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(56) Documents Cited:  
**CA 001234298 A** **DE 009417425 U**  
**DE 102019201649 A1**

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Other: **WPI, EPODOC**

(54) Title of the Invention: **A brace for a safety deck**  
Abstract Title: **BRACE FOR A SAFETY DECK**

(57) The brace 10 for a safety deck comprises a pair of spaced apart wing portions 11 to receive a portion of a vertical standard there between and an engagement portion 31 oriented at an angle to the spaced apart wing portions. the engagement portion to engage a portion of a diagonal to position the portion of the diagonal relative to the portion of the standard. Each wing may include an attachment opening 22 which is keyhole shaped into which a locking pin is inserted. Also claimed is a safety deck assembly with two standards, a diagonal and the brace.

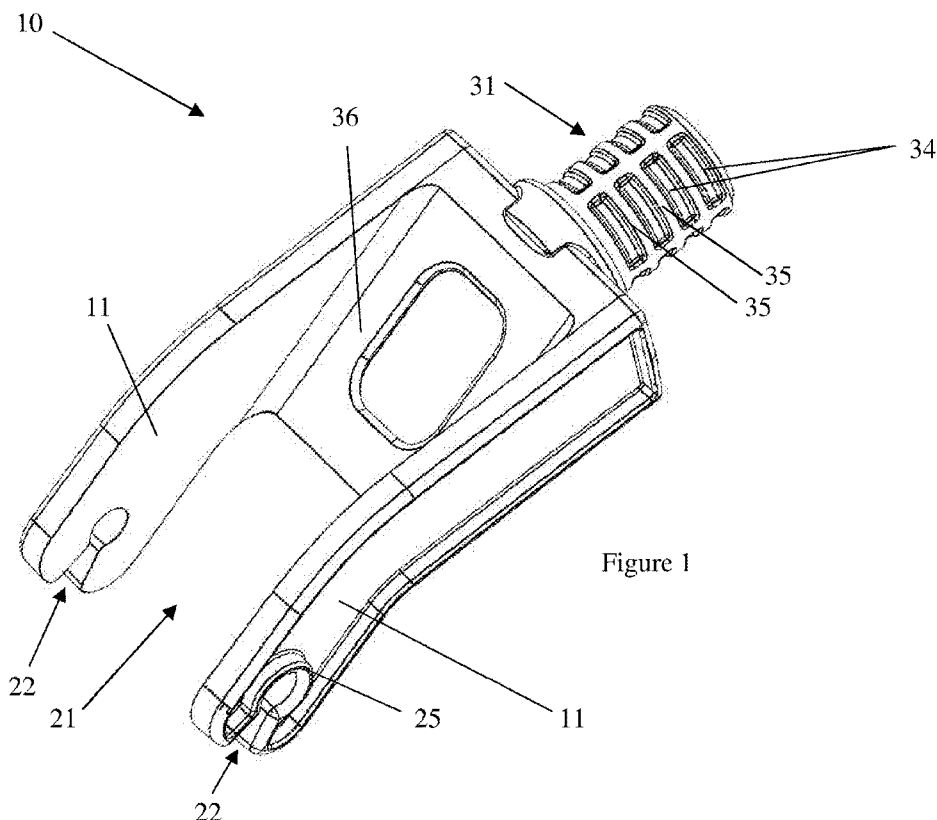


Figure 1

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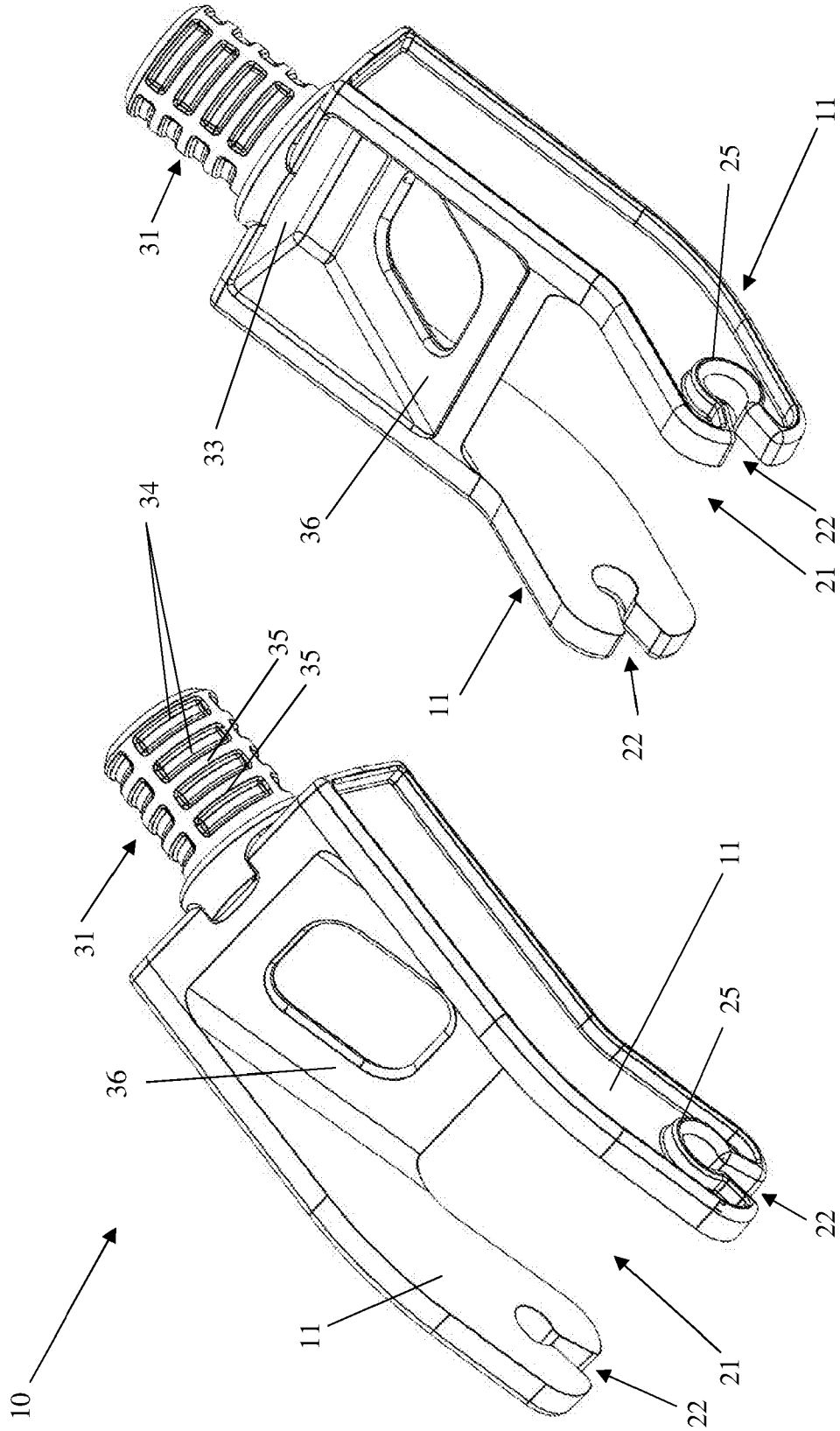


Figure 2

Figure 1

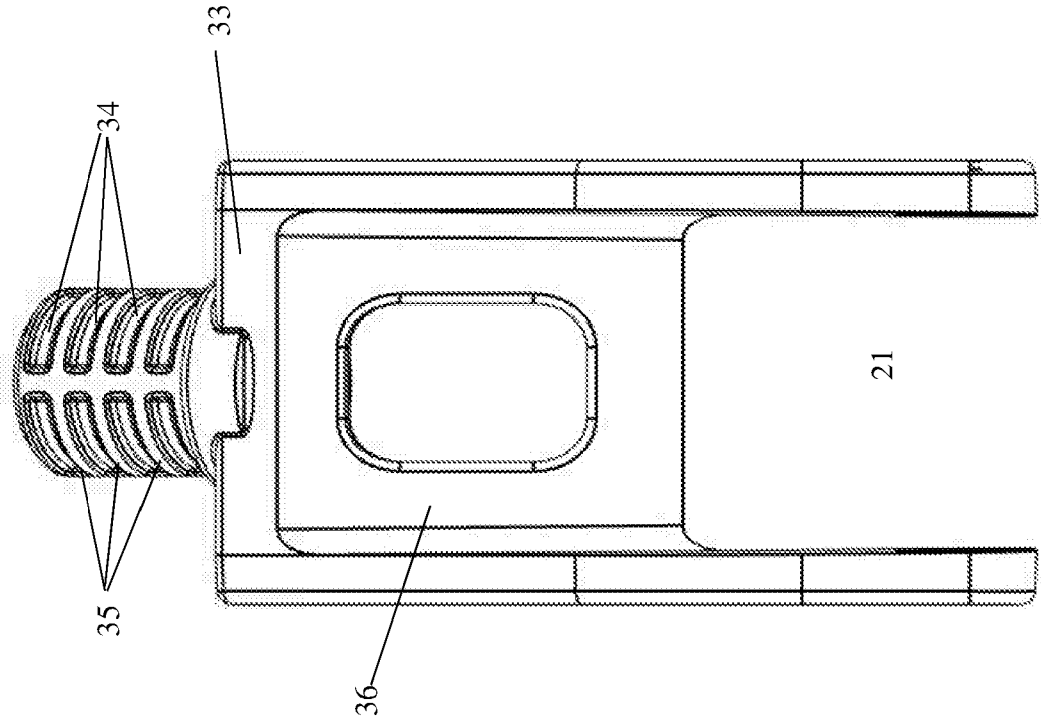


Figure 4

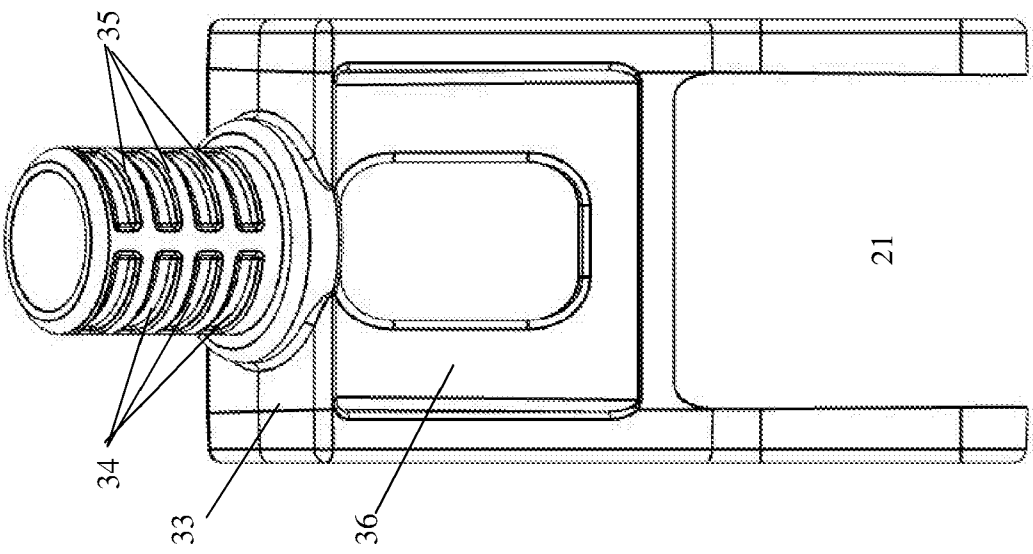


Figure 3

21

21

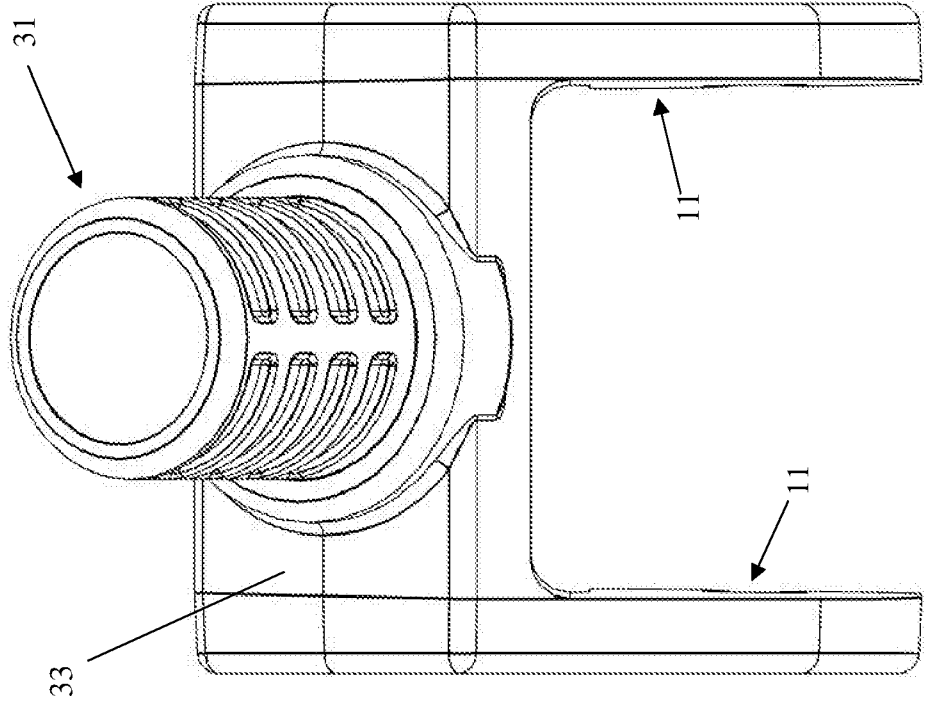


Figure 6

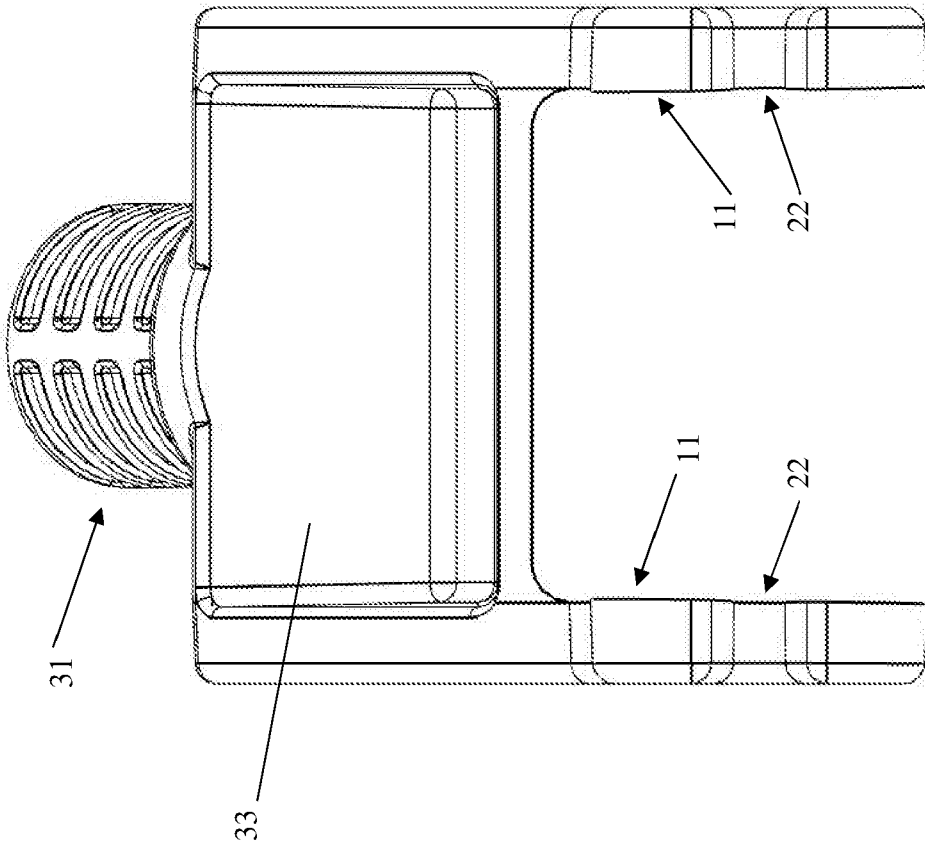


Figure 5

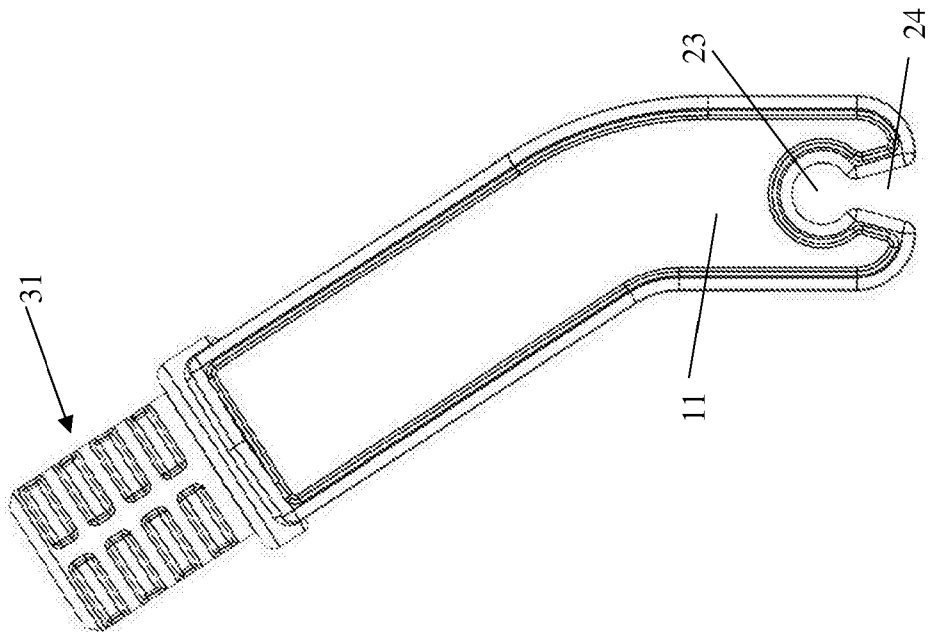


Figure 7

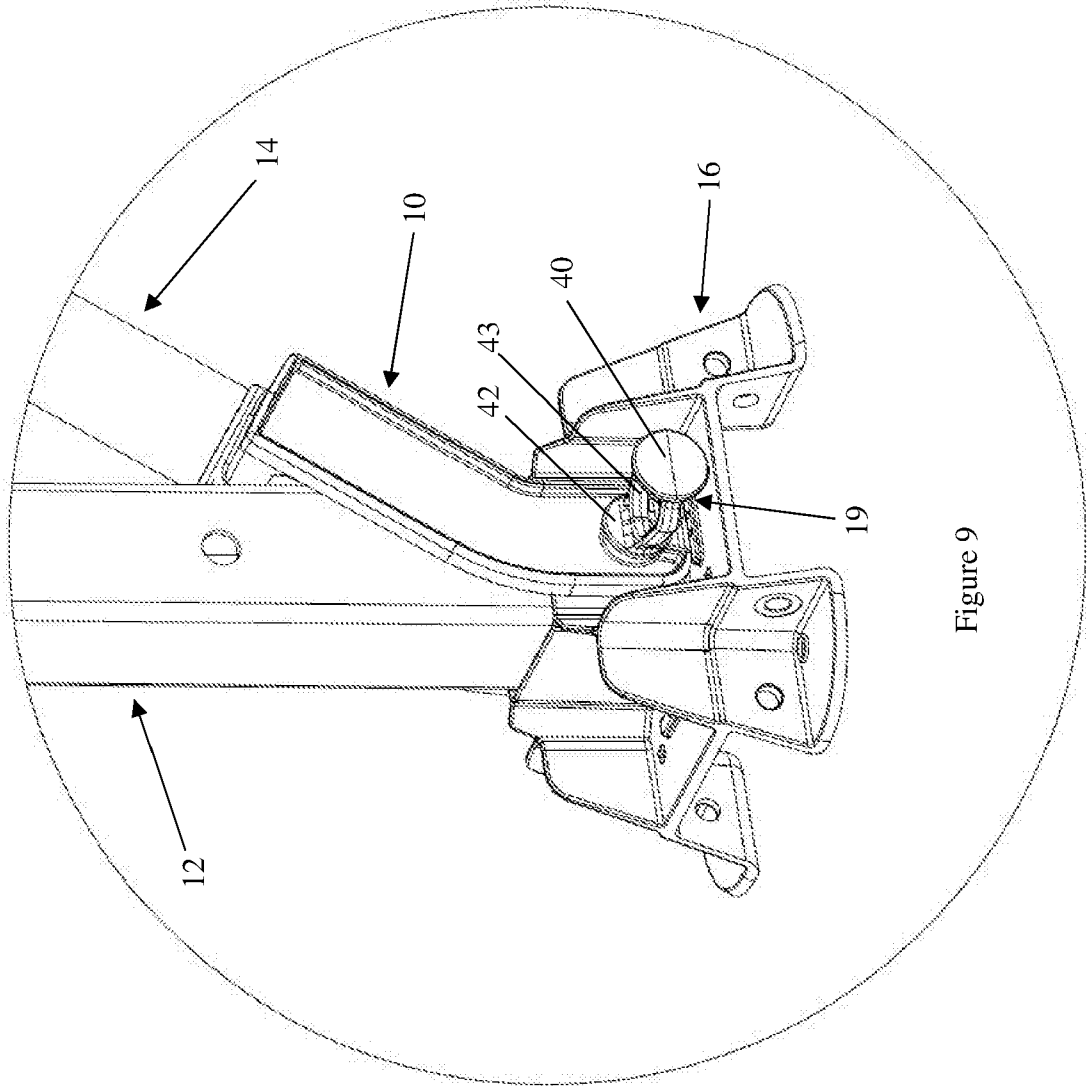


Figure 9

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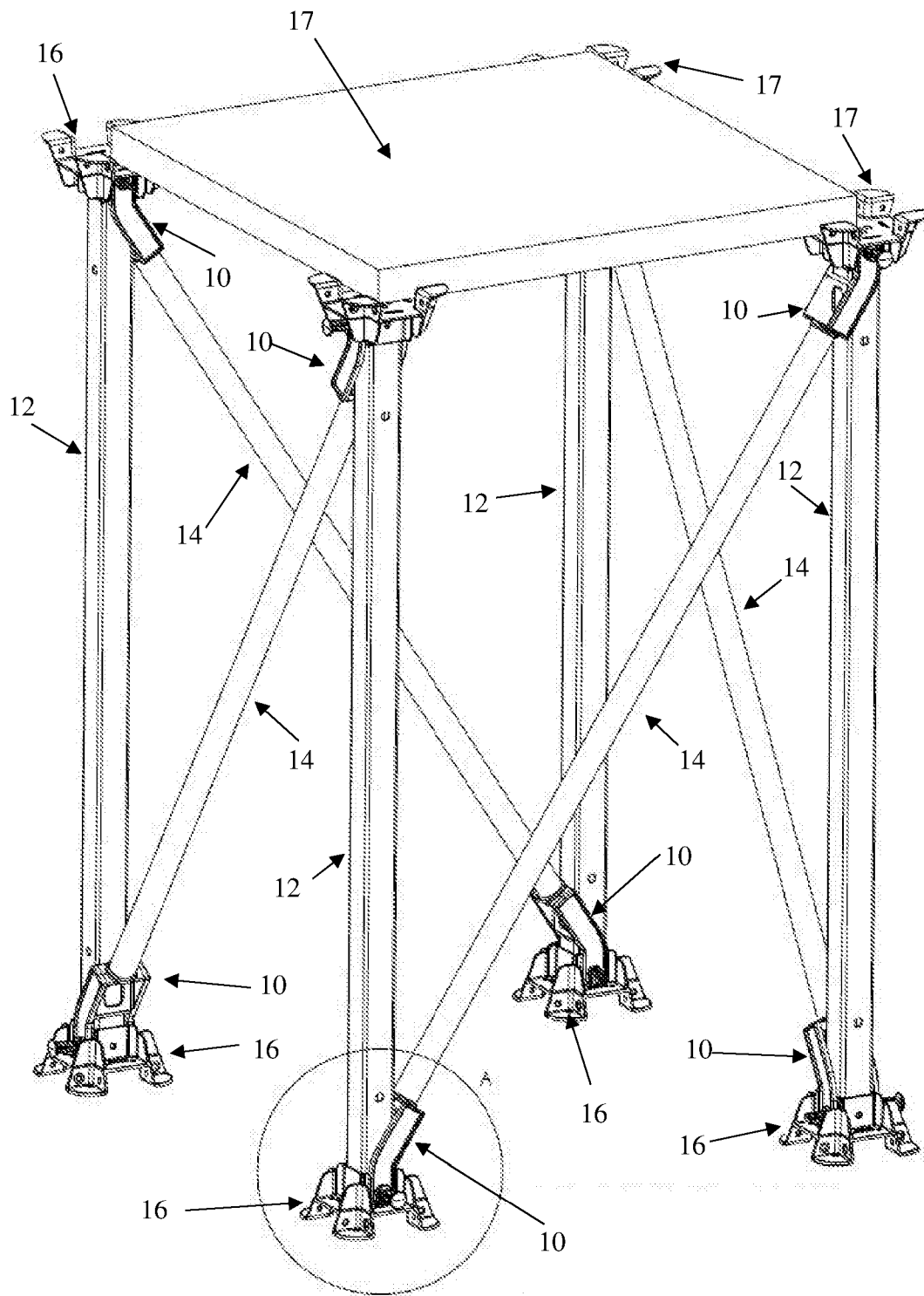


Figure 8

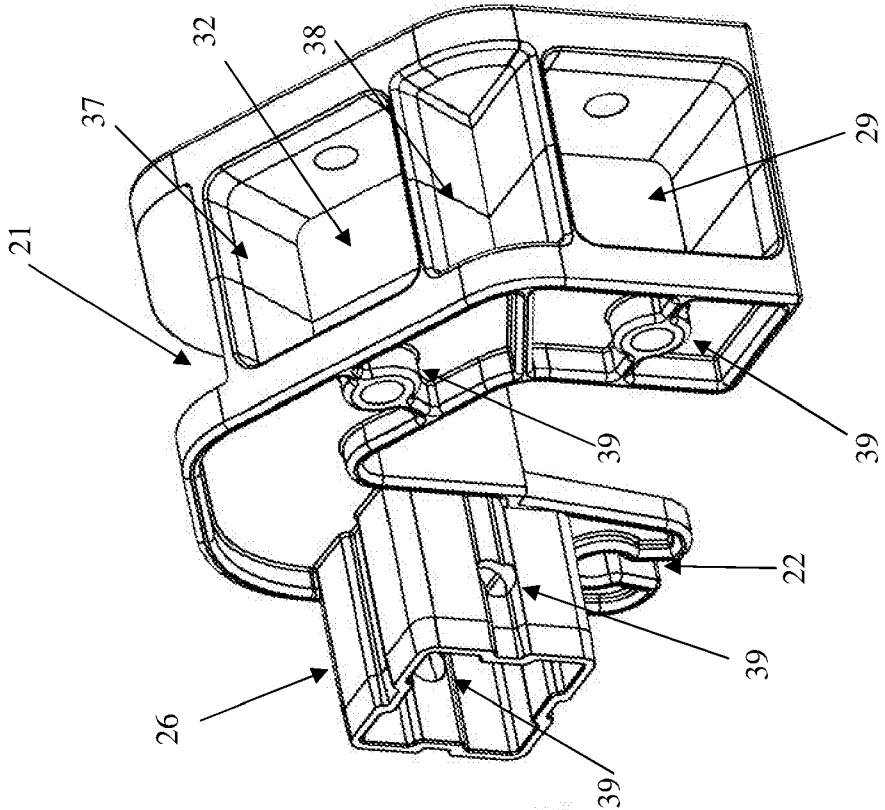


Figure 11

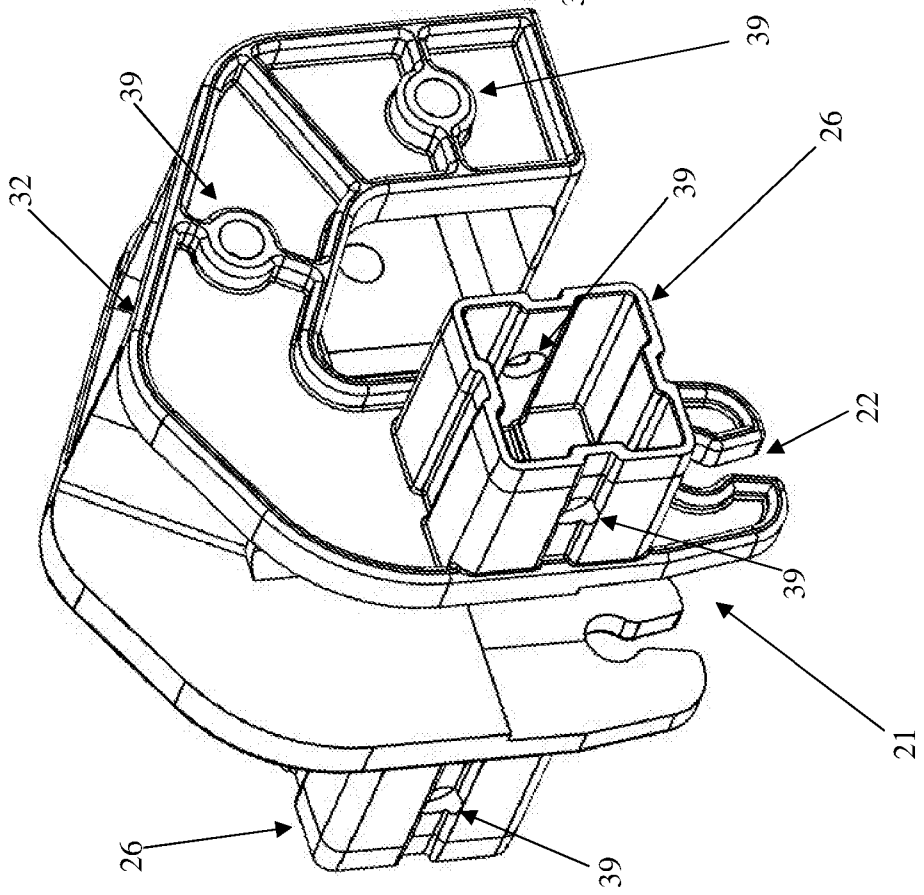


Figure 10

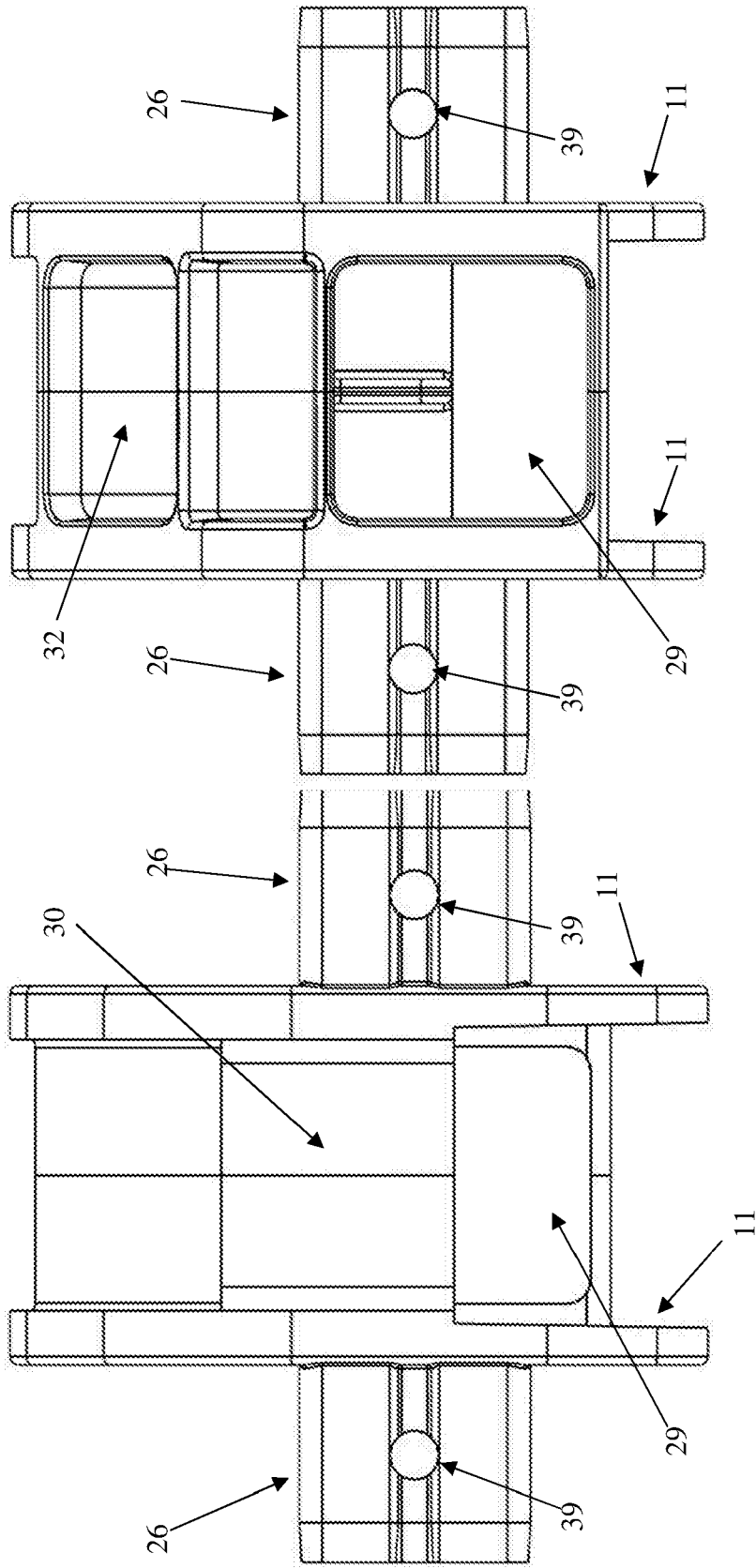


Figure 13

Figure 12



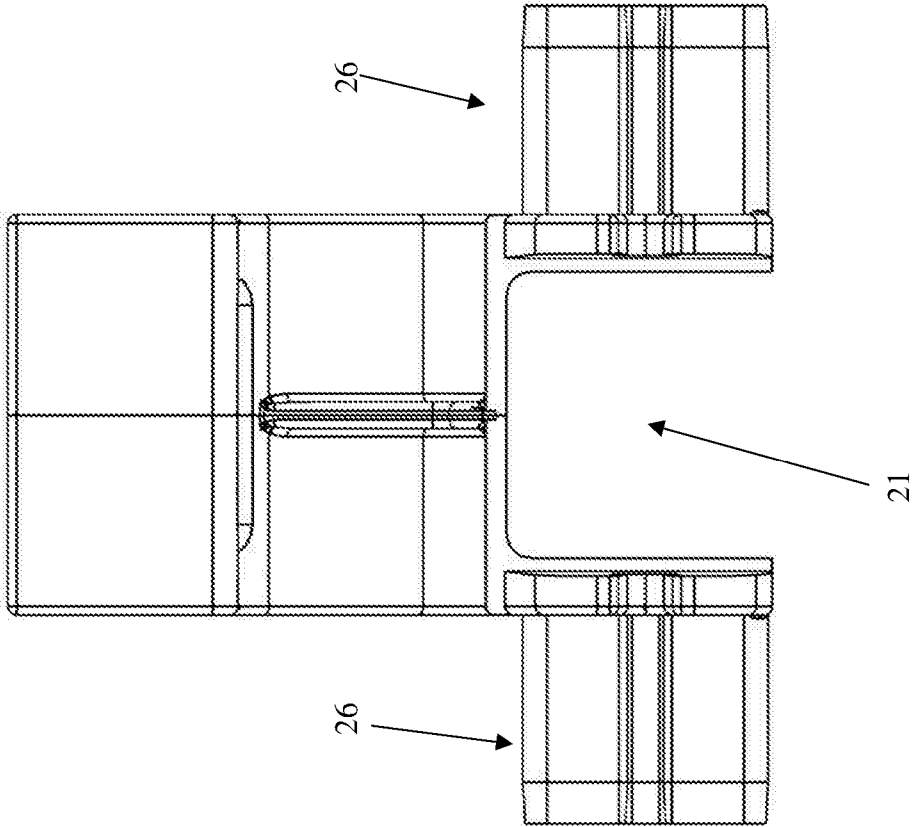
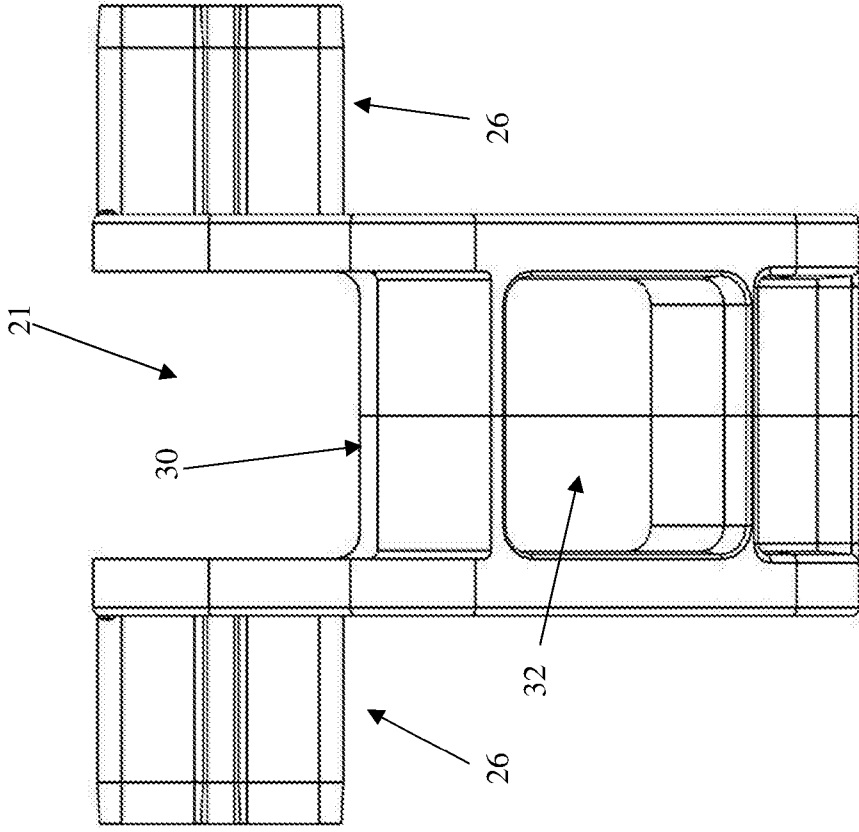


Figure 15

Figure 14

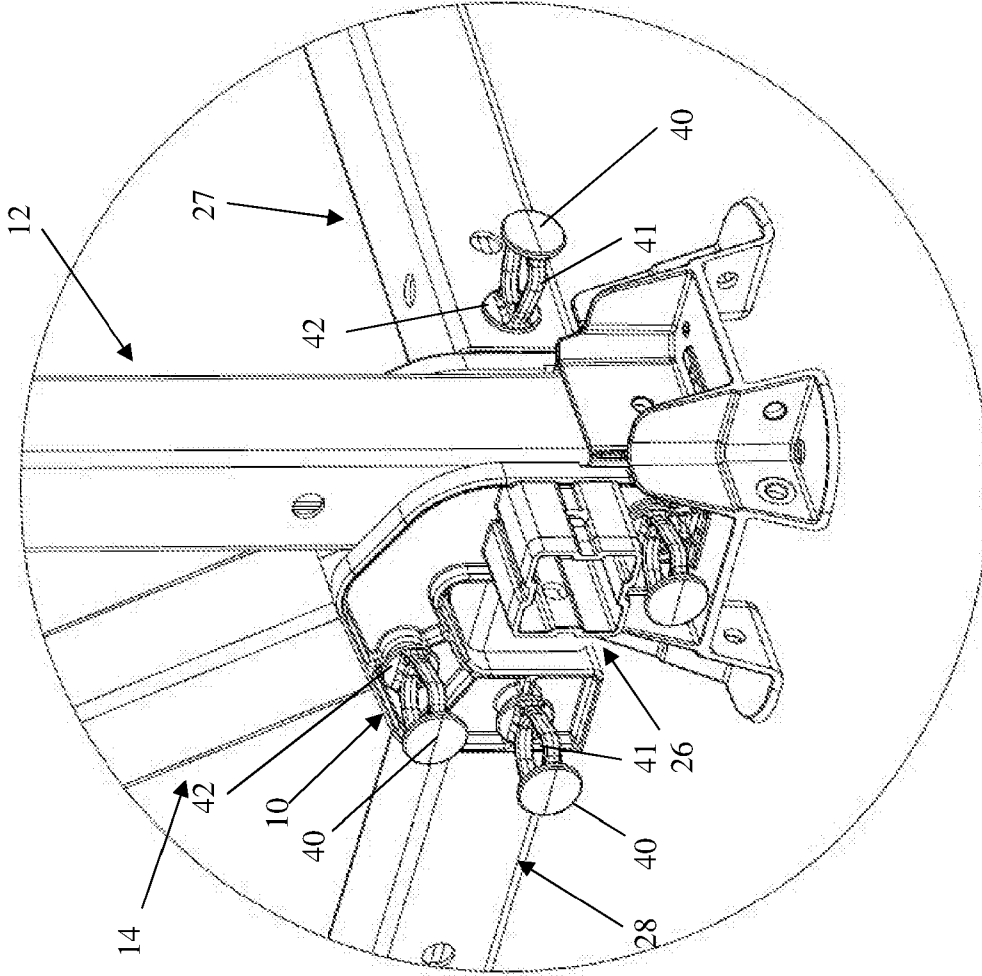


Figure 18

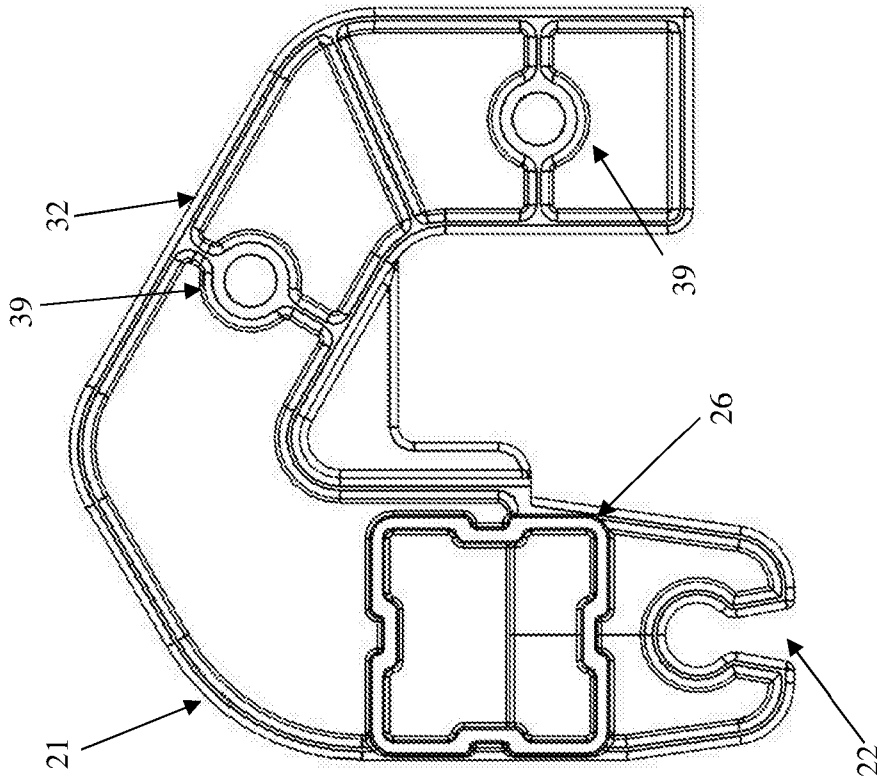


Figure 16

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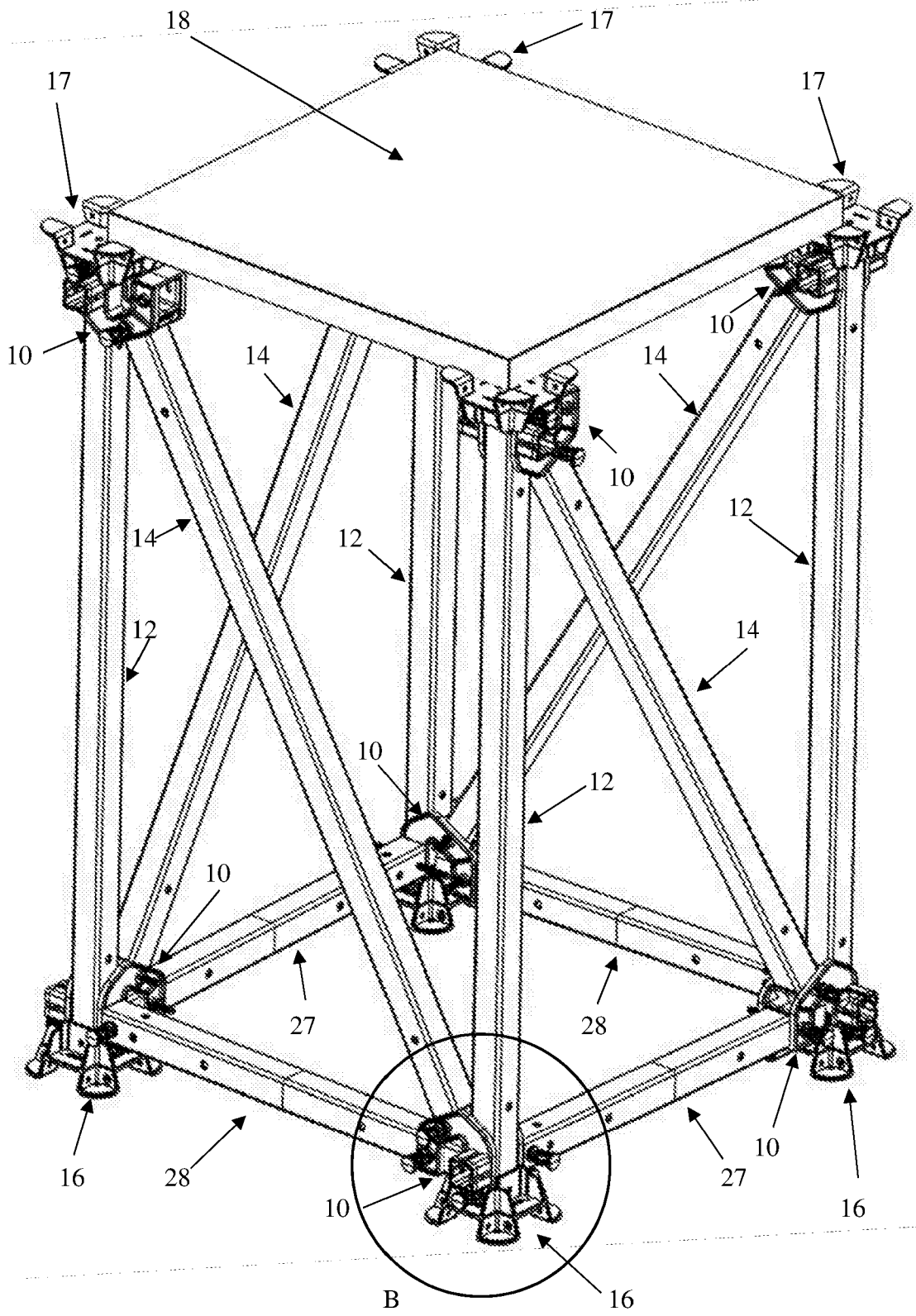


Figure 17

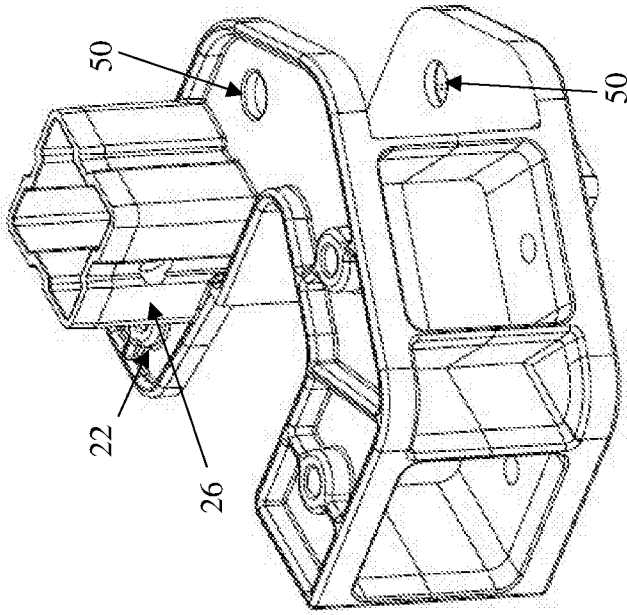


Figure 20

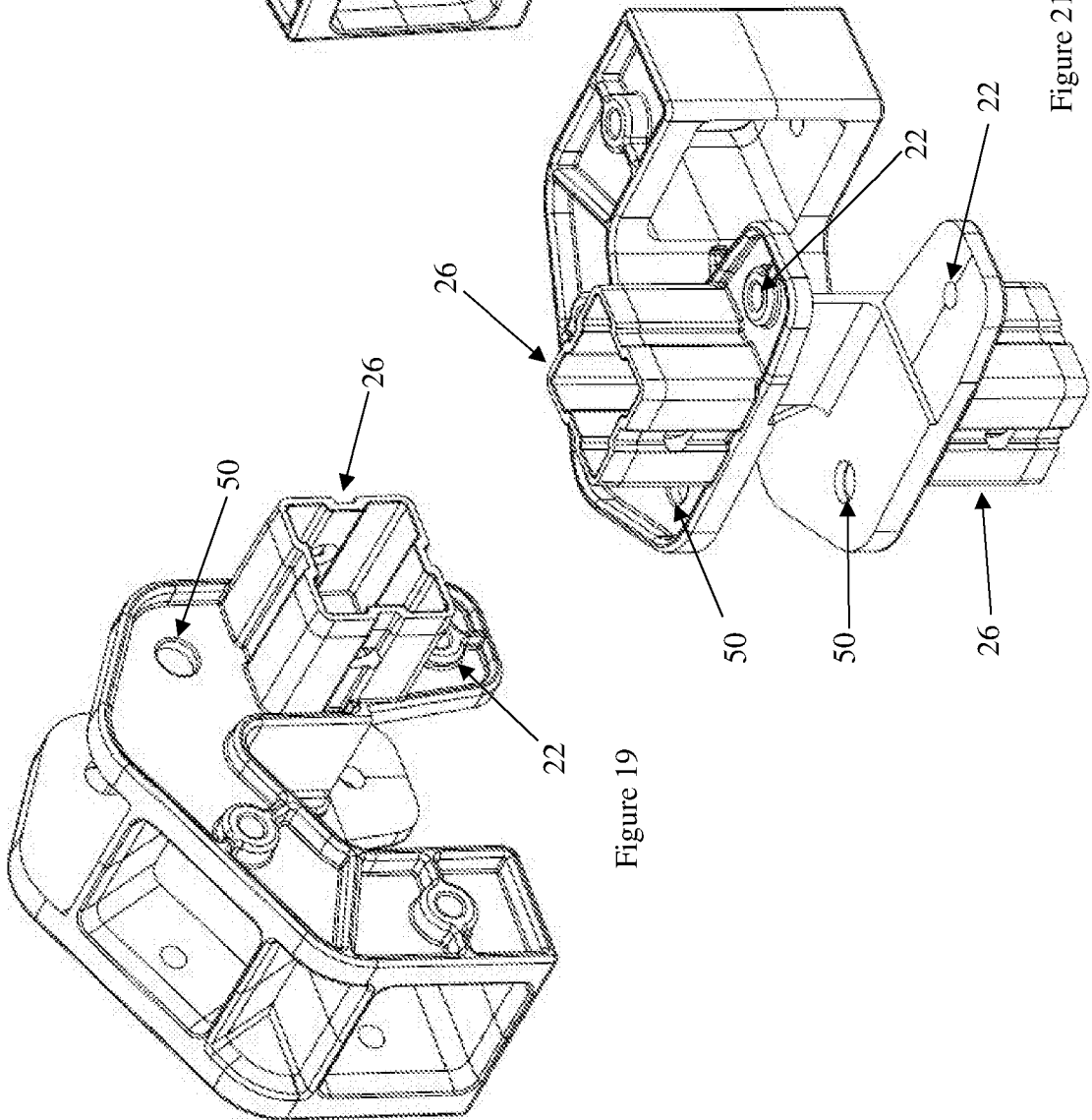
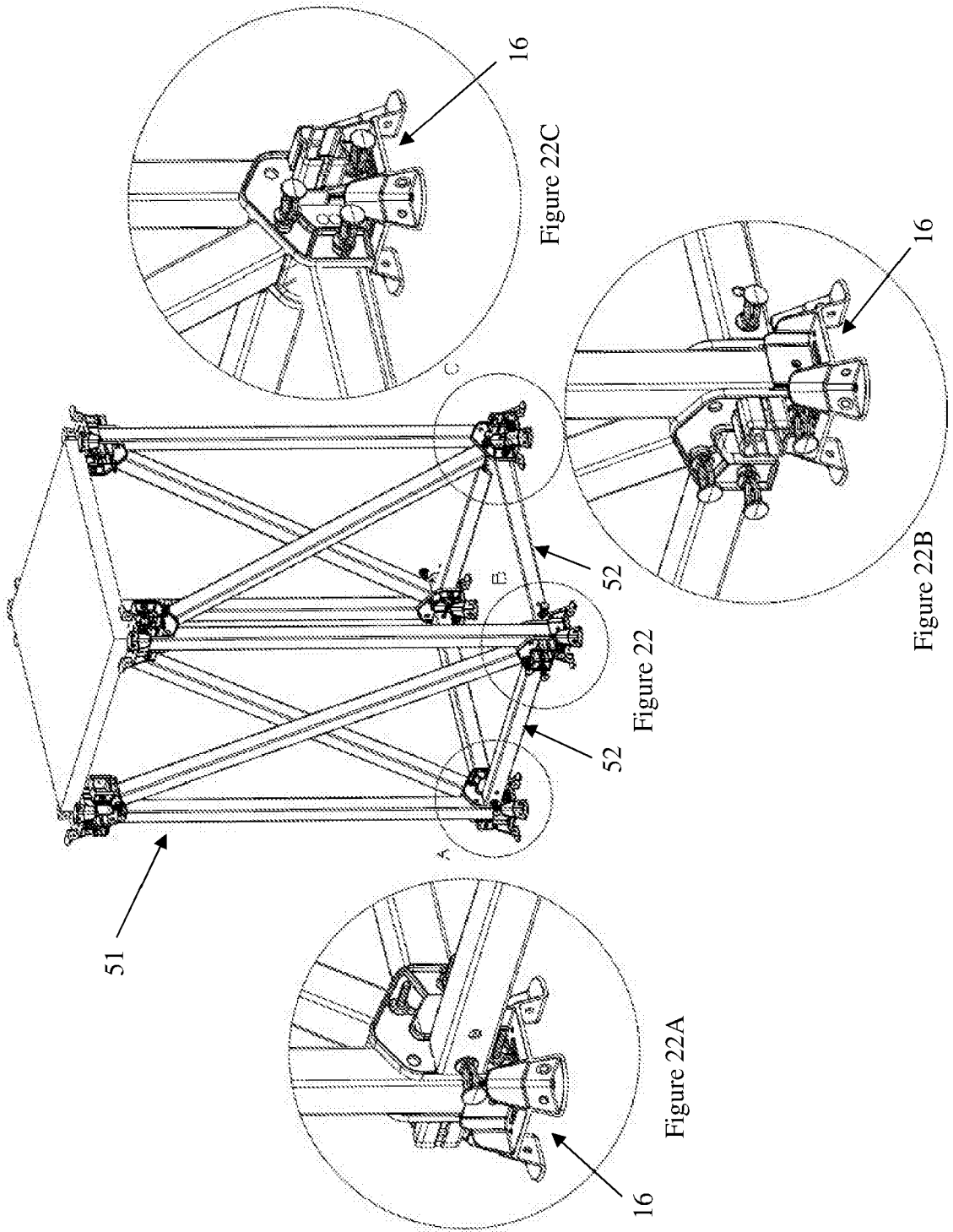


Figure 19

Figure 21



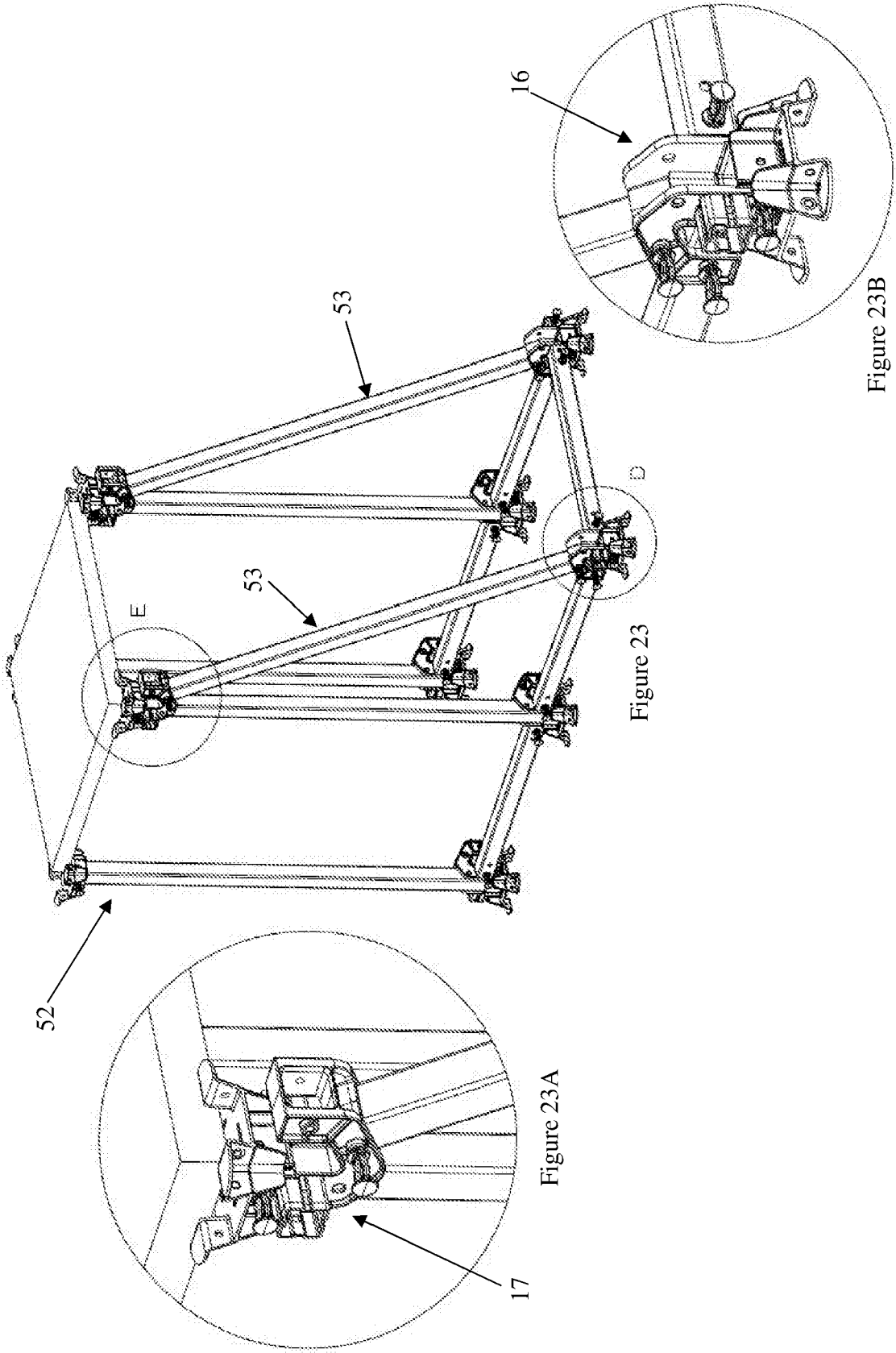


Figure 23

Figure 23A

Figure 23B

## **A BRACE FOR A SAFETY DECK**

### Technical Field of the Invention

The present invention relates generally to the scaffolding and safety decking field. In particular, but not exclusively, the invention concerns a connector or brace  
5 used to create safety deck towers.

### Background to the Invention

A safety deck is a temporary structure used to support a work crew and materials to aid in the construction, maintenance and repair of buildings, bridges and all other man-made structures. Unsafe safety decking has the potential to result in death or  
10 serious injury.

There are five main types of scaffolding used worldwide today. These are tube and coupler (fitting) components, prefabricated modular system scaffold components, H-frame/facade modular system scaffolds, timber scaffolds and bamboo scaffolds (particularly in China). Safety decking is normally assembled using similar components  
15 to scaffolding. Each type is made from several components which often include:

- A base plate which is a load-bearing base for the scaffold/safety deck;
- A number of standards which are the upright or vertical components;
- A number of ledgers which are the horizontal components;
- Diagonal bracing members and/or cross-sectional bracing components;
- 20 • Battens or decking boards used to make a working platform;
- Couplers which are used to join components together;
- Scaffold/safety deck tie, used to tie the scaffold/safety deck to a structure; and
- Brackets, used to extend the width of working platforms.

25 The most common coupler used to connect a diagonal bracing member to a standard, particularly when the scaffold/safety deck is a tube and clamp-type scaffold/safety deck, is a metal clamp having two tube clamps in a back to back configuration connected by a pivot allowing the tube clamps to be offset relative to one

another. The tube clamps normally include a threaded rod and a nut or similar which is used to tighten and loosen the tube clamp.

5 Couplers such as these are time consuming to use. Further, the use of the tube clamps needs to be planned as they typically need to be either installed at specific times during the assembly process or need to be undone entirely and redone entirely if installed at the wrong time. Still further, the tube clamps can be overtightened which instead of forming a strong connection, can deform the scaffold/safety deck members which leads to a reduction in strength and can cause point failure.

10 Embodiments of the invention seek to at least partially overcome or ameliorate any one or more of the abovementioned disadvantages or provide the consumer with a useful or commercial choice.

#### Summary of the Invention

According to a first aspect of the invention there is provided a brace for a safety deck, the brace comprising:

15 a pair of spaced apart wing portions to receive a portion of a standard therebetween; and

an engagement portion oriented at an angle to the spaced apart wing portions, the engagement portion to engage a portion of a diagonal to position the portion of the diagonal relative to the portion of the standard.

20 According to a second aspect of the invention there is provided a safety deck assembly comprising:

at least two standards;

at least one diagonal; and

at least one brace comprising:

25 a pair of spaced apart wing portions to receive a portion of one of the standards therebetween and



an engagement portion oriented at an angle to the spaced apart wing portions, the engagement portion to engage a portion of the at least one diagonal to position the portion of the diagonal relative to the portion of the standard.

5 Providing a brace as detailed above will allow an operator to erect a safety deck assembly rapidly and repeatedly, with a high level of stability due to the juxtaposition of the end of the diagonal relative to the end of the standard via the brace.

The brace is preferably particularly configured for coupling a diagonal member relative to a standard.

10 The brace may couple one or more ledgers relative to a diagonal and/or a standard.

Usually, a number of braces will be used in a safety deck assembly. A brace may be used at one or both ends of a diagonal member, ledger and/or standard. A brace may be used at any appropriate location along the length of a diagonal member, ledger and/or standard.

15 A brace may be attached relative to a diagonal member, ledger and/or standard directly or indirectly. If attached indirectly, the brace may be attached relative to a foot and/or platform support of a scaffold or safety deck assembly.

The brace will preferably be configured to allow the attachment of the brace relative to the diagonal member, ledger and/or standard using one or more locking pins.

20 The brace typically includes a pair of spaced apart wing portions to receive a portion of a standard therebetween.

The wing portions may each be wings, each having a free end. In this configuration, the wings may be connected to a transverse member or assembly at the end opposite the free end. This typically provides a U-shaped configuration.

25 The wing portions may be connected to a transverse member or assembly at both ends to form an opening with a closed periphery. This will typically form a rectangular opening.

Preferably, the wing portions will be substantially parallel with one another.

The wing portions may be planar. An inner or facing surface of the spaced apart wing portions may be planar.

An outer or free end of the wing portions may be arcuate.

5 The wing portions are spaced apart. Preferably, the wing portions are spaced apart equally over the length of the wing portions. A receiving gap is typically defined between the wing portions into which a portion of the standard is at least partially received.

Any receiving gap will preferably be an accepted width, to correspond to an accepted dimension of the standard, to be at least partially received therein.

10 The receiving gap may be shaped to receive a rectangular or circular cross-sectional shape standard. The receiving gap is preferably rectilinear in shape. Preferably, the dimension of the receiving gap substantially corresponds to the dimension of the standard. One or more spacers may be used if the dimension of the receiving gap is larger than the dimension of the standard.

15 Each wing portion may be provided with at least one attachment opening. As mentioned above, the at least one attachment opening may allow the use of one or more locking pins to attach the brace to the standard.

The at least one attachment opening will typically extend perpendicularly to the plane of an inner surface of the wing portion.

20 The at least one attachment opening may be keyhole shaped. A keyhole shaped opening will typically have an at least partially circular main portion and a convergent entryway leading to a narrowed neck or pinch point between the convergent entryway and the main portion. The pinch point will preferably discourage accidental but not determined attachment and detachment of the brace to and from the typical locking pin.

25 A locking pin can be inserted laterally through the main portion of the at least one opening and through aligned openings in the standard. Attachment could be accomplished by inserting a locking pin into the openings on the standard and then forcefully pushing the brace in a direction such that the pin enters the main part of the opening through the pinch point.

Separation of the brace from the standard may be accomplished by either lateral removal in the same manner as insertion but in the opposite direction, or by forcefully pulling the brace in a direction such that the pin exits the main part of the opening through the pinch point.

- 5           The convergent portion of the at least one opening will typically be oriented substantially vertically when the brace is in use. The load is typically borne by the periphery of the main portion of the at least one opening, typically in line with a main longitudinal axis of the wing portion.

- 10           The at least one opening may have an enclosed periphery. In this configuration, the preferred locking pin can only be inserted into and removed from the at least one opening in a transverse direction.

The periphery of the at least one opening may be reinforced. The periphery of the at least one opening may be enlarged. A perpendicularly extending lip may be provided about the periphery of the at least one opening.

- 15           A transverse member mounting portion may be provided on at least one wing portion. The transverse member mounting portion, where provided, can be used to mount a ledger relative to the brace. Typically, the transverse member mounting portion will extend in a direction transversely away from the receiving gap.

- 20           A transverse member mounting portion may be provided on each wing portion. The transverse member mounting portions will typically extend at an angle to one another. Angles such as 90° or 180° will normally be used. The transverse member mounting portions may be aligned and/or coaxial with one another.

- 25           The transverse member mounting portion is typically shaped to either receive a portion of a scaffold or safety deck member or be received within a portion of a scaffold or safety deck member. At least one transverse pin opening may be provided into or through the transverse member mounting portion. If the transverse member mounting portion is hollow, then at least one transverse pin opening may be provided into or through a wall of the transverse member mounting portion. If more than one transverse pin opening is provided in opposite walls of a hollow transverse member mounting

portion, then the transverse pin openings will normally be aligned to receive a locking pin therethrough.

At least one secondary opening may be provided on an opposite side of the transverse member mounting portion to the at least one opening. In an embodiment, the  
5 at least one secondary opening may be larger in dimension than the at least one opening.

An abutment wall or surface may be provided relative to the receiving gap and against which the standard abuts when positioned within the receiving gap. The abutment wall or surface will typically be substantially perpendicular to the plane of the wings and/or to the longitudinal axis of the at least one opening that may be provided  
10 in the wing portions. The abutment wall or surface will preferably assist with aligning the standard within the receiving gap.

The brace typically includes an engagement portion oriented at an angle to the spaced apart wing portions, the engagement portion to engage a portion of a diagonal to position the portion of the diagonal relative to the portion of the standard.

15 The engagement portion may be provided as a part of the brace which extends from the wing portions. The engagement portion may extend at an angle from the wing portions. Each of the wing portions may extend to form side sections of the engagement portion. The wing portions may extend beyond the preferred abutment wall to at least partially form the engagement portion.

20 The engagement portion may include an extension or an opening.

One or more separating walls of structures can be provided to separate the wing portions from the engagement portion. The abutment wall or surface may be or be a part of a separating wall.

In an embodiment, the engagement portion may be configured to include an  
25 opening into or through which a portion of a diagonal member is received. The opening may be formed by a pair of planar side walls, a separating wall and an opposed wall. The planar side walls are preferably parallel and perpendicular to the separating wall and the opposed wall. This will form a rectangular engagement opening but an arcuate engagement opening (or an engagement opening of any shape) could be formed with  
30 one or more walls.

In another embodiment, the engagement portion may be configured to include an extension which is at least partially received into a hollow portion in a diagonal member of a scaffold or safety deck assembly.

5 The extension may be shaped, and may have any shape. In an embodiment, an external shape of the extension will correspond to an internal shape of a hollow portion of a scaffold or safety deck member to be engaged by the extension. The extension may be cylindrical or rectangular. A cylindrical extension may be preferred.

The extension will preferably extend from a wall provided between the wing portions or between extensions from the wing portions.

10 One or more engagement formations may be provided on the exterior of the extension to assist with the engagement between the extension and the scaffold or safety deck member. The extension will normally be received within the diagonal member in a friction fit. One or more alternating series of slot openings and lands therebetween may be provided about the lateral periphery of the extension. Each land separated by  
15 slot openings may function as a fin. Each fin may be deformable to a small degree.

Where more than one series of slot openings and lands is provided, each series will preferably be circumferentially spaced about the periphery.

20 One or more further engagement portion may be provided on the brace to engage a scaffold or safety deck member at an angle to both the standard and the diagonal. Typically, the or each further engagement portion may be provided perpendicularly to the preferred transverse member mounting portions. The or each further engagement portion may be provided to engage a ledger or cross member if desired or required.

25 The one or more further engagement portion may be an opening or an extension as described above in respect of the engagement portion. The one or more further engagement portion may comprise any one or more features described above in respect of the engagement portion. In an embodiment, a further engagement portion may be an opening into which a portion of a ledger or cross member if desired or required.

30 Any engagement portion is preferably dimensioned to correspond to the portion of the diagonal that is engaged.

At least one transverse opening may be provided into or through any one or more engagement portions. If the engagement portion is hollow, then at least one transverse opening may be provided into or through a wall of the engagement portion. If more than one transverse opening is provided in opposite walls of a hollow engagement portion, then the transverse openings will normally be aligned to receive a locking pin therethrough.

Any transverse opening that is provided to receive a locking pin may include an enlarged periphery to increase the strength of the periphery. In an embodiment, the or each transverse opening provided to receive a locking pin will preferably have a perpendicularly extending lip surrounding the transverse opening. If the transverse opening is circular (which is preferred, although the transverse opening could be shaped for use as a part of a bayonet engagement with the locking pin), the provision of a perpendicularly extending lip surrounding the transverse opening will typically form a tubular extension.

The engagement portion may extend at any angle relative to the wing portions. The angle between the engagement portion and the wing portions will typically be proportional to the height between vertically spaced ledgers or other members of the scaffold or safety deck assembly.

The brace may be provided in a first configuration to couple a diagonal scaffold or safety deck member relative to a standard.

The brace may be provided in a second configuration to couple a diagonal scaffold or safety deck member relative to a standard and the diagonal and the standard relative to one or more ledgers. In this configuration, the brace preferably couples the one or more ledgers to the standard in a 180° configuration and a cross-ledger at 90° to the standard and the one or more ledger.

The brace may be manufactured from any one or more materials. In an embodiment, an engineering plastic may be used. Metal may also be used.

As mentioned above, the brace is preferably attached to or relative to the scaffold or safety deck members using one or more locking pin. The locking pin may be formed of any one or more materials. In some configurations, a wholly plastic

locking pin could be used or a combination pin with a metal shank or shaft with a plastic head portion may be provided.

The locking pin will preferably have an enlarged head. A flattened surface may be provided on the head to allow a hammer or similar tool to be used to drive the locking pin into position during assembly. An opening may be provided on the head to provide a gripping portion for removal of the locking pin. The opening may be provided between the shaft and the head (as a part of the head or the shaft). An enlarged abutment shoulder may be provided perpendicularly to the length of the shaft, between the head and the shaft to limit insertion of the locking pin.

The shaft may be shaped or provided with shaped portions, for example to provide a bayonet fitting if rotated after insertion. One or more grooves or extensions may be provided on the shaft to provide tactile and/or audible feedback of the engagement of the locking pin during assembly.

#### Detailed Description of the Invention

In order that the invention may be more clearly understood one or more embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, of which:

- Figure 1 is an isometric view from above of the brace of an embodiment.
- Figure 2 is an isometric view of the brace illustrated in Figure 1, from below.
- 20 Figure 3 is a rear view of the brace illustrated in Figure 1.
- Figure 4 is a front view of the brace illustrated in Figure 1.
- Figure 5 is a view from below of the brace illustrated in Figure 1.
- Figure 6 is a view from above of the brace illustrated in Figure 1.
- Figure 7 is a side view from the left of the brace illustrated in Figure 1.
- 25 Figure 8 is an isometric view of a safety deck tower formed using the brace illustrated in Figure 1.
- Figure 9 is a detailed view of the portion of Figure 8 identified by reference letter A.

- Figure 10 is an isometric view from a first side of the brace of another embodiment.
- Figure 11 is an isometric view of the brace illustrated in Figure 10, from the opposite end.
- 5 Figure 12 is a front view of the brace illustrated in Figure 10.
- Figure 13 is a rear view of the brace illustrated in Figure 10.
- Figure 14 is a view from below of the brace illustrated in Figure 10.
- Figure 15 is a view from above of the brace illustrated in Figure 10.
- Figure 16 is a side view from the right of the brace illustrated in Figure 10.
- 10 Figure 17 is an isometric view of a safety deck tower formed using the brace illustrated in Figure 10.
- Figure 18 is a detailed view of the portion of Figure 17 identified by reference letter B.
- Figure 19 is an isometric view from the front of a brace of a further embodiment.
- 15 Figure 20 is an isometric view from below of the brace illustrated in Figure 19.
- Figure 21 is an isometric view from above of the brace illustrated in Figure 19.
- Figure 22 is an isometric view of a safety deck tower formed using the brace illustrated in Figure 19.
- Figure 22A is a detailed view of the portion illustrated in Figure 22 and designated  
20 'A'.
- Figure 22B is a detailed view of the portion illustrated in Figure 22 and designated 'B'.
- Figure 22C is a detailed view of the portion illustrated in Figure 22 and designated 'C'.
- 25 Figure 23 is an isometric view of a safety deck tower with lateral buttress formed using the brace illustrated in Figure 19.



Figure 23A is a detailed view of the portion illustrated in Figure 23 and designated 'D'.

Figure 23B is a detailed view of the portion illustrated in Figure 23 and designated 'E'.

5

With reference to the accompanying figures, a brace 10 for a safety deck is provided. The brace 10 is illustrated in two embodiments in the Figures, a first embodiment shown in Figures 1 to 9 and a second embodiment shown in Figures 10 to 18.

10 In both embodiments, the brace 10 comprises a pair of spaced apart wings 11 to receive a portion of a standard 12 (illustrated in Figures 8, 9, 17 and 18) therebetween. The brace also includes an engagement portion 13 oriented at an angle to the spaced apart wings 11 to engage a portion of a diagonal 14 (illustrated in Figures 8, 9, 17 and 18) to position the portion of the diagonal 14 relative to the portion of the standard 12.

15 The brace is used in a safety deck assembly, such as that illustrated in Figures 8, 9, 17 and 18. The safety deck assembly 20 illustrated in Figures 8 and 9, comprises four standards 12, four diagonals 14 and a brace 10 at the upper and lower end of each diagonal 14 to couple the diagonal 14 to one standard 12 at a lower end and an adjacent standard 12 at an upper end.

20 The brace may be used to couple one or more ledgers relative to a diagonal and/or a standard. This is shown in the configuration illustrated in Figures 17 and 18.

Usually, a number of braces will be used in a safety deck assembly. A brace may be used at one or both ends of a diagonal member, ledger and/or standard. A brace may be used at any appropriate location along the length of a diagonal member, ledger and/or standard.

25

The brace 10 may be attached relative to a diagonal 14, ledger 15 and/or standard 12 directly or indirectly. If attached indirectly such as illustrated in Figures 8, 9, 17 and 18, the brace 10 may be attached relative to a foot 16 and/or platform support 17 of a safety deck assembly. The platform support 17 illustrated has the same

configuration as the foot 16 but is used in an inverted orientation to support a platform 17.

The brace 10 is coupled relative to the diagonal 14, ledger and/or standard 12 using an elongate locking pin 19. The locking pin 19 attaches the brace 10 and the foot 5 17/platform support 17 to the standard 12 as shown in Figure 9 in particular.

The brace 10 illustrated includes a pair of spaced apart wings 11 to receive a portion of a standard 12 therebetween.

As shown, the wings 11 each have a generally arcuate free end. In this configuration, the wings are connected to a transverse wall 36 at the end opposite the 10 free end. This typically provides a receiving gap 21 of a generally U-shaped configuration for receiving the standard 12 thereinto.

The receiving gap 21 is normally an accepted width to correspond to an accepted dimension of the standard 12 to be at least partially received therein.

The generally U-shaped receiving gap 21 can receive a rectangular or circular 15 cross-sectional shape standard 12. The receiving gap 21 is preferably rectilinear in shape. Typically, the dimension of the receiving gap substantially corresponds to the dimension of the standard but if not, one or more spacers may be used if the dimension of the receiving gap 21 is larger than the dimension of the standard 12.

As shown, the wings 11 are substantially parallel with one another. The wings 20 11 illustrated are planar. An inner or facing surface of the spaced apart wings 11 is planar.

Each wing illustrated is provided with an attachment opening 22, allowing the use of a locking pin 19 to attach the brace 10 to the standard 12. The attachment opening 22 illustrated extends perpendicularly to the plane of an inner surface of the wings 11.

25 The attachment opening 22 in the illustrated embodiments is keyhole shaped. The keyhole shaped opening 22 has a partially circular main portion 23 and a convergent entryway 24 leading to a narrowed neck or pinch point between the convergent entryway 24 and the main portion 23. The pinch point will preferably

discourage accidental but not determined attachment and detachment of the brace 10 to and from the locking pin 19.

5 A locking pin 19 can be inserted laterally through the main portion 23 of the opening 22 and through aligned openings in the standard 12. Attachment could be accomplished by inserting a locking pin 19 into the openings on the standard 12 and then forcefully pushing the brace 10 in a direction such that the pin 19 enters the main part of the opening 22 through the pinch point, although this will typically require that the locking pin 19 and/or the periphery of the opening 22 is at least partially deformable.

10 Separation of the brace 10 from the standard 12 may be accomplished by either lateral removal of the locking pin 19 in the same manner as insertion, but in the opposite direction ,or by forcefully pulling the brace 10 in a direction such that the pin 19 exits the main part 23 of the opening 22 through the pinch point.

15 The convergent portion 24 of the opening 22 will typically be oriented substantially vertically when the brace 10 is in use as illustrated in Figure 7 (or inverted if used at an upper end). The load is typically borne by the periphery of the main portion 23 of the opening 22, typically in line with a main longitudinal axis of the wing 11.

The periphery of the opening 22 may be reinforced. As shown best in Figures 1 and 2, a perpendicularly extending lip 25 may be provided about the periphery of the opening 22.

20 As illustrated in Figures 10 to 18, the brace 10 may include a transverse member mounting portion 26 on at least one wing 11, and possibly both as shown. The transverse member mounting portion, where provided, can be used to mount a ledger 27 relative to the brace 10. Typically, the transverse member mounting portion 26 will extend in a direction transversely away from the receiving gap 21.

25 A transverse member mounting portion 26 may be provided on each wing 11 as shown. The transverse member mounting portions shown in Figures 10 to 18 extend at 180° to one another. The transverse member mounting portions 26 are aligned or coaxial with one another. This transverse member mounting portion 26to configured to be received within a portion of the ledger 27.

A second (or third) transverse member mounting portion may be provided, configured as a transverse opening 29, shaped to receive a portion of transverse ledger 28. As shown in Figures 11 to 13 in particular, the transverse opening may be provided through a part of the brace, separated from the receiving gap 21 and the mounting portion for the diagonal 14.

An abutment wall 30 is provided relative to the receiving gap 21 and against which the standard 12 abuts when positioned within the receiving gap 21. The abutment wall 30 is substantially perpendicular to the plane of the wings 11 and parallel to the longitudinal axis of the attachment opening 22 that may be provided in the wings 11. The abutment wall 30 will preferably assist with aligning the standard 12 within the receiving gap 21.

The brace 10 typically includes an engagement portion oriented at an angle to the spaced apart wings 11 to engage a portion of a diagonal 14, to position the portion of the diagonal 14 relative to the portion of the standard 12.

The engagement portion may be provided as a part of the brace 10 which extends from the wings 11. The engagement portion may extend at an angle from the wings 11.

The engagement portion may be an extension 31 as shown in Figures 1 to 9, or an opening 32 as shown in Figures 10 to 18.

In both illustrated configurations, the wings 11 extend beyond the preferred abutment wall 22, 30 to at least partially form the engagement portion.

One or more separating walls or structures can be provided to separate the wings 11 from the engagement portion. As illustrated in Figures 2 and 3 for example, a transverse separating wall 33 is provided relative to which the extension 31 is formed.

In this embodiment, the engagement portion is configured as an extension 31 which is at least partially received into a hollow portion in a diagonal member 14 of a safety deck assembly.

The extension 31 is shaped. In the embodiment illustrated in Figures 1 to 9, the external shape of the extension 31 corresponds to an internal shape of a hollow portion

of the diagonal 14 to be engaged by the extension 31. The extension 31 shown is cylindrical.

The extension 31 extends from the separating wall 33 provided between the extensions from the wings 11.

5           The extension 31 is normally received within the diagonal 14 in a friction fit. Engagement formations are provided on the exterior of the extension 31 to assist with the engagement between the extension 31 and the diagonal. At least two alternating series of slot openings 34 and lands 35 therebetween are provided on the periphery of the extension 31. Each land 35 separated by slot openings 34 functions as a fin. The  
10 fins may be deformable to a small degree. The engagement formations are circumferentially spaced about the periphery of the extension 31 as shown.

In the embodiment shown in Figures 10 to 18, the engagement portion is configured as an opening 32 into or through which a portion of a diagonal 14 is received. The opening 32 is formed by a pair of planar side walls which are configured  
15 as extensions from the wings 11, a separating wall 37 and an opposed wall 38. The planar side walls are parallel and perpendicular to the separating wall 37 and the opposed wall 38. This will form a rectangular engagement opening 32.

As shown, a transverse pin opening 39 may be provided into or through the engagement portions. If the engagement portion is hollow such as the transverse  
20 member mounting portion 26, then the transverse pin opening is provided through a wall of the transverse member mounting portion 26. If more than one transverse pin opening 39 is provided in opposite walls of a transverse member mounting portion 26, then the openings 39 will normally be aligned to receive a locking pin 19 therethrough.

Any transverse opening 39 that is provided to receive a locking pin 19 may  
25 include an enlarged periphery to increase the strength of the periphery. In an embodiment, at least some of the transverse pin openings 39 have a perpendicularly extending lip surrounding the transverse pin opening 39. If the transverse opening is circular (which is preferred, although the transverse opening could be shaped for use as a part of a bayonet engagement with the locking pin), the provision of a perpendicularly  
30 extending lip surrounding the transverse pin opening 39 will form a tubular extension.

The engagement portion 31. 32 is provided at any angle relative to the wings 11. The angle will typically be related to the height between the ledgers 15 or other members of the safety deck assembly.

5 The brace 10 is provided in a first configuration to couple a diagonal safety deck member 14 relative to a standard 12.

The brace 10 may be provided in a second configuration to couple a diagonal safety deck member 14 relative to a standard 12 and the diagonal 14 and the standard 12 relative to one or more ledgers 15. In this configuration, the brace preferably couples the one or more longitudinal ledgers 27 to the standard in a 180° configuration and a  
10 cross-ledger 28 at 90° to the standard and the one or more longitudinal ledger 27.

The brace may be manufactured from any one or more materials. In an embodiment, an engineering plastic may be used. Metal may also be used.

As mentioned above, the brace 10 is preferably attached to or relative to the safety deck members using a locking pin 19. The locking pin 19 may be formed of any  
15 one or more materials. In some configurations, a wholly plastic locking pin 19 could be used or a combination pin 19 with a metal shank or shaft with a plastic head portion may be provided.

The locking pin 19 will preferably have an enlarged head. A flattened surface 40 may be provided on the head to allow a hammer or similar tool to be used to drive  
20 the locking pin 19 into position during assembly. An opening 41 may be provided on the head to provide a gripping portion for removal of the locking pin 19. The opening 41 may be provided between the shaft (not shown) and the head (as a part of the head or the shaft). An enlarged abutment shoulder 42 may be provided perpendicularly to the length of the shaft, between the head and the shaft to limit insertion of the locking  
25 pin 19.

The embodiment of the brace illustrated in Figures 19 to 21 is basically similar to the embodiment illustrated in Figures 10 to 18 with some small differences. Instead of the keyhole shaped opening in the wings for example, the attachment opening 22 in the embodiment in Figure 19 to 21, has an enclosed periphery. In this configuration,

the locking pin 19 can only be inserted into and removed from the attachment opening 22 in a transverse direction.

5 A secondary opening 50 is provided on each wing 11, on an opposite side of the transverse member mounting portion 26 to the attachment opening 22. In an embodiment, the secondary opening 50 is larger in dimension than the attachment opening 22.

10 The brace of the embodiments illustrated allows the vertical safety deck components in multiple ways using a single brace. For example, the legs can be braced using a top to bottom method (chase the brace) without the need for a ledger/kicker lift in the bottom. The brace also allows bracing of the legs using a top to bottom method (chase the brace) with ledgers 52 (kicker lift) then fitted at the bottom as illustrated in the tower 51 shown in Figure 22.

15 Still further, the brace can allow the use of a buttress effect where a diagonal 53 is fitted to the brace at the top, and to an external perimeter of the safety deck at the bottom, to provide a raked buttress support by extension of the base, to stop the decking from overturning in a particular direction as illustrated in Figure 23.

The one or more embodiments are described above by way of example only. Many variations are possible without departing from the scope of protection afforded by the appended claims.

CLAIMS

1. A brace for a safety deck, the brace comprising a pair of spaced apart wing portions to receive a portion of a standard therebetween and an engagement portion oriented at an angle to the spaced apart wing portions, the engagement portion to engage a portion of a diagonal to position the portion of the diagonal relative to the portion of the standard.  
5
2. A brace for a safety deck as claimed in claim 1 wherein the wing portions are configured as wings, each having a free end connected to a transverse member or assembly at an end opposite the free end.
- 10 3. A brace for a safety deck as claimed in claim 1 or claim 2 wherein each wing portion comprises an inner or facing surface which is planar and substantially parallel with the inner or facing surface of the other wing portion.
4. A brace for a safety deck as claimed in any one of the preceding claims wherein a receiving gap is defined between the wing portions into which a portion of the standard is at least partially received.  
15
5. A brace for a safety deck as claimed in any one of the preceding claims wherein each wing portion is provided with at least one attachment opening.
6. A brace for a safety deck as claimed in claim 5 wherein the at least one attachment opening extends perpendicularly to the plane of an inner surface of the wing portion.  
20
7. A brace for a safety deck as claimed in claim 5 or claim 6 wherein the at least one opening is keyhole shaped, having an at least partially circular main portion and a convergent entryway leading to a narrowed neck or pinch point between the convergent entryway and the main portion.
- 25 8. A brace for a safety deck as claimed in claim 7 wherein the convergent portion of the at least one opening is oriented substantially vertically when the brace is in use.
9. A brace for a safety deck as claimed in any one of claims 5 to 8 wherein a periphery of the at least one opening is reinforced.



10. A brace for a safety deck as claimed in any one of the preceding claims further comprising a transverse member mounting portion provided on at least one wing portion.
- 5 11. A brace for a safety deck as claimed in claim 10 wherein the transverse member mounting portion extends in a direction transversely away from the other wing portion.
12. A brace for a safety deck as claimed in claim 10 or claim 11 wherein the transverse member mounting portion is shaped to either receive a portion of a scaffold member or be received within a portion of a scaffold member.
- 10 13. A brace for a safety deck as claimed in any one of claims 10 to 12 wherein at least one transverse pin opening is provided into or through the transverse member mounting portion.
14. A brace for a safety deck as claimed in any one of the preceding claims wherein a transverse abutment surface is provided relative to the wing portions against  
15 which the standard abuts.
15. A brace for a safety deck as claimed in any one of the preceding claims wherein each of the wing portions extend to form side sections of the engagement portion.
16. A brace for a safety deck as claimed in any one of the preceding claims wherein  
20 the engagement portion includes an extension.
17. A brace for a safety deck as claimed in any one of the preceding claims wherein the extension has an external shape corresponding to an internal shape of a hollow portion of a scaffold member to be engaged by the extension.
18. A brace for a safety deck as claimed in claim 16 or 17 wherein the extension  
25 extends from a wall provided between the wing portions or extensions from the wing portions.
19. A brace for a safety deck as claimed in any one of claims 16 to 18 wherein one or more engagement formations is provided on the exterior of the extension to assist with the engagement between the extension and the safety deck member.
- 30 20. A brace for a safety deck as claimed in any one of the preceding claims wherein the engagement portion includes an opening into or through which a portion of a diagonal member is received.

21. A brace for a safety deck as claimed in any one of the preceding claims further comprising one or more further engagement portion to engage a safety deck member at an angle to both the standard and the diagonal.
- 5 22. A brace for a safety deck as claimed in any one of the preceding claims wherein at least one transverse pin opening is provided into or through any one or more engagement portion.
23. A brace for a safety deck as claimed in claim 22 wherein the or each at least one transverse pin opening includes an enlarged periphery to increase the strength of the periphery.
- 10 24. A safety deck assembly comprising at least two standards, at least one diagonal and at least one brace as claimed in any one of the preceding claims.
25. A safety deck assembly as claimed in claim 24 wherein the or each brace is attached relative to a diagonal member, a ledger and/or a standard using one or more locking pins.
- 15 26. A safety deck assembly as claimed in claim 24 or 25 wherein the or each brace is attached relative to a diagonal member, a ledger and/or a standard directly or indirectly.

CLAIMS

1. A brace for a safety deck, the brace comprising a pair of spaced apart wing portions to receive a portion of a standard therebetween, each of the wing portions having at least one opening therein to receive a locking pin and an engagement portion oriented at a diagonal angle to the spaced apart wing portions, the engagement portion to engage a portion of a diagonal to position the portion of the diagonal relative to the portion of the standard.  
5
2. A brace for a safety deck as claimed in claim 1 wherein the wing portions are configured as wings, each having a free end connected to a transverse member or assembly at an end opposite the free end.  
10
3. A brace for a safety deck as claimed in claim 1 or claim 2 wherein each wing portion comprises an inner or facing surface which is planar and substantially parallel with the inner or facing surface of the other wing portion.
4. A brace for a safety deck as claimed in any one of the preceding claims wherein a receiving gap is defined between the wing portions into which a portion of the standard is at least partially received.  
15
5. A brace for a safety deck as claimed in any one of the preceding claims wherein each wing portion is provided with at least one attachment opening.
6. A brace for a safety deck as claimed in claim 5 wherein the at least one attachment opening extends perpendicularly to the plane of an inner surface of the wing portion.  
20
7. A brace for a safety deck as claimed in claim 5 or claim 6 wherein the at least one opening is keyhole shaped, having an at least partially circular main portion and a convergent entryway leading to a narrowed neck or pinch point between the convergent entryway and the main portion.  
25
8. A brace for a safety deck as claimed in claim 7 wherein the convergent portion of the at least one opening is oriented substantially vertically when the brace is in use.
9. A brace for a safety deck as claimed in any one of claims 5 to 8 wherein a periphery of the at least one opening is reinforced.  
30

10. A brace for a safety deck as claimed in any one of the preceding claims further comprising a transverse member mounting portion provided on at least one wing portion.
- 5 11. A brace for a safety deck as claimed in claim 10 wherein the transverse member mounting portion extends in a direction transversely away from the other wing portion.
12. A brace for a safety deck as claimed in claim 10 or claim 11 wherein the transverse member mounting portion is shaped to either receive a portion of a scaffold member or be received within a portion of a scaffold member.
- 10 13. A brace for a safety deck as claimed in any one of claims 10 to 12 wherein at least one transverse pin opening is provided into or through the transverse member mounting portion.
14. A brace for a safety deck as claimed in any one of the preceding claims wherein a transverse abutment surface is provided relative to the wing portions against which the standard abuts.
- 15 15. A brace for a safety deck as claimed in any one of the preceding claims wherein each of the wing portions extend to form side sections of the engagement portion.
16. A brace for a safety deck as claimed in any one of the preceding claims wherein the engagement portion includes an extension.
- 20 17. A brace for a safety deck as claimed in any one of the preceding claims wherein the extension has an external shape corresponding to an internal shape of a hollow portion of a scaffold member to be engaged by the extension.
18. A brace for a safety deck as claimed in claim 16 or 17 wherein the extension extends from a wall provided between the wing portions or extensions from the wing portions.
- 25 19. A brace for a safety deck as claimed in any one of claims 16 to 18 wherein one or more engagement formations is provided on the exterior of the extension to assist with the engagement between the extension and the safety deck member.
- 30 20. A brace for a safety deck as claimed in any one of the preceding claims wherein the engagement portion includes an opening into or through which a portion of a diagonal member is received.

21. A brace for a safety deck as claimed in any one of the preceding claims further comprising one or more further engagement portion to engage a safety deck member at an angle to both the standard and the diagonal.
22. A brace for a safety deck as claimed in any one of the preceding claims wherein at least one transverse pin opening is provided into or through any one or more engagement portion.
23. A brace for a safety deck as claimed in claim 22 wherein the or each at least one transverse pin opening includes an enlarged periphery to increase the strength of the periphery.
24. A safety deck assembly comprising at least two standards, at least one diagonal and at least one brace as claimed in any one of the preceding claims.
25. A safety deck assembly as claimed in claim 24 wherein the or each brace is attached relative to a diagonal member, a ledger and/or a standard using one or more locking pins.
26. A safety deck assembly as claimed in claim 24 or 25 wherein the or each brace is attached relative to a diagonal member, a ledger and/or a standard directly or indirectly.



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**Claims searched:** 1-26

**Date of search:** 7 January 2021

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-5, 14, 15, 20-26	CA 1234298 A (ALUMA SYSTEMS) - See Figure 2 noting a bracing 42 with wings 56 for receiving a standard 16 and an engagement portion 64 for engaging diagonal 70.
X	1, 2, 4, 14, 15, 17,	DE 102019201649 A1 (PERI) - See Figure 4d and 5 noting a bracing 54 with wings 30a and engagement 28a the wings receiving the standard and the engagement for attaching to a bar 34
X	1, 2, 4, 15, 24-26	DE9417425 U (ROSING) - See Figures 5 and 8 noting a brace 27 with a pair of wings 16 for receiving a standard 12 and angled section 20 for engaging with diagonal 13

**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

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Worldwide search of patent documents classified in the following areas of the IPC

E04B; E04G; F16B

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

**International Classification:**

Subclass	Subgroup	Valid From
E04G	0007/22	01/01/2006
E04B	0001/58	01/01/2006
F16B	0007/04	01/01/2006