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(54) **A VEST AND A BELT WITH MULTIPLE ANCHOR POINTS**

(57) A system comprising: a vest; wherein the vest comprises: a front portion; a rear portion; the front portion and rear portion are connected at least by shoulder straps; the rear portion comprises a first rear anchor point and a second rear anchor point; the system additionally comprising a belt, wherein the belt comprises: a rear belt anchor point; and means for coupling a waist portion of a sit harness to the belt such that a front belt anchor point of the sit harness and the rear belt anchor point of the belt are located on opposite sides of the belt; the second rear anchor point of the vest is configured to be coupled to the rear belt anchor point of the belt by first coupling means; the first rear anchor point of the vest is configured to couple to a rope to enable dorsal ascent and dorsal descent of the user.

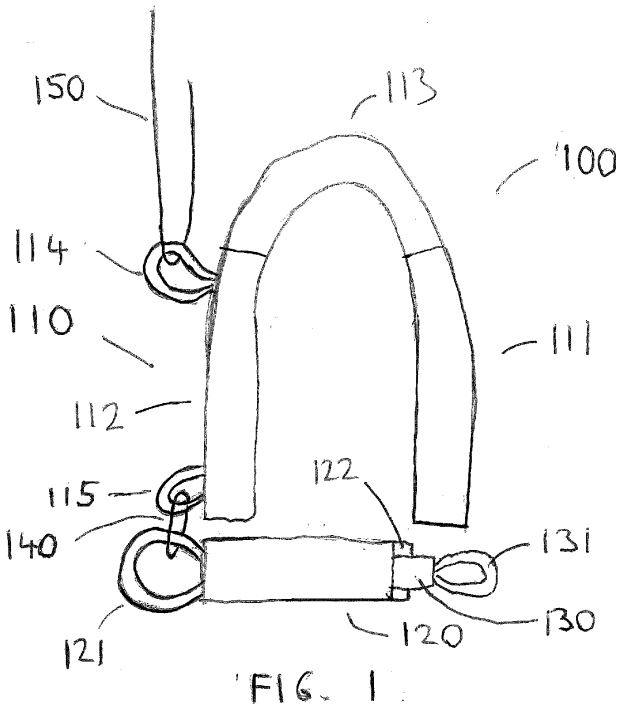

FIG. 1

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Description

TECHNOLOGICAL FIELD

[0001] Embodiments of the present disclosure relate to a vest and a belt with multiple anchor points. Some relate to vests and belts in combat protection gear.

BACKGROUND

[0002] Soldiers often require different belt order pouches for different situations. A soldier may require a different torso item depending on whether they are in a ground assault situation, a vertical assault situation, a situation where they need to swim or if they are performing humanitarian work. There is a need to provide a system that enables easy and quick switching of scalable gear to different capabilities and provides the necessary mission requirements for operating at height.

BRIEF SUMMARY

[0003] According to various, but not necessarily all, embodiments there is provided a system comprising: a vest; wherein the vest comprises: a front portion; a rear portion; the front portion and rear portion are connected at least by shoulder straps; the rear portion comprises a first rear anchor point and a second rear anchor point; the system additionally comprising a belt, wherein the belt comprises: a rear belt anchor point; and means for coupling a waist portion of a sit harness to the belt such that a front belt anchor point of the sit harness and the rear belt anchor point of the belt are located on opposite sides of the belt; the second rear anchor point of the vest is configured to be coupled to the rear belt anchor point of the belt by first coupling means; the first rear anchor point of the vest is configured to couple to a rope to enable dorsal ascent and dorsal descent of the user.

[0004] In some, but not necessarily all examples, the front portion of the vest comprises a first front anchor point and a second front anchor point; the second front anchor point of the vest is configured to be coupled to the front belt anchor point of the sit harness by second coupling means; the first front anchor point of the vest is configured to couple to a rope to enable sternum ascent and sternum descent of the user.

[0005] In some, but not necessarily all examples, the system additionally comprises leg loops, wherein the leg loops comprise a rear strap connecting the leg loops and a front strap connecting the leg loops; the rear strap is configured to couple to the rear belt anchor point of the belt. The front strap is configured to couple to the front belt anchor point of the sit harness.

[0006] In some, but not necessarily all examples, the first rear anchor point of the vest is linked to the second rear anchor point of the vest, the first front anchor point of the vest is linked to the second front anchor of the vest; the interconnection of the front anchor points, the front belt anchor point, the leg loops, the rear-load bearing loop and the rear anchor points enables: the system to spread load applied to the first rear anchor point when the user is having a dorsal ascent or a dorsal descent or is in an arrest fall whilst rope is attached to the first rear anchor point; and also enables: the system to spread load applied to the first front anchor point when the user is having a sternum ascent or a sternum descent or is in an arrest fall whilst rope is attached to the first front anchor point.

[0007] In some, but not necessarily all examples, the first rear anchor point and the second rear anchor point are parts of a single first loop, wherein a portion of the first loop is concealed behind a front layer of the rear portion of the vest, and wherein the portions of the first loop forming the first rear anchor point and the second rear anchor point emerge from the front layer of the rear portion of the vest; the first front anchor and second front anchor are parts of a single second loop; a portion of the second loop is concealed behind a front layer of the front portion of the vest, and the portions of the second loop forming the first front anchor point and second front anchor point emerge from the front layer of the front portion of the vest.

[0008] In some, but not necessarily all examples, the first rear anchor point and the second rear anchor point are provided by first and second links, wherein the first and second links are connected via a first loop, wherein at least a portion of the first loop is concealed behind a front layer of the rear portion of the vest, wherein the first front anchor and second front anchor are provided by third and fourth links, wherein the third and fourth links are connected via a second loop, wherein at least a portion of the second loop is concealed behind a front layer of the front portion of the vest.

[0009] In some, but not necessarily all, examples, the first and second links each comprise first attachment means and second attachment means, wherein the first attachment means is angled with respect to the second attachment means, wherein the first attachment means of the first link and second link are configured to attach to the first loop; wherein the third and fourth links each comprise first attachment means and second attachment means, wherein the first attachment means is angled with respect to the second attachment means, wherein the first attachment means of the third link and fourth link are configured to attach to the second loop.

[0010] In some, but not necessarily all, examples, the second attachment means of one or more of the first, second, third and fourth links comprises a D-hook.

[0011] In some, but not necessarily all examples, the vest additionally comprises a rear ballistic protection plate and a front ballistic protection plate; at least part of the first loop overlies the rear ballistic protection plate; the first loop is configured to disperse at least part of the load applied to it over the rear ballistic protection plate when the first loop is pressing the rear ballistic protection plate into the user's back; at least part of the second loop

overlies the front ballistic protection plate; the second loop is configured to disperse at least part of the load applied to it over the front ballistic protection plate when the second loop is pressing the front ballistic protection plate into the user's chest.

[0012] In some, but not necessarily all examples, the rear portion of the vest comprises rear padding located so that at least two edges of the rear ballistic protection plate disperse the load applied by first loop to the rear padding, thereby dispersing the load away from the user's spine; and the front portion of the vest comprises front padding located so that at least two edges of the front ballistic protection plate disperse the load applied by second loop to the front padding, thereby dispersing the load away from the user's sternum.

[0013] In some, but not necessarily all examples, the leg loops comprise leg loops adjustment means on one of the rear strap and front strap which adjusts both leg loops and can be accessed by one hand of the user for adjustment.

[0014] In some, but not necessarily all examples, each leg loop comprises a quick out buckle.

[0015] In some, but not necessarily all examples, the system additionally comprises an auxiliary anchor point attachment, wherein the auxiliary anchor point attachment comprises attachment means for attachment to the first front anchor point and the second front anchor point; the auxiliary anchor point attachment comprises one or more auxiliary anchor points; attaching the rope for a sternum ascent or sternum descent to each different auxiliary loop instead of the first front anchor point changes the user's centre of gravity whilst ascending or descending.

[0016] In some, but not necessarily all examples, the shoulder straps are adjustable to adjust the fitting of the vest for different users.

[0017] In some, but not necessarily all examples, the vest comprises secondary item attachment buckles configured to attach secondary items to the vest.

[0018] In some, but not necessarily all examples, the secondary items comprise a life preserver unit and a backpack.

[0019] In some, but not necessarily all examples, the vest additionally comprises two side flanks; the side flanks are configured to hold soft armour inserts; one side flank connects the front portion of the vest to the rear portion of the vest by buckles on one side and the other side flank connects the front portion of the vest to the rear portion of the vest by buckles on the other side.

[0020] In some, but not necessarily all examples, the system additionally comprises two side snatches; one side snatch connects the front portion of the vest to the rear portion of the vest by buckles on one side and the other side snatch connects the front portion of the vest to the rear portion of the vest by buckles on the other side.

[0021] In some, but not necessarily all examples, the belt comprises attachment means for attaching the belt to the vest and to other torso items when the vest is not connected to the belt.

[0022] In some, but not necessarily all examples, the other torso items comprise a yoke and a second vest.

[0023] In some, but not necessarily all examples, the belt is a Modular Lightweight Load-carrying Equipment (MOLLE) belt with the rear belt anchor point.

[0024] In some, but not necessarily all examples, the means for coupling the waist portion of the sit harness to the belt comprises a sleeve that runs around the majority of the length of the belt.

[0025] In some, but not necessarily all examples; the system additionally comprises the waist portion of the sit harness; the waist portion of the sit harness comprises a quick out buckle configured to fasten the sit harness around the user's waist.

[0026] In some, but not necessarily all examples, the sit harness comprises a second rear belt anchor configured to couple to the second rear anchor point of the vest by the first coupling means.

[0027] According to various, but not necessarily all, embodiments there is provided a vest comprising: a front portion; a rear portion; wherein the front portion and rear portion are connected at least by shoulder straps; the rear portion comprises a first rear anchor point and a second rear anchor point; the second rear anchor point of the vest is configured to be coupled to a rear belt anchor point of a belt by first coupling means; the first rear anchor point of the vest is configured to couple to a rope to enable dorsal ascent and dorsal descent of a user.

[0028] In some, but not necessarily all examples, the front portion of the vest comprises a first front anchor point and a second front anchor point, wherein the second front anchor point of the vest is configured to be coupled to a front belt anchor point of a sit harness by second coupling means; the first front anchor point of the vest is configured to couple to a rope to enable sternum ascent and sternum descent of the user.

[0029] According to various, but not necessarily all, embodiments there is provided a belt comprising: a rear belt anchor point; and means for coupling a waist portion of a sit harness to the belt such that a front belt anchor point of the sit harness and the rear belt anchor point of the belt are located on opposite sides of the belt; the rear belt anchor point of the belt is configured to couple to a second rear anchor point of a vest by first coupling means.

[0030] In some, but not necessarily all examples, the belt is a Modular Lightweight Load-carrying Equipment (MOLLE) belt.

[0031] In some, but not necessarily all examples, the means for coupling the waist portion of the sit harness to the belt comprises a sleeve that runs around the majority of the length of the belt.

[0032] According to various, but not necessarily all, embodiments there is provided an auxiliary anchor point attachment, wherein the auxiliary anchor point attachment comprises attachment means for attachment to a first anchor point and a second anchor point; wherein the

auxiliary anchor point attachment comprises one or more auxiliary anchor points, wherein attaching the rope for a sternum ascent or sternum descent to each different auxiliary loop instead of the first anchor point changes the user's centre of gravity whilst ascending or descending.

[0033] In some, but not necessarily all examples, there is provided a waist wrap comprising: an opening at a front of the wrap so that a user of the wrap can wrap the wrap around the user's waist with the opening at a front side of the user and comprising a rear loop located at a rear of the wrap so that the rear loop is located at a rear side of the user when the wrap is wrapped around the user's waist with the opening at the front side of the user and wherein the rear loop is configured to bear a suspended weight of the user; wherein the wrap comprises upwardly disposed attachment means for attaching to items worn by the user at a location above the wrap when the wrap is wrapped around the user's waist with the opening to the front side of the user.

[0034] In some, but not necessarily all examples, there is provided a system comprising: the waist wrap and a torso item attached to the upwardly disposed attachment means.

[0035] In some, but not necessarily all examples, the torso item comprises a vest.

[0036] According to various, but not necessarily all, embodiments there is provided examples as claimed in the appended claims.

BRIEF DESCRIPTION

[0037] Some examples will now be described with reference to the accompanying drawings in which:

FIG. 1 shows an example embodiment of the subject-matter disclosed herein;
FIG. 2 shows an example embodiment of the subject-matter disclosed herein;
FIG. 3 shows an example embodiment of the subject-matter disclosed herein;
FIG.4A shows an example embodiment of the subject-matter disclosed herein;
FIG. 4B shows an example embodiment of the subject-matter disclosed herein;
FIG. 5A shows an example embodiment of the subject-matter disclosed herein;
FIG. 5B shows an example embodiment of the subject-matter disclosed herein;
FIG. 6 shows an example embodiment of the subject-matter disclosed herein;
FIG. 7 shows an example embodiment of the subject-matter disclosed herein;
FIG. 8 shows an example embodiment of the subject-matter disclosed herein;
FIG. 9A shows an example embodiment of the subject-matter disclosed herein;
FIG. 9B shows an example embodiment of the subject-matter disclosed herein;
FIG. 10A shows an example embodiment of the subject-matter disclosed herein;
FIG. 10B shows an example embodiment of the subject-matter disclosed herein;
FIG. 11 shows an example embodiment of the subject-matter disclosed herein;
FIG. 12A shows an example embodiment of the subject-matter disclosed herein;
FIG. 12B shows an example embodiment of the subject-matter disclosed herein;
FIG. 13A shows an example embodiment of the subject-matter disclosed herein;
FIG. 13B shows an example embodiment of the subject-matter disclosed herein;
FIG. 13C shows an example embodiment of the subject-matter disclosed herein;
FIG. 13D shows an example embodiment of the subject-matter disclosed herein.

DETAILED DESCRIPTION

[0038] FIG. 1 illustrates an example system 100. The system comprises a vest 110. The vest is also known as a torso sub-system. In this example the vest 110 comprises a front portion 111 and a rear portion 112. The front portion 111 and rear portion 112 are connected by shoulder straps 113. FIG.1 is a schematic cross section of the system 100 and so only one shoulder strap 113 is shown.

[0039] The rear portion 112 comprises a first rear anchor point 114 and a second rear anchor point 115.

[0040] The system 100 additionally comprises a belt 120. The belt 120 comprises a rear belt anchor point 121 and means for coupling 122 a waist portion of a sit harness 130 to the belt 120 such that a front belt anchor point 131 of the sit harness 130 and the rear belt anchor point 121 of the belt 120 are located on opposite sides of the belt 120. In this example the means for coupling 122 comprises a sleeve.

[0041] The second rear anchor point 115 of the vest 110 is configured to be coupled to the rear belt anchor point 121 of the belt 120 by first coupling means 140. In this example the first coupling means 140 comprises a carabiner, a screw gate clamp or a maillon. In some examples the first coupling means 140 is part of the system 100.

[0042] The first rear anchor point 114 of the vest 110 is configured to couple to a rope to enable dorsal ascent and dorsal descent of the user. References to dorsal are referring to when a user is lifted or descended via a rope 150 attached to their back.

[0043] FIG. 2 illustrates another example system 100, where the front portion 111 of the vest comprises a first front anchor point 200 and a second front anchor point 210. The second front anchor point 210 of the vest is configured to be coupled to the front belt anchor point 131 of the sit harness 130 by second coupling means 220. In this example the second coupling means 220 can

be a carabiner, a screw gate clamp or a maillon. In some examples the second coupling means 220 is part of the system 100.

[0044] The first front anchor point 200 of the vest 110 is configured to couple to a rope 230 to enable sternum ascent and sternum descent of the user.

[0045] References to sternum refer to when the user is attached to rope 230 on their chest and they are lifted or lowered by their chest.

[0046] In this example, the belt 120 also comprises front attachment means 260 and rear attachment means 250 for attaching to the vest 110.

[0047] In this example, the first rear anchor point 114, the rear belt anchor point 121, the first front anchor point 200 and the front belt anchor point 131 are configured to bear the suspended weight of the user. In particular, in this example they meet the 15 kN strain requirement for belay requirements, and they also meet the requirements for BSEN 361. The second rear anchor point 115 and the second front anchor point 210 do not have to be tested as they are tested in conjunction with the belt anchor points, but in some examples they may comply with the same requirements.

[0048] In some examples the system 100 may be provided with both pairs of front anchors and rear anchors and in other examples the system 100 may only be provided with either the front anchors or the rear anchors.

[0049] FIG. 3 illustrates an example system 100 comprising a belt 120 and a vest 110. In the example of FIG. 3 the system 100 additionally comprises leg loops 300. A rear strap 310 connecting the leg loops 300 is configured to couple to the rear belt anchor point 121. In this example a front strap 320 that connects the leg loops 300 is configured to couple to the front belt anchor point 131 (front belt anchor point 131 is not shown in FIG. 3). The leg loops 300 comprise leg loop adjustment means 330 on the rear strap 310 which adjusts both leg loops 300. In this example, the leg loop adjustment means is provided on the left-hand side of the leg loops so that the user can access and operate the leg loop adjustment means 330 with just their left hand, leaving their right arm free for holding a weapon. In this example the leg loops 300 each comprise quick out buckles 340 which allow for quicker removal of the leg loops 300 for the user.

[0050] The leg loops 300 go through the rear belt anchor point 121 to maximize comfort and disperse the load across a greater body mass area on a dorsal ascent or descent or an arrest fall.

[0051] In the examples illustrated above, the belt 120 may be provided as a Modular Lightweight Load-carrying Equipment (MOLLE). The MOLLE belt needs to have the sit harness waist portion inserted with the front belt anchor point 131 at the front and the rear belt anchor point 121 at the back to comply with safety requirements. The attachment of the leg loops 300 to the front belt anchor point 131 and the rear belt anchor point 121 meets all of the full harness rig safety at height requirements, for BSEN 361, 365 and 12277.

[0052] FIG. 4A illustrates part of the vest 110. In this example the first rear anchor point 114 and the second rear anchor point 115 are linked. FIG. 4B illustrates part of the vest 110. In this example the first front anchor point 200 and the second front anchor point 210 are linked.

[0053] The interconnection of the front anchor points of the vest 200, 210, the front belt anchor point 131, the leg loops 300, the rear belt anchor point 121 and the rear anchor points of the vest 114, 115, enables the system to spread load applied to the first rear anchor point 114 when the user is having a dorsal ascent or a dorsal descent or is in an arrest fall whilst rope is attached to the first rear anchor point 114. It also enables the system to spread load applied to the first front anchor point 200 when the user is having a sternum ascent or a sternum descent or is in an arrest fall whilst rope is attached to the first front anchor point 200.

[0054] This capability to transfer load throughout the system is because of the chain of linkage from the first front anchor point 200 to the first rear anchor point 114. The chain of linkage is as follows: the first front anchor point 200 is linked to the second front anchor point 210, which is coupled to the front belt anchor point 131 by the second coupling means 220. The front belt anchor point 131 is coupled to the leg loops 300 by the front strap 320. The leg loops 300 couple to the rear belt anchor point 121 by the rear strap 310. The rear belt anchor point 121 is coupled to the second rear anchor point 115 by the first coupling means 140. The second rear anchor point 115 is linked to the first rear anchor point 114. In an arrest fall, the leg loops 300 take the strain and disperse the load around the system.

[0055] In the example of FIG. 4A the first rear anchor point 114 and the second rear anchor point 115 are linked by being parts of a single first loop 400 of material. A portion 410 of the loop 400 is concealed behind a front layer 420 of the rear portion 112 of the vest 110. The portions of the first loop 400 forming the first rear anchor point 114 and the second rear anchor point 115 emerge from the front layer 420 of the rear portion 112 of the vest 110. In this example at least part of the loop 400 is stitched to the interior of the vest 110 by stitches 460. This prevents movement of the anchors and also increases the integrity of the vest 110 and first loop 400.

[0056] FIG. 4B illustrates a portion of the vest 110. The first front anchor point 200 and the second front anchor point 210 are parts of a second loop 430 of material. A portion 440 of the second loop 430 is concealed behind a front layer 450 of the front portion 111 of the vest 110. The portions of the second loop 430 forming the first front anchor point 200 and the second front anchor point 210 emerge from the front layer 450 of the front portion 111 of the vest 110. In the example of FIG. 4B at least part of the loop 430 is stitched to the interior of the vest 110 to prevent the loop from moving and also to increase the integrity of the vest 110 and second loop 430.

[0057] FIG. 5A illustrates another example part of a vest 110. In this example the vest 110 comprises the first

rear anchor point 114 and the second rear anchor point 115 formed of a single first loop 400 as illustrated in FIG. 4A. In this example the first loop 400 at least partly overlies a rear ballistic protection plate 500 which is contained within the rear portion 112 of the vest 110. The first loop 400 overlies the rear ballistic protection plate 500 to the extent that it overlies the rear ballistic protection plate 500 relative to the user's back when the user is wearing the vest 110. The first loop 400 is positioned over the rear ballistic protection plate 500 so that when the first loop 400 has a load applied to it which presses into the user's back the first loop 400 at least partially disperses the load over the rear ballistic protection plate 500 which is a wider area compared to if it was only the first loop 400 pressing into the user's back. This leads to a decreased risk of injury of the user if they, for example, were in an arrest fall and at the point of elasticity where there is no more slack in the rope after the user has been falling there is a hard force applied to the first loop 400 which then presses into the user.

[0058] FIG. 5B illustrates another example part of a vest 110. In this example the vest 110 comprises the first front anchor point 200 and the second front anchor point 210 formed of a single second loop 430 as illustrated in FIG. 4B. In this example the second loop 430 at least partly overlies a front ballistic protection plate 510 which is contained within the front portion 111 of the vest 110. The second loop 430 overlies the front ballistic protection plate 510 to the extent that it overlies the front ballistic protection plate 510 relative to the user's chest when the user is wearing the vest 110. The second loop 430 is positioned over the front ballistic protection plate 510 so that when the second loop 430 has a load applied to it which presses into the user's chest the second loop 430 at least partially disperses the load over the front ballistic protection plate 510 which is a wider area compared to if it was only the second loop 430 pressing into the user's chest. This leads to a decreased risk of injury of the user if they, for example, were in an arrest fall and at the point of elasticity where there is no more slack in the rope after the user has been falling there is a hard force applied to the second loop 430 which then presses into the user.

[0059] In the examples of FIG. 5A and FIG. 5B, a load is applied to the second loop 430 when the user is having a dorsal ascent or dorsal descent or is in an arrest fall with the first rear anchor 114 connected to rope 150. When the load is applied to the first rear anchor 114 which tends to be in a direction away from the user's body, the transferal of the load through the system to the second loop 430 presses the second loop 430 towards the user's chest. A load is applied to the first loop 400 when the user is having a sternum ascent or sternum descent or is in an arrest fall with the first front anchor 200 connected to rope 230. When the load is applied to the first front anchor 200 which tends to be in a direction away from the user's body, the transferal of the load through the system to the first loop 400 presses the first loop 400 towards the user's back.

[0060] In the examples of FIG. 5A and FIG. 5B, the ballistic protection plates 500, 510, may be a standalone with no soft armour, or may be an in-conjunction plate which requires additional soft armour to be provided between the user and the in-conjunction plate.

[0061] FIG. 6 illustrates an example front portion 111 of a vest 110. In this example, the front ballistic protection plate 510 (dashed) is contained within the front portion 111. Front padding 600 on either side of the front portion 111 is configured to contact the user when worn. The front padding 600 is located so that at least two edges of the front ballistic protection plate 510 disperse the load applied by second loop 430 (not shown) to the front padding, thereby dispersing the load away from the user's sternum.

[0062] The front ballistic protection plate 510 is generally curved and so follows the curve of the user's chest. This means the central part of the front ballistic protection plate 510 will not press against the user's sternum and centre of their rib cage. By diverting the load applied to the second loop 430 to the side of the rib cage this reduces the isolated point of impact in an arrest fall than you would normally get in a next to skin chest harness, thereby mitigating blood pooling whilst in distress at height.

[0063] In a typical chest harness, the load is against the rib cage and sternum due to the positioning of the straps and the narrowness of the straps. In the system 100, the load is taken off the centre of rib cage and put onto the working muscles, including the pectoral mass. The ballistic protection plates spread the load over a wider area, whereas typical harnesses focus load on certain points of body.

[0064] Rear padding is also provided on the rear portion 112 of the vest 110. This provides a similar function as the front padding 600 as it is located so that at least two edges of the rear ballistic protection plate 500 disperse the load applied by first loop 400 to the rear padding, thereby dispersing the load away from the user's spine.

[0065] The front and rear padding reduces blood pooling in an arrest fall, providing higher levels of comfort. The padding will not stop blood pooling permanently, but will provide a greater window of recovery.

[0066] In this example, the front and rear padding is made of 10mm of EVA foam, machined to allow for air ventilation, wicking, and working with the muscles of the body and works in tandem with the muscular skeletal mass to maximise on the elasticity of the rib cage as it spreads the load.

[0067] The system 100 also spreads load across the shoulders via the shoulder straps 113, which are, in this example, provided with extra padding so that they contour across the shoulders and spread the load against deltoids.

[0068] FIG. 7 illustrates an auxiliary anchor point attachment 700. The auxiliary anchor point attachment 700 comprises attachment means 710, 720 for attachment

to the first front anchor point 200 and the second front anchor point 210. The auxiliary anchor point attachment 700 comprises one or more auxiliary anchor points 730. Attaching the rope 230 for a sternum ascent or sternum descent to each different auxiliary anchor point 730 instead of the first front anchor point 200 changes the user's centre of gravity whilst ascending or descending, so that the angle of ascent or descent is adjustable and may also be changed so that a user can alter their relative position to a descender attached to the rope 230. The auxiliary anchor point attachment may be provided separately to the system 100 and may be used for any harness which has two anchor points. The auxiliary anchor point attachment means 700 in this example has bar tacks between each auxiliary anchor point 730. Other reinforcement means may be used instead of bar tacks.

[0069] Without the auxiliary anchor point attachment 700, the angle of a sternum ascent or descent is typically 35 degrees and the angle of a dorsal ascent or descent is 25 degrees, but these angles are variable depending on the positioning of the anchors.

[0070] FIG. 8 illustrates an example vest 110. The shoulder straps 113 comprise secondary shoulder straps 800 which are adjustable by buckles 810 on the secondary shoulder straps 800. By providing the secondary shoulder straps 800 and buckles 810 to make the shoulder straps 113 adjustable, this makes the vest 110 a one-size-fits-all so that users of different sizes can adjust the vest 110 to suit their shape and size.

[0071] FIG. 9A illustrates an example vest 110 comprising buckles 900 on the shoulder straps 113 of the vest 110. The buckles 900 are configured to attach secondary items to the vest 110. In the example of FIG. 9A the secondary item is a micro life preserver unit (LPU) 910. The micro LPU has a 150N buoyancy and meets the beyond the horizon requirements and this torso subsystem is certified for an arrest fall with the micro LPU.

[0072] In FIG. 9B the secondary item is a backpack 920. In this example, buckles 930 are also provided to attach the backpack to side flanks of the vest 110. Attaching the backpack 920 to these buckles on the side of the vest and the shoulder spreads the load applied to the user due to the weight of the backpack so that it is more comfortable for the user and less likely to strain their back.

[0073] FIG. 10A shows an example vest 110. In this example the side flanks 240 of the vest 110 are connected by side buckles 1000 to the vest 110. Two side flanks are provided, with one being shown in FIG. 10A as it is a side view.

[0074] In FIG. 10B instead of side flanks the front portion 111 of the vest and the rear portion 112 of the vest are connected by snatches 1010, one of which is shown in FIG. 10B as it is a side view, which are also attached by side buckles 1000. The ability to switch between side flanks and snatches gives unique operational scalability.

[0075] The side flanks 240 contain soft armour inserts, which provide protection against 9mm ammunition and protection against blast shrapnel.

[0076] FIG. 11 illustrates another example system 100 comprising a belt 120 as described herein and in this example system 100, the vest 110 has been removed and replaced with a yoke 1110 which is comprised mainly of two lengths of material which extend over each of a user's shoulders and attaches onto the front and rear of the belt 120. In this example, the belt 120 comprises front attachment means 260 and rear attachment means 250. FIG. 11 is a side view so only one of the lengths of material is shown.

[0077] FIG. 12A and 12B illustrate examples of a belt 120. The belt 120 comprises a rear belt anchor point 121 (shown as dashed, hidden behind back of belt in FIG. 12A), and means for coupling 122 a waist portion of a sit harness 130 to the belt 120 such that a front belt anchor point 131 of the sit harness and the rear belt anchor point 121 of the belt 120 are located on opposite sides of the belt 120. The rear belt anchor point 121 of the belt is configured to couple to a second rear anchor point of a vest by first coupling means as illustrated above.

[0078] In the example of FIG 12A, the means for coupling 122 comprises a sleeve that extends around the majority of the length of the belt 120. Other means for coupling 122 are possible, such as multiple sleeves with gaps or pockets.

[0079] In the example of FIG. 12A and 12B, the belt 120 has an opening at the front of the belt 120 so that a user of the belt can wrap it around the user's waist with the opening at a front side of the user.

[0080] In the example of FIG. 12B, the belt 120 also comprises upwardly disposed attachment means 260 for attaching to items worn by the user at a location above the belt when the belt is wrapped around the user's waist with the opening to the front side of the user.

[0081] In FIG. 12B, the belt 120 additional comprises second attachment means 1200 for attaching one or more pouches and/or ammunition and/or fighting order to the belt 120. The belt 120 in this example also comprises rear attachment means 250 for attaching to items worn by the user at a location above the belt when the belt is wrapped around the user's waist with the opening to the front side of the user.

[0082] In this example, each of the upwardly disposed attachment means 260 comprises one half of a snap buckle arrangement on each side of the belt. The other side of each snap buckle arrangement will be typically provided on the item worn by the user at a location above the belt. In this example the second attachment means 1200 comprises two parallel lines of MOLLE belt attachment loops. The rear attachment means 250 in this example comprises a buckle.

[0083] The buckle comprising: a first part, a second part and selective locking means; wherein the selective locking means is configured to selectively lock the second part and first part together; wherein the first part comprises multiple spaced strap anchor points integrated in the first part; wherein the multiple spaced strap anchor

points in the first part have a fixed spatial relationship relative to one another and are distinct from one another; wherein the second part comprises multiple spaced strap anchor points integrated in the second part; wherein the multiple spaced strap anchor points in the second part have a fixed spatial relationship relative to one another and are distinct from one another.

[0084] One or more of the side buckles 1100 may be the same as the rear attachment means 250.

[0085] In FIG. 12A the sit harness 130 comprises closing means 132. The closing means 132 in this example comprises a quick out buckle. Other closing means may be provided. The closing means fastens the harness around the user's waist.

[0086] FIG. 13A illustrates part of an example vest 110. In this example the first rear anchor point 114 and the second rear anchor point 115 are provided by first and second links. The first and second links are connected via a first loop 1300. At least a portion of the first loop 1300 is concealed behind a front layer 420 of the rear portion of the vest. At least part of the loop 1300 is stitched to the interior vest 110 by stitches 460, which prevent movement of the loop 1300 and the first and second links.

[0087] FIG. 13B illustrates a portion of an example vest 110. The first front anchor point 200 and the second front anchor point 210 are provided by third and fourth links, wherein the third and fourth links are connected via a second loop 1310. At least a portion of the second loop 1310 is concealed behind a front layer 450 of the front portion of the vest. At least part of the loop 1310 is stitched to the interior vest 110 by stitches 460, which prevent movement of the loop 1310 and the third and fourth links.

[0088] FIGS. 13C and 13D illustrate an example link, in this example the first link providing the first rear anchor point 114. The first link comprises first attachment means 1320 and second attachment means 1330. As can be seen in FIGS. 13C and 13D the first attachment means 1320 is angled with respect to the second attachment means 1330. The first attachment means 1320 provides a hole and is configured to allow attachment to the first loop 1300 by the first loop 1300 passing through the hole provided by the first attachment means 1320.

[0089] In this example the second attachment means 1330 comprises a D-hook. This enables a rope to be passed through the D-hook, for example to enable a dorsal lift of the user to be performed using the first rear anchor point 114.

[0090] In some examples the first link, second link, third link and fourth link are substantially identical. In other examples there may be variations between the different links, for example a different shaped D-hook. Any or all of the first, second, third and fourth links may be provided with a different shaped D-hook to the D-hook illustrated in FIGS. 13C and 13D, for example all of the links can be semi-circular D-hooks instead of the triangular shaped D-hook provided in the example of FIG. 13C and FIG. 13D. In some examples the links are made of a light and rigid material, for example aluminum. By providing the first attachment means and the second attachment means at an angle with respect to each other, this enables the second attachment means to protrude correctly from the vest. As with the examples provided in FIG. 5A and FIG. 5B, the first loop 1300 and the second loop 1310 may overlie front and rear ballistic protection plates so that the load applied to the first loop 1300 or second loop 1310 is spread over the user's chest or back as described above in the examples of FIG. 5A and FIG. 5B.

[0091] In another example, a system 100 is provided which is known as VAULT - Vertical Assault, User Light Tactical which has operational capability. This system is designed for specialist work orders, mountain warfare, urban warfare, urban assault, maritime interdiction, where boarding parties have to go into an oil safe. The system is to be used anytime where you need safety at height and still fight with an operational piece of kit.

[0092] The VAULT system is also jump compatible, it meets the requirements so you can jump out of a plane when wearing protection underneath free fall kit or static line kit. The VAULT system has no hook or loop systems and will work in all environments and is fully scalable.

[0093] In the examples shown the system 100 scales into different formats by changing what is attached to the belt. The system 100 is belt centric in that the system is based around the belt. In some examples the belt 120 is designed to be a Modular Lightweight Load-carrying Equipment (MOLLE) belt so that the user can have all pouches for fighting order on the belt. The MOLLE belt can be removed so that the user just has the sit harness with the vest for maritime interdiction with concealed pouches in the front of the vest for storing equipment including ammunition.

[0094] By linking the rear anchors and the rear belt anchor, this allows for a correct centre of gravity to do a face first run down a cliff and reducing the risk of inverting because of where the centre of gravity is. Due to the ballistic protection plates in the vest (torso subsystem) the user is typically top heavy so if you are doing a face first dive all the weight is at the front which can pull you forward and cause you to invert. The system avoids this by the placement and linkage of the rear anchors and rear belt anchor.

[0095] In some examples the front closing means is a separate harness belt which slides into the belt and in other example the front closing means is integrated into the belt.

[0096] The layout of the system which comprises the belt and the vest which comprises the front anchors and rear anchors may be known as an urban/mountain assault rig. It enables a user to have a dorsal lift, a sternum lift and a sit lift, and can include the auxiliary anchor point attachment 700 for changing the centre of gravity of the user when suspended. The sit lift is done via the front loop. The user may swap out the urban rig into a swim rig which is itself designed to be buoyant. The swim rig comprises the same vest with the dorsal and sternum lift system and the sit harness but without the MOLLE belt

120. The sit harness 130 may itself have a front belt anchor point and a rear belt anchor point so that it can connect to the vest 110 without the MOLLE belt. In the swim rig, the best has the side flanks to provide buoyancy. The sit harness 130 may be part of the system.

[0097] The swim rig has positive buoyancy and has attachments for a life preserver unit attached to the buckles on the side of the vest which meet the 150N self-righting horizon requirement for Safety Of Life At Sea (SOLAS). It also completes the full maritime interdiction requirements of any exclusive economic zone. Without the life preserver unit, the swim preserver unit meets the interdiction requirements for littoral but does not self-right. The swim rig has a special secondary oral inflation device on the front of the vest for the littoral requirements.

[0098] The system 100 is designed so that it can be jump compatible out of an airplane. In this rig, the belt 100 may be arranged to be a MOLLE belt and be attached to a yoke. Alternatively, the belt 100 may be provided with or without the MOLLE belt and attached to a load vest. A load vest is a simple vest without ballistic protection or any of the anchor points mentioned herein. As the front loop is still provided in this system the yoke and load vest rigs may still be provided for sit lifts. The system is also scuba-rebreather compatible.

[0099] The system is tested and compliant with all operational zones C1 to A1 (STANAG 2895) from -40° to +50°.

[0100] The system is also complaint with BSEN 361, 365 and the 2312 Generic Soldier Architecture requirements.

[0101] The system meets air crew requirements. The anchor points from the back may be attached to the deck of the plane or to the roof of the plane. The system also meets requirements for winching for search and rescue and is Short Term Air Supply (STAS) compliant.

[0102] Throughout this description, anchor points have been described, which may be described as belay point anchors.

[0103] Where a structural feature has been described, it may be replaced by means for performing one or more of the functions of the structural feature whether that function or those functions are explicitly or implicitly described.

[0104] The term 'comprise' is used in this document with an inclusive not an exclusive meaning. That is any reference to X comprising Y indicates that X may comprise only one Y or may comprise more than one Y. If it is intended to use 'comprise' with an exclusive meaning then it will be made clear in the context by referring to "comprising only one.." or by using "consisting".

[0105] In this description, reference has been made to various examples. The description of features or functions in relation to an example indicates that those features or functions are present in that example. The use of the term 'example' or 'for example' or 'can' or 'may' in the text denotes, whether explicitly stated or not, that such features or functions are present in at least the described example, whether described as an example or not, and that they can be, but are not necessarily, present in some of or all other examples. Thus 'example', 'for example', 'can' or 'may' refers to a particular instance in a class of examples. A property of the instance can be a property of only that instance or a property of the class or a property of a sub-class of the class that includes some but not all of the instances in the class. It is therefore implicitly disclosed that a feature described with reference to one example but not with reference to another example, can where possible be used in that other example as part of a working combination but does not necessarily have to be used in that other example.

[0106] Although examples have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the claims.

[0107] Features described in the preceding description may be used in combinations other than the combinations explicitly described above.

[0108] Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

[0109] Although features have been described with reference to certain examples, those features may also be present in other examples whether described or not.

[0110] The term 'a' or 'the' is used in this document with an inclusive not an exclusive meaning. That is any reference to X comprising a/the Y indicates that X may comprise only one Y or may comprise more than one Y unless the context clearly indicates the contrary. If it is intended to use 'a' or 'the' with an exclusive meaning then it will be made clear in the context. In some circumstances the use of 'at least one' or 'one or more' may be used to emphasis an inclusive meaning but the absence of these terms should not be taken to infer and exclusive meaning.

[0111] The presence of a feature (or combination of features) in a claim is a reference to that feature or (combination of features) itself and also to features that achieve substantially the same technical effect (equivalent features). The equivalent features include, for example, features that are variants and achieve substantially the same result in substantially the same way. The equivalent features include, for example, features that perform substantially the same function, in substantially the same way to achieve substantially the same result.

[0112] In this description, reference has been made to various examples using adjectives or adjectival phrases to describe characteristics of the examples. Such a description of a characteristic in relation to an example indicates that the characteristic is present in some examples exactly as described and is present in other examples substantially as described.

[0113] Whilst endeavoring in the foregoing specification to draw attention to those features believed to be of importance it should be understood that the Applicant

may seek protection via the claims in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not emphasis has been placed thereon.

Claims

1. A system comprising:

a vest;
wherein the vest comprises:

a front portion;
a rear portion;

wherein the front portion and rear portion are connected at least by shoulder straps;
wherein the rear portion comprises a first rear anchor point and a second rear anchor point;
the system additionally comprising a belt, wherein the belt comprises:

a rear belt anchor point; and
means for coupling a waist portion of a sit harness to the belt such that a front belt anchor point of the sit harness and the rear belt anchor point of the belt are located on opposite sides of the belt;

wherein the second rear anchor point of the vest is configured to be coupled to the rear belt anchor point of the belt by first coupling means;
wherein the first rear anchor point of the vest is configured to couple to a rope to enable dorsal ascent and dorsal descent of the user.

2. A system as claimed in claim 1, wherein the front portion of the vest comprises a first front anchor point and a second front anchor point, wherein the second front anchor point of the vest is configured to be coupled to the front belt anchor point of the sit harness by second coupling means;
wherein the first front anchor point of the vest is configured to couple to a rope to enable sternum ascent and sternum descent of the user.

3. A system as claimed in claim 2, wherein the system additionally comprises leg loops, wherein the leg loops comprise a rear strap connecting the leg loops and a front strap connecting the leg loops;

wherein the rear strap is configured to couple to the rear belt anchor point of the belt;
wherein the front strap is configured to couple to the front belt anchor point of the sit harness.

4. A system as claimed in claim 3, wherein the first rear anchor point of the vest is linked to the second rear anchor point of the vest;
wherein the first front anchor point of the vest is linked to the second front anchor of the vest;
wherein the interconnection of the front anchor points, the front belt anchor point, the leg loops, the rear-load bearing loop and the rear anchor points enables:
the system to spread load applied to the first rear anchor point when the user is having a dorsal ascent or a dorsal descent or is in an arrest fall whilst rope is attached to the first rear anchor point; and also enables:
the system to spread load applied to the first front anchor point when the user is having a sternum ascent or a sternum descent or is in an arrest fall whilst rope is attached to the first front anchor point.

5. A system as claimed in claim 4, wherein the first rear anchor point and the second rear anchor point are parts of a single first loop, wherein a portion of the first loop is concealed behind a front layer of the rear portion of the vest, and wherein the portions of the first loop forming the first rear anchor point and the second rear anchor point emerge from the front layer of the rear portion of the vest;
wherein the first front anchor and second front anchor are parts of a single second loop, wherein a portion of the second loop is concealed behind a front layer of the front portion of the vest, and wherein the portions of the second loop forming the first front anchor point and second front anchor point emerge from the front layer of the front portion of the vest.

6. A system as claimed in claim 5, wherein the vest additionally comprises a rear ballistic protection plate and a front ballistic protection plate;
wherein at least part of the first loop overlies the rear ballistic protection plate, wherein the first loop is configured to disperse at least part of the load applied to it over the rear ballistic protection plate when the first loop is pressing the rear ballistic protection plate into the user's back;
wherein at least part of the second loop overlies the front ballistic protection plate, wherein the second loop is configured to disperse at least part of the load applied to it over the front ballistic protection plate when the second loop is pressing the front ballistic protection plate into the user's chest.

7. A system as claimed in claim 6, wherein the rear portion of the vest comprises rear padding located so that at least two edges of the rear ballistic protection plate disperse the load applied by first loop to the rear padding, thereby dispersing the load away from the user's spine; and
wherein the front portion of the vest comprises front padding located so that at least two edges of the

front ballistic protection plate disperse the load applied by second loop to the front padding, thereby dispersing the load away from the user's sternum.

8. A system as claimed in any of claims 2 to 7, wherein the system additionally comprises an auxiliary anchor point attachment, wherein the auxiliary anchor point attachment comprises attachment means for attachment to the first front anchor point and the second front anchor point;
wherein the auxiliary anchor point attachment comprises one or more auxiliary anchor points, wherein attaching the rope for a sternum ascent or sternum descent to each different auxiliary loop instead of the first front anchor point changes the user's centre of gravity whilst ascending or descending.

9. A system as claimed in any preceding claim, wherein the vest comprises secondary item attachment buckles configured to attach secondary items to the vest.

10. A system as claimed in any preceding claim, wherein the vest additionally comprises two side flanks, wherein the side flanks are configured to hold soft armour inserts, wherein one side flank connects the front portion of the vest to the rear portion of the vest by buckles on one side and the other side flank connects the front portion of the vest to the rear portion of the vest by buckles on the other side.

11. A system as claimed in any of claims 1 to 9, wherein the system additionally comprises two side snatches, wherein one side snatch connects the front portion of the vest to the rear portion of the vest by buckles on one side and the other side snatch connects the front portion of the vest to the rear portion of the vest by buckles on the other side.

12. A system as claimed in any preceding claim, wherein the belt comprises attachment means for attaching the belt to the vest and to other torso items when the vest is not connected to the belt; and/or
wherein the belt is a Modular Lightweight Load-carrying Equipment (MOLLE) belt with the rear belt anchor point.

13. A system as claimed in any preceding claim, wherein the means for coupling the waist portion of the sit harness to the belt comprises a sleeve that runs around the majority of the length of the belt; and/or
wherein the system additionally comprises the waist portion of the sit harness, wherein the waist portion of the sit harness comprises a quick out buckle configured to fasten the sit harness around the user's waist, wherein the sit harness comprises a second rear belt anchor configured to couple to the second rear anchor point of the vest by the first coupling means.

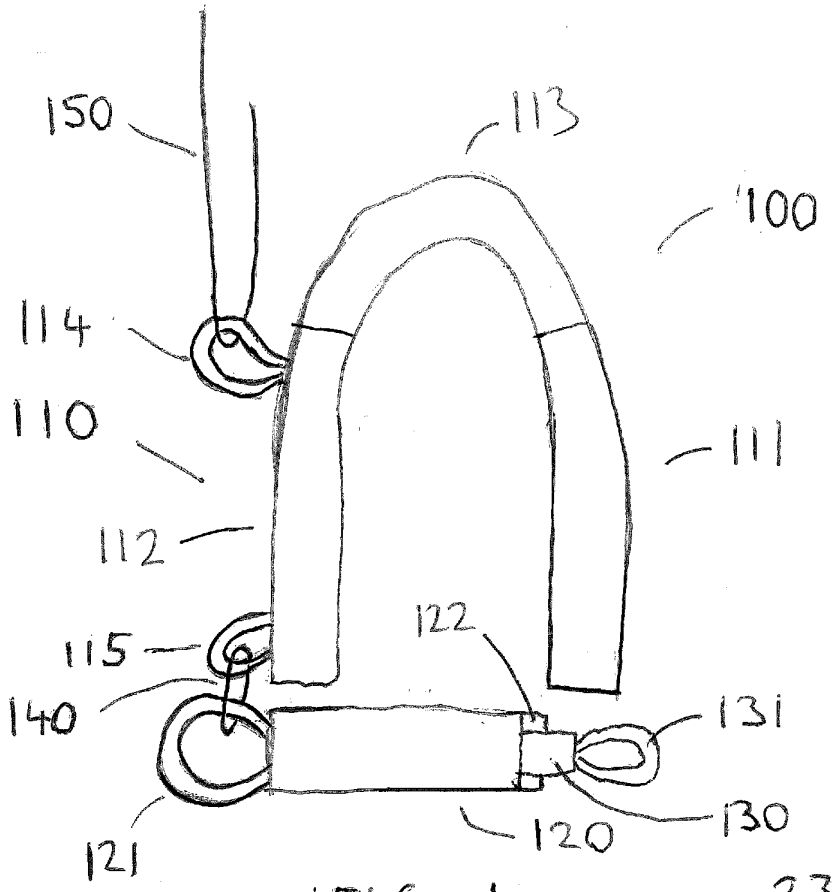
14. A vest comprising:

a front portion;
a rear portion;

wherein the front portion and rear portion are connected at least by shoulder straps;
wherein the rear portion comprises a first rear anchor point and a second rear anchor point;
wherein the second rear anchor point of the vest is configured to be coupled to a rear belt anchor point of a belt by first coupling means;
wherein the first rear anchor point of the vest is configured to couple to a rope to enable dorsal ascent and dorsal descent of a user.

15. A belt comprising:

a rear belt anchor point; and
means for coupling a waist portion of a sit harness to the belt such that a front belt anchor point of the sit harness and the rear belt anchor point of the belt are located on opposite sides of the belt;
wherein the rear belt anchor point of the belt is configured to couple to a second rear anchor point of a vest by first coupling means.


150
113
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114
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112
122
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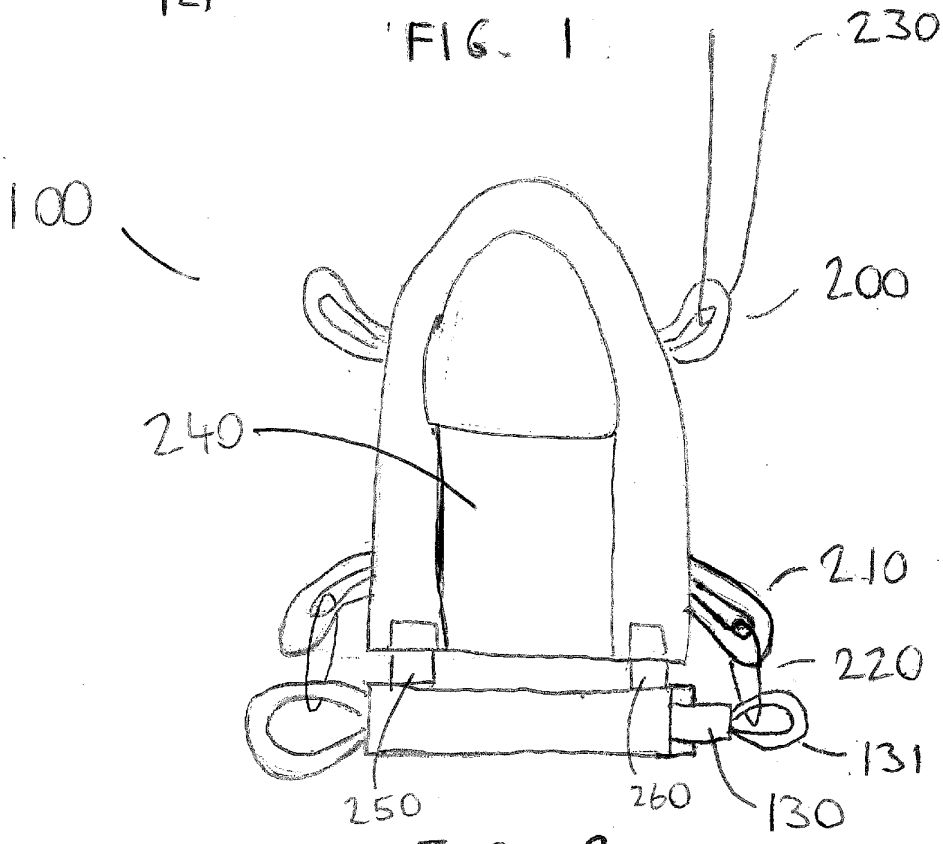
130
120
121

FIG. 1


230
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210
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131
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260
130

FIG. 2

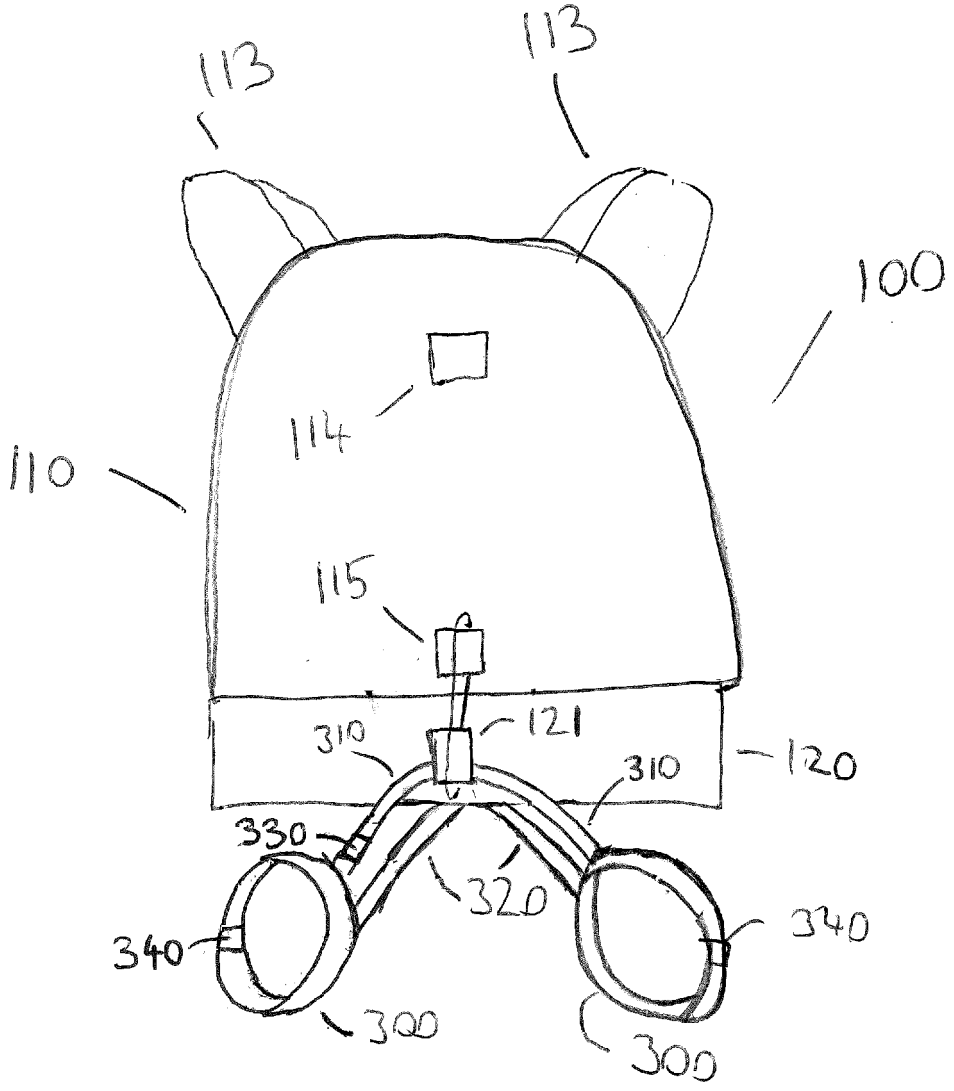

FIG. 3

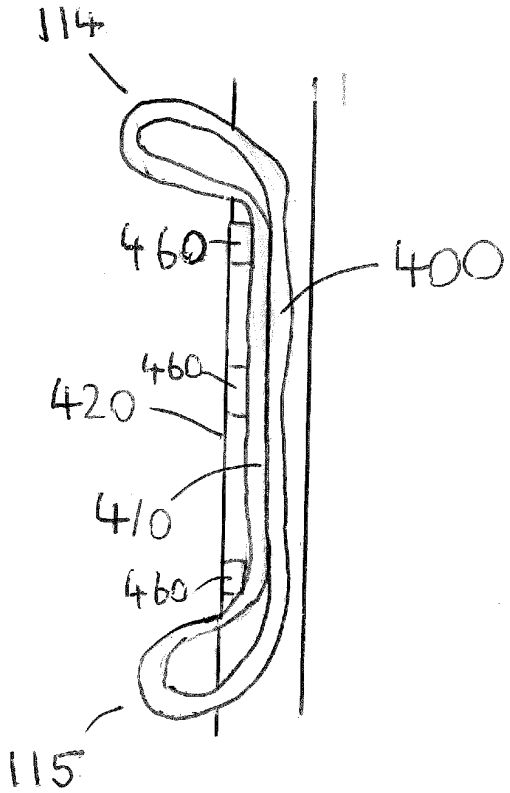

FIG. 4A

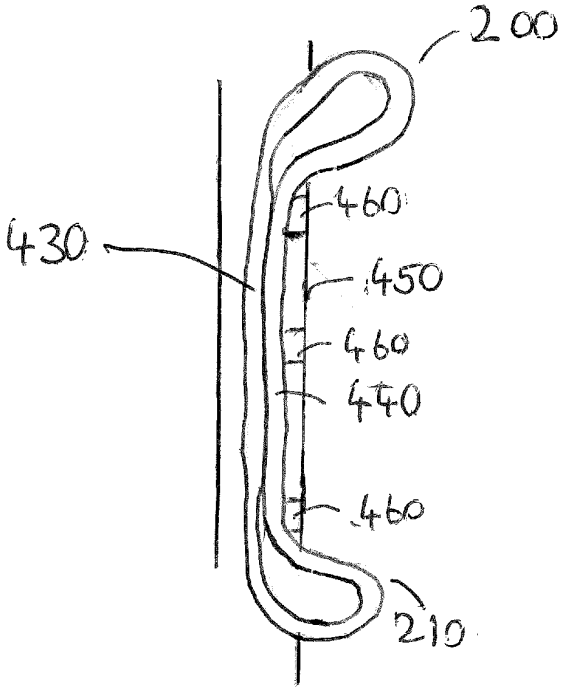

FIG. 4B

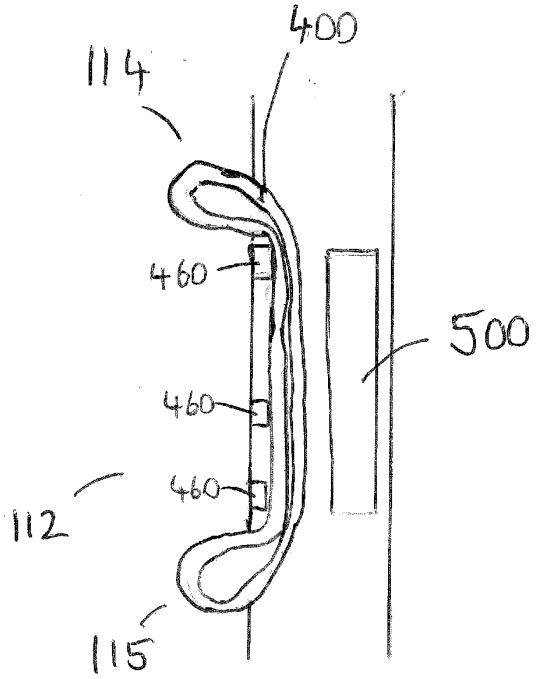

FIG. 5A

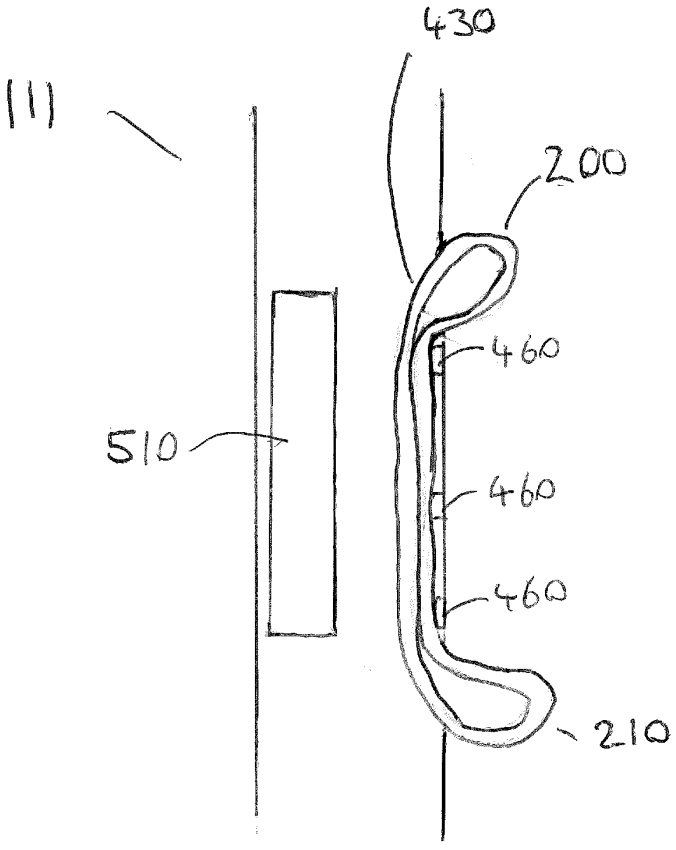

FIG. 5B

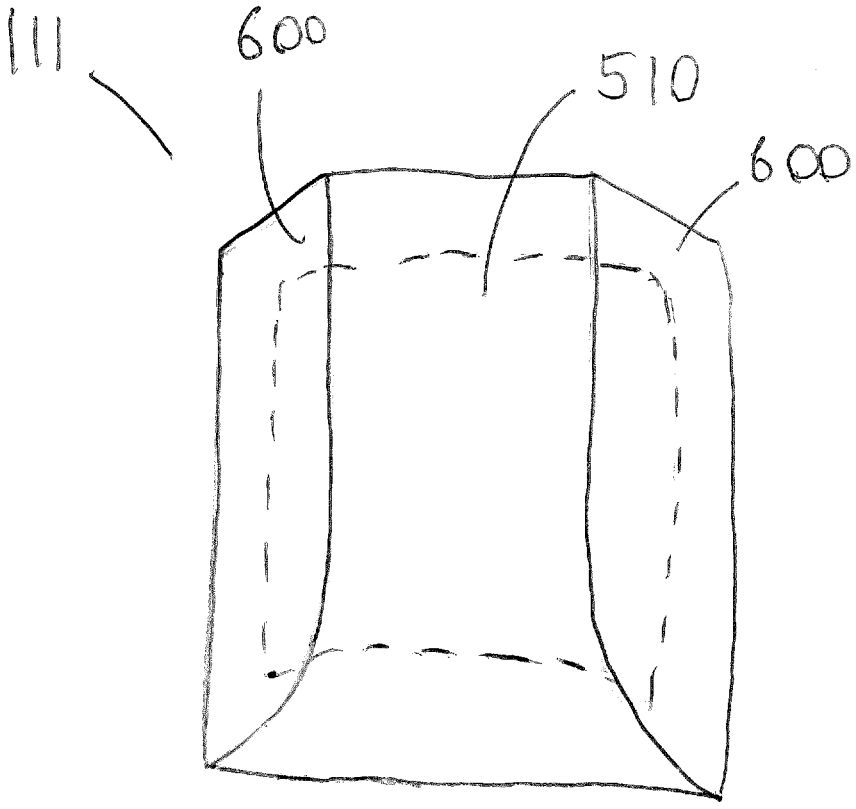

FIG. 6

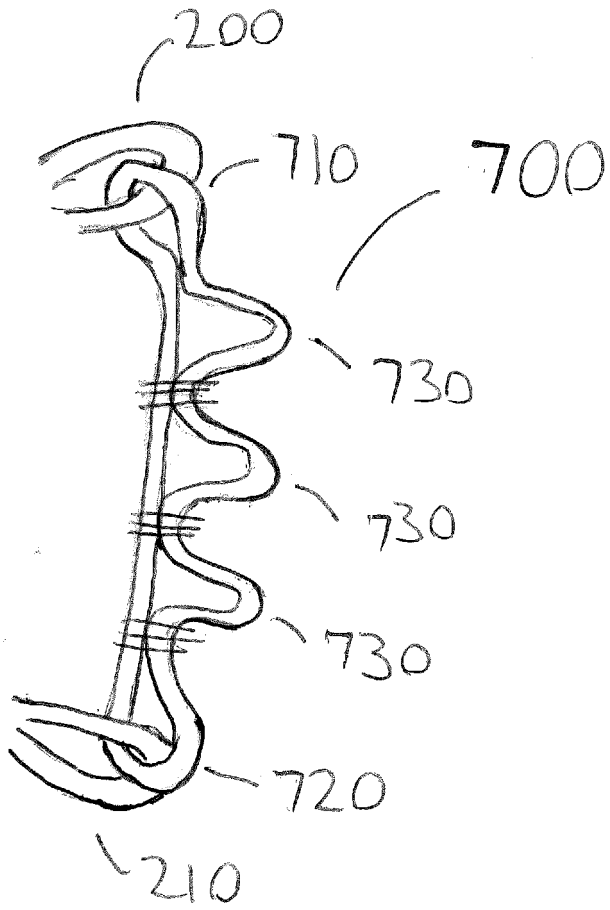

FIG. 7

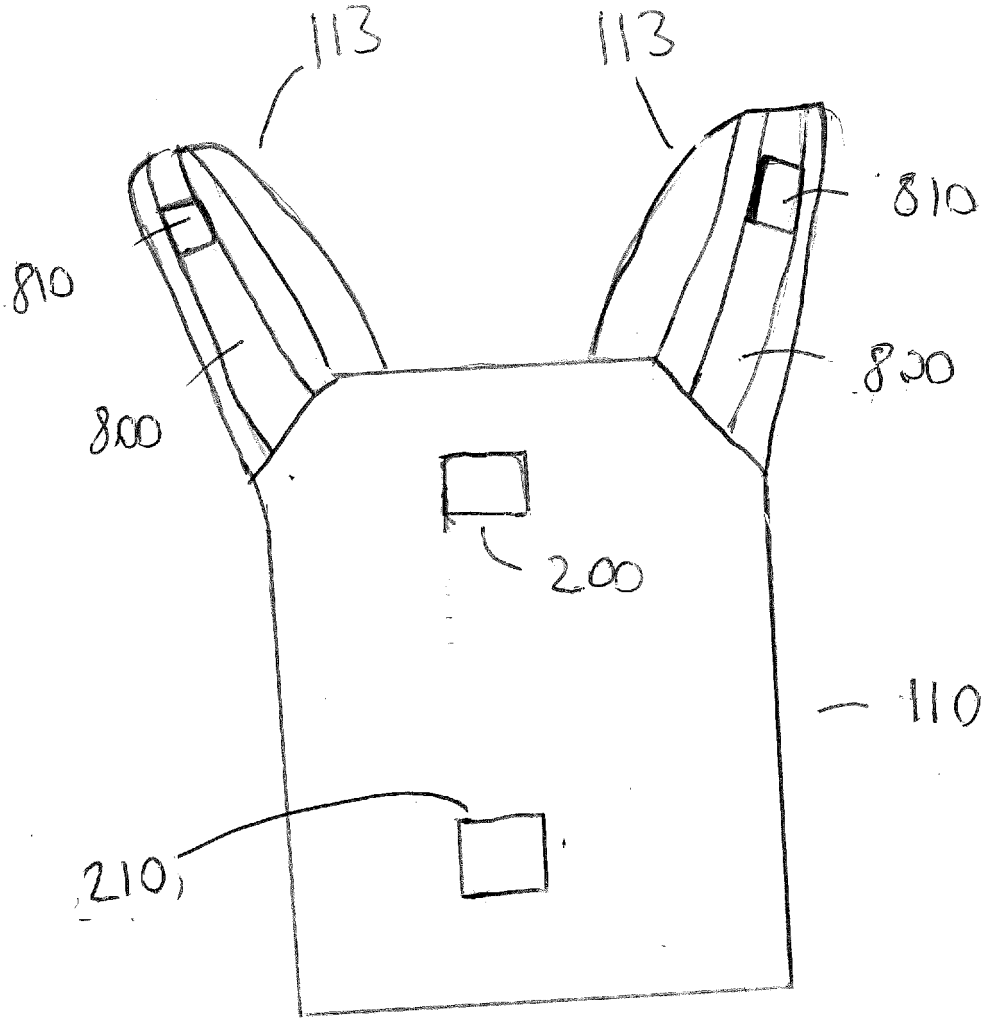

FIG. 8

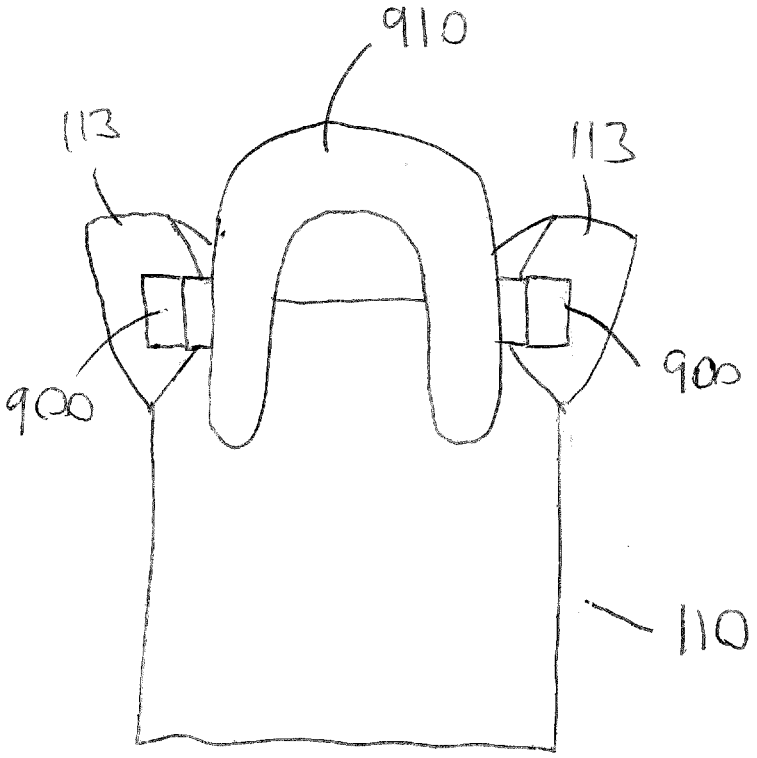

FIG. 9A

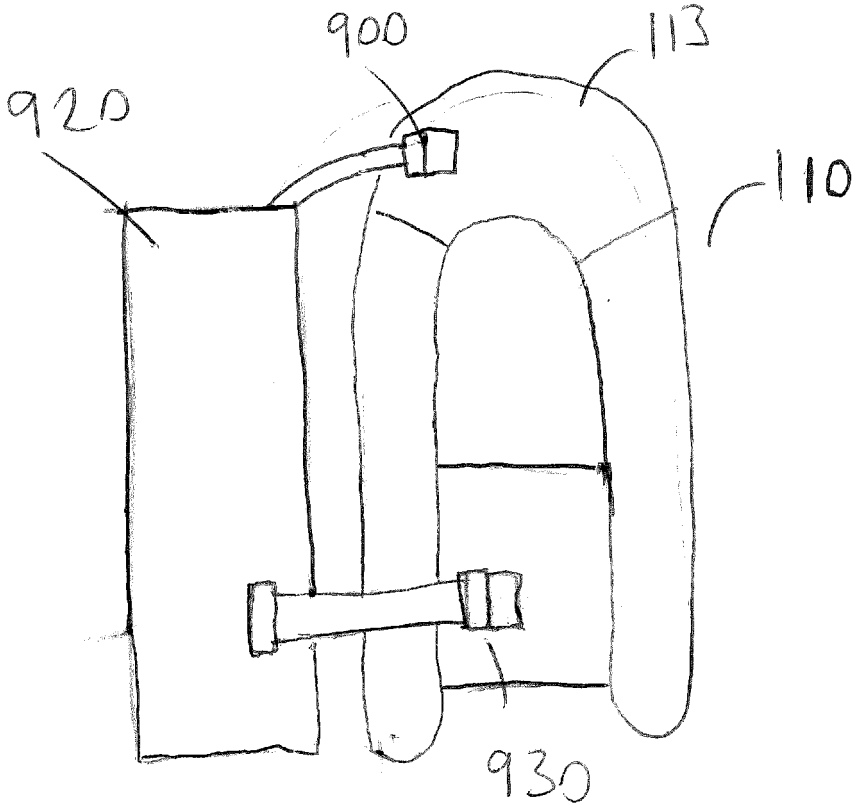

FIG. 9B

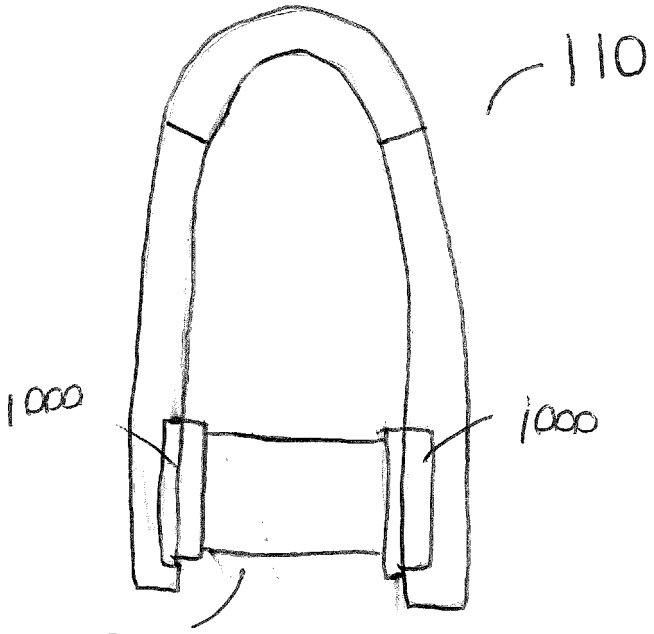

FIG. 10A

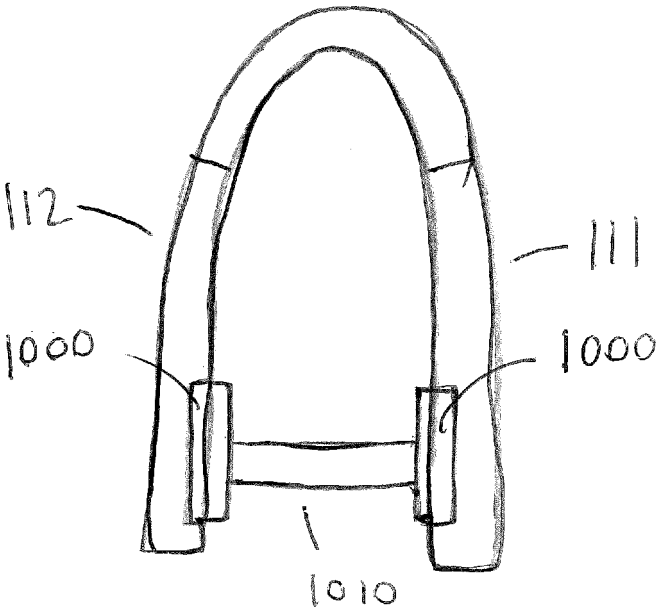

FIG. 10B

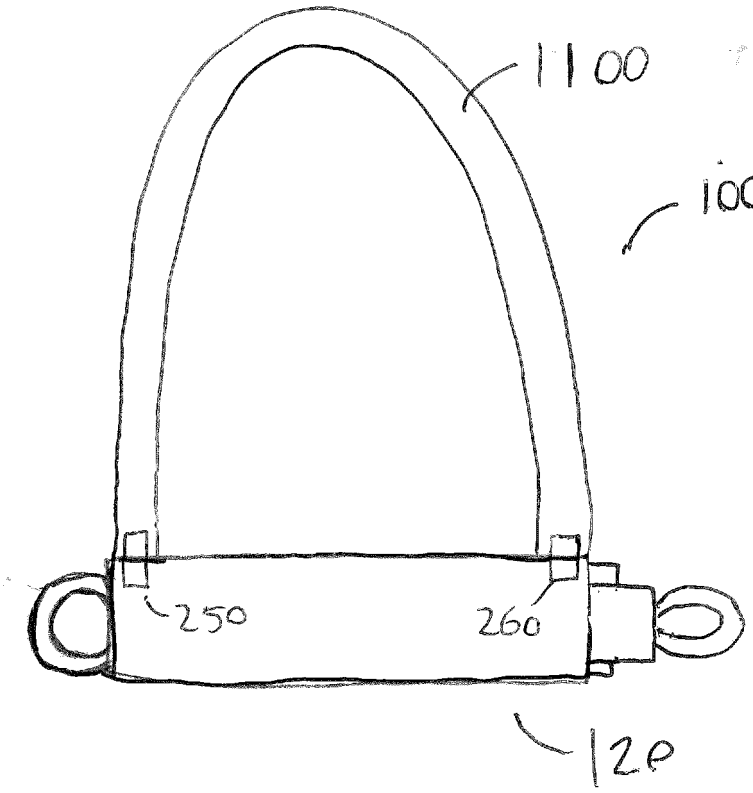

FIG. 11

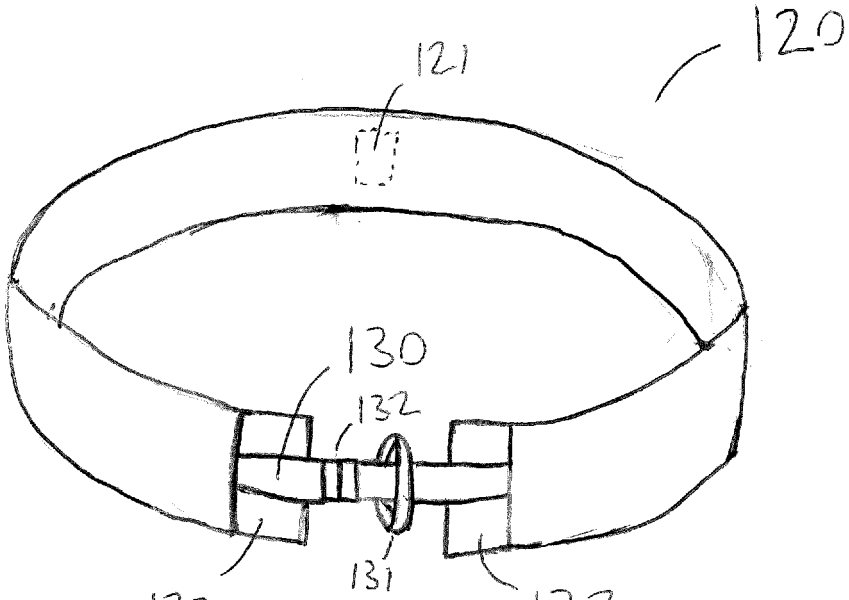

FIG. 12A

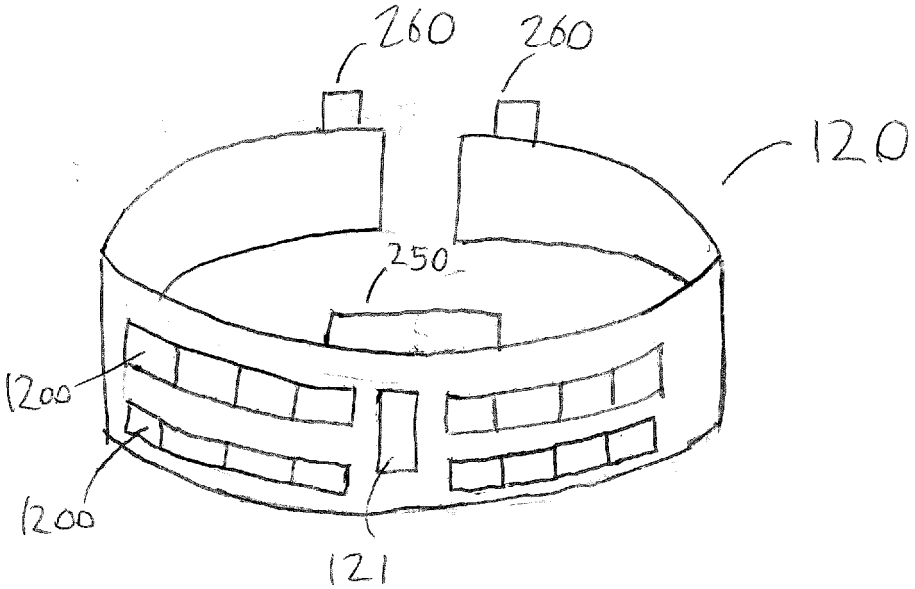

FIG. 12B

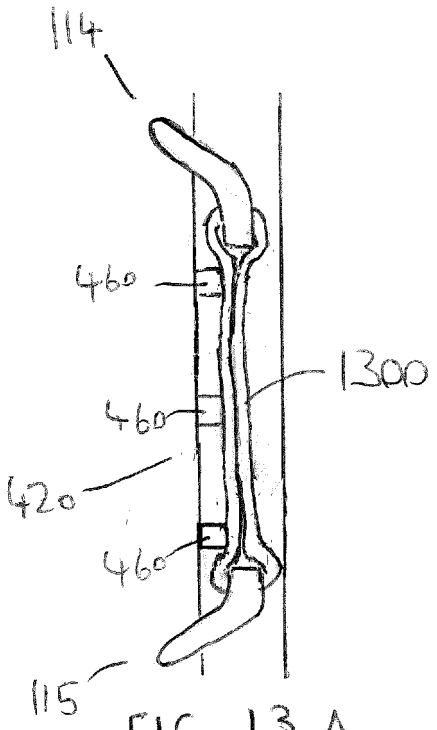

FIG. 13 A

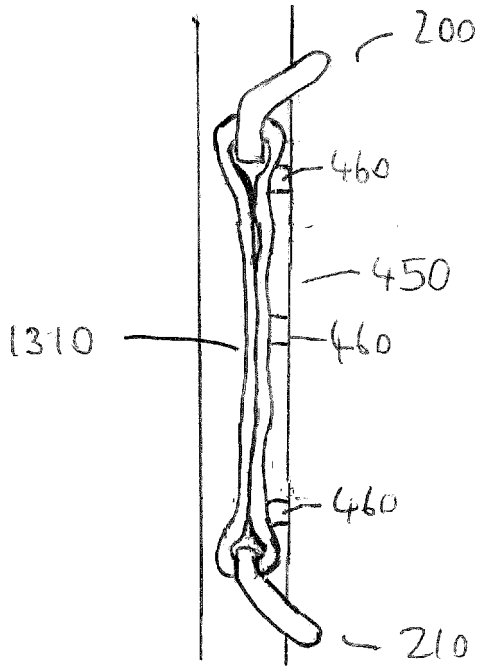

FIG. 13B

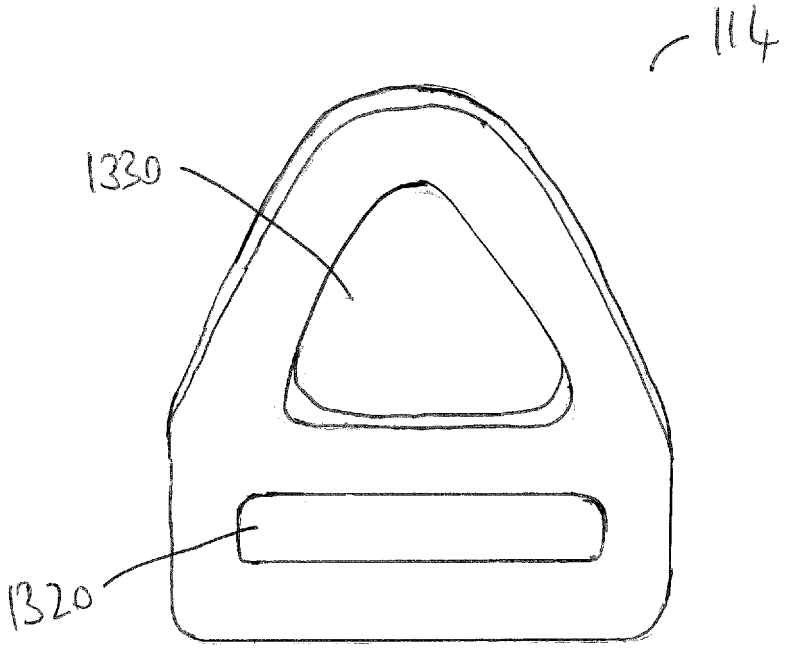

FIG. 13C

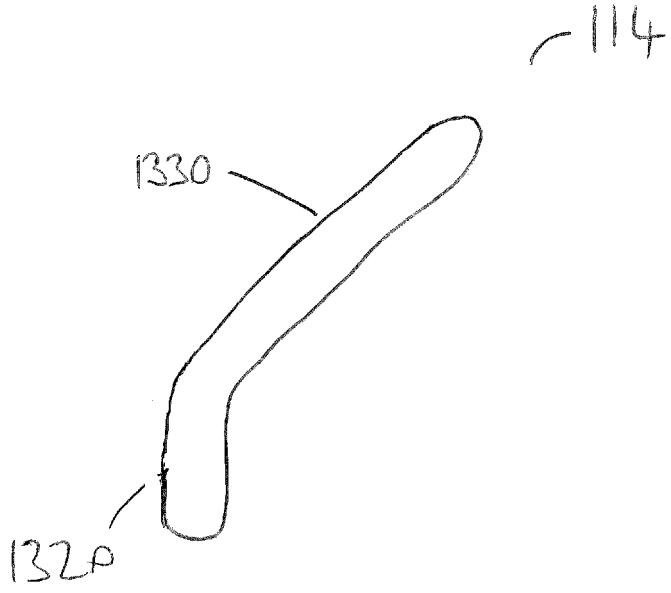

FIG. 13D

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 18 6806

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 6 367 582 B1 (DERBY RONALD C [US]) 9 April 2002 (2002-04-09) * figures 1-3 * * column 3, line 41 - column 4, line 47 * * claims * -----	1-5,8,9, 11-15 6,7,10	INV. A62B35/00
X Y	CA 2 316 763 A1 (DERBY RONALD C [US]) 28 February 2002 (2002-02-28) * figures 1-3 * * page 7, line 1 - page 8, line 24 * * claims * -----	1-5,8,9, 11-15 6,7,10	
X Y	US 5 544 363 A (MCCUE PATRICK O [US] ET AL) 13 August 1996 (1996-08-13) * figures 1-4, 8 * * column 2, line 63 - column 4, line 14 * -----	14 1-13	
X Y	DE 199 53 689 A1 (HEIM GMBH [DE]; SCHMOLKE KARL HEINZ [DE]) 10 May 2001 (2001-05-10) * paragraph [0050] - paragraph [0060] * * figures * -----	14 1-13	TECHNICAL FIELDS SEARCHED (IPC)
X Y	EP 1 712 259 A2 (CAMP SPA [IT]) 18 October 2006 (2006-10-18) * figures 1, 2 * * paragraph [0043] - paragraph [0048] * -----	15 1-13	A62B
Y	US 2010/088799 A1 (CARTER PAUL [US]) 15 April 2010 (2010-04-15) * paragraph [0011] - paragraph [0020] * -----	6,7,10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 December 2020	Cardin, Aurélie

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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