlapping water shading surface to be explained. In other words, the footprint of the roofing surface **110** exceeds the footprint of the ensemble of mating elements.

[0052] The roof tile **200** depicted in FIGS. **4**-**4**D illustrates a second embodiment of a roof tile according to the present invention. The roof tile **200** is substantially identical to the roof tile **100** except that the roofing surface is configured as a water collecting surface. Features or parts of the roof tile **100** which are common or equivalent to features of parts of the roof tile **200** are incorporated herein where appropriate and are identified with the same numerals but increased by **100**.

[0053] Similar to the roof tile **100** of FIGS. **3**-**3**D, the roof tile is integrally mould of hard plastics and includes a roofing surface **210** and a mating surface **220**. The mating surface **220** comprises a plurality of downwardly extending tubular elements **230** which are formed on the underside of the water collecting surface. The tubular elements are distributed at nodes of a regular grid formed from an intersection of orthogonal axes such that the spacing between adjacent tubular elements on a same axis is the same. Likewise, periphery of the roofing surface **210** overhangs the ensemble of the mating elements **220** to provide extra or overlapping water shading surface to be explained. In other words, the footprint of the roofing surface **210** exceeds the footprint of the ensemble of mating elements **220**.

[0054] The roofing surface **210** of FIG. **4** is configured as a water collecting surface and includes a downstream end **214** and an upstream end **212**, the upstream end being elevated above the downstream end. The water collecting surface comprises a concavely curved surface which extends between the upstream and downstream ends with a constant or substantially constant curvature. The curvature of the concavely curved surface is symmetrical or substantially symmetrical about an axis of symmetry which extends between the upstream and downstream ends and passes through the middle of the water collecting surface. The axis of symmetry at the middle of the water collecting surface also defines a water flow line on the concavely curved surface such that water drops on the roofing surface will be directed to flow towards that the water flow line or the axis of symmetry during to the concaved curvature towards the water flow line.

[0055] The roof tile **300** depicted in FIGS. **5**-**5**D illustrates a third embodiment of a roof tile according to the present invention. The roof tile **300** is identical to roof tile **100** in that it includes a roofing surface **310** and a mating surface **320** which supports and defines the roofing surface. The roof tile **300** is different from roof tile **100** in that the slope of the roofing surface inflects at a water dividing ridge or a water dividing line located intermediate two free ends of the roofing surface. This water dividing ridge or water dividing line as an example of a water divider **312** extends transversely across the roofing surface as. In addition, the water divider also defines the highest roofing level on the roofing surface **310** and is therefore the upstream end of the roof tile **300**. The two free ends of the roof tile **314** are on two sides of the water divider and are below the level of the water divider. As such, the two free ends both become downstream ends relative to the water divider. The roofing surface **310** of the roof tile **300** is also a convexly curved water repelling surface, and the curvature is symmetrical about a line of symmetry which extends between the two ends and intersects the middle of the

water divider. While the roofing surface **310** inflects at the water divider, the curvature of the convexly curved water repelling surface is substantially constant between the two free ends. Likewise, periphery of the roofing surface **310** overhangs the ensemble of the mating elements **320** to provide extra or overlapping water shading surface to be explained. In other words, the footprint of the roofing surface **310** exceeds the footprint of the ensemble of mating elements **320**. Features or parts of the roof tile **100** which are common or equivalent to features of parts of the roof tile **300** are incorporated herein for succinctness where appropriate and are identified with the same numerals but increased by **200**.

[0056] The roof tile **400** depicted in FIGS. **6**-**6**D illustrates a fourth embodiment of a roof tile according to the present invention. The roof tile **400** is identical to roof tile **100** in that it includes a roofing surface **410** and a mating surface **420** which supports and defines the roofing surface. The roof tile **400** is different from roof tile **100** but similar to that of the roof tile **300** in that the slope of the roofing surface inflects at a water dividing ridge or a water dividing line located intermediate two free ends of the roofing surface. Similar to that of the roof tile **300**, this water dividing ridge or water dividing line as an example of a water divider **412** of the roof tile **400** extends transversely across the roofing surface as. Likewise, periphery of the roofing surface **410** overhangs the ensemble of the mating elements **420** to provide extra or overlapping water shading surface to be explained. In other words, the footprint of the roofing surface **410** exceeds the footprint of the ensemble of mating elements **420**. In addition, the water divider also defines the highest roofing level on the roofing surface **410** and is therefore the upstream end of the roof tile **400**. The two free ends of the roof tile **414** are on two sides of the water divider and are below the level of the water divider. As such, the two free ends both become downstream ends relative to the water divider. Similar to the roof tile **200** and different to that of roof tile **300**, the roofing surface **410** of the roof tile **400** is a concavely curved water collection surface, and the curvature is symmetrical about a line of symmetry which extends between the two ends and intersects the middle of the water divider. While the roofing surface **410** inflects at the water divider, the curvature of the concavely curved water collection surface is substantially constant between the two free ends. Features or parts of the roof tile **100** which are common or equivalent to features of parts of the roof tile **100**, **200** and **300** are incorporated herein for succinctness where appropriate and are identified with the same numerals but increased by **300**, **200** and **100** respectively.

[0057] Assembly of the model building structure depicted in FIGS. **1**, **1**A and **1**B using the embodiments of the present invention will be described below.

[0058] Firstly, a roof base support **20** comprising 4 stepped layers and assembled from a plurality of modular building blocks as an example of a roof support structure is shown in FIG. **2**A. The roof base support **20** is arranged such that the middle building block is at the highest vertical level, while the vertical levels of support layers 3, 2, 1 gradually decrease by the height of the building blocks. The width of this exemplary roof base support is constant and is equal to the width of a modular building block having an upper mating surface which comprises a 2×4 matrix of building upper mating protrusions **24**. Each 2×2 matrix of building upper mating protrusions is adapted for complementary mating with a 2×2 matrix of mating elements on the roof tiles **100**-**400**, and the 2×4 matrix of building upper mating protrusions **24** is adapted for complementary mating with two roof tiles **100**-**400**. The periphery of the roofing surface of each of the roof tiles **100**-**400** is arranged such that when a roof tile is mated on a corresponding matrix of the building upper mating protrusions on the building roof support base, the roofing surface will project beyond boundaries of the block defining the building upper mating protrusions **24** and extend into the boundary of the next block or next matrix of building upper mating protrusions **24**. For example, the roofing surface at projects beyond the width of the building roof support building block **22**. Where the roofing surface is at an extremity of the building roof support building block **24**, the roofing surface will project beyond that extremity. Where the roofing surface is at not an extremity of the building roof support building block **24**, the roofing surface will project into the territory covered by an adjacent roofing surface. Therefore, in general the roofing surfaces are arranged such that adjacent roofing surfaces mutually overlap and/or in contiguous contact to define an overlapped roofing portion for improved water shielding.

[0059] Referring to an exemplary method of assembling a roof of FIG. **1**, a first roof tile **200** is firstly placed on a layer two roof support block, and then a roof tile **100** is inserted adjacent to the first roof tile. When the roof tiles **100** and **200** are so placed, the peripheral roof surface of the roof tile **100** is immediately above and overlaps with a corresponding adjacent peripheral roofing surface of the roof tile **200**. The relative heights of the peripheral surfaces of the first and second type of roof tiles **100**, **200** are adapted such that when they are inserted on a leveled support surface having complementary mating arrangements, the peripheral roof surface of the first roof tile will be immediately above and in an overlapped interlocking relationship with a corresponding peripheral roofing surface of the second roof tile, as shown in FIGS. **1** and **1**A. Likewise, the third and fourth types of roof tiles **300**, **400** are adapted to be laid on a water dividing ridge of a structure and have the same or similar overlapping relationship with adjacent roof tiles. The mutually lapping relationship between adjacent roof tiles means better interlocking of adjacent roof tiles as well as better water shielding as the overhanging portions will help to dispose water from a roof tile into an adjacent tile at a location further away from the periphery or edge.

[0060] FIG. **7** depicts a dog house which comprises a roof structure assembled from a plurality of roof tiles described above and schematically described in FIGS. **3**-**3**D, **4**-**4**D, **5**-**5**D and **6**-**6**D. The dog house comprises a house base **40** which is assembled from a plurality of building blocks in mated interconnection. Each building block comprises a main body having an upper mating surface and a lower mating surface. The upper mating surface comprises a plurality of upper mating protrusions, and the lower mating surface comprises a same or corresponding plurality of lower mating protrusions. The mating protrusions are arranged in a regular matrix or array. The matrix or array is regular in the sense that there is a uniform spacing between adjacent mating protrusion along first and second orthogonal axes. The plurality of building blocks collectively defines walls of the dog house and forms the house base **40**. The upper mating protrusions are distributed on the uppermost free ends of the house bases and are exposed for mated interconnection with the roof tiles in order that the roof structure can be assembled onto the house base **40** by mated engagement of coupling.

[0061] As depicted in FIG. **7**, the roof structure is corrugated and comprises alternate rows of water collection channels and water repelling ridges. Each water collection channel is constructed from a plurality of roof tiles **200** having a water collection surface. Each water repelling ridge is constructed from a plurality of roof tiles **100** having a water repelling surfaces. The water collection channels and water repelling ridges are assembled such that a lateral side portion of a water collection channel is immediately underneath a corresponding lateral side portion of a corresponding water repelling ridge such that water repelled by the water repelling ridge is collected by the water collection channel when water flows from an upstream end of the water repelling ridge towards the downstream end. With this arrangement, water collected by the roof structure will be diverted to flow along the water collection channels which are between the water repelling ridges. To mitigate the risk of water seepage when collected water is passed from the water repelling ridges to the water collection channels, the roof tiles are assembled such that lateral portions of adjacent roof tiles are overlapping so that there will be no gap between adjacent water repelling ridges to the water collection channels. In this regard, it will be noted that the lateral portion of a roof tile projects beyond the foot print of its lower mating surface. To further mitigate water seepage, the lateral portions of adjacently disposed roof tiles are complementarily curved. Furthermore, the lateral portions of the adjacently disposed roof tiles may be contiguous to mitigate seepage due to splashing. The projecting end or later portions of the roof tiles also facilitate the formation of a balcony type overhanging at the extreme end of the roof structure to provide an enhanced rain shield. The roof structure also comprises a water dividing ridge formed by the roof tiles **300**, **400** having two downstream ends. The water dividing reach defines a local top of the roof structure.

[0062] In the examples, it will be appreciated that the roofing surface of a roof tile is elevated above the mating surface by an elevation means. The elevation means shown in the examples are circular columns each having an internal bore as coupling or engagement means for making mated engagement with the building blocks on the house base **40**. The integration of coupling or engagement means into the elevation means is advantageous both for structural integrity, for reliability and for cost savings. While the internal bore is used as an example of an engagement means, it will be appreciated that the column itself or other mechanism can be used as an engagement means. For example, where the coupling or engagement means on the house base comprises of a grid, the exterior of the column may be used as an engagement means to interlock with the grid to facilitate mated coupling. Of course, the column needs not to be circular, and can be oval, square or polygonal without loss of generality.

[0063] While embodiment(s) of the present invention(s) has/have been explained with reference to the examples above, the embodiments are non-limiting examples for illustrating the present invention(s) and should not be construed to limit the scope of the invention. For example, while embodiments of the roof tiles have been explained with reference to a plastic moulded piece, it will be appreciated that the roof tiles could be formed from metal, such as steel or aluminum, whether by casting or extrusion, or concrete. Furthermore, while each of the third and fourth tiles comprises either a convexly curved or a concavely curved roofing surface, it will be appreciated that the roof surfaces at opposite sides of the water divider could be of opposite curvature without loss of generality. For example, one side of the roofing surface could be concavely curved while the other side is convexly curved.

Table of Numerals

10				Building structure
20				Building roof support base
22				Building roof support building block
24				Building upper mating protrusion
30				Building roof structure
40				House base
50				House roof
100	200	300	400	Roofing title
110	210	310	410	Roofing surface
120	220	320	420	Mating surface
130	230	330	430	Tubular elements
112	212			Upstream end
114	214			Downstream end
		312	412	Water divider
		314	414	Free ends

1. A tile comprising a mating surface and a roofing surface, wherein the roofing surface is elevated above the mating surface and is shaped to guide or direct a liquid to flow from an upstream first end to a downstream second end under the influence of gravity when the mating surface rests on a leveled surface, and wherein the mating surface comprises a mating or coupling means which is adapted to make complementary mating or coupling engagement with a support member or a support surface having a complementary mating or coupling means.

2. A tile according to claim **1**, wherein the first end and the second end of the roofing surface are at different elevation levels relative to the leveled surface and collectively define a draining slope on the roofing surface when the mating surface rests on the leveled surface.

3. A tile according to claim **2**, wherein the mating or coupling means on the support member or the support surface comprises a coupling or engagement surface on which there is formed a plurality of coupling or engagement members, the plurality of coupling or engagement members being distributed in a regular matrix having a uniform spacing along first and second orthogonal axes; and wherein the mating or coupling means on the mating surface of the tile comprises a plurality of coupling or engagement members which is adapted to enter into complementary mating engagement with the plurality of coupling or engagement members on the support member or the support surface.

4. A tile according to claim **3**, wherein the plurality of coupling or engagement members on the mating surface of the tile is distributed in a matrix, the matrix having a uniform spacing along first and second orthogonal axes, the uniform spacing being the same as that on the matrix on the coupling or engagement surface of the support member or the support surface.

5. A tile according to claim **1**, wherein the roofing surface is elevated above the mating surface by an elevation means, the elevation means defining the elevation of the first end and the elevation of the second end when the mating surface makes mating or coupling engagement with the support member or the support surface.

6. A tile according to claim **5**, wherein the mating or coupling means on the mating surface is an integral part of the elevation means.

7. A tile according to claim 6, wherein the elevation means comprises a plurality of elevation members which extends downwardly from the roofing surface, and wherein the mating or coupling means of the tile is defined collectively by the free ends of the plurality of elevation members.

8. A tile according to claim 7, wherein each elevation member of the tile comprises a supporting column, the supporting columns of the tile collectively defining the elevation means and each supporting column defining an axial bore which is adapted for making individual mated engagement or coupling with a coupling or engagement member on the support member or support surface.

9. A tile according to claim 1, wherein the downstream second end of the roofing surface overhangs or projects beyond the mating surface of the tile.

10. A tile according to claim 1, wherein the roofing surface comprises first and second lateral sides which interconnect the upstream first and downstream second ends of the roofing surface, the lateral sides overhanging or projecting beyond the mating surface of the tile.

11. A tile according to claim 1, wherein the first and second lateral sides of the roofing surface are adapted to overlap with lateral sides of adjacent tiles when the tiles are mounted on the support member or the support surface to form a roof.

12. A tile according to claim 1, wherein the roofing surface is either a liquid repelling surface or a liquid collection surface, the liquid repelling surface being adapted to direct a liquid collected by the roofing surface to be dispersed towards the lateral sides of the roofing surface when flowing from the upstream first end to the downstream second end, and the liquid collection surface being adapted to direct a liquid collected by the roofing surface to be concentrated in a portion of the roofing surface intermediate the first and second lateral sides of the roofing surface when flowing from the upstream first end to the downstream second end.

13. A tile according to claim 1, wherein the roofing surface has a uniformly arcuate profile between the upstream first and the downstream second ends.

14. A tile according to claim 13, wherein the roofing surface is either convexly or concavely curved along an axis of symmetry, the axis of symmetry extending between the upstream first and the downstream second ends and is intermediate the first and second lateral sides of the roofing surface.

15. A tile according to claim 1, wherein the roofing surface comprises an upstream first end, a downstream second end and a downstream third end, the upstream first end being intermediate the downstream second and third ends; wherein the upstream first end is a liquid dividing ridge adapted to divide liquid falling on the roofing surface to flow either towards the downstream second end or the downstream third end.

16. A tile according to claim 15, wherein the upstream first end extends across the lateral sides of the roofing surface.

17. A set of tiles comprising a first type of tiles each having a liquid collection surface and a second type of tiles each having a liquid repelling surface, wherein each type of tiles is a tile comprising a mating surface and a roofing surface, wherein the roofing surface is elevated above the mating surface and is shaped to guide or direct a liquid to flow from an upstream first end to a downstream second end under the influence of gravity when the mating surface rests on a leveled surface, and wherein the mating surface comprises a mating or coupling means which is adapted to make complementary mating or coupling engagement with a support member or a support surface having a complementary mating or coupling means, and wherein the first and second types of tiles are such that lateral sides of adjacent tiles of different types will overlap with a lateral side portion of a tile of the first type immediately underneath an overlapping lateral side portion of a tile the second type when mounted on a support member or a support surface, and wherein the overlapping side portions are complementarily curved such that liquid repelled by a tile of the second type will be collected by a tile of the first type when mounted on a support member or a support surface.

18. (canceled)

19. A roof comprising a plurality of tiles according to claim 1, assembled on a support member or a support surface, wherein the tiles are assembled to form a corrugated roof comprising a plurality of alternately disposed liquid repelling ridges and liquid collecting channels, and wherein each liquid repelling ridge is assembled from a plurality of tiles each having a liquid repelling surface, and each liquid collecting channel is assembled from a plurality of tiles each having a liquid collection surface.

20. (canceled)

21. A roof according to claim 19, wherein a tile of the first type or a tile of the second type in the roof is overhung by three adjacent tiles while overhanging another three adjacent tiles.

22. A building structure comprising a roof constructed from a plurality of tiles according to claim 1.

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