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(54) ATTACHMENT MECHANISMS AND SYSTEMS FOR USE WITH EDGE PROTECTION SYSTEMS

(57) Mechanisms, systems, and/or the like are provided. In some embodiments, the attachment mechanism includes an attachment plate comprising an attachment slot and an attachment groove, wherein one or more of the attachment slot and the attachment groove are configured to receive one or more fastening mechanisms to secure the attachment mechanisms to a fixed structure; a cross plate comprising a cross hole, wherein the cross plate is fixedly connected to the attachment plate, and wherein the cross plate is disposed perpendicular to the attachment plate. In some embodiments, the cross hole defines a pivot point of the attachment mechanism.

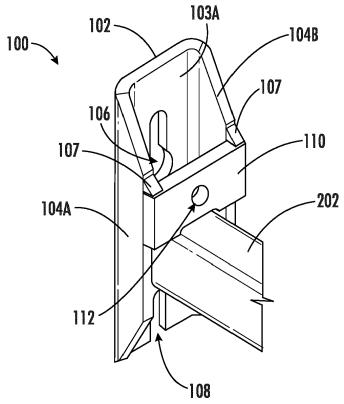

FIG. 1A

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Description

TECHNICAL FIELD

[0001] The present disclosure relates generally to attachment mechanisms. In particular, it relates to adjustable attachment mechanisms for use with an edge protection system.

BACKGROUND

[0002] Edge protection systems may be used to provide safety for workers operating at dangerous altitudes, such as on various levels of a building construction site. An edge protection system may include one or more temporary edge protection systems are disposed along the edges of a construction site to form a protective perimeter. The temporary edge protection systems may be composed of beam nets, frame barriers, mesh barriers, and/or the like. One or more attachment mechanisms may be used to secure the panels to the edges of the construction site.

[0003] Depending on a variety of factors (e.g., panel type, the type of material used at the construction site, and/or the like) one or more different types of attachment mechanisms may be required. For example, some attachment mechanism may require multiple fastening devices to connect to the structure of a building where the temporary edge protection system is utilized.

[0004] Through applied effort, ingenuity, and innovation, Applicant has solved problems relating to attachment mechanisms for edge protection systems by developing solutions embodied in the present disclosure, which are described in detail below.

SUMMARY

[0005] In general, embodiments of the present disclosure provide attachment mechanisms, systems, and/or the like.

[0006] In accordance with various embodiments of the present disclosure there is provided an attachment mechanism including an attachment plate including an attachment slot and an attachment groove, wherein one or more of the attachment slot and the attachment groove are configured to receive one or more fastening mechanisms to secure the attachment mechanisms to a fixed structure; a cross plate including a cross hole, wherein the cross plate is fixedly connected to the attachment plate, and wherein the cross plate is disposed perpendicular to the attachment plate.

[0007] In some embodiments, the cross hole defines a pivot point of the attachment mechanism.

[0008] In some embodiments, the cross hole is aligned with one or more of the attachment slot or the attachment groove.

[0009] In some embodiments, the cross plate is fixedly attached to the attachment plate via one or more weldments.

[0010] In some embodiments, the attachment slot is a keyhole-shaped slot.

[0011] In some embodiments, the attachment slot and the attachment groove are disposed on opposite sides of the cross plate, and wherein the attachment slot is disposed below the attachment slot.

[0012] In accordance with various embodiments there is provided an attachment system configured to support an edge protection system, wherein the attachment system includes an attachment mechanism including an attachment plate including an attachment slot and an attachment groove, wherein one or more of the attachment slot and the attachment groove are configured to receive one or more fastening mechanisms to secure the attachment mechanisms to a fixed structure; a cross plate including a cross hole, wherein the cross plate is fixedly connected to the attachment plate, and wherein the cross plate is disposed perpendicular to the attachment plate; a fixed beam fixedly attached to the attachment mechanism; and a running beam operably attached to the first beam such that the running beam is configured to move along a length of the fixed beam relative to the attachment mechanism.

[0013] In some embodiments the attachment system includes a sliding bracket, wherein the sliding bracket is fixedly attached to the running beam and operatively engaged with the fixed beam, such that the sliding bracket is configured to move along the length of the fixed beam relative to the attachment mechanism.

[0014] In some embodiments, the cross hole defines a pivot point of the attachment mechanism above the center of gravity of the fixed beam such that the fixed beam is prevented from rotating relative to the attachment mechanism.

[0015] In some embodiments, the cross hole is aligned with one or more of the attachment slot or the attachment groove.

[0016] In some embodiments, the cross plate is fixedly attached to the attachment plate via one or more weldments.

[0017] In some embodiments, the attachment slot is a keyhole-shaped slot.

[0018] In some embodiments, the attachment slot and the attachment groove are disposed on opposite sides of the cross plate, and wherein the attachment slot is disposed below the attachment slot.

[0019] The above summary is provided merely for purposes of summarizing some example embodiments to provide a basic understanding of some embodiments of the disclosure. Accordingly, it will be appreciated that the above-described embodiments are merely examples. It will be appreciated that the scope of the disclosure encompasses many potential embodiments in addition to those here summarized, some of which will be further described below.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0020] Having thus described the disclosure in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1A shows an isometric view of an example attachment mechanism in accordance with various embodiments of the present disclosure;
FIG. 1B shows a rear plan view of an example attachment mechanism in accordance with various embodiments of the present disclosure;
FIG. 1C shows a front plan view of an example attachment mechanism in accordance with various embodiments of the present disclosure;
FIG. 2 shows an isometric view of an example attachment system in accordance with various embodiments of the present disclosure;
FIGS. 3A-3D show isometric views depicting an installation process for an example attachment system in accordance with various embodiments of the present disclosure;
FIGS. 4A-4C show isometric views depicting an installation process for an example attachment system in accordance with various embodiments of the present disclosure; and
FIGS. 4D-4E show detail views depicting an installation process for an example attachment system in accordance with various embodiments of the present disclosure.

DETAILED DESCRIPTION OF SOME EXAMPLE EMBODIMENTS

[0021] Various embodiments of the present disclosure now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the disclosure are shown. Indeed, this disclosure may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. The term "or" (also designated as "/") is used herein in both the alternative and conjunctive sense, unless otherwise indicated. The terms "illustrative" and "exemplary" are used to be examples with no indication of quality level. Like numbers may refer to like elements throughout. The phrases "in one embodiment," "according to one embodiment," and/or the like generally mean that the particular feature, structure, or characteristic following the phrase may be included in at least one embodiment of the present disclosure and may be included in more than one embodiment of the present disclosure (importantly, such phrases do not necessarily may refer to the same embodiment).

Overview

[0022] According to various embodiments, there is provided an attachment mechanism that may provide support for an edge protection system. The attachment mechanism may include an attachment plate fixed to a beam, post, wall, or other fixed object at a site (e.g., a construction site). In some embodiments, the attachment mechanism may include a fixed beam and a running beam configured to move along the fixed beam. The edge protection system may be attached to the running beam, and the running beam may be moved along the fixed beam to adjust the distance of the edge protection system from the fixed attachment plate.

[0023] The attachment plate may include an attachment slot and an attachment groove, each of which may be used to attach the attachment plate to the aforementioned fixed object. In some embodiments, a fastener may be fixed through the attachment slot, through the attachment groove, or both to fix the attachment plate to the fixed object. In some embodiments, the attachment plate may include a cross plate with a cross hole. In some embodiments, one or more fasteners may be disposed through the cross hole, which may be aligned with one or more of the attachment slot and/or the attachment groove.

Example Attachment Mechanisms

[0024] FIG. 1A shows an isometric view of an example attachment mechanism 100 and FIGS. 1B and 1C show a rear plan and front plane view, respectively, of the example attachment mechanism 100, according to various embodiments. In some embodiments, the attachment mechanism 100 may include an attachment plate 102. The attachment plate 102 may be a substantially rectangular metal plate having a substantially flat, planar surface. In some embodiments, the attachment plate 102 may be configured to be fixedly attached to a beam, a wall, and/or the like.

[0025] In some embodiments, the attachment plate 102 may define a rear face 103A (shown in at least FIGS. 1A and 1B) and a front face 103B (shown in at least FIG. 1C). In some embodiments, the front face 103B may be configured to be flush with the beam, wall, and/or the like. In some embodiments, the attachment plate 102 may include one or more flanges 104A, 104B disposed on opposed sides of the attachment plate 102. In some embodiments, the flanges 104A, 104B may be included on the rear face 103A of the attachment plate 102. In some embodiments, the attachment plate 102 and the one or more flanges 104A, 104B may be a bracket configured to receive one or more components of the attachment mechanism 100.

[0026] In some embodiments, the attachment plate 102 may include an attachment slot 106. The attachment slot 106 may be a keyhole shaped slot, as shown in the figures. In some embodiments, the attachment slot 106

may be configured to receive one or more fastening mechanisms to secure the attachment plate 102 and/or various other components of the attachment mechanism 100 to a wall, beam, and/or the like, as will be described in greater detail later in this disclosure. In some embodiments, the one or more fastening mechanisms may be disposed through one or more locations on the attachment slot 106 (e.g., the "bottom," circular section, or the "upper," elongated section).

[0027] In some embodiments, the attachment plate 102 may include an attachment groove 108. Similar to the attachment slot 106, the attachment groove 108 may be configured to receive one or more fastening mechanisms to secure the attachment plate 102 and/or various other components of the attachment mechanism 100 to a wall, beam, and/or the like, as will be described in greater detail later in this disclosure. In some embodiments, the groove 108 may be an elongated cutout of the plate 102. The groove 108 may be rectangularly-shaped and include an arcing or curved portion defining one or more sides, as shown. In some embodiments, the attachment slot 106 and the attachment groove 108 may be disposed on separate locations of the plate 102. In some embodiments, the attachment groove 108 may be disposed on a "lower" portion of the plate 102, and the attachment slot 106 may be disposed on an "upper" portion of the plate 102 ("lower" and "upper" herein being in reference to a portrait orientation of the figures, with the figure label at the bottom, for reference).

[0028] In some embodiments, the attachment mechanism 100 may include a cross plate 110. The cross plate 110 may be a substantially rectangular, metal plate. In some embodiments, the cross plate 110 may be fixedly attached to the attachment plate 102. In some embodiments, the cross plate 110 may be fixedly attached via one or more weldments 107, as shown throughout the figures. It will be understood that multiple types of attachment mechanisms may be used to secure the cross plate 110 to the attachment plate 102.

[0029] In some embodiments, the cross plate 110 may include a cross hole 112. In some embodiments, the cross hole 112 may be a substantially circular hole disposed at or near the center of the cross plate 110. The cross hole 112 may be configured to be aligned with the attachment slot 106. In some embodiments, the cross hole 112 may be configured to receive one or more fasteners, similarly to the attachment slot 106 and the attachment groove 108, to secure the attachment plate 102, the cross plate 110, and/or various other components of the attachment mechanism 100 to a wall, beam, and/or the like, as will be described in greater detail later in this disclosure.

Example Attachment Systems

[0030] FIG. 2 shows an isometric view of an example attachment system 200. In some embodiments, the attachment system 200 may include the attachment mechanism 100. In some embodiments, the attachment system 200 may further include a fixed beam 202. The fixed beam 202 may be an elongated, substantially rectangular, rigid metal beam. The fixed beam 202 may include a hollow interior. The fixed beam 202 may be fixedly attached (e.g., via one or more weldments) to the attachment plate 102 of the attachment mechanism 100. In some embodiments, the fixed beam 202 may be attached perpendicularly to the attachment plate 102. In some embodiments, the fixed beam 202 may be attached on the rear face 103A of the attachment plate 102. In some embodiments, the fixed beam 202 may be attached to the attachment plate 102 at or near a position below the cross plate 110, "above" the attachment groove 108, and "below" the cross hole 112. It will be understood that the fixed beam 202 may be attached to various locations on the attachment plate 102, according to various embodiments. In some embodiments, the cross hole 112 may be a pivot point relative to the center of gravity of the fixed beam 202; the positioning of the cross hole 112 may be such that the pivot point is above the center of gravity of the fixed beam 202, thereby preventing rotation of the fixed beam 202 relative to the attachment mechanism 100.

[0031] In some embodiments, the attachment system 200 may further include a running beam 204. The running beam 204 may be an elongated metal beam having one or more surfaces being cylindrical, rectangular, and/or both for various spans along the length of the running beam 204. For example, in at least FIG. 2, the running beam 204 has a "lower" portion 209A that is substantially rectangular and an "upper" portion 209B that is substantially cylindrical. In some embodiments, the running beam 204 may be configured to be attached to one or more panels and/or the like of an edge protection system. In some embodiments, the edge protection system may be attached to the running beam 204 at one or more attachment points 205.

[0032] In some embodiments, the running beam 204 may be disposed perpendicularly to the fixed beam 202. In some embodiments, the running beam 204 may be attached to the fixed beam 202 by a sliding bracket 206. The sliding bracket 206 may be operably engaged to the fixed beam 202 and fixedly attached to the running beam 204, and the sliding bracket 206 may be configured such that the sliding bracket 206 may travel along the fixed beam and thereby move the running beam 204 closer or farther from the attachment mechanism 100, as desired. For example, the sliding bracket 206 may be secured to the fixed beam 202 via a fastener 207 (e.g., an adjustable bolt) such that the running beam 204 is fixed in a position on the fixed beam 202; in some embodiments, the fastener 207 may be loosened to enable the sliding bracket to slide along the fixed beam 202; the fastener 207 may then be tightened again such that the running beam 204 is fixed again to a position on the fixed beam 202.

[0033] In some embodiments, the running beam 204 may be adjustable such that its length can be increased

or decreased as desired. For example, the running beam 204 may be lengthened such that more components of the edge protection system may be attached to the running beam 204. In some embodiments, the running beam 204 may be lengthened by attaching additional beams and/or the like in series with the running beam 204. In some embodiments, the running beam 204 may include an adjustable tube configured to be lengthened or shortened, as desired.

[0034] FIGS. 3A-3D show an installation process of an example attachment system 200, according to various embodiments. In some embodiments, the attachment system 200 may be attached to a beam 300. It will be understood that the beam 300 may be embodied as a wall or similar structure located at a construction site to which the example attachment system 200 may be fixed for installing an edge protection system. FIGS. 3A-3D depict an installation process for an example attachment system 200 utilizing one fastening mechanism, according to various embodiments.

[0035] Referring now to FIG. 3A, a fastening mechanism 302 is installed on the beam 300. In some embodiments, the fastening mechanism 302 may be a screw and nut. some embodiments, the screw may be preinstalled with the nut in the beam 300 prior to the introduction of the attachment system 200. Referring now to FIG. 3B, the fastening mechanism 302 may be disposed through the attachment slot 106 and the cross hole 112, in some embodiments. Referring now to FIGS. 3C and 3D (showing a detail view of the isometric view in FIG. 3C), the fastening mechanism 302 may then be secured (e.g., using a nut) such that the attachment system 200 is secured to the beam 300.

[0036] FIGS. 4A-4E show an installation process of an example attachment system 200, according to various embodiments. As in FIGS. 3A-3D, FIGS. 4A-4E depict the attachment system 200 being attached to the beam 300, as previously described. FIGS. 4A-4E depict an installation process for an example attachment system 200 utilizing two fastening mechanisms, according to various embodiments.

[0037] Referring now to FIG. 4A, multiple fastening mechanisms 304A, 304B may be installed on the beam 300. In some embodiments, the fastening mechanisms 304A and 304B may be described similarly to the fastening mechanism 302. As shown in FIGS. 4B and 4D, the fastening mechanisms 304A may be disposed through the attachment slot 106 and cross hole 112 and the fastening mechanism 304B may be disposed through the attachment groove 108. As shown in FIGS. 4C and 4E, the fastening mechanisms 304A and 304B may be secured (e.g., via nuts) such that the attachment system 200 is fixedly attached to the beam 300. In some embodiments, the one or more fastening mechanisms 304A, 304B may work in conjunction to secure the attachment system 200 to the beam 300. As shown in at least FIGS. 4D and 4E, in some embodiments the fastening mechanism 304A may not be disposed through the cross hole 112 after the attachment plate 102 has been secured to the beam 300.

[0038] Many modifications and other embodiments of the disclosure set forth herein will come to mind to one skilled in the art to which this disclosure pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the disclosure is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

Claims

1. An attachment mechanism comprising:

an attachment plate comprising an attachment slot and an attachment groove,
wherein one or more of the attachment slot and the attachment groove are configured to receive one or more fastening mechanisms to secure the attachment mechanisms to a fixed structure;
a cross plate comprising a cross hole,
wherein the cross plate is fixedly connected to the attachment plate, and
wherein the cross plate is disposed perpendicular to the attachment plate.

2. The attachment mechanism of claim 1, wherein the cross hole defines a pivot point of the attachment mechanism.

3. The attachment mechanism of claim 1, wherein the cross hole is aligned with one or more of the attachment slot or the attachment groove.

4. The attachment mechanism of claim 1, wherein the cross plate is fixedly attached to the attachment plate via one or more weldments.

5. The attachment mechanism of claim 1, wherein the attachment slot comprises a keyhole-shaped slot.

6. The attachment mechanism of claim 5, wherein the attachment slot and the attachment groove are disposed on opposite sides of the cross plate, and wherein the attachment slot is disposed below the attachment slot.

7. An attachment system configured to support an edge protection system, wherein the attachment system comprises:

an attachment mechanism comprising:

an attachment plate comprising an attachment slot and an attachment groove,
wherein one or more of the attachment slot and the attachment groove are configured to receive one or more fastening mechanisms to secure the attachment mechanisms to a fixed structure;
a cross plate comprising a cross hole,
wherein the cross plate is fixedly connected to the attachment plate, and
wherein the cross plate is disposed perpendicular to the attachment plate;

a fixed beam fixedly attached to the attachment mechanism; and
a running beam operably attached to the first beam such that the running beam is configured to move along a length of the fixed beam relative to the attachment mechanism.

8. The attachment system of claim 7, further comprising a sliding bracket, wherein the sliding bracket is fixedly attached to the running beam and operatively engaged with the fixed beam, such that the sliding bracket is configured to move along the length of the fixed beam relative to the attachment mechanism.

9. The attachment system of claim 7, wherein the cross hole defines a pivot point of the attachment mechanism above the center of gravity of the fixed beam such that the fixed beam is prevented from rotating relative to the attachment mechanism.

10. The attachment system of claim 7, wherein the cross hole is aligned with one or more of the attachment slot or the attachment groove.

11. The attachment system of claim 7, wherein the cross plate is fixedly attached to the attachment plate via one or more weldments.

12. The attachment system of claim 7, wherein the attachment slot comprises a keyhole-shaped slot.

13. The attachment system of claim 12, wherein the attachment slot and the attachment groove are disposed on opposite sides of the cross plate, and wherein the attachment slot is disposed below the attachment slot.

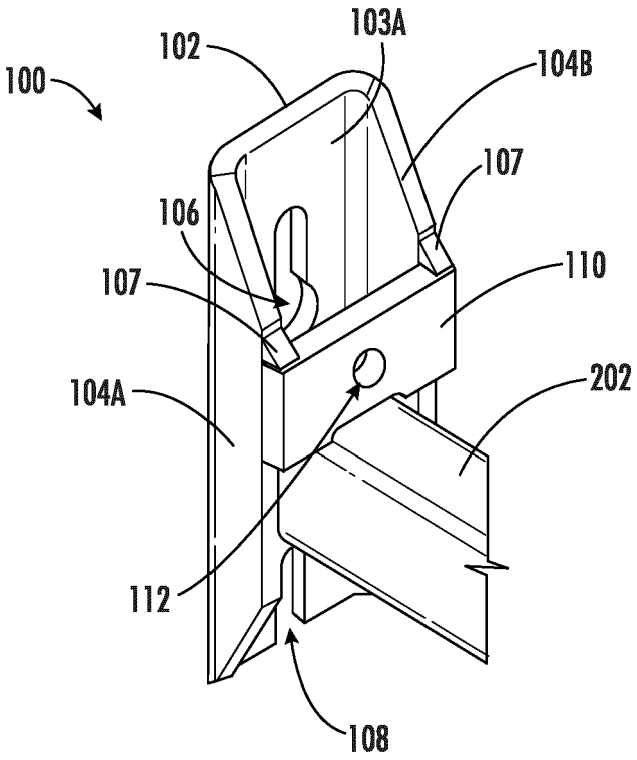

FIG. 1A

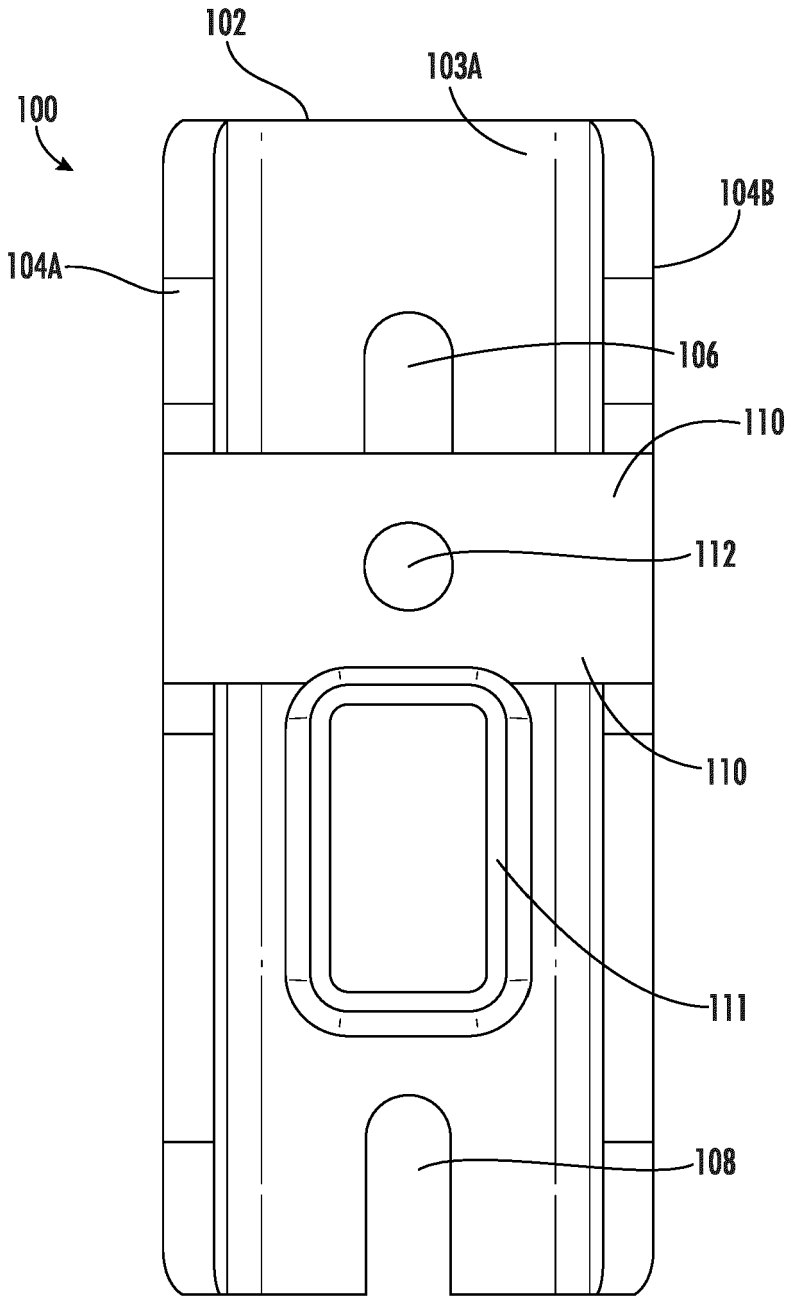

FIG. 1B

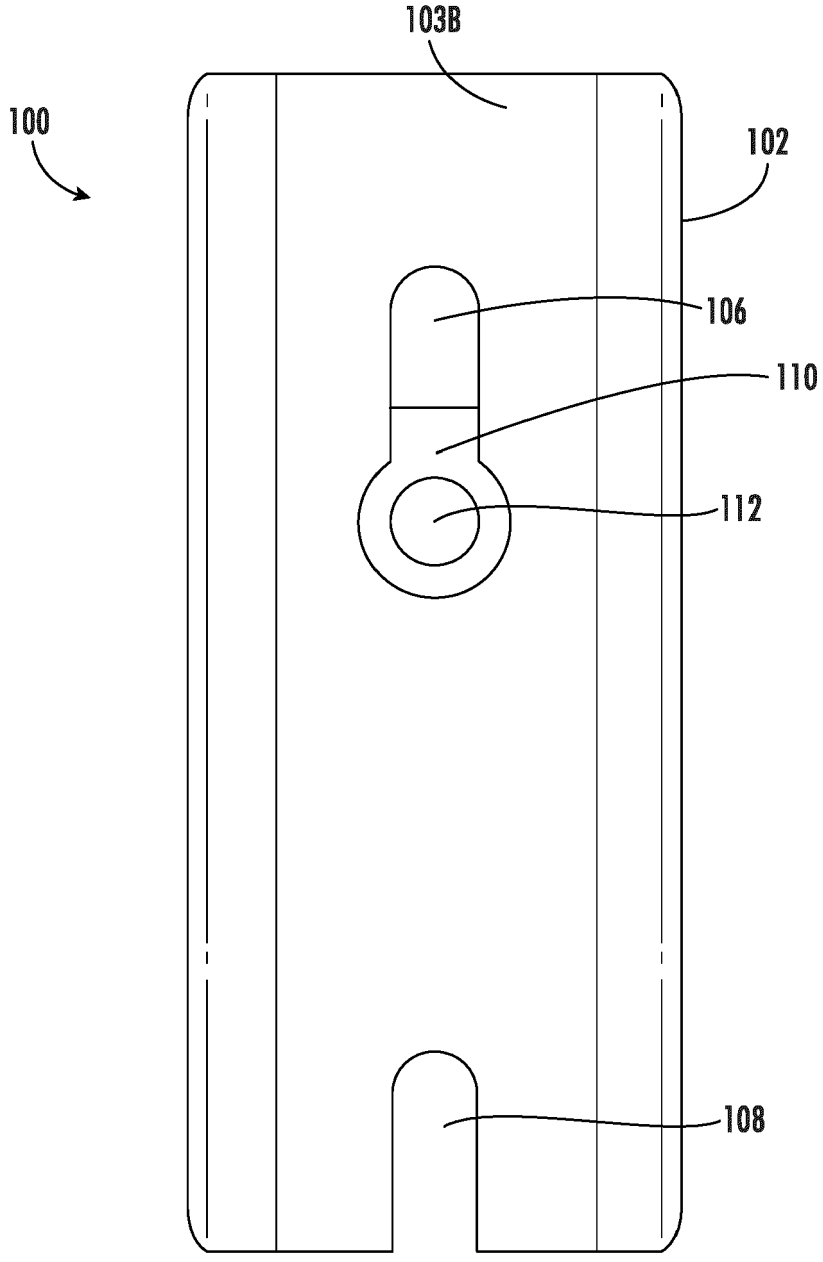

FIG. 1C

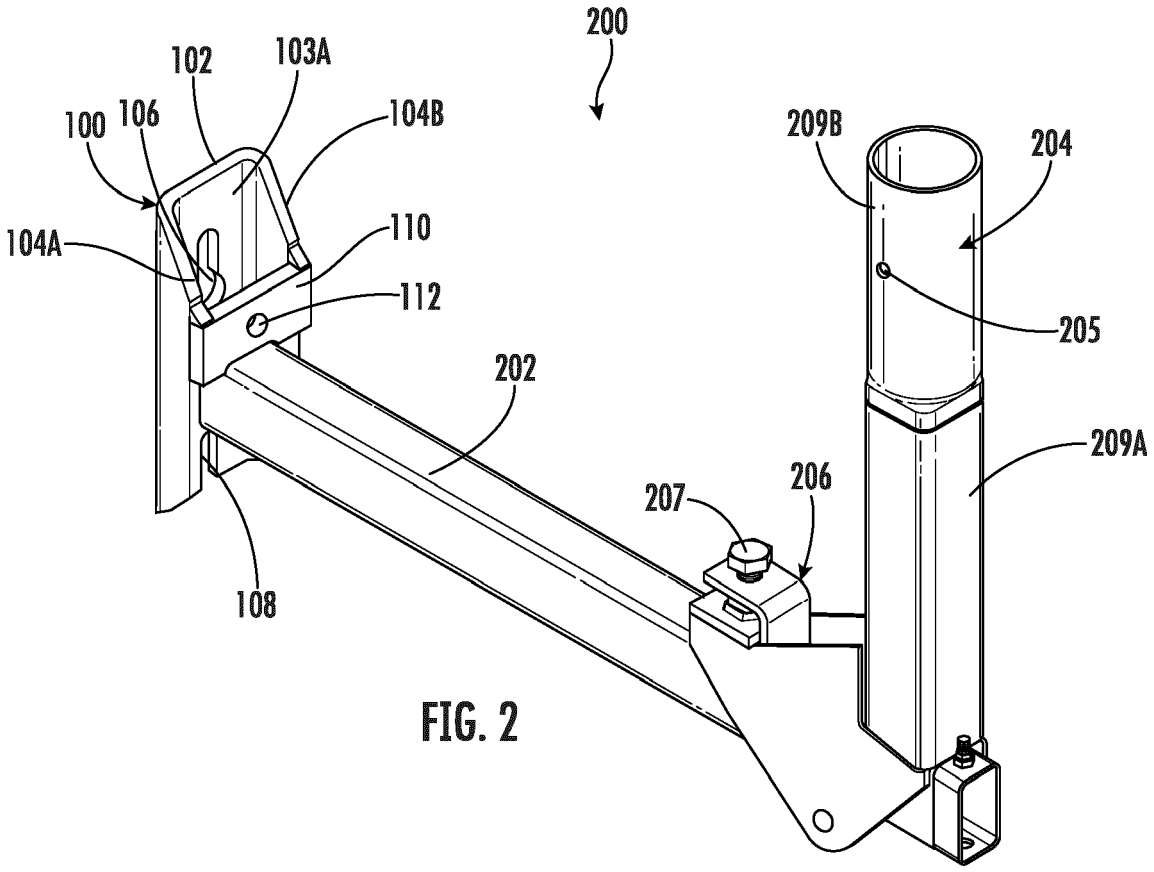
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FIG. 2

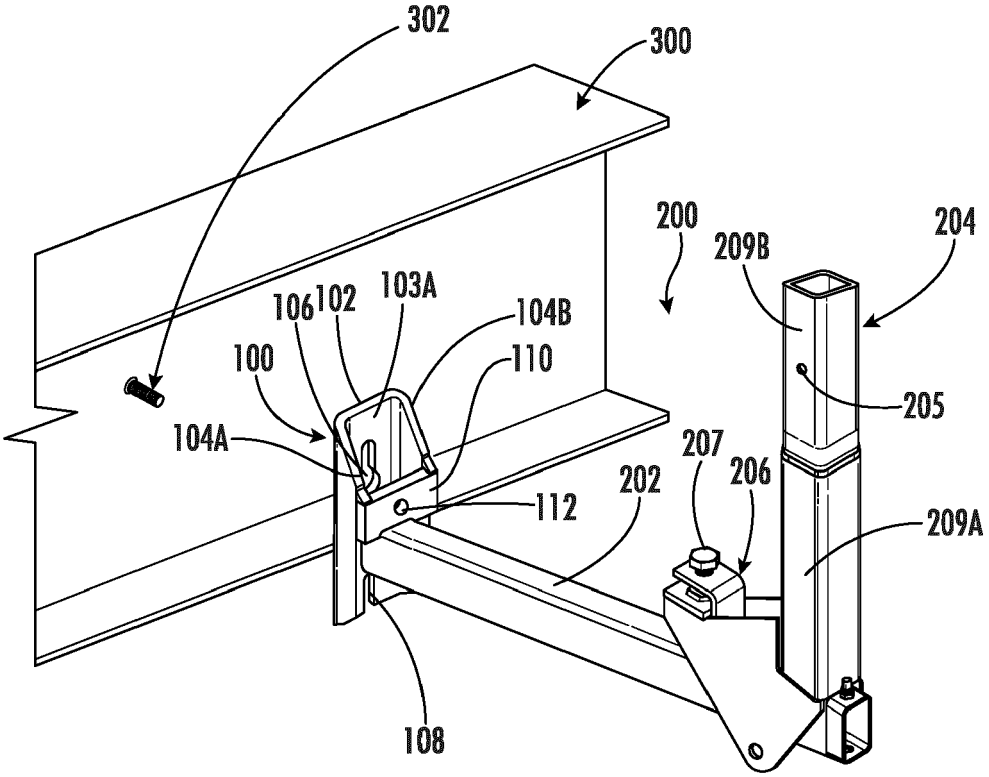
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FIG. 3A

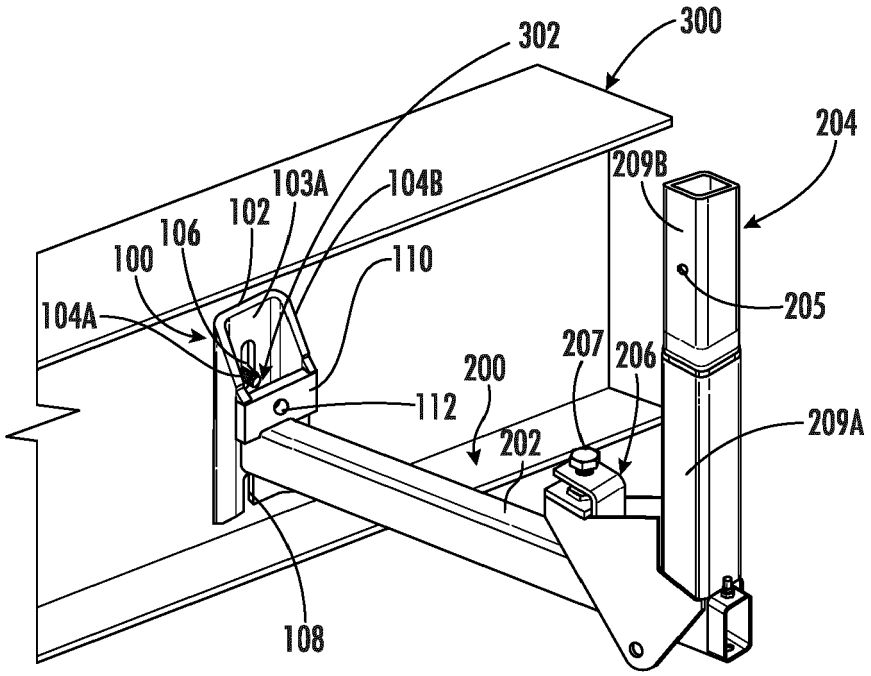
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FIG. 3B

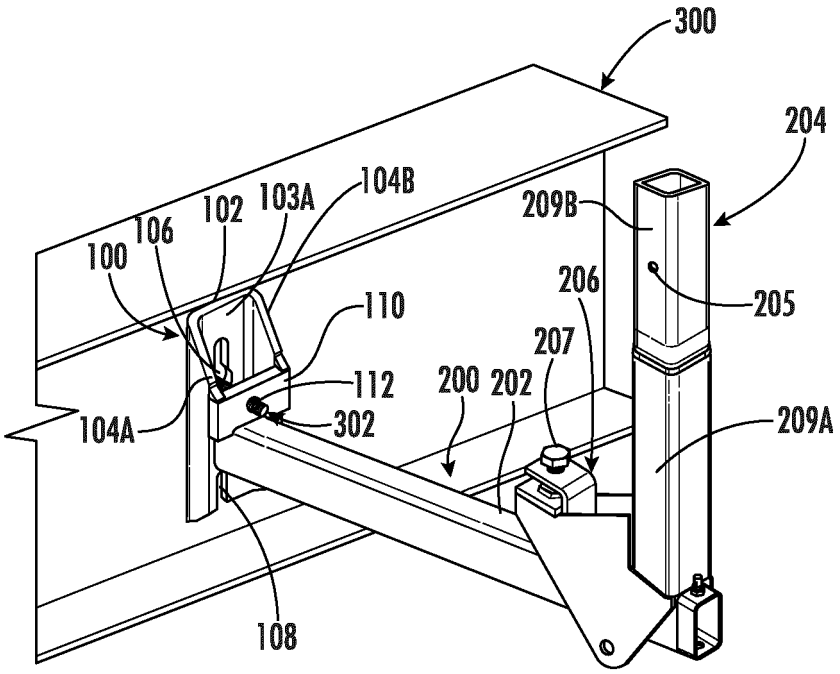
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FIG. 3C

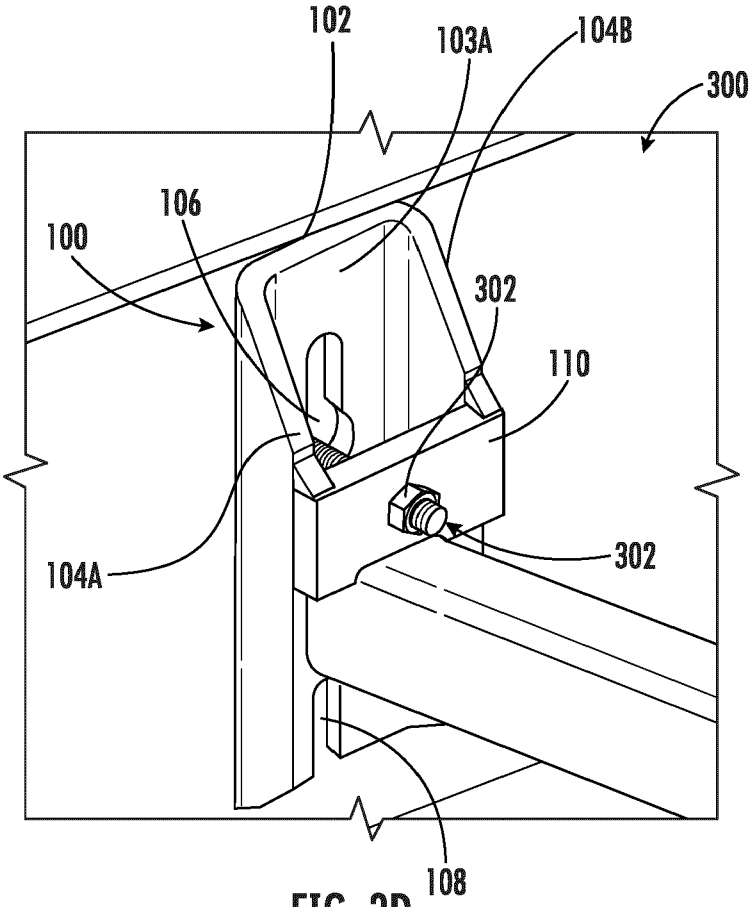

FIG. 3D

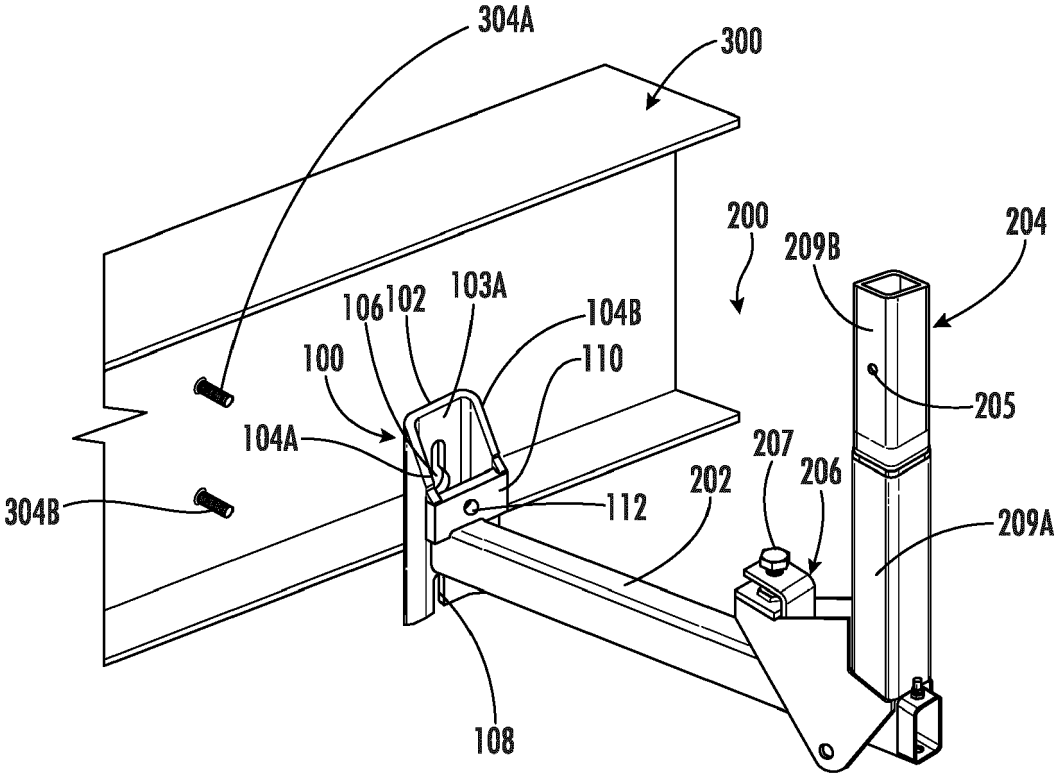
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FIG. 4A

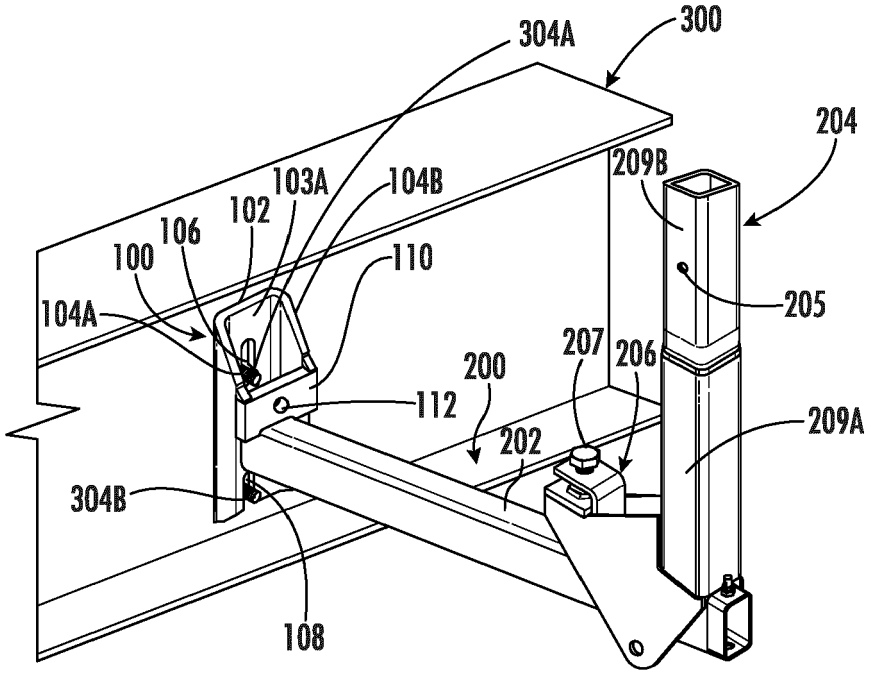
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FIG. 4B

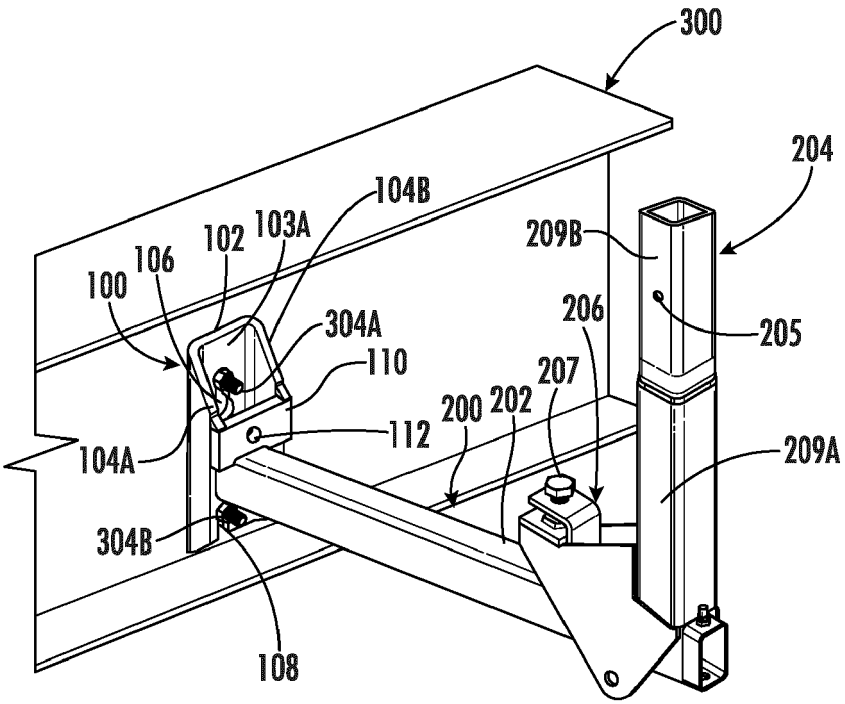
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FIG. 4C

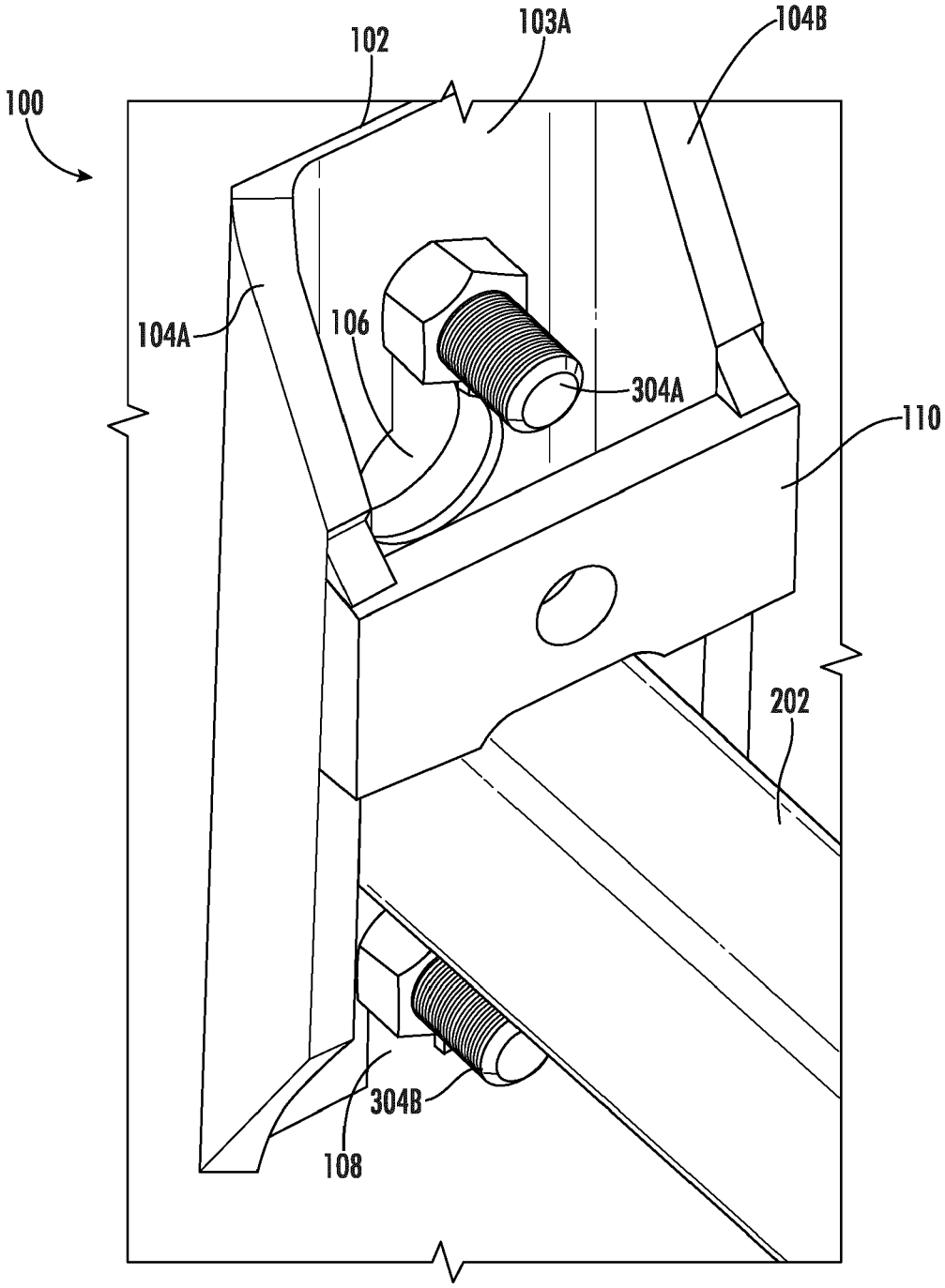

FIG. 4D

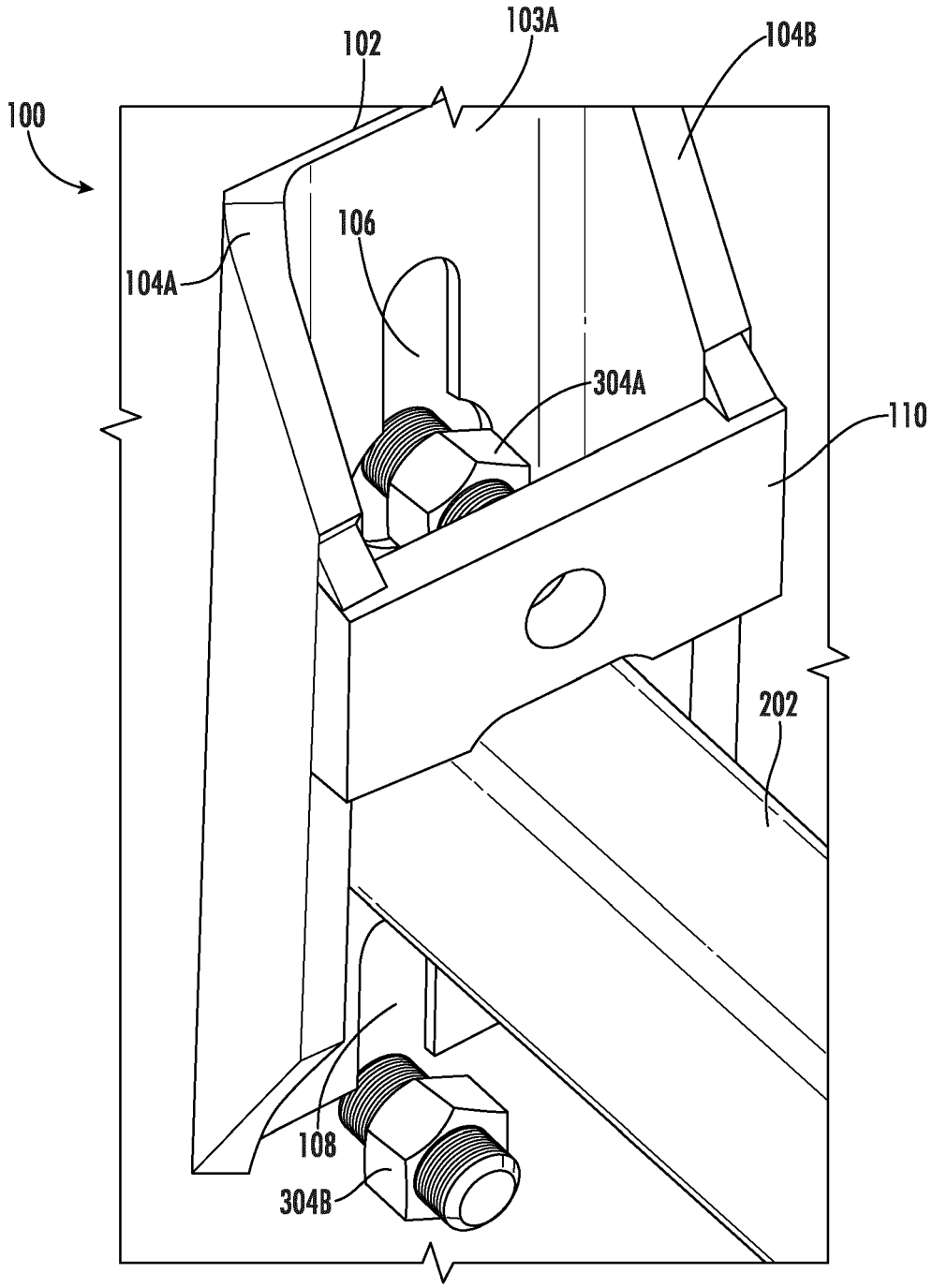

FIG. 4E

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 24 18 0058

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	FR 2 609 301 A1 (RICOUARD MARCEL [FR]) 8 July 1988 (1988-07-08) * page 2, line 19 - page 4, line 19; figures 3,4 *	1-7,9-13 7-13	INV. E04G5/04 E04F11/18 E04G5/06 E04G21/32
X	WO 2019/226752 A1 (ARMSTRONG WORLD IND INC [US]) 28 November 2019 (2019-11-28) * paragraph [0019] - paragraph [0025]; figures 21-24 *	1-3,5,6	
Y	US 2012/273740 A1 (TYRRELL DANA [US] ET AL) 1 November 2012 (2012-11-01) * paragraph [0012] - paragraph [0013]; figure 1 *	7-13	
A	DE 20 2013 007587 U1 (WBV WERKZEUG UND BAUMASCHINENVERMIETUNG E K [DE]) 22 October 2013 (2013-10-22) * figure 2 *	5,6,12, 13	

TECHNICAL FIELDS SEARCHED (IPC)

E04G
E04B
E04H
E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 November 2024	Manera, Marco

CATEGORY OF CITED DOCUMENTS

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