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(71) Applicant: **Masonry Support Systems Limited**
Swadlincote, Derbyshire DE11 9EU (GB)

(72) Inventor: **Coyle, Owen**
Swadlincote, DE11 9EU (GB)

(74) Representative: **Hanna, John Philip**
Hanna IP
4th Floor
58 Howard Street
Belfast BT1 6PJ (GB)

(54) **A COVERING ELEMENT SUPPORT ARRANGEMENT**

(57) The present invention relates to the field of supporting covering elements of a cladding panel for a building exterior. A covering element support arrangement (1) for attaching covering elements (3) to a building and/or a building component having a carrier means (2) for receiving covering elements (3) thereon, the carrier means (2) comprising a metal plate comprising a plurality of apertures (10) disposed thereon for being engaged by mechanical fastening means (5a) for fixing the covering elements to the carrier means, wherein the plurality of apertures (10) are aligned in a predetermined bond pattern.

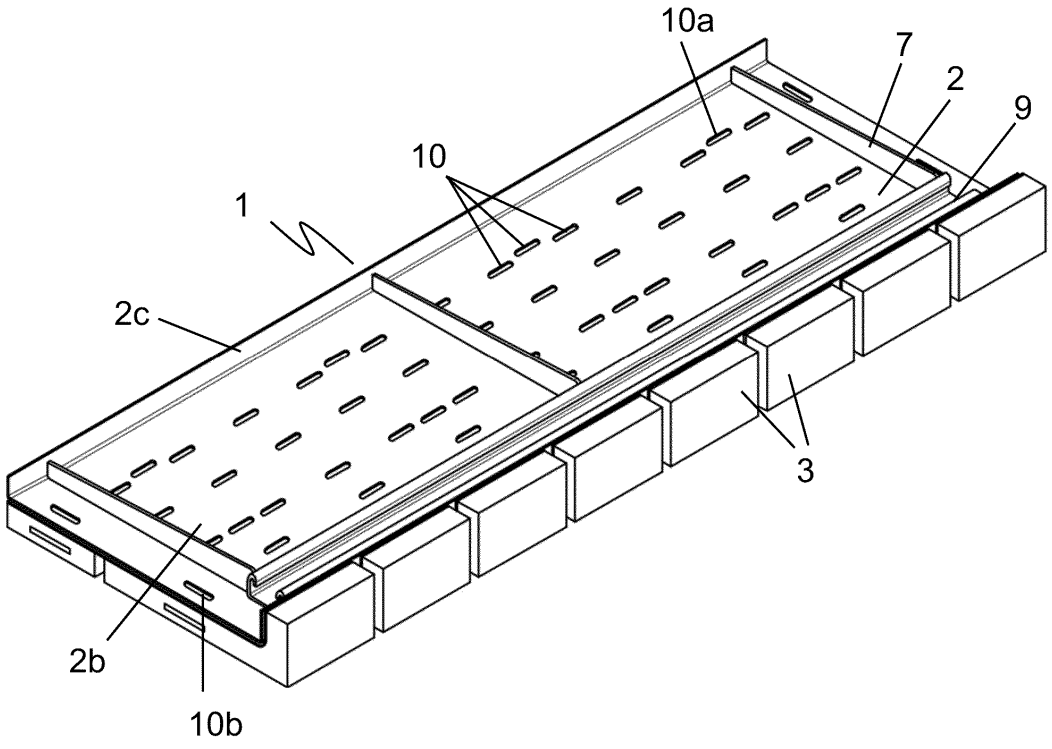

Figure 8

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Description

BACKGROUND

[0001] The present invention relates to a covering element support arrangement for allowing covering elements to be securely attached to a building or building component.

[0002] In construction, there has been an increasing trend towards the use of masonry slips, such as brick slips, which are often bonded to carriers, and then mounted on a face of a building. Such arrangements can be used, for example, in cladding panels or lintels to form parts of the fascia or soffit of a building. Masonry slip arrangements can be prefabricated before transporting to a site for installation and this reduces the amount of onsite time required to construct a building. Additionally, masonry slips arranged as ornate features, such as arched lintels, replaces onsite crafting, which can often be time consuming and require a high level of skill. Construction companies can produce entire building facades and sidings, composed of a plurality of masonry slip units, within a factory in a quality-controlled setting before transporting and assembling on site.

[0003] Concerns are being raised by certain sectors that the connection between the masonry slips and the carrier will weaken over time and the slips may come loose and fall from height. This is particularly concerning when the masonry slips form a part of a soffit and are therefore located vertically beneath the carrier, as gravity is constantly pulling the masonry slips away from the backing board. To mitigate this risk, there have been some recent improvements in how slips are bonded to carriers. In some arrangements, slips are bonded to a carrier using epoxy resins or mortar and mechanical fastening means.

[0004] Where a steel carrier formed from one or more steel sheets is used, one method is to initially measure the location of holes and then drill the carrier with holes to receive mechanical fixes. The slips must then be aligned with the holes before being fixed to the carrier. This process is time consuming as there is minimal allowance for error. If the slip is not correctly aligned with the pre-drilled hole, then another hole must be drilled before a mechanical fix can be applied. Therefore, the process is relatively inefficient due to minor misalignments requiring further drilling of the carrier. Additionally, some prior art brackets used in fixing adjacent slips to a carrier are sized and shaped such that they fill the space between the adjacent slips. wherein a portion of the bracket that is located between adjacent slips is equal to the gap between the slips. These brackets can be slid along the gap between the slips, but they cannot be manoeuvred in any other direction. If the hole in the carrier that is used to fix the bracket to the carrier is not located in the centre between two slips, then the bracket will simply not fit into place and cannot be manoeuvred into position. This can lead to further requirements for realignment of the slips on the carrier and/or drilling of new holes.

[0005] Another example in the prior art involves fixing a cementitious and/or composite backing board to a carrier, applying mechanical fixings such as screws through the covering element and into the backing board thereby fixing the covering element to the carrier. An advantage of this approach is that the cementitious and/or composite backing plate presents a continuous area over which mechanical fixings such as screws can be applied into the backing board, allowing flexibility regarding the placement of such screws upon installation of the covering elements to the carrier and meaning for example that any number of bond patterns can be used on the carrier. However, one problem with this approach is that securing mechanical fixings into mortar can be tricky and time consuming, requiring either pre-drilling to establish pilot holes which then have to be carefully aligned with the gaps in the covering elements allowing minimal allowance for error or else requiring use of self-tapping screws and specialised drills which can become unwieldy in the installation procedure when a high degree of precision is required. A further problem with the use of a cementitious and/or composite backing plate is that these materials can be subject to corrosion in certain environments, for instance in areas near saltwater and areas where acidic rain is common. Finally, mechanical fixings applied into cementitious and/or composite backing boards can become entirely obscured by the backing material itself making it difficult for the person installing the covering element onto the carrier (or a person later assessing the building for safety) to verify the quality of the connection between the mechanical fixing and the backing board, which is a safety concern particularly when the building component is subject to vibrations (which are particularly damaging for connections formed by mechanical fixings in cementitious material), repeated temperature changes and a poor initial screw installation which may result in the fixing loosening or failing altogether.

[0006] A further example solution in the prior art involves use of a perforated sheet attached to the carrier in addition to the cementitious and/or composite backing plate; applying mechanical fastenings such as screws through the covering elements and the perforations of the perforated sheet and perhaps additionally into a cementitious and/or composite backing board or boards. An adhesive fastening means such as epoxy can be applied to the perforated sheet before the mechanical fastening is applied therethrough, or the mechanical fastening can be used without an adhesive fastening. An advantage of this approach is that the perforated sheet can be so designed that the density and geometry of the perforations allow for a continuous region for fastening mechanical and/or adhesive fastenings into/onto the perforated sheet. This means that the mechanical fastenings/fixings need not be initially aligned relative to any one perforation, the perforations additionally allowing effective distribution of an adhesive over the fastening interface of the mechanical fastenings and the perforated sheet and/or

cementitious and/or composite backing. In addition to the problems already discussed in relation to the cementitious and/or composite backings, other problems exist with this approach, namely that forming a continuous area over which a mechanical fixing may be applied requires a high density of perforations which may overly decrease the strength of the perforated sheet at the position in which the mechanical fixing is applied and weaken the overall arrangement. Additionally, despite a continuous area of the perforated sheet being suitable for applying a mechanical fixing therein, it is still necessary to correctly align the mechanical fixing with a single perforation which may become awkward during installation when visibility of the carrier is reduced.

[0007] It is an object of the present invention to obviate or mitigate the problems outlined above. In particular, it is an object of the invention to reduce reliance on cementitious and/or composite materials for backing boards.

[0008] It is a yet further object of the invention to provide a quicker, easier and more effective way to attach masonry slips to carriers.

SUMMARY OF THE INVENTION

[0009] Accordingly, the present invention provides a covering element support arrangement for attaching covering elements to a building and/or building component, the covering element support arrangement comprising a carrier means for receiving covering elements thereon. The covering element support arrangement may comprise an attachment means for attaching the covering elements to the carrier means, the attachment means comprising a mechanical fastening means that can be fastened to the carrier means and that is engageable with covering elements to fix the covering elements to the carrier means. The carrier means is formed at least partially from/comprises a metal plate comprising a plurality of apertures disposed thereon, the mechaniTcal fastening means being engageable with the apertures.

[0010] Advantageously, the use of mechanical fastening means allows covering elements, such as masonry slips, to be more readily mechanically fixed to a carrier means to provide a strong support arrangement potentially in tandem with the use of fire rated adhesives.

[0011] Ideally, the plurality of apertures are disposed on the metal plate in an accurate pattern. Advantageously, use of an accurate pattern of apertures disposed on the metal plate decreases the need for alignment of the apertures with the mechanical fastening means since the pattern can be such that apertures present at the positions where the mechanical fastening means act.

[0012] Ideally, the plurality of apertures are arranged in a predetermined bond pattern. The accurate pattern may be the predetermined bond pattern.

[0013] By 'predetermined bond pattern' we mean that the apertures disposed on the metal plate are located, oriented, sized and/or shaped to permit attachment, using the mechanical fastening means, of the covering elements to the carrier means in a predetermined covering element bond pattern, for example a running brick bond pattern.

[0014] Advantageously, a predetermined bond pattern of the apertures reduces labor-intensive on-site work such as measuring and marking locations for forming apertures in the metal plate and manual drilling, and therefore this measure enhances project throughput, achieved by leveraging high-volume factory prefabrication methods and facilities which are better suited for this form of fabrication than a construction site, prior to onsite installation.

[0015] The apertures forming the predetermined bond pattern may be elongate apertures. The elongate apertures may comprise a major axis, wherein the major axes of at least some of the elongate apertures are oriented in a longitudinal direction of the metal plate of the carrier means.

[0016] Ideally, the predetermined bond pattern enables the covering elements to be arranged in a plurality of bond patterns. Ideally, the predetermined bond pattern of the apertures comprises multiple bond patterns. By this we mean that the apertures of the metal plate are located, oriented, sized and/or shaped to permit attachment, using the mechanical fastening means, of the covering elements to the carrier means in more than one predetermined covering element bond pattern, for example a running brick bond pattern and a common/American brick bond pattern.

[0017] Advantageously, the multiple bond patterns being suitable for use with more than one predetermined covering element bond pattern reduces the number of unique designs of carrier means that need to be produced and supplied thereby saving costs and simplifying the use of the carrier on site.

[0018] Ideally, the predetermined bond pattern comprises one or more bond patterns most common in a specific geographical location.

[0019] Ideally, the metal plate comprises a planar surface for receiving one or more covering elements thereon. The planar surface may comprise some or all of the plurality of apertures.

[0020] Ideally, the metal plate comprises two planar surfaces for receiving one or more covering elements thereon. The two planar surfaces may each comprise apertures of the plurality of apertures. The apertures may be arranged in the predetermined bond pattern. The two planar surfaces may be disposed at an angle to one another. A first of the two planar surfaces may be suitable for receiving one or more covering elements thereon for forming a soffit surface of a building. A second of the two planar surfaces may be suitable for receiving one or more covering elements thereon for forming a face surface of a building.

[0021] Ideally, at least some of the plurality of apertures are arranged in a row extending longitudinally along the metal plate. The apertures arranged in the row may be generally spaced apart over a longitudinal dimension of

the metal plate. The row of apertures may form at least part of the predetermined bond pattern. The apertures in the row may be aligned with one another.

[0022] Ideally, at least some of the plurality of apertures are arranged in a plurality of rows extending longitudinally along the metal plate. The apertures of each row may be generally spaced apart over a longitudinal dimension of the metal plate. The plurality of rows may be generally spaced apart from one another over a width dimension of the metal plate. The rows of apertures may form at least part of the predetermined bond pattern. The apertures in the rows may be aligned with one another.

[0023] By 'generally spaced apart' we mean that the apertures of the rows and/or the rows themselves are separated from one another by substantially constant distances along the longitudinal dimension and/or width dimension of the metal plate.

[0024] Ideally, the apertures arranged in the plurality of rows extend longitudinal along the metal plate, wherein the apertures of each row being generally spaced apart over a longitudinal dimension of the metal plate and wherein a plurality of the rows being generally spaced apart from one another over a width dimension of the metal plate and wherein one or more of the rows being spaced a relatively smaller distance in the width dimension from one or more of the plurality of generally spaced apart rows.

[0025] By 'relatively smaller distance' we mean a smaller distance compared with the spacing of the plurality of generally spaced apart from one another over the width dimension.

[0026] Ideally, the plurality of rows extending longitudinally along the metal plate are parallel rows extending longitudinally along the metal plate.

[0027] Ideally, the apertures of the one or more rows are equispaced over a longitudinal dimension of the metal plate.

[0028] Ideally, the plurality of rows are equispaced over a width dimension of the metal plate.

[0029] Ideally, the apertures of the one or more rows are substantially uniformly distributed over a portion of a longitudinal dimension of the metal plate.

[0030] By 'substantially uniformly distributed' in respect of the portion of the longitudinal dimension of the metal plate we mean that the separation between apertures of the one or more rows are approximately equal and are equal to a value of the length of the portion of the longitudinal dimension of the metal plate divided by the number of apertures of the one or more rows.

[0031] Ideally, the apertures of the one or more rows are substantially uniformly distributed over a longitudinal dimension of the metal plate.

[0032] By 'substantially uniformly distributed' in respect of the longitudinal dimension of the metal plate we mean that the separation between apertures of the one or more rows are approximately equal and are equal to a value of the longitudinal dimension of the metal plate divided by the number of apertures of the one or more rows.

[0033] Ideally, the plurality of rows are substantially uniformly distributed over a portion of a width dimension of the metal plate.

[0034] By 'substantially uniformly distributed' in respect of the portion of the width dimension of the metal plate we mean that the separation between the plurality rows are approximately equal and are equal to a value of the width of the portion of the width dimension of the metal plate divided by the number of rows.

[0035] Ideally, the plurality of rows are substantially uniformly distributed over a width dimension of the metal plate.

[0036] By 'substantially uniformly distributed' in respect of the width dimension of the metal plate we mean that the separation between the plurality rows are approximately equal and are equal to a value of the width dimension of the metal plate divided by the number of rows.

[0037] Ideally, at least some of apertures are located adjacent two opposing longitudinal edge portions of the metal plate. These apertures may form at least part of the predetermined bond pattern.

[0038] Ideally, the apertures located adjacent two opposing longitudinal edge portions of the metal plate extend widthwise across the metal plate adjacent each of the two opposing longitudinal edge portions of the metal plate. The plurality of apertures may be generally spaced apart over a width dimension of the metal plate.

[0039] Ideally, the apertures located adjacent two opposing longitudinal edge portions of the metal plate are arranged in a row extending widthwise across the metal plate.

[0040] Ideally, the apertures located adjacent two opposing longitudinal edge portions of the metal plate are arranged in a staggered group extending widthwise across the metal plate. Advantageously, this occurs when the metal plate is a carrier for certain predetermined covering element bond patterns such as the stretcher bond.

[0041] Ideally, apertures of the plurality of apertures extending widthwise across the metal plate adjacent each of the two opposing longitudinal edge portions of the metal plate are equispaced over a width dimension of the metal plate.

[0042] Ideally, apertures of the plurality of apertures extending widthwise across the metal plate adjacent each of the two opposing longitudinal edge portions of the metal plate are substantially uniformly distributed over a width dimension of the metal plate.

[0043] Ideally, the one or more rows of apertures aligned in a longitudinal direction of the metal plate of the carrier means comprise one or more clusters of apertures generally spaced apart over a longitudinal dimension of the metal plate.

[0044] Ideally, the one or more clusters of apertures are substantially equispaced along a longitudinal dimension of the metal plate of the carrier means.

[0045] Ideally, the one or more clusters of apertures are formed of two of the rows of apertures extending longitudinally along the metal plate being aligned in a single row extending longitudinally along the metal plate.

[0046] Ideally, the one or more clusters of apertures are formed of two rows of apertures extending longitudinally along the metal plate being aligned in a single staggered row extending longitudinally along the metal plate.

[0047] Ideally, one or more apertures of the generally spaced apart rows are located at the same longitudinal position of the metal plate of the carrier means.

[0048] Ideally, the apertures disposed on the metal plate are apertures extended in size. This may mean that the opening of the apertures are larger than the mechanical fastening means for engaging therewith such that the mechanical fastening means can engage the apertures at a plurality of positions in the apertures.

[0049] As such, the use of extended apertures allows for flexibility regarding slight adjustments necessary during installation.

[0050] Ideally, the apertures are formed by any suitable metal cutting method such as laser cutting.

[0051] Advantageously, employing metal cutting methods such as laser cutting reduces labour-intensive on-site work such as manual drilling, and therefore enhances project throughput, achieved by leveraging high-volume metal cutting methods and facilities prior to on-site installation.

[0052] Ideally, the mechanical fastening means comprises a bracket for fixing two adjacent covering elements to the carrier means. The bracket may be engageable with the two adjacent covering elements for fixing said adjacent covering elements to the carrier means. The mechanical fastening means may comprise a plurality of brackets.

[0053] Ideally, each aperture provides an attachment means receiving means.

[0054] Ideally, the bracket may be configured such that it is manoeuvrable laterally between adjacent covering elements when located in the gap between covering elements and/or is rotatable about its axis when located between two adjacent covering elements such that it can be maneuvered to align with an attachment means receiving means on the carrier means to enable fixing thereto. Advantageously again, the installer can maneuver the bracket in multiple directions relative to the covering elements to align the bracket with an attachment means receiving means of the carrier means. In prior art systems the bracket can only be moved longitudinally in the gap between covering elements by sliding it along the groove in the sides of the covering elements. Manoeuvrability is thereby dependent on the length of the groove extending along the edge of the covering elements. By configuring the bracket such that it can be moved laterally or rotated relative to the covering element, the length of the groove in the covering element can be reduced because manoeuvrability of the bracket is no longer dependent wholly on the length of the groove. The covering elements are thereby quicker and easier to produce. The enhanced manoeuvrability of the bracket further removes the requirement for careful alignment of the attachment means receiving means relative to the covering means and so this saves time and effort in fixing covering elements to the carrier means.

[0055] Preferably the apertures can receive an adhesive, mechanical fixing, or both. Advantageously, use of an adhesive can be useful when the dimensions, as an example the thicknesses, of the covering elements are not uniform as the adhesive can act as a levelling agent to adjust the covering elements to ensure they sit flush against one another.

[0056] Ideally, the covering element support arrangement comprises a layer of adhesive coating the metal plate engageable with covering elements to fix the covering elements to the carrier means.

[0057] Ideally, at least part of the layer of adhesive can be forced through the plurality of apertures to create a gripping arrangement on an opposing side face of the metal plate.

[0058] Preferably the carrier means comprises an accurate and repeating regular pattern of apertures over at least a part of one face of the carrier means. The accurate and repeating regular pattern of apertures may be the predetermined bond pattern as referred to above.

[0059] Preferably the carrier means comprises an accurate and repeating regular pattern of apertures over substantially all of one face of the carrier means. The accurate and repeating regular pattern of apertures may be the predetermined bond pattern as referred to above.

[0060] Preferably the carrier means comprises an accurate and repeating regular pattern of apertures over substantially all of the carrier means. The accurate and repeating regular pattern of apertures may be the predetermined bond pattern as referred to above.

[0061] Advantageously, the accurate and repeating regular pattern of apertures is such that one design of the carrier means is suitable for use with all of the most common brick bond patterns such as stretcher and soldier courses, since the carrier can be designed to present a sufficient number of apertures in the gaps between covering elements for adequate fastening of the covering elements to the carrier. Furthermore, small adjustments are able to be accommodated if needed by utilising the extended geometry of the apertures in combination with the manoeuvrability of the brackets. Further advantageously, the accurate and repeating regular pattern of apertures and their extended geometry being suitable with all of the most common brick bond patterns reduces the number of unique designs of carrier that need to be produced and supplied thereby saving costs and simplifying the use of the carrier on site. Yet further advantageously, as an accurate and repeating regular pattern of apertures is used it is easy to automate the process of forming the apertures on the carrier and this removes the requirement for manually drilling apertures/holes/perforations in the carrier means.

[0062] Ideally, the dimensions and arrangement of the accurate pattern of apertures are able to be altered during design of the carrier prior to manufacturing. Advantageously, being able to alter the dimensions and arrangement of the pattern allows the carrier to easily be redesigned to suit geographical regions in which different brick sizes are standard and different bond patterns more common than others.

[0063] Ideally, less than 50% of the area of the carrier means, in one example the metal plate, is open, wherein 'open' is intended to mean having an absence of material, that is, an aperture.

[0064] Ideally, less than 20% of the area of the carrier means is open.

[0065] Ideally, less than 10% of the area of the carrier means is open.

[0066] Ideally, more than 1 % of the area of the carrier means is open.

[0067] Advantageously, reducing the percentage of the carrier means that is open increases the strength of the carrier means and reduces the likelihood that the carrier will break when the covering elements are applied thereon. Advantageously, having a lower limit on the open area of the carrier allows enough open area to form a pattern of apertures that is suitable for use with all common bond patterns and suitable to be adjusted small amounts during installation by providing sufficiently numbering and sufficiently sized apertures.

[0068] Ideally, the apertures are elongate apertures.

[0069] Ideally, the apertures are obround in shape.

[0070] Ideally, the radiuses of the rounded edges of the obround apertures are approximately between 1 and 10 mm.

[0071] Ideally, the length of the major axis of the obround apertures is approximately between 10 and 50mm. Advantageously this allows for sufficient lateral adjustment of the covering elements on the carrier.

[0072] Preferably, the length of the minor axis of the obround apertures is approximately between 2 and 20mm. Advantageously, adjustability in the sagittal direction is provided if needed by the slots formed in the side of the carrier elements and so restricting the length of the minor axis can be used to decrease the open area on the carrier and increase its strength.

[0073] Preferably, the distance between the adjacent apertures is approximately greater than 5mm. Advantageously, a minimum separation between apertures ensures there is an acceptably low risk of adjacent apertures coalescing or the carrier failing otherwise by its susceptibility to mechanical stresses.

[0074] Preferably, the apertures are sized to receive a fixing means. The fixing means may be for fastening the mechanical fastening means to the carrier means.

[0075] Preferably, the fixing means are rivets.

[0076] Preferably, the apertures are sized to allow adhesive material to pass therethrough.

[0077] Preferably, the apertures in the carrier means provide predetermined positions for the mechanical fastening means.

[0078] Ideally, one or more covering elements are attached to the carrier means.

[0079] Preferably, the covering elements are slips such as brick, block or stone slips, or glass-reinforced plastic slips.

[0080] Ideally, the, or each, covering element includes an interior face for attachment to the carrier means, an exterior face opposite the interior face and a plurality of peripheral edge faces connecting the interior face and the exterior face. The interior face may be attached to the carrier means in a planar adjoined relationship with a planar surface of the metal plate.

[0081] Ideally, the one or more covering elements comprise a soffit- and/or face-forming exterior face.

[0082] Ideally, the soffit- and/or face-forming exterior face of the one or more covering elements are planar.

[0083] Ideally, the one or more covering elements comprise an interior face attached to the carrier means in a planar adjoined relationship with a second planar surface of the metal plate.

[0084] Ideally, the one or more covering elements are L-shaped.

[0085] Ideally, the one or more interior faces of the covering elements are attached to the carrier means in a planar-abutting relationship with the one or more planar surfaces of the metal plate.

[0086] Ideally, the one or more interior faces of the covering elements are separated from the planar surfaces of the metal plate by a layer of adhesive.

[0087] Preferably, the mechanical fastening means is/are made from corrosion-resistant material.

[0088] Ideally, the mechanical fastening means is/are formed from metal, most preferably steel, most preferably stainless steel.

[0089] Preferably, the or each bracket comprises a base that is fixable to the carrier means.

[0090] Ideally, the bracket is fixable to the carrier means and can (at the same time) engage with at least one covering element to fix the covering element to the carrier means.

[0091] Preferably, the or each bracket can engage with two adjacent covering elements to fix the two adjacent covering elements to the carrier means.

[0092] Ideally, the or each bracket can be fixed to the carrier means and can engage with two adjacent covering elements in more than one orientation relative to the covering elements.

[0093] Advantageously, the installer can re-orientate the bracket if the bracket does not align with an aperture on the carrier means.

[0094] Ideally, the or each bracket can be fixed to the carrier means and be engaged with two adjacent covering elements in more than one axial orientation relative to the covering elements. Advantageously, this ensures sufficient engagement with the adjacent covering elements to support their weight while also allowing the brackets to align with the attachment means receiving

means adequately.

[0095] Ideally, the base abuts the carrier means in use.

[0096] Preferably, the base of the or each bracket is planar.

[0097] Preferably, the base of the or each bracket comprises an aperture, hole or slot for allowing a fixing means to pass therethrough.

[0098] Ideally, the base of the or each bracket comprises an elongate aperture. The elongate aperture is for allowing a fixing means to pass therethrough.

[0099] Advantageously, the elongate aperture provides further manoeuvrability of the bracket relative to the covering elements when fixing the bracket to the covering means, as the axis of the aperture of the bracket does need to be exactly coaxial with the aperture in the carrier means to enable fixing thereto, and some amount of misalignment is tolerable. This means that manoeuvrability of the or each bracket is permitted in a direction non-coaxial with an aperture of the carrier means, for example in a direction perpendicular to the aperture of the carrier means.

[0100] Preferably, the or each bracket comprises an engagement means for engaging with one or more covering elements.

[0101] Ideally, the engagement means is a planar engagement means.

[0102] Preferably, the engagement means is shaped such that it does not obscure the view of the base of the bracket in use.

[0103] Ideally, the engagement means is shaped with cut out material such that it does not obstruct the application of a mechanical fixing and tool for applying the mechanical fixing through the aperture on the base of the bracket. Advantageously, this makes for easier installation of a mechanical fixing such as a rivet by easier use of a rivet gun.

[0104] Preferably, the engagement means is generally U-shaped.

[0105] Ideally, the engagement means is shaped to extend between a slot in a first covering element to a slot in an adjacent second covering element.

[0106] Preferably, the engagement means of the or each bracket comprises a free end for engaging a slot in a first covering element, and at least one prong for engaging a slot in a second covering element. Most preferably, the first covering element and second covering element are neighbouring covering elements.

[0107] Preferably, the free end is integrally connected to the or each prong.

[0108] Preferably, the engagement means of the or each bracket has two prongs.

[0109] Preferably, the engagement means of the or each bracket has a face with a cut out region to allow greater access to the aperture in the or each bracket.

[0110] Ideally, the engagement means comprises a circularly shaped opening axially aligned with a central axis of the aperture, hole and/or slot of the base of the or each bracket to allow greater access to the aperture in the or each bracket.

[0111] Ideally, a portion of the bracket extends from the engagement means towards the carrier means in use.

[0112] Preferably, the or each bracket comprises a pillar for connecting the base to the engagement means. The or each bracket may comprise a single pillar.

[0113] Advantageously, using a single pillar means that part of the second covering element may be located over the base of the bracket in use. Prior art brackets have a base and two mutually opposing pillars extending upwards from the base to two free engaging ends. The pillars of these brackets must be positioned abutting each covering element as the distance between the pillars defines the size of the gap between the covering elements. The bracket cannot be rotated relative to the covering elements because the two mutually opposing pillars abut the adjacent covering elements. These arrangements can make it difficult for the manufacturer to align the bracket with a perforation on the carrier means. The perforations in the carrier and the brackets must be precisely aligned before attaching the masonry slips to the carrier. Time must be taken to ensure that this is done correctly, and the possibility of errors cannot be ruled out. By providing a bracket with a single pillar, the bracket location can be adjusted such that the pillar is not abutting either covering element, and the gap between covering elements is not defined by the gap between the pillars of the bracket(s). The single pillar does not need to be parallel to the plane of the side of either covering element and may even be installed extending diagonally relative to the plane of the side of the covering elements.

[0114] Preferably, the length of the or each pillar corresponds to the distance between the interior face and the slot of the covering element.

[0115] Preferably, the length of the or each pillar is between about 5 mm to 25 mm.

[0116] Preferably, the length of the or each pillar is between about 10 mm to 15 mm.

[0117] Preferably, the or each bracket is made from a sheet having a plurality of bends.

[0118] Preferably, a first bend defines the joint between the base and the pillar.

[0119] Preferably, a second bend defines the joint between the pillar and the engagement means.

[0120] Preferably, the bracket base, engagement means and pillar are integrally formed.

[0121] Preferably, the base and engagement means are connected to the pillar at opposing ends of the pillar.

[0122] Preferably, the base extends from the pillar in a first direction.

[0123] Preferably, the free end extends from the pillar in a second direction.

[0124] Preferably, the or each prong extends from the free end in the first direction.

[0125] Preferably, the or each bracket base is located between the two prongs at the opposite end of the pillar to the engagement means.

[0126] Preferably, each covering element has a thick-

ness of about 25 mm to 35 mm.

[0127] Ideally, the or each covering element includes a slot in one or more of the peripheral edges of said covering element for receiving at least a portion of the attachment means.

[0128] Ideally, the or each slot is located between about 10 mm to 15 mm from the interior face of the covering element.

[0129] Preferably, the carrier means comprises at least one generally planar surface.

[0130] Preferably, the carrier means is made from steel, especially stainless steel.

[0131] Preferably, the carrier means is between about 1 mm to 10 mm thick.

[0132] Preferably, the carrier means is formed at least partially by a flat, bent or curved metal plate or sheet.

[0133] Ideally, the carrier means includes at least one bend.

[0134] Ideally, the carrier means is generally L-shaped.

[0135] Preferably, the carrier means has a soffit surface.

[0136] Ideally, the carrier means has an upstanding planar surface.

[0137] Ideally, the soffit surface is substantially perpendicular to the upstanding planar surface.

[0138] Ideally, the upstanding planar surface is a face surface.

[0139] Ideally, one or more covering elements may be attached to the soffit surface and/or the upstanding planar surface.

[0140] Ideally, the carrier means is adapted to receive covering elements in a plurality of positions and/or configurations.

[0141] Preferably, the covering elements are mechanically fixed and/or adhesively bonded to the carrier means.

[0142] Preferably, the attachment means further comprises adhesives.

[0143] Preferably, the adhesive comprises an epoxy, polymer-modified adhesive and/or mortar.

[0144] Preferably, the attachment means comprises at least one end clip for attaching one end of a peripheral covering element to the covering element support arrangement. A peripheral covering element may be located at a longitudinal edge portion of the planar portion of the metal plate.

[0145] Preferably, the or each end clip is made from 1 mm stainless steel sheet.

[0146] Preferably the end clip has an adjustable capacity, meaning it can accommodate a variable depth covering element and/or variable depth covering element support arrangement.

[0147] Preferably, the or each end clip is generally C-shaped.

[0148] Ideally, the or each end clip is generally F-shaped.

[0149] Preferably, the or each end clip comprises a base part and an engagement part.

[0150] Preferably, the base part and engagement parts are generally L-shaped.

[0151] Preferably, the base part comprises a base and a connection portion.

[0152] Preferably the base and/or the connection portion of the or each end clip base part are planar.

[0153] Preferably the base of the or each end clip base part comprises an aperture, hole or slot for allowing a fixing means to pass therethrough.

[0154] Preferably the connection portion of the or each end clip base part comprises an aperture, hole or slot for allowing a separate, potentially different, fixing means to pass therethrough.

[0155] Preferably, the engagement part of the or each end clip comprises a planar base and connection portion.

[0156] Preferably, the engagement part of the or each end clip comprises an aperture, hole or slot for allowing a fixing means to pass therethrough.

[0157] Preferably, in use, the apertures, holes or slots in the connection portions of the base and engagement parts of the or each end clip align so that a single fixing means (distinct from the fixing means used in the base of the base part) can be inserted therethrough to secure the two parts of the end clip to one another and/or to the carrier means.

[0158] Preferably, one or both of the apertures, holes or slots in the connection portions of the base and engagement parts of the or each end clip are elongate apertures, holes or slots, such that variation in the width between the bases of the base part and the engagement part is possible. Advantageously, a variable width allows variable capacity within the end clip and permits the end clip to be operable with the use of additional components within the support arrangement, or components of different depth for example variable thicknesses of adhesive and/or carrier means and/or covering element.

[0159] Preferably, applying the fixing means through the apertures, holes or slots of the two connection portions of the base part and engagement part to secure the two parts of the end clip to one another prevents any further variation in width between the bases of the base part and the engagement part.

[0160] Preferably, the base of the engagement part of the or each end clip comprises a free end for engaging a slot in a peripheral covering element.

[0161] Preferably, the capacity of the end clip is about 10 mm to 50 mm.

[0162] Preferably, both end clip parts of the or each end clip are made from a sheet, e.g. a stainless steel sheet, having a plurality of bends.

[0163] Preferably a first bend defines a joint between the base and the connection portion of the base part.

[0164] Preferably a distinct first bend defines a joint between the base and the connection portion of the engagement part.

[0165] Preferably the end clip base part and engagement part are integrally formed.

[0166] Preferably the base of the base part extends

from the connection portion of the base part in the same direction as the base of the engagement part.

[0167] Ideally, the covering element support arrangement comprises a reinforcement means.

[0168] Preferably, the reinforcement means includes one or more plates which are attached to the carrier means. Advantageously, the reinforcement means provide increased strength to the carrier means to prevent flex and movement of the carrier means in the installed condition.

[0169] Preferably, the reinforcement means comprises one or more gussets.

[0170] Preferably, the or each gusset has a thickness of 2.5 mm.

[0171] Preferably the or each gusset is attached to the carrier means along at least one edge portion of the gusset.

[0172] Ideally, the carrier means has a soffit surface and an upstanding planar surface, and the one or more gusset plates are securable to the upstanding planar surface and/or the soffit surface of the metal plate of the carrier means.

[0173] Ideally, the or each gusset plate is suitable for being secured to the upstanding planar surface of the carrier means and/or the soffit surface of the carrier means by means of one or more mechanical fastening means.

[0174] Ideally, the or each gusset plate comprises at least one flange and/or tab comprising a mechanical fastening means receiving means for securing the or each gusset plate to the carrier means.

[0175] Ideally the covering element support arrangement comprises a connection means for connecting the covering element support arrangement to a building or building component.

[0176] Preferably the gussets include slots or gaps to receive the connection means.

[0177] Preferably the connection means is attached to the reinforcement means. Advantageously, using spaced apart reinforcement means instead of a continuous support structure can reduce the overall mass of the support arrangement.

[0178] Ideally, the connection means is operable to attach or mechanically fix the covering element support arrangement to a building or building component, or to hang the support arrangement from a building or building component.

[0179] Preferably, the connection means is operable to retain the covering element support arrangement at or about a face of a building.

[0180] Preferably, the connection means is operable to attach or mechanically fix the covering element support arrangement on a building such that at least part of the covering element support arrangement forms at least a part of a building soffit.

[0181] Ideally, the connection means is an elongate connection means.

[0182] Ideally, the connection means is operable to receive fixing means.

[0183] Preferably, the connection means comprises a channel.

[0184] Preferably, the channel is a 41 mm by 21 mm steel channel.

[0185] Preferably, the connection means comprises a channel that is operable to receive fixing means such as a nut and bolt.

[0186] Preferably, the connection means comprises a steel channel.

[0187] Preferably, the connection means comprises a mechanical fixing such as screws and/or bolts.

[0188] Ideally, the fixing means is/are movable relative to the channel. Advantageously, as the fixing means are movable relative to the channel, the position of the covering element support arrangement can be adjusted before fixing the covering element support arrangement to a mount.

[0189] In some embodiments, the fixing means is a male fixing means such as a bolt or screw that protrudes from the channel to engage with a female fixing means such as a nut.

[0190] Alternatively, the fixing means is a female fixing means such as a nut that can receive a male fixing means that extends to the female fixing means of the connection means.

[0191] Preferably, the female fixing means is a nut or machined block having an aperture to receive and fixedly engage with a male fixing means such as a bolt.

[0192] Ideally, the fixing means is a spring nut.

[0193] Preferably, the connection means comprises a retaining means to retain at least one fixing element within the channel.

[0194] Ideally, the channel is shaped to movably retain the fixing means within the channel.

[0195] Preferably, the retaining means comprises a retaining lip that extends over an opening in the channel to movably retain the fixing means therein.

[0196] Ideally, wherein the fixing means is a spring nut, the spring biases the nut against the retaining means.

[0197] Advantageously, the location of the covering element support arrangement relative to the building component to which it is fixable can be adjusted along the longitudinal axis of the elongate channel before torqueing the fixings.

[0198] Optionally, the connection means is directly connectable to a building or building component.

[0199] Alternatively, the attachment means comprises an interlocking arrangement to enable the attachment means to interlock with a corresponding arrangement on a building component.

[0200] Ideally, the connection means is connectable to a mounting means.

[0201] Preferably, the mounting means is adapted to be mechanically fixed to a building or building component.

[0202] Ideally, the mounting means is adapted to receive and retain the covering element support arrange-

ment.

[0203] Ideally, the mounting means is adapted to engage with the connection means to mechanically fix, interlock or hang the covering element support arrangement therefrom.

[0204] Preferably, the mounting means is adapted to form at least a part of a lintel or soffit support structure.

[0205] Preferably, the mounting means comprises fixings, and/or is adapted to receive fixings, the fixings being operably engageable with the attachment means to retain the covering element support arrangement on the mount.

[0206] Preferably, the engagement between the mounting means and the connection means is adjustable. Advantageously, this provides further adjustability of the location of the covering element support arrangement on the building facing even after the mount has been mounted on a surface such as an inner leaf of a cavity wall.

[0207] Ideally, the mounting means is mountable on a surface such as an inner leaf of a cavity wall. Advantageously, the adjustable mounting means allow the position of the mount relative to the surface to which it is fixed to be adjusted after installation. This allows fine adjustment of the position of the building component and this correspondingly allows fine adjustment of the location of the covering element support arrangement on the face/-soffit of the building.

[0208] Preferably, the mounting means comprises one or more mounting brackets operable to be mounted to a surface such as an inner leaf of a cavity wall.

[0209] Ideally, the mounting means includes a masonry support surface.

[0210] Ideally, the masonry support surface is engaged with and is supported by the one or more mounting brackets.

[0211] Ideally, the one or more mounting brackets comprise a slot to receive a bracket fixing means.

[0212] Preferably, the mounting means comprises a lock washer that can be locked relative to the slot in more than one configuration. Advantageously, changing the configuration of the lock washer relative to the slot can adjust the location of the bracket relative to the surface to which the bracket is fixed via a bracket fixing means that extends through the slot and into the surface.

[0213] Ideally, the lock washer comprises a body; a protrusion disposed on one face of the body, the protrusion being configured to be disposable in a corresponding slot of a bracket; an engagement means disposed on the protrusion, the engagement means being configured to be engageable with the slot of the bracket and to hold the body stationary with respect to the bracket; and a slotted hole disposed in the body, the slotted hole being configured to admit a shaft of a bracket fixing means therethrough so as to allow lateral movement of the body relative to the shaft while the shaft is admitted through the slotted hole.

[0214] Ideally, the mounting means comprises a spacer insertable between the bracket and a mounting surface in use.

[0215] Preferably, the spacer is a shim.

[0216] Advantageously, this provides yet further adjustability by altering the position of the bracket, and therefore the masonry support surface, relative to the surface to which the mount is fixed.

[0217] Preferably, the covering element support arrangement comprises interlocking means for interlocking with a neighbouring covering element support element.

[0218] Preferably, the interlocking means comprises a female interlocking formation for interlocking with an appropriately-configured male interlocking formation.

[0219] According to a second aspect of the invention there is provided a covering element support arrangement for attaching covering elements to a building or building component, the covering element support arrangement comprising a carrier means for receiving covering elements thereon, the covering element support arrangement comprising attachment means for attaching covering elements to the carrier means, the attachment means comprising mechanical fastening means that can be fastened to the carrier means and that are engageable with covering elements to fix the covering elements to the carrier means, the mechanical fastening means comprising a bracket for fixing two adjacent covering elements to a carrier means, the carrier means comprising a plurality of attachment means receiving means for receiving the mechanical fastening means to fix the mechanical fastening means to the carrier means, wherein the bracket is configured such that it is manoeuvrable laterally between adjacent covering elements when located in the gap between covering elements and/or is rotatable about its axis when located between two adjacent covering elements such that it can be maneuvered to align with an attachment means receiving means on the carrier means to enable fixing thereto.

[0220] Ideally, the or each attachment means receiving means is an elongate aperture.

[0221] According to a third aspect of the invention there is provided a bracket for fixing two adjacent covering elements to a carrier means, the bracket comprising a base that is fixable to the carrier means, and an engagement means for engaging with and fixing covering elements to a carrier means, the engagement means being shaped to extend between a first covering element and an adjacent second covering element, the bracket further comprising a pillar that extends between the base and the engagement means thereby connecting the base to the engagement means.

[0222] Ideally, the bracket comprises a single engagement means that engages with both adjacent covering elements.

[0223] Ideally, the single engagement means is shaped so as to permit access of a rivet and rivet-applying tool.

[0224] Preferably, the bracket comprises a single pillar.

[0225] According to a fourth aspect of the invention there is provided a method of constructing a support arrangement for covering elements attachable to a building or building component, the method comprising providing a carrier means for receiving at least one covering element and adapting the carrier means to allow covering elements to be received by the carrier means in a plurality of positions and/or configurations as previously described herein. Advantageously, allowing the covering elements to be received on the carrier means in a plurality of positions provides a more adaptable covering element support arrangement which can receive covering elements of different sizes.

[0226] Ideally, the method comprises cutting covering elements, e.g. masonry or brick slips, to the required size.

[0227] Preferably, the method comprises forming a groove in one or more of the peripheral edges of the covering element.

[0228] Ideally, the groove is located 10-15 mm from the interior face of the covering element.

[0229] Ideally, the method comprises cutting the carrier means to an appropriate size for forming at least part of a soffit of a building or for attachment to a building or building component.

[0230] Ideally, the method comprises cutting the carrier means to an appropriate size for receiving one or more covering elements.

[0231] Ideally, the method comprises bending the carrier means such that the carrier means is generally L-shaped and comprises a lower face which is perpendicular to an upstanding face.

[0232] Ideally, the method comprises the step of forming a plurality of apertures, perforations or holes in the carrier means.

[0233] Ideally, the method comprises the step of forming an accurate pattern of apertures in the carrier means.

[0234] Ideally, the method comprises the step of forming apertures in the carrier means by laser cutting apertures into the carrier means.

[0235] Preferably, the method comprises reinforcing the carrier means.

[0236] In some embodiments, the method comprises attaching a reinforcement means to the carrier means by welding.

[0237] In some embodiments, the method comprises attaching a reinforcement means to the carrier means by application of one or more mechanical fasteners.

[0238] Preferably, the method comprises reinforcing the carrier means by attaching gussets to the carrier means.

[0239] Ideally, the method comprises providing a connection means for the support arrangement, most preferably the connection means being in the form of a steel channel.

[0240] Preferably, the method comprises attaching the connection means directly to the carrier means or indirectly, for example, via the reinforcement means, to the carrier means.

[0241] In some embodiments, the method comprises welding the connection means to the reinforcement means.

[0242] Ideally, the method comprises inserting a backing means between the carrier means and the reinforcement means.

[0243] Preferably, the method comprises applying an adhesive layer to the carrier means.

[0244] Preferably, the adhesive layer applied to the carrier means has a thickness of 3 mm.

[0245] Preferably, the method comprises applying an adhesive layer to one or more covering elements.

[0246] Preferably, the adhesive layer applied to the or each covering elements has a thickness of 1 mm.

[0247] Ideally, the method comprises pressing the first covering element onto the carrier means after adhesive layers have been applied to the covering element and/or carrier means.

[0248] Advantageously, when a covering element is pressed onto the carrier means after adhesive has been applied, some adhesive is pushed through the apertures in the carrier means.

[0249] Preferably, the method comprises inserting mechanical fastening means into a groove on the peripheral edge of the covering element.

[0250] Preferably, the method comprises retaining covering elements on the carrier means using brackets placed at the edges of the covering element.

[0251] Ideally, the method comprises inserting a fixing means into an aperture, hole or slot formed in the mechanical fixing means.

[0252] Ideally, the method comprises attaching the mechanical fastening means to the carrier means using a fixing means.

[0253] Ideally, the fixing means is a rivet.

[0254] Ideally the mechanical fastening means is attached to the carrier means using a fixing means which passes through a hole or slot in the base of the mechanical fastening means.

[0255] Preferably the mechanical fastening means is attached to the carrier by inserting the fixing means in an aperture in the carrier means.

[0256] Ideally the mechanical fastening means is attached to the carrier by inserting the fixing means in the closest aperture in the carrier means. Advantageously, by having a plurality of apertures in the carrier means, the fixing means can be inserted into the pre-formed aperture that is in the most suitable position for holding the mechanical fastening means in its required position.

[0257] Preferably a locating member is at least partially inserted into the aperture or perforation in the carrier means prior to the curing of the adhesive.

[0258] Ideally the locating member is a pin and is most preferably formed from stainless steel.

[0259] Ideally the method includes leaving the adhesive to cure for 24 hours.

[0260] Preferably the locating member is removed after the adhesive is cured. Advantageously this leaves

clear access to the aperture in the carrier means.

[0261] Preferably the mechanical fastening means is inserted into the aperture in the carrier means, most preferably, after curing of the adhesive.

[0262] Ideally the method comprises attaching a plurality of covering elements to the carrier means.

[0263] Ideally the method comprises attaching a plurality of covering elements to the carrier means using adhesive and/or mechanical fastening means.

[0264] Ideally the method comprises attaching a plurality of covering elements to the carrier means in a regular arrangement.

[0265] Ideally the method comprises retaining peripheral covering elements using end clips.

[0266] Preferably the method comprises inserting the engagement means of an end clip into a slot in the exposed edge of a peripheral covering element.

[0267] Ideally the method comprises attaching the base part of the end clip to the carrier by means of a fixing means such as a rivet, screw or bolt.

[0268] Ideally the method comprises attaching one or more covering element support arrangements to a building or building component.

[0269] Ideally the method comprises attaching a mounting means to a building.

[0270] Ideally the method comprises attaching the connection means of the covering element support arrangement to a mounting means to a building.

[0271] According to a fifth aspect of the invention there is provided a method of attaching covering elements to a covering element support arrangement, the covering element support arrangement having a carrier means for receiving covering elements, the method comprising providing covering elements and one or more brackets, the brackets being configured to engage with the covering elements and to be fixed to the carrier means to fix the covering elements to the carrier means, wherein the method comprises placing a first covering element on the carrier means and placing a bracket in engagement with the first covering element, placing a second covering element onto the carrier means and in engagement with the bracket, leaving a gap between the first and second covering elements, and maneuvering the bracket laterally between the first and second covering elements and/or rotating it about its axis such that it aligns with an attachment means receiving means on the carrier means, and fixing the bracket to the carrier means via the attachment means receiving means.

[0272] Ideally the method comprises applying an adhesive to the carrier means and/or the covering elements before setting the covering elements on the carrier means.

[0273] Preferably the method comprises repeating the steps of applying subsequent covering elements and brackets to provide one or more rows of covering elements.

[0274] The skilled person will appreciate that all preferred or optional features of the invention described with reference to only some aspects or embodiments of the invention may be applied to all aspects of the invention.

[0275] It will be appreciated that optional features applicable to one aspect of the invention can be used in any combination, and in any number. Moreover, they can also be used with any of the other aspects of the invention in any combination and in any number. This includes, but is not limited to, the dependent claims from any claim being used as dependent claims for any other claim in the claims of this application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0276] The invention will now be described with reference to the accompanying drawings which show a single embodiment of a support arrangement according to the invention by way of example only.

Figure 1 is a front perspective exploded view of a covering element support arrangement in accordance with a first embodiment of the invention.

Figure 2 is a rear perspective exploded view of a covering element support arrangement in accordance with a first embodiment of the invention.

Figure 3 is a rear perspective view of the covering element support arrangement in accordance with a first embodiment of the invention.

Figure 4 is a rear perspective view of the covering element support arrangement in accordance with a second embodiment of the invention.

Figure 5 is a cutaway rear perspective view of the covering element support arrangement of figure 4.

Figure 6 is an end view of the covering element support arrangement of figure 4.

Figure 7 is a plan view of the covering element support arrangement of figure 4.

Figure 8 is a rear perspective view of the covering element support arrangement in accordance with a first embodiment of the invention.

Figure 9 is a soffit view of the covering element support arrangement in accordance with a first embodiment of the invention. Soffit view meaning a view from below upwards towards the soffit.

Figure 10 is a front perspective view of the covering element support arrangement in accordance with a first embodiment of the invention and having an alternative bond pattern of covering element applied thereon.

Figure 11 is a soffit view of the covering element support arrangement in accordance with a first embodiment of the invention with the bond pattern of Figure 10.

Figure 12 is a soffit view of the covering element support arrangement in accordance with a first embodiment of the invention with covering elements arranged in a alternative bond pattern.

Figure 13 is a soffit view of the covering element support arrangement in accordance with a first em-

bodiment of the invention with covering elements arranged in an alternative bond pattern.

Figure 14 is a perspective view of a bracket according to an aspect of the invention.

Figure 15 is a perspective view of an alternative bracket according to an aspect of the invention.

Figure 16 is a perspective view of an alternative bracket according to an aspect of the invention being the same as the bracket shown in Figure 11 except for additional material being removed in the centre of the bracket's face.

Figure 17 is a perspective view of an end clip for attaching one end of a peripheral covering element to the carrier according to an aspect of the invention.

Figure 18 is a perspective view of an alternative end clip for attaching one end of a peripheral covering element to the carrier according to an aspect of the invention.

Figure 19 is a top view of an alternative embodiment of a covering element support arrangement according to the invention.

Figure 20 is a front perspective view of a mount for a support arrangement according to the invention.

Figure 21 shows a side view of the mount shown in Figure 16, and a side view of a simplified example embodiment of the covering element support arrangement according to the invention.

DETAILED DESCRIPTION

[0277] The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of various embodiments of the disclosure as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the various embodiments described herein can be made without departing from the scope and spirit of the disclosure. In addition, descriptions of well-known functions and constructions may be omitted for clarity and conciseness.

[0278] The terms and words used in the following description and claims are not limited to the bibliographical meanings, but, are merely used by the inventor to enable a clear and consistent understanding of the disclosure. Accordingly, it should be apparent to those skilled in the art that the following description of various embodiments of the disclosure is provided for illustration purpose only and not for the purpose of limiting the disclosure as defined by the appended claims and their equivalents.

[0279] It is to be understood that the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise.

[0280] In the figures there is shown a covering element support arrangement according to the invention illustrated generally by reference numeral 1. In Figures 1 to 3 and 8 to 13 there is shown a first embodiment of a covering element support arrangement according to the invention illustrated generally by reference numeral 1. Figures 4 to 7 show a second embodiment of the covering element support arrangement 1. The covering element support arrangement 1 comprises a carrier 2 for receiving covering elements 3 thereon in a plurality of positions and/or configurations. In the embodiments described herein, the carrier 2 is formed from stainless steel, but other materials may also be used. The covering elements are masonry slips 3 such as brick, block or stone slips, or glass-reinforced plastic slips that are attached to the carrier 2.

[0281] Each covering element 3 includes an interior face (see face 3a of figure 2 for example) for attachment to the carrier 2, an exterior face (see face 3b of figure 10 for example) opposite the interior face and a plurality of peripheral edge faces connecting the interior face and the exterior face (see 3c, 3d, and 3e of figure 2). In preferred embodiments each covering element 3 has a thickness of 25-35 mm and includes slots in two opposing peripheral edges (see, for example, figure 2 showing a slot 6 in the first opposing peripheral edge 3c, wherein a slot in the second opposing peripheral edge is obscured from view). Each slot is located 10-15 mm from the interior face of the covering element and provides a means by which covering elements 3 may be mechanically fixed to the carrier 2. The slot 6 is provided by removing a semi-circular shaped portion of the covering element 3.

[0282] Covering elements 3 are mechanically fixed and adhesively bonded to the carrier 2. The covering elements 3 are adhesively bonded to the carrier 2 using any suitable adhesive 4 (see figure 1 but not shown in other figures) such as an epoxy resin, polymer-modified adhesive or mortar which is applied to the carrier 2 and the interior face of each covering element. In alternative embodiments, the covering elements 3 are bonded to the carrier 2 without an adhesive. The covering elements 3 are mechanically fixed to the carrier using a combination of attachment members 5a, 5b, 5c, 5d, 5e, wherein at least a portion of each attachment member is received in a slot 6 in the peripheral edge of a covering element 3 (such as edges 3c to 3e shown in figure 2). The use of mechanical fastenings means that covering elements, such as masonry slips, can more readily be mechanically fixed to a carrier means and this discourages the use of copious amounts of epoxy resin, polymer-modified adhesive or mortar, particularly useful if legislation-compliant fire rated epoxies are difficult to source in large quantities.

[0283] The carrier 2 has a generally L-shaped cross-section, having two generally planar surfaces 2a and 2b for receiving covering elements 3. The arrangement shown in figure 1 has surfaces 2a and 2b of approximately equal dimension, although this may not be the case as in figures 2, 3, 4 and 8 for example. The carrier 2

also includes a reinforcing flange 2c for the purpose of improving the rigidity of the carrier 2. The carrier 2 is constructed from a single stainless steel panel and is bent into the configuration shown in e.g. figure 1. The carrier 2 is formed of/comprises a metal plate. The carrier 2 comprises a soffit surface 2b which is perpendicular to an upstanding planar surface 2a and, as shown in figures 1 to 13, covering elements 3 are attached to these two surfaces. L-shaped covering elements 3 are attached to both the soffit surface 2b and upstanding planar surface 2a and flat covering elements 3 are attached to the soffit surface 2b only. The upstanding planar surface 2a is suitable for receiving one or more covering elements 3 thereon for forming a face surface of a building.

[0284] The covering element support arrangement 1 is reinforced using gussets 7 which are attached to the carrier 2 via welding (figures 2, 8 and 9, for example). The covering element support arrangement 1 is reinforced using gussets 7 which are attached to the carrier 2 via mechanical fasteners (figures 4 to 7, for example). The gussets 7 of figures 4 to 7 are secured to the carrier 2 and the reinforcing flange 2c, as well as connection member 9 hereinafter described. The gussets 7 comprise a plurality of tabs and/or flanges for enabling them to be secured to the carrier 2, flange 2c, and/or connection member 9. Each gusset is made from stainless steel and has a thickness of 2.5 mm. The gussets 7 provide increased strength to the carrier 2 thereby preventing flex and movement of the carrier 2. Each gusset 7 engages the soffit surface 2b via the portion 8a of the gusset 7, while also engaging the rear side of upstanding planar surface 2a, and the reinforcing flange 2c. Gussets 7 include a slot 8b to receive a connection member 9 (see figure 2, for example). In another embodiment, gussets 7 are sized to extend only from flange 2c up to the connection member 9 (figures 4 to 7). The connection member 9 is welded to each gusset 7. Alternatively, the connection member 9 is attached directly to the carrier 2 (see for example figures 4 to 7).

[0285] As shown in figures 2 to 5, and 7 to 13, carrier 2 includes a plurality of apertures 10 for receiving both adhesive and mechanical fixing elements, the apertures being an accurate pattern of apertures on the soffit surface 2b and/or the upstanding planar surface 2a (not shown). The apertures are arranged in a predetermined bond pattern. By 'predetermined bond pattern' we mean that the apertures 10 disposed on the carrier 2 are located, oriented, sized and/or shaped to permit attachment, using the mechanical fastening means, in one example the brackets 5a, 5b, 5c or 5e, of the covering elements 3 to the carrier 2 in a predetermined covering element bond pattern, for example a stretcher brick bond pattern (figures 4 to 7 and figures 10 and 11). The apertures 10 forming the predetermined bond pattern may be elongate apertures 10. The elongate apertures 10 may comprise a major axis, wherein the major axes of at least some of the elongate apertures 10 are oriented in a longitudinal direction of the carrier 2.

[0286] The carrier 2 is formed of/comprises a metal plate 2 which comprises planar surface (see, for example, underside of soffit surface 2b of figure 1) for receiving one or more covering elements 3 thereon. The planar surface comprises some or all of the plurality of apertures 10.

[0287] The metal plate 2 comprises two planar surfaces 2a, 2b for receiving one or more covering elements thereon (see figure 1).

[0288] At least some of the plurality of apertures 10 are arranged in a row (see figures 4 to 7 and 8) extending longitudinally along the metal plate 2. The apertures 10 are arranged in a plurality of rows extending longitudinally along the metal plate 2. The apertures arranged in the rows are generally spaced apart over a longitudinal dimension of the metal plate 2 (see especially figures 4 to 7). The apertures 10 in the rows are aligned with one another (see especially figures 4 to 7). The plurality of rows are generally spaced apart from one another over a width dimension of the metal plate (the dimension measured from 2a to 2c of figure 1, for example). The rows of apertures 10 form the predetermined bond pattern. One or more of the rows are spaced a relatively smaller distance in the width dimension from one or more of the plurality of generally spaced apart rows (see row of which aperture 10a forms a part in figure 8). By 'relatively smaller distance' we mean a smaller distance compared with the spacing of the plurality of rows generally spaced apart from one another over the width dimension. The plurality of rows extending longitudinally along the metal plate 2 are parallel rows extending longitudinally along the metal plate 2. The apertures 10 of the one or more rows are equispaced over the longitudinal dimension of the metal plate (see especially figure 7). The apertures 10 of the rows are uniformly distributed over the longitudinal dimension of the plate 2 and the plurality of rows are uniformly distributed over a width dimension of the metal plate 2. Some of apertures (see 10b of figure 8, for example, obscured in figures 4 to 7 by end clips 5b) are located adjacent two opposing longitudinal edge portions of the metal plate 2. These apertures 10b form at least part of the predetermined bond pattern. The apertures 10b located adjacent two opposing longitudinal edge portions of the metal plate 2 extend widthwise across the metal plate 2 adjacent each of the two opposing longitudinal edge portions of the metal plate 2. The plurality of apertures 10b are generally spaced apart over a width dimension of the metal plate 2 (see for example figure 5). The apertures 10b adjacent the longitudinal edge portions of the plate 2 are in a row (see figure 5) or staggered (see figure 4) for use with the stretcher bond of figure 4 and 5. Apertures 10b are equispaced (see figures 4 to 7) and substantially uniformly distributed over a width dimension of the metal plate 2. The one or more rows of apertures 10 aligned in the longitudinal direction of the metal plate of the carrier means comprise one or more clusters of apertures generally spaced apart over the longitudinal dimension of the metal plate 2 (see figure

8), which are substantially equispaced and uniformly distributed over the longitudinal dimension of the metal plate 2. Some of the apertures 10 of each row are located at the same longitudinal position of the metal plate 2.

[0289] It should be noted that the apertures 10 are not illustrated in Figures 1 and 19 to enhance the clarity of these drawings. The apertures 10 are obround in shape (see figure 2, for example). The apertures 10 are so arranged so that no two apertures are so close to one another so as to risk failure of the support arrangement 1 by increased susceptibility to stresses in the support arrangement 1. The apertures 10 are also so arranged in an accurately predetermined pattern (a predetermined bond pattern) so that the covering elements 3 can be arranged on the carrier 2 in any of the most common brick bond patterns, including stretcher courses (see figures 6 and 7 for example), soldier courses (see figure 1 for example) and stretcher-soldier course hybrids (see figure 13 for example). The skilled reader will understand that the dimensions of the apertures 10, their specific pattern, and their separation may be altered for instance to ensure compatibility with geographical regions where different brick dimensions are standard or different brick bond patterns are preferred. The apertures 10 are sized to be able to receive and retain rivets, as well as allowing a certain amount of adhesive material to pass therethrough. This means that the apertures allow positions where mechanical fixings may be attached to the carrier 2, as well as positions where adhesive can strongly bond to the carrier 2.

[0290] The apertures 10 are to be positioned at places on the carrier 2 intended to receive covering elements 3. As will be appreciated by the skilled person, apertures 10 can be provided in a regular or semi-regular arrangement over any suitable part of carrier 2, including over substantially all of the surface of the carrier 2. The carrier 2 may include regions or sections which are free of apertures 10 (see for example 2a of figure 3). While in the preferred embodiments the apertures are obround, the apertures may be of any suitable shape such as circular or square and may be in any appropriate pattern.

[0291] Covering elements 3 are attached to the carrier 2 via attachment members, particularly brackets 5a, 5c, 5e, shown in detail in Figures 14, 15 and 17 and end clips 5b, 5d, shown in detail in Figures 16 and 17. Although brackets 5a and end clips 5c are shown in Figure 1, alternatively brackets 5c, 5e and end clips 5d may be used in preference. For instance, bracket 5e are shown in figure 2.

[0292] All of the attachment members shown in figures 1, 2 and 14 to 18 are made from 1 mm-thick stainless steel sheet material but variations in the thickness and/or type of material used are also within the scope of the invention. The regular pattern (the predetermined bond pattern) of apertures 10 in the carrier 2 provide predetermined positions for the brackets 5a, 5c, 5e to be attached to the carrier using fixing members such as rivets. Depending on the number and arrangement of covering elements on the carrier 2, each bracket 5a, 5c, 5e is used to attach one end of each covering element 3 to the carrier 2.

[0293] As shown in Figures 14, 15 and 17, each bracket 5a, 5c, 5e comprise a base 11. In this embodiment, the base 11 is a planar base. The bracket 5a, 5c, 5e further comprises a slot 12 to allow a fixing member such as a stainless steel rivet to pass therethrough and fix the bracket 5a, 5c, 5e to the carrier 2. The slot 12 is formed in the base 11. The slot 12 is an elongate slot and this provides further manoeuvrability of the bracket 5a, 5c, 5e. Each bracket 5a, 5c, 5e also comprises an engagement surface 14 which has previously been described as an engagement means. The engagement surface 14 is generally U-shaped and planar. The engagement surface 14 of each bracket 5a, 5c, 5e has a free end 14a for engaging a slot in a first covering element 3, and two prongs 14b for engaging a slot in a neighbouring covering element 3. While two prongs are preferable, a single prong in some embodiments would suffice. Each respective free end 14a is integrally connected to each prong 14b.

[0294] Each bracket 5a, 5c, 5e further comprises a pillar 13 which connects the base 11 to the planar engagement surface 14. The base 11 and engagement surface 14 are spaced apart by the pillar 13. As shown in figure 15 for example, the pillars 13 are planar and have a length of 10-15 mm. This length corresponds to the distance between the interior face and the slot of the covering element 3 for which the bracket 5a, 5c, 5e is to be used to retain, and brackets having different length pillars may be formed to cooperate with different sized or shaped covering elements.

[0295] The outline of each bracket 5a, 5c, 5e is cut from a metal sheet and the cut shape is bent at either end of the pillar 13 to assume the form shown in figures 14, 15 and 17. A first perpendicular bend defines the joint between the base 11 and the pillar 13 and a second perpendicular bend defines the joint between the pillar 13 and the planar engagement surface 14. In this way the base 11, planar engagement surface 14 and pillar 13 are integrally formed. The base 11 is located between the two prongs 14b at the opposite end of the pillar 13 to the planar engagement surface 14. The planar engagement surface 14 and base 11 are substantially parallel. The base 11 and each prong 14b extends from the pillar 13 in a first direction perpendicular to the axis of the pillar 13 and the free end 14a extends from the pillar in a second direction (also perpendicular to the axis of the pillar 13) that is opposite the first direction. Bracket 5c as shown in figure 15 differs from that of bracket 5a in figure 14 in that the engagement surface 14 is circular in shape instead of rectangular. This can improve the strength of the fix of the covering element 3 to the carrier 2 as a greater amount of the bracket 5c is located within the slot of the covering element 3 after the bracket 5c is fixed to the carrier 2 (when compared with that of bracket 5a). Bracket 5e differs from bracket 5c in that it has some material removed from its prongs 14b as indicated by reference

numeral 28 in order to permit easier installation of a mechanical fixing such as a rivet and easier use of a mechanical fixing tool such as a rivet gun by providing more space to manoeuvre the fixing and fixing tool.

[0296] As shown in e.g. Figure 1 end clips 5b are used to attach covering elements 3 having an edge at the periphery of the covering element support arrangement 1 (referred to as 'peripheral covering elements'). The end clips 5b, shown in detail in Figure 16, are generally C-shaped having a planar base 15 with a hole 16 for allowing a fixing means such as a screw or bolt to pass therethrough. End clip 5b also comprises a planar engagement surface 18 which is attached to the base 15 via a planar connection strip 17. The base 15 and planar connection strip 18 are spaced apart from one another by the base 15. Engagement surface 18 includes a curved free end for engaging a slot in a peripheral covering element 3. In this embodiment, the length of each connection strip 17 between the base 15 and the planar engagement surface 18 is 21-26 mm, which corresponds to the sum of distance between the interior face and the slot 6 of the covering element 3, the thickness of the backing board 6, the thickness of the adhesive 4, and the thickness of the carrier 2.

[0297] Each end clip 5b is cut from a flat stainless-steel sheet and bent at either end of the connection strip 17 to assume the form shown in figure 16. A first perpendicular bend defines the joint between the base 15 and the connection strip 17 and a second perpendicular bend defines the joint between the connection strip 17 and the engagement surface 18. In this way the base 15, engagement surface 18 and connection strip 17 are integrally formed from a single sheet. The engagement surface 18 and base 15 are substantially parallel and extend from the connection strip 17 in substantially the same direction.

[0298] End clips 5d are shown in Figure 18 as an alternative embodiment of the end clips 5b shown in Figure 16 and can be used in the same manner as end clips 5b shown in e.g., figures 1 to attach covering elements 3 having an edge at the periphery of the covering element support arrangement 1. The end clips 5d, shown in detail in figure 18, are generally F-shaped, having a base part 19 and an engagement part 20, both parts generally L-shaped. The base part has a planar base portion 21 and planar connection portion 22. The base 21 of the base part 19 has a hole 23 for allowing a fixing mean such as a screw, bolt or rivet to pass therethrough. The engagement part 20 of the end clip 5d comprises a planar base portion 24 and planar connection portion 25. The base part 19 and engagement part 20 of the end clip 5d comprise holes 26 and 27 which can be aligned for allowing a fixing means such as a rivet or screw and washer to pass therethrough to secure the two parts together. The two parts could also, and perhaps additionally, be secured by any other suitable means such as welding (not shown). The hole 27 in the engagement part 20 of the end clip 5d is elongate, such that variation in the width between the bases of the base part and the engagement part is possible prior to fixing, therefore allowing for altering of the capacity of the variable capacity end clip 5d. The base 24 of the engagement part 20 of the end clip 5d has a free end for engaging a slot in a peripheral covering element 3. The separation of the base portions 21, 24 of the base part 19 and engagement part 20 is shown in figure 18 as approximately 10 mm to 30 mm which is the approximate sum of the thicknesses of the distance between the interior face and the slot 6 of the covering element 3, the thickness of the carrier 2 and the thickness of the adhesive 4.

[0299] Both end clip parts 19 and 20 of the end clip 5d are cut from a flat stainless steel sheet and bent along their lengths to assume the form shown in figure 18. A first perpendicular bend defines the joint between the base portion 21 and the connection portion 22 of the base part and a second perpendicular bend defines the joint between the base portion 24 and the connection portion 25 of the engagement part 20. The connection portions 22 and 25 of the two parts 19 and 20 are substantially parallel and slidable along one another.

[0300] In Figure 19 there is shown a second embodiment of a covering element support arrangement according to the invention illustrated generally by reference numeral 101 having the same bond pattern as illustrated in Figures 10 and 11. The differences between this second embodiment 101 and the first embodiment 1 lies in the presence of an interlocking arrangement 120a, 120b. When a plurality of support arrangements 101 are to be connected to a building via their respective connection means 109, the interlocking arrangement allows proper and accurate alignment between neighbouring units by providing a female interlocking formation 120a and a male interlocking formation 120b. In the installed condition, the male interlocking formation 120b and female interlocking formation 120a are abutted to form an interlocked connection between the neighbouring units.

[0301] Generally, the covering element support arrangement 1, 101 comprises a connection member 9, 109 for connecting the covering element support arrangement 1, 101 to a building or building component. The connection member 9, 109 is operable to retain the covering element support arrangement 1, 101 at or about a face of a building such that at least part of the covering element support arrangement 1, 101 forms at least a part of a building soffit. The connection member 9, 109 is elongate and comprises a 41 mm by 21 mm steel channel that extends between, and is attached to, gussets 7 (not numbered in Figure 19). The longitudinal axis of the connection member 9, 109 is perpendicular to the plane of each gusset 7. The connection member 9 has a base with two mutually opposing sidewalls that extend perpendicularly from the base, and an opening that is mutually opposing the base. The opening has two mutually opposed retaining lips that extend from the upper portion of the sidewalls to project over the opening. The connection member 9 is sized to receive a retaining member

such as a spring nut or machined block, the position of the retaining member being adjustable along the length of the connection member 9 (see figure 21 as described below).

[0302] As shown in figures 20 and 21, connection member 9 is to be connected to a mount 50 which is in turn mechanically fixed to a building or building component. The mount 50 has a support surface 51 for masonry such as rows of brickwork. The support surface 51 functions as a shelf to which a covering element support arrangement 1 can be attached, but it also provides a platform for upper courses of brickwork. The support surface 51 has a thickness not greater than that of the space between rows of brickwork, such that the end portions of the support surface 51 can be embedded between rows of bricks. The support surface 51 has two elongate slots 52a, 52b extending therethrough. The slots 52a, 52b are sized to receive bolts 53a, 53b that can engage with the covering element support arrangement 1. In particular, the bolts 53a, 53b can engage with spring nut 240 shown in figure 21. The position of the covering element support arrangement 1 can be moved forwards or backwards by adjusting the location of the bolt 53a, 53b in the slot 52a, 52b and the covering element support arrangement 1 can be moved laterally by adjusting the location of the spring nut 240 in the channel of connection member 9.

[0303] The mount 50 further has two spaced apart mounting brackets 54a, 54b that each support the masonry support surface 51. The mounting brackets 54a, 54b have a slot (not shown) and a lock washer 55a, 55b arranged to attach the mounting brackets 54a, 54b to a wall with bolts 56 (see figure 21). The bolts 56 extend through the slot and are fixed relative to the slot by the lock washers 55a, 55b. Each lock washer 55a, 55b has a body (not shown) and a protrusion (not shown) disposed on one face of the body. The protrusion is configured to be disposable in a corresponding slot of a mounting bracket 54a, 54b. The lock washer further has an engagement arrangement (not shown) disposed on the protrusion that is configured to be engageable with the slot of the bracket 54a, 54b and hold the body stationary with respect to the mounting bracket 54a, 54b. Further, there is a slotted hole (not shown) disposed in the body configured to admit a shaft of a bolt 56 therethrough to allow lateral movement of the body relative to the shaft while the shaft is admitted through the slotted hole. The mount 50 further has a shim 57a, 57b located and the wall, providing adjustability of the building arrangement.

[0304] The covering element support arrangement 1 is mounted to a wall by first attaching a mount 50 to the surface of the wall. The mounting brackets 54a, 54b of the mount 50 are first attached to the surface of the wall using a single bolt 56 for each mounting bracket 54a, 54b. A lock washer 55a, 55b is also used. The bolt 56 passes through the lock washer 55a, 55b and a slot of the mounting bracket 54a, 54b and into the wall. The lock washer 55a, 55b can fixedly adjust the location of the mounting bracket 54a, 54b relative to the placement of the bolt 56 after the bolt has been inserted into the wall. This enables the final location of the covering element support arrangement 1 on the building to be adjusted even after the bolt has been inserted into the wall. Once the mounting brackets 54a, 54b are fixed to the wall, the covering element support arrangement 1 can then be fixed to the masonry support surface 50. Initially, spring nuts 240 are inserted into the connection member 9 and moved along the channel to the location of the slots 52a, 52b in the masonry support surface 50. Then bolts 53a, 53b are inserted through the slots 52a, 52b and the covering element support arrangement 1 is raised, with the connection member 9 being located at the bolts 53a, 53b. The bolts 53a, 53b are tightened through the spring nuts 240 to fix the covering element support arrangement 1 to the mount 50.

[0305] In relation to the detailed description of the different embodiments of the invention, it will be understood that one or more technical features of one embodiment can be used in combination with one or more technical features of any other embodiment where the transferred use of the one or more technical features would be immediately apparent to a person of ordinary skill in the art to carry out a similar function in a similar way on the other embodiment.

[0306] In the preceding discussion of the invention, unless stated to the contrary, the disclosure of alternative values for the upper or lower limit of the permitted range of a parameter, coupled with an indication that one of the said values is more highly preferred than the other, is to be construed as an implied statement that each intermediate value of said parameter, lying between the more preferred and the less preferred of said alternatives, is itself preferred to said less preferred value and also to each value lying between said less preferred value and said intermediate value.

[0307] The features disclosed in the foregoing description or the following drawings, expressed in their specific forms or in terms of a means for performing a disclosed function, or a method or a process of attaining the disclosed result, as appropriate, may separately, or in any combination of such features be utilised for realising the invention in diverse forms thereof.

Claims

1. A covering element support arrangement for attaching covering elements to a building and/or a building component, the covering element support arrangement comprising a carrier means for receiving covering elements thereon, the carrier means comprising a metal plate comprising a plurality of apertures disposed thereon for being engaged by mechanical fastening means for fixing the covering elements to the carrier means, wherein the plurality of apertures are arranged in a predetermined bond pattern.

2. A covering element support arrangement as claimed in claim 1, wherein the plurality of apertures are elongate apertures.

3. A covering element support arrangement as claimed in claim 1 or 2, wherein the elongate apertures comprise a major axis, wherein the major axes of at least some of the elongate apertures are oriented in a longitudinal direction of the metal plate of the carrier means.

4. A covering element support arrangement as claimed in any preceding claim, wherein at least some of the plurality of apertures are arranged in a row extending longitudinally along the metal plate, wherein the apertures arranged in the row are generally spaced apart over a longitudinal dimension of the metal plate.

5. A covering element support arrangement as claimed in any preceding claim, wherein at least some of the plurality of apertures are arranged in a plurality of rows extending longitudinally along the metal plate, wherein the apertures of each row are generally spaced apart over a longitudinal dimension of the metal plate and wherein the plurality of rows are generally spaced apart from one another over a width dimension of the metal plate.

6. A covering element support arrangement as claimed in any preceding claim, wherein at least some of apertures are located adjacent two opposing longitudinal edge portions of the metal plate.

7. A covering element support arrangement as claimed in claim 6, wherein the apertures located adjacent to two opposing longitudinal edge portions of the metal plate are elongate apertures having a major axis, wherein the major axes of the apertures are oriented in a widthwise direction of the metal plate.

8. A covering element support arrangement as claimed in any preceding claim, wherein between 1% and 20% of the carrier means is open.

9. A covering element support arrangement as claimed in any preceding claim, wherein the distance between adjacent apertures is greater than 5 mm.

10. A covering element support arrangement as claimed in any preceding claim, further comprising an attachment means for attaching the covering elements to the carrier means, the attachment means comprising the mechanical fastening means, wherein the mechanical fastening means are engageable with the plurality of apertures and the covering elements to fix the covering elements to the carrier means.

11. A covering element support arrangement as claimed in claim 12, wherein the mechanical fastening means comprises at least one bracket engageable with two adjacent covering elements for fixing the adjacent covering elements to the carrier means.

12. A covering element support arrangement as claimed in claim 13, wherein the bracket is manoeuvrable laterally between adjacent covering elements when located in the gap between covering elements and/or is rotatable about its axis when located between two adjacent covering elements such that it can be maneuvered to align with an attachment means receiving means on the carrier means to enable fixing thereto.

13. A covering element support arrangement as claimed in claim 15 or 16, wherein the or each bracket comprises an engagement means for engaging with one or more covering elements, wherein the engagement means is shaped such that it does not obscure the view of the base of the bracket in use.

14. A method of constructing a support arrangement for covering elements attachable to a building or building component, the method comprising: providing a carrier means for receiving at least one covering element; and forming a plurality of apertures in the carrier means, wherein the apertures are engageable by mechanical fastening means for fixing covering elements to the carrier means, and wherein the apertures are arranged in a predetermined bond pattern.

15. A covering element support arrangement for attaching covering elements to a building or building component, the covering element support arrangement comprising a carrier means for receiving covering elements thereon, the covering element support arrangement comprising attachment means for attaching covering elements to the carrier means, the attachment means comprising mechanical fastening means that can be fastened to the carrier means and that are engageable with covering elements to fix the covering elements to the carrier means, the mechanical fastening means comprising a bracket for fixing two adjacent covering elements to a carrier means, the carrier means comprising a plurality of attachment means receiving means for receiving the mechanical fastening means to fix the mechanical fastening means to the carrier means, wherein the bracket is configured such that it is manoeuvrable laterally between adjacent covering elements when located in the gap between covering elements and/or is rotatable about its axis when located between two adjacent covering elements such that it can be maneuvered to align with an attachment means receiving means on the carrier means to enable fixing thereto.

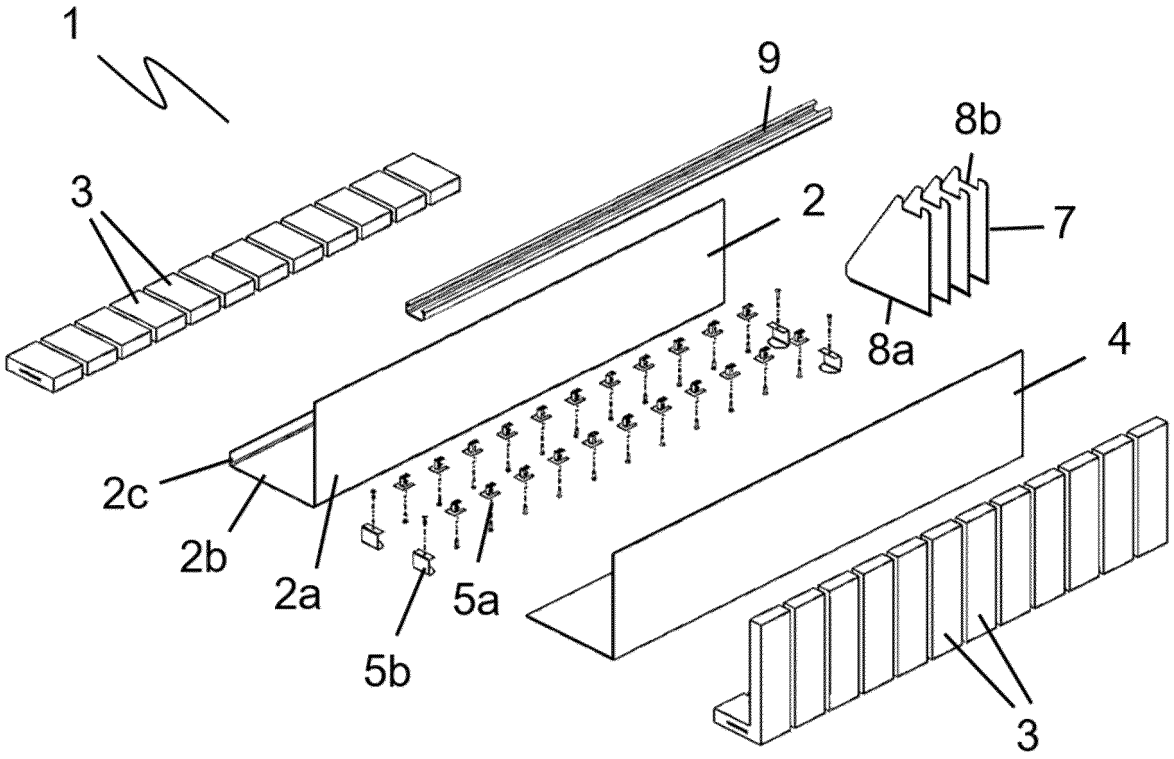

Figure 1

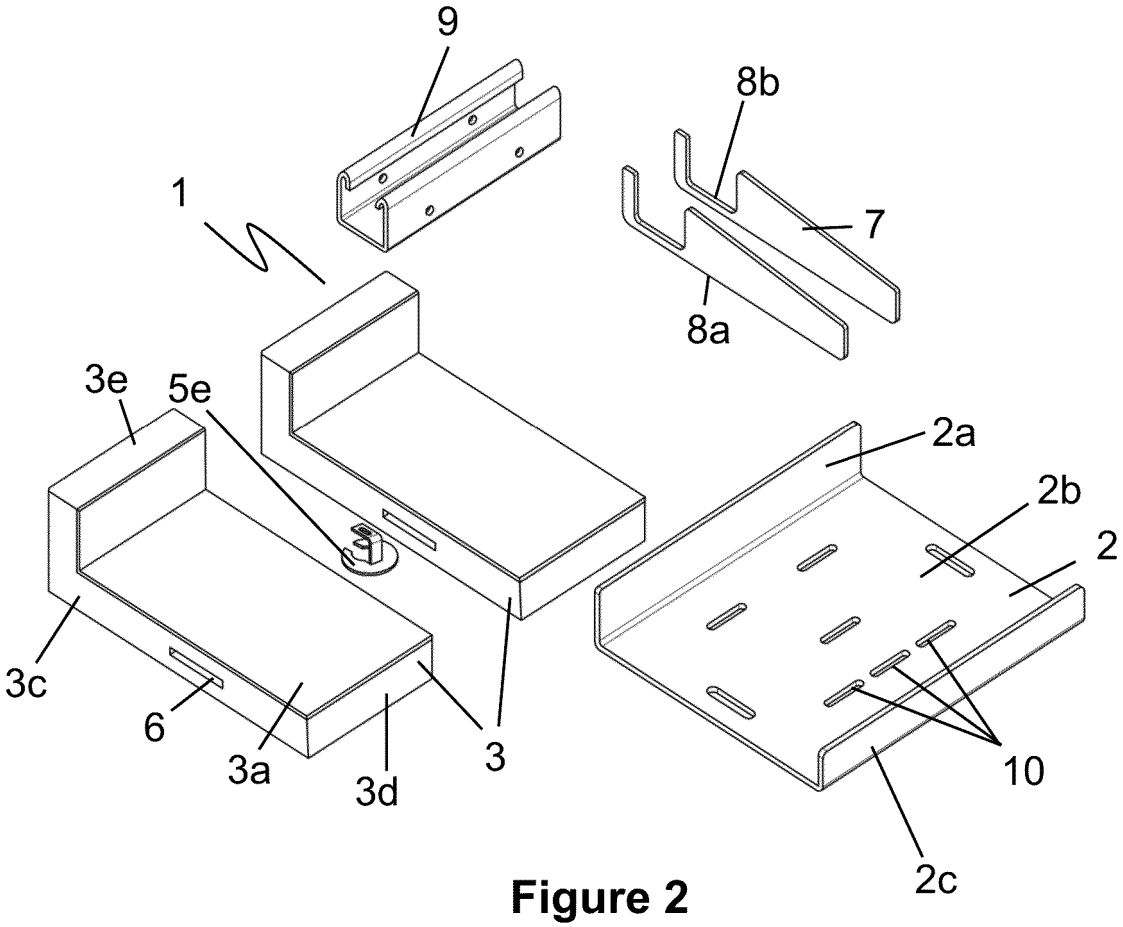

Figure 2

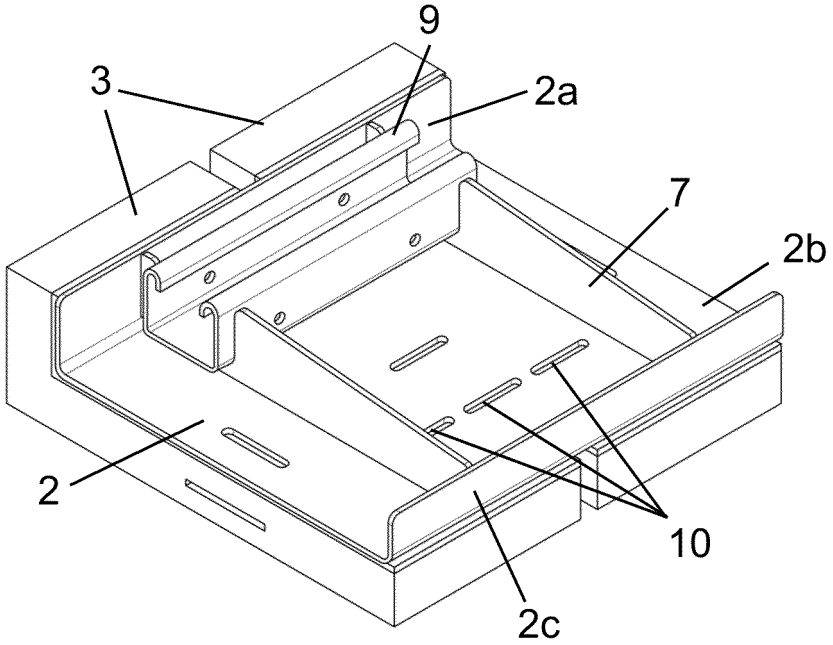

Figure 3

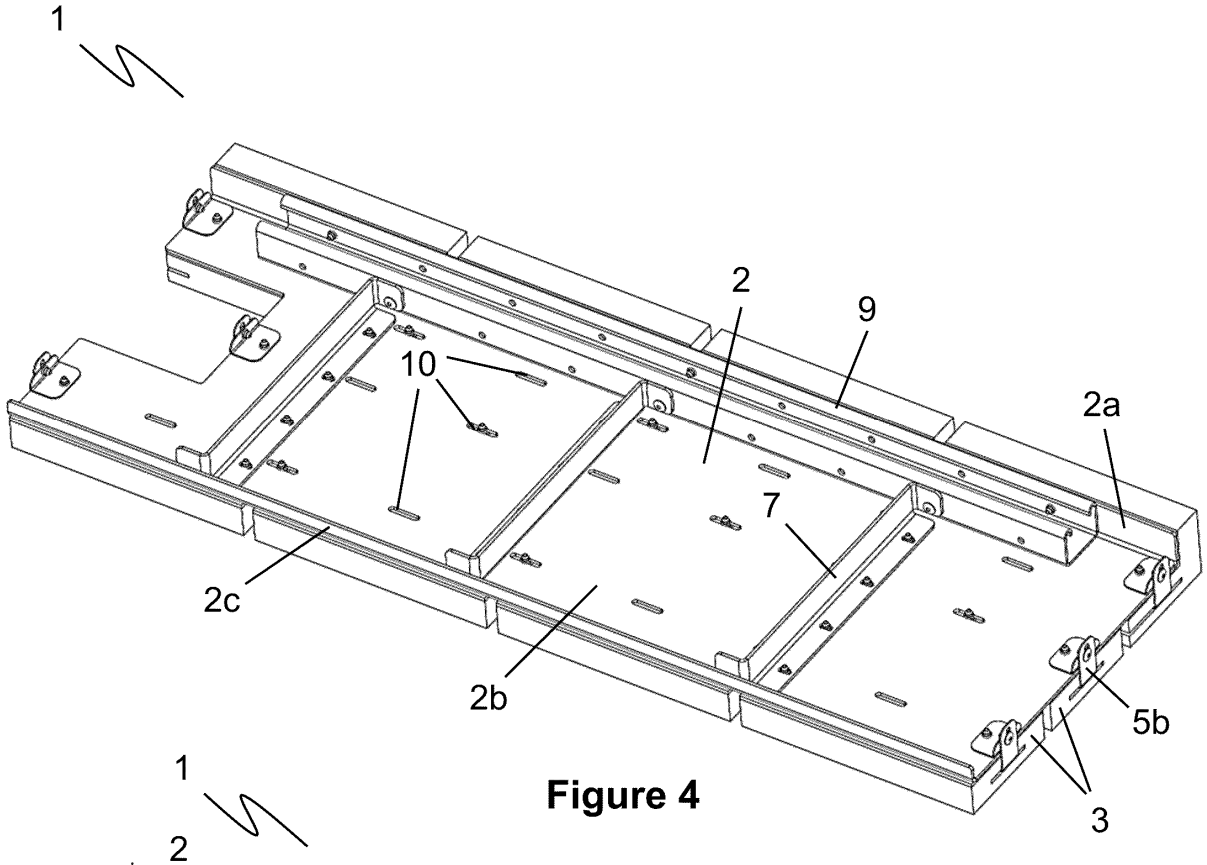

Figure 4

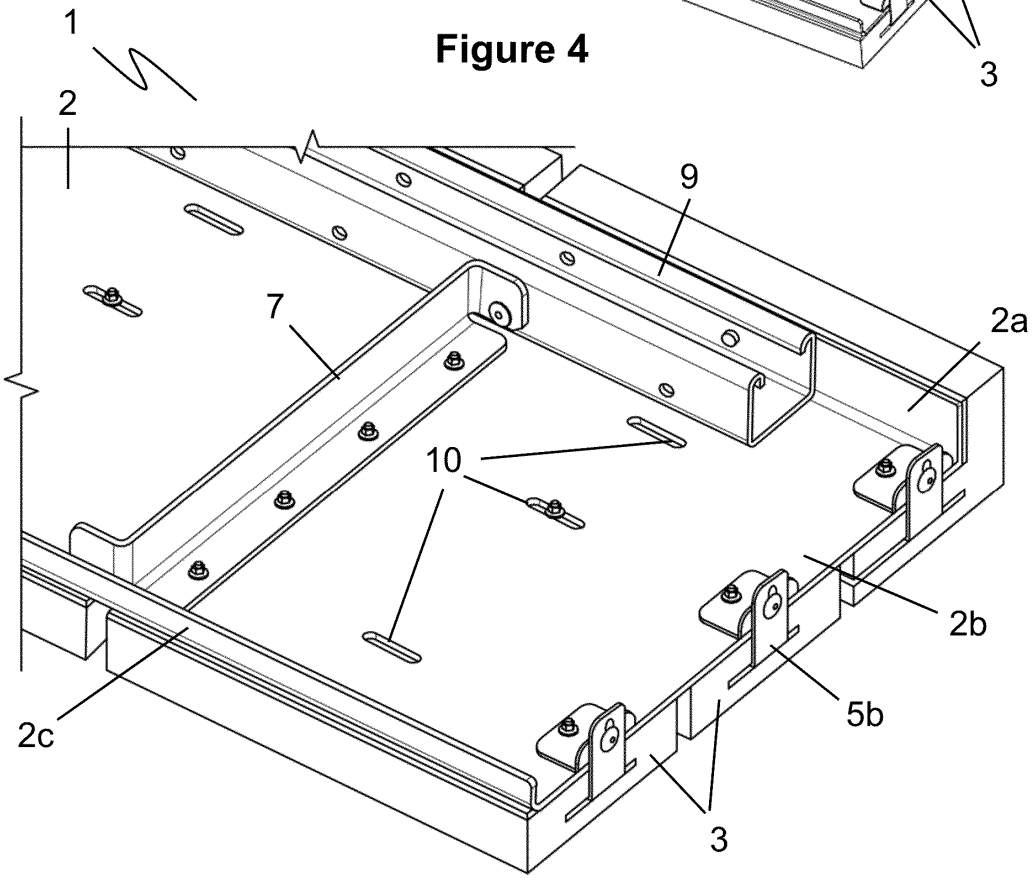

Figure 5

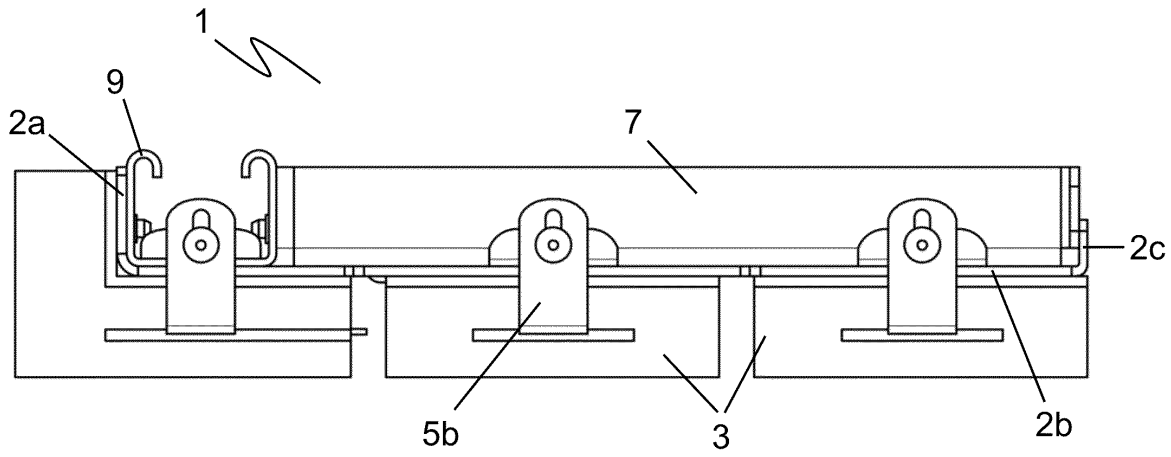

Figure 6

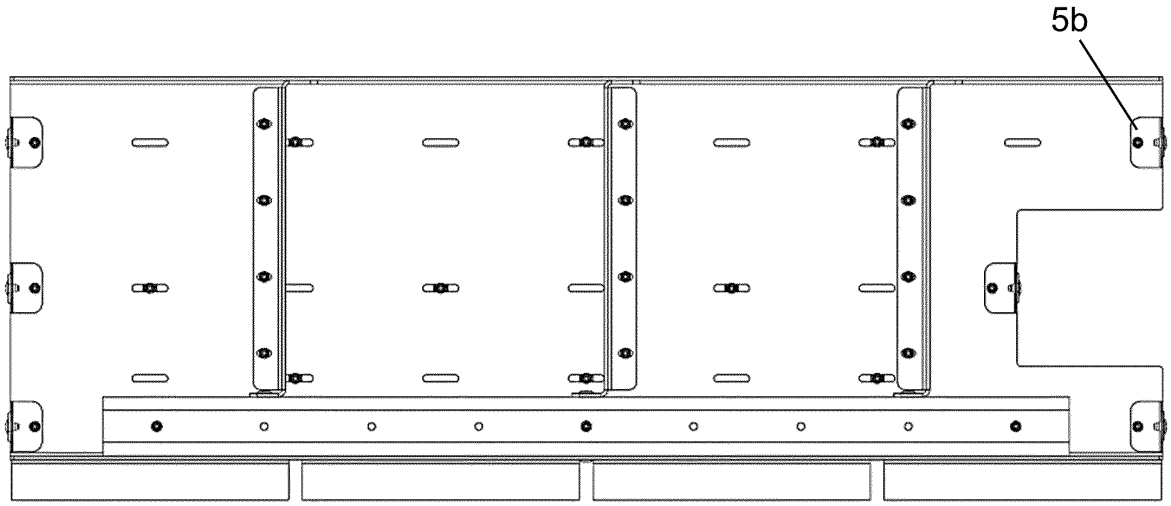

Figure 7

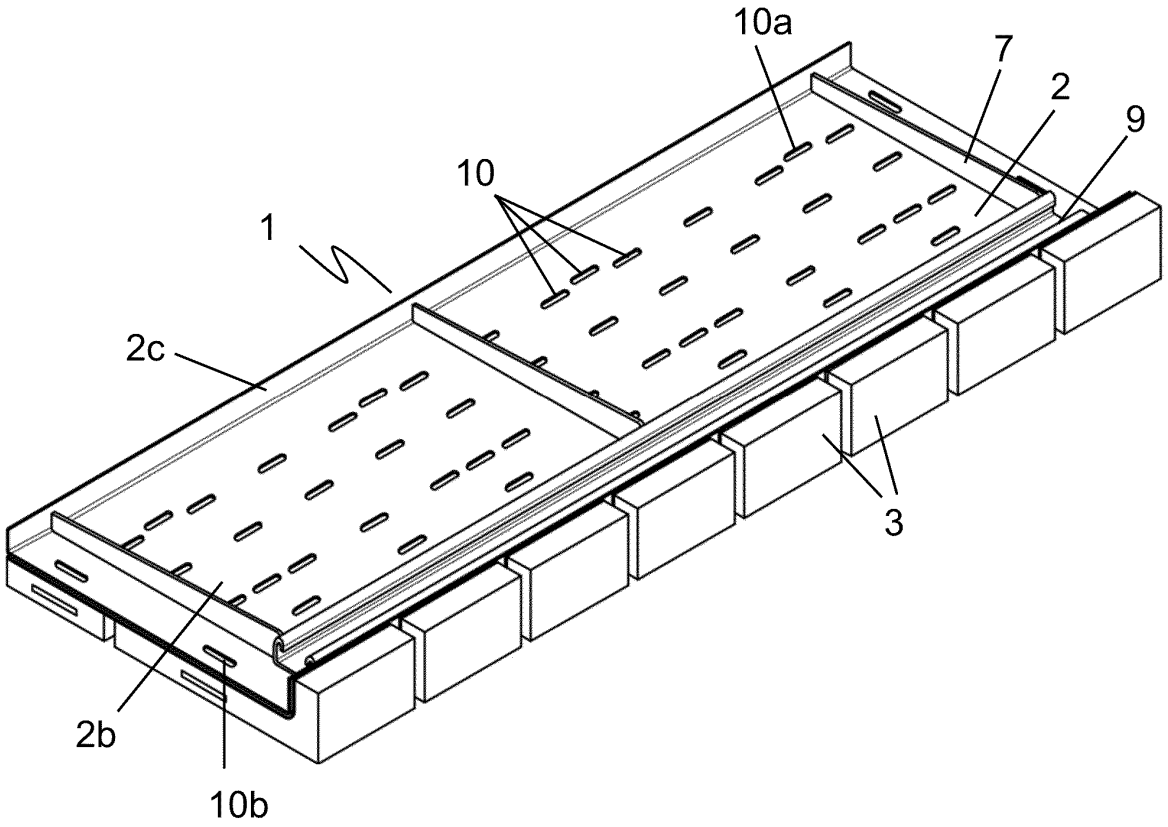

Figure 8

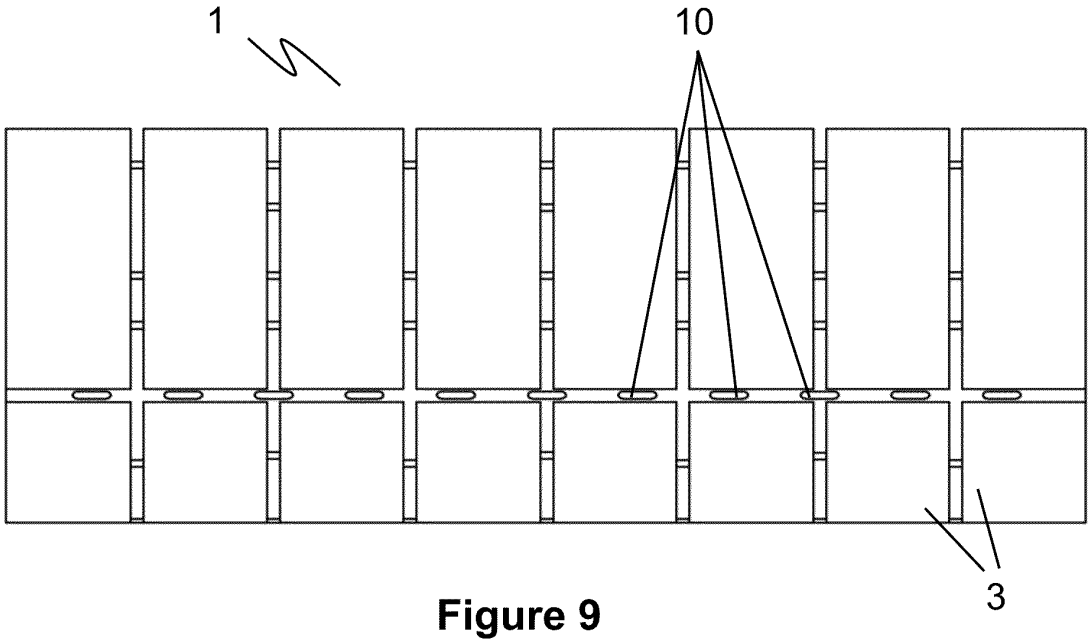

Figure 9

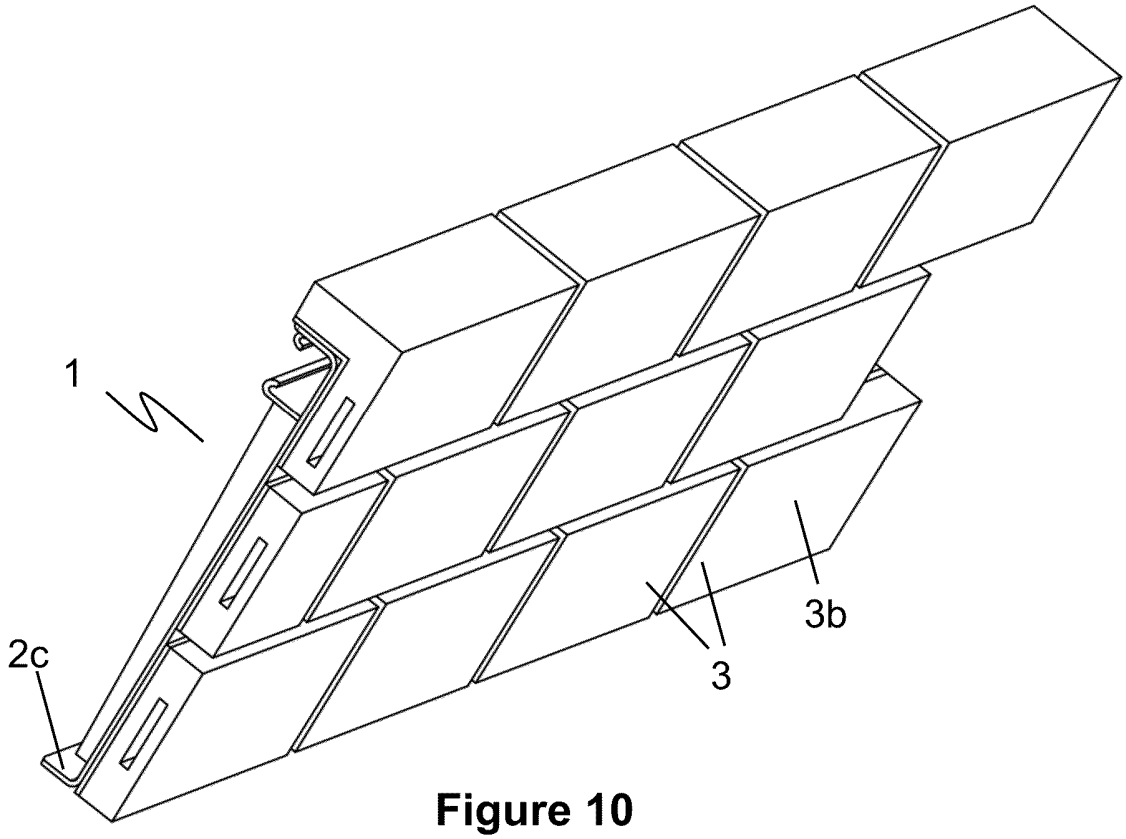

Figure 10

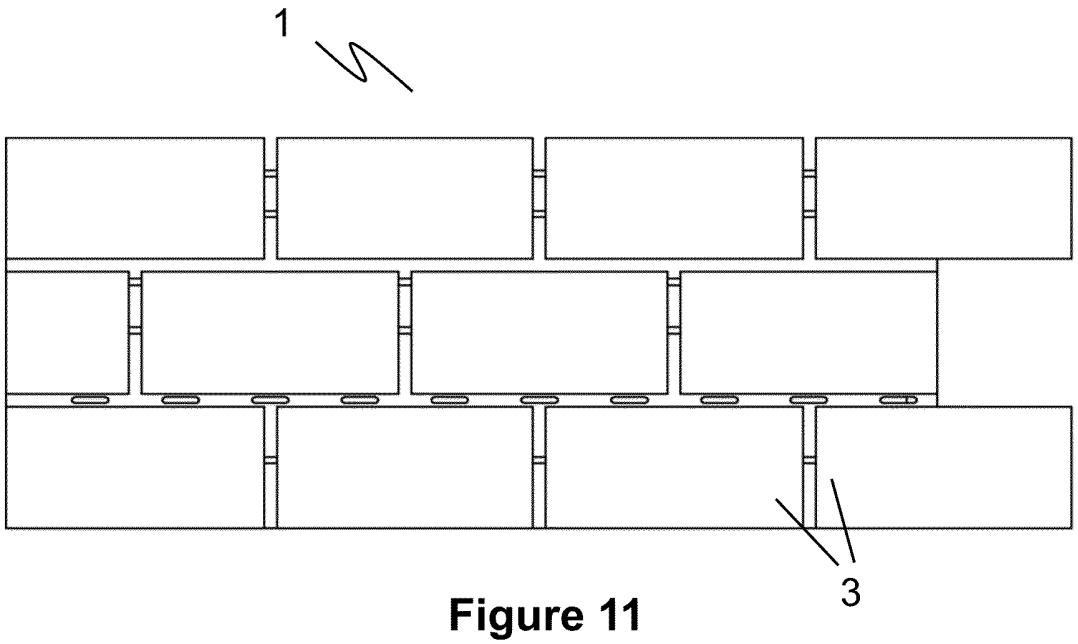

Figure 11

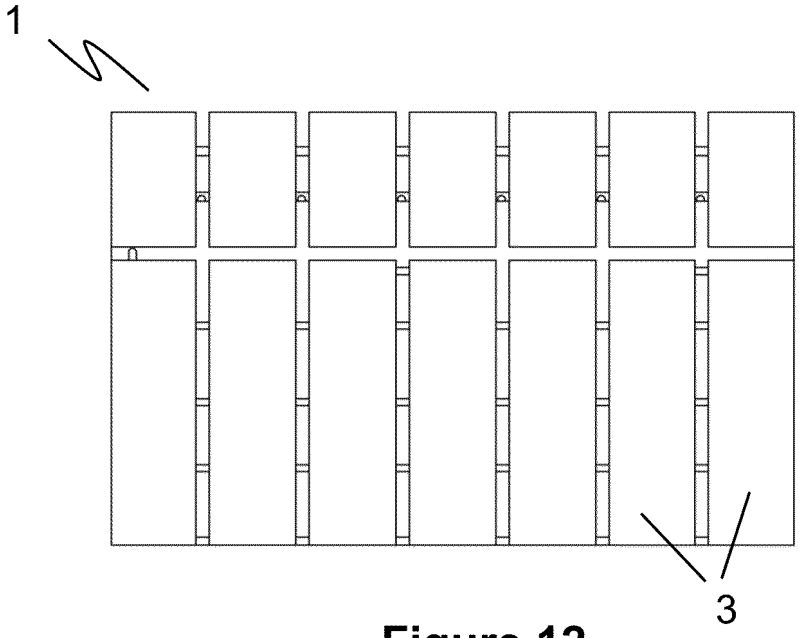

Figure 12

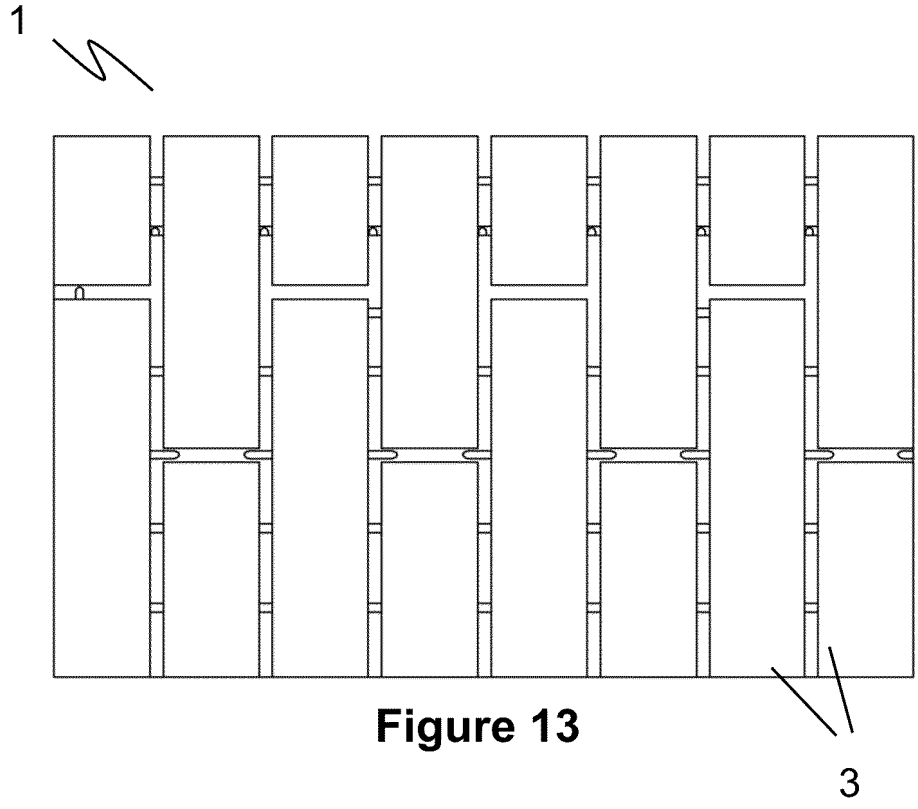

Figure 13

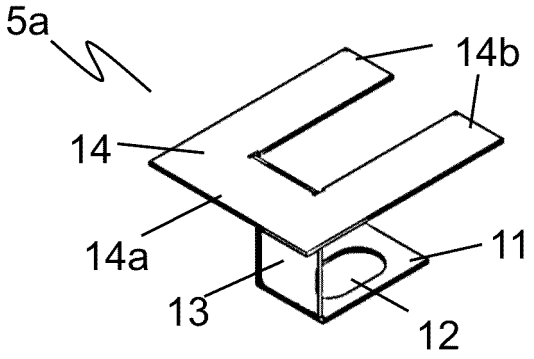

Figure 14

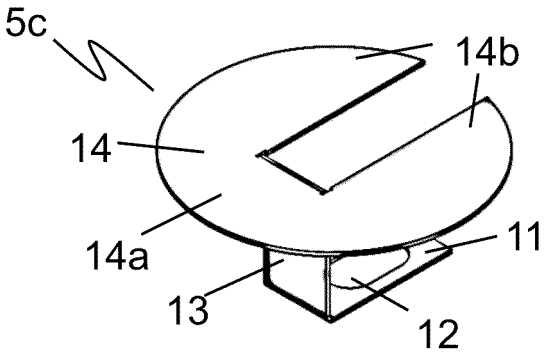

Figure 15

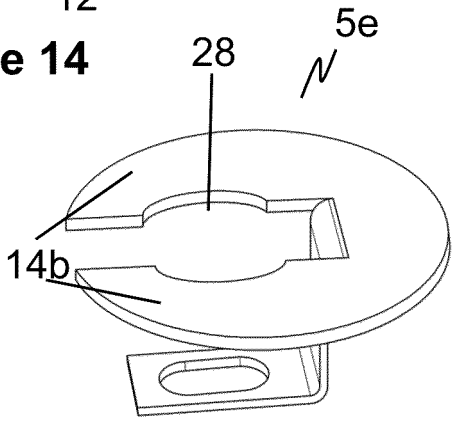

Figure 17

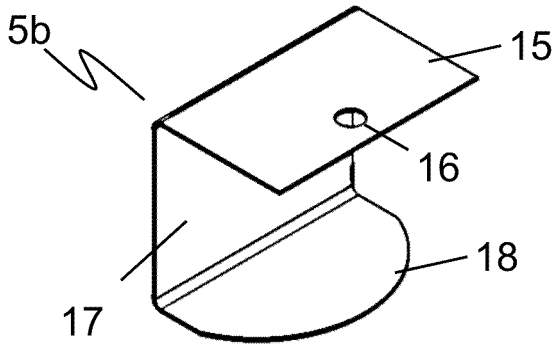

Figure 16

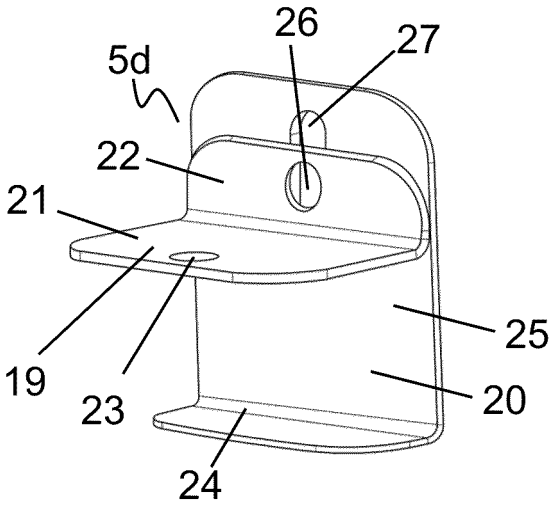

Figure 18

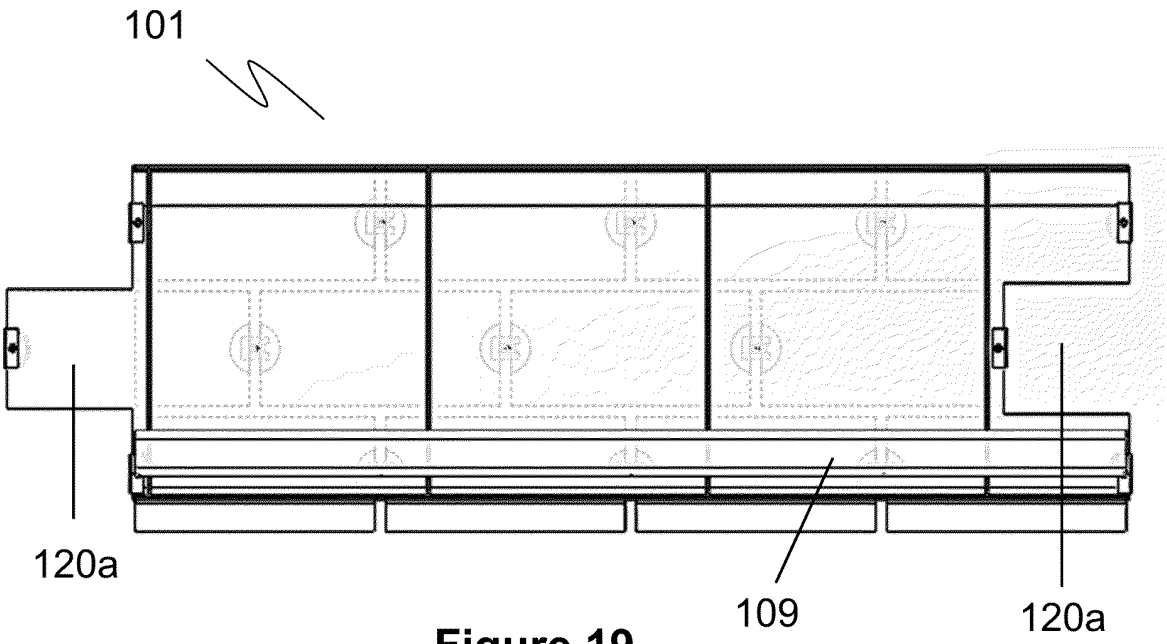

Figure 19

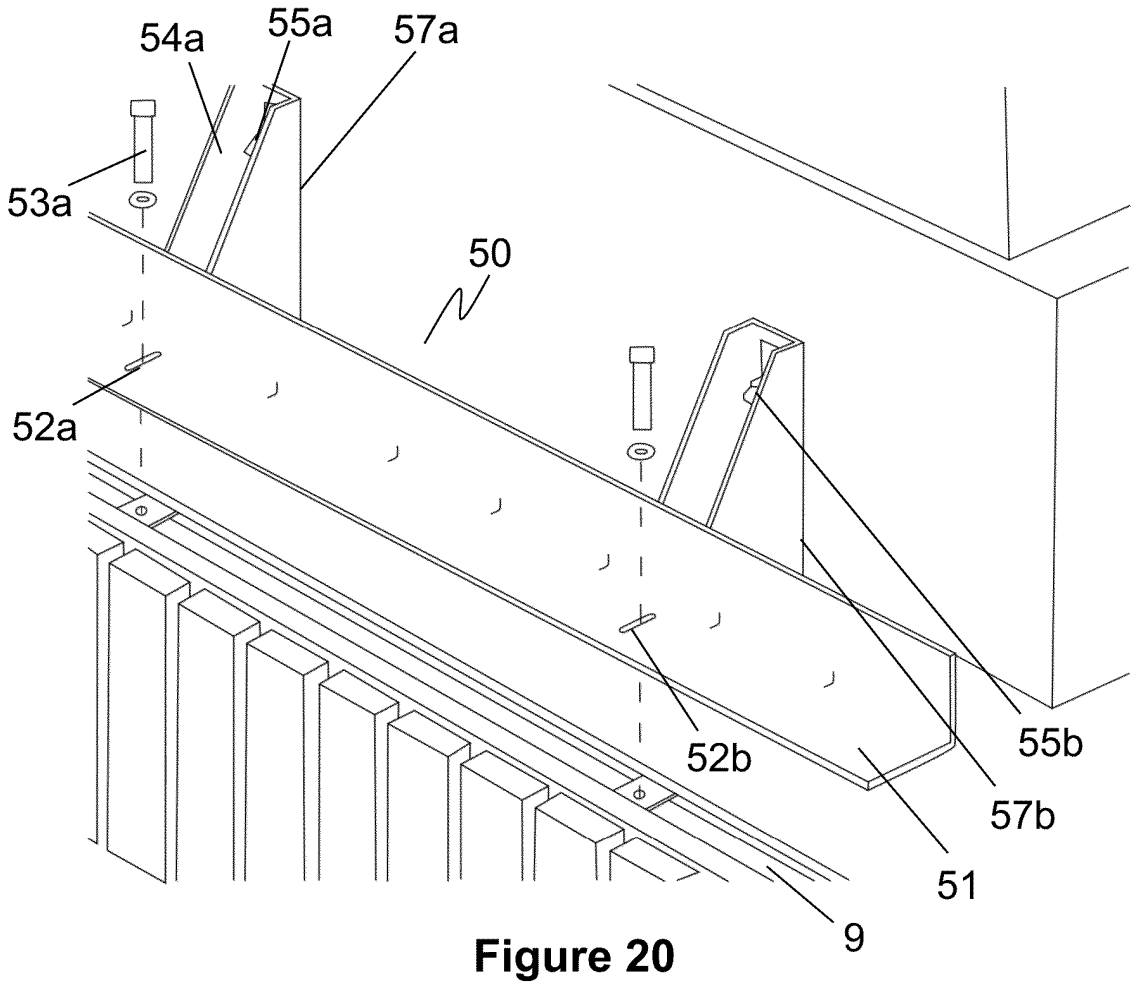

Figure 20

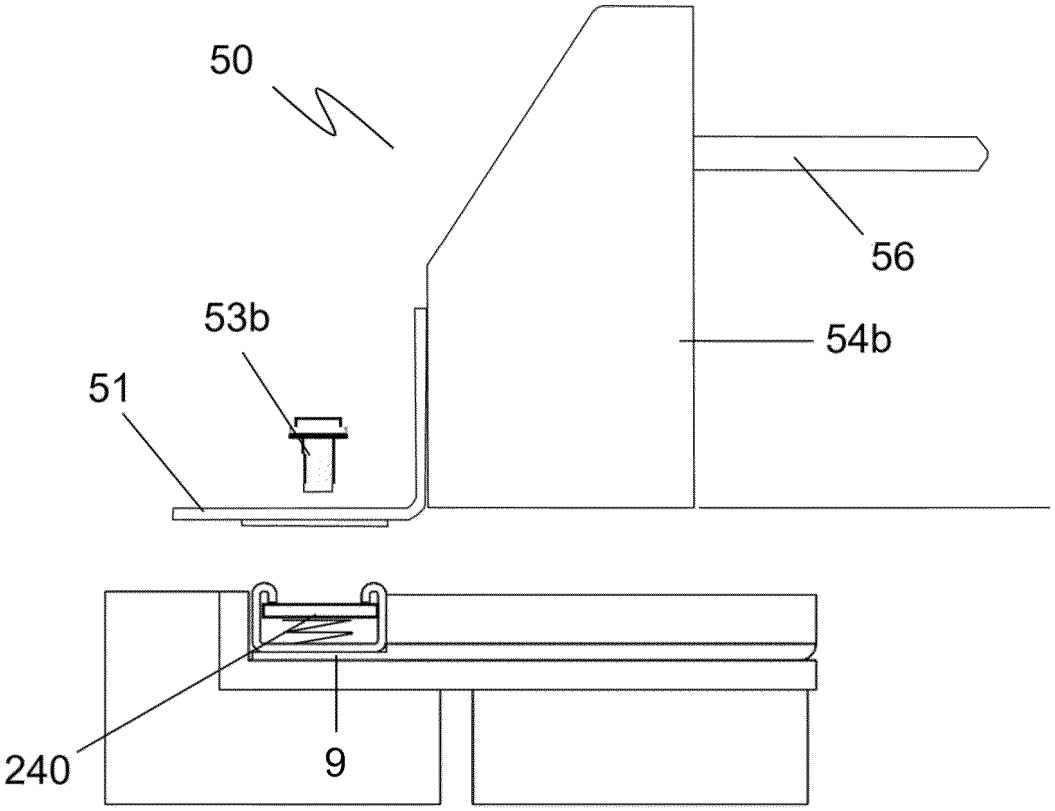

Figure 21