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(54) **Improved trampoline**

(57) This invention concerns a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension. A plurality of support poles is arranged, in use, to extend upwardly from the frame and a surround of flexible material is arranged to be connected to the support poles to extend around and above the flexible bounce. An interface between the flexible bounce mat and surround may be inward of the resilient members. A cover comprising a sheet of material may extend from the surround over the resilient members to the frame. The trampoline may be without foam/padding material over at least some of the resilient members. Each support pole may be arranged to, whilst connected to the surround, pivot between an operating position for supporting the surround at an operating height above the flexible bounce mat and a lowered position such that the pivotal movement twists the surround about a centre of the flexible mat. The surround may comprise a skeleton for supporting the flexible material of the surround. The skeleton may comprise stiffening material embedded in the flexible material of the surround.

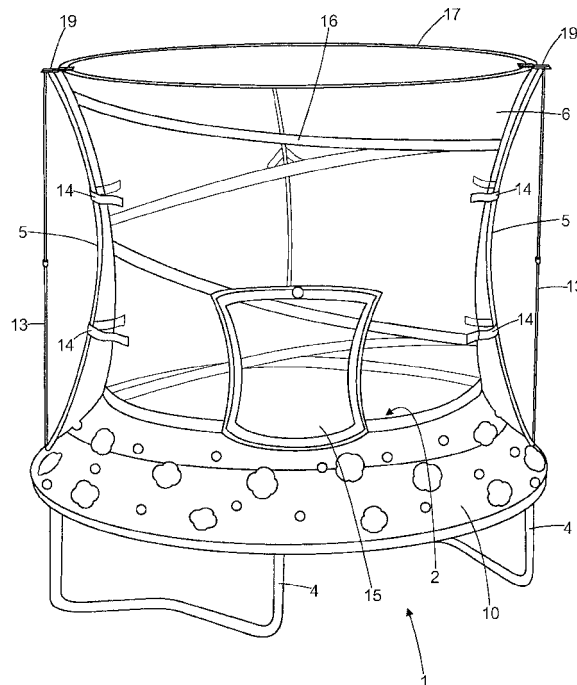


Fig. 1

Description

[0001] This invention concerns improvements in or relating to trampolines.

[0002] Conventionally, trampolines comprise a flexible bounce mat tensioned within a frame by helical springs. One of most significant safety hazards on a trampoline is a user falling on or becoming trapped in the springs. Accordingly, to prevent injury to users, a foam filled pad is provided over the springs to protect the user when the user falls on the springs (and/or the steel frame). It is known to provide a surround for preventing users falling from the trampoline and, in some arrangements, this surround is located inward of the springs. However, even when the surround is provided inward of the springs, a foam filled pad is still provided over the springs to protect people external to the trampoline injuring themselves on the springs (and/or the steel frame).

[0003] For a typical trampoline, the foam filled pads are one-third of the manufacturing cost of the trampoline.

[0004] It is desirable to provide surrounds for preventing users from falling from the trampoline as this can significantly reduce injuries. However, to erect such surrounds can take time and, once erected, users are often reluctant to disassemble the surround/trampoline because of the time involved in erecting/disassembling the surround. This reluctance exists despite the fact that the trampoline may take up room, for example in a private garden/backyard, and users may view permanent erection of the surround as aesthetically displeasing.

[0005] According to the invention there is provided a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension. The trampoline may comprise a plurality of support poles arranged, in use, to extend upwardly from the frame and a surround of flexible material arranged to be connected to the support poles to extend around and above the flexible bounce, an interface between the flexible bounce mat and surround being inward of the resilient members.

[0006] The trampoline may comprise a cover, the cover comprising a sheet of material that extends from the surround over the resilient members to the frame. The trampoline may be without padding material, such as foam, in particular closed cell foam such as EPE or EVA, over at least some of the resilient members. In one embodiment, no foam material is provided over resilient members beneath the cover.

[0007] It will be understood that "padding material" means soft and/or resilient material that absorbs/cushions impacts through compression of the material. The sheet material of the cover does not absorb impacts through compression, although it may absorb impacts through non-compressive deformation, for example, resilient stretching of the material.

[0008] The invention may be advantageous as the cover restricts access to the resilient members, for example

springs, and the surround, located inwardly of the resilient member, prevents a user bouncing on the bounce mat from falling on the resilient members. In this way, fewer, or possibly no, foam pads are required resulting in significant cost savings in manufacture of the trampoline.

[0009] The cover may be connected to the surround at a position spaced above the resilient members such that the cover is inclined to the resilient members, and wherein the surround extends above the connection between the cover and the surround. Further, the connection between the cover and the surround may be spaced above the resilient members and spaced below a top of the surround. This arrangement is particularly advantageous as the resilient members are shielded from a user without the need for foam or padding material. Also, the inclined cover has been found to be particularly capable at ensuring a user's fingers do not become trapped and instead are deflected away from the resilient members.

[0010] The trampoline may comprise a padding layer, such as foam and preferably closed cell foam, that encloses at least a proportion of the frame (but may not extend over the resilient members) so as to protect a user colliding with the frame. The proportion of the frame enclosed by the padding layer may be outwardly facing parts of the frame. Even though padding extending over the resilient members is no longer required, it is desirable to provide padding to protect users, for example children, who may run into/collide with the trampoline. The padding layer may have a cross-sectional shape corresponding to a cross-section of frame members of the frame. The padding layer may have one or more gaps through which the resilient members can connect to the frame. In this regard, the padding layer may cover a connecting portion of each resilient member that connects the resilient member to the frame but does not extend over a portion of the resilient member that extends between the frame and the bounce mat. In one embodiment, the frame members are circular in cross-section and the padding layer has an arc section. Use of closed cell foam is desirable as closed cell foam does not absorb water if it rains.

[0011] The cover may be integrally connected to the surround, for example by stitching. The surround may be integrally connected to the bounce mat, for example by stitching or lacing. As mentioned above, the cover may be arranged to extend over the resilient members around the frame to connect to the bottom of the bounce mat. In this way, the surround and the cover form an enclosure housing the resilient members.

[0012] The sheet material of the cover may extend only over the top of the resilient members or may extend both above and below the resilient members. The latter arrangement restricts access to the resilient members even from below, enhancing safety. The cover may connect to an underside of the flexible bounce mat by suitable cooperating connectors. Alternatively, the cover may connect to the frame of the trampoline. In either arrangement, it is desirable for the sheet material of the cover to

be held under tension when connected such that it is difficult, if not impossible, for a user to deform the sheet material sufficiently to touch the resilient members.

[0013] A lower portion of the surround extending between a location where the cover attaches to the surround and the mat is arranged to allow for movement of the mat relative to the surround. In this way, movement of the mat is not restricted by connection to the surround.

[0014] In one embodiment, the lower portion of the surround has sufficient length to allow for deflection of the mat. For example, the lower portion of the surround may comprise pleated material forming a bellows like arrangement that expands and collapses with movement of the mat.

[0015] In an alternative embodiment, the lower portion of the surround comprises elastic material that stretches and contracts with movement of the mat.

[0016] Each support pole may be arranged to, whilst connected to the surround, pivot between an operating position for supporting the surround at an operating height above the flexible bounce mat and a lowered position such that the pivotal movement twists the surround about a centre of the flexible mat. The support poles may be pivotally connected to the frame. The support poles may be lockable in an operating position for supporting the surround at an operating height above the flexible bounce mat and unlocked for lowering the surround. In this way, the surround can be quickly lowered without having to disassemble the support poles from the surround. Preferably, the support poles are arranged such that the support poles can be pivoted to a collapsed position in which each support pole lies on the resilient members and/or bounce mat. It may also be possible to lock the support poles in the collapsed/lowered position.

[0017] In an alternative arrangement, the surround may be releasably attachable to the support poles. For example, the trampoline may comprise quick-release connectors for connecting the support poles to the surround. In one embodiment, the surround comprises a top rail on which the flexible material of the surround hangs, the top rail connectable to the support poles by the quick release connectors. Each quick release connector may be operable to release the top rail from the support poles by a button, switch, lever of the like that can be operated through a single action of a user (ie pressing, pulling, pinching or the like) as opposed to a connector that releases the top rail from the support pole through multiple actions, such a multiple twists required in the unscrewing of a screw or a nut. An advantage is such an arrangement, is that the user can detach the surround from the support poles quickly (eg for an average adult, within less than 5 and preferably within a couple of minutes) and without the use of tools. In this way, a user may be more willing to disassemble the trampoline, after use.

[0018] The quick-release connector may comprise a hood that is positioned over the top rail and secured to the support pole by a catch. In one embodiment, the catch comprising an aperture in the support pole and/or hood

and a projection arranged such that, when the hood is in place over the top rail, the projection is biased to extend through the aperture to secure the hood in place and form a button that can be pressed by the user for releasing the hood from the support pole.

[0019] In one embodiment, the projection is part of the hood and the hood is arranged to be inserted on to the support pole such that the projection projects through the aperture in the support pole, securing the hood to the support pole.

[0020] In another embodiment, the projection is part of the support pole and projects through an aperture in the hood when the hood is inserted onto the support pole, securing the hood to the support pole.

[0021] In a further embodiment, the catch comprises a spring having the projection thereon located within the support pole such that the projection projects through apertures in the support pole and the hood when the hood is inserted on to the support pole, to secure the hood to the support pole.

[0022] The support poles may be releasably attachable to the frame. The trampoline may comprise connectors for connecting the support poles to the frame at two or more angles of inclination. In this way, common connectors can be used with support poles that extend at different angles of inclination, for example as may be present on different trampoline designs. Using common components across a range of trampolines may result in cost savings in manufacture and the provision of replacement parts.

[0023] The support pole may be releasably attached to the frame such that the support pole can be detached from the frame without the use of tools. In this way, disassembly of the surround is simplified relative to connectors which require screwdrivers, Allen keys, or the like to unfasten the support pole from a connector. The support pole may be secured in place onto the frame by a hand operated fastening mechanism, such as a screw thread or a quick release mechanism. In an alternative arrangement, the support poles may be a push-fit onto a connector, the support pole held freely by the connector without being fastened in place by a fastening mechanism. For example, the support pole may be connected to the frame by sliding the pole over an upstanding dowel of the connector, preferably, without being fixed to the dowel.

[0024] In one embodiment, the trampoline comprises connectors for connecting the support poles to the frame, the connectors being a snap-fit onto the frame. For example, each connector may comprise a hook shaped portion for securing onto a corresponding circular section of the frame. In this way, the connectors can be quickly assembled onto the frame. Alternatively, the connectors may be formed as an integral part of the frame, for example an integral part of legs of the frame.

[0025] The surround may comprise an internal skeleton for supporting the flexible material of the surround. The skeleton may comprise stiffening wires, poles or the

like embedded in the flexible material for supporting the flexible material internally. The skeleton may be arranged such that the surround can be lowered from an operating height without removing the skeleton. In this way, the skeleton may be integral with the flexible material.

[0026] The skeleton may comprise a spiral, for example a helix, of stiffening material extending from the bottom to the top of the surround, in use. The skeleton may comprise two spirals, for example a double helix, of stiffening material. A skeleton of resilient, stiffening material in the shape of one or more spirals allows the surround to be lowered from an operating height without removing the skeleton from the flexible material as the turns of the one or more spirals can be pushed together. The resilience of the skeleton will also provide a biasing force that pushes the surround upwards. Accordingly, the trampoline may comprise means for securing the surround in a lowered, collapsed position. For example, the securing means may secure the surround in the lowered, collapsed position against the biasing of the skeleton.

[0027] According to a second aspect of the invention there is provided a kit of parts arranged to be assembled to form a trampoline according to the first aspect of the invention.

[0028] According to a third aspect of the invention there is provided a kit to be assembled into a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held in tension, a surround preassembled in a collapsed position with the frame, the surround adjustable from the collapsed position to an operating position in which the surround extends around and above the flexible bounce mat, and legs for supporting the frame above the ground.

[0029] According to a fourth aspect of the invention there is provided a method of supplying a trampoline comprising supplying to the customer: a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held in tension, a surround preassembled in a collapsed position with the frame, the surround adjustable from the collapsed position to an operating position in which the surround extends around and above the flexible bounce mat, and legs for supporting the frame above the ground.

[0030] An advantage of the third and fourth embodiments of the invention is that the customer does not need to connect the surround to the frame, as the trampoline is supplied in this condition, but simply needs to adjust the trampoline to the operating position for use. Furthermore, this may be achieved without increasing the space required in a delivery truck or the like, as in the collapsed position the trampoline is compact and substantially flat.

[0031] According to a further aspect of the invention, a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension, a plurality of support poles connected to the frame and a surround of flexible material connected to the sup-

port poles to extend around and above the flexible bounce mat, wherein each support pole is arranged to, whilst connected to the surround, pivot between an operating position for supporting the surround at an operating height above the flexible bounce mat and a lowered position such that the pivotal movement twists the surround about a centre of the flexible bounce mat.

[0032] The trampoline may comprise locking means for locking the support poles in the operating position. Preferably the support poles are arranged to pivot to a collapsed position in which each support poles lies on the resilient members and/or bounce mat. Preferably the trampoline comprises securing means for securing the support poles in the lowered position. Preferably the support poles are pivotally connected to the frame to pivot on an axis substantially in a plane of the bounce mat. Preferably the surround comprises a stiffening pole that extends circumferentially around the top of the surround and each support pole is pivotally connected to the stiffening pole such that the support poles can be lowered whilst still connected to the surround. Preferably the surround comprising an internal skeleton for supporting the flexible material of the surround.

[0033] According to a further aspect of the invention, a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension and a surround comprising flexible material and an internal skeleton, the flexible material arranged to extend around and above the flexible bounce mat and the internal skeleton arranged to support the flexible material of the surround.

[0034] Optionally the trampoline comprises a plurality of support poles and the surround is arranged to be connected to and supported by the support poles. Optionally the internal skeleton is arranged such that the surround can be lowered from an operating height whilst connected to the trampoline without removing the internal skeleton from the flexible material. Optionally the internal skeleton comprises stiffening material that extends circumferentially around the surround.

[0035] According to a further aspect of the invention, a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension and a surround comprising flexible material and a skeleton that extends circumferentially around the surround, the flexible material arranged to extend around and above the flexible bounce mat and the skeleton arranged to support the flexible material of the surround.

[0036] Optionally the skeleton comprises a spiral of stiffening material extending from the bottom to the top of the surround, in use. Optionally the skeleton comprises two spirals of stiffening material. Optionally the skeleton comprises resilient, stiffening material. Optionally the trampoline comprises means for securing the surround in a lowered, collapsed position. Optionally the securing means secures the surround in the lowered, collapsed

position against biasing of the skeleton.

[0037] According to a further aspect of the invention, a kit to be assembled into a trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held in tension, a surround preassembled in a collapsed position with the frame, the surround adjustable from the collapsed position to an operating position in which the surround extends around and above the flexible bounce mat, and legs for supporting the frame above the ground.

[0038] According to a further aspect of the invention, a method of supplying a trampoline comprising supplying to the customer: a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held in tension, a surround preassembled in a collapsed position with the frame, the surround adjustable from the collapsed position to an operating position in which the surround extends around and above the flexible bounce mat, and legs for supporting the frame above the ground.

[0039] Embodiments of the invention will now be described, by example only, with reference to the accompanying drawings, in which:-

Figure 1 is a front view of a trampoline according to an embodiment of the invention;

Figure 2 is a front view of a trampoline according to another embodiment of the invention;

Figure 3 is a perspective view of a portion of a cover arrangement of the trampolines shown in Figures 1 and 2;

Figure 4 is another perspective view of a portion of a cover arrangement of the trampolines shown in Figures 1 and 2;

Figure 5 is a schematic side view of a trampoline according to another embodiment of the invention in an operating condition;

Figure 6 is a schematic side view of the trampoline shown in

Figure 5 in a collapsed condition;

Figure 7 is a schematic view of the trampoline shown in Figures 5 and 6 with various parts of the trampoline shown in more detail;

Figure 8 is a perspective view of a trampoline according to yet another embodiment of the invention;

Figure 9 is a perspective view of a trampoline according to another embodiment of the invention;

Figure 10 is a perspective view of a trampoline ac-

cording to another embodiment of the invention;

Figure 11 is a perspective view of a lower portion of the surround in accordance with one embodiment of the invention;

Figure 12 is a perspective view showing one embodiment for attaching the support poles and surround to the frame;

Figure 13 is an exploded perspective view of the components shown in Figure 12;

Figure 14 is a perspective view of a bracket for connecting a support pole to a frame of a trampoline in accordance with one embodiment of the invention;

Figure 15 is a cross-sectional view of the bracket shown in Figure 14 with the frame shown in dotted lines;

Figure 16 is a perspective view of a quick-release connector for connecting the surround to the support poles in accordance with another embodiment of the invention in a disassembled condition;

Figure 17 is a perspective view of the connector shown in Figure 15 in an assembled condition;

Figure 18 is a perspective view of a connector for connecting the support pole to the frame according to one embodiment of the invention;

Figure 19 is an exploded perspective view of the connector shown in Figure 18;

Figure 20 is a cross-sectional view of a portion of the connector shown in Figures 18 and 19;

Figure 21 is a cross-sectional view of the connector shown in Figures 18 to 20 with the support pole attached;

Figure 22 is a perspective view of a leg of a trampoline having an integral connector for connecting the support pole to the frame according to one embodiment of the invention;

Figure 23 is a perspective view of the leg and connector shown in Figure 22 with the support pole attached; and

Figure 23 is a perspective view of the leg and connector shown in Figures 22 and 23 with the outer plastic moulding removed.

[0040] Referring to Figures 1, 3 and 4, there is shown a trampoline 1 comprising a flexible bounce mat 2 con-

nected to a frame 3 (only the legs 4 of which are shown in Figure 1) by resilient members, in this embodiment coil springs 7 (shown in Figures 3 and 4), such that the flexible bounce mat 2 is held above the ground in tension. In this embodiment, the coil springs 7 are connected to the bounce mat 2 by integral fasteners, in this embodiment triangular shaped fasteners 8, having eyeholes through which ties (not shown) of the bounce mat 2 are passed to secure the bounce mat 2 to the coil springs 7. The coil springs 7 are secured to the frame 2 in an appropriate manner, for example by rivets.

[0041] The trampoline comprises a plurality of support poles, in this embodiment three support poles 5 extending upwardly from the frame and a surround 6 of flexible material, such as netting, connected to the support poles 5 to extend around and above the flexible bounce mat 2. In this embodiment, at the top of the surround 6 there is provided a stiffening pole 17 that extends circumferentially around the top of the surround 6 and to which each support pole 5 is connected by clamps 19. As shown in Figures 3 and 4, the surround 6 extends to form an interface 9 between the flexible bounce mat 2 and surround 6 inward of the coil springs 7. In this embodiment, the surround 6 is integrally connected to the bounce mat 2 at this interface 9, for example by stitching.

[0042] The trampoline further comprises a cover comprising a sheet of material 10 that extends from the surround 6 over the coil springs 7 to the frame 2. In this embodiment, the sheet material 10 of the cover extends around the frame 2 and underneath the coil springs 7 to be attached to the bounce mat 2 by releasable fasteners (not shown). The sheet material 10 of the cover is connected to a location on the surround such that, in use, the sheet material 10 extends in a plane above the springs 7 that is at an angle (ie not parallel) to the horizontal (and therefore, also at an angle to the substantially horizontal bounce mat 2). In this way, users may be less inclined to stand or sit on the cover. Furthermore, the sheet material 10 of the cover is held under tension when connected such that it is difficult, if not impossible, for a user to deform the sheet material 10 to touch the coil springs 7.

[0043] In other embodiments (not shown), the sheet material 10 may extend only as far as the frame 2 to obscure the coil springs 7 from above and not below, even though fastening portions of the cover (for example elongate ties) may extend beneath the coil springs 7 to connect the cover to the bounce mat 7. In another embodiment (not shown), the sheet material 10 may be releasably connected to the frame 2.

[0044] With the surround 6 preventing users bouncing on the bounce mat 2 from falling on the coil springs 7 and the sheet material 10 of the cover restricting external access to springs 7, it has been realised that it is no longer necessary to provide foam padding over the coil springs 7. Accordingly, in this embodiment no foam padding is provided over coil springs 7. This is acceptable in this embodiment because all of the coil springs 7 are ob-

scured by the cover 10.

[0045] However, in other embodiments, some of the coil springs 7 may not be obscured by the cover. For example it may be desirable to have, in use, a horizontal section in front of the door 15. In such an arrangement, cover 7 may extend over all the springs 7 with the exception of those in front of the door 15. The springs 7 in front of door 15 may be covered by padding material, such as foam, in a conventional manner to form a flat surface in front of the door 15.

[0046] It will be understood that "padding material" means soft and/or resilient material that absorbs/cushions impacts through compression of the material. The sheet material 10 of the cover does not absorb impacts through compression, although it can absorb impacts through non-compressive deformation, for example, resilient stretching of the material 10. As the sheet material 10 is deformable, it is desirable that the sheet material 10 is spaced from the coil springs 7.

[0047] The trampoline 1 further comprises a padding layer 11 (shown in Figures 3 and 4), in this embodiment closed cell foam, that encloses a proportion of the frame 3 so as to protect a user colliding with the frame. The proportion of the frame 3 enclosed by the padding layer includes the outwardly facing parts of the frame 3. The padding layer 11 has a cross-sectional shape corresponding to a cross-section of frame members of the frame 3. The padding layer 11 has a gap 12 through which the coil springs 7 can connect to the frame 3.

[0048] In the embodiment shown in Figure 1, the support poles 5 are bowed inward such that when connected to the surround 6, the surround 6 forms a cylinder pinched at its midpoint. In this embodiment, tensioning bars 13 extend from the top of the surround to the frame 3 to tension the support poles 5 into the bowed shape. The surround 6 is connected to each support pole 5 at a plurality of locations by ties 14.

[0049] The surround 6 further comprises an internal skeleton 16 for supporting the netting of the surround 6. The skeleton 16 comprises one or more resilient, stiffening members embedded in the netting for supporting the netting internally. In this embodiment, the stiffening member is a fibre glass pole. However, it will be understood that other resilient, stiffening material could be used, for example spring steel. In this embodiment, the skeleton 16 comprises a helix of stiffening material extending from the bottom to the top of the surround 6 when the surround is in an operative position. The helix of stiffening material supports the netting around its circumference and may allow fewer support poles 5 to be used than is conventional. For example, in this embodiment only three support poles 5 are provided.

[0050] The internal skeleton 16 is arranged such that the surround 6 can be lowered from its operating height without removing the skeleton 16 from the netting.

[0051] The cover 10 and surround 6 restricts access to the coil springs 7, such that users cannot injure themselves by contact with the coil springs 7, allowing the

trampoline to be without foam pads under the cover 10. The elimination of foam pads can significantly reduce the costs of the trampoline. Furthermore, safety may be enhanced relative to the use of foam pads as a user may be able to insert fingers or the like underneath a foam pad extending over the coil springs 7, whereas it is more difficult for the user to do this with cover 10.

[0052] Another embodiment of the invention is shown in Figure 2. This embodiment comprises similar features to the previously described embodiment and like references but in the series 100 have been used for features of the second embodiment that are similar to or the same as corresponding features of the previous embodiment.

[0053] This embodiment differs in that the support poles comprise two circular arms, first circular arm 105a and 105d and second circular arm 105b and 105c, connected together at their intersection by X-connectors 118. The circular arms clip to the frame (not shown) and surround 102 to support the surround in the operating position. The X-connectors 118 may be arranged to allow relative pivoting movement between the circular arms such that the surround 102 can be lowered to a collapsed position whilst still attached to the support arms.

[0054] In one embodiment, each support arm is made up of two separate semi-circular poles 105a and 105d or 105b and 105c. However, in another embodiment, each support arm is a single, unitary pole.

[0055] A further embodiment of the invention is shown in Figures 5 to 7. This embodiment comprises similar features to the previously described embodiments and like references but in the series 200 have been used for features of this embodiment that are similar to or the same as corresponding parts of the previous embodiments. Many of the features of this embodiment are illustrated schematically to aid understanding and clarity.

[0056] This embodiment is a trampoline 200 comprising a flexible bounce mat 202 connected to a frame 203 by one or more resilient members, for example coil springs 207 (illustrated as a flat shaded area around the bounce mat 202), such that the flexible bounce mat 202 is held above the ground in tension. A plurality of support poles 205 are connected to the frame 203 and a surround 206 of flexible material is connected to the support poles 205 to extend around and above the flexible bounce mat 202. In this embodiment, the support poles 205 are permanently connected to the surround 202 by a surround brace 219 (described in more detail below). "Permanently connected" means that the connection is intended to remain during erection and collapsing of the trampoline. It may well be possible to disassemble/destroy the surround brace 219 and thereby disconnect the surround 206 from the support poles 205 but this is not necessary to fold up/collapse the surround 205.

[0057] Like the previous embodiments, the surround comprises netting supported by an internal skeleton 216. As with the previous embodiments the internal skeleton 214 comprises a spiral of stiffening material extending from the bottom to the top of the surround 106, in use.

However, in this embodiment, the stiffening material is extended to form support circles 216a and 216b around the top and bottom of the cylindrical netting.

[0058] Each support pole 205 is arranged to, whilst connected to the surround 206, pivot between an operating position for supporting the surround 205 at an operating height above the flexible bounce mat 202, as shown in Figure 5, and a lowered position, such as a collapsed position, as shown in Figure 6. Such pivotal movement twists (in this embodiment contorts (in what one may describe as a wringing motion)) the surround 206 about a central axis of the bounce mat 202. Due to resilience of the stiffening material of the skeleton 216, twisting of the surround 206 will be against a biasing of the skeleton 216 pushing the surround 206 upwards. In this respect, the trampoline may have securing means (not shown) to secure the surround 206 in the lowered, collapsed position against the biasing of the skeleton 216. A resilient skeleton 216 may also be advantageous when the surround 206 is in the operating position shown in Figure 5 as when a user falls against the netting this may result in twisting of the surround 206 against the biasing of the skeleton 216 and therefore, a resultant force pushing the user back in to the centre of the trampoline 200.

[0059] When in the upright position the support poles 205 curve towards a centre of the trampoline 200. In this embodiment, the curvature of the support poles 205 is equal to or greater than a curvature of the trampoline 200. In this way, when the support poles 205 are moved to the position shown in Figure 6, the support poles 205 stay within the confines (ie within the outer edges of the frame 203) of the trampoline 200.

[0060] As shown in Figure 7, each surround brace 219 comprises a hook 221 that clips over the top of the surround 206 and the support pole 205 is pivotally connected to the brace 219. In this embodiment, the brace 219 comprises a circular abutment 222, comprising a channel with stops at either end, for restricting pivotal movement of the support pole 205 relative to the brace 219.

[0061] Each support pole 205 is pivotally connected to the frame 203 at point 223 such that the pole 205 can pivot laterally relative to a line (in this embodiment a radial line) to the centre of the trampoline 200. In this embodiment, each axis of rotation is parallel with a radius of the trampoline 200.

[0062] Each leg 204 cooperates with a corresponding support pole 205 such that when the support pole 205 is upright the support pole 205 is locked in position. The support pole 205 is released from this position by pressing button 220. On release, the support pole can be pivoted to twist the surround 206 into the collapsed position (as indicated by the arrows in Figure 6). In the collapsed position each support pole 205 lies against a cover or padding material covering coil springs 207 and/or the bounce mat 202.

[0063] It will be understood that the term "support pole" as used herein is not limited to round, solid or hollow

poles but is intended to include poles of various cross-sectional shapes, hollow and solid.

[0064] In use, the trampoline can be delivered with the surround 206 preassembled on the frame 203 but in the collapsed position and, to erect the trampoline, the user simply connects the legs 204, if required, and then moves the support poles 205 to an upright position. Furthermore, for storage, the user can simply collapses the support poles 205 back down. In this way, erection and collapsing of the trampoline can be carried out quickly and easily without the need to detach the support poles 205 from the frame 203 and the surround 206.

[0065] A further embodiment of a trampoline in accordance with the invention is shown in Figure 8. This trampoline differs from the previous trampolines in that the surround is supported alone by a skeleton 316 without the use of support poles. In this embodiment, to provide extra rigidity, the skeleton comprises a double helix of stiffening material.

[0066] Yet another trampoline in accordance with an embodiment of the invention is shown in Figure 9. This trampoline differs from the previous trampolines in that mesh surround 406 is supported by rigid, outwardly curved support poles 405, in this embodiment poles made of steel, that are fixed in place. As before the surround 406 is supported by a flexible upper rail 417, however in this embodiment the upper rail 417 is connected to the support poles 405 by quick-release connectors (described in more detail below with reference to Figures 11, 12, 15 and 16).

[0067] The support poles 405 are enclosed within padding, in this embodiment foam padding covered by a polyester sleeve. The padding reduces the chance of injury when a user impacts with the support poles 405.

[0068] The surround 406 has an upper sleeve for receiving the upper rail 417 and a cover 410 is integrally attached to the surround 406 to extend over and enclose the springs (not shown). The upper sleeve and cover 410 may be made of polyester material or the like. Referring to Figure 11, a lower portion 440 of the surround 406 extending between a location where the cover 410 attaches to the surround 406 and the mat 402 is arranged to allow for movement of the mat 402 relative to the surround 406 whilst restricting access to the springs 407. In this embodiment, the lower portion 440 of the surround 406 comprises pleated material forming a bellows like arrangement that expands and collapses with movement of the mat 402.

[0069] The door 415 is surrounded by a door awning 430 comprising substantially triangular shaped side walls 431 either side of the door 415. The springs (not shown) located between the side walls 431 of the door awning 430 may be covered by padding 432 rather than a non-padded cover 410.

[0070] A pocket 433, in this embodiment made of mesh, integral with the cover 410 provides a location for users to store their shoes when using the trampoline.

[0071] The trampoline also comprises legs 404 that

are in accordance with the legs described in International patent application no:WO2009/098324.

[0072] Figure 10 shows an alternative embodiment that uses quick release connectors comprising straight support poles 505. This embodiment also differs in that part of the surround is not mesh but a solid opaque panel 549 that defines windows 550 and 551 and door 515. These windows may add to the entertainment provided by the trampolines as a user can play peek-a-boo with a person external to the surround. Less than half of the surround 505 is formed from the opaque panel 549 as this provides adequate visibility of the user of the trampoline, for example allowing an adult to view a child using the trampoline. If too great a proportion of the surround is formed by the opaque panel, a supervising adult may not be able to adequately view the user for safety purposes.

[0073] Referring to Figures 12 and 13, there is shown one way of connecting the support poles 605 to the frame 603 of the trampoline and an embodiment of the quick-release bracket that may be used in the trampolines shown in Figures 9 and 10. The jagged line in Figures 12 and 13 indicate that a substantial portion of the support pole 605 is not shown. This is merely for convenience and in most practical circumstances the support pole 605 will have a much greater length than shown in Figures 12 and 13.

[0074] In this embodiment, a bottom connector 660 is provided for securing each support pole 605 to the frame 603. The bottom connector 660 comprises a first portion 661 and a second portion 662 that are secured either side of the frame 603 and support pole 605 to secure the support pole 605 in place. The two portions 661, 662 of the connector 660 are secured together using nuts and bolts 665, 666. However, it will be understood that other suitable fasteners could be used. A lower, square sectioned portion of each support pole 605 has a pair of holes therein for receiving bolts of the connector 660. In this embodiment, the two portions of the connector 660 define T-shaped recesses to enclose an upper portion of the leg 604 as well as a portion of the frame 603 and the support pole 605. The upper rail 617, and therefore the surround, is releasably connected to each support pole 605 by a quick release connector 670. Each quick release connector 670 is operable to release the top rail 617 from the support pole 617 by a button 671 operated through a single action of a user, in this embodiment, by pressing the button 671.

[0075] The quick-release connector 670 comprises a hood 672 that, in use, is positioned over the top rail 617 and secured to the support pole 617 by a catch (described below). In this embodiment, the hood 672 is a cylindrical structure having a cut-out section 674 for receiving the top rail 617. When the hood 672 is inserted onto the support pole 605 with the top rail 617 received in the cut-out section 674, a top section 675 of the hood 674 traps the top rail 617 against the support pole 605. In this embodiment, the top of the support pole 605 has a pair of semi-

circular cut-outs 676a, 676b therein for receiving a portion of the top rail 617.

[0076] The catch comprises an aperture 678 in the support pole 605 and an aperture 679 in the hood 672 that align when the hood 672 is inserted onto the support pole 605. A U-shaped spring 680 is provided in the support pole 605 and has a projection 681 thereon such that the projection 681 is biased to project through the aperture 678 in the support pole 605 and the aperture 679 in the hood 672 to secure the hood 672 in place.

[0077] An alternative bottom connector 760 for connecting a support pole to the frame is shown in Figures 14 and 15. In this embodiment, the connector is a single piece comprising a hook shaped portion 761 for securing onto a corresponding circular section of the frame 703 and a U-shaped portion 762 for attaching to a square-section lower portion of a support pole. The U-shaped portion has apertures therein for receiving bolts for securing the support pole in place.

[0078] The hook shaped portion 761 is arranged to be a snap-fit onto the frame 703 such that the U-shaped portion hangs below the frame 703. Securing of the support pole to the U-shaped portion 762 prevents the connector 760 detaching from the frame 703.

[0079] As an alternative to bolts for securing the support pole to the connector, a suitable quick release mechanism may be used.

[0080] The connector 760 may allow the support pole to be connected at different angles of inclination as is can rotate around the frame. In this way, the connector 760 can be used with different shaped support poles that may extend away from the frame at different angles of inclination.

[0081] An alternative quick-release connector 870 is shown in Figures 16 and 17. In this embodiment, the hood 872 comprises a U-shaped recess 874 for receiving the top rail 817. Integral with the hood 872 is resilient portion, in this embodiment a resilient finger 860, having a projection 881 thereon. In use, the top rail 817 is secured to the support poles 805 by placing the hood 872 over the top rail 817 and inserting the hood into the support pole 805 until the projection aligns with aperture 878. Insertion of the hood 872 causes the projection 881 and finger 860 to be deflected against the biasing of the resilient finger 860 and therefore, when the projection aligns with the aperture 878, the projection is forced to project from the aperture 878, securing the hood 872 in place. In a similar manner to the embodiment described with reference to Figures 12 and 13, the projection 881 forms a button that can be pressed to release the hood 872 from the support pole 805.

[0082] An alternative embodiment for connecting a hollow support pole 905 to the frame will now be described with reference to Figures 18 to 21.

[0083] In this embodiment, a recess 990 is formed in the frame 903 or a leg of the frame 904. A liner 991 is located in the recess 990, the liner 991 having an upper flange 993 that locates against the top of the frame

903/904 and a screw thread therein for receiving a bolt 992. The connector further comprises a dowel 995 that is located within a recess formed by the liner and fixed thereto by bolt 992. The dowel 995 will typically have a short length relative to the support pole 905, for example 10 to 30 cm. The hollow support pole 905 is then placed over the dowel 995 to connect the support pole 905 to the frame. In this way, the support pole 905 can be detached from the frame without the use of tools, allowing the surround to be disassembled quickly.

[0084] A further embodiment for connecting a support pole 1005 of a trampoline to a leg 1004 of a trampoline is shown in Figures 22 to 24. In this embodiment, the leg comprises a central steel core 1004a surrounded by a plastic outer casing 1004b. Integrally connected to the leg 1004 is a connector 1060 for receiving the support pole 1005 of the surround. The connector 1060 comprises a tube in which a lower end of the support pole 1005 is inserted. The support pole 1005 may be secured in place by a fastener (not shown), which may be a quick-release fastener.

[0085] It will be understood that in each embodiment described above, like reference numerals but in a different hundred series have been used for the same or similar parts.

[0086] It will be understood that modifications and alterations can be made to the above described embodiment without departing from the scope of the invention as defined herein. For example, the stiffening material may be provided as a series of concentric rings rather than one or more spirals. The skeleton that extends circumferentially around the surround, for example as a helix, may be external rather than internal to the netting of the surround.

Claims

1. A trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension, a plurality of support poles arranged, in use, to extend upwardly from the frame, a surround of flexible material arranged to be connected to the support poles to extend around and above the flexible bounce mat, an interface between the flexible bounce mat and surround being inward of the resilient members and a cover comprising a sheet of material arranged to extend from the surround over the resilient members to the frame, wherein the trampoline is without foam material over at least some of the resilient members.
2. A trampoline according to claim 1, wherein the cover is connected to the surround at a position spaced above the resilient members such that the cover is inclined to the resilient members, and wherein the surround extends above the connection between the

cover and the surround.

3. A trampoline according to claim 1 or claim 2, wherein the trampoline is without padding material over at least some of the resilient members. 5
4. A trampoline according to any one of claims 1 to 3, wherein no foam material or padding material is provided over the resilient members beneath the cover. 10
5. A trampoline according to any one of the preceding claims, wherein the trampoline comprises a padding layer that encloses at least a proportion of the frame and optionally the proportion of the frame enclosed by the padding layer includes outwardly facing parts of the frame. 15
6. A trampoline according to claim 5, wherein the padding layer has one or more gaps through which the resilient members can connect to the frame. 20
7. A trampoline according to any one of the preceding claims, wherein the cover is integrally connected to the surround and the surround is integrally connected to the bounce mat such that the surround and the cover form an enclosure housing the resilient members. 25
8. A trampoline according to claim 7, wherein a lower portion of the surround extending between a location where the cover attaches to the surround and the mat is arranged to allow for movement of the mat relative to the surround. 30
9. A trampoline according to claim 8, wherein the lower portion of the surround has sufficient length to allow for deflection of the mat. 35
10. A trampoline according to claim 9, wherein the lower portion of the surround comprises pleated material forming a bellows like arrangement that expands and collapses with movement of the mat. 40
11. A trampoline according to claim 8, wherein the lower portion of the surround comprises elastic material that stretches and contracts with movement of the mat. 45
12. A trampoline according to any one of the preceding claims, wherein the sheet material of the cover is arranged to be connected under tension over and spaced from the resilient members such that a user cannot deform the sheet material sufficiently to touch the resilient members underneath. 50
13. A trampoline according to any one of the preceding claims, wherein each support pole is arranged to, whilst connected to the surround, pivot between an 55

operating position for supporting the surround at an operating height above the flexible bounce mat and a lowered position such that the pivotal movement twists the surround about a centre of the flexible bounce mat.

14. A kit of parts arranged to be assembled to form a trampoline according to any one of the preceding claims.
15. A trampoline comprising a flexible bounce mat connected to a frame by one or more resilient members such that the flexible bounce mat is held above the ground in tension, a plurality of support poles arranged, in use, to extend upwardly from the frame, a surround of flexible material arranged to be connected to the support poles by quick-release connectors to extend around and above the flexible bounce mat.

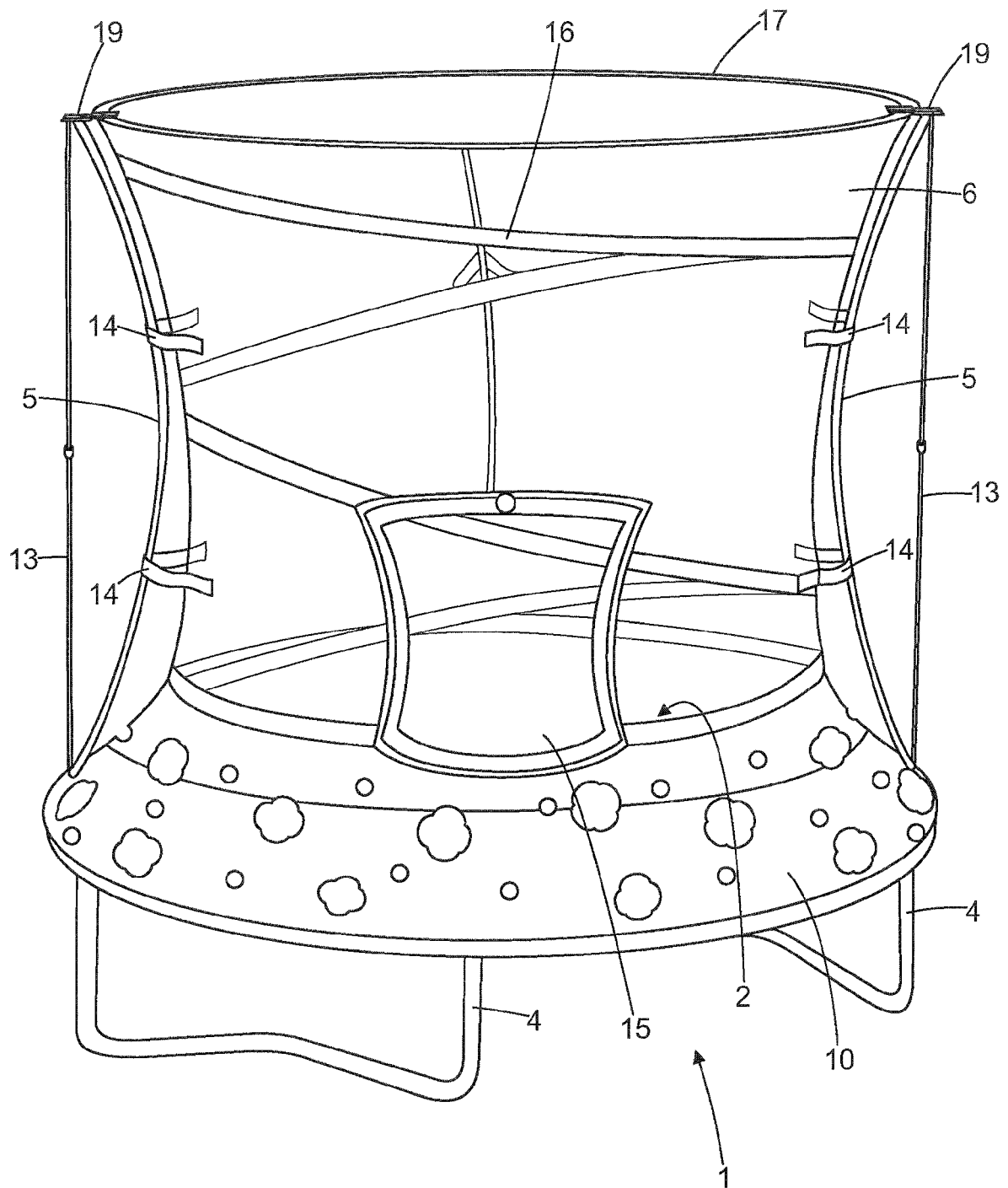


Fig. 1

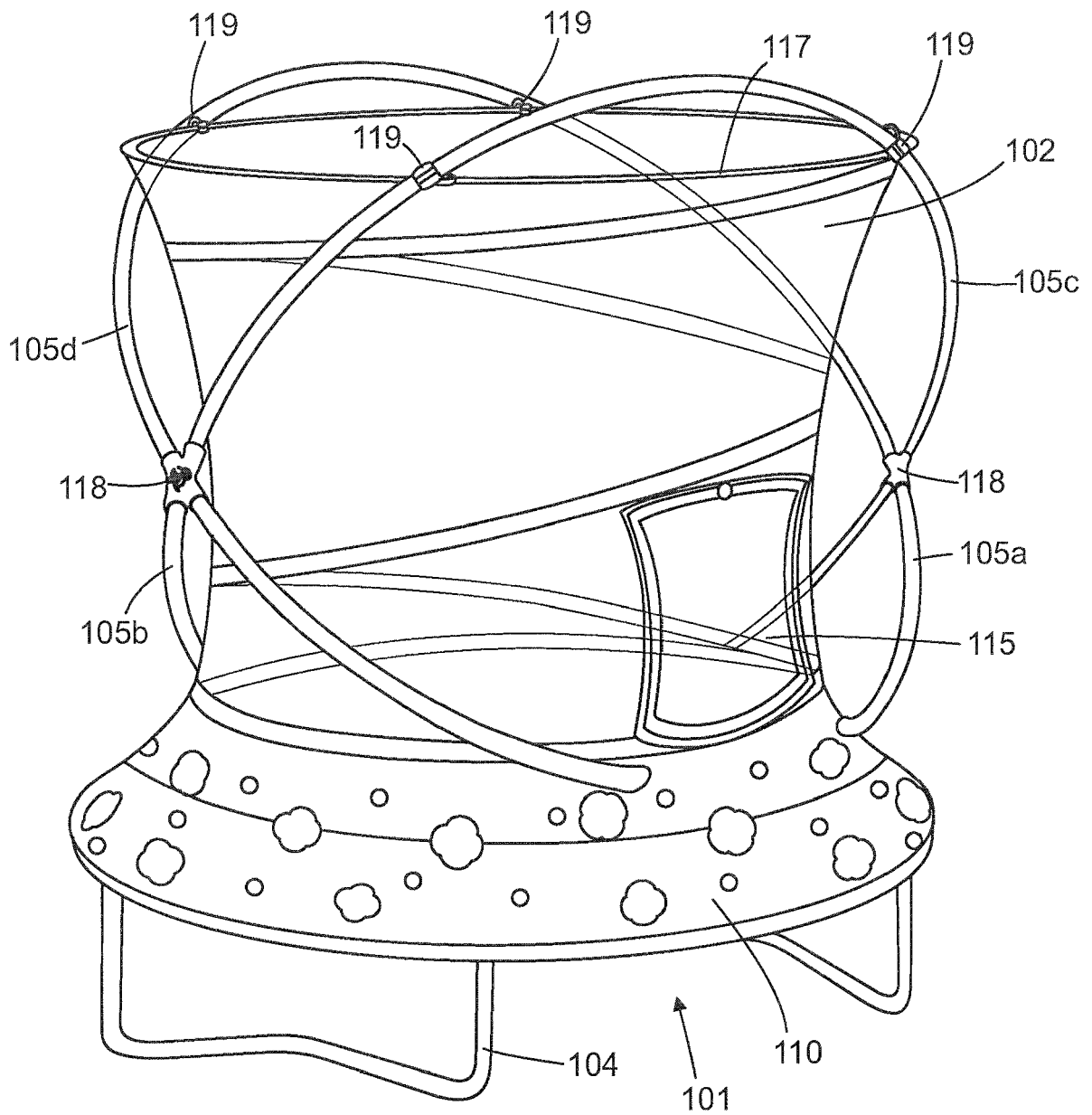
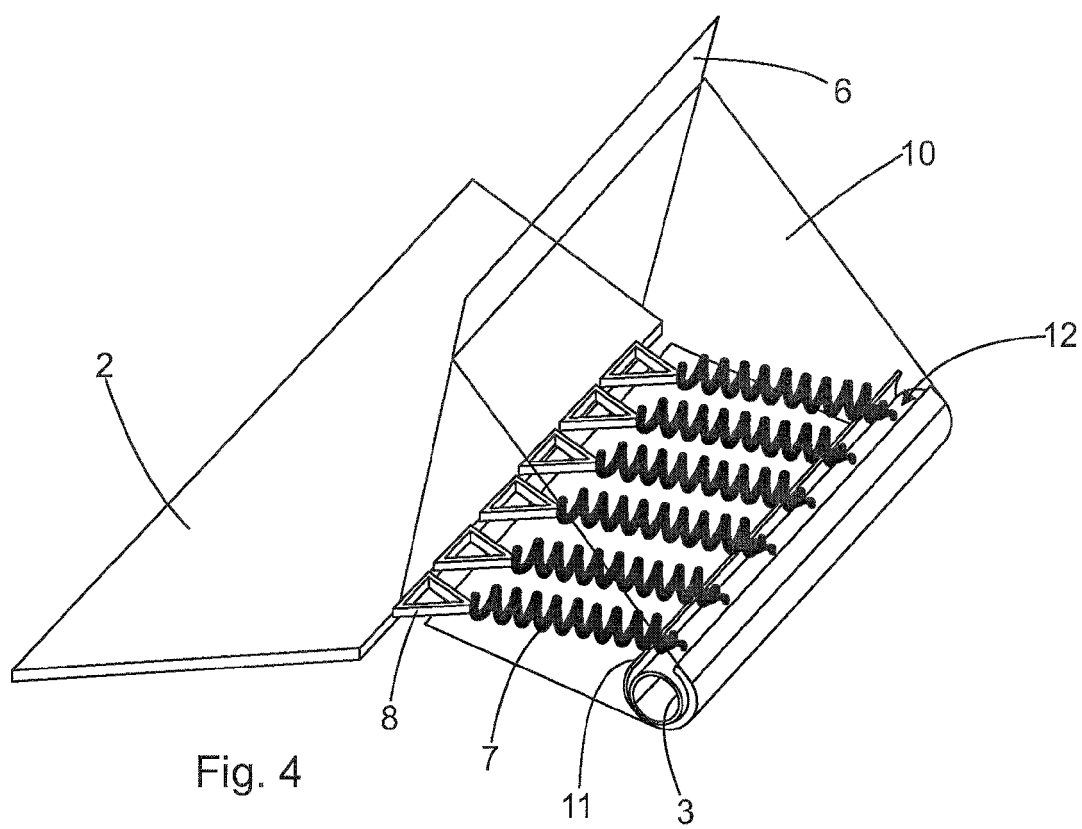
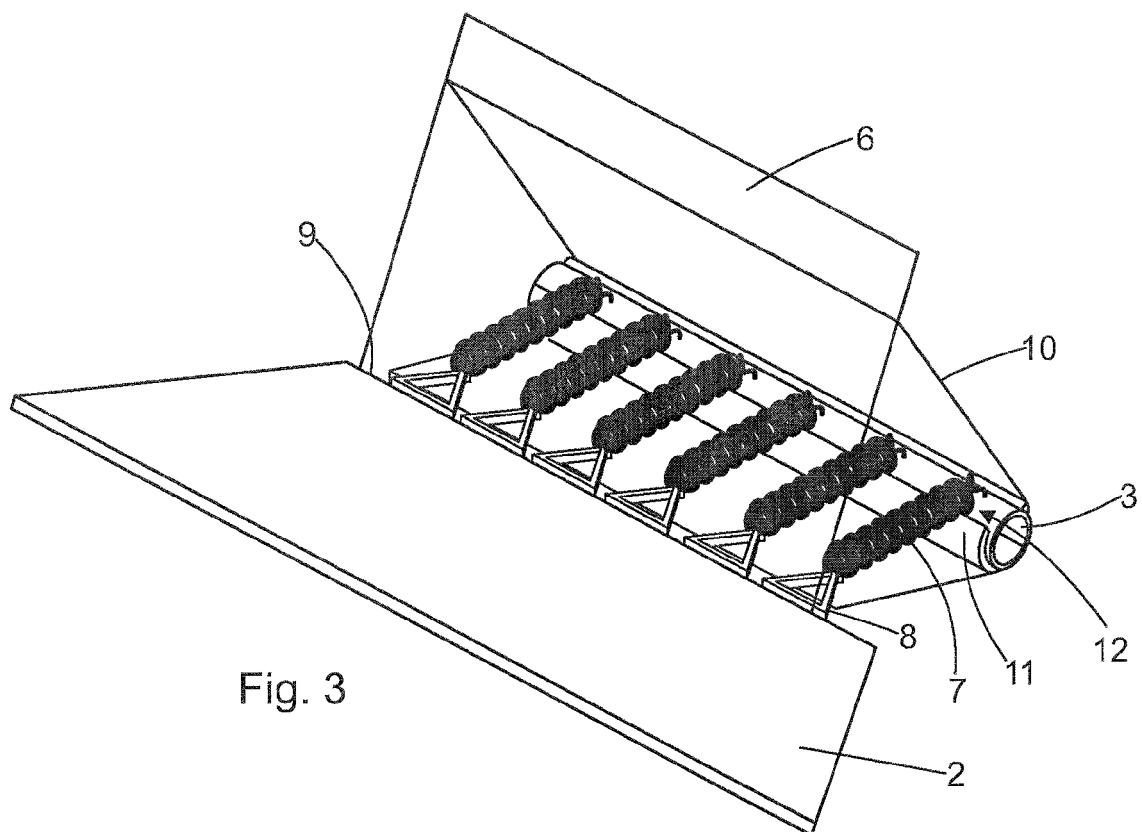


Fig. 2



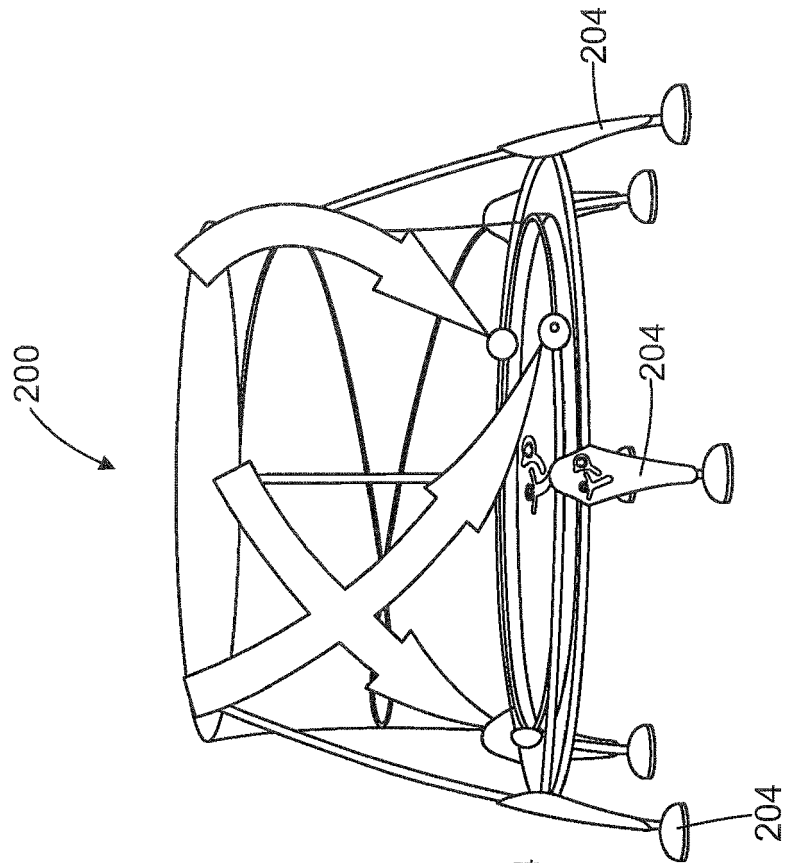


Fig. 5

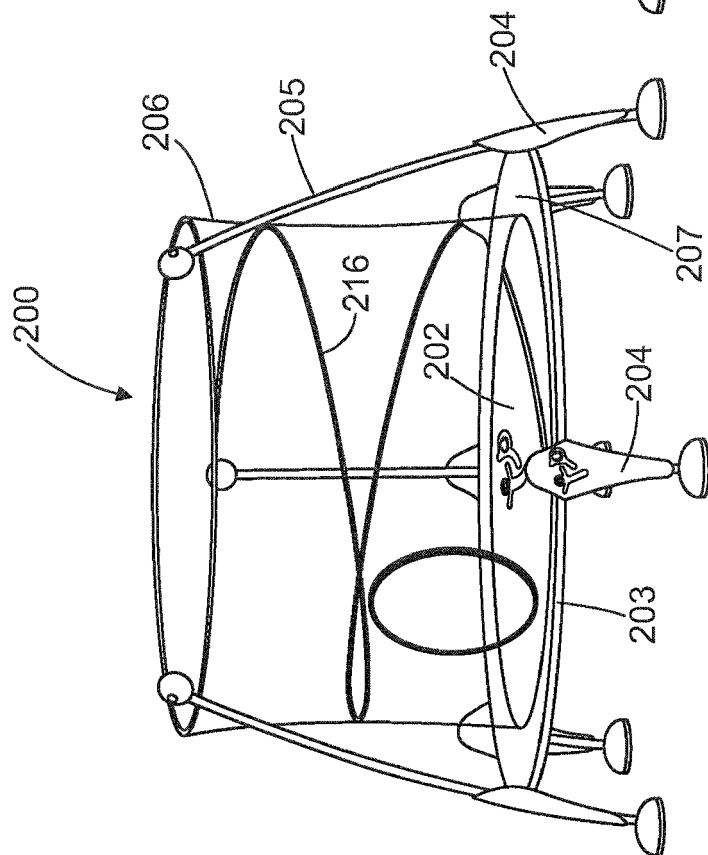


Fig. 6

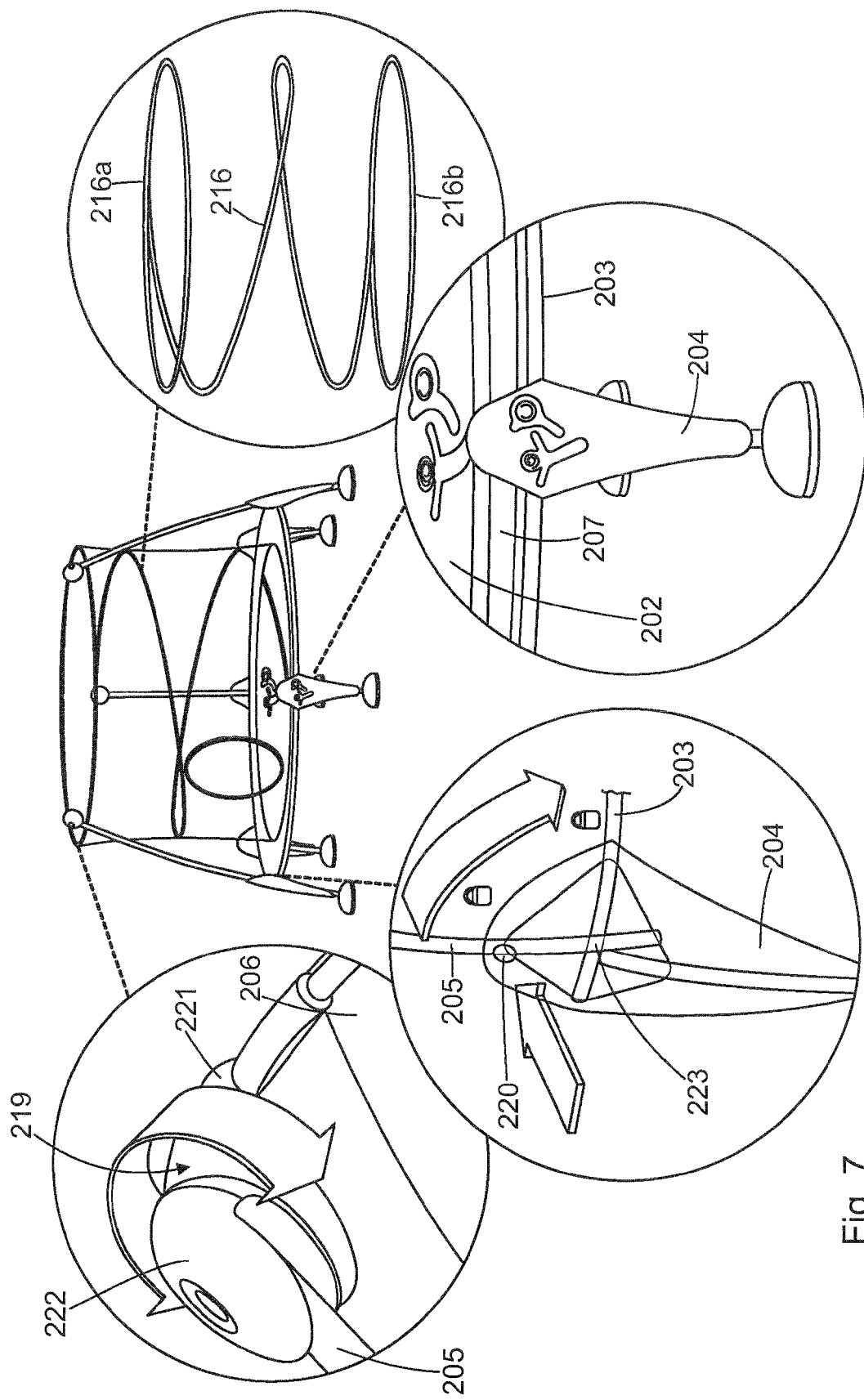


Fig. 7

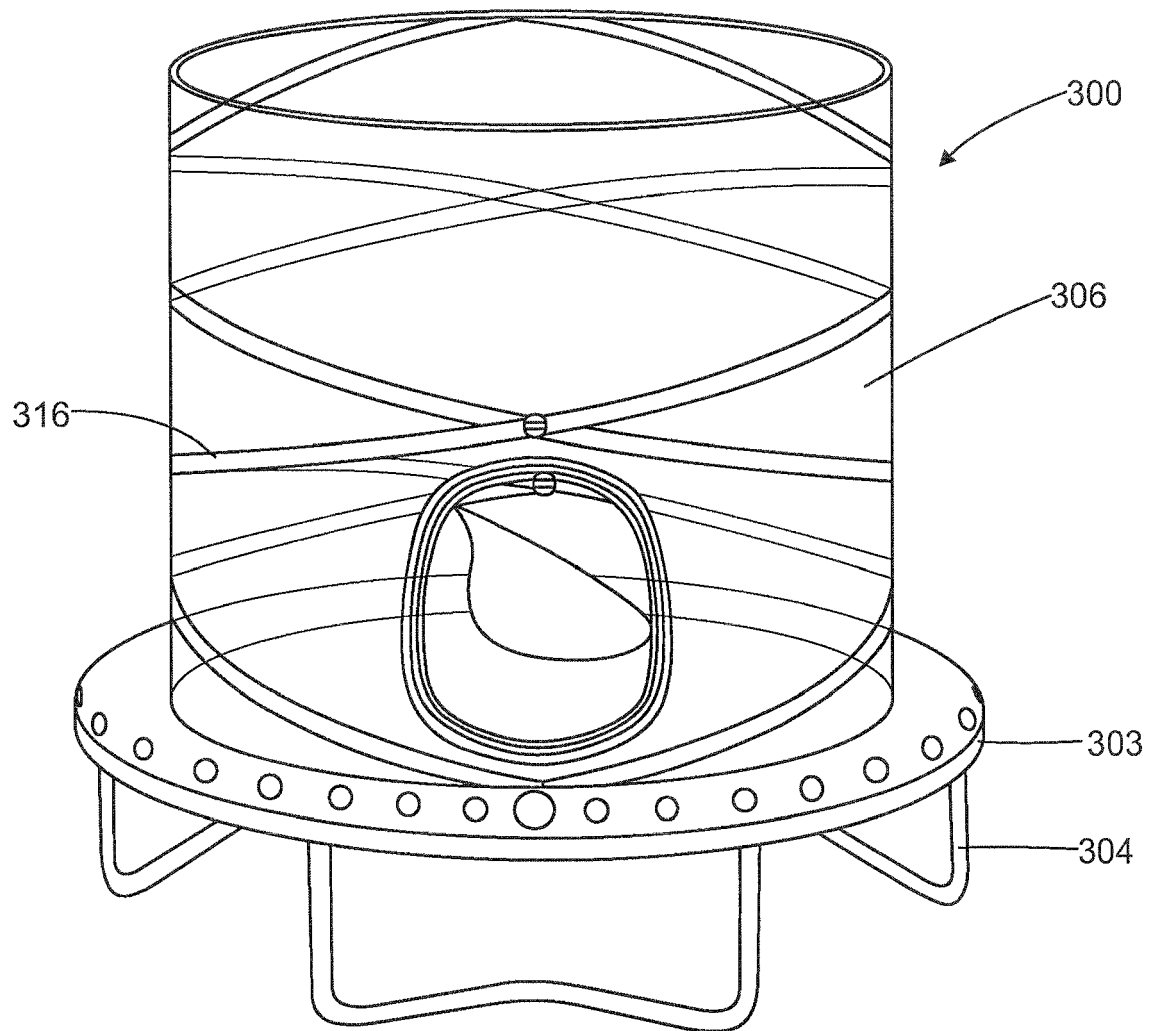


Fig. 8

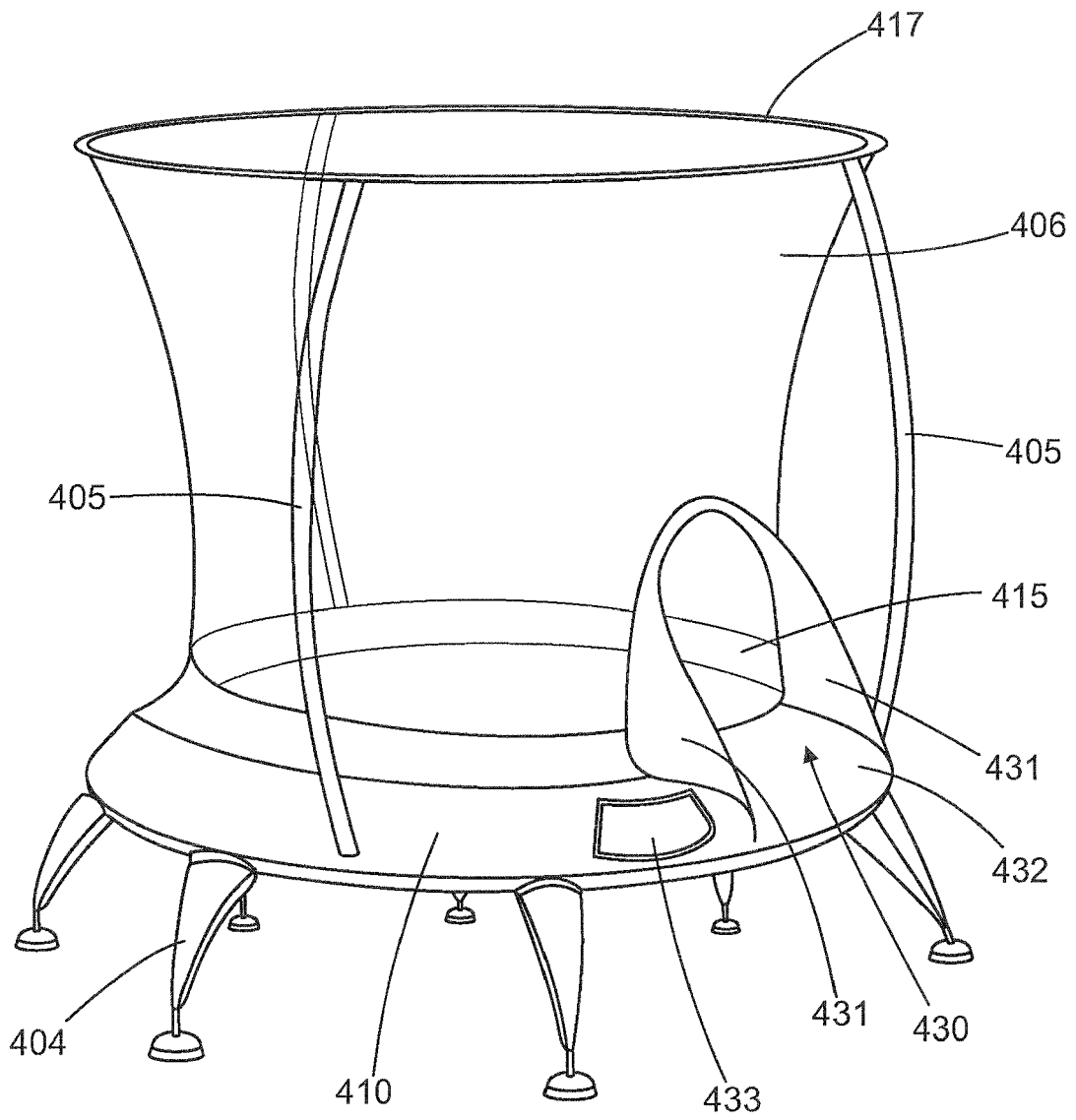


Fig. 9

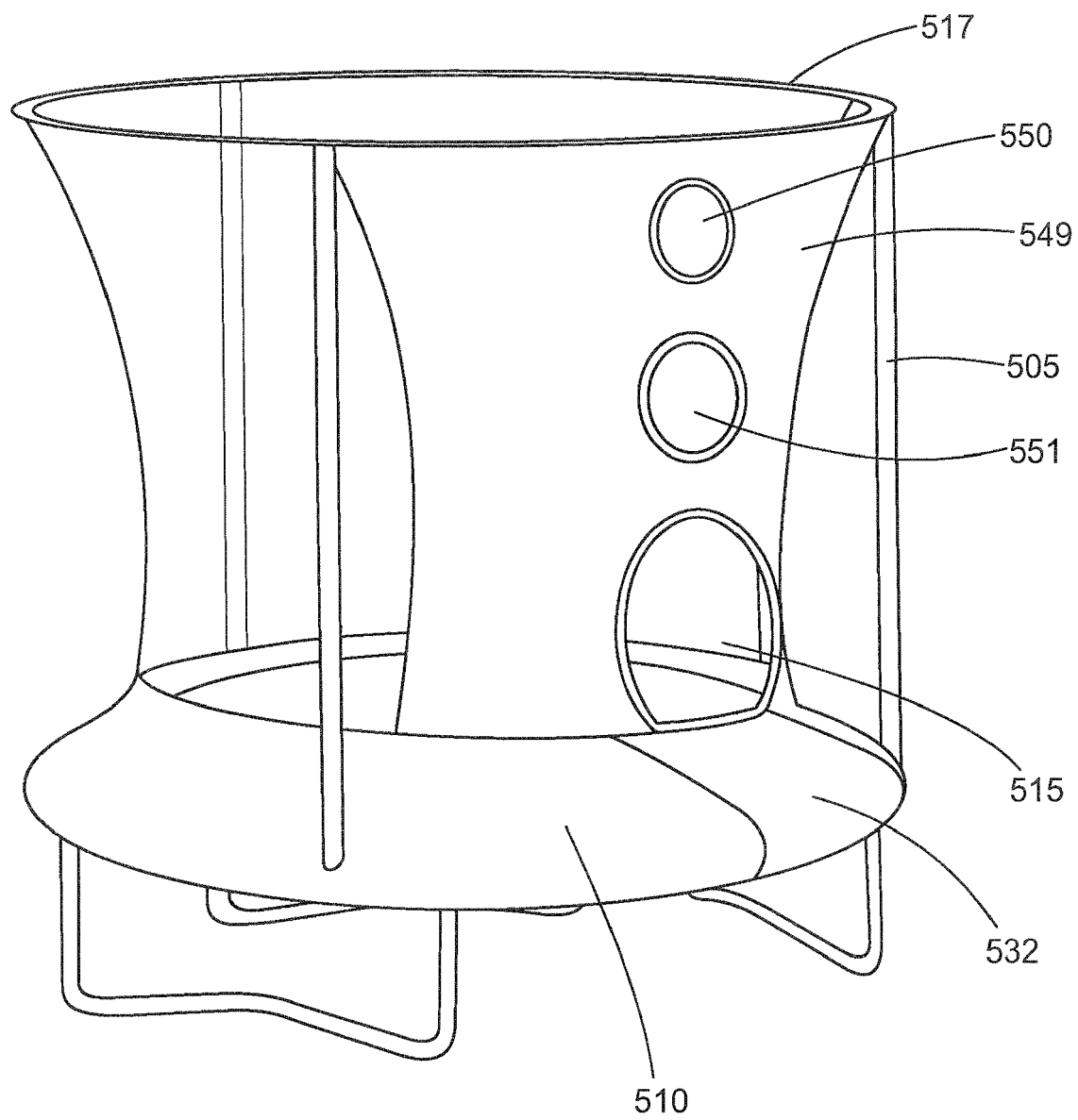
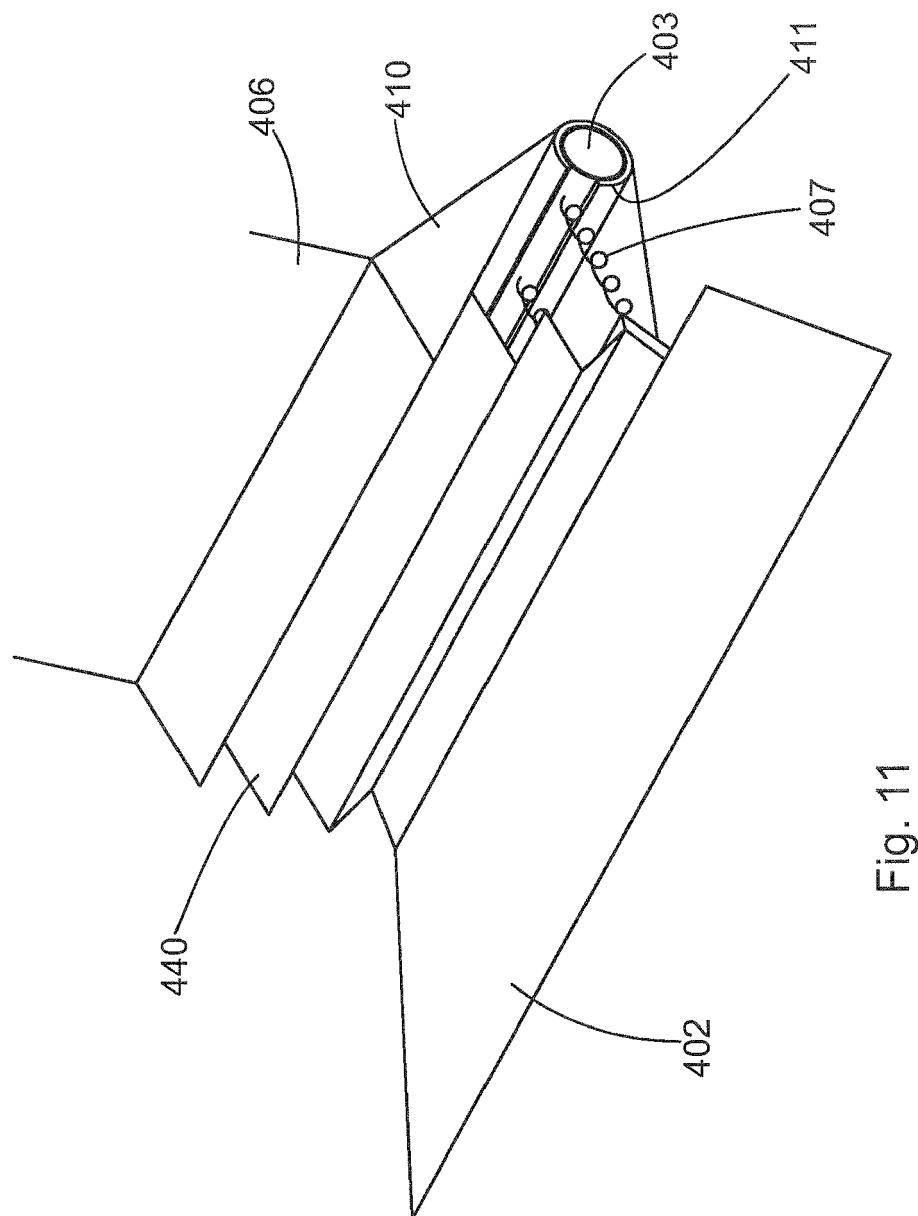


Fig. 10



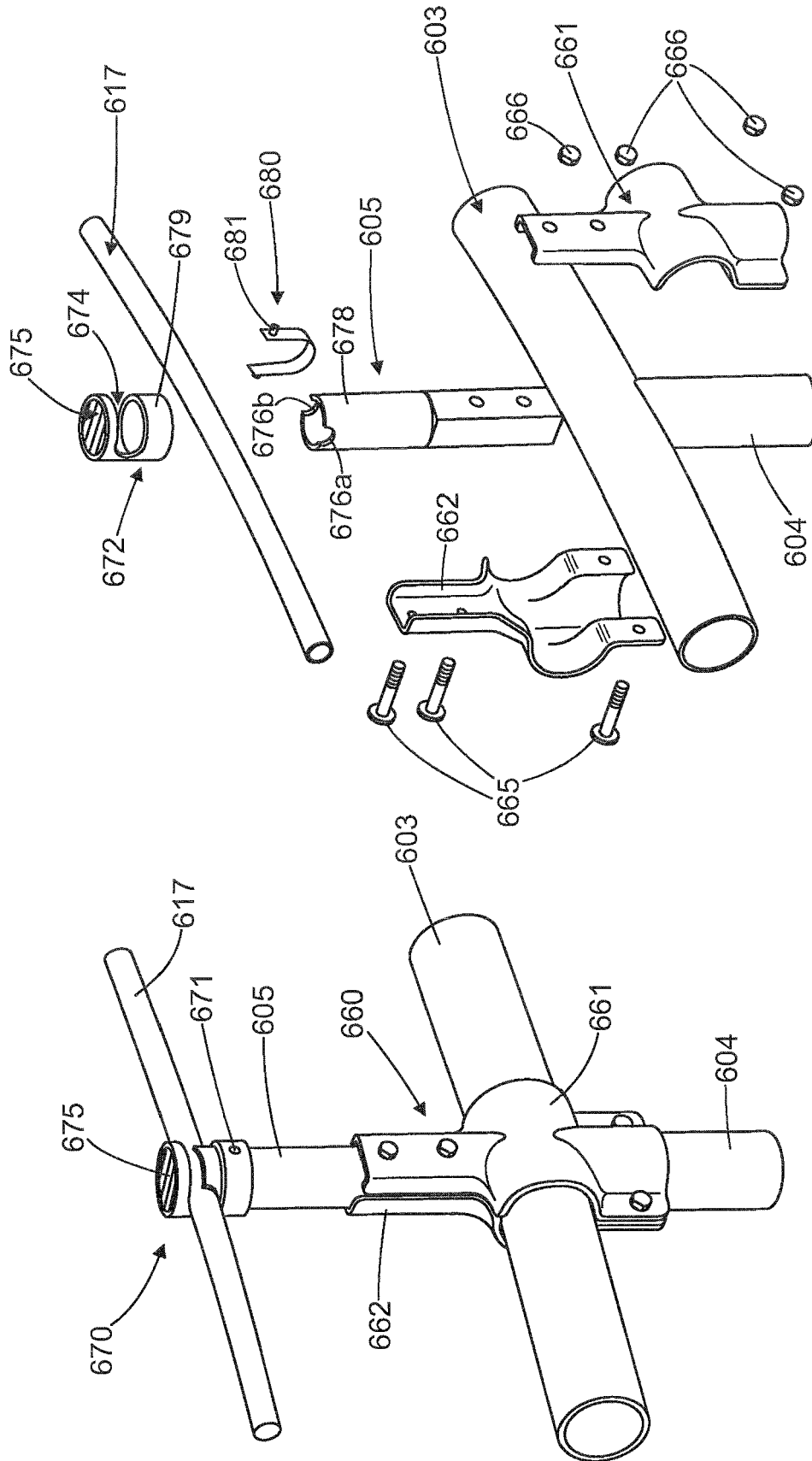


Fig. 12

Fig. 13

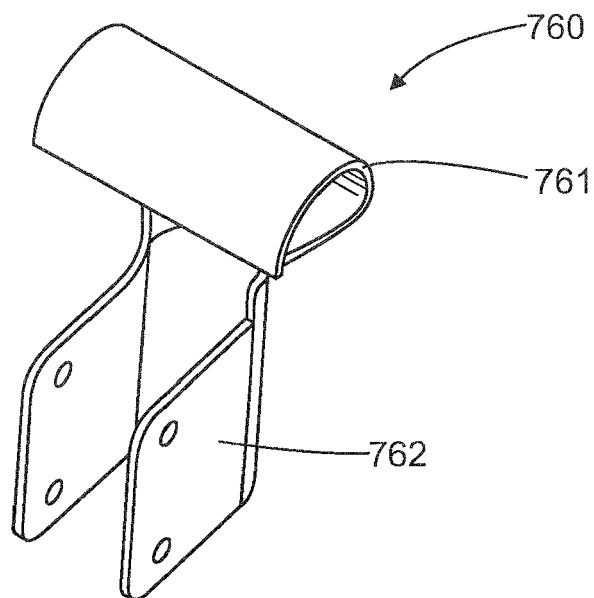


Fig. 14

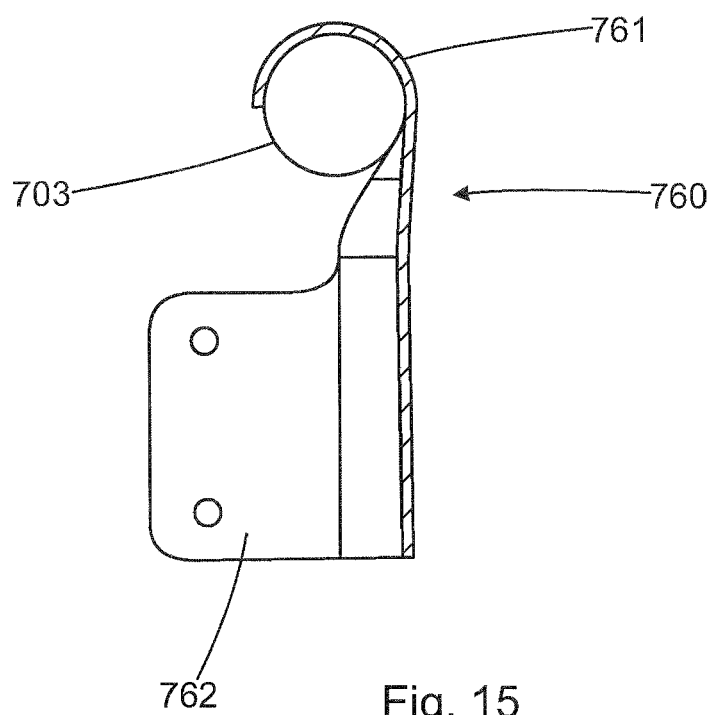


Fig. 15

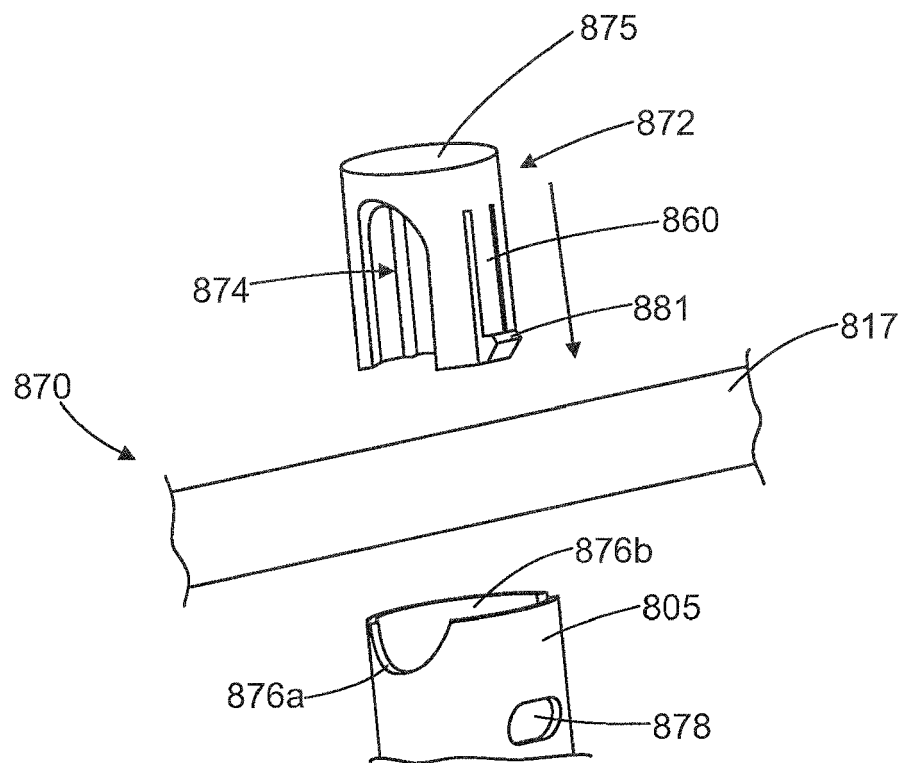


Fig. 16

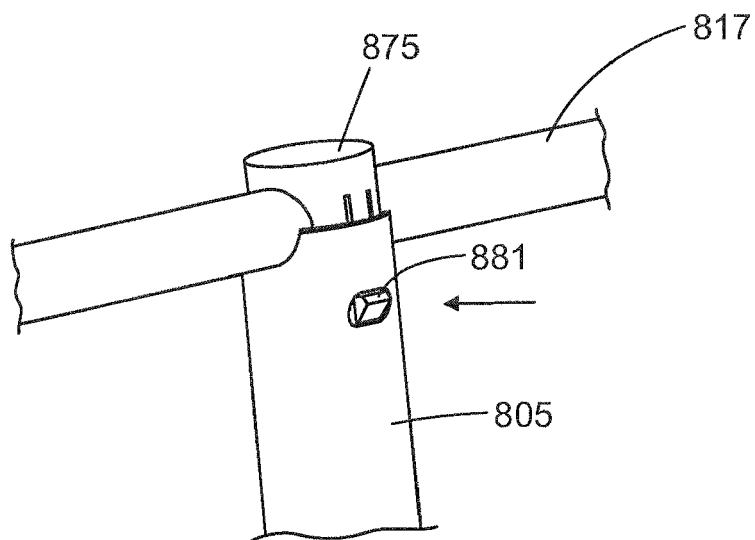
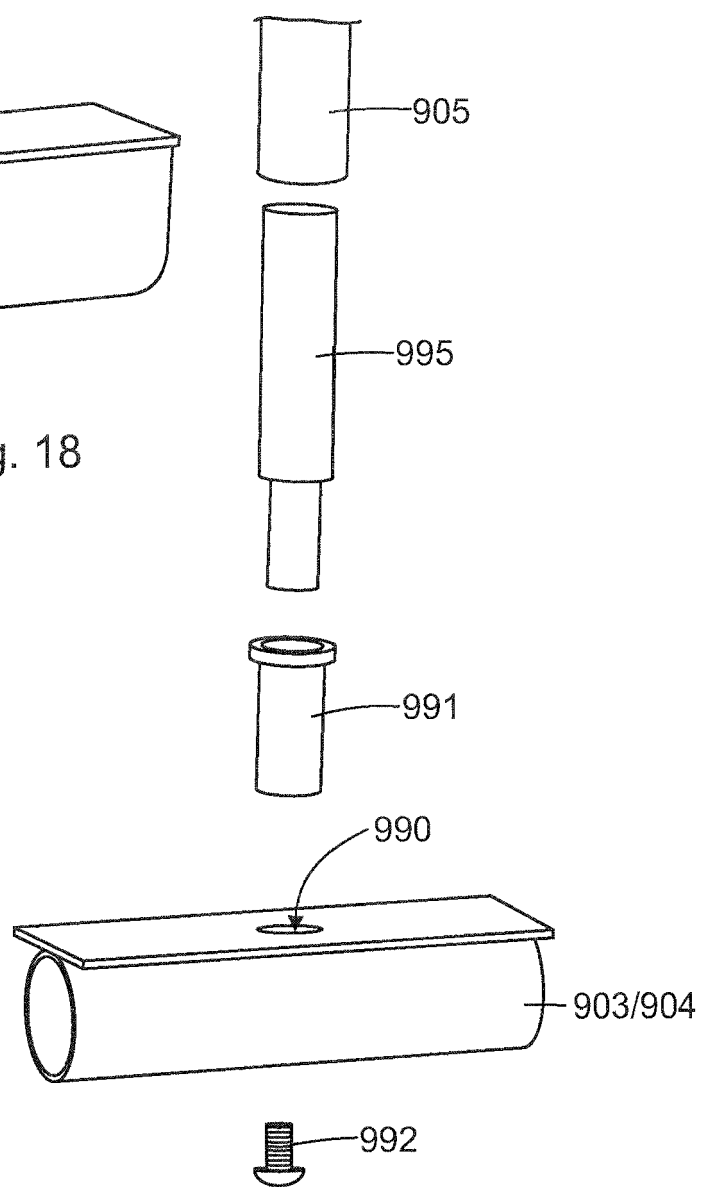
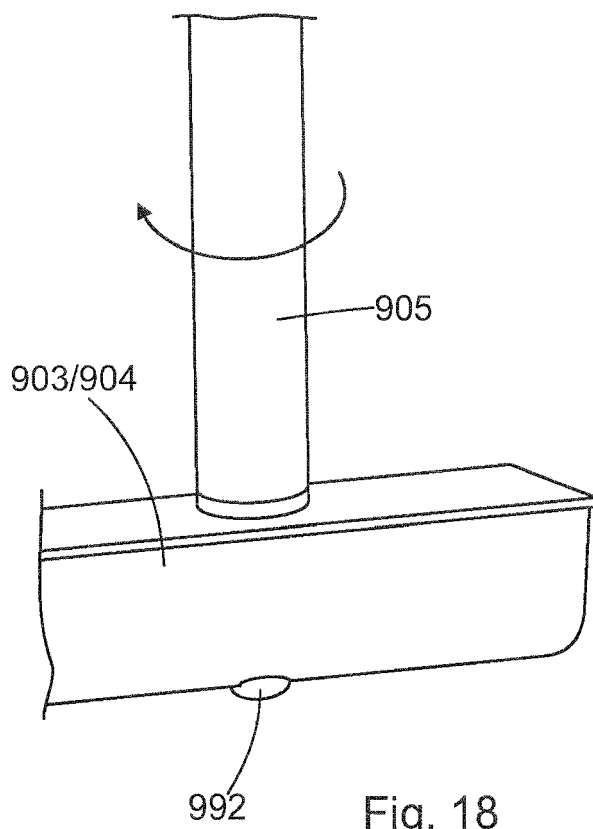


Fig. 17



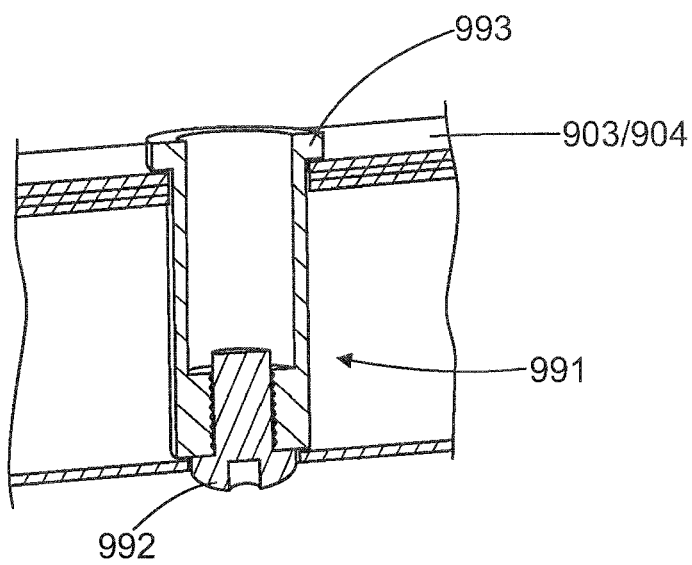


Fig. 20

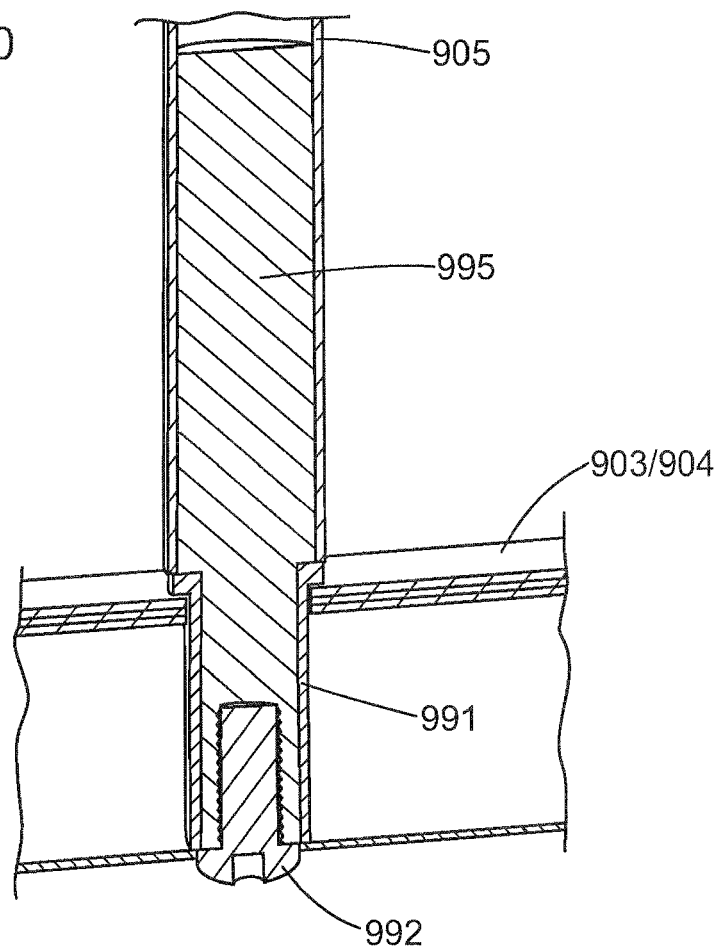
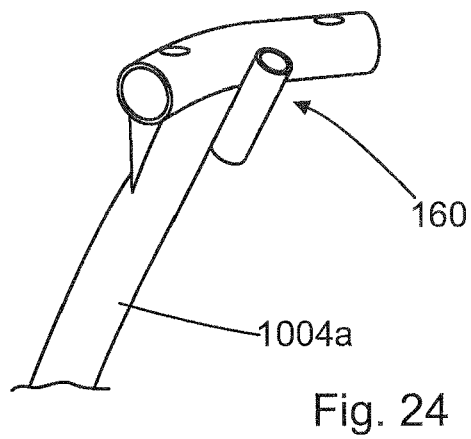
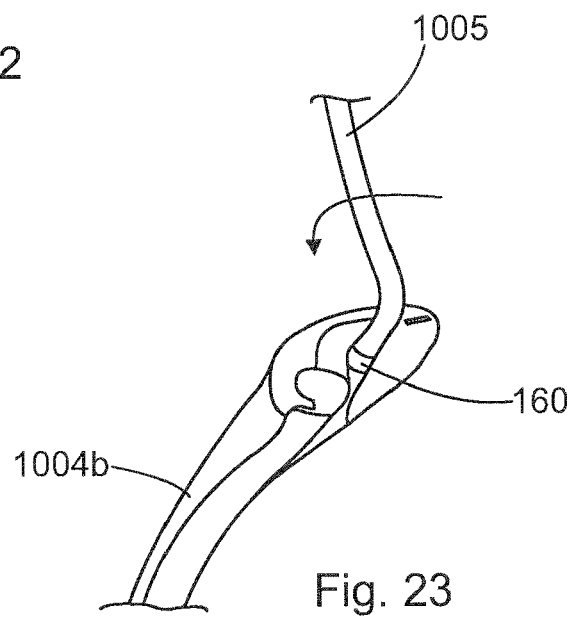
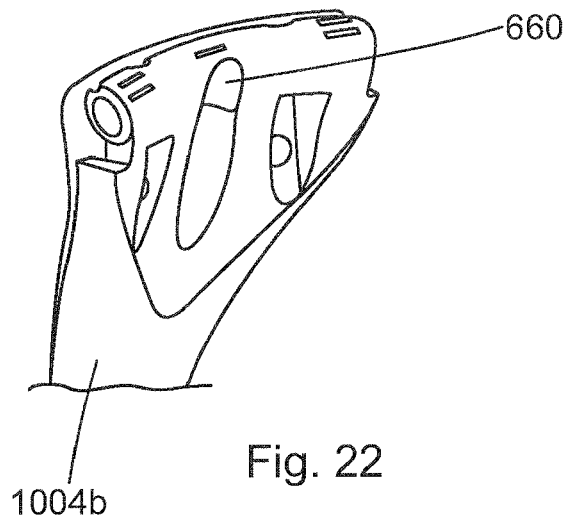


Fig. 21



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2009098324 A [0071]