



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.05.2023 Bulletin 2023/18

(21) Application number: **22197447.0**

(22) Date of filing: **23.09.2022**

(51) International Patent Classification (IPC):
E04D 13/10 ^(2006.01) **E04D 13/12** ^(2006.01)
E04D 3/365 ^(2006.01) **E04G 3/26** ^(2006.01)
E04G 21/32 ^(2006.01) **E06C 1/34** ^(2006.01)

(52) Cooperative Patent Classification (CPC):
E04D 13/10; E04D 3/365; E04D 13/12; E04G 3/26;
E04G 21/3276; E06C 1/345

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **28.10.2021 SE 2151315**

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(54) **AN ATTACHMENT ARRANGEMENT FOR THE ATTACHMENT OF ONE OR MORE ROOF EQUIPMENT DEVICES**

(57) An attachment arrangement (100; 400; 600; 700; 900) for the attachment of one or more roof equipment devices (202) to a roof (302), wherein the attachment arrangement (100; 400; 600; 700; 900) comprises a first member (102; 402; 902); a second member (104; 404; 604; 904) connectable to the first member (102; 402; 902); and a coupling section (106; 906) for the coupling of the one or more roof equipment devices (202). The first member (102; 402; 902) comprises a first interface

(108; 908) for the attachment of the first member (102; 402; 902) to a first roof portion (304a) of the roof (302). The second member (104; 404; 604; 904) comprises a second interface (110; 610; 910) for the attachment of the second member (104; 404; 604; 904) to a second roof portion (306a) of the roof (302). The second roof portion (306a) is angled in relation to the first roof portion (304a).

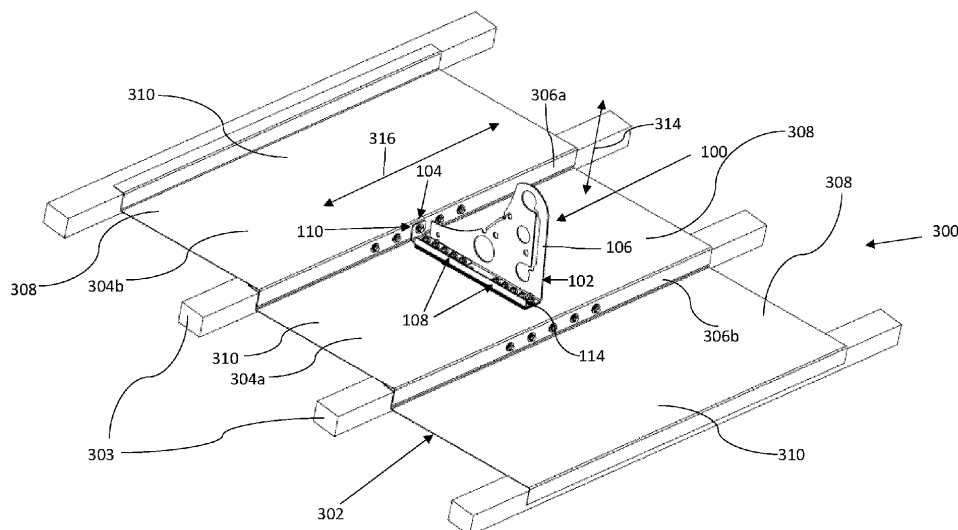


Fig. 6

Description

Technical field

[0001] Aspects of the present invention relate to an attachment arrangement for the attachment of one or more roof equipment devices to a roof.

Background

[0002] Conventionally, roof equipment and/or roof equipment devices may be mounted or attached to the roof of a building by way of attachments. For example, the roof equipment and/or the roof equipment devices may include ladders, walkways and steps for users, snow rails or fences for preventing snow from sliding off of the roof, ridge and roof foot rails and guardrails.

Summary

[0003] The inventors of the present invention have found drawbacks in conventional solutions for attaching roof equipment and/or roof equipment devices to the roof of a building. For example, some conventional solutions do not provide a sufficient attachment of the roof equipment and/or roof equipment devices to the roof.

[0004] An object of embodiments of the invention is to provide a solution which mitigates or solves drawbacks and problems of conventional solutions.

[0005] The above and further objects are solved by the subject matter of the independent claim. Further advantageous embodiments of the invention can be found in the dependent claims.

[0006] According to a first aspect of the invention, the above mentioned and other objects are achieved with an attachment arrangement for the attachment of one or more roof equipment devices to a roof, wherein the attachment arrangement comprises

a first member,
a second member connectable to the first member,
and
a coupling section for the coupling of the one or more roof equipment devices,
wherein the first member comprises the coupling section,
wherein the first member comprises a first interface for the attachment of the first member to a first roof portion of the roof, and
wherein the second member comprises a second interface for the attachment of the second member to a second roof portion of the roof, the second roof portion being angled in relation to the first roof portion.

[0007] An advantage of the attachment arrangement according to the first aspect is that the attachment of one or more roof equipment devices to a roof is improved. An

advantage of the attachment arrangement according to the first aspect is that the strength of the attachment of one or more roof equipment devices to a roof is improved or enhanced, or that the one or more roof equipment devices is/are more strongly secured to the roof. An advantage of the attachment arrangement according to the first aspect is that an attachment that can handle enhanced loads or forces in a sufficient manner is provided. Some conventional solutions do not provide an attachment that is strong enough and that can handle enhanced loads or forces in a sufficient manner.

[0008] An advantage of the attachment arrangement according to the first aspect is that the second interface efficiently counteracts pull forces which act on the first interface, whereby the attachment of the attachment arrangement and thus of the one or more roof equipment devices to the roof is strengthened. An advantage of the attachment arrangement according to the first aspect is that the second interface efficiently counteracts pull forces substantially in the direction of the pull forces acting on the first interface, whereby the attachment of the attachment arrangement and thus of the one or more roof equipment devices to the roof is strengthened. An advantage of the attachment arrangement according to the first aspect is that the second interface efficiently counteracts shear forces, or shear stress, acting on the second interface, for example substantially in parallel to the plane of the second interface, which result from pull forces acting on the first interface, for example substantially transversely to the plane of the first interface. Expressed alternatively, an advantage of the attachment arrangement according to the first aspect is that the pull forces acting on the first interface are transformed, or converted, to shear forces acting on the second interface.

[0009] An advantage of this embodiment is that the flexibility of the attachment one or more roof equipment devices to a roof is improved. For example, the extension of the attachment arrangement and/or of the first member may be varied and adapted to different kinds of roofs and/or to different roof dimensions. For example, the longitudinal extension of the first member, or of the base of the first member, may be varied and adapted while maintaining or improving the strength of attachment. For example, the attachment arrangement and/or the first member may be made more compact with a maintained or enhanced strength of attachment in relation to conventional solutions and may, for example, be adapted to first roof portions with a limited extension, for example in the direction of the longitudinal extension of the first member. For example, the attachment arrangement and/or the first member may have a shorter extension in relation to conventional solutions, for example in the direction of the longitudinal extension of the first member, or of the base of the first member, while maintaining or improving the strength of attachment.

[0010] For some embodiments, the attachment arrangement and/or the first and second interfaces may be configured for a roof with the second roof portion being

angled in relation to the first roof portion by an angle of 10° to 170°, for example 40° to 140°, such as 70° to 110°, for example 80° to 100°, such approximately, or substantially, 90°. For some embodiments, the attachment arrangement and/or the first and second interfaces may be configured for a roof having steps, such as a stepped roof, for example covered by plates, covers, or panels, made of a material comprising or consisting of a metal or metal alloy. The stepped roof may have a plurality of first roof portions connected to one another by second roof portions, i.e. two first roof portions may be connected to one another by one or more second roof portions. For some embodiments, the attachment arrangement and/or the first and second interfaces may be configured for a folded plate roof, or a folded sheet panel roof, having folds. The plates or panels of the folded plate roof may be made of a material comprising or consisting of a metal or metal alloy. The folded plate roof may have a plurality of first roof portions connected to one another by second roof portions, i.e. two first roof portions may be connected to one another by one or more second roof portions, wherein the fold of the folded plate roof comprises one or more second roof portions.

[0011] For some embodiments, the second roof portion may have a substantially vertical extension and optionally a longitudinal substantially horizontal extension.

[0012] The roof equipment device may comprise one or more of the group of: a ladder; a walkway; a step for a user; a snow rail or a snow fence for preventing snow from sliding off of the roof; a ridge and roof foot rail; a guardrail; a rope, for example to which a user working on the building or roof is connected; and a hook, a loop element, or a carabiner, for example to which a rope for a user is connected. However, other types of roof equipment devices are also possible.

[0013] For some embodiments, the second member may be connected or attached to the first member.

[0014] According to an advantageous embodiment of the attachment arrangement according to the first aspect, at least one portion of the second member is angled in relation to the first member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0015] According to a further advantageous embodiment of the attachment arrangement according to the first aspect, at least one portion of the second member is angled in relation to the first member by an angle of 10° to 170°. For some embodiments, at least one portion of the second member is angled in relation to the first member by an angle of 40° to 140°, such as 70° to 110°, for example 80° to 100°, such as approximately, or substantially, 90°. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of

the attachment of one or more roof equipment devices to a roof is further enhanced.

[0016] According to another advantageous embodiment of the attachment arrangement according to the first aspect, the first member comprises a base member comprising the first interface. An advantage of this embodiment is that the flexibility of the attachment one or more roof equipment devices to a roof is further improved. For example, the base member may be made more compact with a maintained or enhanced strength of attachment and may, for example, be adapted to first roof portions with a limited extension, for example in the direction of the longitudinal extension of the base member. For example, the base member may have a shorter extension, for example in the direction of the longitudinal extension of the base members while maintaining or improving the strength of attachment.

[0017] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, at least one portion of the second member is angled in relation to the base member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0018] According to another advantageous embodiment of the attachment arrangement according to the first aspect, the coupling section is integrally formed with the base member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0019] According to still another advantageous embodiment of the attachment arrangement according to the first aspect, the second member comprises a tongue comprising the second interface. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved and made more efficient.

[0020] According to an advantageous embodiment of the attachment arrangement according to the first aspect, at least one portion of the tongue is angled in relation to the first member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0021] According to a further advantageous embodiment of the attachment arrangement according to the first aspect, at least one portion of the tongue is angled in relation to the base member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the

roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0022] According to another advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the first and second interfaces comprises/comprise one or more openings for receiving one or more attachment elements, the one or more attachment elements being configured for the attachment to one or more of the first and second roof portions. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the one or more attachment elements associated with the first interface are efficiently prevented from being pulled out of the roof by way of the one or more attachment elements associated with the second interface.

[0023] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, the one or more openings of the first interface is/are formed by one or more of the first member and base member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0024] According to still another advantageous embodiment of the attachment arrangement according to the first aspect, the one or more openings of the second interface is/are formed by one or more of the second member and tongue. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0025] According to an advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the second member and tongue comprises/comprise a third interface for the attachment of the second member to a third roof portion of the roof, the third roof portion being angled in relation to the second roof portion. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. For some embodiment, the third interface may be configured for the attachment to a third roof portion which is substantially in parallel to the first roof portion of the roof.

[0026] According to a further advantageous embodiment of the attachment arrangement according to the first aspect, the third interface comprises one or more

openings for receiving one or more attachment elements, the one or more attachment elements being configured for the attachment to the third roof portion. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the one or more attachment elements associated with the first interface are efficiently prevented from being pulled out of the roof by way of the one or more attachment elements associated with the third interface.

[0027] According to another advantageous embodiment of the attachment arrangement according to the first aspect, the one or more openings of the third interface is/are formed by one or more of the second member and tongue. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced.

[0028] According to still another advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the second member and tongue comprises/comprise a fourth interface for the attachment of the second member to the first roof portion. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the flexibility of the attachment is further improved.

[0029] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, the attachment arrangement comprises a third member connectable to the first member, wherein the third member comprises a fifth interface for the attachment of the third member to the first roof portion.

[0030] An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the flexibility of the attachment is further improved.

[0031] According to an advantageous embodiment of the attachment arrangement according to the first aspect, the third member comprises a sixth interface for the attachment of the third member to a fourth roof portion of the roof, the fourth roof portion being angled in relation to the first roof portion. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further

improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the flexibility of the attachment is further improved. An advantage of this embodiment is that the sixth interface efficiently counteracts pull forces which act on the first interface, whereby the attachment of the attachment arrangement and thus of the one or more roof equipment devices to the roof is strengthened. An advantage of this embodiment is that the sixth interface efficiently counteracts pull forces substantially in the direction of the pull forces acting on the first interface, whereby the attachment of the attachment arrangement and thus of the one or more roof equipment devices to the roof is strengthened. An advantage of this embodiment is that the sixth interface efficiently counteracts shear forces, or shear stress, acting on the sixth interface, for example substantially in parallel to the plane of the sixth interface, which result from pull forces acting on the first interface, for example substantially transversely to the plane of the first interface.

[0032] According to a further advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the fourth, fifth and sixth interfaces comprises/comprise one or more openings for receiving one or more attachment elements, the one or more attachment elements being configured for the attachment to one or more of the first and fourth roof portions. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the one or more attachment elements associated with the first interface are efficiently prevented from being pulled out of the roof by way of the one or more attachment elements associated with one or more of the fourth, fifth and sixth interfaces.

[0033] According to another advantageous embodiment of the attachment arrangement according to the first aspect, the one or more openings of one or more of the fourth, fifth and sixth interfaces is/are formed by one or more of the second and third members. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. An advantage of this embodiment is that the flexibility of the attachment is further improved.

[0034] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the second and third members is/are detachably attachable to the first member. An advantage of this embodiment is that the flexibility of the attachment is improved. An advantage of this embodiment is that the attachment of the attachment arrange-

ment and/or of the roof equipment device to the roof is further improved.

[0035] According to still another advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the second and third members is/are detachably attachable to the base member. An advantage of this embodiment is that the flexibility of the attachment is improved. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved.

[0036] According to an advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the second and third members is/are integrally formed with one or more of the first member and base member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. According to this embodiment, the attachment arrangement can be manufactured in an efficient manner.

[0037] According to another advantageous embodiment of the attachment arrangement according to the first aspect, the coupling section comprises one or more openings. An advantage of this embodiment is that the attachment of the roof equipment device to the roof is further improved.

[0038] According to still another advantageous embodiment of the attachment arrangement according to the first aspect, the one or more openings of the coupling section is/are formed by the first member. An advantage of this embodiment is that the attachment of the roof equipment device to the roof is further improved.

[0039] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, the coupling section comprises one or more weakenings. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved.

[0040] According to an advantageous embodiment of the attachment arrangement according to the first aspect, the one or more weakenings is/are formed by the first member. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved.

[0041] According to a further advantageous embodiment of the attachment arrangement according to the first aspect, the base member is angled in relation to the coupling section. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. For some embodiments, the base member may be angled in relation to the coupling section by an angle of 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°.

[0042] According to another advantageous embodi-

ment of the attachment arrangement according to the first aspect, one or more of the first, second and third members is/are made of a material comprising or consisting of a metal or a metal alloy. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. An advantage of this embodiment is that the strength of the attachment of one or more roof equipment devices to a roof is further enhanced. According to this embodiment, the attachment arrangement can be manufactured in an efficient manner.

[0043] According to yet another advantageous embodiment of the attachment arrangement according to the first aspect, one or more of the first, second and third members is/are formed from a plate. An advantage of this embodiment is that the attachment of the attachment arrangement and/or of the roof equipment device to the roof is further improved. According to this embodiment, the attachment arrangement can be manufactured in an efficient manner.

[0044] According to a second aspect of the invention, the above mentioned and other objects are achieved with a roof installation comprising one or more roof equipment devices and one or more attachment arrangements according to any one of the embodiments disclosed above or below.

[0045] According to a third aspect of the invention, the above mentioned and other objects are achieved with a roof arrangement comprising a roof and one or more of the group of:

- an attachment arrangement according to any one of the embodiments disclosed above or below; and
- a roof installation according to any one of the embodiments disclosed above or below.

[0046] For some embodiments, the roof may be a stepped roof having steps, for example according to any one of the variations or embodiment disclosed above or below. For some embodiments, the roof may be a folded plate roof, or a folded sheet panel roof, having folds, for example according to any one of the variations or embodiments disclosed above or below. However, other roofs are also possible.

[0047] According to a fourth aspect of the invention, the above mentioned and other objects are achieved with a stepped roof arrangement comprising a stepped roof and one or more of the group of:

- an attachment arrangement according to any one of the embodiments disclosed above or below; and
- a roof installation according to any one of the embodiments disclosed above or below.

[0048] The above-mentioned features and embodiments of the attachment arrangement, the roof installation and the roof arrangement, respectively, may be combined in various possible ways providing further advantages.

tageous embodiments.

[0049] Further advantageous embodiments of the attachment arrangement, the roof installation and the roof arrangement according to the present invention and further advantages with the embodiments of the present invention emerge from the detailed description of embodiments.

Brief Description of the Drawings

[0050] Embodiments of the invention will now be illustrated, for exemplary purposes, in more detail by way of embodiments and with reference to the enclosed drawings, where similar references are used for similar parts, in which:

- Figure 1 is a schematic perspective view of a first embodiment of the attachment arrangement according to the first aspect of the invention;
- Figure 2 is a schematic side view of the attachment arrangement of figure 1;
- Figure 3 is a schematic rear view of the attachment arrangement of figure 1;
- Figure 4 is a schematic top view of the attachment arrangement of figure 1;
- Figure 5 is a schematic perspective view of the attachment arrangement of figure 1 from a different perspective in relation to figure 1;
- Figure 6 is a schematic perspective view of the attachment arrangement of figure 1 attached to a roof and of a first embodiment of the roof arrangement according to the third aspect of the invention;
- Figure 7 is a schematic side view of the attachment arrangement and of the roof arrangement of figure 6;
- Figure 8 is a schematic side view of the attachment arrangement of figure 1 and of an embodiment of the roof installation according to the second aspect of the invention;
- Figure 9 is a schematic perspective view of a second embodiment of the attachment arrangement according to the first aspect of the invention and of a second embodiment of the roof arrangement according to the third aspect of the invention;
- Figure 10 is an enlargement of the attachment arrangement of figure 9;
- Figure 11 is a schematic perspective view of a third embodiment of the attachment arrangement according to the first aspect of the invention attached to a roof;
- Figure 12 is a schematic perspective view of a fourth embodiment of the attachment arrangement according to the first aspect of the invention and of a third embodiment of the roof arrangement according to the third aspect of the invention.

- pect of the invention;
- Figure 13 is an enlargement of the attachment arrangement of figure 12;
- Figure 14 is a schematic perspective view of a fifth embodiment of the attachment arrangement according to the first aspect of the invention;
- Figure 15 is a schematic side view of the attachment arrangement of figure 14 and of an embodiment of the stepped roof arrangement according to the fourth aspect of the invention; and
- Figure 16 is a schematic bottom perspective view of the attachment arrangement of figure 14.

Detailed Description

[0051] With reference to figures 1 to 8, a first embodiment of the attachment arrangement 100 for the attachment of one or more roof equipment devices 202 to a roof 302 according to the first aspect of the invention, an embodiment of the roof installation 200 according to the second aspect of the invention, a first embodiment of the roof arrangement 300 including a roof 302 according to the third aspect of the invention and a stepped roof arrangement 300 including a stepped roof 302 according to the fourth aspect of the invention are schematically illustrated. The roof 302 illustrated in figures 6 and 7 is only partially illustrated for illustrative purposes. The roof 302 illustrated in figures 6 and 7 comprises, or is in the form of, a stepped roof including supporting ribs 303 and covering plates 310 or panels made of a material comprising or consisting of a metal or metal alloy. However, the attachment arrangement 100 may be applied to other types of roofs.

[0052] With reference to figures 1 to 8, the attachment arrangement 100 includes a first member 102 and a second member 104. The second member 104 is connectable to the first member 104. For some embodiments, the second member 104 may be connected or attached to the first member 102, which is further disclosed hereinbelow. The attachment arrangement 100 includes a coupling section 106 for the coupling of the one or more roof equipment devices 202, for example to the attachment arrangement 100 and/or to the roof 302. The first member 102 comprises the coupling section 106. The first member 102 includes, or forms, a first interface 108 for the attachment of the first member 102 to a first roof portion 304a, or a first roof surface, of the roof 302. The second member 104 includes, or forms, a second interface 110 for the attachment of the second member 104 to a second roof portion 306a, or a second roof surface, of the roof 302. The second roof portion 306a is angled in relation to the first roof portion 304a. Expressed alternatively, the second roof portion 306a may be described to form a non-straight angle with the first roof portion 304a.

[0053] With reference to figures 5 and 6, for some em-

bodiments, the attachment arrangement 100 and/or the first and second interfaces 108, 110 may be configured for a roof 302 with the second roof portion 306a being angled in relation to the first roof portion 304a by an angle of 10° to 170°, for example 40° to 140°, such as 70° to 110°, for example 80° to 100°, such approximately, or substantially, 90°. However, other angle ranges are also possible. For some embodiments, the attachment arrangement 100 and/or the first and second interfaces 108, 110 may be configured for a roof 302 having steps 308, such as a stepped roof, for example covered by plates 310, covers, or panels, made of a material comprising or consisting of a metal or metal alloy. However, other materials are possible. The stepped roof may have a plurality of first roof portions 304a connected to one another by second roof portions 306a, i.e. two first roof portions 304a may be connected to one another by one or more second roof portions 306a. For alternative embodiments, the attachment arrangement 100 and/or the first and second interfaces 108, 110 may be configured for a folded plate roof, or a folded sheet panel roof, having folds. The plates or panels of the folded plate roof may be made of a material comprising or consisting of a metal or metal alloy. However, other materials are possible. The folded plate roof may have a plurality of first roof portions connected to one another by second roof portions, i.e. two first roof portions may be connected to one another by one or more second roof portions, wherein the fold of the folded plate roof comprises one or more second roof portions. For some embodiments, when the roof is installed, the second roof portion 306a may have a substantially vertical extension 314, such as a substantially vertical transverse extension 314, and optionally a substantially horizontal longitudinal extension 316. However, other extensions of the second roof portion 306a are possible.

[0054] With reference to figure 8, for some embodiments, the roof equipment device 202 may include one or more of the group of: a ladder; a walkway; a step for a user; a snow rail or a snow fence for preventing snow from sliding off of the roof; a ridge and roof foot rail; a guardrail; a rope, for example to which a user working on the building or roof is connected; a hook, a loop element, or a carabiner 204, for example to which a rope for a user is connected; an attachment member, such as a bolt, for example for attaching another roof equipment device to the coupling section 106. However, other types of roof equipment devices are also possible.

[0055] With reference to figures 1 and 2, for some embodiments, it may be defined that at least one portion 112 of the second member 104 is angled in relation to the first member 104. For some embodiments, at least one portion 112 of the second member 104 may be angled in relation to the first member by an angle of 10° to 170°, for example 40° to 140°, such as 70° to 110°, for example 80° to 100°, such as approximately, or substantially, 90°. However, other angle ranges are also possible.

[0056] With reference to figures 1 to 8, the first member

102 may include, or form, a base member 114, wherein the base member 114 may include, or form, the first interface 108. For some embodiments, at least one portion 112 of the second member 104 may be angled in relation to the base member 114, for example by an angle of 10° to 170°, such as 40° to 140°, for example 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. The longitudinal extension of the base member 114 and/or of the first interface 108 may be variable and adaptable to different kinds of roofs and to different roof dimensions. For some embodiments, the coupling section 106 may be integrally formed with the base member 114. The fact that the coupling section 106 is integrally formed with the the base member 114 implies, or means, that the coupling section 106 and the base member 114 are formed into a single piece and/or are formed from a single piece. For example, a blank, or any other suitable piece, may be formed into the base member 114 and the coupling section 106 integrally formed therewith, for example by way of hot press forming, or cold working. Expressed alternatively, the fact that the coupling section 106 is integrally formed with the base member 114 may imply, or may mean, that the coupling section 106 and the base member 114 are made of a single piece, for example a single blank.

[0057] With reference to figures 1 to 8, the second member 104 may include, or form, a tongue 116, wherein the tongue 116 may include, or form, the second interface 110. For some embodiments, at least one portion 112 of the tongue 116 is angled in relation to the first member 102, for example by an angle of 10° to 170°, such as 40° to 140°, for example 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. For some embodiments, at least one portion 112 of the tongue 116 is angled in relation to the base member 114, for example by an angle of 10° to 170°, such as 40° to 140°, for example 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. For some embodiments, it may be defined that said at least one portion 112 of the tongue 116 and/or second member 104 includes, or forms, the second interface 110. For some embodiments, the second member 104, the tongue 116, the least one portion 112 of the tongue 116 and/or the second interface 110 may have one or more lateral extensions. For example, the second member 104 and/or the tongue 116 may form a T-shape. The longitudinal extension of the second member 104, of the tongue 116 and/or of the second interface 110 may be variable and adaptable to different kinds of roofs and to different roof dimensions.

[0058] With reference to figures 1 to 8, the first interface 108 may include one or more openings 118 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to the first roof portion 304a. The second interface 110 may include one or more openings 122 for receiving

one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to the second roof portion 306a. Thus, for some embodiments, one or more of the first and second interfaces 108, 110 may include one or more openings 118, 122 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to one or more of the first and second roof portions 304a, 306a.

[0059] With reference to figures 1, 3 and 4, the one or more openings 118 of the first interface 108 may be formed by one or more of the first member 102 and base member 114, i.e. may be formed by the first member 102 and/or the base member 114.

[0060] With reference to figures 1 and 2, the one or more openings 122 of the second interface 110 may be formed by one or more of the second member 104 and tongue 116, i.e. may be formed by the second member 104 and/or the tongue 116.

[0061] With reference to figures 1 and 4, the second member 104 may be detachably, or releasably, attachable to the first member 102, for example by way one or more openings 124, 118 and by way of one or more attachment elements 120. More specifically, the second member 104 may be detachably, or releasably, attachable to the base member 114. However, the second member 104 may be detachably attachable to the first member 102 by way of attachments other than the illustrated attachment elements 120. For some embodiments, when the attachment arrangement 100 is attached to a roof 302, the first member 102, for example the base member 114, may be configured to be placed between the second member 104 and the roof 302 or the first roof portion 304a. However, for alternative embodiments, when the attachment arrangement 100 is attached to a roof 302, the second member 104 may be configured to be placed between the first member 102, for example the base member 114, and the roof 302 or the first roof portion 304a.

[0062] With reference to figures 1 and 8, the coupling section 106 may include one or more openings 126a-g. The one or more openings 126a-g of the coupling section 106 may be formed by the first member 102. For some embodiments, the coupling section 106 may include one or more weakenings 128, 130. The weakening 128, 130 may comprise, or be in the form of, a notch 132, 134, a recess, an opening and/or a deformation zone. The one or more weakenings 128, 130 and/or the one or more notches 132, 134 may be formed by the first member 102. For alternative embodiments, the coupling section may include one or more protrusions and/or hooks.

[0063] With reference to figures 3 to 5, for some embodiments, one or more of the attachment arrangement 100 and first member 102 may comprise an auxiliary coupling section 127 to supplement the coupling section 106. The auxiliary coupling section 127 may comprise a lip 129, which for example may be angled in relation to the coupling section 106, for example by an angle of 70° to

110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. The auxiliary coupling section 127 may comprise one or more openings 131a-b, for example for receiving one or more attachment members. For example, a step for a user may be attached, or coupled, to the auxiliary coupling section 127 or lip 129.

[0064] With reference to figures 1 to 8, the base member 114 may be angled in relation to the coupling section 106, for example by an angle of 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. One or more of the first and second members 102, 104 may be made of a material comprising or consisting of a metal or a metal alloy. However, other materials are possible. One or more of the first and second members 102, 104 may be formed from a plate. However, the one or more of the first and second members 102, 104 may be formed, or produced, in other manners, for example by way of casting.

[0065] With reference to figures 6 and 7, for some embodiments, when the attachment arrangement 100 is attached to a roof 302, the second member 104 may be configured to position the second interface 110 above the first interface 108. For some embodiments, when the attachment arrangement 100 is attached to a roof 302, the second member 104 may be configured to position the second interface 110 between the first interface 108 and the ridging, or highest point, of the roof 302.

[0066] With reference to figure 7, an advantage of the attachment arrangement 100 is that the second interface 110 efficiently counteracts pull forces which act on the first interface 108 for example in a first direction 136, or that the second interface 110 efficiently counteracts pull forces substantially in the direction 136 of the pull forces acting on the first interface 108, whereby the attachment of the attachment arrangement 100 and thus of the one or more roof equipment devices 202 to the roof 302 is strengthened. An advantage of the attachment arrangement 100 is that the second interface 108 efficiently counteracts shear forces, or shear stress, acting on the second interface 108, for example in a direction 136 substantially in parallel to the plane 138 of the second interface 110, which result from pull forces acting on the first interface 108 in the first direction 136, for example in a direction 136 substantially transverse to the plane 140 of the first interface 108. With reference to figures 7 and 8, for example, said pull forces may result from a user tied to a rope which in turn is tied to a carabiner 204 coupled to the coupling section 106, for example to an opening 126a-g of the coupling section 106.

[0067] As stated above, figure 8 also schematically illustrates an embodiment of the roof installation 200 according to the second aspect of the invention. The roof installation 200 includes one or more roof equipment devices 202, for example according to one or more of the versions mentioned above. The roof installation 200 includes one or more attachment arrangements 100 ac-

cording to any one of the embodiments disclosed above or below.

[0068] As stated above, figures 6 and 7 also schematically illustrate a first embodiment of the roof arrangement 300 according to the third aspect of the invention. The roof arrangement 300 includes a roof 302 (only a portion of an entire roof is illustrated in figure 6) and one or more of the group of: an attachment arrangement 100 according to any one of the embodiments disclosed above or below; and a roof installation 200 according to any one of the embodiments disclosed above or below. It may be defined that the roof 302 includes the one or more first and second roof portions 304a, 306a.

[0069] With reference to figures 9 and 10, a second embodiment of the attachment arrangement 400 for the attachment of one or more roof equipment devices 202 to a roof 302 according to the first aspect of the invention and a second embodiment of the roof arrangement 500 including a roof 302 according to the third aspect of the invention are schematically illustrated. Several features of the attachment arrangement 400 of figures 9 and 10 may correspond to features of the attachment arrangement 100 of figures 1 to 8, and several features of the roof arrangement 500 of figure 9 may correspond to features of the roof arrangement 300 of figures 6 and 7 and are thus not described in further detail here to avoid repetition. The attachment arrangement 400 of figures 9 and 10 differs from the attachment arrangement 100 of figures 1 to 8 in that one or more of the second member 404 and tongue 416 includes/include a third interface 442 for the attachment of the second member 404 to a third roof portion 304b, or a third roof surface, of the roof 302, in addition to the first and second interfaces 108, 110 of the attachment arrangement 400, wherein the third roof portion 304b is angled in relation to the second roof portion 306a, for example by an angle of 10° to 170°, such as 40° to 140°, for example 70° to 110°, such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. For some embodiment, the third interface 442 may be configured for the attachment to a third roof portion 304b which is substantially in parallel to the first roof portion 304a of the roof 302.

[0070] With reference to figures 9 and 10, the third interface 442 may include, or may form, one or more openings 444 for receiving one or more attachment elements 120, wherein the one or more attachment elements 120 is/are configured for the attachment to the third roof portion 304b. The one or more openings 444 of the third interface 442 may be formed by one or more of the second member 404 and tongue 416. For some embodiments, it may be defined that one or more of the second member 404 and tongue 416 is configured to position the second interface 110 between the first interface 108 and the third interface 442.

[0071] Further, the attachment arrangement 400 of figures 9 and 10 differs from the attachment arrangement 100 of figures 1 to 8 in that the second 404 member is

integrally formed with one or more of the first member 402 and base member 414, i.e. the second member 404 and one or more of the first member 402 and base member 414 are formed from one piece, such as from one and the same plate or blank.

[0072] With reference to figure 11, a third embodiment of the attachment arrangement 600 for the attachment of one or more roof equipment devices 202 to a roof 302 according to the first aspect of the invention and is schematically illustrated. Several features of the the attachment arrangement 600 of figure 11 may correspond to features of the attachment arrangement 100 of figures 1 to 8 and are thus not described in further detail here to avoid repetition. The attachment arrangement 600 of figure 11 differs from the attachment arrangement 100 of figures 1 to 8 in that when the attachment arrangement 600 is attached to a roof 302, the second member 604 is configured to position the second interface 610 below the first interface 108. For some embodiments, when the attachment arrangement 600 is attached to a roof 302, the first member 102 may be configured to position the first interface 108 between the second interface 610 and the ridging, or highest point, of the roof 302. Further, the attachment arrangement 600 of figure 11 differs from the attachment arrangement 100 of figures 1 to 8 in that one or more of the second member 604 and tongue 616 includes/include a fourth interface 646 for the attachment of the second member 604 to the first roof portion 304a. For alternative embodiments, the second 604 member of the attachment arrangement 600 may be integrally formed with one or more of the first member 102 and base member 114.

[0073] With reference to figures 12 and 13, a fourth embodiment of the attachment arrangement 700 for the attachment of one or more roof equipment devices 202 to a roof 302 according to the first aspect of the invention and a third embodiment of the roof arrangement 800 including a roof 302 according to the third aspect of the invention are schematically illustrated. Several features of the the attachment arrangement 700 of figures 12 and 13 may correspond to features of the attachment arrangement 100 of figures 1 to 8, and several features of the roof arrangement 800 of figure 12 may correspond to features of the roof arrangement 300 of figures 6 and 7 and are thus not described in further detail here to avoid repetition. The attachment arrangement 700 of figures 12 and 13 differs from the attachment arrangement 100 of figures 1 to 8 in that the attachment arrangement 700 includes a third member 748 connectable to the first member 102. The third member 748 includes a fifth interface 750 for the attachment of the third member 748 to the first roof portion 304a. For some embodiments, the third member 748 may include a sixth interface 752 for the attachment of the third member 748 to a fourth roof portion 306b, or a fourth roof surface, of the roof 302, wherein the fourth roof portion 306b is angled in relation to the first roof portion 304a, for example by an angle of 10° to 170°, such as 40° to 140°, for example 70° to 110°,

such as 80° to 100°, for example approximately, or substantially, 90°. However, other angle ranges are also possible. The third member 748 may comprise a tongue. For some embodiments, it may be defined that the third member 748 is configured to position the fifth interface 750 between the first interface 108 and the sixth interface 752. The roof arrangement 800 includes a roof 302 and one or more of the group of: an attachment arrangement 700 according to any one of the embodiments disclosed above or below; and a roof installation according to any one of the embodiments disclosed above or below. In figure 12, only a portion of an entire roof 302 is illustrated. For some embodiments, the third member 748 of figures 12 and 13 may substantially correspond to the second member 604 of figure 11.

[0074] With reference to figures 11 to 13, one or more of the fourth, fifth and sixth interfaces 646, 750, 752 may comprise one or more openings 654, 756, 758 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to one or more of the first and fourth roof portions 306a, 306b. The one or more openings 654, 756, 758 of one or more of the fourth, fifth and sixth interfaces 646, 750, 752 may be formed by one or more of the second and third members 604, 748.

[0075] With reference to figures 11 to 13, for some embodiments, one or more of the second and third members 604, 748 may be detachably attachable to the first member 102. For some embodiments, one or more of the second and third members 604, 748 may be detachably attachable to the base member 114. For alternative embodiments, one or more of the second and third members 604, 748 may be integrally formed with one or more of the first member 102 and base member 114.

[0076] With reference to figures 14 to 16, a fifth embodiment of the attachment arrangement 900 for the attachment of one or more roof equipment devices 202 (for example, see figure 8) to a roof 302 according to the first aspect of the invention and a stepped roof arrangement 980 including a stepped roof 302 according to the fourth aspect of the invention are schematically illustrated. The roof 302 illustrated in figure 15 is only partially illustrated for illustrative purposes. The roof 302 illustrated in figure 15 comprises, or is in the form of, a stepped roof including supporting ribs 303 and covering plates 310, or panels, made of a material comprising or consisting of a metal or metal alloy. However, the attachment arrangement 900 may be applied to other types of roofs. Several features of the the attachment arrangement 900 of figures 14 to 16 may correspond to features of the attachment arrangements disclosed in connection with figures 1 to 13 and are thus not described in further detail here to avoid repetition.

[0077] With reference to figures 14 to 16, the attachment arrangement 900 includes a first member 902 and a second member 904. The second member 904 is connectable, or connected, to the first member 904. The attachment arrangement 900 includes a coupling section

906 for the coupling of the one or more roof equipment devices, for example to the attachment arrangement 900 and/or to the roof 302. The roof equipment device may comprise any one of the items disclosed above, and/or may comprise one or more solar cell panels/photo-voltaic panels, and/or one or more attachments for one or more solar cell panels/photo-voltaic panels. The first member 902 comprises the coupling section 906. The first member 902 includes, or forms, a first interface 908 for the attachment of the first member 902 to a first roof portion 304a of the roof 302. The second member 904 includes, or forms, a second interface 910 for the attachment of the second member 904 to a second roof portion 306a of the roof 302. The second roof portion 306a is angled in relation to the first roof portion 304a, for example as disclosed above. The attachment arrangement 900 may be configured for a stepped roof 302.

[0078] With reference to figures 14 to 16, it may be defined that at least one portion 912 of the second member 904 is angled in relation to the first member 904, for example as disclosed above. For some embodiments, at least one portion 912 of the second member 904 may be angled in relation to the first member by an angle of 10° to 170°, for example 40° to 140°, such as 70° to 110°, for example 80° to 100°, such as approximately, or substantially, 90°. However, other angle ranges are also possible.

[0079] With reference to figures 14 to 16, the first member 902 may include a base member 914, wherein the base member 914 may include, or form, the first interface 908. The longitudinal extension of the base member 914 and/or of the first interface 908 may be variable and adaptable to different kinds of roofs and to different roof dimensions. As illustrated in figures 14 to 16, the coupling section 906 may be detachably attachable, or detachably attached, to the base member 914, for example by way of one or more openings 915 and one or more attachment element 920, such as one or more bolts 920a, and optionally one or more nuts 920b. However, other attachment elements 920 are possible. For alternative embodiments, the coupling section 906 may be fixedly attached to, or integrally formed with, the base member 914. For some embodiments, the second member 904 may form a waist 917.

[0080] With reference to figures 14 to 16, the first interface 908 may include one or more openings 918 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to the first roof portion 304a. The second interface 910 may include one or more openings 922 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to the second roof portion 306a. Thus, for some embodiments, one or more of the first and second interfaces 908, 910 may include one or more openings 918, 922 for receiving one or more attachment elements 120, the one or more attachment elements 120 being configured for the attachment to one or more of

the first and second roof portions 304a, 306a. For some embodiments, one or more of the openings 918, 922 may be oblong. The one or more openings 918 of the first interface 908 may be formed by one or more of the first member 902 and base member 914. The one or more openings 922 of the second interface 910 may be formed by the second member 904.

[0081] With reference to figures 14 to 16, the second member 904 may be detachably, or releasably, attachable to the first member 902, for example by way one or more openings 924, 918 and by way of one or more attachment elements 120, for example attachment elements 120 as illustrated above. More specifically, the second member 904 may be detachably, or releasably, attachable to the base member 914. However, the second member 904 may be detachably attachable to the first member 902 by way of attachments other than the attachment elements 120 illustrated above. For some embodiments, when the attachment arrangement 900 is attached to a roof 302, the first member 902, for example the base member 914, may be configured to be placed between the second member 904 and the roof 302 or the first roof portion 304a. However, for alternative embodiments, when the attachment arrangement 900 is attached to a roof 302, the second member 904 may be configured to be placed between the first member 902, for example the base member 914, and the roof 302 or the first roof portion 304a. For alternative embodiments, the second 904 member may be integrally formed with one or more of the first member 902 and base member 914.

[0082] With reference to figures 14 to 16, the coupling section 906 may include one or more openings 926a-g. The one or more openings 926a-g of the coupling section 906 may be formed by the first member 902. The opening 926a-g of the coupling section 906 may have various shapes, and may, for example, be oblong. For alternative embodiments, the coupling section 906 may include one or more protrusions and/or hooks. For some embodiments, the cross-section of the first member 902 may be L-shaped. For some embodiments, the cross-section of the coupling section 906 may be L-shaped.

[0083] With reference to figures 1 to 16, for some embodiments, one or more of the first, second and third members 102, 104, 402, 404, 604, 748, 902, 904 may be made of a material comprising or consisting of a metal or a metal alloy. However, other materials are possible. For some embodiments, one or more of the first, second and third members 102, 104, 402, 404, 604, 748, 902, 904 may be formed, for example press formed, from a plate.

[0084] With reference to figures 1 to 16, for some embodiments, the opening 118, 122, 124, 126a-g, 131a-b, 654, 756, 758 of the one or more openings 118, 122, 124, 126a-g, 131a-b, 654, 756, 758 disclosed above may be referred to as a through-hole. The attachment element 120 or the attachment member disclosed above may be a screw, a bolt, a rivet, or any other element of attach-

ment. For some embodiments, the attachment arrangement 400 may be referred to as an attachment.

[0085] For some embodiments, one or more sealings, for example one or more polymer members, such as one or more flat members, may be placed between the attachment arrangement 100 and the roof 302. For example, a sealing may be placed between the first roof portion 304a and the first member 102 or the base member 114. For example, a sealing may be placed between the second roof portion 306a and the second member 104 or the at least one portion 112 of the second member 104.

[0086] Although the embodiments of the attachment arrangement 100, 400, 600, 700, 900 disclosed above are illustrated when applied to a stepped roof, it is to be understood that embodiments of the attachment arrangement 100, 400, 600, 700, 900 may be applied to other roofs, for example to a folded plate roof, or a folded sheet panel roof, having folds.

[0087] The present invention is not limited to the above-described embodiments. Instead, the present invention relates to, and encompasses all different embodiments being included within the scope of the appended independent claim.

Claims

1. An attachment arrangement (100; 400; 600; 700; 900) for the attachment of one or more roof equipment devices (202) to a roof (302), wherein the attachment arrangement (100; 400; 600; 700; 900) comprises

a first member (102; 402),
 a second member (104; 404; 604) connectable to the first member (102; 402), and
 a coupling section (106) for the coupling of the one or more roof equipment devices (202), wherein the first member (102; 402) comprises the coupling section (106), wherein the first member (102; 402) comprises a first interface (108) for the attachment of the first member 102; 402) to a first roof portion (304a) of the roof (302), and wherein the second member (104; 404; 604) comprises a second interface (110; 610) for the attachment of the second member (104; 404; 604) to a second roof portion (306a; 306b) of the roof (302), the second roof portion (306a; 306b) being angled in relation to the first roof portion (304a).

2. An attachment arrangement (100; 400; 600; 700) according to claim 1, wherein the coupling section (106) comprises one or more openings (126a-g), and wherein the one or more openings (126a-g) of the coupling section (106) is/are formed by the first member (102).

3. An attachment arrangement (100; 400; 600; 700; 900) according to claim 1 or 2, wherein at least one portion (112) of the second member (104) is angled in relation to the first member (102).

4. An attachment arrangement (100; 400; 600; 700; 900) according to any one of the claims 1 to 3, wherein at least one portion (112) of the second member (104) is angled in relation to the first member (102) by an angle of 10° to 170°.

5. An attachment arrangement (100; 400; 600; 700; 900) according to any one of the claims 1 to 4, wherein the first member (102; 402) comprises a base member (114; 414) comprising the first interface (108).

6. An attachment arrangement (100; 400; 600; 700) according to claim 5, wherein the coupling section (106) is integrally formed with the base member (114; 414).

7. An attachment arrangement (100; 400; 600; 700; 900) according to any one of the claims 1 to 6, wherein one or more of the first and second interfaces (108, 110, 610) comprises/comprise one or more openings (118, 122) for receiving one or more attachment elements (120), the one or more attachment elements (120) being configured for the attachment to one or more of the first and second roof portions (304a, 306a).

8. An attachment arrangement (400) according to any one of the claims 1 to 7, wherein one or more of the second member (404) and tongue (416) comprises/comprise a third interface (442) for the attachment of the second member (404) to a third roof portion (304b) of the roof (302), the third roof portion (304b) being angled in relation to the second roof portion (306a).

9. An attachment arrangement (600) according to any one of the claims 1 to 8, wherein one or more of the second member (604) and tongue (616) comprises/comprise a fourth interface (646) for the attachment of the second member (604) to the first roof portion (304a).

10. An attachment arrangement (700) according to any one of the claims 1 to 9, wherein the attachment arrangement (700) comprises a third member (748) connectable to the first member (102), and wherein the third member (748) comprises a fifth interface (750) for the attachment of the third member (748) to the first roof portion (304a).

11. An attachment arrangement (100; 400; 600; 700; 900) according to any one of the claims 1 to 10, wherein one or more of the second and third mem-

bers (104, 404, 604, 748) is/are detachably attachable to one or more of the first member (102, 402) and base member (114, 414).

12. An attachment arrangement (400; 600; 700) according to any one of the claims 1 to 11, wherein one or more of the second and third members (404, 604, 748) is/are integrally formed with one or more of the first member (102, 402) and base member (114, 414). 5 10
13. An attachment arrangement (100; 400; 600; 700; 900) according to any one of the claims 5 to 12, wherein the base member (114) is angled in relation to the coupling section (106). 15
14. An attachment arrangement (100; 400; 600; 700; 900) according to claim 13, wherein the base member (114) is angled in relation to the coupling section (106) by an angle of 70° to 110°. 20
15. A stepped roof arrangement (300; 980) comprising a stepped roof (302) and one or more attachment arrangements (100; 400; 600; 700; 900) according to any one of the claims 1 to 14. 25

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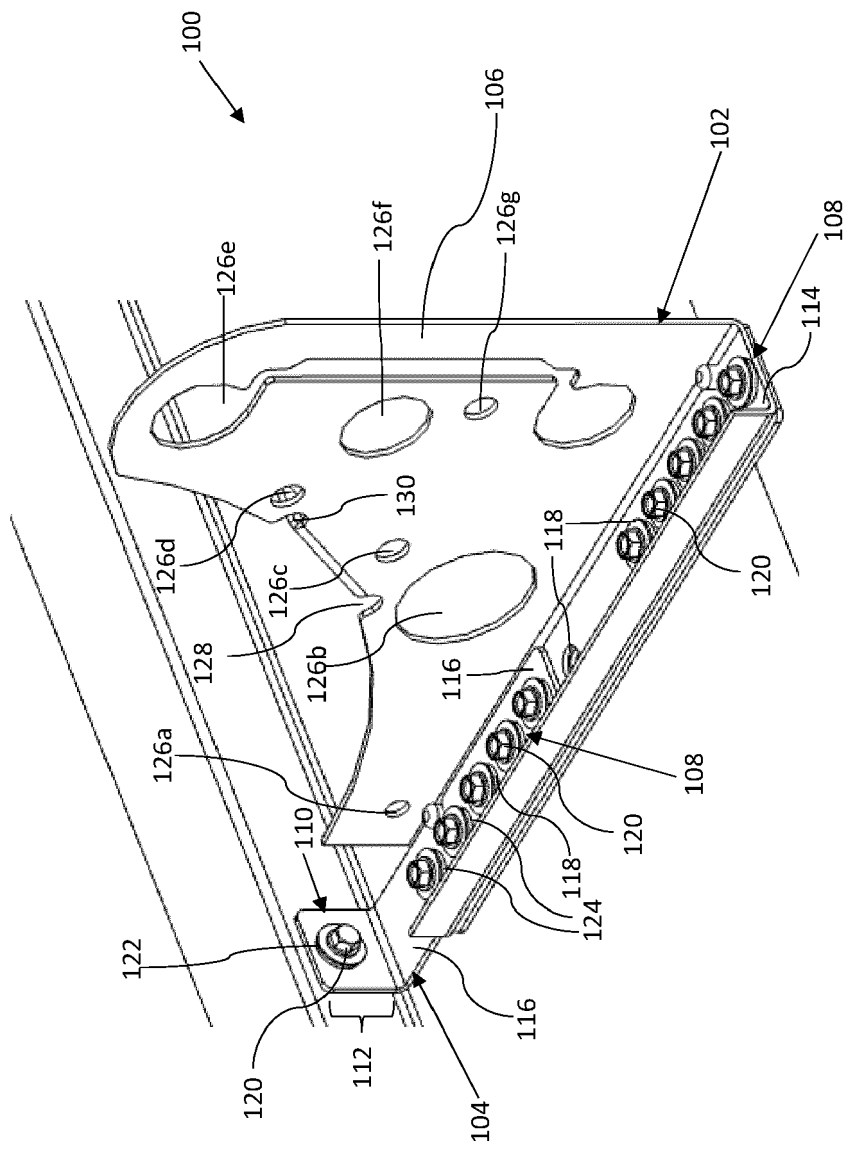
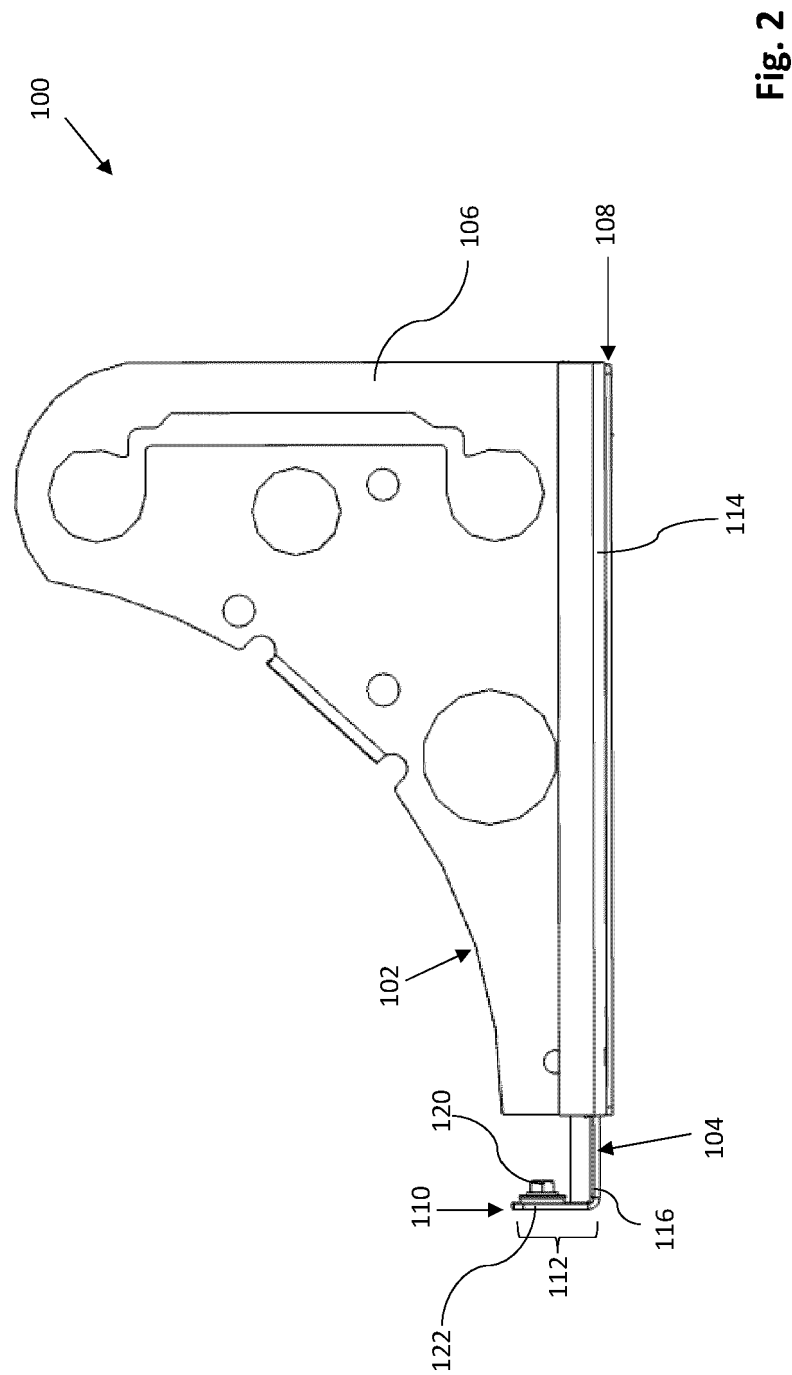


Fig. 1



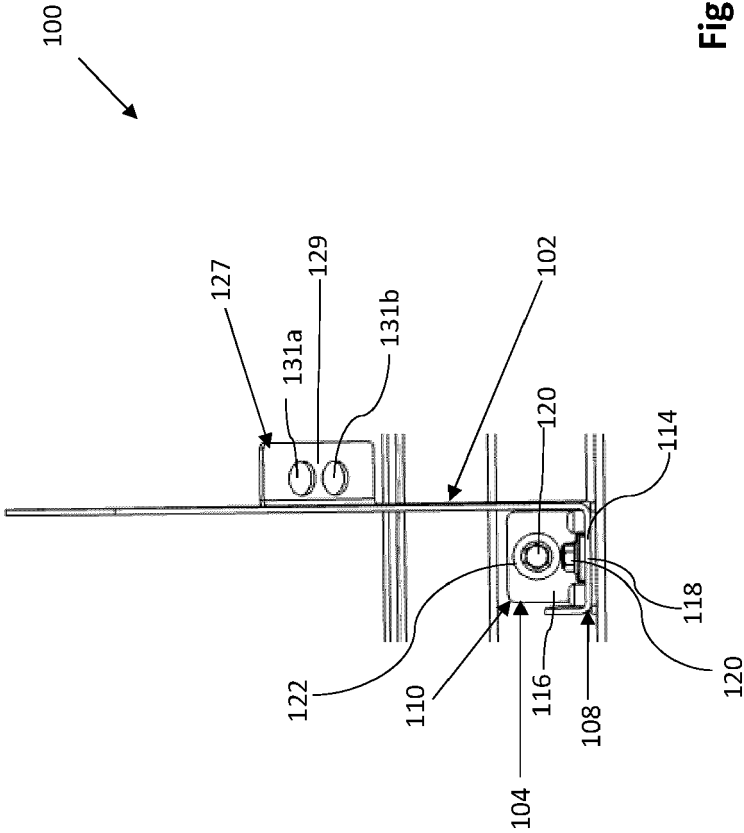


Fig. 3

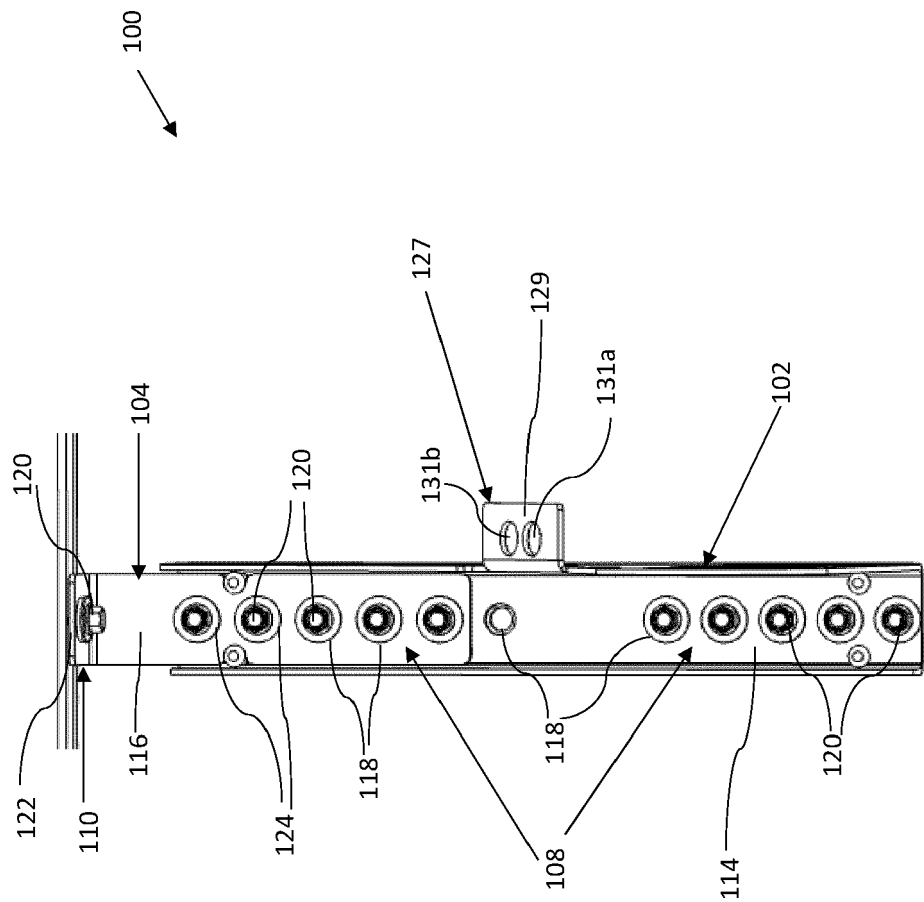


Fig. 4

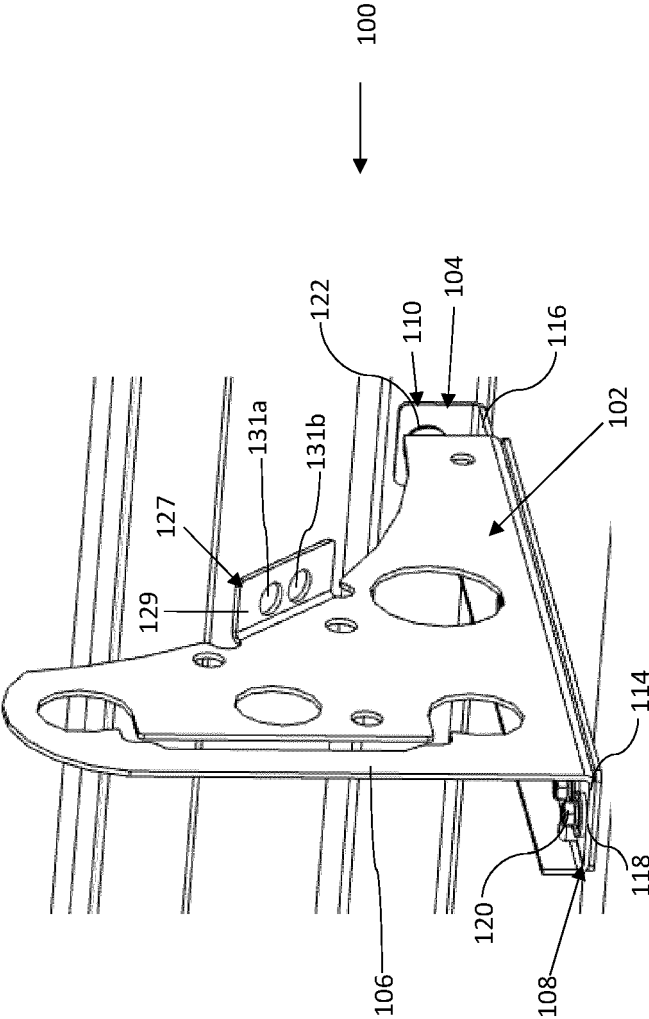


Fig. 5

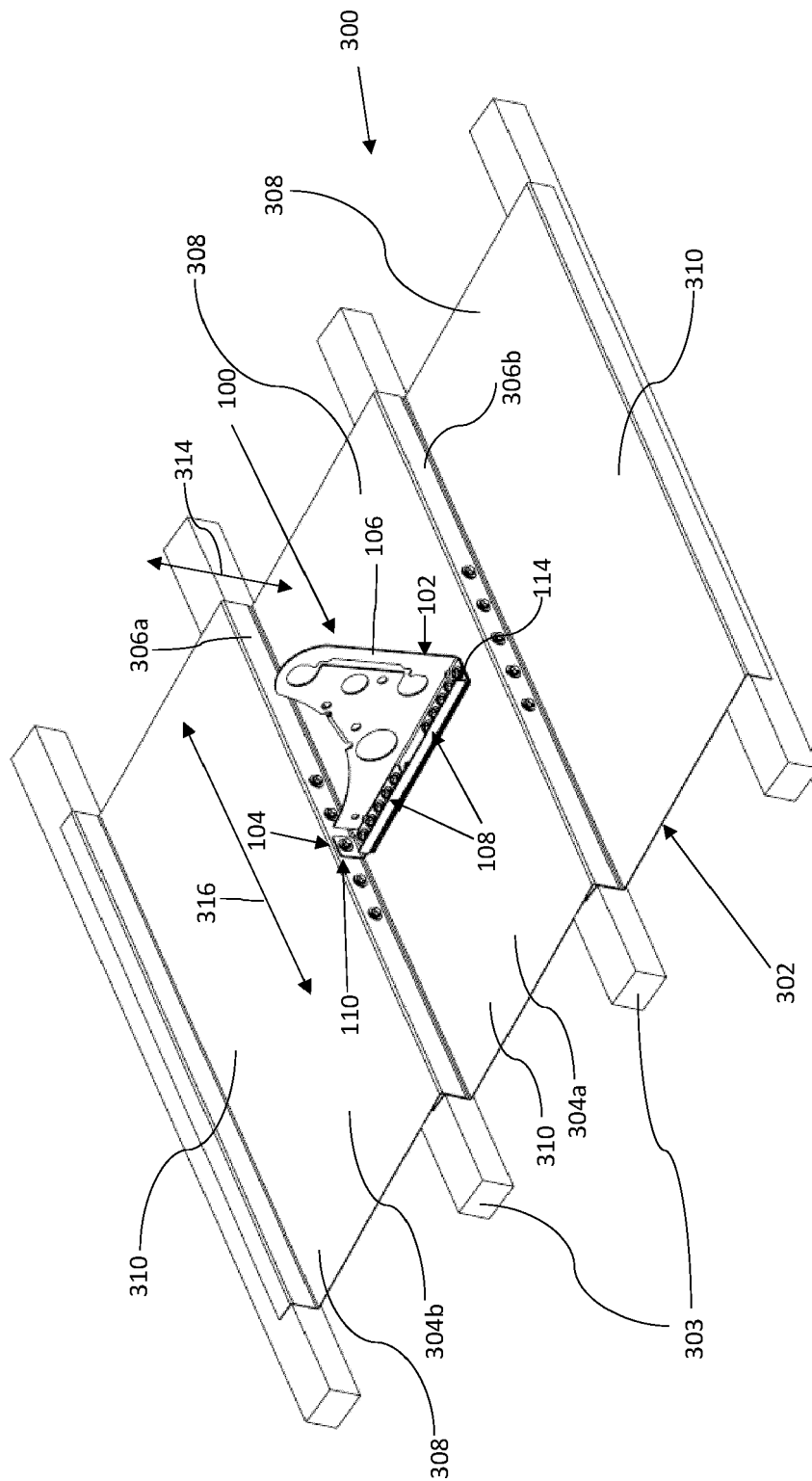


Fig. 6

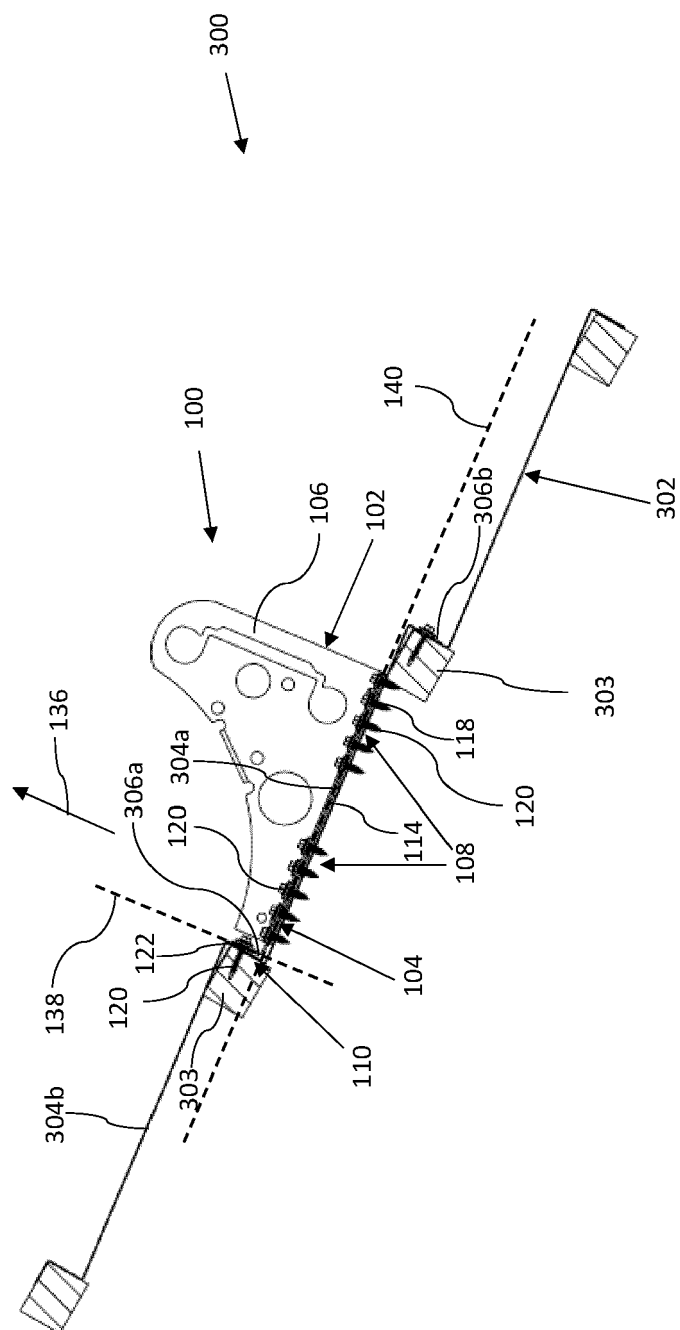


Fig. 7

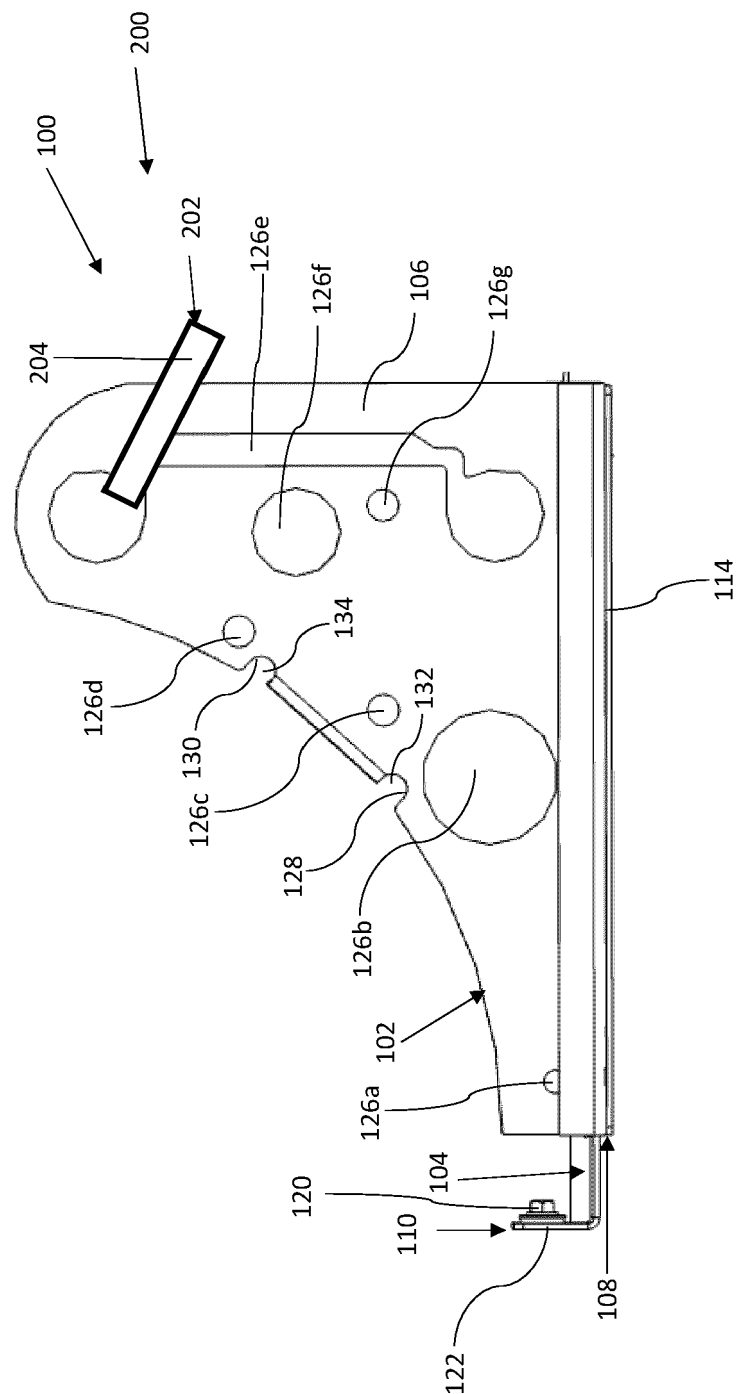


Fig. 8

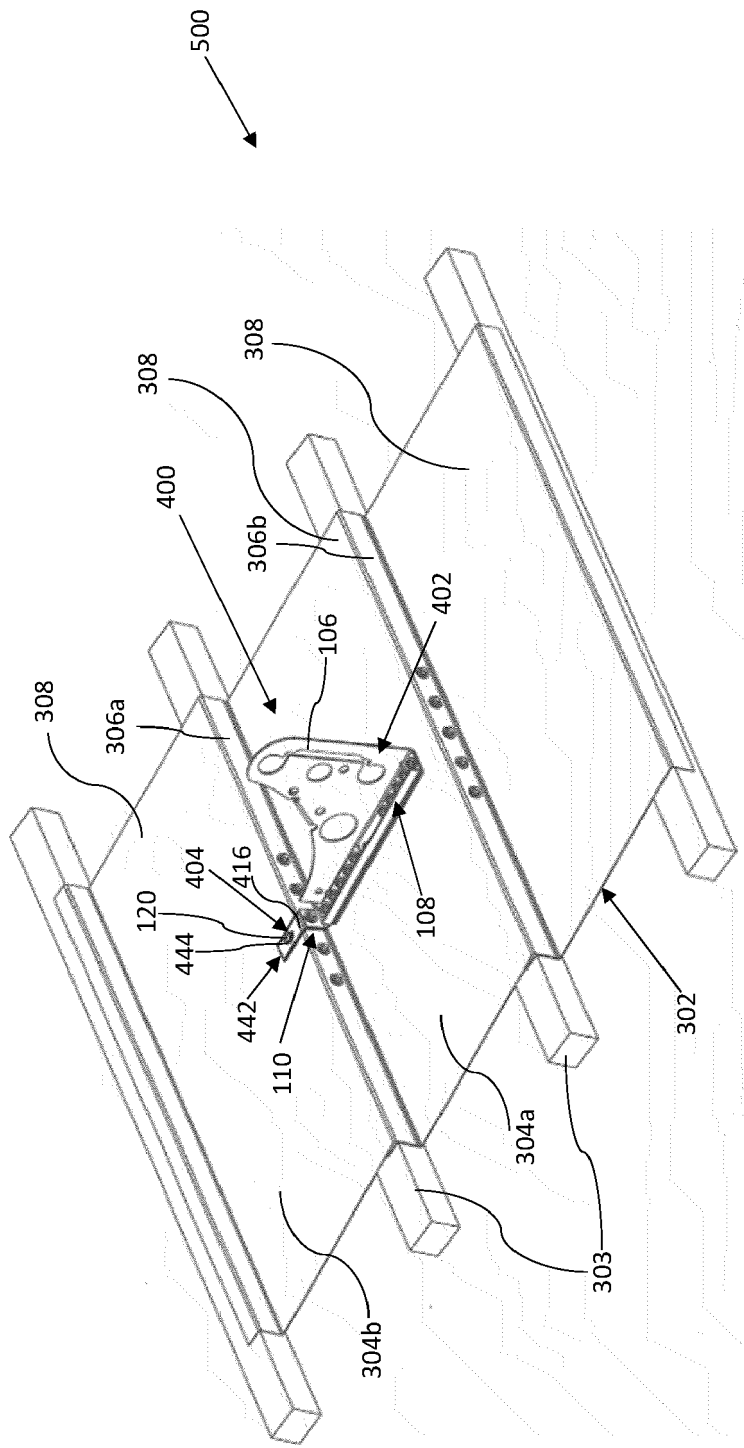


Fig. 9

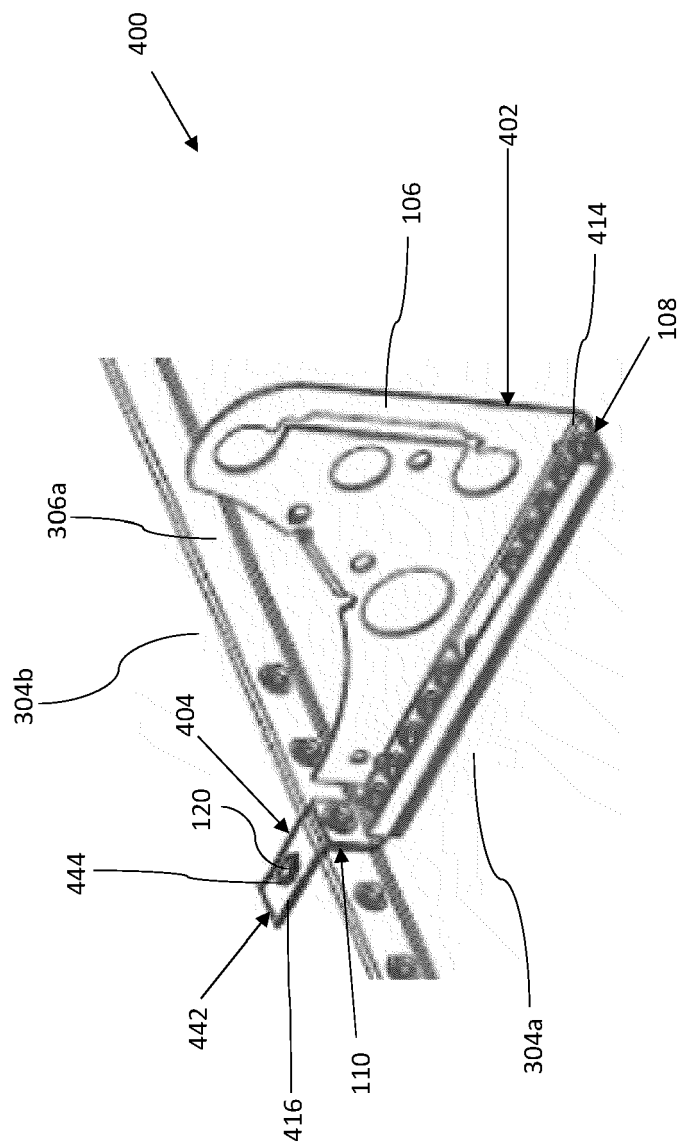


Fig. 10

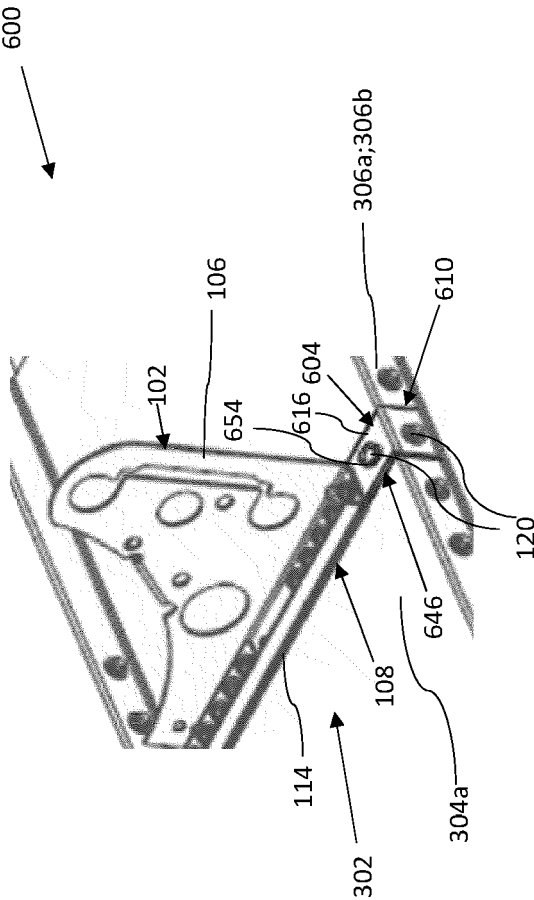


Fig. 11

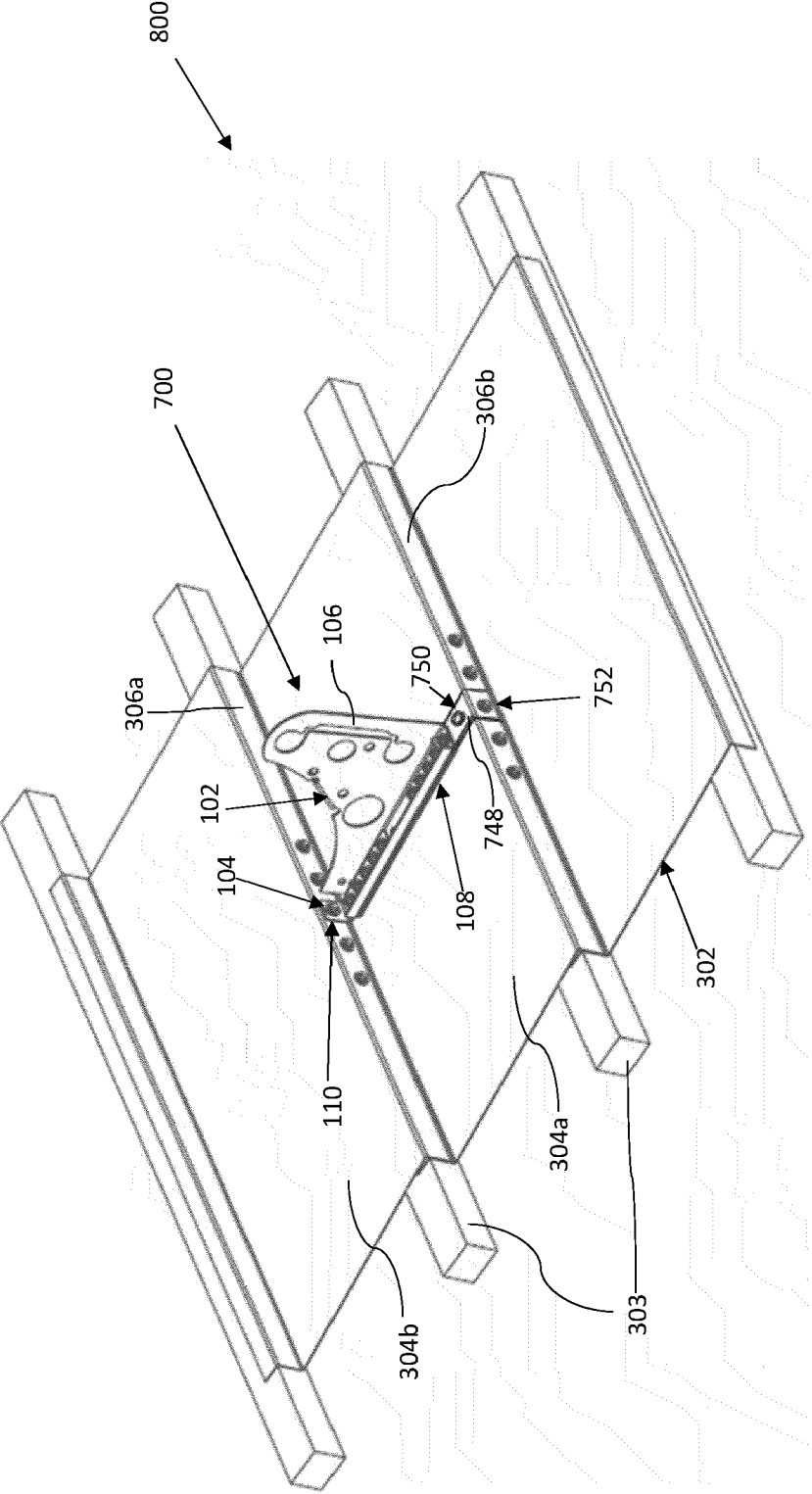


Fig. 12

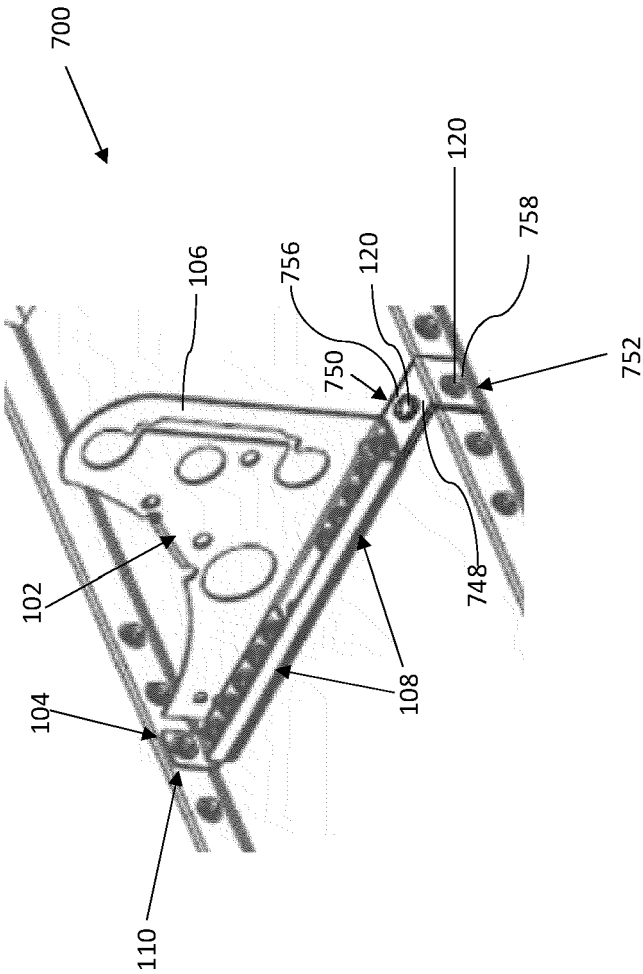


Fig. 13

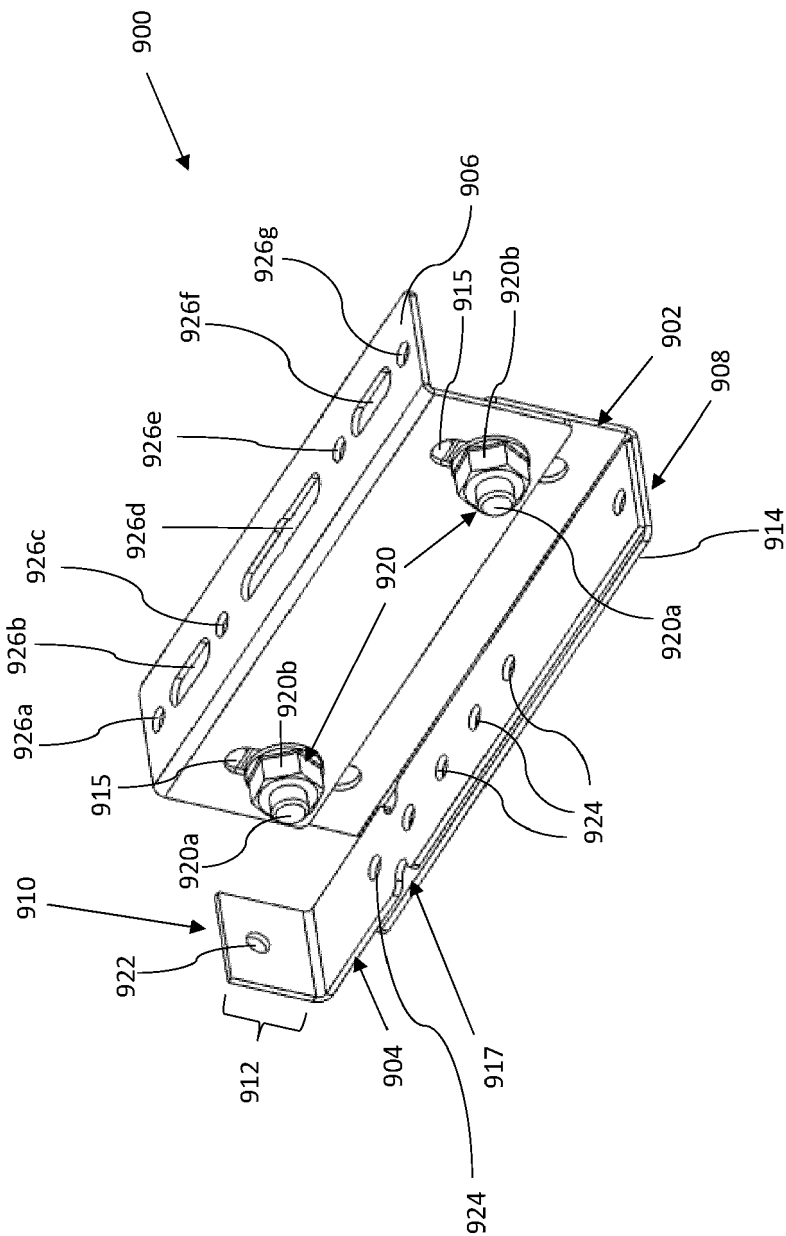


Fig. 14

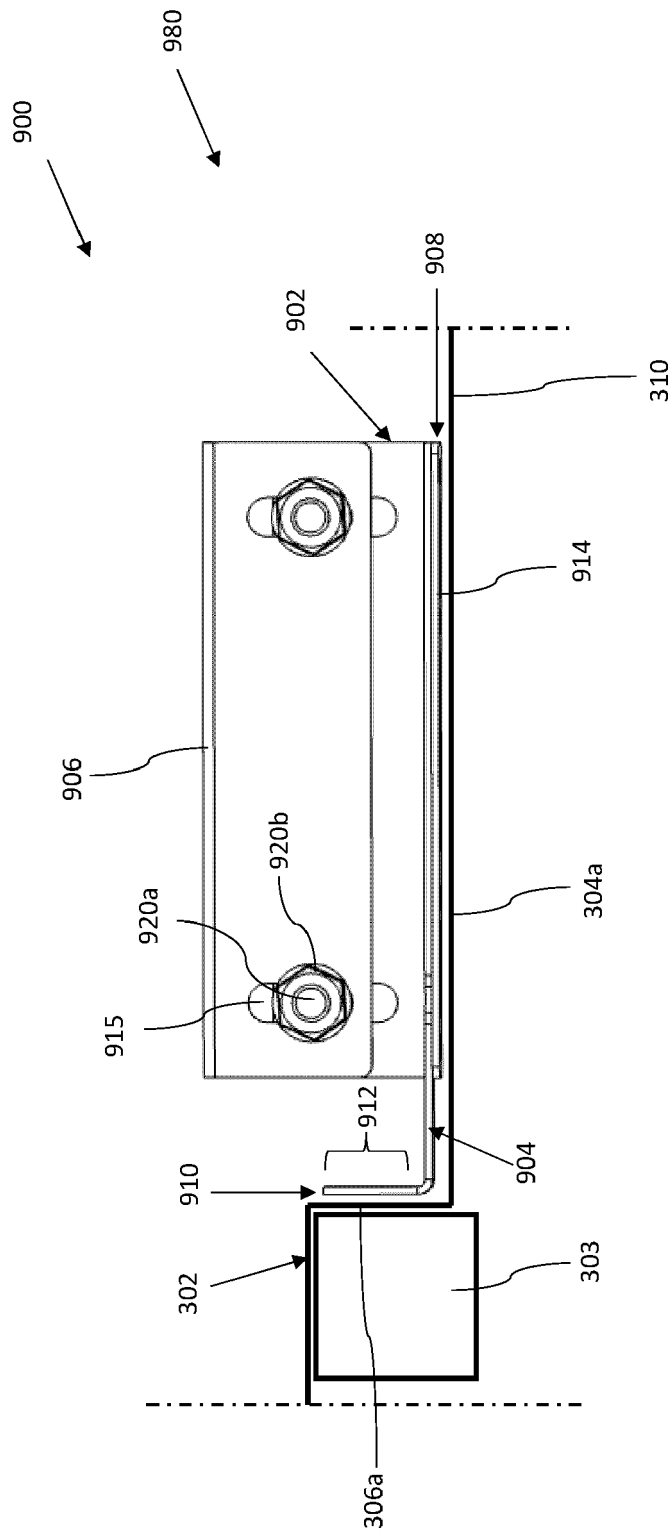


Fig. 15

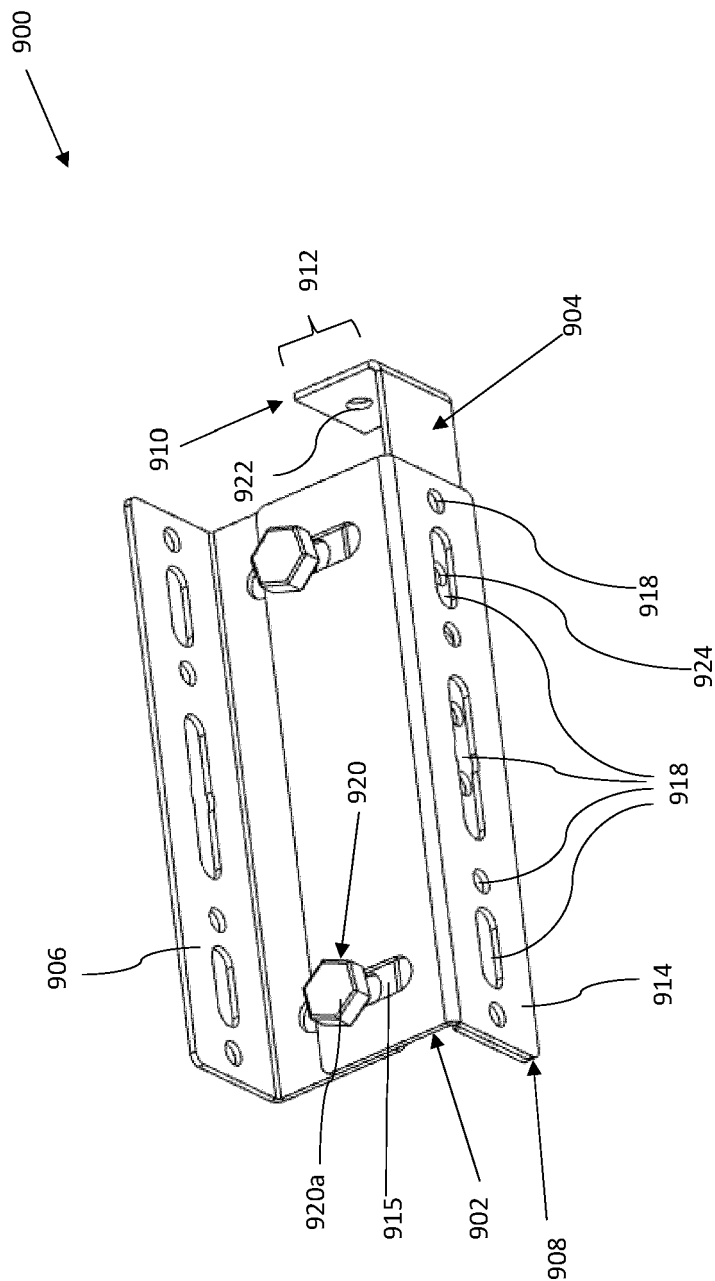


Fig. 16



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