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(54) A RUCKSACK

(57) A harness for a rucksack. The harness is configured to be at least in part in contact with user's back in use. The harness comprises a back portion, and at least one strap extending from the back portion. The strap is a shoulder strap extending from the top end of the back portion or a hip portion extending from the back portion arranged to extend around a portion of a user's torso in use. The harness is of knitted construction, and the knitting pattern varies in density across the harness.

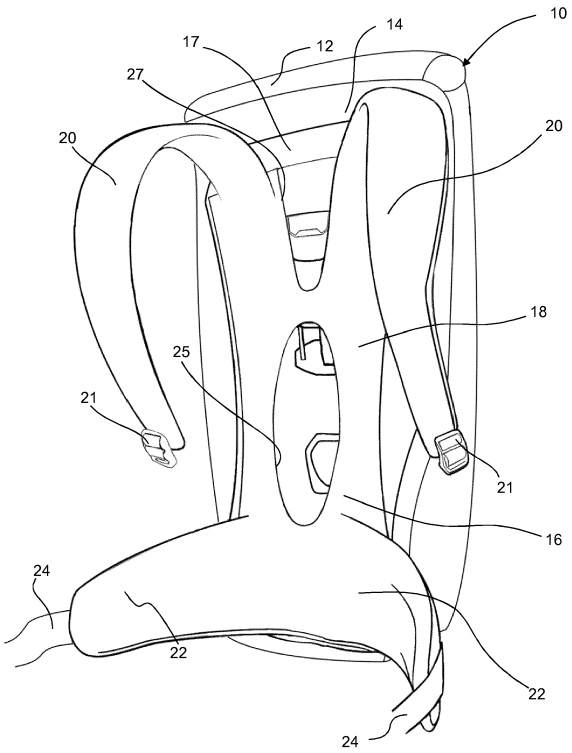

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a harness for a rucksack, a rucksack, a method of manufacturing the harness, and a method of manufacturing the rucksack.

BACKGROUND OF THE INVENTION

[0002] A rucksack (sometimes referred to as a backpack, or simply a pack) comprises a storage compartment, for storing whatever a user requires within and a means for attaching the rucksack to a user with the compartment in contact with a user's back. Rucksacks are typically used for outdoor leisure or travel activities such as hiking, running, climbing etc, where the combination of durability, lightweight, comfort and carrying capacity is desirable.

[0003] The storage compartment may be divided into separate sections, and may have various pockets attached to the outside, to increase the overall storage space of the rucksack. The storage compartment is generally formed from woven panels of material, stitched together to form the shape of the storage compartment. Woven fabric is formed by weaving. It is produced on a loom, and usually frays at the edges, unless techniques are used to counter it, such as hemming, e.g. by attaching binding material over the fraying edge. Separate attachments can also be stitched into the storage compartment to make any openings closable, e.g. zips and buckles.

[0004] A harness for a rucksack is usually attached to a rear face of the storage compartment, to enable a user to carry the rucksack on their back. A harness generally includes a back panel secured to the rear face of the storage compartment, and shoulder straps extending from a top end of the back panel. The harness may also include hip portions extending from a bottom end of the back panel, intended to wrap around the hips of a user like a belt, to help distribute the weight of the pack.

[0005] The harness is often part of a 'back system' that attaches to the storage compartment of the rucksack. In one type of back system, the back panel of the harness is relatively lightweight and tensions a resilient flexible plate in a portion of the wall of the storage compartment adjacent the harness, such that the plate bows away from the back panel, to create an air gap that can increase the comfort of a user by keeping their back cooler than if the storage compartment contacts their back directly.

[0006] The separate components of the rucksack are generally manufactured separately, before the rucksack is then assembled. However, this assembly process can be expensive. The separate components are stitched together manually, meaning there are significant labour costs. Also, during manual assembly of the rucksacks it can be difficult to align the components accurately and reliably, potentially resulting in inconsistent products. Further, seams can represent a point of weakness and potential failure, so the greater the number of seams required, the greater the potential for failure of the pack.

[0007] In addition, the nature of the stitching process can mean additional components need to be included in the rucksacks to make it possible to stitch components together. For example, to attach binding material to the edges of mesh material that can be used in the back panel or shoulders (to stop the mesh material from fraying), a substrate may need to be placed between the binding material and mesh material. A seam can then be stitched to the substrate and binding material to hold it on the mesh material. This increases the cost of each rucksack, as well as increasing the overall weight of the rucksack, and decreases the breathability of the mesh.

[0008] Figure 7 shows an example of a typical rucksack 210 according to the prior art incorporating the bowed arrangement described above. It has a harness 216 that is part of a back system 217. The harness 216 has a back portion 218 with shoulder straps 220 extending from a top end of the back portion 218. It can be seen that the back portion 218 is made from a mesh material, with a binding strip 219 stitched on the sides of the back portion 218, to stop the mesh material from fraying. Although not visible in the figure, a substrate 215 is required, to attach the binding strip 219 to, as the mesh material cannot be stitched directly. This type of back system 217 also requires at least one connector 221 to fasten the vertically split sections of the back portion 218 to one another. Each connector 221 must be stitched in to the binding strip 219, which must be done manually. In addition, to avoid ruching of the mesh material it needs to be accurately stitched to a rear face 214 of the storage compartment.

[0009] Further, if a waterproof rucksack is required, the seams where components are joined together represent a potential point of where water ingress can occur. To combat this, tape is installed on the inside of the seam to strengthen the seam and help seal it against water ingress. Alternatively, the seam can be an adhesive, but there is a prejudice against this construction on the part of end users. Nevertheless, both methods are labour intensive and costly. The greater the number of seams, the greater amount of taping or adhesive that is required, and the greater the amount of labour needed, further adding to cost.

SUMMARY OF THE INVENTION

[0010] A first aspect of the invention provides a harness for a rucksack. The harness is configured to be at least in part in contact with the user's back in use, preferably comprising a back portion, at least one strap extending from the back portion and wherein the harness is of knitted construction. Advantageously the harness being knitted rather than manually assembled may reduce assembly costs, with a lower risk of misaligned, inconsistent products being produced. Forming the harness from knitted material may also improve its breathability.

[0011] The harness preferably comprises one or two shoulder straps extending from the top end of the back portion.

[0012] The, or each shoulder strap of the harness is preferably integral with the back portion. The shoulder strap and back portion are preferably all one piece, so there are no seams required to connect components together. This can be advantageous as seams may represent a weak point of the rucksack, and in waterproof rucksacks, can be an area where water ingress can occur. Forming them in one piece also saves on labour.

[0013] The harness preferably comprises two hip portions extending from the back portion, and arranged to extend around a portion of a user's torso in use. Each hip portion of the harness is also preferably integral with the back portion.

[0014] The back portion of the harness preferably comprises an internal cavity for locating padding material, to provide cushioning in use. Forming the cavity within the back portion may make it easy to insert padding material during assembly of the rucksack. This is advantageous as the padding material might be replaceable during the life of the rucksack, without having to replace the whole rucksack.

[0015] The, or each shoulder strap of the harness preferably comprises an internal cavity for locating padding material, to provide cushioning in use.

[0016] Each shoulder strap of the harness preferably extends from a front face of the back portion, and each shoulder strap preferably comprises an opening in a front and/or a rear face, a path being defined from each opening to the internal cavity of the shoulder strap.

[0017] Each shoulder strap of the harness is preferably integral with a top edge of the back portion wherein the back portion preferably comprises at least one opening in a rear face, a path being defined from each opening to the internal cavity of the shoulder strap.

[0018] Each hip portion of the harness preferably comprises an internal cavity for locating padding material, to provide cushioning in use.

[0019] Each hip portion of the harness preferably extends from a front face of the back portion, and the back portion preferably comprises at least one opening in a rear face, a path being defined from each opening to the internal cavity of the hip portion.

[0020] Each hip portion of the harness preferably comprises an opening in a front and/or rear face, a path being defined from each opening to the internal cavity of the hip portion.

[0021] The knitting pattern of the harness preferably varies in density across the harness and is optionally tighter at locations of greater stress. This helps to ensure an efficient use of material, as a greater amount of material is used at the stress points, but less is used at points of less stress.

[0022] The knitting pattern of the harness is preferably relatively open where greater air flow through the harness is desired, such as the back portion.

[0023] A second aspect of the present invention provides a back system for a rucksack comprising a harness of the first aspect and optionally a curved stiffening element to create an air gap between the back portion and stiffening element.

[0024] A third aspect of the present invention provides a rucksack comprising a harness and/or a back system according to the first and/or second aspects respectively, the harness being manufactured using a knitting machine to knit the harness.

[0025] According to a fourth aspect of the invention, there is provided a rucksack comprising a knitted component, wherein the component is preferably a tubular strap or a storage compartment. The storage compartment is preferably manufactured from a one piece construction, this is advantageous as minimal assembly is required, reducing costs.

[0026] The storage compartment of the rucksack is preferably generally tubular and closed off at a bottom end to define a void within the storage compartment.

[0027] The storage compartment of the rucksack is preferably generally sock-like, to define a void within the storage compartment.

[0028] The storage compartment of the rucksack preferably has an internal surface, and the surface is treated to be water resistant.

[0029] A flap portion of the rucksack preferably extends from a top end of the storage compartment, the flap portion is preferably configured to extend over an opening to the void when in a closed position, to close off the storage compartment.

[0030] A harness of the rucksack is preferably integral with the storage compartment, wherein the harness is of knitted construction and preferably comprises at least one shoulder strap.

[0031] Each shoulder strap of the rucksack is preferably generally tubular. This is advantageous as knitting the shoulder straps in a tubular form means there is no internal stitching needed to hold the two faces together, which can often create a messy seam.

[0032] The harness of the rucksack preferably comprises two hip portions for helping to form a belt around a user when the rucksack is in use.

[0033] A fifth aspect of the present invention provides a method of manufacturing a rucksack or a harness for a rucksack using a knitting machine to knit at least a portion of the rucksack.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a rear perspective view of a rucksack according to an embodiment of the invention;

Figure 2 is a cross-sectional view through the ruck-

sack of Fig. 1;

Figure 3 is a cross-sectional view through a rucksack of an alternative embodiment of the invention;

Figure 4 is a cross-sectional view through a rucksack of an alternative embodiment of the invention on the line 4-4 of Figure 5;

Figure 5 is a rear view of the rucksack of Fig. 4;

Figure 6 is a side view of the rucksack of Fig. 4; and

Figure 7 is a perspective view of a backpack according to the prior art.

DETAILED DESCRIPTION OF EMBODIMENT(S)

[0035] Referring to Figure 1, a rucksack is indicated generally at 10. The rucksack 10 comprises a storage compartment 12, the storage compartment 12 having a rear face 14. In this embodiment, a harness 16 forms part of a back system 17, the back system 17 being attached to the rear face 14 of the storage compartment 12.

[0036] The harness 16 has a back portion 18 which is generally planar and extends substantially vertically in use. The back portion 18 is attached to the storage compartment at top and bottom ends of the rear face 14. The rear face 14 of the storage compartment forms a bowed arrangement with the rest of the back system 17, to define an air gap between the back portion 18 and the rear face 14 of the rucksack 10 when the back system 17 is attached to the rucksack 10. The rear face 14 can be provided with at least one resilient stiffening element 26 that extends at least part of the length of the rear face 14. In use, the back portion 18 is secured adjacent the top and bottom of the stiffening element and is in tension to restrain the stiffening element 26 and form a bowed or curved shape, also curving the rear face 14 away from the back portion 18, creating the air gap. This allows enhanced ventilation of the wearer's back, minimising the likelihood of excess perspiration.

[0037] Extending from a location adjacent a top end of the back portion 18 are two elongate shoulder straps 20. In use, the shoulder straps 20 sit on the shoulders of a user to support the weight of the rucksack 10. A fastening device, for example a buckle 21, can be secured to a free end of each shoulder strap 20, or to webbing attached to the shoulder strap 20, to enable the free end of the shoulder strap 20 to be attached to the rucksack 10 by a band, the band and the fastening device forming an adjustable arrangement to vary the length of the band as required (not shown).

[0038] Extending from a bottom end of the back portion 18 in a transverse direction are two hip portions 22. The hip portions 22 are arranged to extend around the hips of a user in use, to form a belt. They can be clipped together by way of a strap 24 attached to each hip portion, the two straps 24 connected by a fastening device (e.g. a side release buckle, not shown).

[0039] The harness 16 is of knitted construction. In knitting, fabric is formed by the intermeshing of loops of thread or yarn - i.e. the thread has a meandering path. Generally, knitted fabric is more breathable and has greater elasticity in all directions compared to woven fabric, where threads are straight and are interlaced perpendicular to one another, so generally only stretch diagonally. However elasticity of knitted fabric may be controlled by using a relatively close knit, and/or or by use of suitably non-elastic materials. One advantage of knitting is that edges of knitted fabric are not prone to fraying.

[0040] In this embodiment, the shoulder straps 20 and the hip portions 22 are integral with the back portion 18. The entire harness 16 is knitted as one piece, using a complete garment knitting machine, such as the computer controlled V-bed flat knitting machines made by Shima Seiki MFG., LTD. of Japan and H. Stoll GmbH & Co. KG of Germany. This is weft knitting and can advantageously produce a seamless product. It is possible to create several types of tubular formed knitting as well as build varied design structures on tubular knitted garments simultaneously using this process.

[0041] In this embodiment, the back portion 18 is formed as a single layer knit with a central hole 25 and with an upper V 27 formed therein to further enhance airflow. In addition the back portion has generally scalloped sides. In other embodiments, no such holes or recesses are provided and the back portion may be a substantially rectangular sheet. In other embodiments, multiple holes may be provided.

[0042] The back portion 18, shoulder straps 20 and/or the hip portions 22 can include cushioning to make the rucksack 10 more comfortable for a user to wear. As shown in Figure 2, in this embodiment, the shoulder straps 20 have an internal cavity 28, and the hip portions 22 have an internal cavity 30. The internal cavities 28, 30 are for locating padding material, such as foam material, within, to provide cushioning when the rucksack 10 is in use. In the embodiment shown in Figure 2, each shoulder strap 20 extends from a front face 32 of the back portion 18. Each shoulder strap 20 has an opening 36, and a path is defined from the opening 36 to the internal cavity 28 of the shoulder strap 20. Padding material, such as a foam pad, can be inserted through the opening 36 to be located in the internal cavity 28. In figure 2, the opening 36 is located in a rear face of the shoulder strap 20, but could also be in a front face of the shoulder strap 20.

[0043] Alternatively, as shown in Figure 3, each shoulder strap 20 is integral with a top edge of the back portion 18. In this alternative embodiment, each opening 36 is in a rear face 34 of the back portion 18, and a path is defined from the opening 36 to the internal cavity 28 of the shoulder strap 20, such that padding material can be inserted into the internal cavity 28.

[0044] It will be appreciated that the position of the

opening 36 may be varied, as long as a path is defined to the internal cavity 28 of the shoulder strap 20. Any combination of the location of the shoulder straps 20 and the location of the opening 36 may be used even if not shown in the figures, e.g. the shoulder straps 20 may be integral with the top edge of the back portion 18 but the opening may be provided in the front face of the shoulder strap 20.

[0045] The openings may be stitched closed once foam has been inserted.

[0046] Although not shown in the figures, openings may also be provided for inserting padding material into cavities of the back portion 18 and the hip portions 22.

[0047] It will be appreciated that by using a knitted construction, seamless tubular components can be made with internal cavities for locating padding material and/or inserting and securing webbing. By seamless, we mean that the component is not brought together such that two portions abut and a run of stitching or adhesive is used connect them together, i.e. the component is continuous. The internal cavities may be tapered, and the padding to fit within may also be tapered. The components may also be knitted to form a natural curved shape. For example, the shoulder straps 20 may be knitted so that they naturally curve away from the back portion 18 in a downwards direction. By forming straps as integral tubular forms, the labour required to stitch flat panels of conventional woven material to form a tube is avoided, and a better finish may be obtained.

[0048] Further "bulges" (not shown) may be integrally knitted into the face of the back portion 18 or the walls of the shoulder straps 20 or hip portions 22 to accommodate a block of padding, without requiring pleats and the like.

[0049] Figures 4 and 5 show an alternative embodiment. It is similar to the embodiment of figures 1 to 3, except the harness 116 and storage compartment 112 of the rucksack 110 are integral. The rucksack 110 is substantially entirely of knitted construction. The rucksack 110 can be formed in one piece on a V-bed flat knitting machine or other suitable automated knitting machine in a similar way to a t-shirt, with the storage compartment 112 being formed as a tube, and shoulder straps 120 extending from the tube like the sleeves on a t-shirt. It is preferable for the shoulder straps 120 to be formed simultaneously with the storage compartment, but they may be formed separately and the rucksack 110 assembled later.

[0050] Hip portions 122 may also extend from the storage compartment 112 and may also be integral. The storage compartment 112 is sock-like, being formed with a closed off bottom end to define a void 140 of the storage compartment 112, where a user can store items. Alternatively, the storage compartment 112 can be formed as a tube with open ends, and the bottom end closed off later to define the void 140. There is an opening 142 in the top end of the storage compartment that leads to the void 140.

[0051] The storage compartment 112 has an internal surface. In this embodiment, the internal surface is treated to be water resistant, e.g. it may have a waterproof membrane attached such as an OUTDRY® membrane provided by OutDry Technologies S.r.l. of Italy. In other embodiments a water resistant membrane may not be required, or a separate water resistant "drop in" liner may be utilised

[0052] As shown in Figure 6, a flap portion 144 extends from the top end of the storage compartment 112. The flap portion 144 is shown in an open position in Figure 6, where the opening 142 of the storage compartment 112 is not covered, and a user is free to put items into the storage compartment 112. The flap portion 144 can be moved in the direction of the arrow on Figure 6 to a closed position. In the closed position, the flap portion 144 extends over the opening 142 of the storage compartment 112, to help retain items within the storage compartment 112. A fastening member (not shown), such as a buckle or zip, holds the flap portion 144 in the closed position until the user wants to open the rucksack, e.g. to remove an item.

[0053] Alternatively, there may be no flap portion 144, and the opening 142 can be closed by using other fastening means, such as a zip, a buckle, or a drawstring arrangement.

[0054] The knitting pattern may be varied at different locations of the rucksack 10, 110, e.g. the knit is tighter at areas of high stress and more open where greater ventilation is needed, e.g. on the back panel 18.

[0055] Different colours of thread or different stitches can also be used within the rucksack. Specific colours or stitches may indicate different things, for example, in the first embodiment, the thread colour or stitch type may be different at the point on the back portion 18 where it is to be stitched to the rear face 14. This can help the components to be easily aligned where assembly is necessary. A different colour of thread or stitch may also be used to indicate the point on the shoulder strap that should sit on top of a user's shoulders, to help the user correctly adjust the shoulder strap, or to denote a particular adjustment position. Such markings are less easy to achieve in prior art construction methods without potentially significant wastage of material when individual panels are cut from a sheet of fabric.

[0056] A range of different materials can be used as yarn to form the knitted components, for example nylon or polyester. It is preferable if the yarn is non-stretch and twisted from multiple strands or filaments. Each component of the rucksack may be knitted individually, i.e. to form discrete component such as a shoulder strap or flap portion that can then be assembled with other components to form a complete rucksack. The waist portions are not essential; the rucksack may just have shoulder straps. In further embodiments, the rucksack may have a storage compartment and waist belt only; in other words be a so-called belt pack or bum bag, which is relatively small, and so does not require shoulder straps.

[0057] Features of different embodiments may be combined. For example the rucksack 110 may have internal cavities within the shoulder straps 120, hip portions 122 and within an external surface of the storage compartment 112 for locating padding material. The openings to the internal cavities may be located in any appropriate place so that a path is defined to the internal cavities, so the padding material can be inserted.

[0058] In other embodiments knitted components may be used in conjunction with different back systems. For example the back system may comprise foam that is secured to the rear of the back panel, with air flow depressions therein, or the foam may be a sheet inserted into a pocket of the back portion.

[0059] In some embodiments other discrete components may be knitted and attached to a rucksack of more conventional general construction. For example a lid with a storage pocket therein may be seamlessly knitted.

[0060] A suitable knitting machine for manufacture of the harness and/or the rucksack described above is available at the Tong Siang Co Ltd (Yeh Group) plant of Samutsakorn, Thailand.

[0061] Although the invention has been described above with reference to one or more preferred embodiments, it will be appreciated that various changes or modifications may be made without departing from the scope of the invention as defined in the appended claims.

Claims

1. A harness (16) for a rucksack, the harness configured to be at least in part in contact with user's back in use, the harness (16) comprising a back portion (18), and at least one strap extending from the back portion (18), the strap being a shoulder strap (20) extending from the top end of the back portion (18) or a hip portion (22) extending from the back portion (18) arranged to extend around a portion of a user's torso in use, wherein the harness (16) is of knitted construction, and

   characterised in that the knitting pattern varies in density across the harness (16).

2. The harness (16) of claim 1, wherein the knitting pattern is tighter at locations of greater stress.

3. The harness (16) of claim 1 or claim 2 wherein the knitting pattern is relatively open where greater air flow through the harness (16) is desired, such as the back portion (18).

4. The harness (16) of any previous claim, wherein the harness (16) comprises two shoulder straps (20).

5. The harness (16) of any previous claim, wherein the or each shoulder strap (20) is integral with the back portion (18).

6. The harness (16) of any previous claim, wherein the harness (16) comprises two hip portions (22) extending from the back portion (18).

7. The harness (16) of any previous claim, wherein the or each hip portion (22) is integral with the back portion (18).

8. The harness (16) of any previous claim, wherein the back portion (18) comprises an internal cavity (28) for locating padding material, to provide cushioning in use.

9. The harness (16) of any previous claim, wherein the or each shoulder strap (20) comprises an internal cavity (28) for locating padding material, to provide cushioning in use.

10. The harness (16) of claim 9, wherein each shoulder strap (20) extends from a front face of the back portion (18), and each shoulder strap (20) comprises an opening (36) in a front face or an opening (36) in a rear face, a path being defined from each opening (36) to the internal cavity (28) of the shoulder strap (20).

11. The harness (16) of any previous claim, wherein each hip portion (22) comprises an internal cavity (28) for locating padding material, to provide cushioning in use.

12. The harness (16) of any previous claim, wherein the entire harness (16) is of knitted construction.

13. A back system (17) for a rucksack (10) comprising a harness according to any previous claim and a curved stiffening element to create an air gap between the back portion (18) and stiffening element.

14. A rucksack comprising the harness of any of claims 1 to 12 and/or the back system of claim 13.

15. A method of manufacturing the harness (16) of claim 1 to 12, the method comprising using a knitting machine to knit the harness.

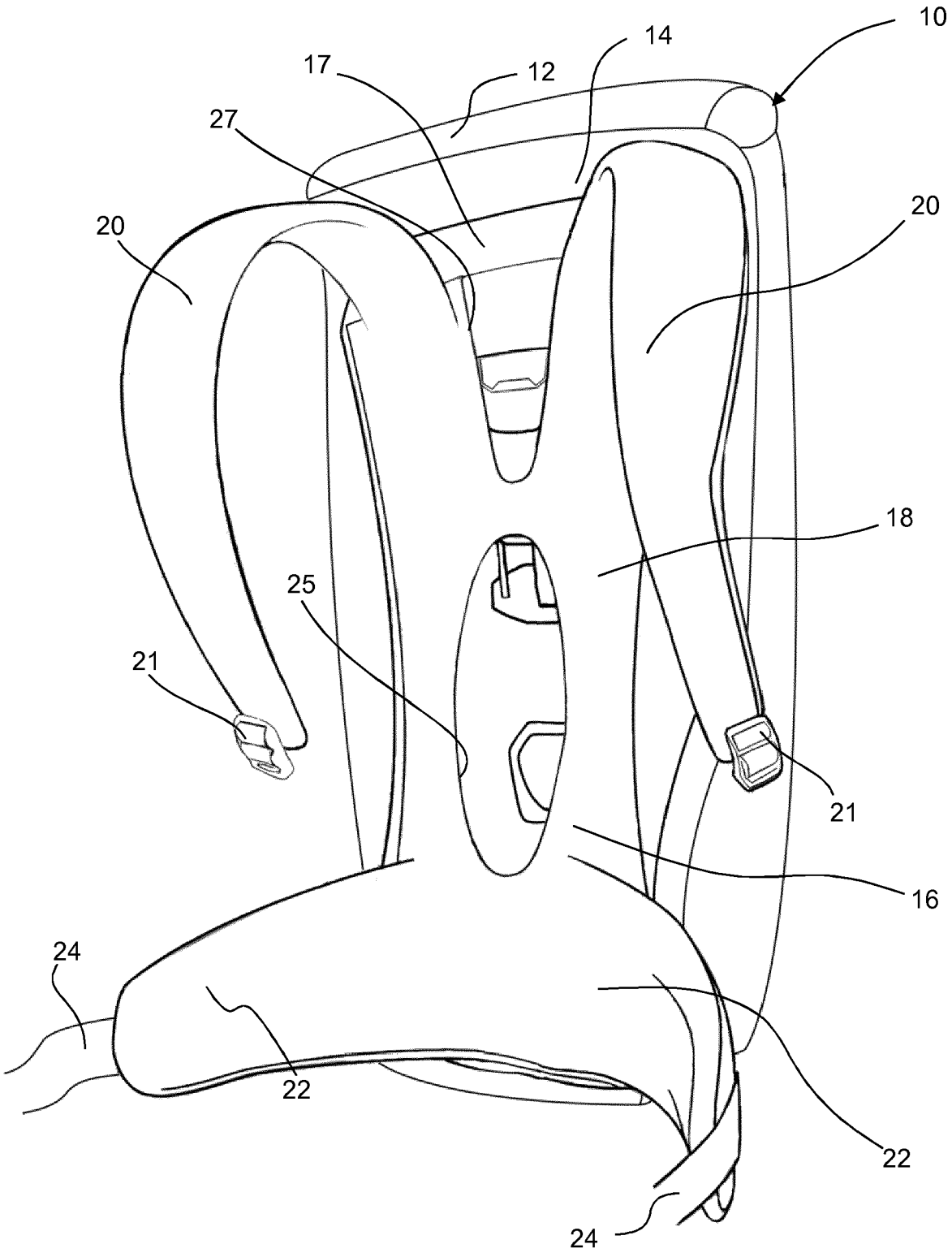

FIG. 1

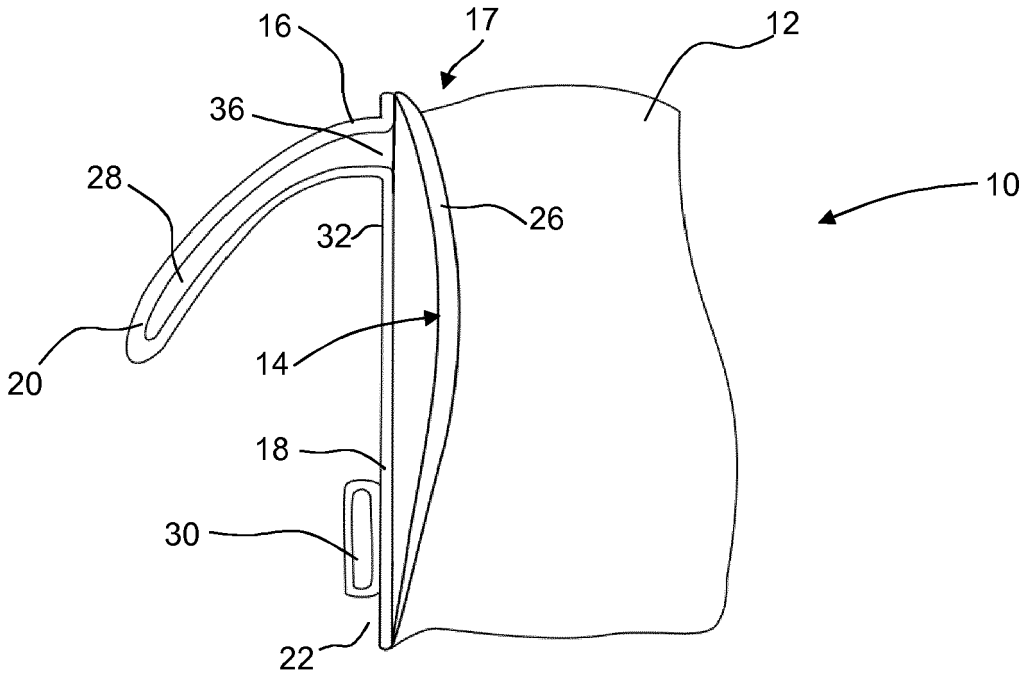

FIG. 2

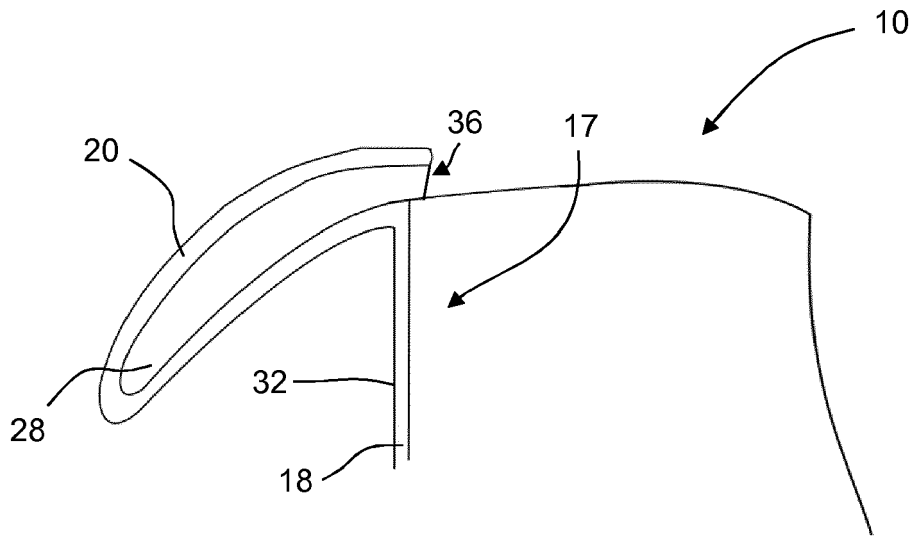

FIG. 3

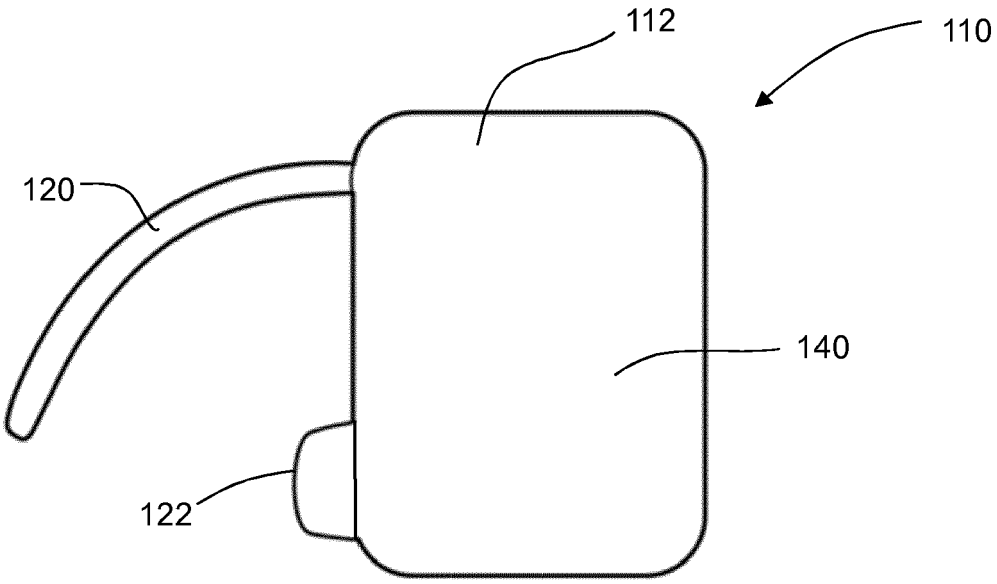

FIG. 4

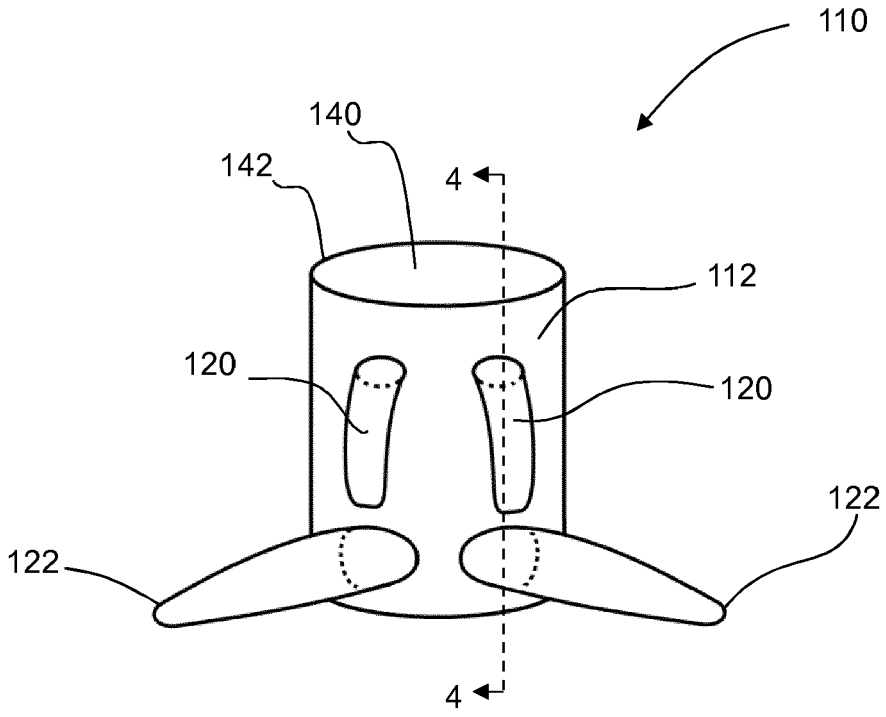

FIG. 5

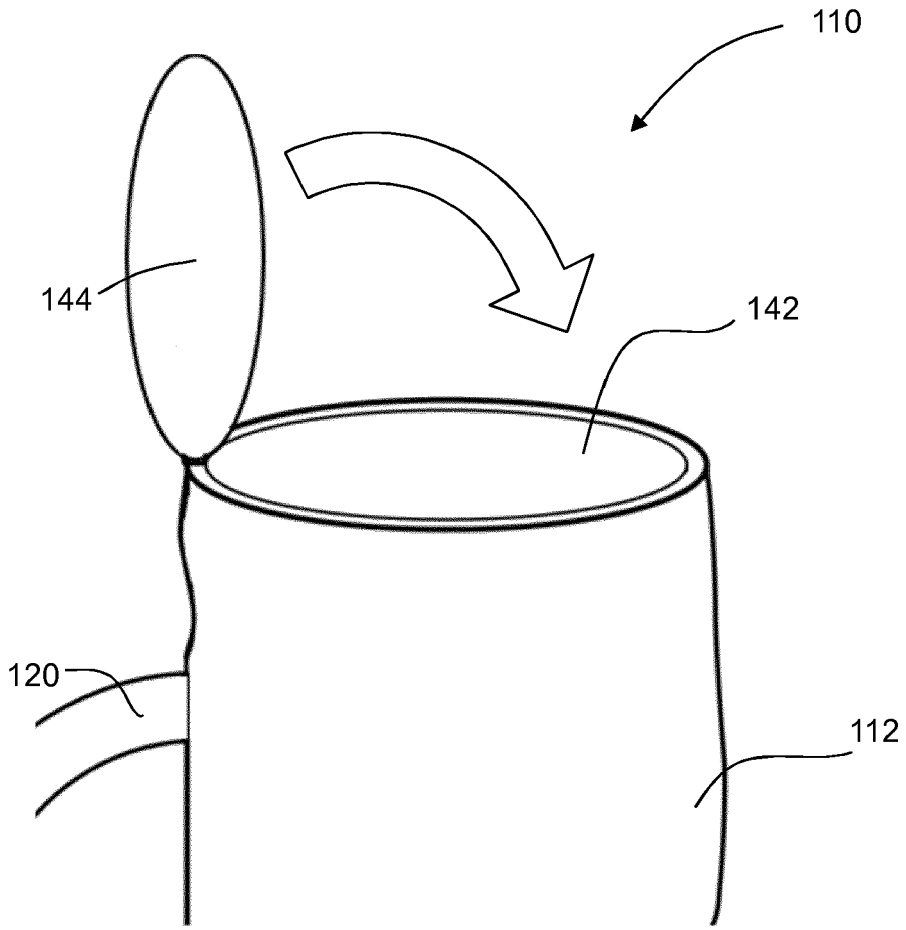

FIG. 6

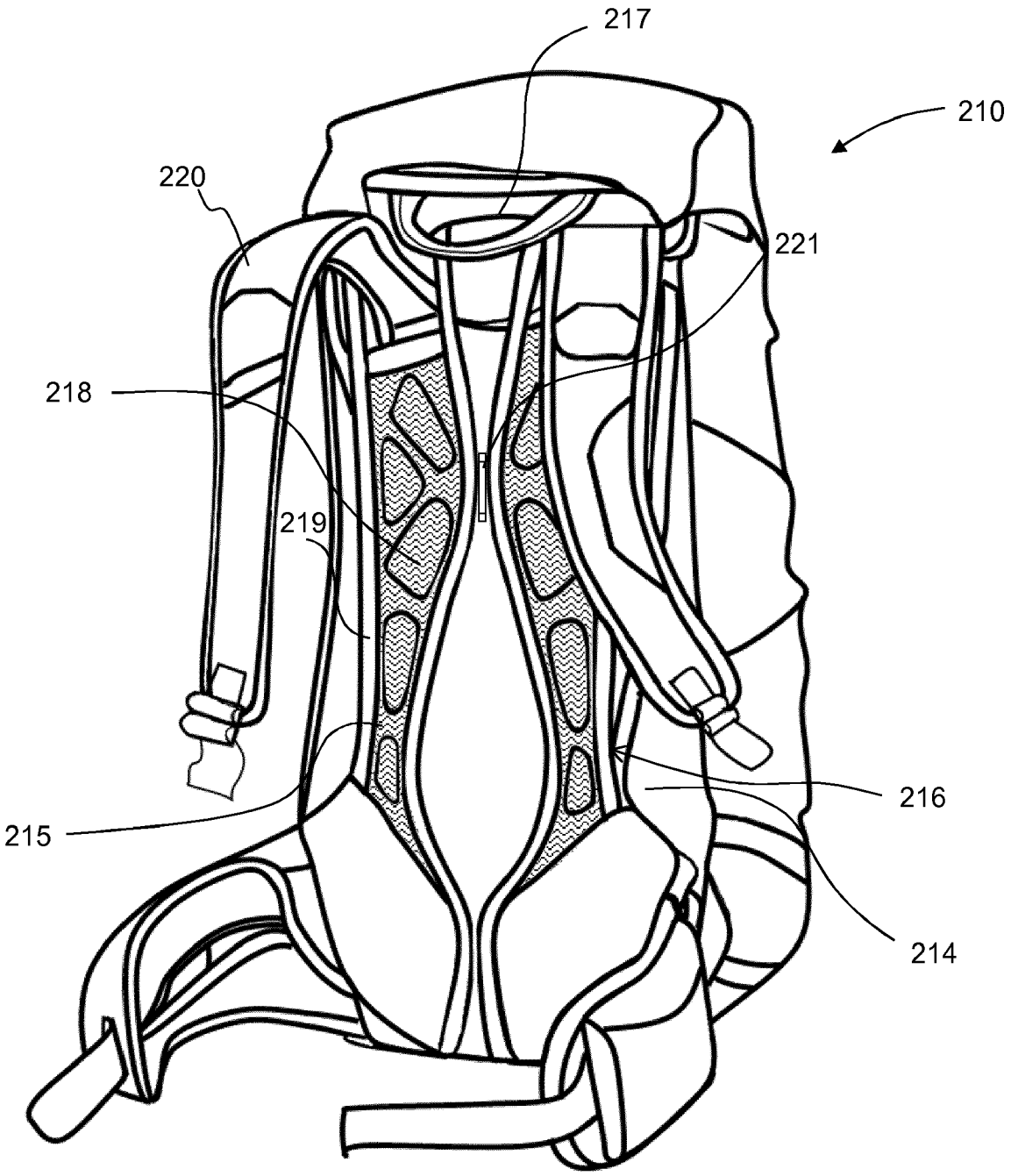

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 17 18 6997

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 November 2017	Nicolás, Carlos

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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