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(54) **A GROUND SURFACE ACCESS ASSEMBLY FRAME AND METHOD OF INSTALLATION OR REPLACEMENT THEREOF**

(57) A ground surface access assembly frame (10, 110) surrounding and defining an aperture; said frame comprising sidewalls (12, 112) that extend downwardly to connect to an outwardly extending flange portion (14, 114) and further comprising a key-engaging member (16, 116) that extends upwardly from said support flange portion and comprises a pair of spaced-apart slots/recesses (18, 118) that allow engagement of a lifting key (K) by firstly sideways movement and then secondly upward movement of said key (K).

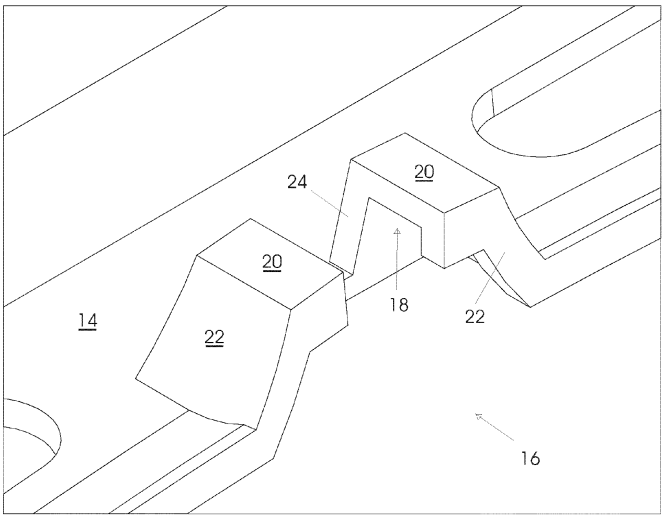

Figure 2

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Description

Technical Field

[0001] This invention relates to the frame of a ground surface access assembly; and in particular to means of engaging the flange with lifting keys in order to facilitate initial installation or subsequent removal.

Background Art

[0002] Ground surface access assemblies are widely employed in roadways and sidewalks/pavements. Typically, such assemblies include a frame with a flange and hinged or removable cover portion. Often such covers are relatively heavy and need to be handled using approved lifting gear, in order to avoid possible injury to operatives during installation or servicing. One or more Lifting Keys (in accord with BS 7903) are generally used to engage keyholes in the cover member. These keys engage the keyholes in a similar way to a key engaging a door-lock; that is by alignment of the key-blade with the keyhole, prior to insertion and the part rotation. Such keyholes are difficult to produce by the metal casting procedures typically used to manufacture such assembly covers and are prone to blockage by sand (after casting) and also (in normal use) by debris.

[0003] In use, after such assemblies have been installed in a roadway etc., subsequent removal of a frame and flange (rather than the cover) from bedding material, for replacement etc., can be difficult owing to a lack of provision for attachment of lifting gear to the frame.

Disclosure of Invention

[0004] An aim of the present invention is to provide a frame for a ground surface access assembly that is easier and safer to install or replace than existing frames because means for engaging lifting keys are provided on the frame; in particular on the frame flange, the frame side-walls, or both.

[0005] In a first aspect the invention comprises a ground surface access assembly frame surrounding and defining an aperture, with sidewalls that extend downwardly to connect to an outwardly extending flange portion: said frame comprising at least one key-engaging member that extends externally/outwardly from said frame, and further comprises a pair of spaced-apart members, located in a raised position relative to the general level of said flange portion; and a slot/recess located on the underside of each spaced-apart member, configured to allow engagement of a lifting key (K) having a shaft (Ks) by firstly sideways movement of the shaft (Ks) to a position between said spaced-apart members followed by upward movement of said key (K) towards said underside slots/recesses.

[0006] The key-engaging member may extend upwardly from said flange portion or may extend outwardly from a said frame sidewall. Alternatively, the key-engaging member may extend upwardly from said flange portion and outwardly from a said sidewall.

[0007] The underside slots/recesses may comprise a planar/flat upper face and at least one perpendicularly extending flat/planar side face. Where there are two (spaced-apart) side faces they, advantageously, restrain pivotal/rotational movement of the key shaft (Ks) relative to the frame, during the lifting sequence; especially where the centre-of-gravity of the frame is such that it otherwise wobble during lifting, and so result in an unstable, and less-safe lift. Optionally the slots/recesses may be arcuate or semi-circular in cross section.

[0008] The two spaced-apart members may be connected by an intermediate roof member to form a roof portion that presents a generally "U-Shaped" aperture; this allows sideways access to the lifting key shaft (Ks). This "U-Shaped" aperture also advantageously results in movement of a suitably configured key shaft (Ks) relative to the frame, during lifting, being restrained, owing to close proximity of the key shaft (Ks) to (or abutment against) the inner (e.g. semi-circular) sidewall of said aperture. Thus again, the frame is less likely to wobble during lifting, which confers a safety advantage. A bridge member may connect the roof portion to the sidewall.

[0009] The key-engaging member(s) may further comprise a sloping portion that extend downwardly from the outer end of each spaced-apart member and adjoin said flange portion.

[0010] Preferably, the flange portion is generally flat/planar and extends underneath said spaced-apart members.

[0011] The flange portion may not extend underneath said pair of key engaging members and the space therebetween.

[0012] Preferably, the key-engaging member is configured to allow engagement of a lifting key (K) by firstly sideways movement of the shaft of said key (K) to a position between said spaced-apart members followed by upward and non-rotational movement of said key (K) towards said underside slots/recesses.

[0013] In a second aspect the invention comprises a ground surface access assembly frame surrounding and defining an aperture, with sidewalls that extend downwardly to connect to an outwardly extending flange portion: said frame comprising at least one key-engaging member that extends externally/outwardly from said frame, and further comprises a pair of spaced-apart members that in use are engaged by a lifting key (K) having a shaft (Ks) by firstly sideways movement of the shaft (Ks) to a position between said spaced-apart members followed by upward movement of said key (K) towards said spaced-apart members.

[0014] In another aspect the invention comprises a method of lifting a ground surface access assembly frame according to any preceding claim, during initial installation or replacement; wherein said frame has at least two key-engaging members located on opposite sides of

said frame; using a pair of keys (K1, K2), each comprising a main shaft (Ks) and at least one radially extending side-arm (Kb), that in use engage said key engaging members; comprising the following steps:

(a) Engaging said lifting keys (K1, K2) within each key-engagement members by: firstly sideways movement of the main shaft (Ks) of said key (K1/2) to a position between said spaced-apart members; followed by upward movement of said keys (K1/2) towards said underside slots/recesses; and

(b) Lifting or lowering frame into desired bedding position using said pair of engaged keys (K1, K2) and either by hand or using approved lifting gear.

[0015] Preferably, in the above step (a) comprises: engaging said lifting keys (K1, K2) within each key-engagement members by firstly sideways none-rotational movement and then secondly movement of said keys (K1, K2), both movements being relative to said frame.

[0016] In another aspect the invention comprises a ground surface access assembly frame surrounding and defining an aperture, with sidewalls that extend downwardly to connect to an outwardly extending flange portion: said frame comprising at least one key-engaging member that extends externally from said frame, and further comprises a pair of spaced-apart members, located in a raised position relative to the general level of said flange portion; each of said spaced apart members having an underside slot configured to allow engagement of a lifting key (K) by firstly sideways movement of the shaft of said key (K) to a position between said spaced-apart members followed by upward movement of said key (K) towards said underside slots.

[0017] Preferably, the ground surface access assembly frame key-engaging member comprises a roof portion that has an aperture defining a keyhole and is located in a raised position relative to said flange portion. The key-engaging member may further comprise a downwardly extending portion that extends from an outer end of said roof portion. The underside surface of said roof portion may be arcuate or semi-circular in cross section.

[0018] Preferably, the ground surface access assembly frame key engaging member comprises a pair of spaced-apart key-engaging slots that are located side-by-side. Optionally, a pair of spaced-apart key-engaging slots share a single roof portion. The shared single roof portion may contain a generally "U-Shaped" aperture that allows access for the shaft (Ks) of a lifting key (K).

[0019] Preferably, said key-engaging member extends upwardly from said flange portion. Optionally, said key-engaging member extends outwardly from said frame sidewall. Optionally, said key-engaging member extends upwardly from said flange portion and outwardly from a said sidewall.

[0020] Optionally, the frame flange portion is generally flat/planar and extends underneath said pair of key engaging slots and the space there-between. Optionally, the ground surface access assembly frame (10) may further comprise a flange portion that is generally flat/planar but does not extend underneath said key-engaging slot(s).

[0021] In another aspect the invention comprises a ground surface access assembly frame surrounding and defining an aperture; said frame comprising sidewalls that extend downwardly to connect to an outwardly extending flange portion: and further comprising a key-engaging member that extends externally from said frame: configured to allow engagement of a lifting key (K) by firstly sideways none-rotational movement and then secondly upward movement of said key (K), both movements being relative to said frame.

[0022] In another aspect the invention comprises a ground surface access assembly frame surrounding and defining an aperture; said frame comprising sidewalls that extend downwardly to connect to an outwardly extending flange portion; and further comprising at least one key-engaging member that extends externally from said frame: configured to allow engagement of a lifting key by firstly sideways movement and then secondly upward movement of said key (K), both movements being relative to said assembly frame.

[0023] In another aspect the invention comprises a method of lifting a ground surface access assembly frame according to present invention, during initial installation or replacement; wherein said frame has at least two key-engaging members located on opposite sides of said frame; using a pair of keys (K1, K2), comprising a main shaft with at least one radially extending side-arm, that in use engages said key engaging members; and comprising the following steps:

(a) Engaging said lifting keys (K1, K2) within each key-engagement member by firstly sideways none-rotational movement and then secondly upward movement of said keys (K1, K2), both movements being relative to said frame;

(b) Lifting or lowering frame into desired bedding position using said pair of engaged keys (K1, K2), either by hand or using approved lifting gear.

Brief Description of Drawings

[0024] The present invention is illustrated by the following diagrammatic figures in which:

Figure 1 shows a perspective view of a ground surface access assembly frame according to a first embodiment of the invention;

Figure 2 shows an enlarged perspective view of one key engaging member;

Figures 3a and 3b show a lifting key about to be

inserted into the key-engaging member and engaged therein, respectively;

Figure 4 shows a perspective view of a ground surface access assembly frame according to a second embodiment of the invention, with a pair of keys engaged within two key-engaging members located on opposite sides of the frame, prior to lifting;

Figure 5 shows an enlarged perspective view of one key-engaging member for this second embodiment of the invention;

Figures 6a and 6b show a lifting key about to be inserted into the key-engaging member and engaged therein respectively, for this second embodiment of the invention;

Figure 7 shows a variant of the second embodiment illustrated in Figures 4-6; and

Figure 8 illustrates a side sectioned-view of a key-engagement member comprising a roof portion that is attached to a sidewall of the frame.

Detailed Description

[0025] Figure 1 shows a perspective view illustration of a ground surface access assembly frame (10) according to a first embodiment of the invention. The frame (10) surrounds and defines an aperture and comprises four sidewall portions (12) that extend downwardly; three of these sidewall portions (12) being connected via curved intermediate portions (12a) to three outwardly extending and generally planar flange portions that together form a flange (14).

[0026] The flange (14) further comprises a member(s) configured to allow engagement of a lifting key; thus a key-engaging member (16) extends upwardly the upper surface of at least one of said three flange portions.

[0027] Figure 2 shows an enlarged perspective view of the key-engaging member (16) illustrated in Figure 1, that provides a pair of spaced-apart key-engaging slots (18) defined by a pair of side-by-side, spaced-apart roof members (20) a pair of inclined/sloping portions (22) and a pair of rear sidewall portions (24). These two spaced-apart slots are (left and right hand) mirror images of one-another. The pair of inclined/sloping sidewall portions (22) extend downwardly from said spaced-apart members (20) and away from each other at an acute angle (in this illustration at ca. 45°) to the flange portion (14). Each key-engaging slot (18) is defined by a rear sidewall portion (24) that extends upwardly from the flange portion (14), preferably in a vertical direction; again leading to and being integrally formed with said spaced-apart member (20). The illustration shows the normal, generally planar, underside of the flange portion (14) being interrupted by the key-engaging member (16). As the flange portion (14) is preferably made by casting ferrous material, this open-bottom arrangement of the key-engaging member facilitates the casting process. However, this is optional and so the frame member may be uninterrupted (as described below in the second embodiment). Alternatively, the sidewall portions (22) may extent upwardly in a generally vertical direction. While the pair of key-engaging slots (18) are preferably formed by two/three generally perpendicular walls (20, 22, 24), these slots may comprise a continuous curved face, when using a lifting key that has a pair of (outwardly extending) blades of circular cross section.

[0028] Figures 3a and 3b show how a lifting key normally engages the key-engaging member (16) comprising a pair of spaced-apart members (20a, 20b). Figure 3a shows the blade (Kb) attached to the shaft (Ks) of a lifting key (K); where the shaft (Ks) is positioned near to and in front of an entry gap (G) located between the spaced-apart members (20a, 20b), such that the shaft (Ks) can be moved in a direction generally perpendicular to the rim of the flange portion (14), until it is located within the entry gap (G); the shaft (Ks) and attached blade (Kb) are then vertically lifted so that the two upper side faces of the key blade (Kb) engage the recesses (18) that extend downwardly from the underside face of the spaced-apart members (20a, 20b). Thus, the required engagement is achieved simply by: firstly sideways movement (towards the frame sidewall (12); and then secondly upward (vertical) movement of the key shaft (Ks) and blade (Kb); both movements being relative to the frame (10). Advantageously, the more complex movement (where a key is first aligned with a key-hole, then inserted, and then rotated to engage), normally required by such a key, is avoided. Further, in use the key-engaging member is less likely to become blocked with debris than a conventional keyhole, as the side entry arrangement is less susceptible such blockage, and can in any event be unblocked more easily.

[0029] Figures 4 to 6 illustrate a second embodiment of the present invention again using a pair of spaced-apart key-engaging slots (118) but in this case sharing a common roof portion (120) and having an uninterrupted flange portion (114a) underneath.

[0030] Figure 4 shows a perspective view illustration of a ground surface access assembly frame (10) according to this second embodiment of the invention. The frame (110) surrounds and defines an aperture and comprises four sidewall portions (112) that extend downwardly; three of these sidewall portions (112) being connected to three outwardly extending flange portions are that together form a flange (114). The flange (114) further comprises two members configured to allow engagement of a pair of lifting keys (K1 and K2); these key-engaging member (116) again being located on the upper surface of opposite (opposing) flange portions. The figure shows the pair of lifting keys engaged such that the frame can be moved either manually; or more preferably using approved lifting gear (not shown).

[0031] Figure 5 shows an enlarged perspective view of the key-engaging member (116) illustrated in Figure 4, that provides a pair of spaced-apart key-engaging slots (118) defined by a single of roof portion (120) a pair of sidewall portions (122) and a single rear-wall portion (124). These two spaced-apart slots are (left and right hand) mirror images of one-another. The pair of sidewall portions (122) extend generally vertically upwards from the upper surface of a flange portion (114) and lead to the single roof portion (120). Each key-engaging slot (118) is further defined by a single rear-wall portion (124) that extends upwardly from the frame flange (114), preferably in a vertical direction; again leading to and being integrally formed with said single roof portion (120). This single roof portion (120) has a U-Shaped aperture provided to allow access of a lifting key shaft (Ks) and also to form two separate (spaced apart) engagement slots (118). Also, the two sidewalls portions (122) and the single rear-wall portion have are generally U-Shaped cross-section, when viewed from above.

[0032] Figure 5 also shows the normal, generally planar, underside of the flange (114) being uninterrupted by the key-engaging member (116). This configuration of the key-engaging member facilitates/assists secure bedding of the frame upon its support surface. However, this is optional and so the frame member may be interrupted (as described above in the first embodiment). While each of the spaced-apart key-engaging slots (118) are formed by two/three generally perpendicular walls (120, 122, 124), these slots may comprise a continuous curved face - when using a lifting key that has a pair of (outwardly extending) blades (Kb) of circular cross section.

[0033] Figures 6a and 6b show how a lifting key can engage a key-engaging member (116). The two spaced-apart members (120a, 120b) are connected by an intermediate roof member (120c) to form roof portion (120) presenting a generally "U-Shaped" aperture that allows sideways access the lifting key shaft (Ks). Figure 6a shows the blade (Kb) attached to the shaft (Ks) of a lifting key (K); where the shaft (Ks) is positioned near to and in front of an entry gap (G) located between the spaced-apart members (120a, 120b), such that the shaft (Ks) can be moved in a direction generally perpendicular to the rim of the flange portion (14), until it is located within the entry gap (G); the shaft (Ks) and attached blade (Kb) are then vertically lifted so that the two upper side faces of the key blade (Kb) engage the recesses (118) that extend downwardly from the underside face of the spaced-apart members (120a, 120b). Thus, the required engagement is achieved simply by: firstly sideways movement (towards the frame sidewall (112); and then secondly upward (vertical) movement of the key shaft (Ks) and blade (Kb); both movements being relative to the frame (10). Advantageously, the more complex movement (where a key is inserted in a key-hole, and then rotated to engage), normally required by such a key, is avoided. Further, in use the key-engaging member is less likely to become blocked with debris than a conventional keyhole, as the side entry arrangement is less susceptible such blockage, and can in any event be cleaned more easily.

[0034] Figure 7 illustrates a variant of the second embodiment where a bridge member (128) connecting the roof portion (120) to the sidewall (112) is provided.

[0035] Figure 8 illustrates the key-engagement member (216) and part of the sidewall (212) and flange (214) for a further embodiment where the key-engagement member (216) comprises a pair (only one shown) of spaced-apart members (220) extending outwardly from a frame sidewall (212) the engagement slots (218) in the underside of the spaced-apart members (220) being semi-circular or arcuate in cross-section, this being particularly suitable when the blade (Kb) of the lifting key (K) is circular in cross-section. Alternatively, the engagement-slots (218) may be defined by a sidewall, the roof member (220) and a portion that extends downwardly from an outer end of this roof portion (220), as described in the earlier embodiments.

Claims

1. A ground surface access assembly frame (10) surrounding and defining an aperture, with sidewalls (12) that extend downwardly to connect to an outwardly extending flange portion (14): said frame (10) comprising at least one key-engaging member (16) that extends externally/outwardly from said frame (10), and further comprises a pair of spaced-apart members (20), located in a raised position relative to the general level of said flange portion (14); and a slot/recess (18) located on the underside of each spaced-apart member (20), configured to allow engagement of a lifting key (K) having a shaft (Ks) by firstly sideways movement of the shaft (Ks) to a position between said spaced-apart members (20) followed by upward movement of said key (K) towards said underside slots/recesses (18).

2. A ground surface access assembly frame (10) according to Claim 1 where said key-engaging member(s) (16) extend/extends upwardly from said flange portion (14).

3. A ground surface access assembly frame (10) according to Claim 1 where said key-engaging member(s) (16) extends/extend outwardly from a said frame sidewall (12).

4. A ground surface access assembly frame (10) according to Claim 1 where said key-engaging members extend upwardly from said flange portion (14) and outwardly from a said sidewall (12).

5. A ground surface access assembly frame (10) according to any preceding claim where said underside

slots/recesses (18) comprise a planar/flat upper face and at least one perpendicularly extending flat/planar side face.

6. A ground surface access assembly frame (10) according to any preceding claim where said underside slots/recesses (18) are arcuate or semi-circular in cross section.

7. A ground surface access assembly frame (10) according to any preceding claim where said spaced-apart members are connected by an intermediate roof member (120c) resulting in a roof portion (120) that presents a generally "U-Shaped" aperture, that allows sideways access the lifting key shaft (Ks).

8. A ground surface access assembly frame (10) according to any preceding claim where said key-engaging member(s) (16) further comprises sloping portions (22) that extend downwardly from the outer end of each spaced-apart member (20) and adjoin said flange portion (14)

9. A ground surface access assembly frame (10) according to any preceding claim wherein the flange portion (14) is generally flat/planar and extends underneath said spaced-apart members (20).

10. A ground surface access assembly frame (10) according to any of Claims 1 to 8 wherein the flange portion (14) does not extend underneath said pair of key engaging members (16) and the space therebetween.

11. A ground surface access assembly frame (10) according to Claim 7 comprising a bridge member (128) connecting the roof portion (120) to the sidewall (112).

12. A ground surface access assembly frame (10) according to any preceding claim wherein said key-engaging member (16) is configured to allow engagement of a lifting key (K) by firstly sideways movement of the shaft of said key (K) to a position between said spaced-apart members (20) followed by upward and non-rotational movement of said key (K) towards said underside slots/recesses (18).

13. A method of lifting a ground surface access assembly frame (10) according to any preceding claim, during initial installation or replacement; wherein said frame (10) has at least two key-engaging members (16) located on opposite sides of said frame (10); using a pair of keys (K1, K2), each comprising a main shaft (Ks) and at least one radially extending side-arm (Kb), that in use engage said key engaging members (16); comprising the following steps:

(a) Engaging said lifting keys (K1, K2) within each key-engagement members (16a, 16b) by: firstly sideways movement of the main shaft (Ks) of said key (K1/2) to a position between said spaced-apart members (20); followed by upward movement of said keys (K1/2) towards said underside slots/recesses (18); and

(b) Lifting or lowering frame into desired bedding position using said pair of engaged keys (K1, K2) and either by hand or using approved lifting gear.

14. A method of lifting a ground surface access assembly frame (10) according to Claim 13 where step (a) comprises: engaging said lifting keys (K1, K2) within each key-engagement members (16a, 16b) by firstly sideways none-rotational movement and then secondly movement of said keys (K1, K2), both movements being relative to said frame (10).

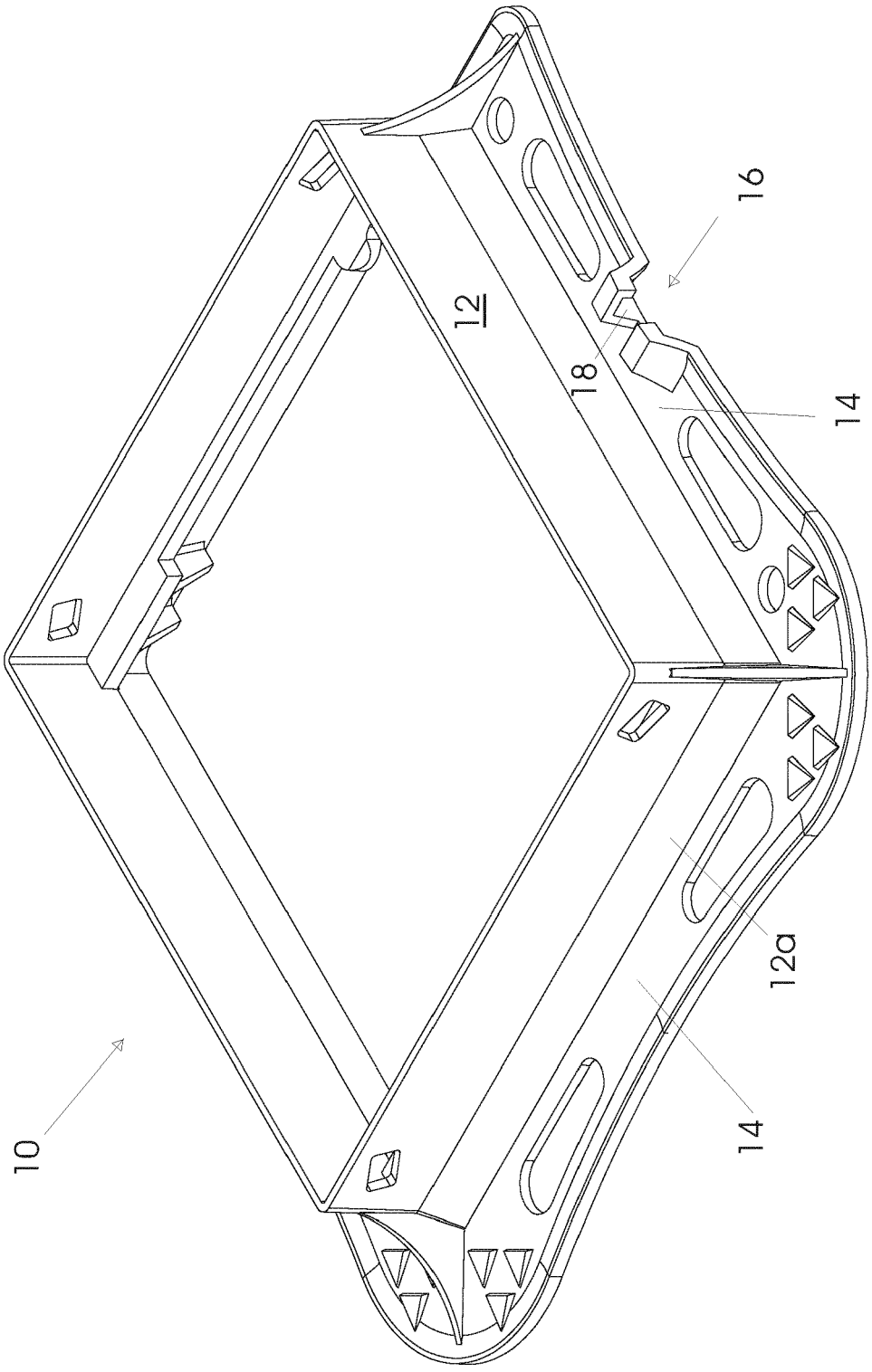

Figure 1

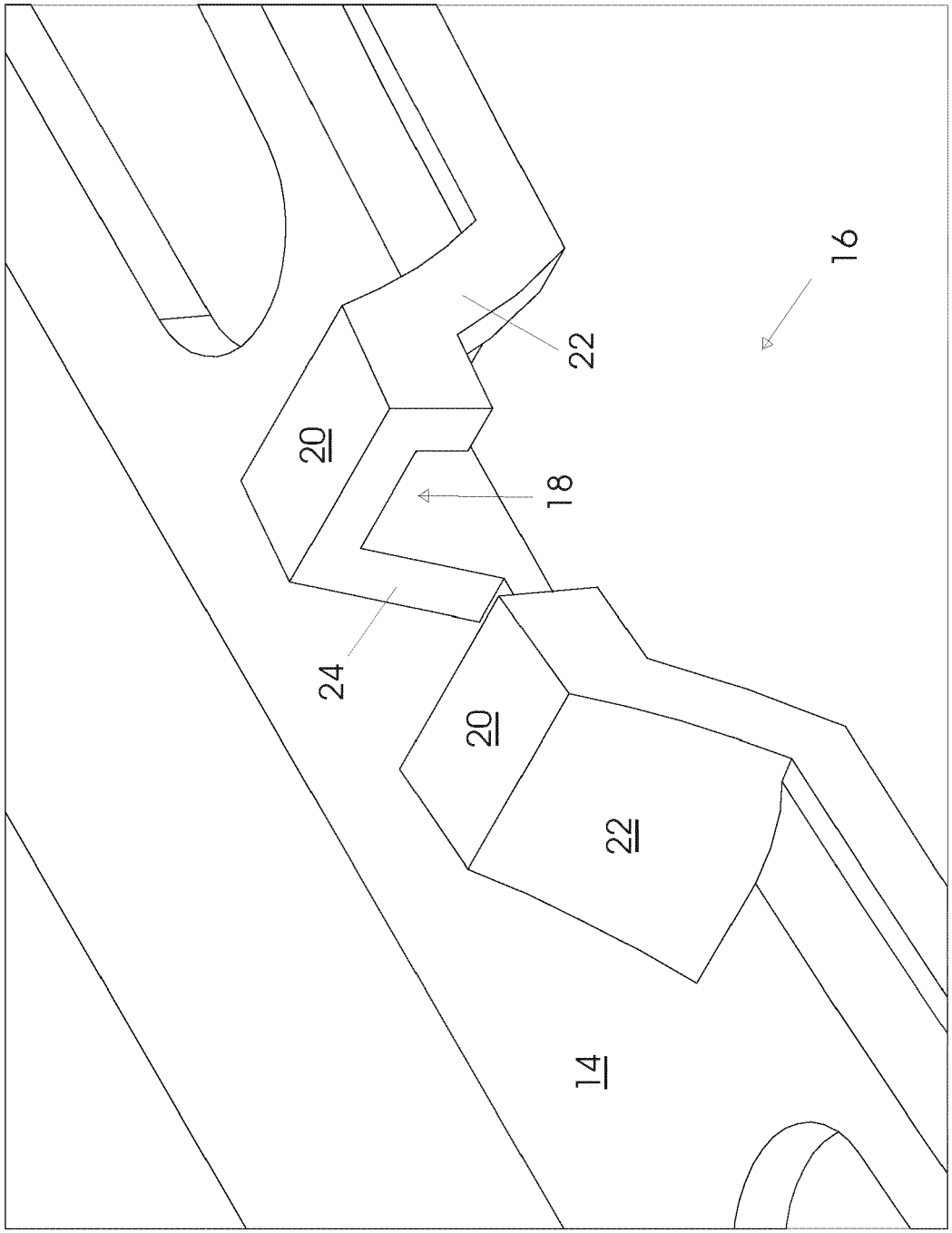

Figure 2

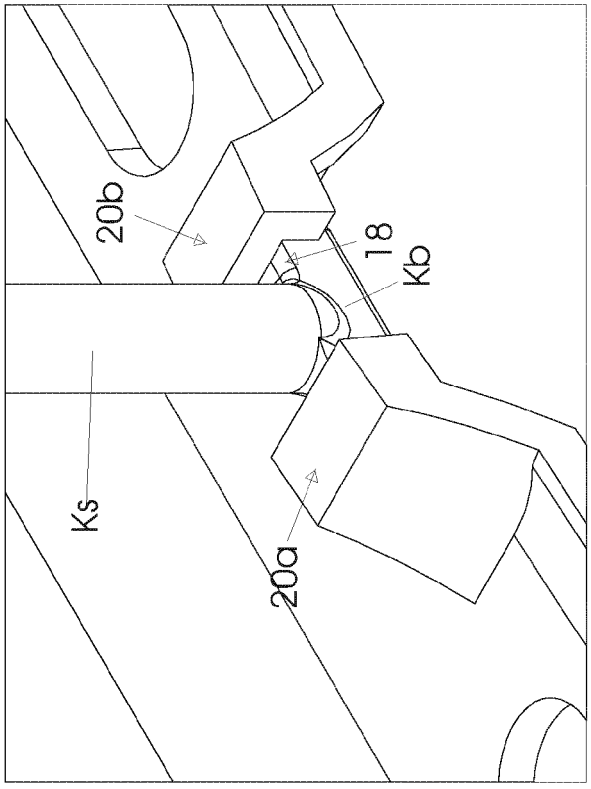

Figure 3b

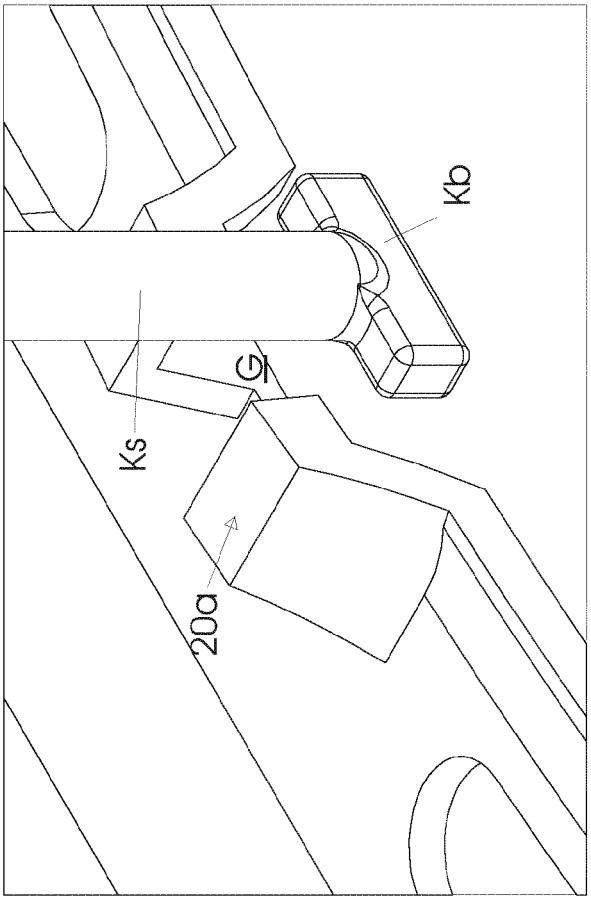

Figure 3a

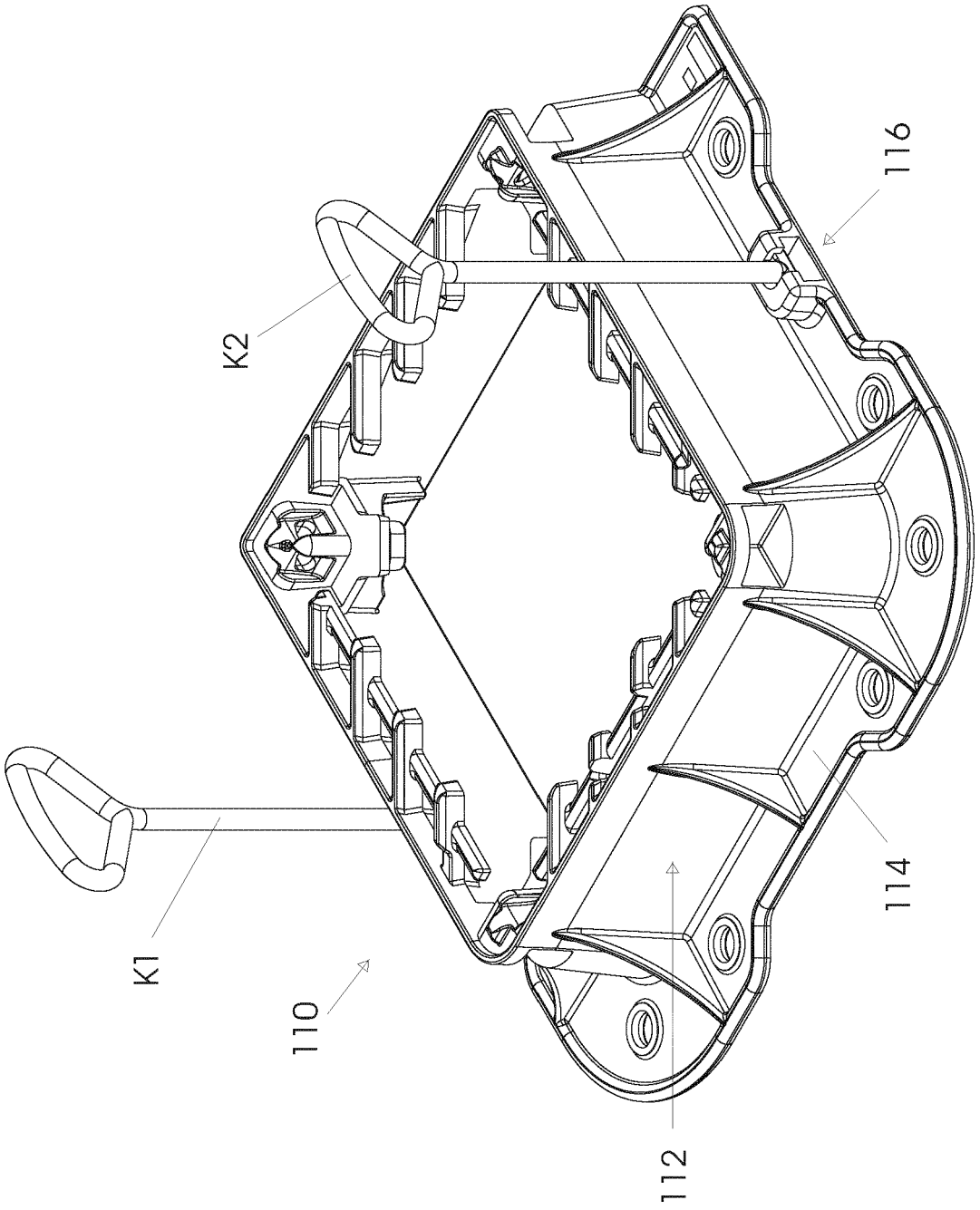

Figure 4

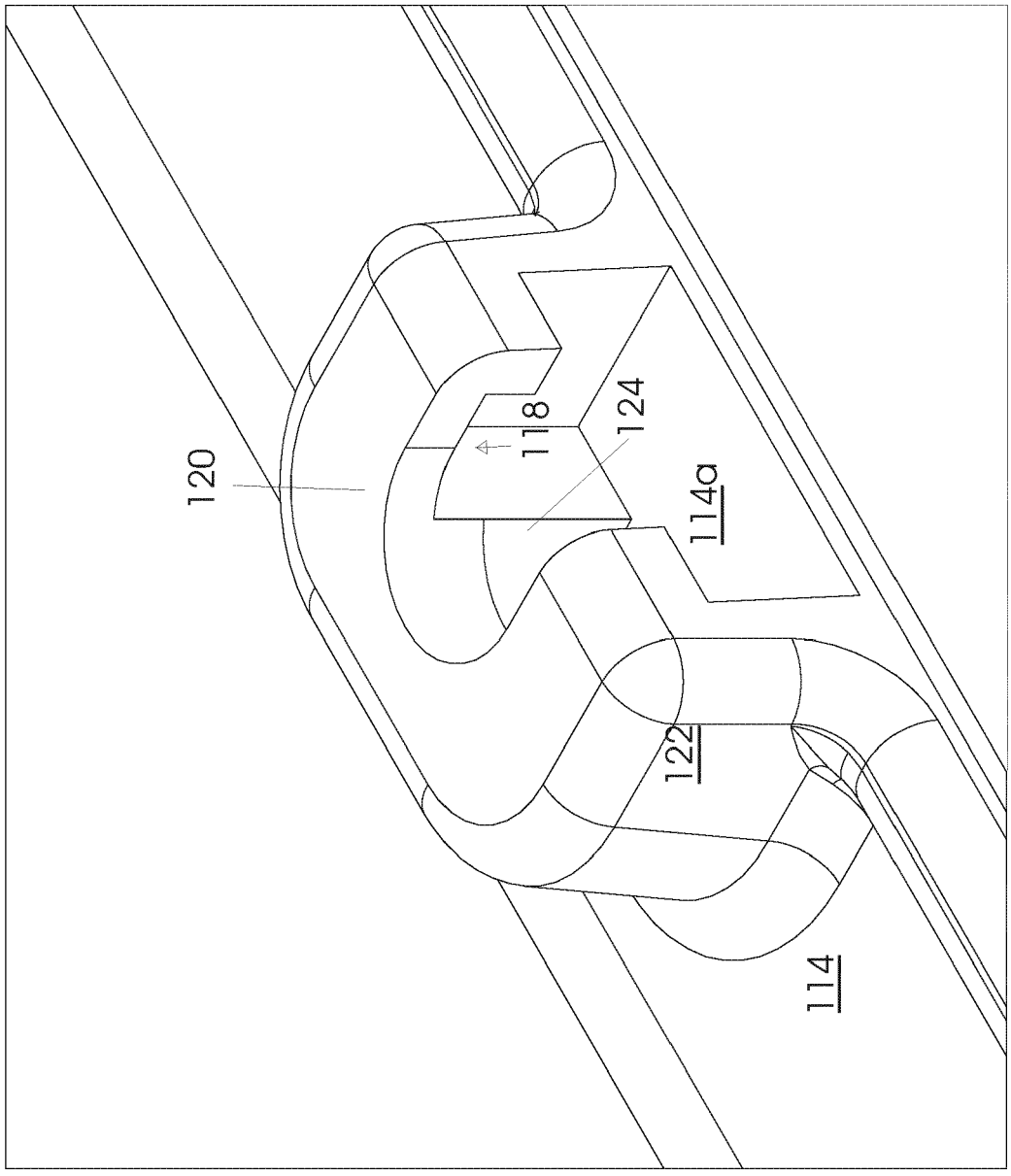

Figure 5

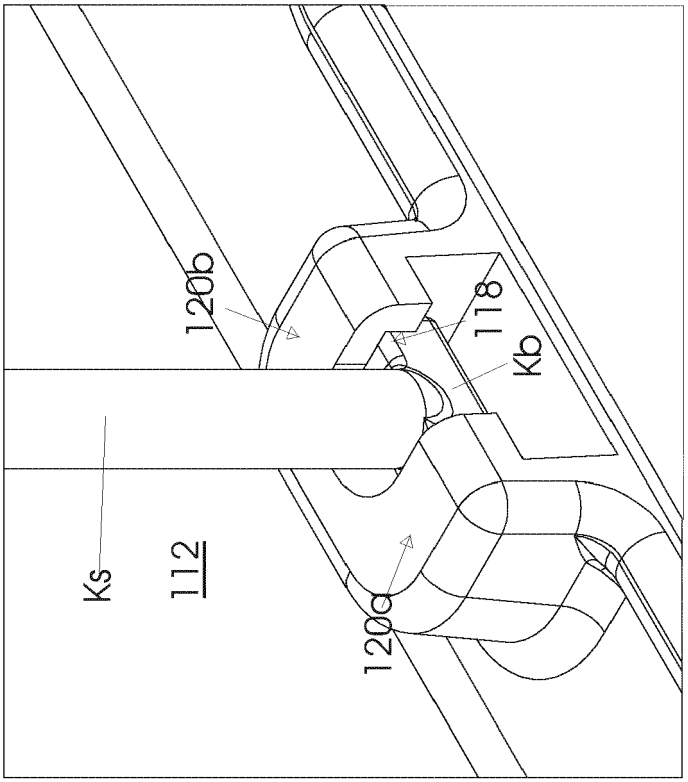

Figure 6b

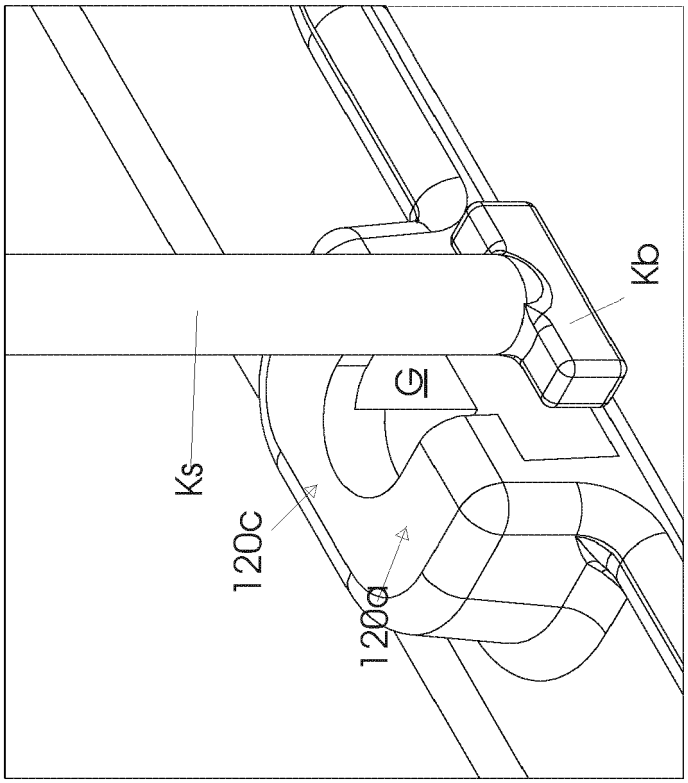

Figure 6a

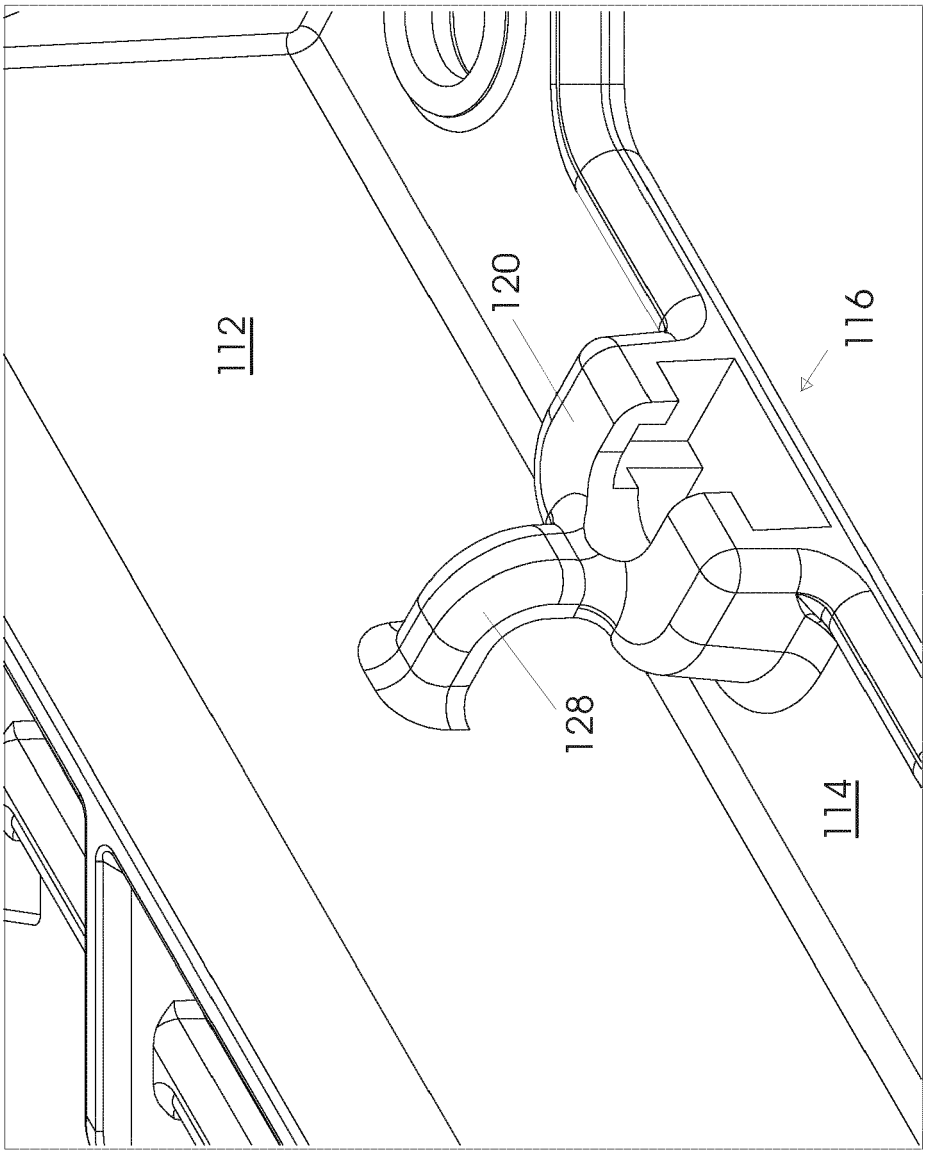

Figure 7

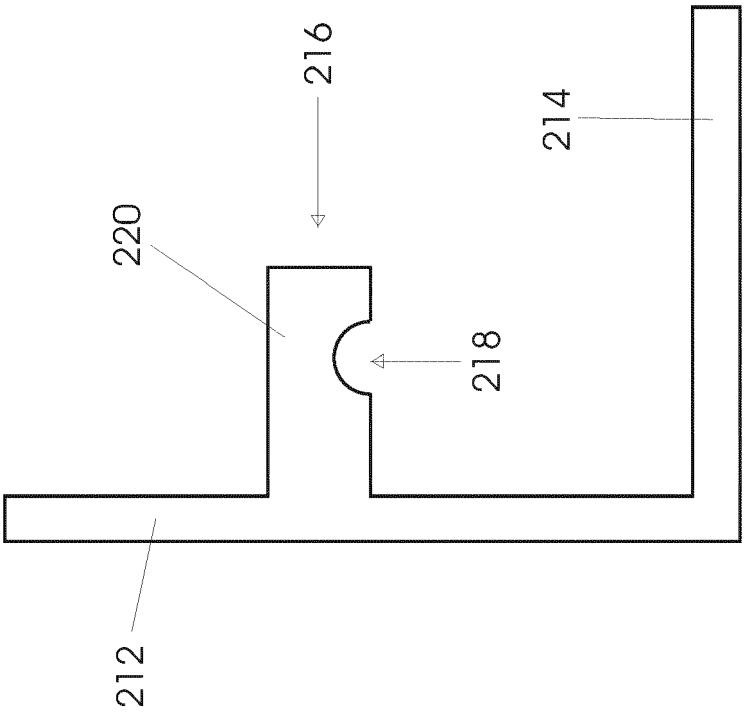

Figure 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 02 0138

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	FR 3 059 018 A1 (FOND DE BROUSSEVAL & MONTREUIL [FR]) 25 May 2018 (2018-05-25) * abstract; figures 1,4,10,11,20; compound 3 * -----	1,3,9,12 2,4-6,8, 13,14 7,10,11	INV. E02D29/14 B66F19/00
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