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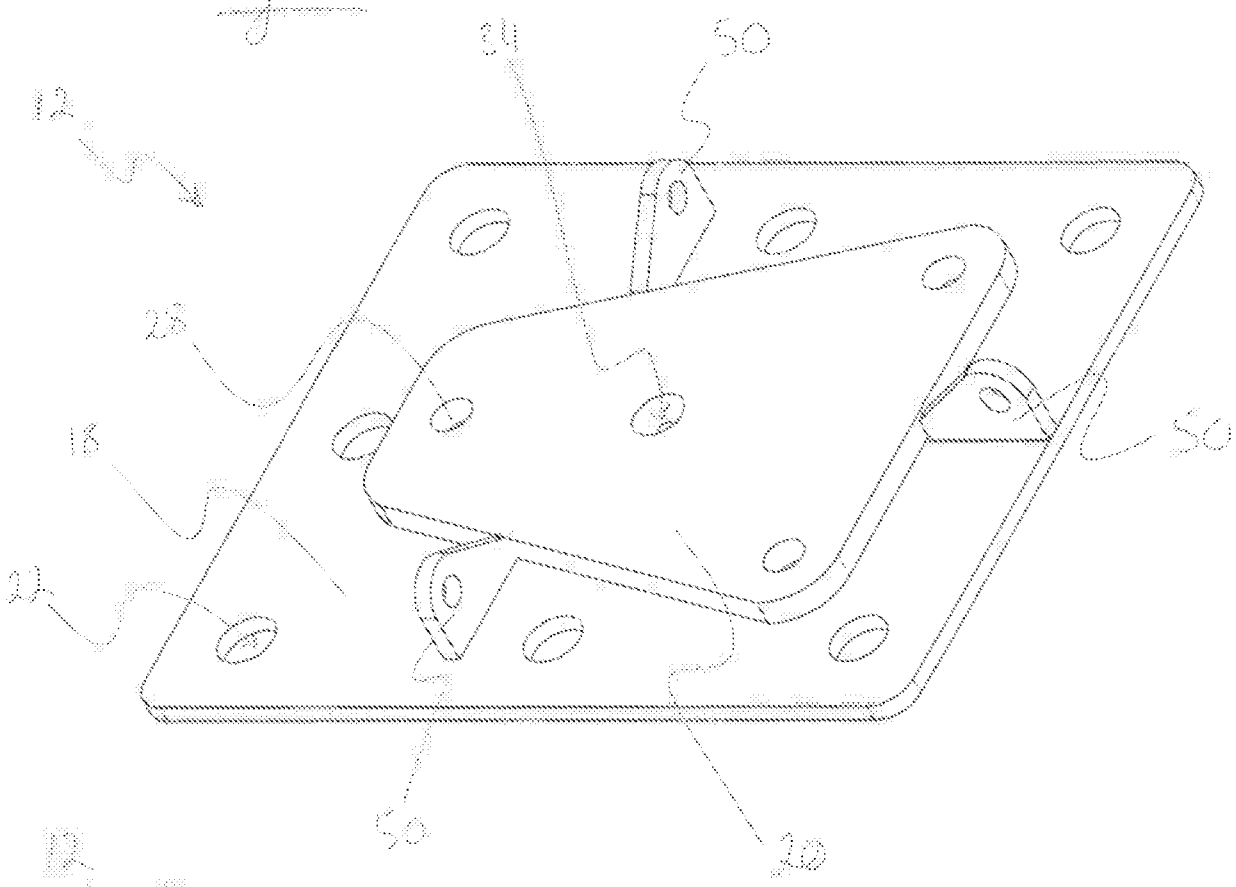
Figure 1



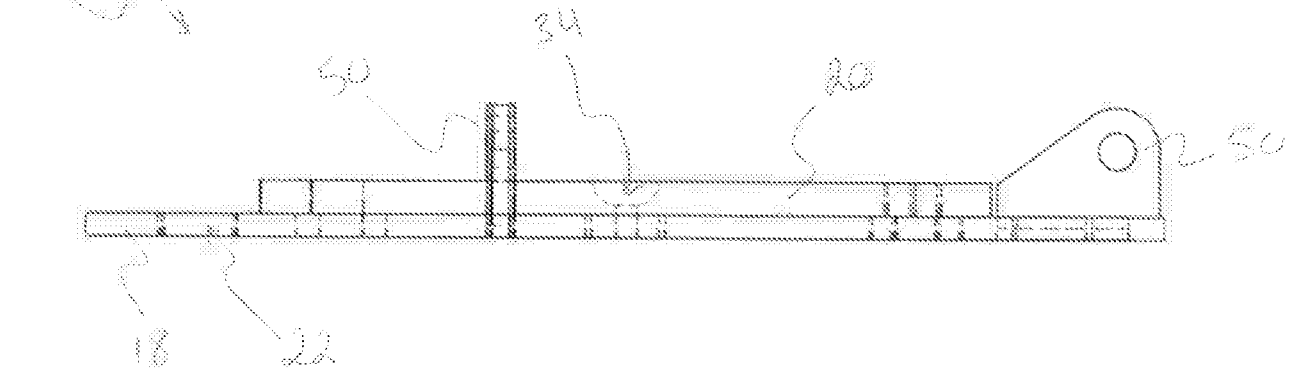


Figure 2

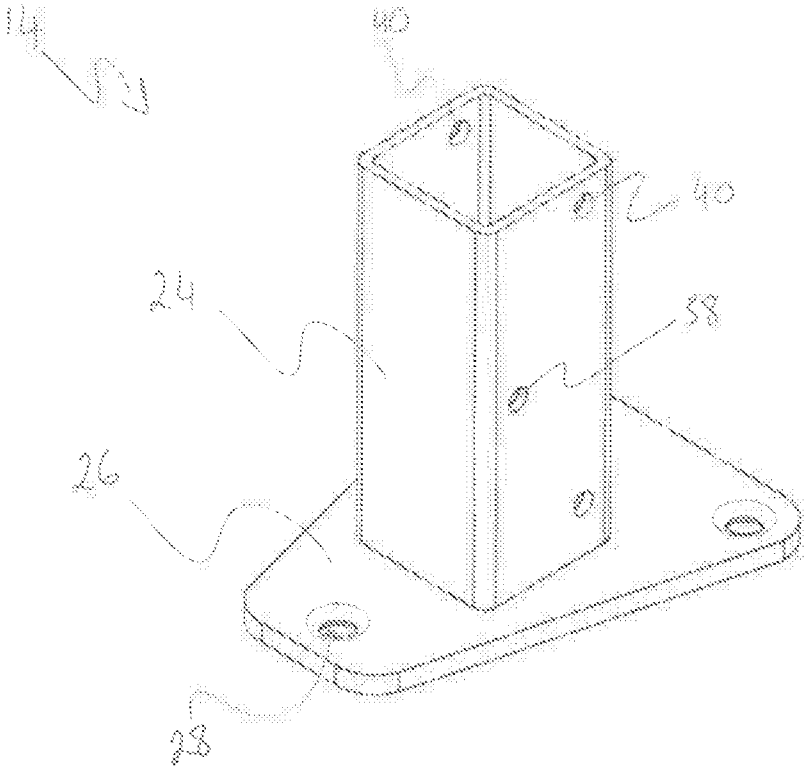


Figure 3

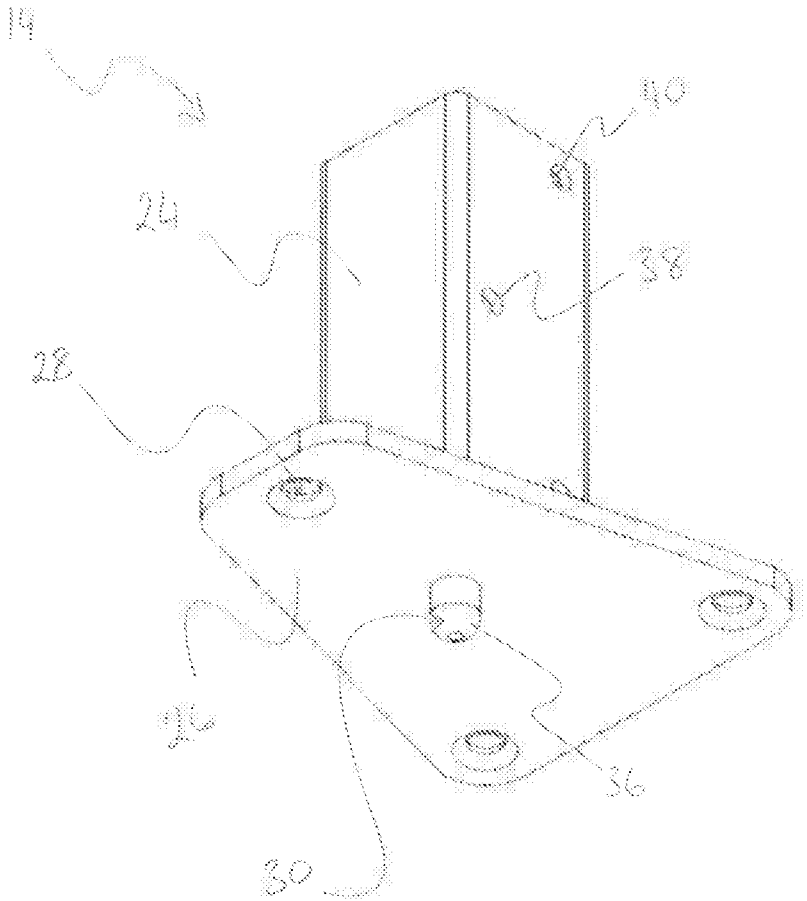


Figure 4

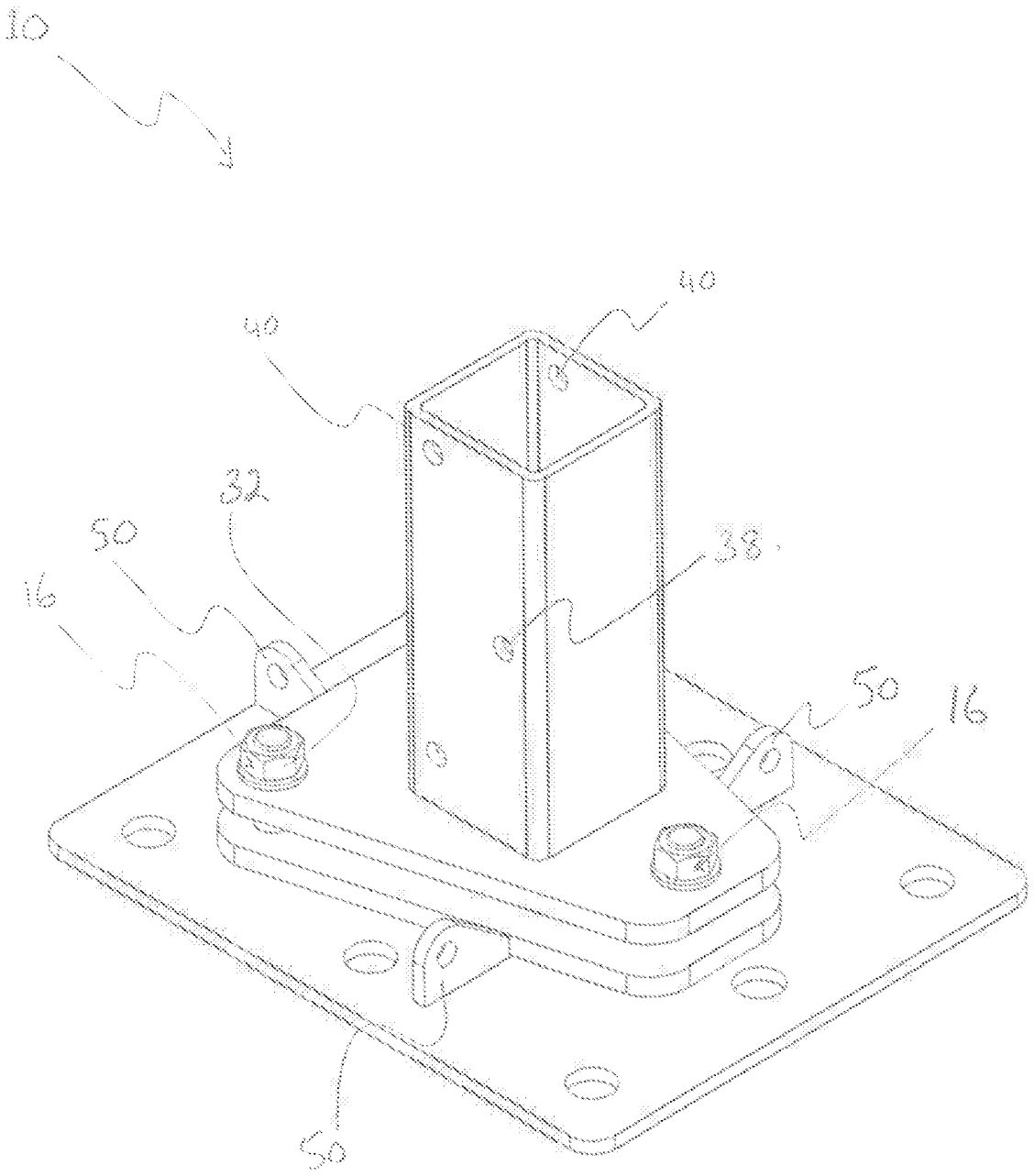


Figure 3

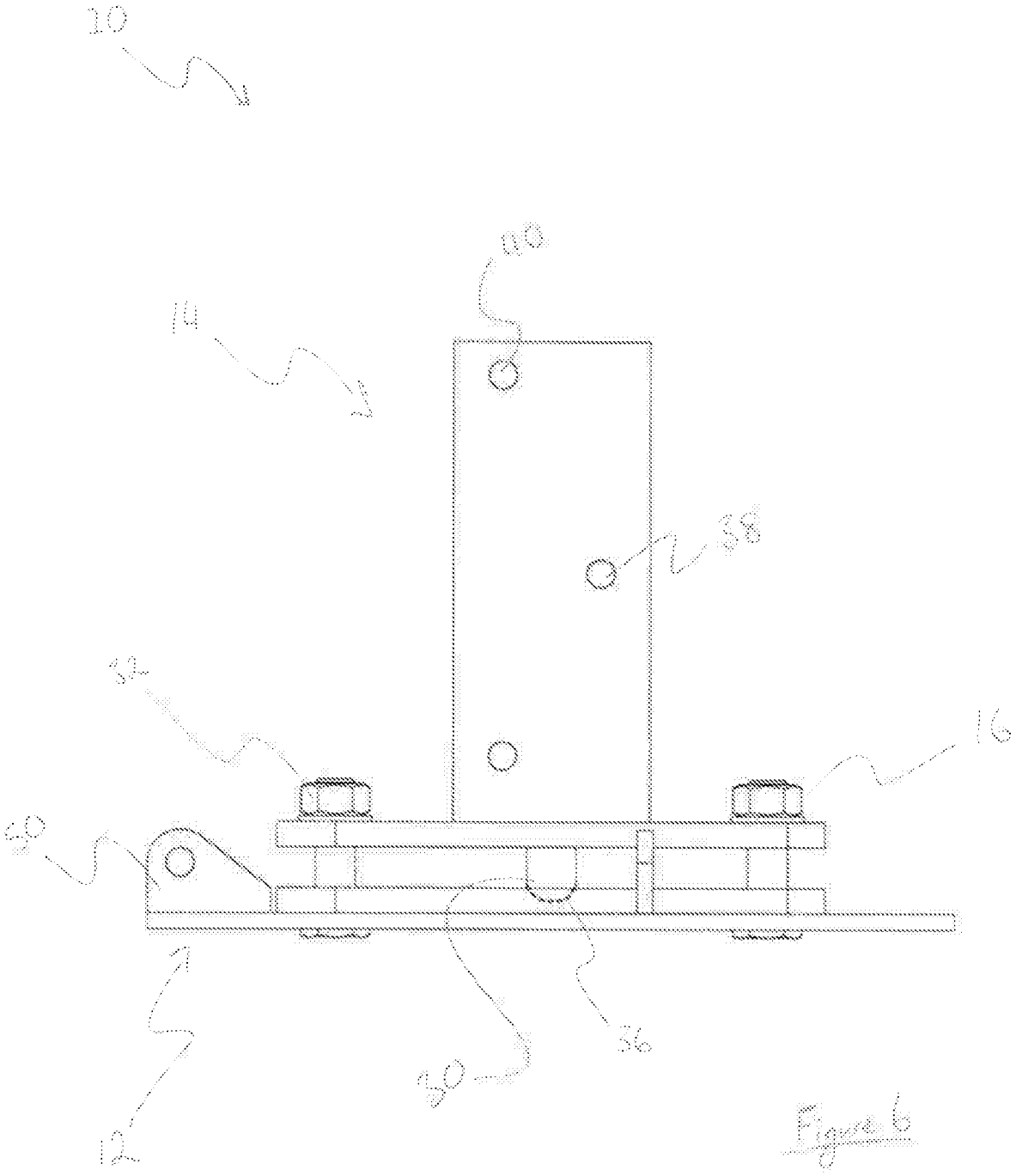


Figure 6

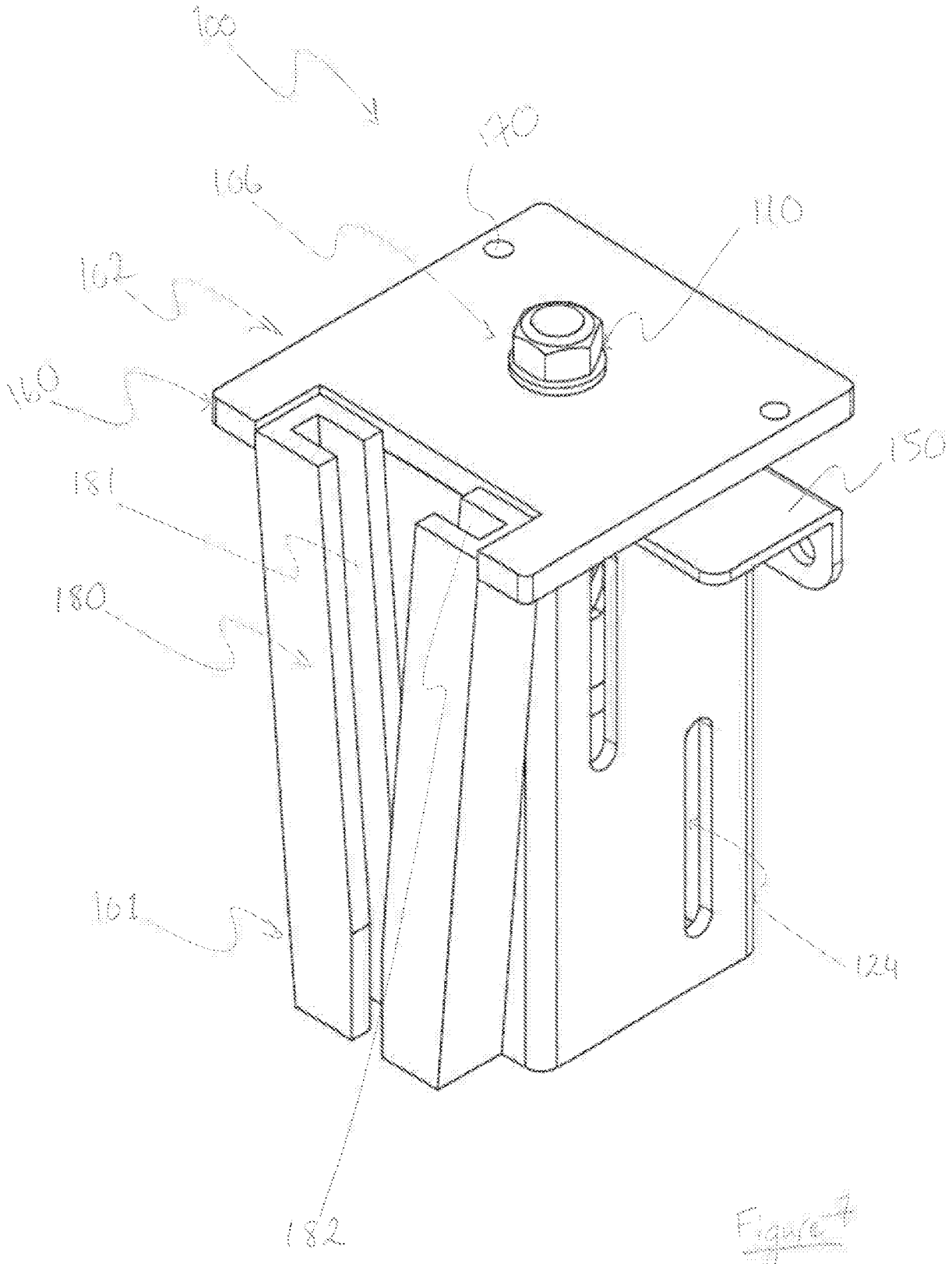


Figure 4

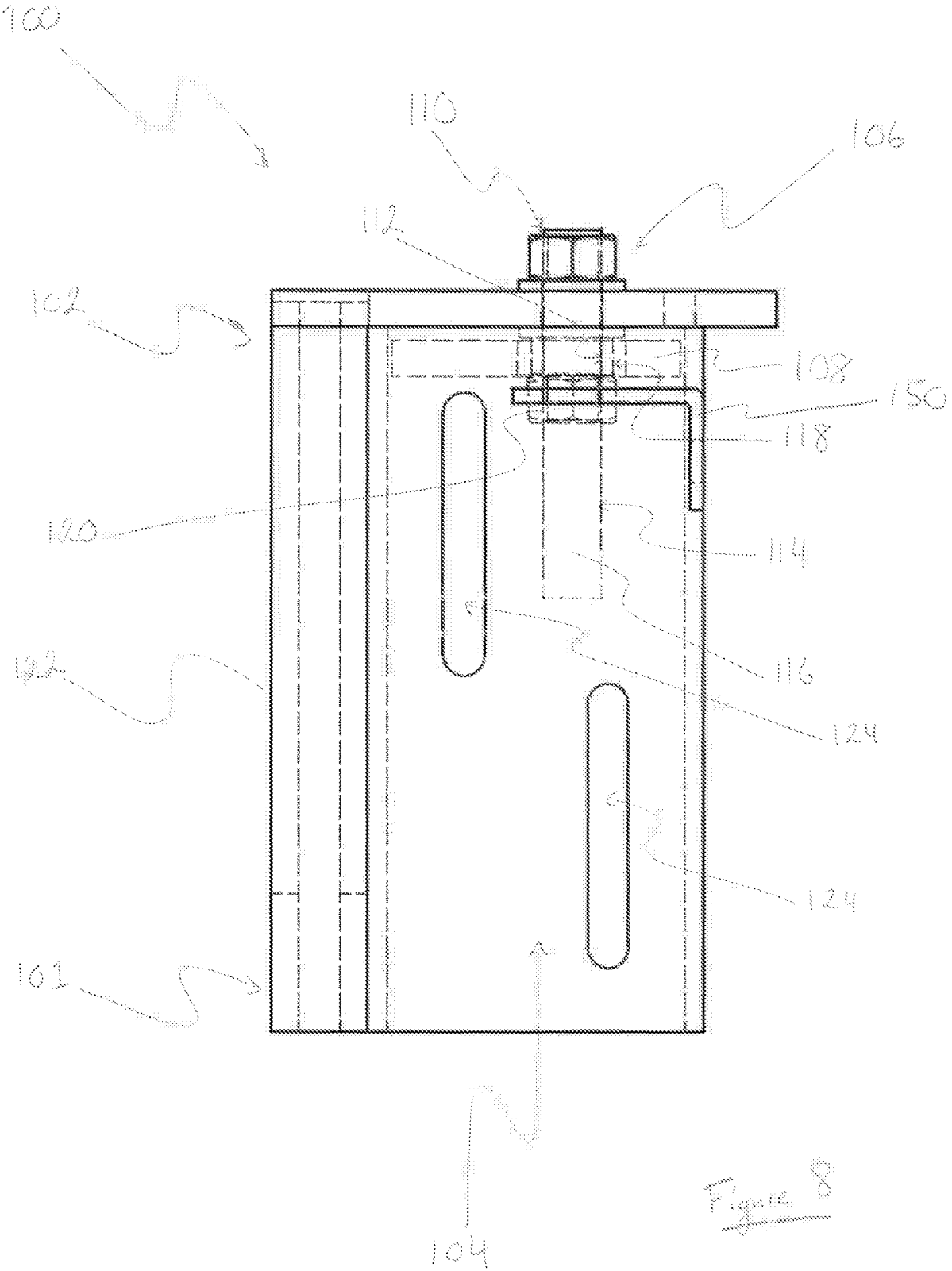


Figure 8

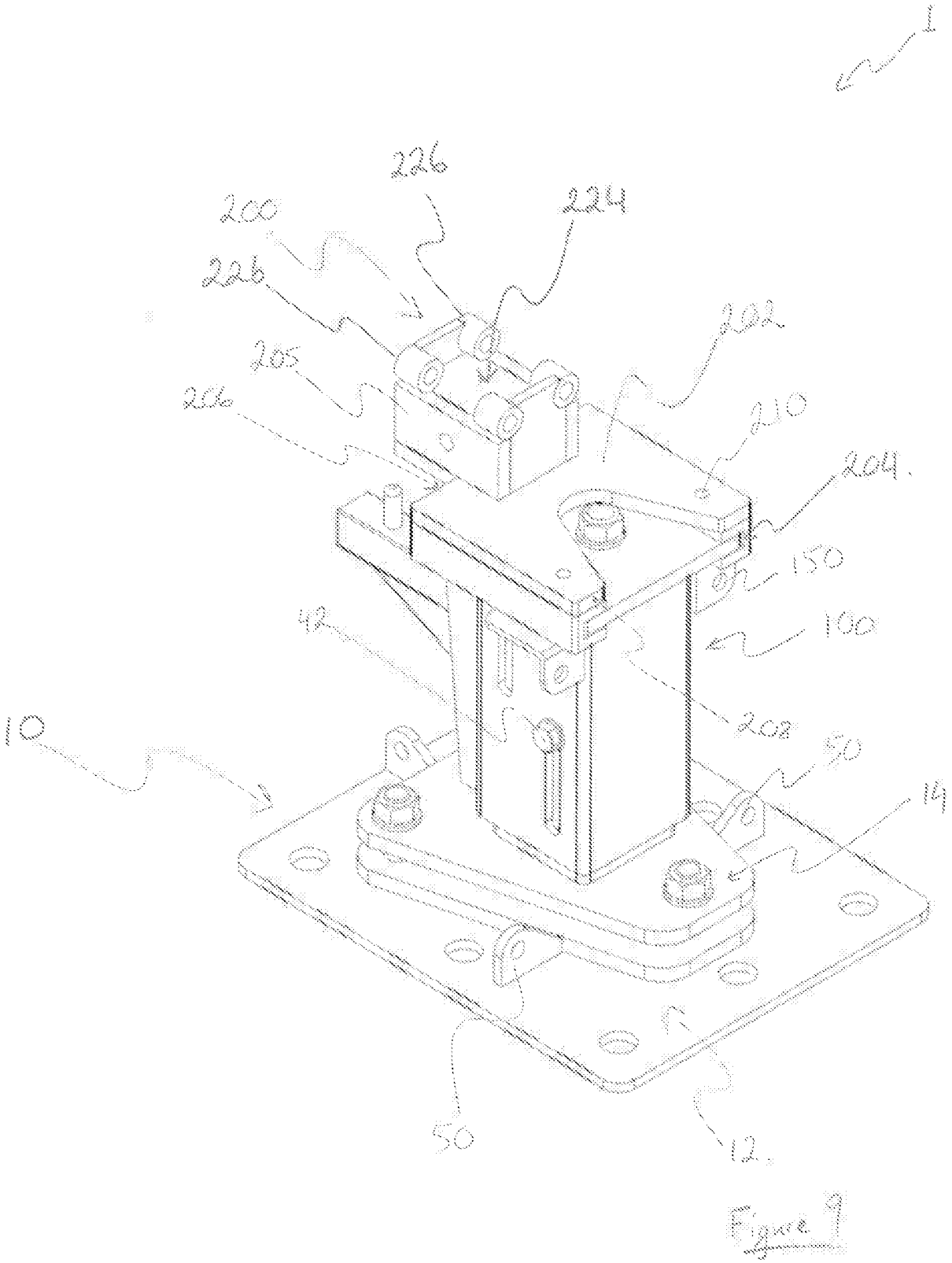


Figure 9

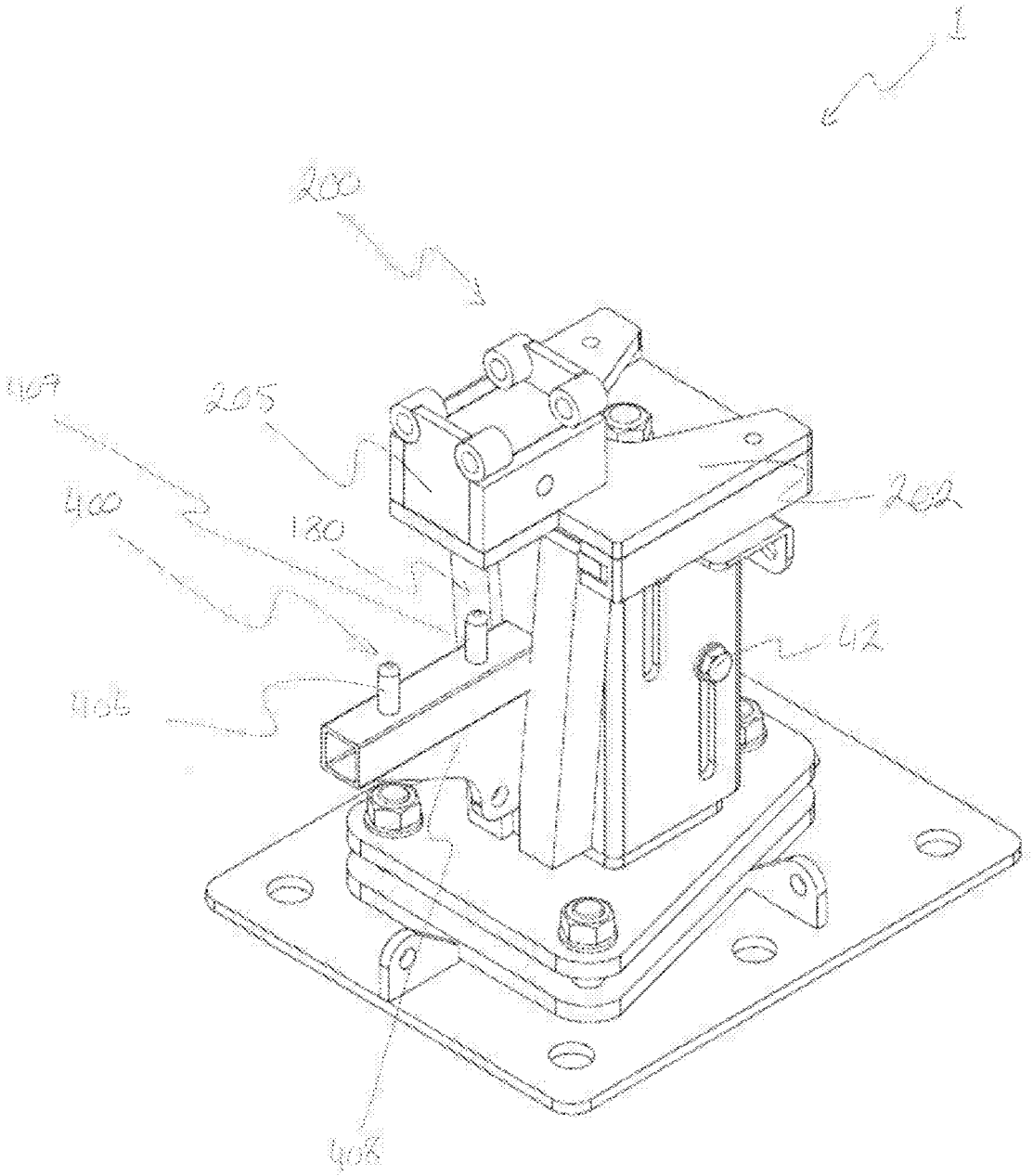


Figure 10

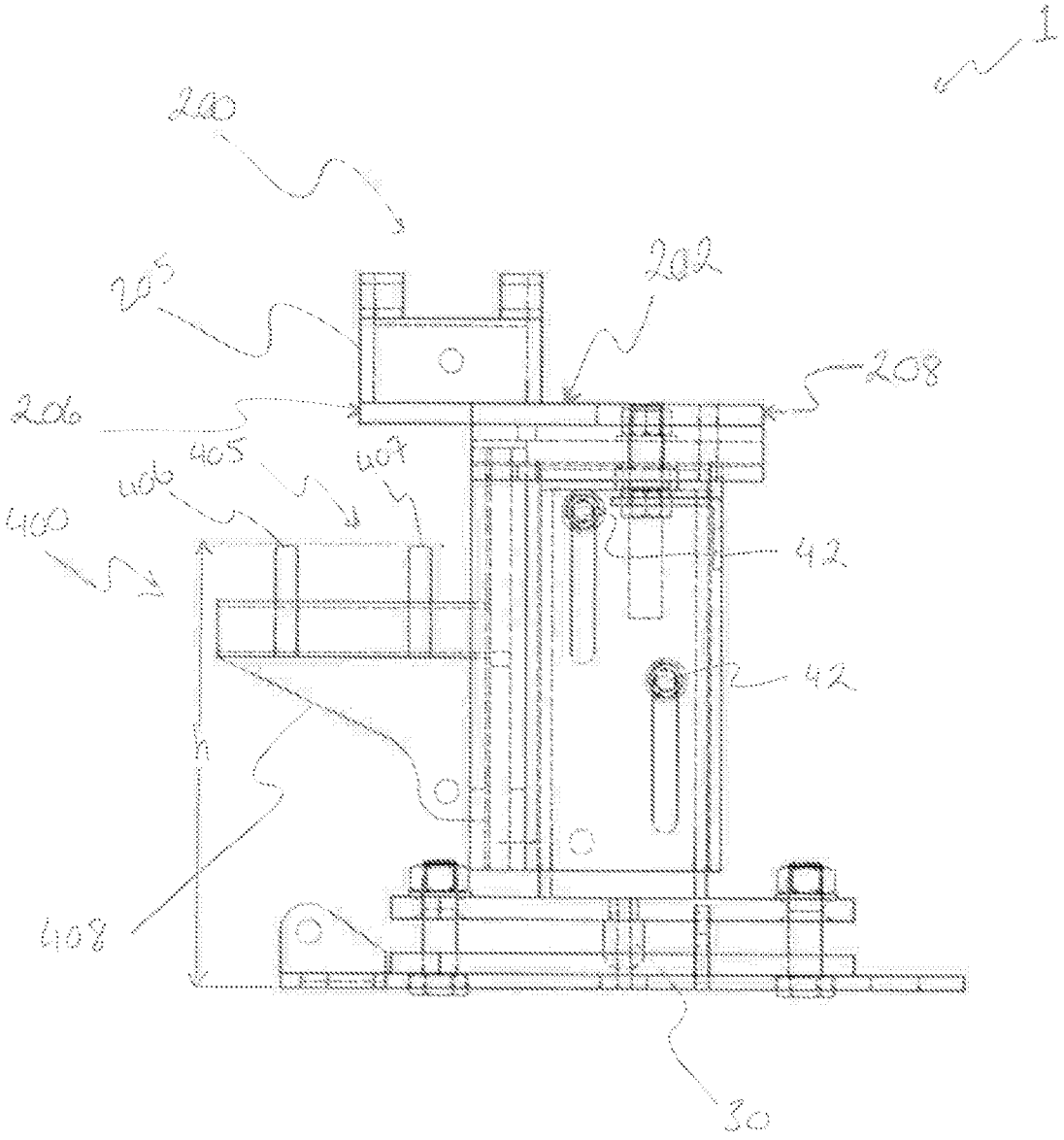


Figure 11

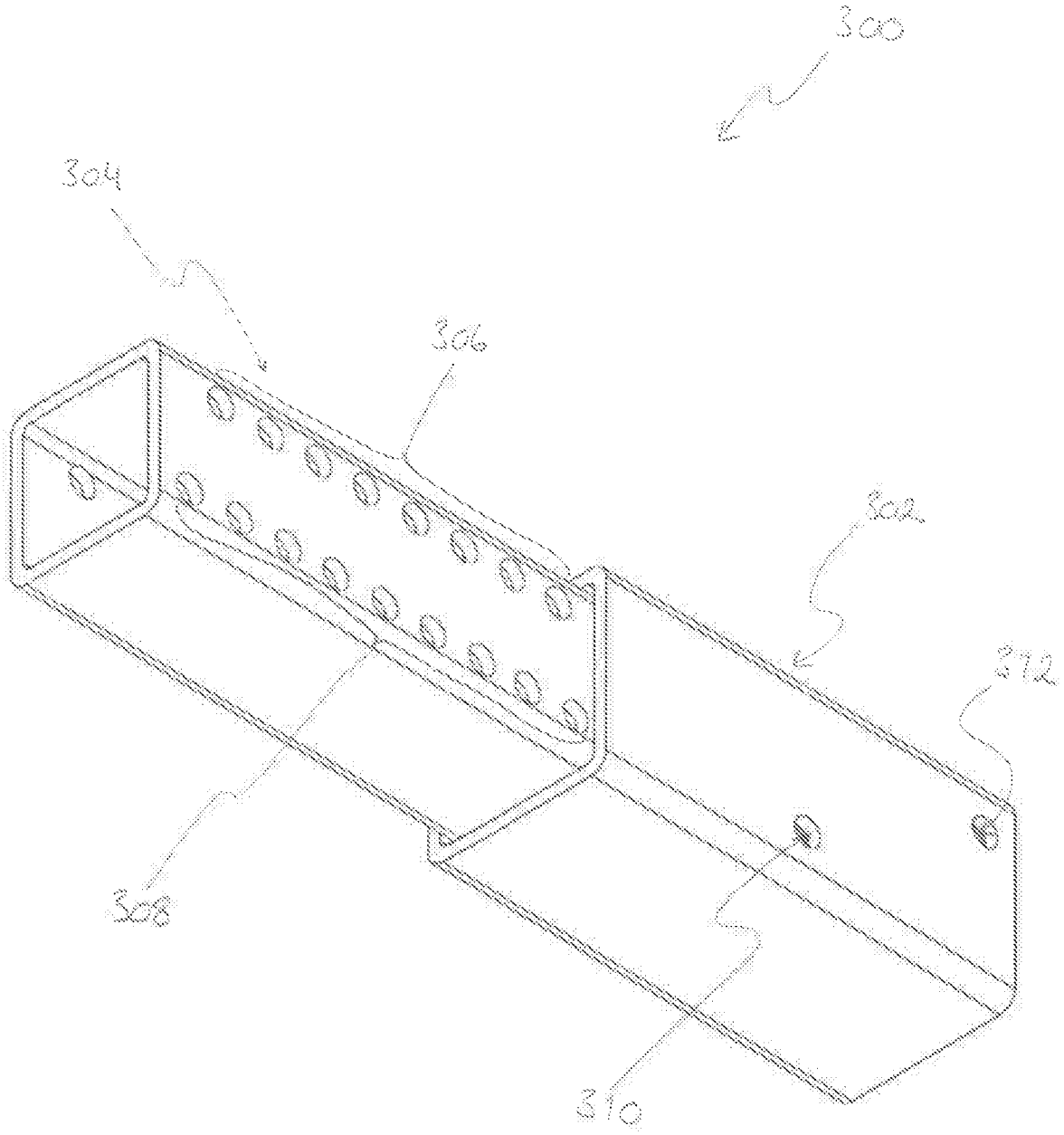


Figure 12

Title: An apparatus for a temporary flooring or temporary structure

Description of Invention

The present invention relates to an apparatus for a temporary flooring or temporary structure. In particular, but not exclusively, the invention relates to an apparatus for providing a level floor for a marquee.

Temporary flooring and temporary structures are typically erected in large open spaces such as, for example, fields. Fields typically have an uneven surface, or in other words, do not have a planar surface. Temporary flooring and temporary structures are typically designed to have a level or planar surface. This is normally for ease of manufacture, construction and erection of the flooring and structures, and to ensure that the flooring and structure can safely support the load which is placed on them. Therefore, a problem which is commonly faced is providing a level surface upon which to erect temporary flooring and structures. The present invention seeks to address this problem.

According to a first aspect of the invention we provide an apparatus for supporting a floor or temporary structure including:

a first member for supporting the apparatus on a surface including an upwardly extending elongate portion;

a second member for supporting a floor or temporary structure at a height (h); said second member having a lower end and an upper end;

wherein the second member defines a space within which the upwardly extending elongate portion is received; and

a height adjustment device for adjusting a distance between the first and second members which is connected to the second member to effect a change in the height (h);

wherein the height adjustment device includes a generally planar first height adjustment member for engagement with the upwardly extending elongate part including a first cooperating formation and an elongate second height adjustment member connected to the second member including a second cooperating formation for cooperating with the first cooperating formation to permit movement of the first and second height adjustment members relative to each other;

wherein the second cooperating formation is a thread and the first cooperating formation is a complementary thread to permit the first and second cooperating formations to engage with each other;

wherein the second height adjustment member passes through at least a part of the first height adjustment member.

The height adjustment device may be connected to the upper end of the second member.

The second height adjustment member may permit a change in the distance between the first height adjustment member and the upper end of the second member.

The second height adjustment member may be configured to effect movement of the first height adjustment member.

The second height adjustment member may be rotatable about an axis and rotation of the second height adjustment member may effect a linear movement of the first height adjustment member relative to the second member.

The first height adjustment member may be at least partially received within the space defined by the second member.

The first height adjustment member may be wholly received in the space defined by the second member.

The first height adjustment member may be non-circular in plan view.

The first height adjustment member may be shaped to abut an inner surface of the second member to inhibit rotation of the first height adjustment member.

The first height adjustment member may extend over the upwardly extending elongate member.

A width of the first height adjustment member in plan view may be larger than a width of the upwardly extending elongate member in plan view.

A length of the first height adjustment member in plan view may be larger than a length of the upwardly extending elongate member in plan view.

The first member may be substantially square or rectangular in plan view.

The second member may be substantially square or rectangular in plan view.

The first member may include a planar portion which rests on a surface. The planar portion may include apertures for receiving fastener members to secure the first member to a surface.

The generally upwardly extending elongate member may include apertures configured to receive generally elongate members. The second member may include apertures configured to receive generally elongate members to couple the first member to the second member.

The apertures of the second member may be generally elongate to permit the distance between the first and second members to vary when the generally elongate members are inserted in said apertures.

A first set of one or more brace members may permit connection of a brace to permit bracing of the apparatus relative to another body.

The one or more brace members may be provided on the first member.

A second set of one or more brace members may be provided on the second member for permitting connection of a brace to permit bracing of the apparatus relative to another body.

According to a second aspect of the invention the apparatus may further include:

the first member including a first portion which is positioned, in use, on the surface;

wherein the first and second members may be releasably fixed relative to each other; and

a pivot member for providing a pivotal connection between the first and second members to permit the second member to pivot relative to the first member about first and second substantially orthogonal axes to a first position.

The first and second members may be configured to permit a fastener device to fasten the second member in the first position.

According to a third aspect of the invention the apparatus may further include:

the first member including a first portion which is positioned, in use, on the surface;

wherein the first and second members may be releasably fixed relative to each other;

wherein the first or second member may include a pivot member for providing a pivotal connection to permit the second member to pivot relative to the first member about an axis to a first position;

wherein the first and second members may be configured to permit a fastener device to fasten the second member in the first position.

The pivot member may permit the second member to pivot relative to the first member about first and second substantially orthogonal axes.

The pivot member may include a curved surface about which the second member pivots.

The pivot member may be dome shaped, or at least partly spherical.

The apparatus may include a plurality of fastener devices for fastening the second member in the first position.

The plurality of fastener devices may be equally spaced around the first member.

The plurality of fastener devices may be spaced equally around the generally elongate member.

The plurality of fastener devices may include first, second and third fastener devices arranged in a triangle, in plan view, about the generally elongate member.

The pivot member may space the first member and the second member apart.

The second member may rest on the first member via the pivot member.

The fastener device, or plurality of fastener devices, may include a part for engaging with an upwardly facing surface of the second member to inhibit pivotal movement of the second member therepast.

The first and/or second member may include a recess for receiving the pivot member.

The first member may be generally planar.

The second member may be generally elongate and may include an upper end and a lower end.

The pivot member may be provided at the lower end optionally or preferably generally centrally thereof.

According to a fourth aspect of the invention we provide a floor for a temporary structure including the apparatus according to any of the first to third aspects of the invention.

According to a fifth aspect of the invention we provide a temporary structure including the apparatus according to any one of the first to third aspects of the invention, or including a floor according to a fourth aspect of the invention.

According to a sixth aspect of the invention we provide a system including:

an apparatus according to any one of the first to third aspects; and

a plurality of devices configured to receive corresponding different component parts of a temporary flooring or structure;

wherein each of the plurality of devices are configured for attachment to the second member such that they can be interchangeably connected to the apparatus.

At least one of the plurality of devices may be configured for attachment to an upwardly facing surface of the second member.

At least one of the plurality of devices may be configured for attachment to a sidewardly facing surface of the second member.

According to a seventh aspect of the invention we provide a device for connection to an apparatus according to any one of the first to third aspects wherein the device includes:

a first device member for engagement with the second member of the apparatus;

a second device member for receiving flooring or a temporary structure;

wherein the device includes a first formation for cooperating with a second formation provided on the second member of the apparatus to permit a coupling therebetween.

The first formation may include one of a recess or a protrusion and the second formation may include the other of the protrusion or recess. The protrusion may be received by the recess.

The first device member may have a first side and a second side. The first side may be generally opposite the second side. The recess and/or protrusion of the first and second formations may extend from the first side to the second side.

The recess and/or protrusion of the first and second formations may be generally linear.

The first formation may include a plurality of recesses and/or protrusions. The second formation may include a plurality of the other of the protrusions and/or recesses. The protrusions may be received by the recesses.

The first device member may have a first side and a second side. The first side may be generally opposite the second side. At least one of the plurality of recesses and/or protrusions of the first formation and at least one of the plurality of protrusions and/or recesses of the second formation may extend from the first side to the second side.

All of the plurality of recesses and/or protrusions may extend from the first side to the second side.

The plurality of recesses and/or protrusions of the first and second formations may be generally linear.

The plurality of recesses and/or protrusions may taper towards each other as they extend from the first side towards the second side.

The second formation may be provided at the upper end of the second member.

The second member may include a sidewall which extends from the upper end towards the lower end. The second formation may be provided on the sidewall.

The device may be configured to permit a fastener device to fasten the first device member to the second member.

The device may include at least one aperture configured to receive at least one fastener device. The second member may include at least one aperture configured to receive at least one fastener device to couple the device to the second member.

According to an eighth aspect of the invention we provide an apparatus according to the first aspect of the invention including one or more or all of the features of any one of the second to seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the second to seventh aspects of the invention.

According to a ninth aspect of the invention we provide an apparatus according to the second aspect of the invention including one or more or all of the features of any one of the first or third to seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first or third to seventh aspects of the invention.

According to a tenth aspect of the invention we provide an apparatus according to the third aspect of the invention including one or more or all of the features of any one of the first, second or fourth to seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first, second or fourth to seventh aspects of the invention.

According to an eleventh aspect of the invention we provide a floor according to the fourth aspect of the invention including one or more or all of the features of any one of the first to third or fifth to seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first to third or fifth to seventh aspects of the invention.

According to a twelfth aspect of the invention we provide a temporary structure according to the fifth aspect of the invention including one or more or all of the features of any one of the first to fourth or sixth or seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first to fourth or sixth or seventh aspects of the invention.

According to a thirteenth aspect of the invention we provide a system according to the sixth aspect of the invention including one or more or all of the features of any one of the first to fifth or seventh aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first to fifth or seventh aspects of the invention.

According to a fourteenth aspect of the invention we provide a device according to the seventh aspect of the invention including one or more or all of the features of any one of the first to sixth aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the first to sixth aspects of the invention.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of a first portion of a first member in accordance with an embodiment of the invention;

Figure 2 is a side cross-section view of figure 1;

Figure 3 is a perspective view of a second portion of a first member in accordance with an embodiment of the invention;

Figure 4 is a further perspective view of the second portion of figure 3;

Figure 5 is a perspective view of the first and second portions of figures 1 to 4 combined in accordance with an embodiment of the invention;

Figure 6 is a side view of figure 5;

Figure 7 is a perspective view of a second member in accordance with an embodiment of the invention;

Figure 8 is a side cross-section view of figure 7;

Figure 9 is a perspective view of an apparatus and devices in accordance with an embodiment of the invention;

Figure 10 is a further perspective view of figure 9;

Figure 11 is a side view of figures 9 and 10; and

Figure 12 is a perspective view of an extension member in accordance with an embodiment of the invention.

Referring to the figures an apparatus 1 for supporting a floor or temporary structure is shown. The apparatus 1 includes a first member generally indicated at 10 (shown in figures 5 and 6), and a second member 100 (shown in figures 7 to 11). The first and second members 10, 100 may be releasably fixed relative to each other. The second member 100 may be for supporting a floor or temporary structure at a height (h). The second member 100 will be described in more detail later. Generally the second member 100 is hollow to fit over the first member 10. The first and second members 10, 100 are slidable relative to one another.

The first member 10 is for supporting the apparatus 1 on a surface. The first member 10 may include first and second portions 12, 14. The first portion 12 is positioned, in use, on the surface. The second portion 14 may include an upwardly extending elongate member, or formation, 24 and a generally planar member, or formation, 26 to which the upwardly extending elongate formation

24 is attached. The upwardly extending elongate member 24 may be positioned generally centrally of the planar member 26. The generally planar member 26 may be trapezoidal in plan view.

The first portion 12 may be substantially rectangular in plan view. The first portion 12 may be substantially planar. In particular, the first portion 12 may include a first planar part 18. The first planar part 18 may be a substantially rectangular plate. A second part 20 may be provided on a generally upwardly facing surface of the first planar part 18 and may be connected thereto. The second part 20 may be trapezoidal in plan view and may be generally planar. In embodiments the second part 20 may be welded to the first part 18. The second part 20 may be positioned generally centrally of the first part 18 in plan view. The first part 18 may include apertures 22 for receiving fastener members to secure the first member 10 to the surface. The apertures 22 may be positioned at a periphery of the first planar part 18.

The first and second portions 12, 14 may be configured to permit a fastener member, or device, 16, or a plurality of fastener members, or devices, to fasten the second portion 14 in a first position. In the present embodiment the first and second portions 12, 14 include apertures 28 for receiving the fastener members 16. In embodiments the first and second members 10, 100 may be configured to permit a fastener member or device to fasten the second member 100 in a first position.

In the present embodiment the plurality of fastener devices 16 are equally spaced around the first member 10. In particular the plurality of fastener devices 16 may be spaced equally around the upwardly extending elongate member, or generally elongate member, 24. Optionally, the fastener devices 16 may be positioned about a periphery of the planar member 26. In the present embodiment the plurality of fastener devices may include first, second and third fastener devices 16 which may be arranged in a triangle about the

upwardly extending member 24. Each fastener device 16 may be provided as a nut and bolt pair with the bolt extending upwardly through the apertures 28 in the first and second portions 12, 14.

The apparatus 1 may include a pivot member 30 for providing a pivotal connection between the first and second members 10, 100 to permit the second member 100 to pivot relative to the first member 10. The first member 10 may include the pivot member 30 for providing a pivotal connection to permit the second member 100 to pivot relative to the first member 10 about an axis to a first position. The pivot member 30 may be provided generally centrally of the first member 10. The pivot member 30 may be provided at an upper end of the first member 10. The pivot member 30 may be provided below the lower end 101 of the second member 100. The pivot member 30 may be provided generally centrally relative to the second member 100. In particular, the pivot member 30 may be integrally formed with the first member 10. The pivot member 30 may permit the second member 100 to pivot relative to the first member 10 about first and second substantially orthogonal axes to a first position. In alternative embodiments the second member 100 may include the pivot member 30 for providing a pivotal connection to permit the second member 100 to pivot relative to the first member 10 about an axis to a first position. The pivot member 30 may be integrally formed with the second member 100.

In the present embodiment the second portion 14 includes the pivot member 30. In particular the pivot member 30 is integrally formed with the second portion 14. The pivot member 30 may be provided on a surface of the second portion 14 which faces the first portion 12 in use. The pivot member 30 may be provided generally centrally of the second portion 14. The pivot member 30 may be provided generally centrally relative to the first portion 12. In other embodiments the first portion 12 may include the pivot member 30. In those embodiments the pivot member 30 may be integrally formed with the first

portion 12. In further envisaged embodiments the pivot member 30 may be provided as a separate, or individual, component to the first and second portions 12, 14.

The pivot member 30 may space the first portion 12 and second portion 14 apart. The pivot member 30 may include an elongate part 80 which extends away from the second member 100 or upwardly extending elongate member 24, in use. In particular, the second portion 14 may rest on the first portion 12 via the pivot member 30. In alternative embodiments, the pivot member 30 may space the first member 10 and the second member 100 apart. The second member 100 may rest on the first member 10 via the pivot member 30.

The pivot member 30 may include a curved surface 36. The second portion 14 may pivot about the curved surface 36. In embodiments the second member 100 may pivot about the curved surface 36.

In embodiments the pivot member 30 may be dome shaped, or at least partly spherical. In further embodiments the pivot member 30 may be generally spherical.

The first member 10 may include a recess 34 for receiving the pivot member 30. In particular, the first portion 12 of the first member 10 may include a recess 34 for receiving the pivot member 30. In embodiments the second portion 14 may include a recess for receiving the pivot member 30. In further envisaged embodiments both the first and second portions 12, 14 may include a recess for receiving the pivot member 30. In alternative embodiments the second member 100 may include a recess for receiving the pivot member 30. The or each recess 34 may have a complementary surface to the surface 36 of the pivot member 30.

The fastener device 16, or plurality of fastener devices 16, may include a part 32 for engaging with an upwardly facing surface 34 of the second portion 14 to inhibit pivotal movement of the second portion 14 therepast. For example, where the fastener devices 16 are provided as nut and bolt pairs the nuts may correspond to part 32.

As described above, the apparatus 1 includes a second member 100 (shown in figures 7 to 11). The second member 100 has a lower end 101 and an upper end 102. The second member 100 defines a space 104 within which the upwardly extending elongate member, or portion, 24 is received. The second member 100 may include a sidewall 122 which extends away from the upper end 102 towards the lower end 101. Sidewall 122 may at least partly define the space 104.

The first member 10 may also define a space 70. In alternative embodiments the sidewall 122 is received in the space 70.

In further envisaged embodiments an extension member 300 is provided (an example of which is shown in figure 12) which is received in both space 70 and space 104. The extension member 300 may be extendable and permit the distance between the first and second members 10, 100 to be adjusted. In particular, the extension member 300 may allow discrete adjustments to the distance between the first and second members 10, 100. The extension member 300 may be extendable to a distance of at least: 100mm; 200mm; 400mm; 600mm; 800; 1000mm; 1200mm; 1400mm; 1600mm; 1800mm; or 2000mm. The extension member 300 may be extendable to a distance of at most: 400mm; 600mm; 800; 1000mm; 1200mm; 1400mm; 1600mm; 1800mm; or 2000mm.

The extension member 300 may include first and second extension member portions 302, 304. The second extension member portion 304 may be slidably

arranged to be received in the first extension member portion 302. In other words the first and second extension member portions 302, 304 may be arranged to move telescopically relative to each other. The first and second extension member portions 302, 304 may each include a respective series of positions at which the overall length of the extension member 300 may be fixed. In particular the first and second extension member portions 302, 304 may each include a respective series of apertures 306, 308, 310, 312 through which a fastener device may be inserted to fix an overall length of the extension member 300.

A height adjustment device 106 for adjusting a distance between the first and second members 10, 100 is connected to the second member 100 to effect a change in the height (h). The height adjustment device 106, in use, rests on the first member 10. In particular, the height adjustment device 106 may rest on the upwardly extending elongate portion 24 of the first member 10.

The height adjustment device 106 may include a first height adjustment member 108 for engagement with the upwardly extending elongate part 24 and a second height adjustment member 110 connected to the second member 100. Optionally, or preferably, the second height adjustment member 110 may be connected to the upper end 102 of the second member 100. Alternatively, the second height adjustment member 110 may be connected to the sidewall 122 of the second member 100.

The second height adjustment member 110 may permit a change in the distance between the first height adjustment member 108 and the upper end 102 of the second member 100. The change in distance between the first height adjustment member 108 and the upper end 102 of the second member 100 may be at least: 20mm; 40mm; 60mm; 80mm; or 100mm. The change in distance between the first height adjustment member 108 and the upper end

102 of the second member 100 may be at most: 100mm; 90mm; 80mm; 70mm; 60mm; or 50mm.

The first and second height adjustment members 108, 110 may be releasably connectable to each other.

The second height adjustment member 110 may be configured to effect movement of the first height adjustment member 108.

The first height adjustment member 108 may include a first cooperating formation 112 and the second height adjustment member 110 may include a second cooperating formation 114 for cooperating with the first cooperating formation 112 to permit movement of the first and second height adjustment members 108, 110 relative to each other.

The second height adjustment member 110 may be rotatable about an axis and rotation of the second height adjustment member 110 may effect a linear movement of the first height adjustment member 108 relative to the second member 100.

The second height adjustment member 110 may be or may include an elongate part 116 including the second cooperating formation 114.

The second cooperating formation 114 may be a thread and the first cooperating formation 112 may be a complementary thread to permit the first and second cooperating formations 112, 114 to engage with each other.

In embodiments, the second height adjustment member 110 is configured as a bolt which passes through an opening in the upper end 102 and extends into the space defined by the second member 100. A portion of the second height

adjustment member 110 passes through the first height adjustment member 108.

The first height adjustment member 108 may be generally planar. The second height adjustment member 110 may pass through at least a part of the first height adjustment member 108. In particular, the first height adjustment member 108 may include an aperture 118 and the first cooperating formation 112 may be provided by a nut 120 which is fixedly connected to the first height adjustment member 108. The elongate portion 116 may engage with the nut 120. Alternatively, or additionally, the aperture 118 may include the first cooperating formation 112.

The first height adjustment member 108 may be at least partially received within the space 104 defined by the second member 100. In particular, the first height adjustment member 108 may be wholly received in the space 104 defined by the second member 100.

In the present embodiment the first height adjustment member 108 is substantially square or rectangular in plan view. However, it should be appreciated that the first height adjustment member 108 may be any non-circular shape in plan view without departing from the scope of the present invention. What is advantageous is that there is a position in which rotation of the first height adjustment member 108 about its axis is inhibited by the second member 100, or side wall 122 in particular.

The first member 10 may be substantially square or rectangular in plan view. In particular, the upwardly extending elongate member 24 may be substantially square or rectangular in plan view.

The second member 100 may be substantially square or rectangular in plan view. The side wall 122 of the second member may be substantially square or

rectangular in plan view. The side wall 122 may extend towards the first member 10.

The first height adjustment member 108 may extend over the upwardly extending elongate member 24. In particular, a width of the first height adjustment member 108 in plan view may be larger than a width of a periphery of the upwardly extending elongate member 24 in plan view. A length of the first height adjustment member 108 in plan view may be larger than a length of a periphery of the upwardly extending elongate member 24 in plan view.

The generally upwardly extending elongate member 24 may include apertures 38, 40 configured to receive generally elongate members 42 and the second member 100 may include apertures 124 configured to receive the generally elongate members 42 to couple the first member 10 to the second member 100, or to couple the extension member 300 to the second member 100 when present.

The apertures 124 of the second member 100 may be generally elongate to permit the distance between the first and second members 10, 100 to vary when the generally elongate members 42 are inserted in said apertures 124.

The apparatus 1 may further include a first set of one or more brace members 50 for permitting connection of a brace to permit bracing of the apparatus 1 relative to another apparatus or another body. The one or more brace members 50 may be provided on the first member 10. The apparatus 1 may include a second set of one or more brace members 150 provided on the second member 100 for permitting connection of a brace to permit bracing of the apparatus 1 relative to another apparatus or another body.

There is also provided a device 200 for connection to the apparatus 1 (shown in figures 9 to 11). The device 200 is for supporting flooring or a temporary

structure. The device 200 includes a first device member 202 for engagement with the second member 100 of the apparatus 1. The device 200 also includes a second device member 205 for receiving flooring or a temporary structure. The device 200 includes a first formation 204 for cooperating with a second formation 160 provided on the second member 100 of the apparatus 1 to permit a steadfast connection therebetween.

The device 200 may be configured to be positioned at an upper end 102 of the apparatus 1. In particular, the first formation 204 may be configured to be positioned at the upper end 102 of the apparatus 1. The first formation 204 may include a recess and the second formation 160 may include a protrusion. The recess may receive the protrusion. Alternatively, or additionally, the first formation 204 may include a protrusion and the second formation 160 may include a recess.

The first device member 202 may have a first side 206 and a second side 208 wherein the first side 206 may be generally opposite the second side 208. The recess and/or protrusion of the first and second formations 204, 160 may extend from the first side 206 to the second side 208. In particular, the recess and/or protrusion of the first and second formations 204, 160 may be generally linear.

The first formation 204 may include a plurality of recesses and/or protrusions. The second formation 160 may also include a plurality of the other of the protrusions and/or recesses, wherein the protrusions may be received by the recesses. In other words, the second formation 160 may include a plurality of complementary protrusions and/or recesses to the first formation 204.

At least one of the plurality of recesses and/or protrusions of the first formation 204 and at least one of the plurality of protrusions and/or recesses of the second formation 160 may extend from the first side 206 to the second side

208 of the first device member 202. In particular, all of the plurality of recesses and/or protrusions may extend from the first side 206 to the second side 208 of the first device member 202.

The plurality of recesses and/or protrusions of the first and second formations 204, 160 may be generally linear. The plurality of recesses and/or protrusions of the first and second formations 204, 160 may be generally parallel.

The plurality of recesses and/or protrusions may alternatively taper towards each other as they extend from the first side 206 towards the second side 208 of the first device member 202.

The second formation 160 may be provided at the upper end 102 of the second member 100. Alternatively, the second formation 160 may be provided on the sidewall 122 of the second member 100.

As mentioned above, the device 200 includes a second device member 205. In the present embodiment the second device member 205 includes a second device member generally upwardly extending part 220 defined by a sidewall 222 which extends away from the first device member 202 in a generally perpendicular direction to a plane in which the first device member 202 lies. The second device member generally upwardly extending part includes a recess 224 within which a portion of a temporary flooring or structure may be received. The sidewall 222 may include apertures 226 which extend in a direction which is generally orthogonal to the side wall 222 and parallel to the plane in which the first device member 202 lies. The apertures 226 are configured to receive fastener devices to secure the temporary flooring or structure to the device 200, and therefore the apparatus 1. In the present embodiment four such apertures 226 are provided arrange in pairs generally opposite each other to receive fastener devices.

The device 200 may be configured to permit a fastener device 210 to fasten the first device member 202 to the second member 100. In particular, the device 200 may include at least one aperture 210 configured to receive at least one generally elongate member and the second member 100 may include at least one aperture 170 configured to receive at least one generally elongate member to couple the device 200 to the second member 100.

A further device 400 may also be provided, as shown in the present embodiment. The device 400 is substantially the same as the device 200. Therefore, only the differences therebetween will be described.

Device 400 is positioned, in use, on the sidewall 122 of the second member 100 of the apparatus 1. The device 400 includes a first formation for cooperating with a second formation 180 provided on the sidewall 122 of the second member 100 of the apparatus 1 to permit a coupling therebetween. The device 400 includes a second device member 405 which may be configured, in use, to receive cross-members for temporary flooring. The second device member 405 may include an outwardly extending part 408. The outwardly extending part 408 may extend away from the first device member 402. In particular, the outwardly extending part 408 may extend in a direction which is generally orthogonal to a plane in which the first device member 402 lies. First and second protrusions 406, 407 are provided on the outwardly extending part 408. The protrusions 406, 407 are both provided on an upwardly facing surface of the outwardly extending part 408. The protrusions 406, 407 may be configured to pass through apertures, or recesses, in temporary flooring, or a cross-member for temporary flooring.

The second formation 180 may include first and second channels 181, 182 which in use receive the first formation which may include first and second protrusions. The first and second channels 181, 182 may taper towards each other as they extend from the upper end 102 towards the lower end 101. The

first and second protrusions may also taper towards each other from a first side to second side.

The apparatus 1 may be used as part of a temporary flooring or temporary structure (not shown). The temporary flooring or structure may include one or more of the apparatus 1 or may be supported entirely by a plurality of apparatus 1.

Operation of the apparatus 1 will now be described.

Firstly, the first member 10, or the first portion 12 of the first member 10, is placed on the surface on which the temporary flooring or structure is to be erected. The first member 10 is secured to the surface by passing securing devices through the apertures 22. Optionally, when present, the second portion 14 including the pivot member 30 is then positioned on top of the first portion 12. Bolts are provided on the underneath of the first member 10 which pass through the apertures 28 in the first and second portions 12, 14.

The second member 100 is then placed onto the first member 10. In particular the second member 100 is slid over the upwardly extending elongate member 24. The first height adjustment member 108 then rests on a top of the upwardly extending elongate member 24.

The second member 100, or the second portion 14 of the first member 10, is then oriented using the pivot member 30. The second member 100, or the second portion 14 of the first member 10, is pivoted relative to the first member 10, or the first portion 12 of the first member 10, about first and second axes to a desired position. The desired position may be a position in which a top, or upper end 102, of the second member 100 lies in a generally horizontal plane. This may be achieved through the use of a tool for measuring the orientation of the upper end 102, e.g. a spirit level or level laser tool.

The first and second portions 12, 14 of the first member 10, and thus the first and second members 10, 100 are then fixed in the desired position. This is achieved by fastening nuts 32 onto the bolts which extend through the apertures 28. The nuts 32 are tightened onto the bolts so as to engage with respective portions of the upwardly facing surface 34 of the second portion 14 to inhibit pivotal movement of the second portion 14 therepast. The provision of multiple nuts and bolts assists in fixing the second portion 14 in position relative to the first portion 12. For example, if the planar formation 20 of the second portion 14 attempts to move downwardly from its fixed position at a first nut and bolt fastening this would require the planar formation 20 to move upwardly at a second nut and bolt fastening. Since the nut and bolt fastening at the second position will not inhibit movement of the planar formation 20 past the nut it is not possible for the planar formation 20 to move downwardly at the first nut and bolt fastening. Therefore, the first and second portions 12, 14 are fixed in position. This position may be an inclined position with respect to the floor surface.

The device 400 is then slid into the formation 180 on the sidewall 122 of the second member 100 to permit flooring to be supported thereon. The device 400 is held in position by virtue of gravity.

A height of the apparatus 1 and device 400 is then altered to a desired height (h). The height of the apparatus 1 is adjusted using a tool on a head of the bolt 110. Rotation of the bolt 110 causes a linear movement of the second member 100 relative to the first member 10. This is because the first height adjustment member 108 is inhibited from rotation within the space 104 defined by the second member 100 and because the first height adjustment member 108 lies on the top of the upwardly extending elongate member 24.

Once the apparatus 1 has been adjusted to a desired height (h), the elongate members 42, provided as bolts onto which nuts are threaded, are passed through apertures in the first and second members 38, 124 and then tightened to fasten the second member 100 at the desired height (h), relative to the first member 10.

Device 200 is then attached to the top of the second member 100. This is achieved by sliding the device 200 onto the top of the second member 100 such that grooves of the first device member 202 receive protrusions 160 of the top of the second member 100. The device 200 may then be secured in position by passing a fastening device through apertures 170, 210.

The steps above are then repeated for each of the apparatus 1 which are to be used in support the flooring and/or temporary structure. For example, the apparatus 1 may be arranged in a matrix configuration with each of the apparatus 1 being equi-spaced with respect to one another over a desired floor area the flooring is required to cover.

Bracing members of respective apparatus are then connected together by tensioning means such as ropes or other suitable means to reinforce the temporary flooring or structure once erected. In particular the tensioning means are connected at one end to the brace member 50, which is positioned towards a lower end of a first apparatus 1, and, connected at another end, to the brace member 150 of a second apparatus 1 which is positioned towards an upper end of the second apparatus 1. This provides for structural support against any sideward forces that may be experienced by the apparatus 1 that could otherwise cause the apparatus 1 to topple sidewards, for example.

Once all of the apparatus 1 are sufficiently secured and braced, the temporary flooring is laid onto the apparatus 1. In particular, cross-members for the flooring are laid onto the device 400. In particular, the apparatus 1 are spaced

at distances that permit the protrusions 406, 407 of the outwardly extending part 408 to pass through corresponding apertures or be received in recesses in the cross-members for the temporary flooring to permit the cross-members to be secured relative to the apparatus 1. Flooring is then laid on top of the cross members.

Once the flooring has been laid the temporary structure is erected. This includes component parts of the temporary structure, such as column members for supporting a roof of the temporary structure, being inserted intorespective recesses 224 of the devices 200. This is completed for all of the necessary component parts of the temporary structure to enable erection of the temporary structure. Following this the components of the temporary structure are then fastened to the device 200 by passing fastening devices through respective apertures of the component parts and through apertures 226 in the sidewall 222 of the device 200.

In embodiments there may be no devices used and the temporary flooring or structure may be attached directly to the apparatus 1, e.g. the second member 100. The height (h) is used to refer to the distance between the respective position at which the temporary flooring or structure is attached to the apparatus 1 and the floor surface on which the apparatus 1 rests. The temporary flooring or structure may be attached at different positions or portions of the apparatus 1.

In embodiments the apparatus 1, devices 200, 400, extension 300 and system may be fabricated from sheet metal. In particular, the apparatus 1, devices 200, 400, extension 300 and system may be fabricated from plate steel. However, it should be appreciated that other fabrication methods and other materials could be used to form the apparatus 1, devices 200, 400, extension 300 and system without departing from the scope of the present invention

provided that the materials used and/or structures fabricated are capable of supporting the load of the temporary flooring and/or temporary structure.

Embodiments according to aspects of the present invention provide advantages over the prior art. For example, the height adjustment device forms a fixed component of the apparatus which means that one can conveniently install the apparatus as the apparatus is self-contained. Also, in embodiments, the configuration of the first and second members provides for an elegant design that is more easily manufactured compared to the prior art and / or the fastening devices for the members are readily available rather than the bespoke fastening devices required by the prior art. In embodiments, the configuration of the first and second members, and the height adjustment device, permits for a continuous range of heights to be achieved unlike the prior art which often only permits a discrete height adjustments.

In embodiments, the apparatus provides for levelling of the temporary flooring or structure about one or more pivot axes which may be important for applications where the floor surface is not level or homogenous.

In embodiments, an advantageous system is provided that permits one to connect multiple, different, component parts of a temporary structure or flooring through the use of devices that are adapted for this purposes, i.e. the devices are adaptor devices that transform the apparatus for multiple purposes. Such a system is thus multi-functional and flexible over the prior art.

In embodiments, the apparatus is relatively straightforward to install with reductions in installation, skill and effort required compared to the prior art.

Representative features are set out in the following clauses, which stand alone or may be combined, in any combination, with one or more features disclosed in the text and/or drawings of the specification.

When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

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

Although certain example embodiments of the invention have been described, the scope of the appended claims is not intended to be limited solely to these embodiments. The claims are to be construed literally, purposively, and/or to encompass equivalents.

Claims

1. An apparatus for supporting a floor or temporary structure including:

a first member for supporting the apparatus on a surface including an upwardly extending elongate portion;

a second member for supporting a floor or temporary structure at a height (h); said second member having a lower end and an upper end;

wherein the second member defines a space within which the upwardly extending elongate portion is received; and

a height adjustment device for adjusting a distance between the first and second members which is connected to the second member to effect a change in the height (h), said height adjustment device resting on the first member, in use;

wherein the height adjustment device includes a generally planar first height adjustment member for engagement with the upwardly extending elongate part including a first cooperating formation and an elongate second height adjustment member connected to the second member including a second cooperating formation for cooperating with the first cooperating formation to permit movement of the first and second height adjustment members relative to each other;

wherein the second cooperating formation is a thread and the first cooperating formation is a complementary thread to permit the first and second cooperating formations to engage with each other;

wherein the second height adjustment member passes through at least a part of the first height adjustment member.

2. An apparatus according to claim 1 wherein the height adjustment device is connected to the upper end of the second member.

3. An apparatus according to claim 2 wherein the height adjustment device includes one or more or all of the following features:

a) the second height adjustment member permits a change in the distance between the first height adjustment member and the upper end of the second member;

b) the second height adjustment member is configured to effect movement of the first height adjustment member;

c) wherein the second height adjustment member is rotatable about an axis and rotation of the second height adjustment member effects a linear movement of the first height adjustment member relative to the second member

4. An apparatus according to claim 2 or claim 3 wherein the first height adjustment member is at least partially received within the space defined by the second member; optionally

wherein the first height adjustment member is wholly received in the space defined by the second member.

5. An apparatus according to any one of claims 2 to 4 wherein the first height adjustment member is non-circular in plan view; and/or

wherein the first height adjustment member is shaped to abut an inner surface of the second member to inhibit rotation of the first height adjustment member; and/or

wherein the first height adjustment member extends over the upwardly extending elongate member; optionally

wherein a width of the first height adjustment member in plan view is larger than a width of the upwardly extending elongate member in plan view; and/or

wherein a length of the first height adjustment member in plan view is larger than a length of the upwardly extending elongate member in plan view.

6. An apparatus according to any preceding claim including one or more or all of the following features:

a) the first member is substantially square or rectangular in plan view;

b) the second member is substantially square or rectangular in plan view;

c) the first member includes a planar portion which rests on a surface, wherein the planar portion includes apertures for receiving fastener members to secure the first member to a surface;

d) the generally upwardly extending elongate member includes apertures configured to receive generally elongate members and the second member includes apertures configured to receive generally elongate members to couple the first member to the second member, optionally wherein the apertures of the second member are generally elongate to permit the distance between the first and second members to vary when the generally elongate members are inserted in said apertures;

e) a first set of one or more brace members for permitting connection of a brace to permit bracing of the apparatus relative to another body, optionally

wherein the one or more brace members is/are provided on the first member;

f) a second set of one or more brace members provided on the second member for permitting connection of a brace to permit bracing of the apparatus relative to another body.

7. An apparatus according to any preceding claim wherein the first member includes a first portion which is positioned, in use, on the surface;

wherein the first and second members may be releasably fixed relative to each other; and

a pivot member for providing a pivotal connection between the first and second members to permit the second member to pivot relative to the first member about first and second substantially orthogonal axes to a first position.

8. An apparatus according to claim 7 wherein the first and second members are configured to permit a fastener device to fasten the second member in the first position.

9. An apparatus according to any one of claims 1 to 6 wherein

the first member includes a first portion which is positioned, in use, on the surface;

a second member for supporting a floor or temporary structure at a height (h);

wherein the first and second members may be releasably fixed relative to each other;

wherein the first or second member includes a pivot member for providing a pivotal connection to permit the second member to pivot relative to the first member about an axis to a first position;

wherein the first and second members are configured to permit a fastener device to fasten the second member in the first position.

10. An apparatus according to claim 9 wherein the pivot member permits the second member to pivot relative to the first member about first and second substantially orthogonal axes.

11. An apparatus according to any one of claims 7 to 10 wherein the apparatus includes one or more or all of the following features:

a) the pivot member includes a curved surface about which the second member pivots;

b) the pivot member is dome shaped, or at least partly spherical;

c) the apparatus includes a plurality of fastener devices for fastening the second member in the first position, optionally

wherein the plurality of fastener devices are equally spaced around the first member;

d) wherein the plurality of fastener devices are spaced equally around the generally elongate member;

e) wherein the plurality of fastener devices includes first, second and third fastener devices arranged in a triangle, in plan view, about the generally elongate member;

f) the pivot member spaces the first member and the second member apart;

g) the second member rests on the first member via the pivot member;

h) the fastener device, or plurality of fastener devices, includes a part for engaging with an upwardly facing surface of the second member to inhibit pivotal movement of the second member therepast;

i) wherein the first and/or second member includes a recess for receiving the pivot member;

j) wherein the first member is generally planar;

k) wherein the second member is generally elongate and includes an upper end and a lower end, optionally wherein the pivot member is provided at the lower end optionally or preferably generally centrally thereof.

12. A floor for a temporary structure including an apparatus according to any preceding claim.

13. A temporary structure including an apparatus according to any one of claims 1 to 11, or including a floor according to claim 12.

14. A system including:

an apparatus according to any preceding claim; and

a plurality of devices configured to receive corresponding different component parts of a temporary flooring or structure;

wherein each of the plurality of devices are configured for attachment to the second member such that they can be interchangeably connected to the apparatus.

15. A system according to claim 14 wherein at least one of the plurality of devices is/are configured for attachment to an upwardly facing surface of the second member; and/or

wherein at least one of the plurality of devices is/are configured for attachment to a sidewardly facing surface of the second member.

16. A device for connection to an apparatus according to any preceding claim;

wherein the device includes:

a first device member for engagement with the second member of the apparatus;

a second device member for receiving flooring or a temporary structure;

wherein the device includes a first formation for cooperating with a second formation provided on the second member of the apparatus to permit a coupling therebetween.

17. A device according to claim 16 including one or more or all of the following features:

a) wherein the first formation includes one of a recess or a protrusion and the second formation includes the other of the protrusion or recess, wherein the protrusion is received by the recess;

b) wherein the first device member has a first side and a second side wherein the first side is generally opposite the second side; and

wherein the recess and/or protrusion of the first and second formations extend from the first side to the second side, optionally

wherein the recess and/or protrusion of the first and second formations is/are generally linear.

18. A device according to claim 16 wherein the first formation includes a plurality of recesses and/or protrusions and the second formation includes a plurality of the other of the protrusions and/or recesses, wherein the protrusions are received by the recesses.

19. A device according to claim 18 wherein the first device member has a first side and a second side, wherein the first side is generally opposite the second side; and

wherein at least one of the plurality of recesses and/or protrusions of the first formation and at least one of the plurality of protrusions and/or recesses of the second formation extend from the first side to the second side.

20. A device according to claim 19 wherein all of the plurality of recesses and/or protrusions extend from the first side to the second side.

21. A device according to any one of claims 18 to 20 wherein the plurality of recesses and/or protrusions of the first and second formations are generally linear.

22. A device according to any one of claims 19 to 21 when dependent on claim 19 or claim 20 wherein the plurality of recesses and/or protrusions taper towards each other as they extend from the first side towards the second side.

23. A device according to any one of claims 16 to 22 including one or more or all of the following features:

a) wherein the second formation is provided at the upper end of the second member;

b) wherein the second member includes a sidewall which extends from the upper end towards the lower end; and

wherein the second formation is provided on the sidewall.

c) wherein the device is configured to permit a fastener device to fasten the first device member to the second member, optionally

wherein the device includes at least one aperture configured to receive at least one fastener device and the second member includes at least one aperture configured to receive at least one fastener device to couple the device to the second member.