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Bouchard et al.(10) **Pub. No.: US 2012/0117904 A1**(43) **Pub. Date: May 17, 2012**(54) **WALL PANEL COMPRISING RESILIENT
MEMBERS FOR RETAINING MASONRY
UNITS****Publication Classification**(51) **Int. Cl.****E04B 2/06** (2006.01)**E04C 2/20** (2006.01)**E04B 2/08** (2006.01)(75) Inventors: **Michel Bouchard,**
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Canada Inc., Anjou, QC (CA)(57) **ABSTRACT**(21) Appl. No.: **13/387,350**(22) PCT Filed: **Jul. 29, 2010**(86) PCT No.: **PCT/CA2010/001191**§ 371 (c)(1),
(2), (4) Date: **Jan. 26, 2012**

A wall panel for retaining masonry units is provided. The panel has a front face provided with a plurality of tabs for supporting the lower lateral face of the masonry units and a plurality of resilient clips for resiliently biasing the upper lateral face of the units against the tabs. In an embodiment, the clips include a frontward curved hook with a downwardly pointing edge to bit on the upper face of the masonry unit and an inverted U-shaped cut-out including the curved hook and providing resiliency. In another embodiment, the clips include at least one downward resilient wing having a longitudinal axis parallel to the plane of the panel. The masonry unit is maintained in place on the panel against the tabs partly by a resilient force applied by the wing and partly by friction of the wing against the upper lateral face of the masonry unit.

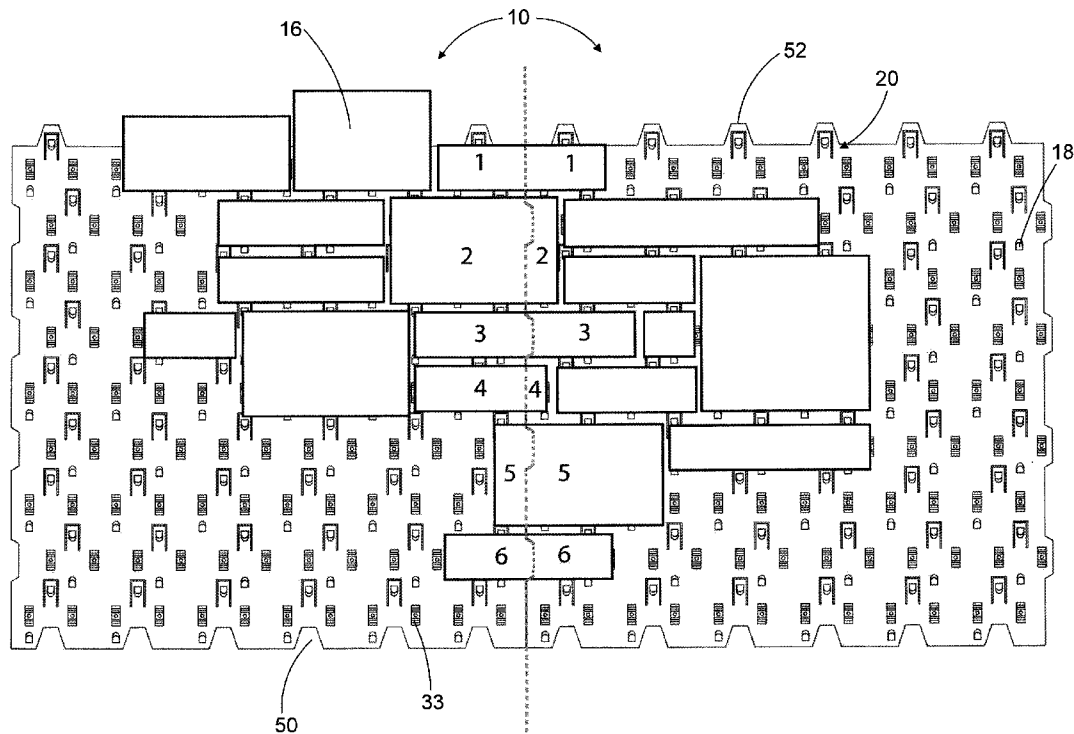
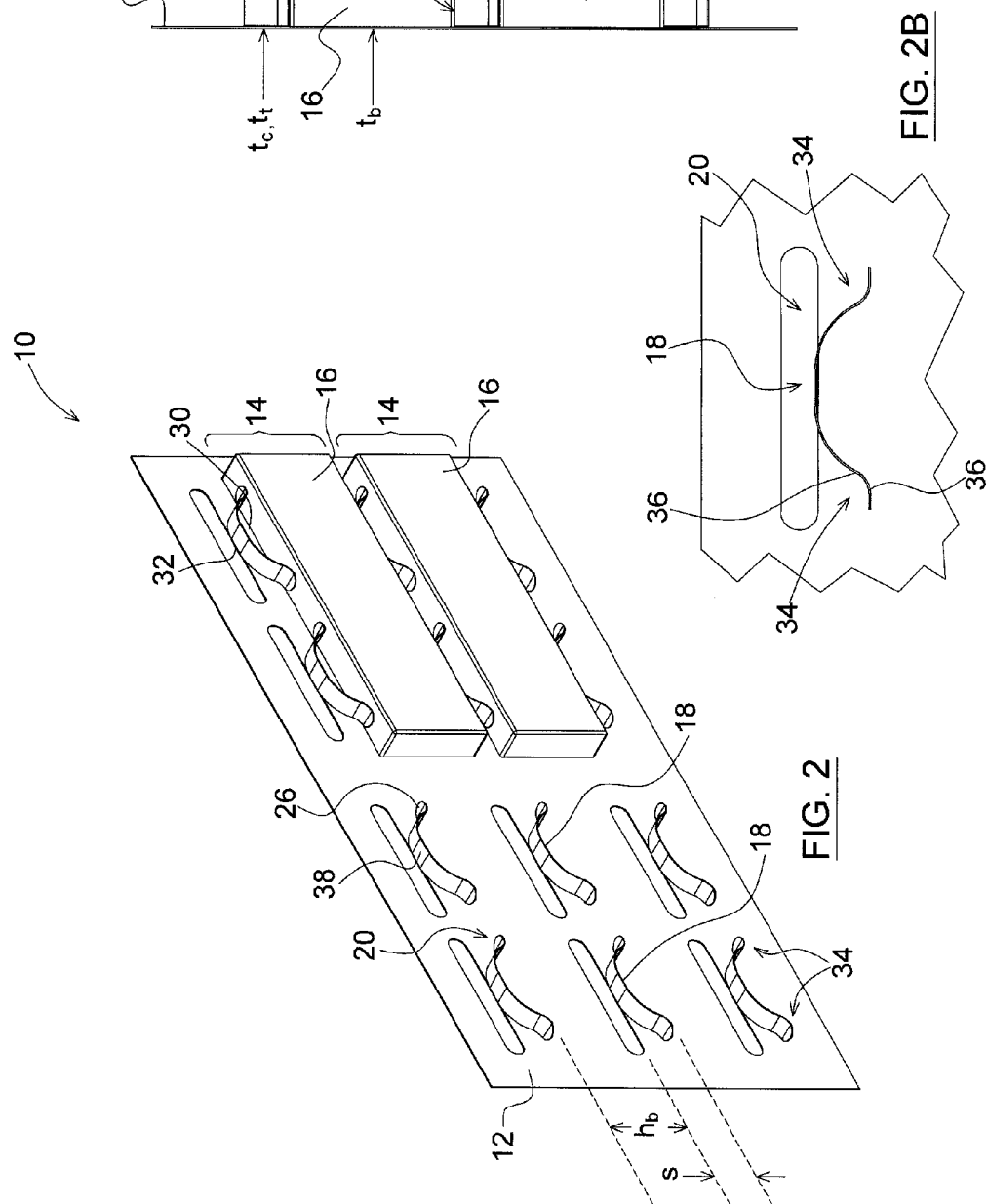
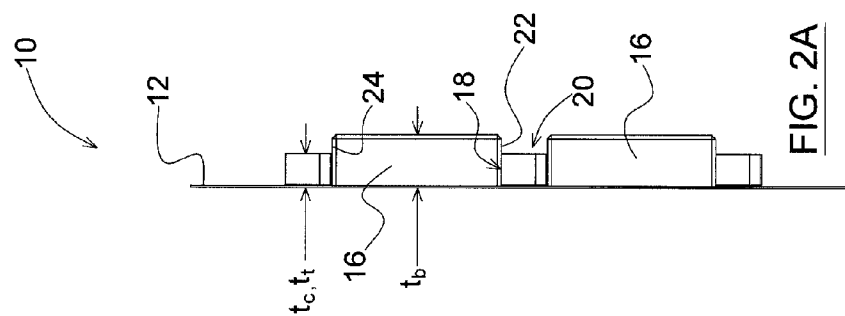
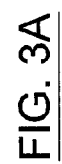
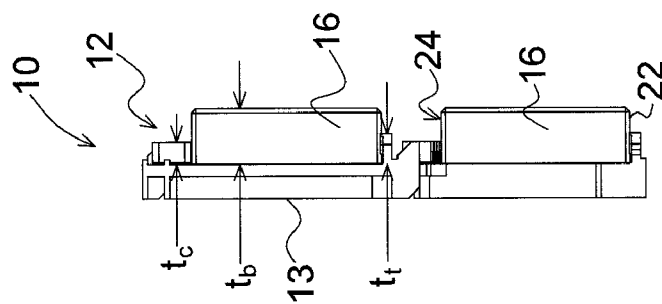
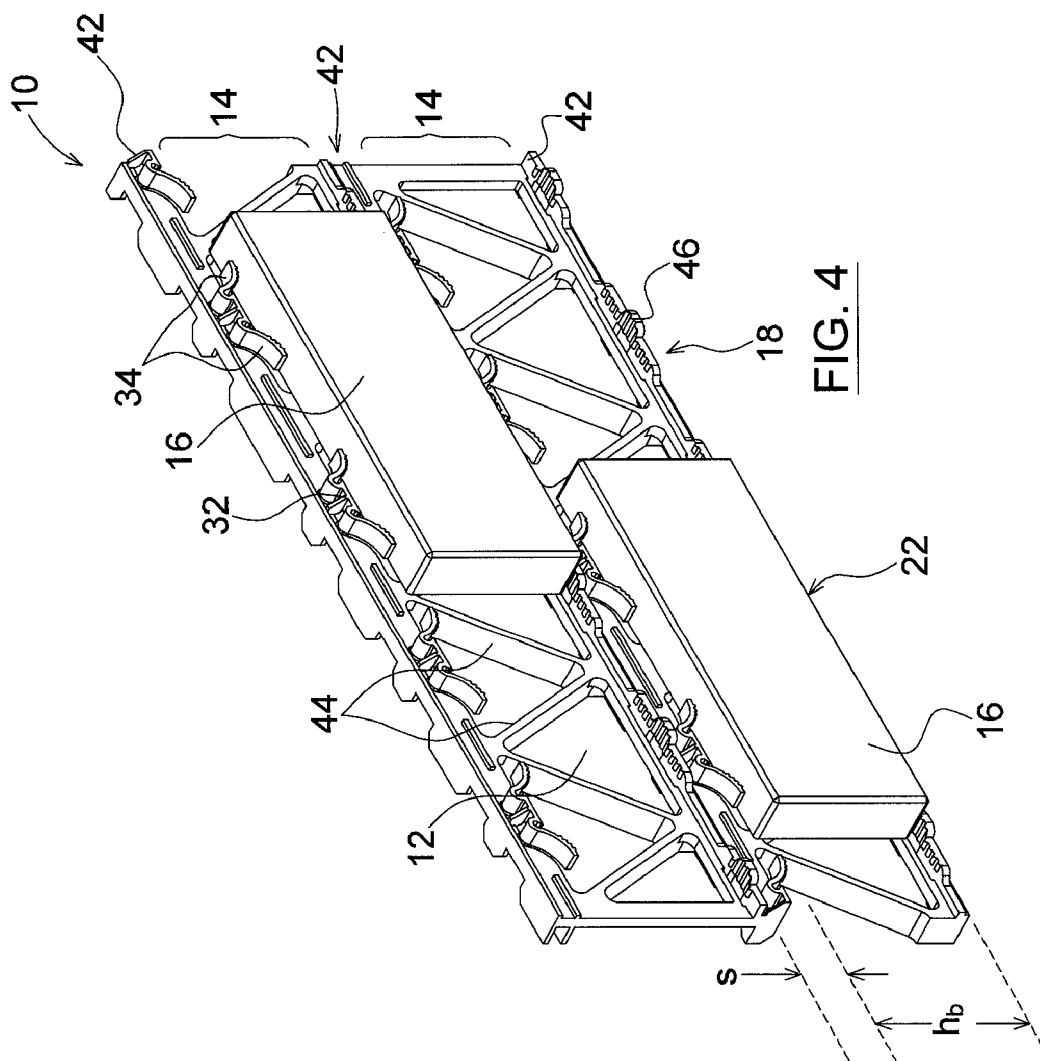
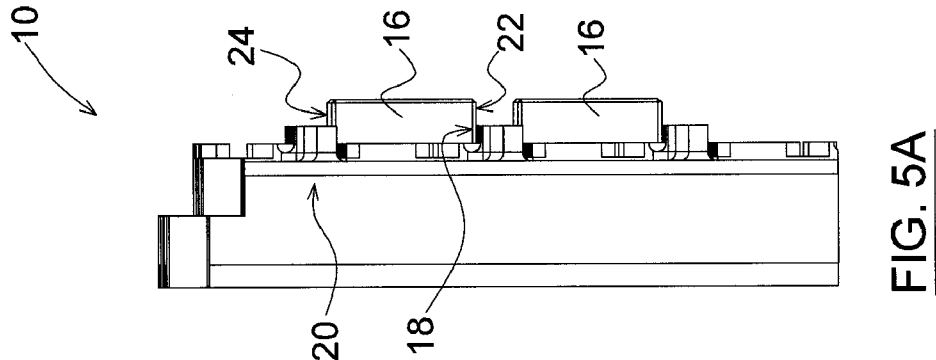
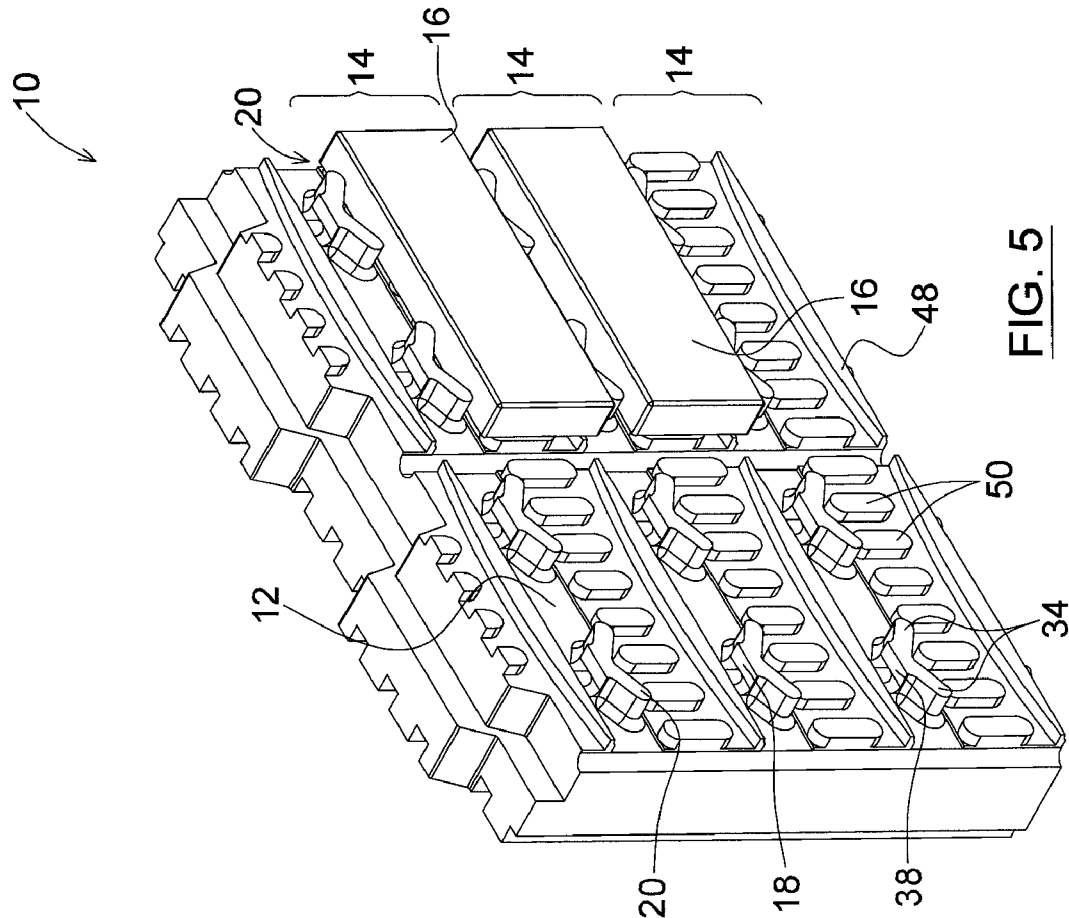
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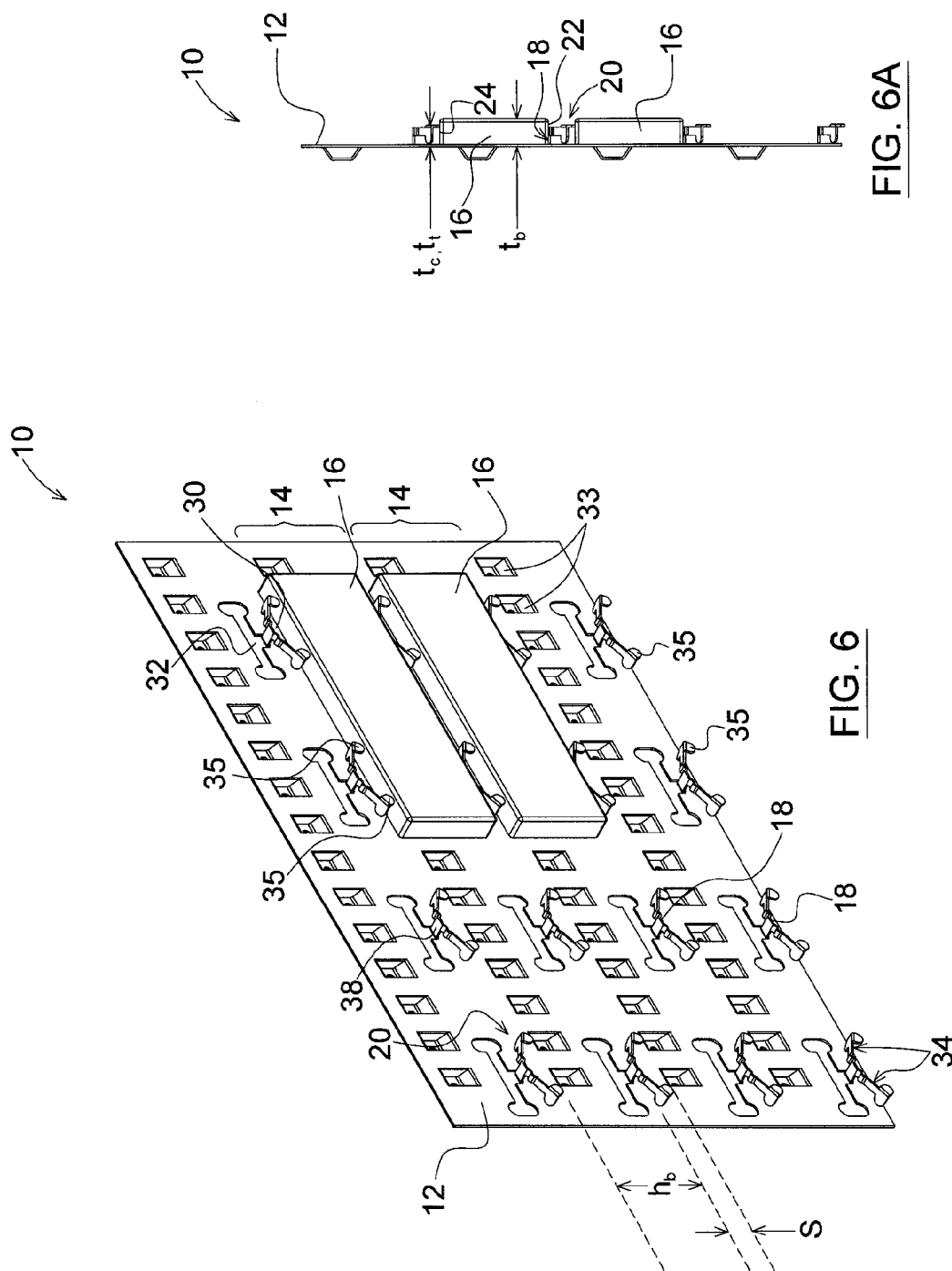
FIG. 1A

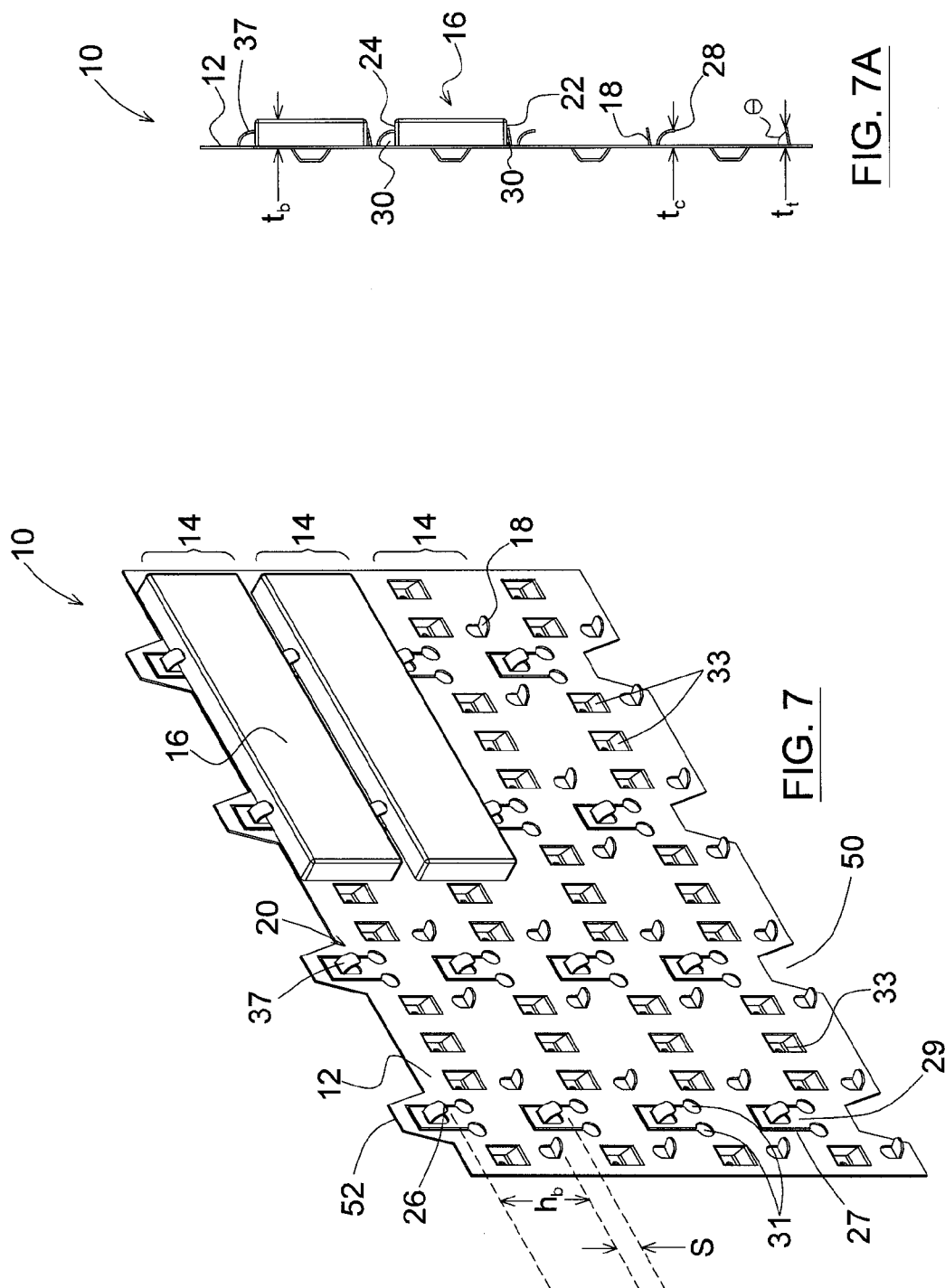












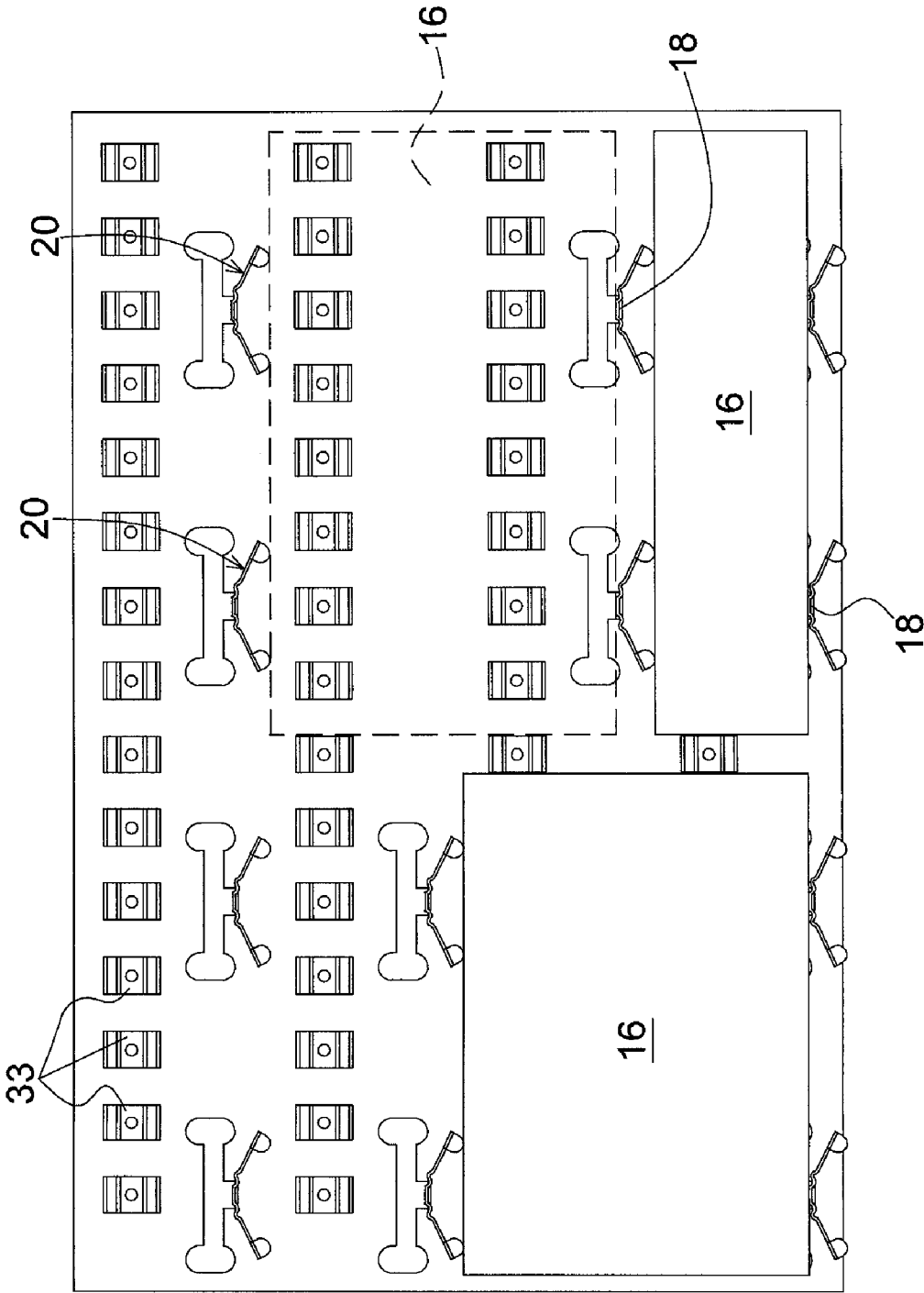


FIG. 8

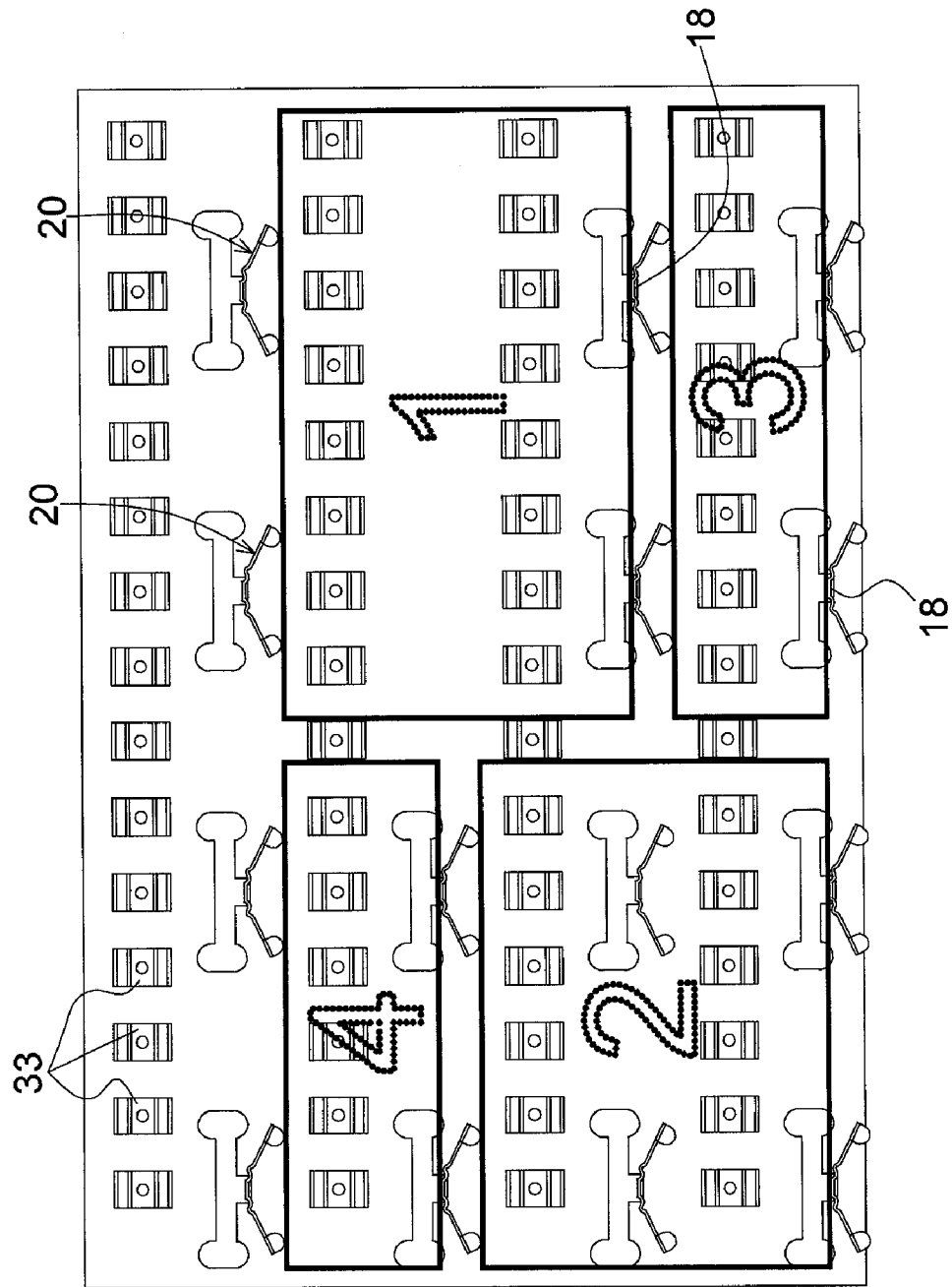
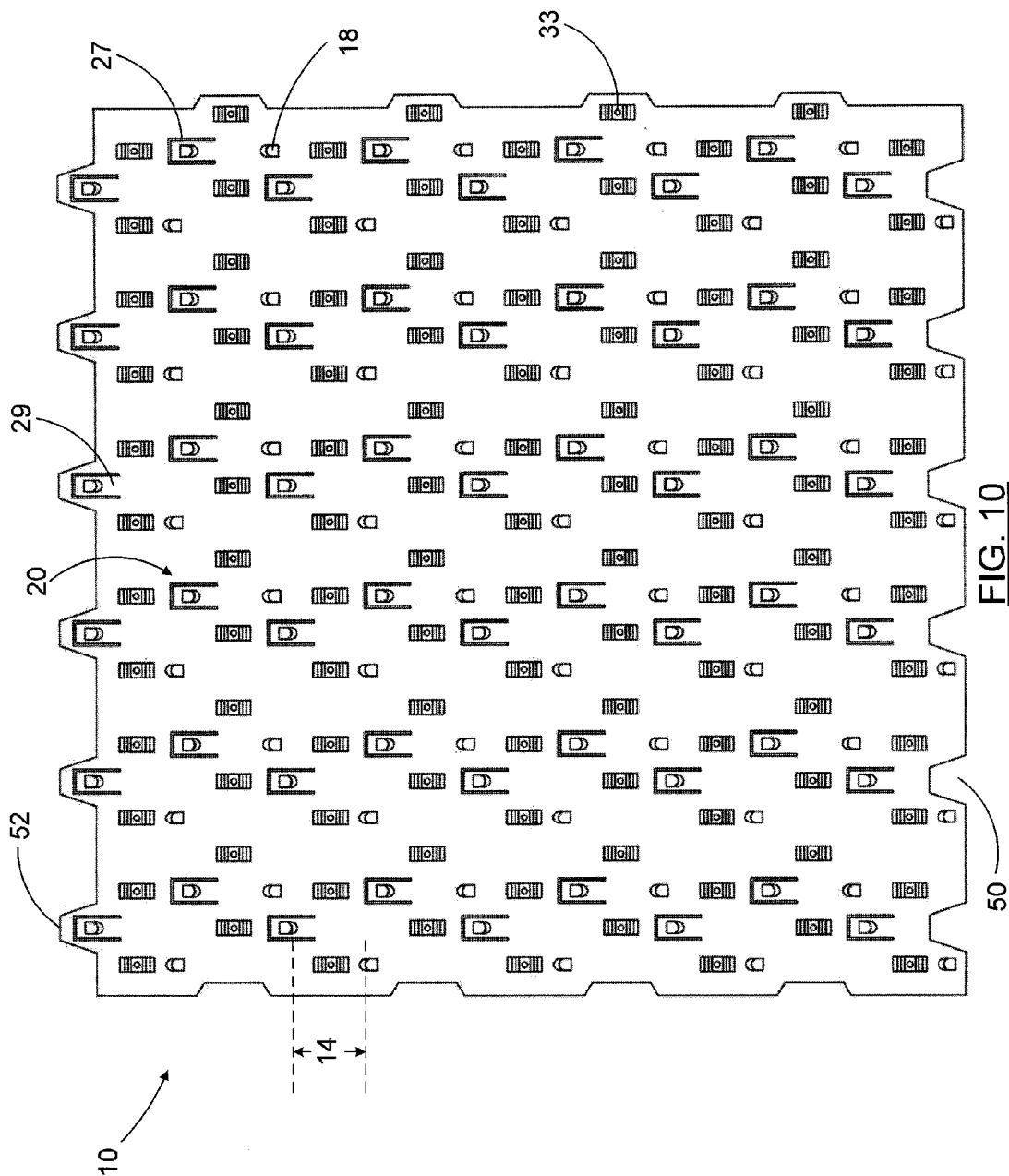


FIG. 9



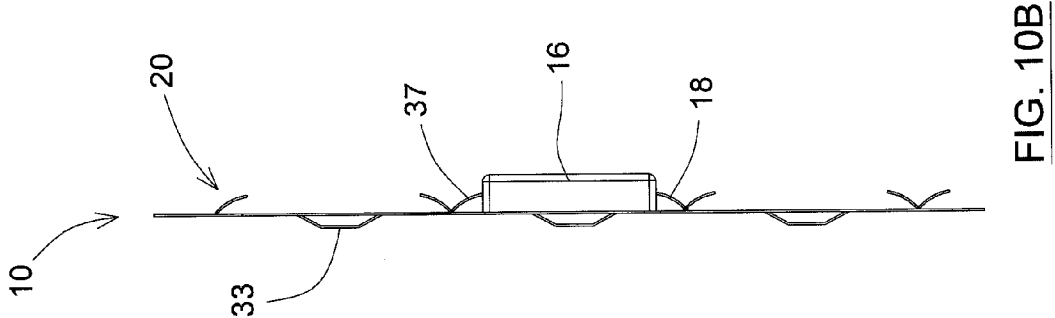


FIG. 10B

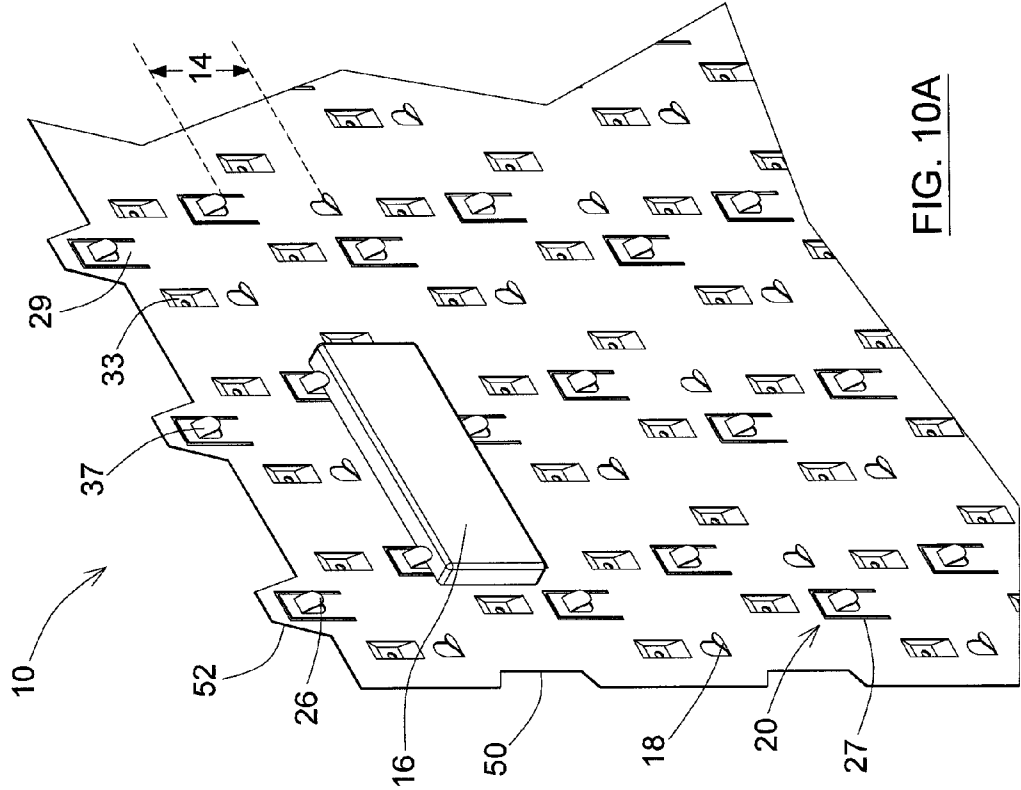
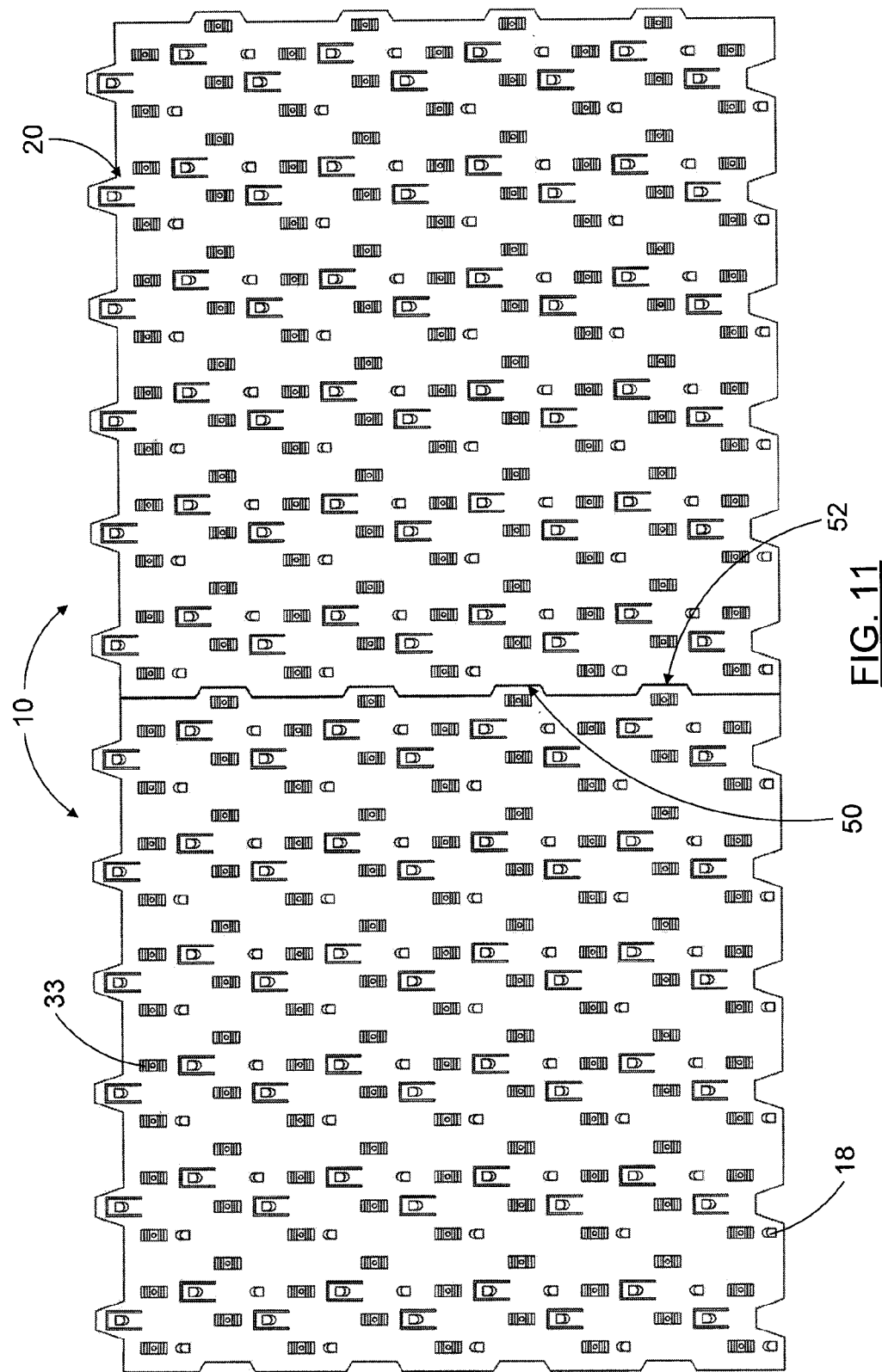
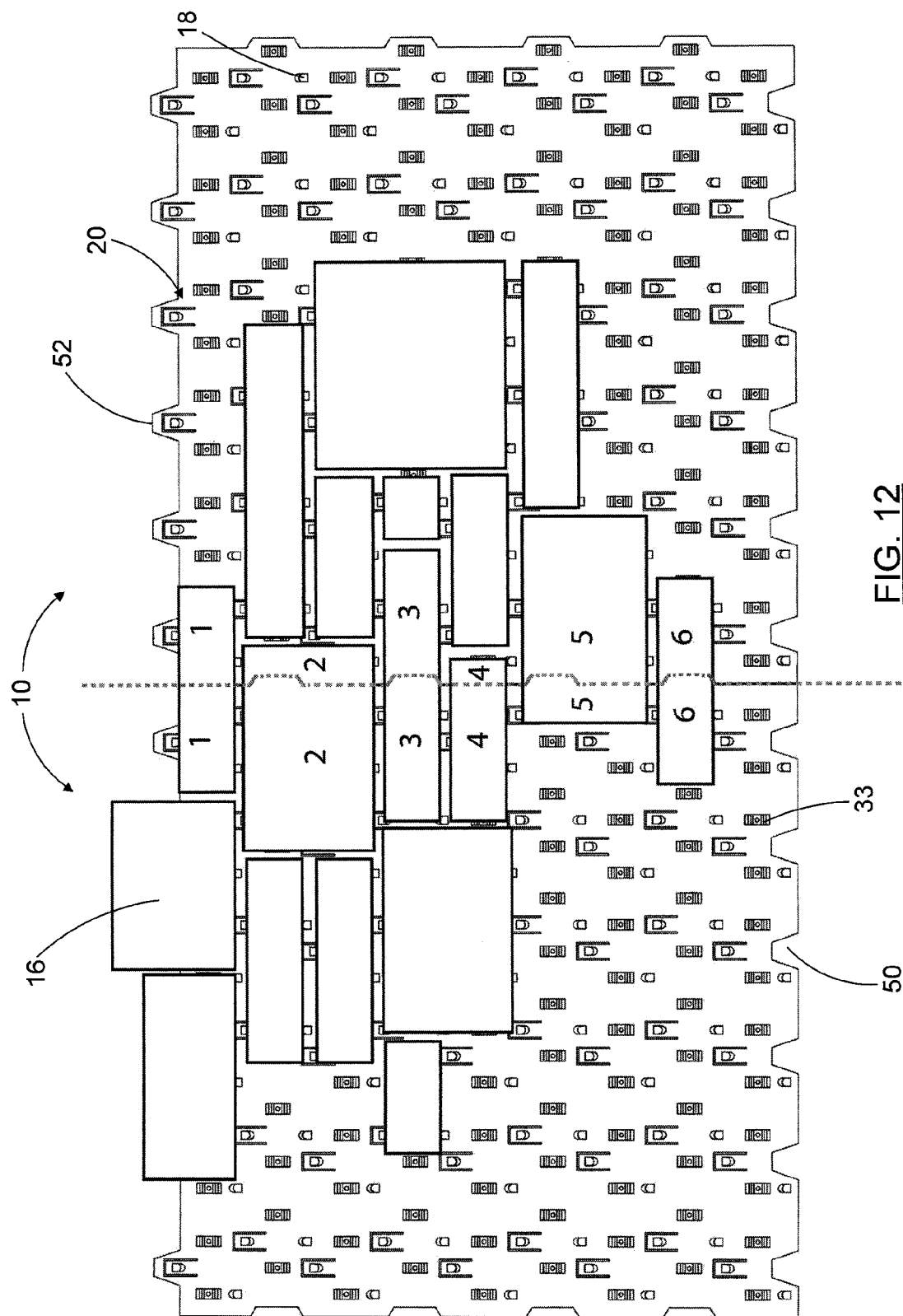


FIG. 10A





WALL PANEL COMPRISING RESILIENT MEMBERS FOR RETAINING MASONRY UNITS

FIELD OF THE INVENTION

[0001] The present invention relates to the field of masonry works and installations. More particularly, it concerns panels provided with clips and tabs for retaining masonry units made of clay, concrete or the like.

BACKGROUND

[0002] One previously known masonry wall system disclosed by the same Applicant in U.S. 2007/0193176 makes it possible to easily and rapidly build an artificial masonry wall without having to use a mixture of cement to temporarily retain the masonry units while building the wall.

[0003] More specifically, U.S. 2007/0193176 provides a panel, preferably made of a compressible material, having a front face provided with masonry unit receiving depressions bordered by protruding ribs. The depressions of different sizes are adapted to receive respective artificial masonry units in a close-fitting relationship. Each of the artificial masonry units comprises a tooth projection for thrusting into the protruding rib when the masonry unit is inserted in a respective depression.

[0004] One difficulty with the use of teeth or protuberances on lateral sides of masonry units is the capacity of unit manufacturers to form such projections with a regular and even shape. It is not always easy to maintain a consistently similar outline for each unit produced, and this possibility varies according to the material used when forming the artificial masonry units. For example, forming even and constant projections with clay bricks is especially challenging. Moreover, forming projections on units adds matter to the units, and since such units are manufactured in high volumes, adding these teeth or projections, though they are small, eventually increases the cost of producing such units, because of the added matter.

[0005] Application US 2005/0284063 (LOSSE) describes a support panel provided with rows of support tabs and rows of L-shaped fingers, for maintaining tiles on the panel. One main drawback of such a system, as described in paragraph [0028] of the published application, is that the tabs and L-shaped fingers are not sufficiently strong to retain the tiles on the panel, and that adhesive strips must be used behind the tiles to secure the tiles in place. In addition, once the tiles are glued onto the panel, each L-shaped finger must be manually bent by the person doing the installation, which is a very long and tedious process.

[0006] Two other examples of panels are described in US Application No. 2004/005003A1 (PASSENO) and U.S. Pat. No. 6,098,363 (YAGUCHI). PASSENO describes a panel provided with L-shaped retainers for supporting brick veneers while YAGUCHI describes a panel provided with bent fingers for supporting wall forming members such as bricks. The disadvantage of these panels is that they must be used in combination with customized bricks provided with some sort of groove or indentation on the top of their upper lateral face. Conventional clay bricks are not likely to be securely maintained by such panels.

[0007] The following prior art documents provide other examples of wall construction using panels and/or masonry units: U.S. Pat. Nos. 3,496,694; 3,712,825; 3,908,326; 4,589,

241; 5,228,937; 5,501,049; 5,894,676, 6,164,037 and 7,121,051; and PCT application WO 1999/022091.

[0008] In light of the aforementioned, it would be desirable to provide a simple and efficient panel system to maintain bricks in place prior to the application of mortar, which would not require any adhesive or extra steps during installation. It would also be desirable to provide a system which can be used with unmodified conventional thin bricks.

SUMMARY OF THE INVENTION

[0009] It is an object of the present invention to provide a masonry panel that satisfies at least one of the above-mentioned needs.

[0010] Therefore, in accordance with the present invention and broadly described, that object is achieved with a masonry wall panel suitable for retaining masonry units that has a front face provided with at least one tab associated with at least one resilient clip for mounting and maintaining a masonry unit. The at least one tab is for supporting the lower lateral face of a masonry unit, while the clip is for resiliently biasing or pressing the upper lateral face of the masonry unit against the at least one tab, the tab and clip thereby maintaining the masonry in place on the panel.

[0011] According to a first aspect, the present invention thus provides a wall panel for retaining masonry units, wherein each one of the masonry units has upper and lower parallel lateral faces and has a height h_b . The wall panel is a metallic sheet panel having on its front face at least one tab associated with at least one resilient clip for mounting and maintaining a masonry unit. The at least one tab and clip are cut-outs integral with the metallic sheet panel. The at least one tab is capable of supporting the lower lateral face of the masonry unit. The at least one clip includes a frontward curved hook with a downwardly pointing edge to bit on the upper lateral face of the masonry unit and an inverted U-shaped cut-out including the curved hook and providing resiliency to the hook. The resilient clip is for resiliently biasing the upper lateral face of the masonry unit against the at least one tab, the at least one tab and at least one clip thereby maintaining said masonry unit in place on the panel.

[0012] In a preferred embodiment, the curved hook and the inverted U-shaped cut-out of the clips are formed from a single continuous cut thereby defining a finger-shaped hook having a semicircular end.

[0013] In another preferred embodiment, the curved hook of the clip is formed from a U-shaped cut extending within the inverted U-shaped cut-out.

[0014] In another preferred embodiment, the wall panel includes a plurality of said tabs forming at least one lower row of tabs and a plurality of said resilient clips forming at least one upper row of clips. The lower and upper rows thereby define at least one horizontally extending channel capable of receiving a row of masonry units. Preferably, the wall panel includes a plurality of said horizontally extending channels which are positioned contiguously to each other from the top edge of the wall panel to its bottom edge.

[0015] In another preferred embodiment, the wall panel is provided with a plurality of spaced-apart embossed portions projecting backward from its back face, the embossed portions comprising a back provided with a hole for inserting fixation means therein. Preferably, the embossed portions are positioned by rows, each embossed portion within a row being offset relative to each embossed portion within a next row.

[0016] In still another preferred embodiment, the masonry wall panel includes a plurality of said tabs and clips which are positioned according to a predetermined pattern of cells of varying sizes adapted to receive masonry units of different sizes. The wall panel may also include a pattern of the masonry units to be placed onto the panel which is imprinted on its front face.

[0017] Hence, the present invention also provides a kit comprising at least one wall panel as defined above and masonry units of different sizes to be positioned onto the panel according to the predetermined pattern.

[0018] According to a second aspect, the present invention provides a wall panel for retaining masonry units, wherein each one of the masonry units has upper and lower lateral faces, and wherein the masonry wall panel has a front face extending in a vertical plane which includes at least one tab associated with at least one resilient clip for mounting and maintaining a masonry unit. The at least one tab is capable of supporting the lower lateral face of the masonry unit. The at least one clip includes at least one downward resilient wing having a longitudinal axis which is parallel to the vertical plane of the front face. The masonry unit is therefore maintained in place on the panel against the at least one tab, partly by a resilient force applied by the wing and partly by friction of the wing against the upper lateral face of the one masonry unit.

[0019] In a preferred embodiment, the wall panel is a metallic sheet panel and the clip includes one resilient wing formed from a L-shaped cut-out, an end portion of the L-shaped cut-out being left uncut thereby forming a connecting section between the wall panel and the clip once the clip is bent perpendicularly relative to the panel. The L-shaped cut-out also includes several inflexion points along its longitudinal axis providing resiliency to the wing.

[0020] In another preferred embodiment, the wall panel is a metallic sheet panel and the clip comprises two resilient wings formed from a substantially rectangular oblong-shaped cut-out. A middle portion of the rectangular-shaped cut-out is left uncut thereby forming a connecting section between the wall panel and the clip once the clip is bent perpendicularly relative to the panel. Each of the two wings is further bent at at least one point of inflexion along its longitudinal axis.

[0021] In still another preferred embodiment, the metallic wall panel includes a plurality of said resilient clips forming at least one upper row of clips and a plurality of said resilient clips forming at least one lower row of clips. The connecting section of the clips of the lower row acts as the tab capable of supporting the lower lateral face of the masonry unit. The lower and upper rows thereby define at least one horizontally extending channel capable of receiving a row of masonry units.

[0022] In another preferred embodiment, the wall panel is made of molded rigid plastic and includes a plurality of said resilient clips and a plurality of said tabs. The clips include two downward wings flanking a medial section molded to the front face.

[0023] Preferably, the wall panel has a meshed body and includes on its front face longitudinal ribs having upper and lower portions, and web members interconnecting the ribs. The clips are located on the lower portion of the ribs and the tabs are shaped as a shelf-like flange protruding from the upper portion of the ribs.

[0024] In another preferred embodiment, the wall panel is made of molded foam plastic comprising a plurality of said

resilient clips and a plurality of said tabs, and has a continuous solid body. The clips include two downward wings flanking a medial section molded to the front face.

[0025] In still another preferred embodiment, the molded rigid or foam plastic panel described above includes a plurality of said resilient clips forming at least one upper row of clips and a plurality of said resilient clips forming at least one lower row of clips. The medial section of the clips of the lower row acts as the tab capable of supporting the lower lateral face of the masonry unit. The lower and upper rows thereby define at least one horizontally extending channel capable of receiving a row of masonry units.

[0026] According to a third aspect, the present invention further provides a method for making a masonry wall covering a building surface, this method comprising the steps of:



[0027] a) mounting a plurality of panels as defined above to a building surface, side by side; and if required row by row;

[0028] b) providing a plurality of masonry units; and

[0029] c) fitting the masonry units onto the panels such that each tab supports the lower lateral face of a respective one of the masonry units and each clip resiliently biases the upper lateral face of the masonry unit against a corresponding tab, the tab and clip thereby maintaining the masonry unit in place on the panel.

[0030] By “masonry unit”, it is meant any stone or brick, natural or artificial, commonly used in a stonework or brickwork. Preferably, the masonry unit is a thin clay brick.

[0031] A “resilient clip” means a device for holding that is capable of returning to its original shape or position, as after having been compressed or deformed. The clips can each be formed by a resilient hook, by one or two resilient wings or by a resilient flange.

[0032] A “U-shaped cut” means a cut provided in the panel having a form close to the letter U. Hence, this shape can be, without being limited to, any of a U with rounded bottom,  with flat bottom, or  with a trapezoidal form.

[0033] An “inverted U-shaped cut” has a form which is similar to the one of a U-shaped cut as defined above, but is inverted.

[0034] A “cut-out” means a portion of material obtained by cutting this material as opposed to a cut line itself. A cut-out is obtained from cut lines defining a cut portion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] Other objects, advantages and features of the present invention will become more apparent upon reading the following non-restrictive description of preferred embodiments thereof, given for the purpose of exemplification only, with reference to the accompanying drawings in which:

[0036] FIG. 1 is a perspective view of a portion of a masonry wall panel according to a first preferred embodiment of the invention, showing one brick positioned in the panel. FIG. 1A is a side view of the section of the panel of FIG. 1.

[0037] FIG. 2 is a perspective view of a portion of a masonry wall panel according to a second preferred embodiment of the invention, showing two bricks positioned in the panel. FIG. 2A is a side view of the panel of FIG. 2, while FIG. 2B is an enlarged front view of a clip of the panel of FIG. 2.

[0038] FIG. 3 is a perspective view of a portion of a masonry wall panel according to a third preferred embodiment of the invention, showing one brick positioned in the panel. FIG. 3A is a side view of the panel of FIG. 3.

[0039] FIG. 4 is a perspective view of a portion of a masonry wall panel according to a fourth preferred embodiment of the invention, showing two bricks positioned in the panel. FIG. 4A is a side view of the panel of FIG. 4.

[0040] FIG. 5 is a perspective view of a portion of a masonry wall panel according to a fifth preferred embodiment of the invention, showing two bricks positioned in the panel. FIG. 5A is a side view of the panel of FIG. 5.

[0041] FIG. 6 is a perspective view of a portion of a masonry wall panel according to a sixth preferred embodiment of the invention, showing two bricks positioned in the panel. FIG. 6A is a side view of the panel of FIG. 6.

[0042] FIG. 7 is a perspective view of a portion of a masonry wall panel according to a seventh preferred embodiment of the invention, showing two bricks positioned in the panel. FIG. 7A is a side view of the panel of FIG. 7.

[0043] FIG. 8 is a front view of a masonry wall panel according to a further preferred embodiment of the invention used for building a stone work.

[0044] FIG. 9 is a front view of a variant of the masonry wall panel of FIG. 8.

[0045] FIG. 10 is a front view of a variant of the masonry wall panel of FIG. 7. FIG. 10A is a perspective view of a portion of the masonry wall panel of FIG. 10. FIG. 10B is a side view of the panel shown in FIG. 10A.

[0046] FIG. 11 is a front view representing two masonry wall panels of FIG. 10 placed side-by-side.

[0047] FIG. 12 is a front view representing two masonry wall panels of FIG. 10 placed side-by-side, used for building a stone work.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0048] In the following description, similar features in the drawings have been given similar reference numerals. In order to preserve clarity, certain elements may not be identified in some figures, if they are already identified in a previous figure.

[0049] Referring to FIGS. 1 and 1A, a first example of a portion of a wall panel 10 according to the first preferred embodiment of the invention is shown. The panel 10 has a front face 12 provided with a plurality of horizontally extending contiguous channels 14. The channels 14 are for fitting rows of bricks 16 in the channels 14. This embodiment of the panel 10 has a continuous solid body (i.e. not hollowed), preferably made of a metallic sheet. The sheet has a thickness which provides the panel 10 a sufficient rigidity to be manufactured in a convenient panel format, such as 4'x8', that will not bend or be easily damaged when transported or installed.

[0050] The bricks 16 to be inserted in such panels 10 are preferably rectangular or trapezoidal thin bricks, made of clay, concrete or any other convenient material. They are bounded by a front and a back face, and at least one pair of parallel lateral faces. Thin bricks typically have a thickness t_b , which can vary between $\frac{1}{2}$ " and 2", but of course bricks 16 having a thickness outside this range could also be used in the panel 10 of the invention.

[0051] Each channel 14 is delimited by a lower row of spaced-apart tabs 18 and by an upper row of spaced-apart resilient clips 20. The tabs 18 and clips 20 are preferably regularly spaced, the clips 20 being offset relative to the tabs 18. Each tab 18 is for supporting the lower lateral face 22 of a respective one of the bricks 16, while each clip 20 is for resiliently biasing or pressing the upper lateral face 24 of the

brick 16 against a corresponding tab 18, the tab 18 and clip 20 thereby maintaining the brick 16 in place on the panel 10.

[0052] In this embodiment, the resilient clips 20 and the tabs 18 are cut-outs that are integral with the metallic sheet. The cut-outs forming the clips 20 have an inverted U-shape and are bent into curved hooks 37 in their upper part, thereby forming a finger-like shape with a semicircular end 26. In other words, the curved hook 37 and the inverted U-shaped cut-out of the clips 20 are formed from a single continuous cut thereby defining a finger-shaped hook having a semicircular end. The two vertical cuts of the inverted U-shaped cut-out provide the hooks their resiliency. The edges or rims 28 of the hook-shaped cut-outs are sharp, so that they can bit into the upper lateral side 24 of the bricks 16 and further retain them by friction.

[0053] The shelf-like tabs 18 are also cut-outs integral with the panel, and are preferably bent at an angle θ that is slightly below 90° , thereby forming an acute angle with the front face 12 of the panel. The shelf-like tabs are also preferably wide enough to extend further pass the center of gravity of the brick unit 16.

[0054] The tabs 18 and clips 20 have respective predetermined thicknesses t_t and t_c both smaller than the thickness t_b of the bricks 16, to ensure that the clips 20 and tabs 18 respectively bias and retain the lateral sides 24, 22 of the bricks 16.

[0055] When inserting a brick 16 within a channel 14 of the panel 10, the brick 16 is positioned at an angle with the panel and the upper lateral face 24 of the brick 16 is pressed upwardly against the rim or edge 28 of the hook. The brick 16 is then pivoted around this contact point toward the panel 10 so that its lower lateral face 22 rests on a corresponding tab 18. The resiliency or spring effect of the clip maintains the brick 16 solidly in place.

[0056] The rows of the tabs 18 and of clips 20 are positioned relative to one another so that the spacing between rows of bricks 16 inserted in the channels 14 is regular. In other words, the distance between the underside of the tabs and the retaining edge of the hooks preferably corresponds to a value which provides a regular and aesthetic longitudinal spacing s of the bricks 16. The rows of tabs 18 and clips 20 are also spaced apart so that, for a given channel, the distance between the upper side of the tabs 18 and the end or tip of the hooks is slightly smaller than the height h_b of the bricks 16 taking into account the height tolerance of the brick which is normally more or less $\frac{1}{8}$ of inches. By "slightly smaller than the height h_b of the bricks", it is meant that the distance between the upper side of the tabs and the end edge of the hooks is smaller than the height of the bricks, but that still allows inserting the bricks onto the panel between these tabs and hooks without difficulty. This slightly smaller distance allows better retaining the bricks onto the panel.

[0057] In addition, the curvature of the hook is such that the distance between the front face of the panel and the tip of the hook, which corresponds to the thickness of the clip t_c , is smaller than the thickness of the bricks t_b . This ensures that the hook clamps onto the upper lateral side 24 of the brick 16, rather than its front face.

[0058] Preferably, there is one or more clips 20 and one or more tabs 18 for retaining a single thin brick 16. However, the number of clips 20 and the number of tabs 18 for retaining a brick 16 does not need to be equal. For example, there might be two tabs 18 and three clips 20 for retaining a single brick 16.

[0059] Advantageously, the curvature of the hook and the acute angle θ of the tabs 18 form spaces 30 which can be filled with mortar once all the bricks 16 have been inserted in the panel 10, and which therefore provide a strong structural connection between the panel 10, the mortar and the bricks 16, once the brick wall is completed.

[0060] Referring to FIGS. 2, 2A and 2B, there is shown another embodiment of a portion of a panel 10 according to the second preferred embodiment of the present invention. In this example, the panel 10 is made of metal and has a continuous solid body.

[0061] In this embodiment, the clips 20 are cut-outs made from a metallic sheet, having a rectangular oblong shape and preferably with rounded ends 26. It is however worth noting that the cut-outs for making the clips can take several other shapes. A portion of each rectangular-shaped cut-out is left uncut, and therefore forms a connecting section 32 between the panel 10 and the clip 20, once the clip 20 is bent perpendicularly relative to the panel 10. The wings 34 of the resilient clip 20 are formed by further bending both sides of the cut-outs, each side being bent with at least one point of inflexion 36, and preferably two or more, as shown in FIG. 2B.

[0062] In this embodiment, the top surface 38 of the connecting section of the clips 20 of a given channel 14 forms the tab 18 of the next upper channel 14. Preferably, this top surface 38 is substantially flat, but in other variants of the clips, for example, where the clips 20 have a substantially inverted V-shape, the top surface 38 can correspond to an edge. Preferably, at least two clips 20 retain each thin brick 16, but of course, depending on the size of the bricks, as few as one clip 20 can also be used.

[0063] The clips 20 are thus formed by two wings 34 having a curved radius, which provides resiliency to the wings 34. When a brick 16 is inserted in a channel 14 of the panel 10, it is therefore not only retained in place by the friction of the cut-out ends of a corresponding clip against the top side 24 of the brick 16, but also by a resilient force stored in the curved wings 34 of the clip 20, which presses the brick 16 downwardly against the top surface 38 of the clip 20 located below. Preferably, the ends 26 of the wings are bent so as to form a flat engaging surface which will not only resiliently retain the bricks 16 in place in the panel 10, but also allow the bricks 16 to be moved or slid more easily from right to left if a repositioning of the bricks 16 is necessary after its insertion.

[0064] As best shown in FIG. 2A, the thickness of the clips t_c is smaller than the thickness of the bricks t_b to ensure that when mortar is applied around the bricks, the clips are completely hidden, for obvious aesthetic reasons.

[0065] Referring to FIG. 2, the connecting section 32 is preferably devised such that the clips are slightly spaced apart from the panel. This advantageously allows mortar to fill the rear space 30 behind the clips 20 and provide a solid structural connection between the mortar, the clips 20, the panel 10 and the bricks 16.

[0066] Referring to FIGS. 3, 3A and 3B, a third preferred embodiment of a portion of a panel 10 is shown. As in the two previous examples, the panel 10 is also made of metal and has a continuous solid body.

[0067] Just as with the first two examples, the clips 20 are cut-outs formed from a metallic sheet. The cut-outs are L-shaped, and are formed by a connecting section 32, and by a single wing 34 which is bent at several inflexion points 36 to provide the wing 34 its resiliency. Just as the clips shown in FIG. 2, the top surfaces 38 of the connecting sections 32 of the

clips 20 of a given channel 14 form the tabs 18 for the next upper channel 14. As shown, this connection section 32 is preferably flat, in order to facilitate the placement of the bricks 16 onto its upper surface.

[0068] Best shown in FIG. 3A, the ends 26 of the wings 34 are preferably bent in an arc shape, providing each wing 34 with two contact points 40 with the upper lateral face 24 of an inserted brick 16. The bricks 16 are thus retained in place in the panel 10 partly by the resilient force applied by the wings 34, and partly by the friction of the two edges 28 of the arc-shaped ends of the wings 34.

[0069] Now turning to FIGS. 4 and 4A, a fourth preferred embodiment of the invention is shown. The panel 10 is preferably made of molded rigid plastic and has a meshed body. The front face of the panel 10 is made of longitudinal ribs 42 and of partitions 44 connecting the ribs 42, the partitions forming right-angled and inverted triangles. Preferably, the back face 13 of the panel 10 is provided with protrusions located on the ribs 42 that ensure that the panel 10 is spaced apart from the wall on which it is affixed, thereby providing better water drainage and aeration of the construction once completed.

[0070] The longitudinal ribs 42 form channels 14, the channels 14 being delimited by a lower row of spaced-apart tabs 18 and by an upper row of spaced-apart resilient clips 20.

[0071] In this embodiment, the tabs 18 are shaped as shelf-like flanges protruding from the upper portion of the ribs 42, and preferably having a pleated top surface 46, which advantageously provides a better grip with the bottom lateral surface 22 of the bricks 16 to be supported.

[0072] The resilient clips 20 are located on the lower portion of the ribs 42, and linked to the ribs 42 by a connecting medial section 32. The clips 20 are formed by two curved wings 34, which also have their inside surface pleated so as to improve the grip with the bricks 16 when they are pressed in place by the clips 20. In this embodiment, the resiliency of the clips 20 is provided partly by the curvature of the wings 34 and partly by the flexural properties of the plastic used to form the panel 10 and the clips 20. As with the other embodiments presented, the thickness of the clips t_c is smaller than the thickness of the bricks t_b , and so is the thickness of the tabs t_b .

[0073] Referring to FIGS. 5 and 5A, there is shown a fifth preferred embodiment of the invention. For this embodiment, the panel 10 is made of a molded foam plastic such as Polystyrene™ and has a continuous, solid front face 12. The front face 12 is provided with horizontal channels 14. The channels 14 are delimited by an upper row of spaced-apart resilient clips 20 and by a lower row of tabs 18. In this specific embodiment, the tabs 18 correspond to the upper flat surface 38 of the spaced-apart clips 20.

[0074] The clips 20 are integral with the panel 10 and have an inverted V-shape. The wings 34 of the clips 20 are straight. The resiliency of the clips 20 is provided by the compressible nature of the material used for the panel 10, in this case, polystyrene™. The ends of the wings 34 of each clip 20 provide two contact points with the upper lateral surface 24 of the bricks 16, and preferably, two clips 20 are used to retain each brick 16. In this embodiment, the clips 20 are aligned vertically on the panel 10. The tabs 18 supporting the bricks 16 of a given channel, and formed by the upper surface 38 of the clips 20 from the next lower row, are located directly opposite to the clips 20 retaining the bricks.

[0075] Preferably, the panel 10 is provided with arc-shaped protrusions 48 located above each pair of clips 20, to facilitate

water drainage towards the bottom of the panel 10. Still preferably, small vertical protrusions 50 are also formed at the back of the channels 14, to facilitate water drainage, and also to act as a stopper to help position the bricks 16 within the panel 10, in order to ensure that once the panel 10 is filled with bricks 16, they form a flat, uniform surface.

[0076] The clips 20 have a predetermined thickness t_c that is smaller than the thickness t_b of the bricks 16.

[0077] Referring to FIGS. 6 and 6A, there is shown another embodiment of a portion of a panel 10 according to the sixth preferred embodiment of the present invention. In this example, the panel 10 is made of metal and has a continuous solid body. This sixth embodiment is actually a variant of the second embodiment shown in FIG. 2 inasmuch as the clips 20 are formed by two wings 34 having a curved radius, which provides resiliency to the wings 34. The description of FIGS. 2, 2A and 2B applies to FIGS. 6, 6A and 6B. In the variant shown in FIG. 6, the wings 34 are provided with a tab 35 projecting downward. These tabs 35 provide a better grip on a masonry unit inserted between the clips. In this embodiment, the cut-outs made in the metallic sheet to form the clips have an elongated middle portion flanked on both ends by an oval portion. This embodiment is also preferably provided with embossed portions 33 projecting backward from the panel back face. These embossed portions 33 are also provided with a hole on their back part to insert fixation means, for example screws, to affix the panel 10 onto a building wall surface. These screw anchoring features 33 can also act as drainage features. Preferably, the embossed portions have lateral empty sides. They are preferably formed from squeezed cut-outs which are integral with the panel 10.

[0078] Referring to FIGS. 7 and 7A, there is shown another embodiment of a portion of a panel 10 according to the seventh preferred embodiment of the present invention. In this example, the panel 10 is made of metal and has a continuous solid body. This seventh embodiment is actually a variant of the first embodiment shown in FIG. 1 inasmuch as each channel 14 is delimited by a lower row of spaced-apart tabs 18 and by an upper row of spaced-apart resilient clips 20. As on FIG. 1, the clips 20 are offset relative to the tabs 18. Each tab 18 is for supporting the lower lateral face 22 of a respective one of the bricks 16, while each clip 20 is for resiliently biasing or pressing the upper lateral face 24 of the brick 16 against a corresponding tab 18, the tab 18 and clip 20 thereby maintaining the brick 16 in place on the panel 10.

[0079] In this embodiment, the resilient clips 20 and the tabs 18 are cut-outs that are integral with the metallic sheet. The clips 20 are formed from an inverted U-shaped cut-out 29 which is provided with a U-shaped cut extending within the inverted U-shaped cut-out 29 thereby defining a curved hook 37 with a downward semicircular end 26. The U-shaped cut-outs are punched from the back of the sheet into frontward curved hooks 37. In other words, the inverted U-shaped cut 27 delimiting the inverted U-shaped cut-out 29 surrounds each curved hook 37 and provides the necessary resiliency to each clip 20, similarly to a metallic spring strip. This is why, in this preferred embodiment, the inverted U-shaped cut-out 29 can also be referred to as a metallic spring strip 29. As in the embodiment of FIG. 1, the edges or rims 28 of the hook-shaped cut-outs are sharp, so that they can bit into the upper lateral side 24 of the bricks 16 and further retain them by friction. In this particular embodiment, the bottom ends 31 of the inverted U-shaped cut 27 are preferably enlarged portion to facilitate the elastic deformation of the metallic spring strip

29. An alternative way (not represented in the figures) to facilitate the elastic deformation of the metallic spring strip 29 (or inverted U-shaped cut-out 29) would be to design an inverted U-shaped cut-out with a trapezoidal form, wherein the trapezoidal form is larger in its bottom portion.

[0080] In the particular embodiment shown in FIG. 7, the bottom edge of the panel is also provided with a plurality of space-apart recesses 50 of a given size and shape. The panel is further provided with a plurality of projections 52 extending from its top edge and having a shape and size fitting the size and shape of the recesses 50. In use, the projections 52 of a first wall panel fit into the recesses 50 of a second wall panel when the first and second wall panels are juxtaposed on a wall of a building surface (see also FIGS. 11 and 12).

[0081] Referring to FIG. 8, a masonry wall panel 10 according to a further preferred embodiment of the invention is shown. This panel 10 is suitable for building a stone work. As can be appreciated, the tabs 18 and clips 20 are positioned on the panel 10 according to a predetermined pattern of cells of varying sizes adapted to receive different sizes of stones 16. It is worth mentioning that any of the other panels shown in FIGS. 1 to 7 can be adapted to receive masonry units of different sizes without departing from the scope of the present invention. In other words the tabs and clips on these other panels can also be positioned according to a predetermined pattern of cells of varying sizes.

[0082] In a preferred variant of the panel shown in FIG. 8, a pattern of the units to be positioned is imprinted on the panel front face (see FIG. 9). In this variant, the location for each different type of units is identified with no 1, 2, 3, etc in the pattern. Advantageously, this imprinted pattern helps or guides a user during the installation of unit of different sizes. For example, a unit identified with number 1 has to be placed in cell 1 of the pattern whereas a unit identified with number 2 has to be placed in cell 2 of the pattern and so on. Obviously another type of pattern could be used without departing from the scope of the present invention, and such a pattern can also be used with the panels shown in any of FIGS. 1 to 7.

[0083] Referring to FIGS. 10, 10A, 10B and 11, there is shown another preferred embodiment of a panel 10 according to the present invention. In this example, the panel 10 is made of metal and has a continuous solid body. This embodiment is actually a variant of the seventh embodiment shown in FIG. 7. In this particular embodiment, the channels 14 are delimited by a lower row of spaced-apart tabs 18 and by an upper row of spaced-apart resilient clips 20. The clips 20 may be either aligned or offset relative to the tabs 18. As shown in FIGS. 10 and 10A, for a given channel 14, the clips are offset relative to the tabs, while they are aligned for the next channel. Moreover, the clips 20 for a given channel 14 are offset relative to the clips 20 in the next channel. The same apply to the tabs 18. In other words, one can say that a given channel 14 is offset relative to the next channel 14. Such configuration allows having more possibilities for positioning the bricks onto the panel. Also, the configuration can be adapted to suit bricks of different lengths. Each tab 18 is for supporting the lower lateral face 22 of a respective one of the bricks 16, while each clip 20 is for resiliently biasing or pressing the upper lateral face 24 of the brick 16 against a corresponding tab 18, the tab 18 and clip 20 thereby maintaining the brick 16 in place on the panel 10.

[0084] In this embodiment, as more particularly shown in FIGS. 10A and 10B, the resilient clips 20 are similar to the ones described in FIG. 7 except that they are not provided

with the enlarged portions at the bottom ends of the inverted U-shaped cut 27. The tabs 18 are formed of an inverted U-shaped cut-out bent upwardly thereby defining a curved hook which has a similar shape than the curved hook 37 of the clip 20, but in an inverted position. This can be advantageous when manufacturing the panel since the same tool can be used for forming the curved hook of the clips and the tabs.

[0085] In this embodiment, the panel 10 is also provided with a plurality of spaced-apart screw anchoring/drainage features 33 similar to the ones shown and described in FIG. 7. As shown in FIG. 10, the panel includes rows of screw anchoring/drainage features 33 positioned between a row of clips 20 and a row of tabs 18. Preferably, the screw anchoring/drainage features within a row are offset relative to the screw anchoring/drainage features within the next row. This is due to the fact that the channels 14 are offset relative to each other, as described above. This configuration allows multiple anchoring points when fixing the panel to a building wall and is therefore particularly adapted for walls having varying gaps between wall studs. Moreover, this configuration allows limiting the number of anchoring points compared for example to the panel shown in FIG. 7 wherein the clips 20 and the tabs 18 are aligned vertically.

[0086] As for the panel of FIG. 7, the panel shown in FIGS. 10, 10A, 10B and 11 is also provided with recesses 50 and projections 52 on its edges so that the projections 52 of a first panel fit into the recesses 50 of a second panel when two panels are juxtaposed on a wall surface. Preferably, the panel 10 includes two edges with recesses 50 and two edges with projections 52. Such features allow to better align the panels horizontally onto the surface wall, thereby providing a better alignment of the channels 14 from one panel to the next one and of the bricks. These features also allow to better align the panels vertically.

[0087] Referring to FIG. 12, there is shown two juxtaposed panels 10 corresponding to the panel of FIG. 10. In this particular embodiment, the panels 10 are used for building a stone work with stones of different sizes. For these panels, the tabs 18 and clips 20 are positioned according to a predetermined pattern of cells of varying sizes adapted to receive different sizes of stones 16. It is worth noting that in this particular embodiment, some of the stones 16 overlap the two panels 10. Of course, this situation could also happen for any one of the panels previously described. For example, it could be necessary to have masonry units overlapping two panels to suit a specific wall surface size.

[0088] Preferably, a pattern of the units to be positioned could be imprinted on the panel front faces (as shown in FIG. 9). Furthermore, each panel may also be numbered or identified, if many panels are required and that the pattern overlaps two or more panels.

[0089] In accordance with another aspect of the present invention, there is also provided a kit including at least one wall panel as described above and masonry units useful to build up a masonry wall on a surface of building wall.

[0090] A kit would be more particularly advantageous for building a masonry wall with stones and/or bricks of different sizes according to a predetermined pattern. Such a kit may for example include at least one wall panel as shown in FIG. 8 or 12, and masonry units of different sizes to be positioned onto the panel according to the predetermined pattern. The kit may include a plurality of panels and corresponding masonry units.

[0091] Referring to FIGS. 1 to 12, in accordance with another aspect of the present invention, there is also provided a method for making a masonry wall covering a building surface. This method requires a plurality of panels 10 as described above, to be mounted side by side, and row by row if required, onto a building surface. The panels 10 can be affixed to the building using any convenient means, such as screws or the like. A plurality of bricks 16 as described above must also be provided. Each one of the bricks 16 is then fitted onto the panels such that each tab 18 supports the lower lateral face 22 of a respective one of the bricks and each clip 20 resiliently biases the upper lateral face 24 of the brick against a corresponding tab. Each brick is thus maintained in place on the panel 10 by the clips 20 pressing downwardly on the brick 16 against the retaining tabs 18.

[0092] In an embodiment, mortar is then added to the masonry wall to fill the gaps between the bricks 16 to complete the structure.

[0093] It is also worth noting that another preferred embodiment not illustrated, the panel is laminated to a substrate panel such as a foam panel. One advantage with an embodiment provided with a panel laminated to a foam panel is that it can be sold as such, as a ready-to-use isolated wall.

[0094] An advantage of this system is that it doesn't require any adhesive strips or grout in order to maintain the masonry units in place prior to applying mortar between them. Another advantage of such a retaining system compared to other existing retaining systems for thin bricks resides in the fact that the longitudinal channels formed by the clips and tabs are uninterrupted by vertical partitions, allowing bricks of different lengths to be used. In addition, the masonry units are not only retained by friction but also by a resilient force which secures the masonry units more firmly in place in the panel. The panel can advantageously be used with conventional thin clay bricks, and the like, and thus does not need to be employed with bricks that are specially customized for use with the panel.

[0095] Of course, numerous modifications could be made to the embodiments above without departing from the scope of the present invention.

1. A wall panel for retaining masonry units, wherein each one of the masonry units has upper and lower lateral faces and a height h_b , said masonry wall panel being a metallic sheet panel comprising on a front face thereof at least one tab associated with at least one resilient clip for mounting and maintaining a masonry unit, the at least one tab and clip are cut-outs integral with the metallic sheet panel, said at least one tab being capable of supporting the lower lateral face of the masonry unit, said at least one clip comprising a frontward curved hook with a downwardly pointing edge to bite on the upper lateral face of the masonry unit and an inverted U-shaped cut-out including the curved hook and providing resiliency to said hook, said resilient clip being for resiliently biasing the upper lateral face of said masonry unit against the at least one tab, the at least one tab and at least one clip thereby maintaining said masonry unit in place on the panel.

2. The wall panel of claim 1, wherein the curved hook and the inverted U-shaped cut-out are formed from a single continuous cut thereby defining a finger-shaped hook having a semicircular end.

3. The wall panel of claim 1, wherein the curved hook is formed from a U-shaped cut extending within the inverted U-shaped cut-out.

4. The wall panel of claim 3, wherein the inverted U-shaped cut-out is formed from an inverted U-shaped cut having enlarged portions at bottom ends thereof to provide further resiliency to the resilient clip.

5. The wall panel of claim 3, wherein the inverted U-shaped cut-out is formed from an inverted U-shaped cut having a trapezoidal form.

6. The wall panel of claim 1, wherein the at least one tab has an upwardly slanted shelf portion extending at an angle [theta] to the front face of the panel that is slightly below 90[deg.], thereby forming an acute angle with the front face of the panel.

7. The wall panel of claim 1, comprising a plurality of tabs forming at least one lower row of tabs and a plurality of resilient clips forming at least one upper row of clips, said lower and upper rows thereby defining at least one horizontally extending channel capable of receiving a row of masonry units.

8. The wall panel of claim 7, comprising a plurality of horizontally extending channels which are positioned contiguously to each other from a top edge of the wall panel to a bottom edge thereof.

9. The wall panel of claim 7, wherein the tabs and clips are regularly spaced apart in their respective row and the clips are offset relative to the tabs.

10. The wall panel of claim 7, wherein the rows of tabs and rows of clips forming the channel are spaced apart so that a distance between an upper side of the tab and the pointing edge of the hook is slightly smaller than the height hb of the masonry unit.

11. The wall panel of claim 1, wherein a plurality of tabs and clips are positioned according to a predetermined pattern of cells of varying sizes adapted to receive masonry units of different sizes.

12. The wall panel of claim 11, wherein a pattern of the masonry units to be placed onto the panel is imprinted on the front face thereof.

13. The wall panel of claim 1, further comprising a plurality of spaced-apart recesses of a given size and shape provided on a first edge of said panel and a plurality of projections extending from a second edge of said panel parallel to said first edge, said projections having a shape and size fitting said given size and shape of the recesses whereby, in use, the projections of a first one of said wall panel fit into the recesses of a second one of said wall panel when the first and second wall panels are juxtaposed on a wall of a building surface.

14. The wall panel of claim 1, further comprising a plurality of spaced-apart embossed portions projecting backward from a back face of said panel, wherein said embossed portions comprise a back provided with a hole for inserting fixation means therein.

15. The wall panel of claim 14, wherein said embossed portions are positioned by rows, each embossed portion within a row being offset relative to each embossed portion within a next row.

16. A kit comprising at least one wall panel as defined in claim 11 and masonry units of different sizes to be positioned onto the panel according to the predetermined pattern.

17. A method for making a masonry wall covering a building surface, this method comprising the steps of:

- a) mounting a plurality of panels as defined in claim 1 to a building surface, side by side; and if required row by row;
- b) providing a plurality of masonry units; and

c) fitting the masonry units onto the panels such that each tab supports the lower lateral face of a respective one of the masonry units and each clip resiliently biases the upper lateral face of the masonry unit against a corresponding tab, the tab and clip thereby maintaining the masonry unit in place on the panel.

18. A wall panel for retaining masonry units, wherein each one of the masonry units has upper and lower lateral faces, and wherein said masonry wall panel has a front face extending in a vertical plane, said front face comprising at least one tab associated with at least one resilient clip for mounting and maintaining a masonry unit, said at least one tab being capable of supporting the lower lateral face of the masonry unit, said at least one clip comprising at least one downward resilient wing having a longitudinal axis which is parallel to the vertical plane of the front face, said masonry unit being maintained in place on the panel against the at least one tab, partly by a resilient force applied by the wing and partly by friction of the wing against the upper lateral face of said one masonry unit.

19. The wall panel of claim 18, wherein said wall panel is a metallic sheet panel and said clip comprises one resilient wing formed from a L-shaped cut-out, an end portion of said L-shaped cut-out being left uncut thereby forming a connecting section between the wall panel and the clip once the clip is bent perpendicularly relative to the panel and wherein said L-shaped cut-out comprises several inflexion points along its longitudinal axis providing resiliency to said wing.

20. The wall panel of claim 18, wherein said wall panel is a metallic sheet panel and said clip comprises two of said resilient wings formed from a substantially rectangular oblong-shaped cut-out, a middle portion of said rectangular-shaped cut-out being left uncut thereby forming a connecting section between the wall panel and the clip once the clip is bent perpendicularly relative to the panel and wherein each of the two wings is further bent at at least one point of inflexion along its longitudinal axis.

21. The wall panel of claim 20, wherein each of the two wings is further provided with a tab projecting downward at an end thereof to bit the upper lateral face of the masonry unit once in place on the wall panel.

22. The wall panel of claim 18, comprising a plurality of resilient clips forming at least one upper row of clips and a plurality of resilient clips forming at least one lower row of clips with said connecting section of the clips of the lower row acting as said tab capable of supporting the lower lateral face of the masonry unit, said lower and upper rows thereby defining at least one horizontally extending channel capable of receiving a row of masonry units.

23. The wall panel of claim 18, wherein said wall panel is made of molded rigid plastic comprising a plurality of said resilient clips and a plurality of said tabs, said clips comprising two of said downward wings flanking a medial section molded to the front face.

24. The wall panel of claim 23, having a meshed body and comprising on its front face longitudinal ribs having upper and lower portions, and web members interconnecting the ribs, and wherein said clips are located on the lower portion of the ribs and said tabs are shaped as a shelf-like flange protruding from the upper portion of the ribs.

25. The wall panel of claim **23**, wherein the tabs have a pleated top surface and the wings have a pleated bottom surface to increase the friction of the tabs and wings against the lower and upper lateral faces of the masonry unit respectively.

26. The wall panel of claim **18**, wherein said wall panel is made of molded foam plastic comprising a plurality of said resilient clips and a plurality of said tabs, and has a continuous solid body, said clips comprising two of said downward wings flanking a medial section molded to the front face.

27. The wall panel of claim **26**, comprising a plurality of resilient clips forming at least one upper row of clips and a plurality of resilient clips forming at least one lower row of clips with said medial section of the clips of the lower row acting as said tab capable of supporting the lower lateral face of the masonry unit, said lower and upper rows thereby defining at least one horizontally extending channel capable of receiving a row of masonry units.

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