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(71) Applicant: **Surefix (Midlands) Ltd**
Swadlincote Derbyshire DE11 8EG (GB)

(72) Inventors:
- **KENDRICK, Alexander James**
Swadlincote Derbyshire DE11 8EG (GB)
- **BREALEY, Richard David**
Swadlincote Derbyshire DE11 8EG (GB)

(74) Representative: **Swindell & Pearson Limited**
48 Friar Gate
Derby DE1 1GY (GB)

(54) **RISE AND FALL GUTTER BRACKET**

(57) A rise and fall gutter bracket (100) comprising: a lateral member (110) comprising a threaded end (112) for connecting to a wall anchor (4) embedded in a structural wall (1); and a bracket structure (130) for receiving a gutter (5), the bracket structure (130) connected to the lateral member (110).

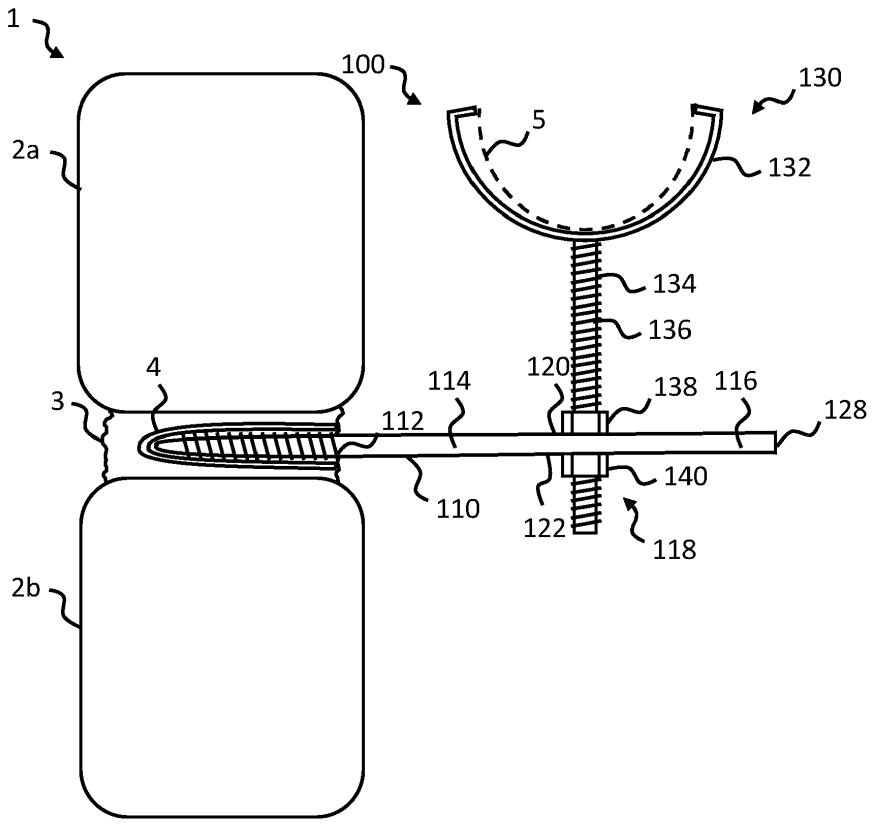

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate to a rise and fall gutter bracket and an associated kit. In particular, they relate to a rise and fall gutter bracket for a masonry wall.

BACKGROUND TO THE INVENTION

[0002] Rise and fall gutter brackets are a type of gutter support that do not require a fascia board. They are anchored directly into the mortar of a masonry wall or into a concrete wall. The brackets are spaced at regular centres to support a rainwater gutter from beneath.

[0003] A rise and fall gutter bracket comprises a lateral member in the form of a wall pin having a spike end, and an upright member supporting a bracket structure. The upright member is height-adjustable, to enable a fall of the gutter to be set.

[0004] To install a rise and fall gutter bracket at the top of a brick and block masonry wall, the installer first drills an opening in the mortar supporting a top course of bricks. The opening may be a through-hole. The installer then inserts the rise and fall gutter bracket into the opening by hammering the spike end of the lateral member into the mortar. The spike extends through a cavity and into blockwork. The installer would then inject resin or other sealant into the brickwork opening, although some installers omit this step.

[0005] Rise and fall gutter brackets have been used in the above manner for many decades despite having several disadvantages.

[0006] Firstly, the installer should take time to ensure that the upright members are all in line to achieve a sufficiently straight line for the gutter. If the drilled opening in the mortar is not sufficiently accurate, this may not be possible.

[0007] Secondly, the drilling and hammering steps can cause the top course of bricks to become loose.

[0008] Thirdly, the connection to the mortar may not be particularly strong. The sealant may be missing or incomplete. The lateral member may only be loosely retained in the opening. The opening may have a different shape than the lateral member and may be oversized. The mortar connection may also be vulnerable to water and frost damage, causing mortar and bricks to crumble over time. Brackets can become dislodged as a result of rain, snow, ice, wind, wildlife, or impacts from ladders.

[0009] Fourthly, the rise and fall gutter bracket is difficult to remove for maintenance, especially if it is sealed in place.

[0010] Fifth, the opening in the brickwork is a through-hole and the lateral member extends through the cavity wall. This provides a thermal bridge for heat loss, especially because the lateral member is made of metal.

[0011] Sixth, the installation process may generate brick dust and particles which may be blown into the cavity, causing further structural damage.

[0012] Seventh, rise and fall gutter brackets are typically pre-installed by bricklayers as per manufacturer's instructions, before a plumber fits the gutter. However, bricklayers do not always fit the brackets at the correct distances from the wall, so the line formed by the upright members may not be straight and parallel to the wall. The brackets may also be missing where the gutter outlet needs support. Therefore, the plumber who later fits the gutter to the brackets may need to break out the brackets and install more brackets, which defeats the objective of 'building them in'. It should also be noted that pre-installed brackets can lead to a trip hazard or shin impacts for those walking on scaffolding past the brackets.

[0013] Eighth, the lateral member is long and may need to be cut down where lintels are fitted, to prevent hitting the lintels.

BRIEF DESCRIPTION OF VARIOUS EMBODIMENTS OF THE INVENTION

[0014] According to an aspect of the invention there is provided a rise and fall gutter bracket comprising:

a lateral member comprising a threaded end for connecting to a wall anchor embedded in a structural wall; and
a bracket structure for receiving a gutter, the bracket structure connected to the lateral member.

[0015] According to another aspect of the invention there is provided a rise and fall gutter bracket comprising:

a lateral member comprising a threaded end; and
a bracket structure for receiving a gutter, the bracket structure connectable to the lateral member after the lateral member has been anchored into the structural wall.

[0016] The advantage is an overall improved rise and fall gutter bracket. The strength of the anchoring connection is greater because there is minimal damage to the mortar and because the threaded end can tightly connect to a wall anchor. This type of anchoring connection reduces the possibility of damage to the mortar because no hammering is required, and because the connection is sealed against moisture ingress. In some examples, the anchoring process is rapid because the lateral member may be rotatable about its own axis, for example via a tool adapter attached to an end of the shank, to screw the threaded end into a wall plug. The bracket structure can then be attached once the lateral member is anchored. Further, the connection is rapidly reversible by unscrewing the lateral member, without leaving behind damaged mortar.

[0017] A threaded length of the threaded end of the lateral member may be suitable for anchoring in the mor-

tar of a brick wall. The threaded length of the threaded end of the lateral member may be greater than 40 millimetres. The threaded length may be no greater than 110 millimetres. Threads may extend all the way to a pointed tip of the threaded end of the lateral member.

[0018] The lateral member may be configured to cantilever the bracket structure away from the structural wall such that a lateral gap is provided between the bracket structure and the structural wall. The end-to-end length of the lateral member may be at least 150.

[0019] The end-to-end length of the lateral member may insufficient to reach an interior block wall, for example the length may be less than 400 millimetres. If the length is less than for example 300 millimetres, the bracket does not need to be cut down to prevent it from hitting a lintel, if a lintel is present.

[0020] The lateral member may comprise a connection portion to which the bracket structure is connectable. The connection portion of the lateral member may be configured to enable the bracket structure to be repositioned laterally, towards and away from the threaded end of the lateral member. This enables the lateral position of the bracket structure from the structural wall to be set. This is especially useful if the structural wall is bowed. The connection portion may provide a slotted connection. The lateral member may comprise a slot defining the connection portion.

[0021] The lateral member may be substantially straight. The lateral member may comprise a shank section. The shank section may be approximately coaxial with the threaded end. The bracket structure may be connectable to the shank section of the lateral member. The shank section may comprise the connection portion.

[0022] The shank section of the lateral member may comprise a structural plate section.

[0023] The lateral member may provide a clamping surface to which the bracket structure is connectable. The structural plate section of the lateral member may provide the clamping surface to which the bracket structure is connectable. The structural plate section may provide a pair of opposite clamping surfaces to which the bracket structure is connectable. The clamping surface or surfaces may be a flat clamping surface. The opposite clamping surfaces may comprise top and bottom clamping surfaces. The shank section may comprise a rectangular cross-section. The clamping surface or surfaces may be at a boundary of the connection portion. The clamping surface or surfaces may be at a boundary of the slot.

[0024] The lateral member may comprise a tool head opposite the threaded end. The tool head may define a plug to which a socket of a tool is attachable. The tool head may be coaxial with the threaded end. The tool head may be an exposed end of the shank section. The tool head may be an exposed end of the structural plate section. The tool head may comprise a rectangular cross-section.

[0025] The bracket structure may comprise an upright member connectable to the lateral member.

[0026] The bracket structure may comprise a gutter holder connected to the upright member. The gutter holder may be shaped to receive the gutter. The gutter may be lowerable into the gutter holder in use. The gutter holder may comprise a shape corresponding to a shape of the gutter. The gutter holder may comprise a curved shape.

[0027] The upright member may be configured to elevate the gutter holder above the lateral member. The gutter holder may be supported from beneath by the upright member.

[0028] The upright member may be approximately perpendicular to the lateral member when connected to the lateral member. The upright member may be a vertical member. The lateral member may be a horizontal member. The lateral member may be perpendicular to the structural wall, in use.

[0029] The upright member may be connectable to the lateral member after the lateral member has been anchored into the structural wall.

[0030] The upright member may be securable to the connection portion of the lateral member. The upright member may be releasably securable to the lateral member via one or more clamps. The upright member may be releasably securable to the connection portion of the lateral member via one or more clamps.

[0031] The upright member may comprise a threaded bar securable to the lateral member via the one or more clamps. The one or more clamps may comprise threaded nuts engaged with the threaded bar. The threaded bar may comprise a diameter less than a width of the slot. The upright member may therefore be insertable into the slot. A pair of clamps may be provided, one to each side of the slot of the lateral member. The clamps may engage with the clamping surfaces of the lateral member.

[0032] The connection portion may enable the upright member to move laterally to set the lateral position of the bracket structure.

[0033] The bracket structure may be movable vertically relative to the lateral member to set a height of the bracket structure relative to the lateral member. The upright member may be movable vertically relative to the lateral member to set a height of the bracket structure relative to the lateral member. The vertical movement may be enabled via the one or more clamps. The vertical movement may be enabled by adjusting a height of the one or more clamps along the upright member.

[0034] According to various, but not necessarily all, embodiments of the invention there is provided a rise and fall gutter bracket kit comprising the rise and fall gutter bracket. The kit may comprise the wall anchor. The wall anchor may be an expandable wall anchor, which expands when the threaded end is anchored in the wall anchor. The kit may comprise a tool adapter configured to engage with the tool head of the lateral member. The tool adapter may comprise a socket into which the tool head of the lateral member is insertable. The tool adapter

may comprise a drill shank.

[0035] According to a further aspect of the invention there is provided a method of installing a rise and fall gutter bracket as defined above. The method comprises:

inserting a wall anchor into a structural wall;
screwing the lateral member into the wall anchor;
connecting the bracket structure to a connection portion of the lateral member;
setting a lateral and/or vertical position of the bracket structure relative to the lateral member, via the connection portion; and
inserting a gutter into the bracket structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] For a better understanding of various examples of embodiments of the present invention reference will now be made by way of example only to the accompanying drawings in which:

FIG. 1 illustrates a side view of a rise and fall gutter bracket;
FIG. 2 illustrates a top view of a lateral member of the rise and fall gutter bracket;
FIG. 3 illustrates an end view of the lateral member; and
FIG. 4 illustrates a perspective view of a tool adapter.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS OF THE INVENTION

[0037] FIG. 1 schematically illustrates a side view of a rise and fall gutter bracket 100, in situ after installation. A gutter 5 is supported by the rise and fall gutter bracket 100. The gutter 5 is an approximately horizontal channel upstream of a downpipe (not shown) of a guttering system. The gutter 5 may comprise a 'fall' towards the downpipe, to promote gravity drainage.

[0038] The rise and fall gutter bracket 100 can be used with cavity walls. The rise and fall gutter bracket 100 can also be used with solid walls.

[0039] FIG. 1 illustrates a structural wall 1. The structural wall 1 comprises masonry. The masonry may comprise bricks 2a, 2b connected by mortar 3. The upper brick 2a may form part of a top course of bricks of the structural wall 1. A roof (not shown) may be provided above the top course of bricks. The roof may drain into the gutter 5 which is shown by dashed lines.

[0040] In one example, the structural wall 1 forms the outer skin of a brick and block wall. Blockwork (not shown) forming an inner skin of the structural wall 1 is not shown in FIG. 1. In another example, the structural wall 1 is a solid wall having no cavity.

[0041] In a further alternative example, the building material from which the structural wall 1 is made is other than masonry and mortar, but may have similar material properties. The structural wall 1 may comprise a cementitious material into which the rise and fall gutter bracket 100 can be embedded.

[0042] In the case of a cavity wall, the rise and fall gutter bracket 100 connects to the brickwork and does not extend through the cavity to the inner skin. The rise and fall gutter bracket 100 does not even extend into the cavity. Therefore, no thermal bridge is created.

[0043] In FIG. 1, the rise and fall gutter bracket 100 is embedded in the mortar 3 between bricks 2a, 2b. This prevents damage to the bricks 2a, 2b.

[0044] The depth of penetration of the rise and fall gutter bracket 100 can be less than the depth of a brick. The depth of a typical brick is 102.5mm or 112.5mm, for example. An example depth of penetration is up to approximately 90mm.

[0045] The main parts of the rise and fall gutter bracket 100 are now described with reference to FIGS. 1 and 2.

[0046] The rise and fall gutter bracket 100 comprises a lateral member 110 and a bracket structure 130. The lateral member 110 connects to the structural wall 1 and the bracket structure 130 is connected or connectable to the lateral member 110. The bracket structure 130 comprises an upright member 134 and a gutter holder 132 connected to the upright member 134. In another implementation, the upright member 134 can be omitted and the gutter holder 132 may be connected or connectable directly to the lateral member 110.

[0047] Starting from the top, the gutter holder 132 is shaped to receive the gutter 5. The gutter 5 is shown in dashed lines. There are various gutter shapes. Gutter shapes include K-style (ogee), half-round, or box.

[0048] The illustrated gutter 5 is a half-round gutter, characterised by a U-shape open at the top. The gutter holder 132 can therefore comprise a corresponding curved shape such as a half-round shape. The gutter holder 132 may comprise a strip of material bent into the required shape.

[0049] If the gutter shape is other than that shown, the shape of the gutter holder 132 may be correspondingly different.

[0050] The gutter holder 132 is shaped such that the gutter 5 can be lowered into the gutter holder 132. The gutter 5 may loosely rest in the gutter holder 132, or may be secured into the gutter holder 132 with fasteners or clips.

[0051] The upright member 134 is beneath the gutter holder 132. The top of the upright member 134 may be welded or otherwise fixed to the underside of the gutter holder 132. The upright member 134 is connected or connectable towards its lower end to the lateral member 110. The illustrated upright member 134 is a vertical member. The upright member 134 may extend substantially parallel to the structural wall 1. In other examples, the upright member 134 is mostly, but not entirely vertical (i.e., >45 degrees to horizontal). The upright member 134 may be straight.

[0052] The upright member 134 elevates the gutter holder 132 towards the top of the structural wall 1, to

collect water running off the eaves of the roof. The length of the upright member 134 may be a value greater than 50mm or greater than 80mm, depending on the implementation.

[0053] The gutter 5 and the bracket structure 130 are cantilevered away from the structural wall 1 by the lateral member 110 so that a lateral gap is provided between the gutter 5 and the structural wall 1 and between the bracket structure 130 and the structural wall 1. In other implementations, an edge of the gutter 5 or gutter holder 132 may be in contact with the structural wall 1.

[0054] The illustrated lateral member 110 is embedded in the structural wall 1 and extends in a lateral (horizontal) direction away from the structural wall 1 towards a distal end. The upright member 134 is connected to the lateral member 110 at a distal location laterally offset from the structural wall 1.

[0055] The illustrated lateral member 110 is a horizontal member. The lateral member 110 may extend substantially perpendicularly to the structural wall 1. In other examples, the lateral member 110 is mostly, but not entirely horizontal (e.g., <45 degrees to horizontal).

[0056] The illustrated lateral member 110 comprises a structural plate section 116 of a rectangular cross-section shape. The specific cross-section shape of the lateral member 110 may vary based on the specific implementation. For example, in other implementations the section may be rounded in cross-section. The lateral member 110 may comprise a metal material such as galvanised steel, stainless steel or carbon steel.

[0057] At one end of the lateral member 110 there is provided a threaded end 112 having a rounded cross-section shape, tapering to a pointed tip 124, and comprising threads extending all the way to the pointed tip 124. The threaded end 112 may have a nominal diameter of approximately 8/10/12mm.

[0058] The threaded end 112 may be welded or otherwise fixed to an end face of the structural plate section 116. The structural plate section 116 may be coaxial with the threaded end 112 so the structural plate section 116 can be regarded as a shank section 114 of the lateral member 110.

[0059] The threaded end 112 of the lateral member 110 enables the lateral member 110 to be rotated and screwed into a pre-installed expandable wall anchor 4 embedded in the mortar 3. The lateral member 110 can be screwed into the wall anchor 4 prior to connecting the bracket structure 130 to the lateral member 110, for ease of installation. The dimensions of the threaded end 112 and the expandable wall anchor 4 are matched to each other.

[0060] A threaded length of the threaded end 112 is suitable for achieving the penetration depth described above without extending all the way through the structural wall 1. In examples, the threaded length of the threaded end 112 is selected from the range 50-110mm although this can vary for different implementations. In an implementation, the threaded length is approximately 90mm, give or take 10mm.

[0061] The illustrated structural plate section 116, excluding the threaded end 112, has a length of at least 100mm. Therefore, the total end-to-end length of the lateral member 110 is a value greater than 150mm although this can vary for different implementations. The total end-to-end length of the lateral member 110 is enough that a wide gutter 5 is not in contact with the structural wall 1.

[0062] The end view of FIG. 3 shows the end of the structural plate section 116 of the lateral member 110. Conveniently, the exposed rectangular end of the structural plate section 116 provides a tool head 128. The tool head 128 acts as a male plug. FIG. 4 shows a tool adapter 6 comprising a female socket 6b shaped to fit with the tool head 128, and a drill shank 6a that can be engaged with the chuck of a drill, wrench, ratcheting screwdriver or the like. The drill shank 6a can comprise a cylinder, a hex shape, or another known shape suitable for drills.

[0063] The tool adapter 6 can be plugged into the end of the lateral member 110, enabling a drill or other tool to screw the lateral member 110 into the wall anchor 4. At this time, the upright member 134 and gutter holder 132 may not yet be connected to the lateral member 110, to enable quick and easy rotation of the lateral member 110. The lateral member 110 is substantially straight and therefore may be rotatable rapidly with minimal harmonic vibrations.

[0064] The tool adapter 6 and/or the tool head 128 can comprise a softer material 6 at the interface between the tool adapter 6 and the tool head 128. The material is softer than the material of the body of the tool adapter 6 and the material of the tool head 128. The softer material can prevent scratching of the lateral member 110 during winding. The material can comprise a nonmetal such as a polymer, for example.

[0065] In other examples, the tool adapter 6 comprises a male plug and the tool head 128 comprises a female socket.

[0066] The tool adapter 6, the rise and fall gutter bracket 100, and the wall anchor 4 may be provided as a kit (6, 100, 4).

[0067] Once the lateral member 110 is embedded in the structural wall 1, the bracket structure 130 is connected to the lateral member 110. The connection is movable relative to the lateral member 110, and is non-destructibly releasable to enable repositioning of the bracket structure 130 without having to move the lateral member 110. The manner in which the bracket structure 130 may be connected to the lateral member 110 is now described with reference to FIGS. 1-2.

[0068] The lateral member 110 comprises a connection portion 118 to form a laterally slidable connection with the upright member 134. The connection may be a slotted connection.

[0069] As shown in the illustrated example, one of the members comprises an opening 126, such as a slot, and the other member comprises a threaded bar 136 having a smaller diameter than the opening so that the threaded

bar 136 can be inserted through the opening/slot 126.

[0070] In a specific example, the lateral member 110 comprises a slot 126 as shown in FIG. 2, and the upright member 134 comprises a threaded bar 136 slidable laterally within the slot 126. The slot 126 is elongated in a lateral direction as dictated by the direction of the lateral member 110, so the upright member 134 can slide laterally to move the gutter 5 closer to and further away from the structural wall 1. This enables the lateral position of the bracket structure 130 from the structural wall 1 and eaves of the roof to be set. The length of the slot 126 may be at least twice the width of the slot 126 or at least three times the width of the slot 126. The length of the slot 126 may be at least 10mm or at least 30mm. The length of the slot 126 may be less than 200mm. In an implementation, the length of the slot 126 is approximately 50mm. The furthest part of the slot 126 from the threaded end 112 may be a distance of at least 100mm from the threaded end 112, such as approximately 140mm.

[0071] The threaded bar 136 can then be secured to the connection portion 118 via clamps 138, 140, such as threaded nuts on the threaded bar 136. In the illustrated example, the clamps 138, 140 clamp against flat clamping surfaces 120, 122 of the lateral member 110. The flat clamping surfaces 120, 122 refer to the top and bottom surfaces of the structural plate section 116, at the periphery of the slot 126. The clamps 138, 140 may be tightened against the clamping surfaces 120, 122 when the lateral position of the bracket structure 130 is set. The clamps 138, 140 can be loosened to free the bracket structure 130 for lateral repositioning. In another implementation, the opening 126 is threaded so multiple clamps 138, 140 may not be needed. In a further alternative implementation, the connection portion 118 is not laterally movable.

[0072] In order to adjust the height of the upright member 134 relative to the lateral member 110, the clamps 138, 140 may be wound or unwound along the threaded bar 136 to change the heights of the clamps 138, 140 along the threaded bar 136. The height can be adjusted across multiple brackets 100 to fine tune the 'fall' of the gutter 5.

[0073] A method of installation is now described.

[0074] First, the method comprises inserting a wall anchor 4 into a structural wall 1. This may comprise drilling a hole in the structural wall 1. The hole may be a blind hole.

[0075] Second, the method comprises screwing the lateral member 110 into the wall anchor 4. At this time, the bracket structure 130 is not connected to the lateral member 110. The screwing operation may be aided by connecting a tool to the tool head 128.

[0076] Third, the method comprises connecting the bracket structure 130 to the lateral member 110. This can comprise connecting the upright member 134 to the connection portion 118 of the lateral member 110.

[0077] Fourth, the method comprises setting a lateral and/or vertical position of the bracket structure 130 relative to the lateral member 110. The lateral position and height of the upright member 134 can be set in the manner described above.

[0078] Fifth, the method comprises inserting a gutter 5 into the bracket structure 130. The gutter 5 may be lowered into the gutter holder 132.

[0079] An alternative method of installation comprises building in the rise and fall gutter bracket 100 while constructing the structural wall 1. For example, a bricklayer may insert the bracket 100 before the mortar 3 is fully dry.

[0080] Although embodiments of the present invention have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the invention as claimed.

[0081] Features described in the preceding description may be used in combinations other than the combinations explicitly described.

[0082] Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

[0083] Although features have been described with reference to certain embodiments, those features may also be present in other embodiments whether described or not.

[0084] Whilst endeavoring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. A rise and fall gutter bracket comprising:

   a lateral member comprising a threaded end for connecting to a wall anchor embedded in a structural wall; and
   a bracket structure for receiving a gutter, the bracket structure connected to the lateral member.

2. The rise and fall gutter bracket of claim 1, wherein a threaded length of the lateral member is a value selected from the range greater than 40 millimetres and less than 110 millimetres, and/or wherein the lateral member has an end-to-end length of at least 150 millimetres to cantilever the bracket structure away from the structural wall such that a lateral gap is provided between the bracket structure and the structural wall.

3. The rise and fall gutter bracket of any preceding claim, wherein the lateral member comprises a connection portion to which the bracket structure is con-

nectable, wherein the connection portion of the lateral member is configured to enable the bracket structure to be laterally repositioned relative to the structural wall.

4. The rise and fall gutter bracket of claim 3, wherein the connection portion provides a slotted connection.

5. The rise and fall gutter bracket of any preceding claim, wherein the lateral member comprises a shank section, and wherein the shank section is approximately coaxial with the threaded end.

6. The rise and fall gutter bracket of any preceding claim, wherein the lateral member provides a clamping surface to which the bracket structure is connectable.

7. The rise and fall gutter bracket of any preceding claim, wherein the lateral member comprises a tool head opposite the threaded end.

8. The rise and fall gutter bracket of any preceding claim, wherein the bracket structure is connectable to the lateral member after the lateral member has been anchored into the structural wall.

9. The rise and fall gutter bracket of any preceding claim, wherein the bracket structure comprises an upright member connectable to the lateral member.

10. The rise and fall gutter bracket of claim 9, wherein the upright member is connectable to the lateral member after the lateral member has been anchored into the structural wall.

11. The rise and fall gutter bracket of claim 9 or 10, wherein the upright member is releasably securable to the lateral member via one or more clamps, optionally wherein the upright member comprises a threaded bar securable to the lateral member via the one or more clamps.

12. The rise and fall gutter bracket of any preceding claim, wherein the bracket structure is movable vertically relative to the lateral member to set a height of the bracket structure relative to the lateral member.

13. A rise and fall gutter bracket kit comprising the rise and fall gutter bracket of any preceding claim, and the wall anchor.

14. A rise and fall gutter bracket kit comprising the rise and fall gutter bracket of any preceding claim, and a tool adapter configured to engage with the tool head of claim 7.

15. A method of installing a rise and fall gutter bracket, the method comprising:

inserting a wall anchor into a structural wall;
screwing the lateral member into the wall anchor;
connecting the bracket structure to a connection portion of the lateral member;
setting a lateral and/or vertical position of the bracket structure relative to the lateral member, via the connection portion; and
inserting a gutter into the bracket structure.

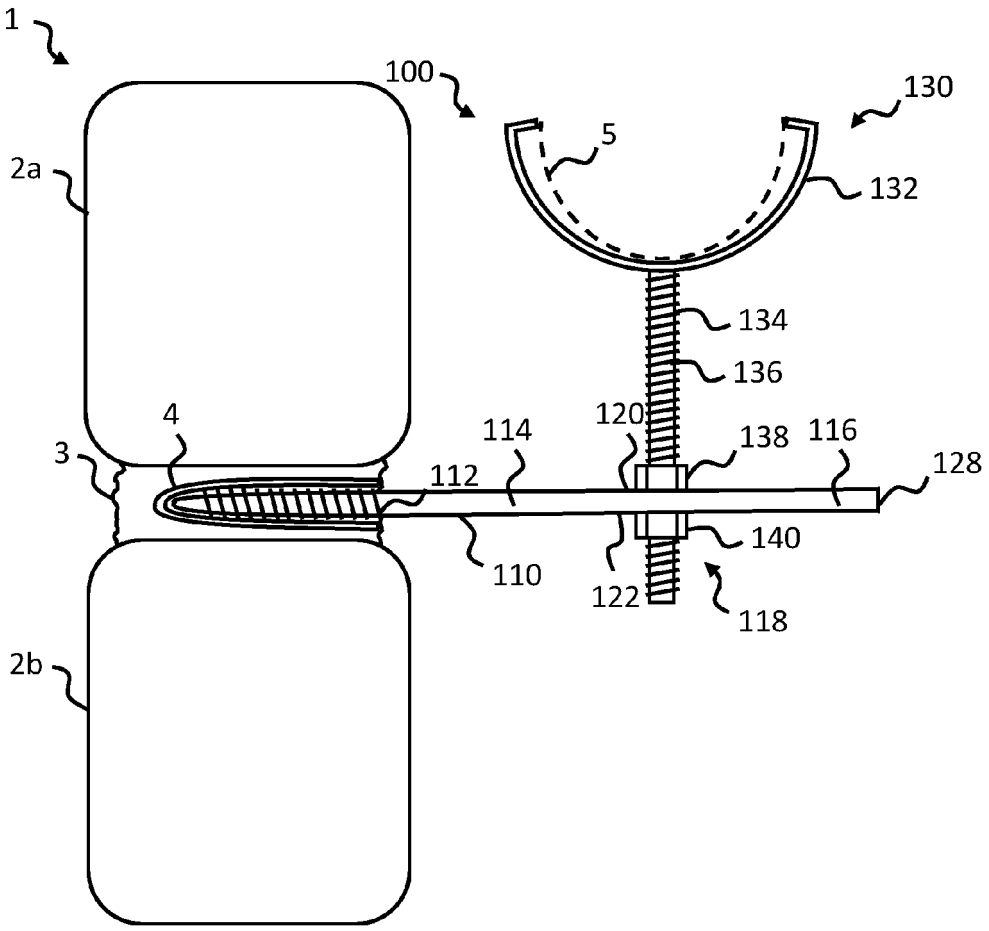

FIG. 1

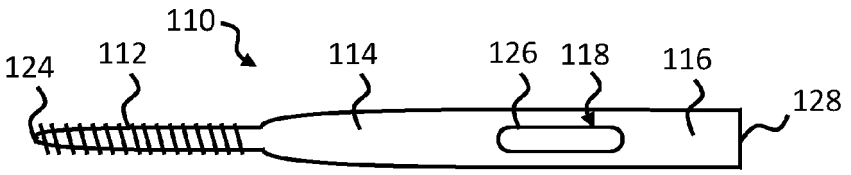

FIG. 2

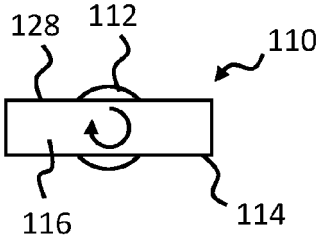

FIG. 3

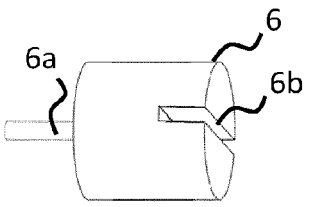

FIG. 4

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 6832

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search	Date of completion of the search	Examiner
The Hague	28 August 2023	Leroux, Corentine

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