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(54) **IMPROVED BACKPACK**

VERBESSERTER RUCKSACK

SAC À DOS PERFECTIONNÉ

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Description

[0001] The invention to which this application relates is a backpack. In particular, but not limited to a backpack for use by soldiers and ground forces on active duty.

[0002] Outdoor backpacks, rucksacks and the like, for carrying a payload on the back, are well known and in widespread use, see e.g. document FR 2 700 676 A1. Backpacks have been developed for a whole variety of uses and activities including day sacks, expedition sacks, rock climbing sacks, picnic sacks, etc.

[0003] Backpacks for civilian use, where the packs incorporate soft unsupported back panels, are known, as are those with rigid or semi-rigid mounting frames, especially where the frame is covered and forms an integral part of the backpack construction. Also, cushioning inserts are usually provided to increase user comfort. These are invariably integrated into the substance of the pack within the region that contacts the back of the wearer when the pack is being worn.

[0004] Specialist backpacks have long been provided for use by soldiers in combat and assault situations, one of the most common and popular of these in the UK being known as the Bergen. This type of pack has been developed with a particular activity and environment in mind and in consequence includes features less widely known that would not be popular with members of the general public; features which are, nevertheless, essential for the welfare and survival of the user of the equipment.

[0005] Due to their nature and use, most specialist packs utilise external, non-integral, mounting frames. Backpacks that utilise external mounting frames are usually supplied with a bag or sack that has integral padded shoulder straps, shoulder blade cushioning pads, back cushioning supports for the lower back of the wearer, waist belt and buckle straps - all or most of these elements being fixedly attached to the sack by stitching.

[0006] Of course in most combat and assault situations the user of the backpack must be self-supporting and should ideally be able to carry out any running repairs to equipment, etc, whilst still in engagement out in the field. However, the extent of field servicing possible with current systems is severely limited due to the various elements being integrated and permanently stitched to the body of the sack. In some instances releasing methods have been incorporated into bags or backpack configurations, but these are often complex, fiddly, and are not well liked by the soldiers that must use them.

[0007] In addition, backpacks for use by armed forces are often capacious so that all equipment likely to be needed by the user, for extended survival out in the field, can be carried in the one pack.

[0008] The sack of the backpack can be reduced in size to fit more closely around the contents by compressing the sack using lateral side compression straps. However, the extent to which sacks can be compressed is currently restricted, due to the compression straps being mounted only on the external lateral side walls of the sack and also by the construction of the bottom of the sack, which does not allow easy folding. Backpacks are sometimes used to carry guns, missiles and other large pieces of equipment into battle, but this is recognised as improper use of the pack and sometimes leads to accidents due to insecure and/or unbalanced loading. There are currently no specialised carriers available for carrying such equipment.

[0009] Backpacks and foundation garments that have vertically spaced, horizontal straps on their outer surfaces are also known, and are used when it is desired to mount utility bags, pouches and other objects externally, such as with an assault pack. The purpose of an assault pack is to mount as much as possible onto the outside of the pack for easy access and use, thus avoiding the need to go rummaging in a sack looking for a particular item; something that could threaten the wearer's safety.

[0010] However, when capacious backpacks are used in this way, i.e. with external objects mounted using vertically spaced, horizontal straps, and lateral side compression straps fully tightened in order to minimise the size of the sack, this still leaves the backpack bulky and oversize and leads to externally mounted bags and other objects being fitted haphazardly and jostling together when the backpack is in use.

[0011] Soldiers often have to spend many nights away from base and for this reason a survival bag is generally carried in the pack. Whereas survival bags used by members of the general public are brightly coloured, so that they may more easily be found by search teams, in the armed forces the survival bags are camouflaged to make them difficult to spot by enemy forces. However, whilst camouflaging is beneficial when actually using the bag, it makes the folded bag more difficult to find in the pack and for this reason bags are often misplaced or lost. Further, when the folded bag has settled to the bottom of the sack beneath lots of other equipment invaluable time is wasted in looking for it.

[0012] Attaching systems that use interlocking removable straps for the purpose of removably attaching bags, pockets and other objects to a backpack, foundation garment or assault pack that is fitted with vertically spaced, horizontal straps, are known. Attaching systems that facilitate rapid removal of bags and other objects have long been in use, especially where it is desirous to shed weight and/or bulk quickly-such as in situations where rapid and unhindered evacuation over and through rough terrain is necessary.

[0013] An example of prior art relating to such attaching systems is to be found in US5724707A - where the bag or other object to be mounted has at least one locking strap. The at least one locking strap is fixedly attached to the mounting face of the bag or object, this face also being supplied with a plurality of vertically spaced, horizontal straps. The locking strap is intended to be fed through the straps of the foundation garment and the straps of the bag or object, in an alternating manner in order to removably attach the bag or object to the foun-

dation garment or assault pack. The end of the at least one locking strap is then attached via a press stud, or other means, to the bag or object for further security and to guard against accidental detachment or unintended separation of the object from the foundation garment.

[0014] This system suffers from it being very difficult to gain access to thread the locking strap that is attached to the bag or object, alternately through the vertically spaced, horizontal straps of the mounting garment and through those of the object, whilst the garment and object are in close proximity to each other. It can be appreciated that it would also be very difficult to remove the bag or object quickly, as the locking strap must first be removed before the object can be separated from the garment. This action is almost impossible when the soldier is on active duty in the field, or when visibility is poor. The use of at least two straps means that difficulties are doubled.

[0015] US7080430B2 Shows a system wherein the locking strap is separate and independent of the bag or object and in use is pushed into engagement with moulded apertures in the foundation garment or assault pack, and on the mounting surface of the bag or object, the apertures being used in place of horizontal straps. The locking strap, once inserted alternately through the vertically spaced, horizontal straps of the garment and the object apertures, is secured via engagement with a projection which is designed to stand proud of the mounting face of the bag or object.

[0016] This system suffers from the locking strap being difficult to firmly grasp, especially when the soldier is wearing gloves. Moreover the strap must first be disengaged from the projection, access to achieve this being restricted and problematic. Further, at least two straps are required to secure the bag or object adequately. The removal of two or more straps is of course more time-consuming than removing just one!

[0017] The above mentioned systems, and other examples of prior art not referred to here, suffer from inherent shortcomings in that rapid removal of the locking strap or straps and separation of the bag or object from a backpack, foundation garment or assault pack is not easily possible. Security devices provided at the end of the locking strap(s) to facilitate anchorage, such as press studs and the like, invariably snag against the edges of vertically spaced, horizontal straps during attempted removal, invariably causing lengthy delays.

[0018] Locking straps that engage with security devices or projections do not readily disengage when required to do so. Where the locking strap is attached to the bag or other object, access to the back of the bag or object for the purpose of inserting and removing the locking strap is severely restricted, causing frustration and delays.

[0019] Where a plurality of individual locking straps is used, the removal of these straps is time consuming and fiddly - especially when the user is wearing gloves. Soldiers in action must rely on effective and efficient quick-release features; their lives may at times depend on them!

[0020] There thus a benefit in providing an improved backpack which addresses or mitigates one or more of the above problems.

[0021] According to the invention, there is provided a backpack comprising a support frame and a collapsible sack being formed by at least one wall, the wall having inner and outer surfaces, the inner surface defining an internal compartment for containing an item; the sack being mountable on the frame; the at least one wall comprising at least three fold lines along which the at least one wall is foldable so as to form at least one pleat; the pleat is configured such that the outer surface of the wall portion defining the pleat is deployable so as to define an outer compartment for containing an item; the at least one wall being moveable between a first, extended position in which the volume of the internal compartment is maximised and a second, collapsed position in which the at least one wall is folded about the at least three fold lines so as to form the at least one pleat and to minimise the volume of the internal compartment.

[0022] In this way, the internal compartment is moveable between a fully stowed position wherein the volume of the internal compartment is minimised and a fully extended position wherein the volume of the internal compartment is maximised. This allows the backpack to be converted from a normal capacious backpack configuration to a configuration which allows it to form the foundation for an assault pack.

[0023] It is preferred that the at least one wall is foldable so as to form a plurality of pleats.

[0024] Preferably the at least one wall comprises at least three fold lines along which the at least one wall is foldable to define a first pleat and at least two further fold lines along which the at least one wall is foldable to define a second pleat. Specifically, the first and second pleats have a common fold line therebetween.

[0025] Each pleat is preferably configured such that a portion of the outer surface of the wall portion defining the pleat is deployable so as to define an outer compartment for containing an item.

[0026] Preferably the pleat is defined by two outer fold lines and an inner fold line. The outer fold lines preferably have a wall portion extending therebetween, which wall portion may be folded inwards at each outer fold line toward the inner fold line.

[0027] Preferably the inner fold line forms the apex of the pleat and is within the inner compartment when the pleat is fully stowed. In such an arrangement, when the wall is in the first position, the wall portion of the pleat forms an integral part of the fully extended wall of the sack and the outer compartment is no longer defined.

[0028] In certain embodiments, further comprising at least one securing element operable to retain an item contained in the outer compartment(s). More specifically, the securing elements(s) may be an adjustable cord, tape, strap or the like.

[0029] In preferred embodiments, the backpack comprises at least one adjustable element operable to allow

the at least one wall to be moved between the first and second positions. It is preferred that the adjustable element is releasably fixable in at least two positions so as to be operable to retain the at least one wall in at least the first and second positions. It is preferred that the adjustable element is releasably fixable in three or more positions so as to be operable to retain the at least one wall in the first and second positions and any intermediate position therebetween.

[0030] In certain embodiments, the securing element(s) and the adjustable element(s) are one and the same.

[0031] In alternative embodiments, the securing element(s) and the adjustable element(s) are separate.

[0032] The securing element(s) and/or the adjustable element(s) may be an elastic or, alternatively, an inelastic material.

[0033] The adjustable element(s) may be a drawstring or the like as is common in the art.

[0034] In exemplary embodiments, the backpack further comprises at least one fastener element for securing the at least one wall in the second position. The fastener element may be any suitable type known in the art, for example may comprise a strap and buckle arrangement, a snap fastener, a button, a clasp, a zipper or a twist lock.

[0035] In preferred embodiments, the support frame comprises a substantially rigid mounting frame comprising supporting members and attachment points for receiving elements of a modular backpack.

[0036] Preferably the sack is removably attached to the attachment points of the mounting frame by means of webbing, straps or cords.

[0037] The backpack may further comprise a shoulder strap as known in the art. The shoulder strap preferably comprises a shoulder strap element that is removably attached to the mounting frame by threading the shoulder strap element between and around support members of the mounting frame.

[0038] The shoulder strap element may be supplied with a pair of removable cushioned shoulder pads.

[0039] The backpack may also further comprising a pair of shoulder blade cushioning pad elements that are separately and removably attached to one or more support members of the mounting frame. It is preferred that each shoulder blade cushioning pad comprises an outer cover that can be removed from the internal cushion, allowing the pads to be fully serviced or repaired.

[0040] The backpack may comprise a back cushioning support element that is removably attached to one or more support members of the mounting frame.

[0041] In exemplary embodiments, the back cushioning support element comprises an outer cover that can be removed from the internal cushion, allowing the support to be fully serviced or repaired. The outer cover of the back cushioning support element may be constructed to allow the through insertion of a strap, for use as a waist belt.

[0042] Preferably the sack incorporates a transverse pocket across a section of the sack for locating a top edge of the mounting frame and to assist in distributing forces that result from the carriage of a heavy pay load.

[0043] Preferably the backpack may comprises a completely detachable lid.

[0044] According to an example not forming part of the invention, there is provided a backpack comprising of a mounting frame, shoulder straps, cushioning pads, a sack and a lid, the sack having an anterior face, two lateral sides, an outer face that includes multiple vertically spaced, horizontal straps, and a base, the sack being constructed so that the lateral sides can be folded inward to allow the outer face to be pushed back towards the mounting frame, thereby making the backpack suitable for conversion into a substantially flat foundation pack for the purpose of attaching and carrying utility bags and other objects on the outside of the pack, using the multiple vertically spaced, horizontal straps.

[0045] Thus a backpack according to the above mentioned example provides a backpack that includes means for converting the sack to meet a variety of needs and uses.

[0046] Preferably conversion from a backpack to a foundation pack is achieved by inwardly folding the lateral sides of the sack, whilst fully tightening a plurality of lateral-side-mounted compression straps.

[0047] In an example not according to the invention, conversion from a backpack to a low capacity pack is achieved by partial folding of the lateral sides of the sack and partial tightening of lateral-side-mounted compression straps.

[0048] In a further example not according to the invention, the outer face of the sack is fitted with a plurality of compression straps to facilitate conversion of the pack for the carriage of externally mounted cargo.

[0049] Preferably the backpack can be converted to provide dual external mounting bays by full tightening of outer-face-mounted compression straps.

[0050] Preferably the backpack can be converted to provide three external mounting bays by partial tightening of outer-face-mounted and lateral-side-mounted compression straps.

Preferably the backpack also comprises a plurality of vertical compression straps that can be used separately from lid fixing straps and other compression straps.

[0051] In an example not according to the invention, the backpack comprises a sack that incorporates an integral survival bag.

[0052] The backpack thus provides an incorporated survival tool. The survival bag can be used by a user to limit contact with elements such as rain, water, wind or snow which would affect the body temperature of the user or to protect the user from abrasive elements such as sand.

[0053] In addition, the survival bag can be used as a bivouac sack or bivvy bag thus reducing the need for a tent or shelter.

[0054] Preferably the survival bag is fixedly attached

at the mouth of the sack to allow the cargo compartment of the sack to be closed and used for storage whilst the survival bag is in use.

[0055] According to another example not forming part of the invention, there is provided a modular backpack comprising, in combination, a mounting frame that is substantially rigid and comprises supporting members and attachment points for receiving essential elements of a modular backpack; a sack element that is removably attached to the attachment points of the mounting frame by means of webbing, straps or cords; a shoulder strap element that is removably attached to the frame by threading the strap between and around support members of the mounting frame; a pair of shoulder blade cushioning pad elements that are separately and removably attached to one or more support members of the mounting frame, and a back cushioning and support element that is removably attached to one or more support members of the mounting frame, whereby the backpack is fully field-serviceable, the wearer being able to remove and replace all of the above elements without the aid of tools.

[0056] The modular backpack according to the above mentioned example thus provides an improved, fully field-serviceable, modular backpack that incorporates many replaceable features and facilitates rapid and convenient field-servicing when required.

[0057] Preferably the sack element incorporates a transverse pocket across the back face of the sack for locating the top edge of the mounting frame and to assist in distributing forces that result from the carriage of a heavy payload.

[0058] In examples not according to the invention, the sack is supplied with a completely detachable lid.

[0059] Preferably the shoulder strap element is supplied with a pair of removable cushioned shoulder pads.

[0060] In an example not according to the invention, each shoulder blade cushioning pad element comprises an outer cover that can be removed from the internal cushion, allowing the pads to be fully serviced or repaired.

[0061] Preferably the back cushioning support element comprises an outer cover that can be removed from the internal cushion, allowing the support to be fully serviced or repaired.

[0062] Preferably the outer cover of the back cushioning support element is constructed to allow the through insertion of a strap, for use as a waist belt.

[0063] According to another example not forming part of the invention, there is provided a locking strap, for use with a backpack, foundation pack or assault pack that has vertically spaced, horizontal straps for removably attaching bags and other objects, wherein the two ends of the strap are inserted, a transverse distance apart from each other, separately and alternately through the vertically spaced, horizontal straps of a backpack, foundation pack or assault pack, the locking strap ends when fully inserted being then releasably anchored to prevent accidental withdrawal or the locking strap. Thus a locking strap according to the above mentioned example provides a locking strap which overcomes the difficulties currently encountered when attempting to quickly remove and separate utility bags or other objects from the mounting faces of backpacks, foundation packs or assault packs.

[0064] Preferably each of the locking strap ends is anchored using a quick-release anchorage point.

[0065] Preferably the locking strap ends are provided with loops that can be removably attached to security toggles or buttons that are secure to the backpack, foundation pack, assault pack or utility bag.

[0066] More preferably the security toggles or buttons are attached to elastic cord, the other end of which is securely attached to the backpack, foundation pack, assault pack or utility bag.

[0067] Most preferably the security toggles or buttons are attached to elasticised cord loops that are wrapped around one of the horizontal straps of the utility bag, backpack, foundation pack or assault pack and secured by passing the cord loop back over the toggle or button, so that the toggle or button and cord can be easily removed for repair or replacement.

[0068] Throughout the description and claims of this specification, the words "comprise" and "contain" and variations of the words, for example "comprising" and "comprises", means "including but not limited to", and is not intended to (and does not) exclude other components, integers or steps.

[0069] Throughout the description and claims of this specification, the singular encompasses the plural unless the context otherwise requires. In particular, where the indefinite article is used, the specification is to be understood as contemplating plurality as well as singularity, unless the context requires otherwise.

[0070] The invention will now be described by way of non-limiting example, with reference being made to Figures 1 - 6b. Examples not forming part of the invention are shown in Figures 7a -16b.

Figure 1 shows a perspective view of the backpack from the wearer's side;

Figures 2a - 2c portrays views of the sack (detached from its frame for clarity) to show how it can be folded down flat;

Figure 2d is a view as 2c but from the open end of the sack;

Figure 3a is a perspective view from the wearer's side showing compression straps partly tightened and the pack size reduced;

Figure 3b is a sectional view through the reduced pack of Figure 3a depicting the reduced volume of the internal compartment;

Figure 4a is a perspective view from the wearer's side showing compression straps fully tightened and the pack converted for use as a foundation for an assault pack;

Figure 4b is a sectional view through the foundation pack;

Figure 5 is a view on the rear face of the pack portrayed in Figs 4a showing the compression straps;

Figure 6a is a view on the rear face of the pack portraying how the pack can be reconfigured to provide two external pockets for carrying missiles and other objects;

Figure 6b is a view on the rear face of the pack portraying how the pack can be reconfigured to provide three external pockets for carrying missiles and other objects;

Figure 7a shows a perspective view with an integral survival bag deployed;

Figures 7b and 7c are sectional views to show how the survival bag is attached to the sack;

Figure 8a shows a perspective view of a mounting frame element;

Figure 8b shows a perspective view of a sack element;

Figure 8c is a sectional view showing how the top edge of a mounting frame element engages with the transverse pocket of a sack element;

Figure 8d shows a perspective view of a sack and mounting frame combined;

Figure 9a shows a set of back cushioning pad elements;
Figure 9b shows a shoulder strap ready for fitting;

Figure 9c shows a perspective view of a single shoulder cushioning pad element;

Figure 10 shows a perspective view as Fig 8d but with back cushioning pads attached;

Figure 11 shows the lid element of a sack as it would appear when detached;

Figure 12 shows a perspective view of a completely assembled backpack;

Figure 13a shows a foundation pack with vertically spaced, horizontal straps;

Figure 13b is a part sectional view to show the channels between the mounting face and straps, formed by stitching at intervals;

Figure 14a depicts a utility bag of a type used with assault packs and two security toggles removable attached to the bag via loops of elasticised cord;

Figure 14b shows a locking strap, formed in an extended U shape, ready for insertion through the vertically spaced, horizontal straps of a utility bag and foundation pack;

Figure 15a is an end view of a utility bag part-way attached to a mounting face to more clearly show how the locking strap is interwoven between horizontal straps;
Figure 15b is a top end view of the utility bag attached to a mounting face with the top main loop of the locking strap clearly visible and forming an obvious handle;

Figure 16a shows the bottom end of a utility bag in close contact with a mounting face; and

Figure 16b shows the same view but with both legs of the locking strap secured to the security toggles.

[0071] In the drawings, the same features are denoted by the same reference signs throughout.

[0072] A backpack according to the invention will now be described with reference to Figures 1 - 6b.

[0073] The backpack comprises a support frame (20) and a collapsible sack (10) being formed by at least one wall (50) having inner and outer surfaces (51, 52).

[0074] The sack (10) is mountable on the support frame (20) and may be releasably attached to the support frame (20).

[0075] The backpack further comprises a lid (19), shoulder straps (21) and a lower back cushioning pad (22) which may be constructed in a manner known in the art or as later described with reference to the a third aspect of the invention.

[0076] The sack comprises four walls defining a back panel (11), two side panels (13) and a front panel (15). The inner surfaces (51) of the panels define an internal compartment (53) for containing an item therein.

[0077] Each panel is connected to an adjacent panel at an edge thereof.

[0078] The two side panels (13) and the front panel (15) each comprise three fold lines (54) along which they are foldable so as to form at least one pleat (55). The pleat is defined by the two outer fold lines (54a) and an inner fold line (54b) wherein the inner fold line (54b) forms the apex of the pleat (55) and is within the inner compartment (53) when the pleat (55) is fully stowed (see Figure 2d).

[0079] The edges of the side panels (13) and the front

panel (15) define their respective outer fold lines (54a). As such, the side panels (13) and the front panel (15) extend between their respective outer fold lines (54a).

[0080] The pleat (55) is configured such that the outer surface (52) of the side panels (13) and the outer surface (52) the front panel (15) are deployable so as to define an outer compartment (56) for containing an item (see Figures 6a and 6b). The side panels (13) are each moveable between a first, extended position in which the volume of the internal compartment (53) is maximised (see Figure 2a) and a second, collapsed position in which the side panel is folded about the three fold lines (54) so as to form the at least one pleat (55) and to minimise the volume of the internal compartment (53) (see Figures 2b - 2c).

[0081] Referring to Figures 6a and 6b, the pleats (55) of the side panels (13) and the front panel (15) are show in deployed state. In figure 6a, the pleats (55) of the side panels are deployed to define two outer compartments for containing an item. In figure 6b, the pleats (55) of the side panels and the front panel are deployed to define three outer compartments (56) for containing an item.

[0082] As can be seen in figures 6a and 6b, the pleats of the side panels (13) and of the front panel (15) have a common fold line therebetween defined by their adjoining edge.

[0083] The backpack further comprises at least one securing element operable to retain an item contained in the outer compartment(s) and at least one adjustable element operable to allow the side walls to be moved between the first and second positions.

[0084] The securing element(s) and the adjustable element(s) are one and the same, and are in the form of three compression straps (24, 27) mounted on the outer surface of each of the front panel (15) and the two side panels (13). The compression straps (24, 27) are orientated in a direction substantially perpendicular to the inner fold line (54b) and extend across the inner fold line (54b). The compression straps (24) which extend across the outer surface of a side panel (13) define lateral-side-mounted compression straps, while the compression straps (27) which extend across the front panel (15) define front-mounted compression straps.

[0085] It would be understood that while the securing element(s) and the adjustable elements(s) are shown as one, this is not necessarily the case, as they may be separate element(s).

[0086] Each lateral-side-mounted compression strap (24) is releasably fixable in at least two positions so as to be operable to retain the side walls in at least the first and second positions.

[0087] Each compression strap (24, 27) is releasably fixable in three or more positions, with the lateral-side-mounted compression straps configured so as to be operable to retain the side walls in the first and second positions and any intermediate position therebetween.

[0088] In use, when a user wishes to utilise the backpack as a normal backpack, he slackens the compressions straps (24, 27) so as to maximise the volume of the internal compartment (53).

[0089] Once a payload has been placed in the internal compartment (53), the sack (10) may be adjusted in size to more closely wrap around the payload being carried by partially tightening the lateral-side-mounted compression straps (24) and/or the front-mounted compression straps (27). Figure 3b depicts a reduced volume internal compartment (53) resulting from the partial tightening the lateral-side-mounted compression straps (24) and/or the front-mounted compression straps (27).

[0090] If the user wishes to convert the backpack into the foundation for an assault pack, he fully tightens the lateral-side-mounted compression straps (24) so as to deploy the side panel pleats (55) such that the inner fold line (54b) of each side panel forms the apex of their respective pleat (55) and is within the inner compartment (53) when the pleat (55) is fully stowed (see Figure 4b). As the lateral-side-mounted compression straps (24) are fully tightened, the sack (10) will be retained in the fully collapsed position until the straps (24) are loosen.

[0091] If the user wants to carry an item such as a missile, he can convert the backpack to define one or more outer compartments (56) for containing the item. To do this, the user simply tightens the lateral-side-mounted compression straps (24) and/or the front-mounted compression straps (27) as required. For example, by fully tightening the front-mounted compression strap (27) the front panel pleat (55) will be deployed such that the inner fold line (54b) of the front panel forms the apex of the pleat (55) and is within the inner compartment (53) when the pleat (55) is fully stowed (see Figure 6a). This will result in the creation of two outer compartments (56) wherein an item can be received defined by the outer surface of the side panels (13). The item can be secured in the outer compartment (56) by adjusting the lateral-side-mounted compression straps (24).

[0092] Three outer compartments can be achieved by partial tightening the front-mounted compression straps (27) rather than fully tightening the front-mounted compression straps (27).

[0093] A backpack not according to the invention will be described with reference to Figures 7a - 7c. Referring to Figure 1, the backpack is shown as a fully extended backpack (1) and comprises a sack (10) with a lid (19), the sack (10) being attached to a support frame (20). Also attached to the support frame (20) are two cushioned shoulder straps (21), two shoulder blade cushioning pads (22), and a lower back cushioning pad (23). Horizontal side-mounted compression straps (24) are shown on each lateral side (13) of the sack (10).

[0094] When it is desired to reduce the front to back dimension of the sack (10), so that the sack will fit more closely around the cargo being carried, side-mounted compression straps (24) can be tightened by pulling the ends of the straps (24) through locking buckles (26).

[0095] Figure 2a depicts a sack (10) that, for the sake of clarity, has been detached from its support frame and

is laid on its back (11); the sack lid and compression straps have also been omitted. Figure 2b shows an interim stage of the progressive folding of the sack to more dearly indicate how the construction at the bottom end (12) allows the sack (10) to be folded, the side panels (13) being pushed toward the centre of the sack, between the front or outer face (14) and the back (11), during folding until the sack is completely flat, as in Figure 2c. Figure 2d depicts the open mouth of the sack (10) and shows how the two sides (13) of the sack (10) have been pushed towards the centre to facilitate folding.

[0096] Figures 3a & 3b show a reduced backpack (2), with shoulder straps and cushioning pads removed for clarity, wherein the sack (10) has been adjusted in size to more closely wrap around the payload being carried, or to provide a smaller lightweight sack, the side-mounted compression straps (24) and the face-mounted compression straps (27) having been partly tightened, as well as the vertical compression straps (28). The vertical straps are more clearly shown in Figure 5.

[0097] Figures 4a & 4b show a flat foundation pack (3), with shoulder straps and cushioning pads removed for clarity, wherein the sack (10) has been fully flattened and compressed around the support frame (20), the lateral side-mounted compression straps (24) having been fully tightened, as well as the vertical compression straps (28). The vertical straps are more clearly shown in Figure 5.

[0098] Figure 5 depicts the outer or front face (14) of the pack, but with the usual vertically spaced, horizontal webbing used for mounting external bags and other objects removed for clarity. Vertical (28) and horizontal face-mounted (27) compression straps for adjusting the extent of the front or outer face (14) of the sack are shown, as well as horizontal side-mounted straps (24) for adjusting the sides (13) of the sack (10).

[0099] Figure 6a depicts a backpack configured for carrying missiles etc wherein the face-mounted compression straps (27) are shown fully tightened to draw the two side edges (29) of the front face (14) together, the resulting bays (30) at each corner being used, in conjunction with straps (24), to carry missiles or other large objects.

[0100] Figure 6b shows the face-mounted straps (27) partly tightened and the backpack configured to receive up to three missiles at once.

[0101] Figure 7a is an external view of a sack (10) not forming part of the invention with the integral survival bag (31) fully deployed.

[0102] Figures 7b & 7c are sectional views through the sack (10) and survival bag (31), wherein the bag (31) is sewn onto the outer end (32) of an annular collar (33), the inner end (34) of the collar being secured to the inwardly turned lip (35) of the sack (10). Also connected to the inner end (34) of the collar (33) is an internal storm cover (36), which can be used to protect the contents of the sack (10) when the survival bag is in use. When not in use the survival bag (31) is gathered and stored around the mouth of the sack, between the lip (35) and the collar (33).

[0103] Referring to Figures 8a - 8d, a mounting frame element and a sack element forming part of a backpack not according to the invention is shown. The mounting frame element defines the support frame (20) of the backpack, while the sack element defines the sack (10) of the backpack. The mounting frame element (20) incorporates a plurality of holes (111) along each vertical edge (112), and a number of support members (115) for the releasable attachment of a variety of elements. The sack element (10) incorporates two side flaps (121), each flap (121) incorporating a plurality of eyeleted holes (122) that correspond with the holes (111) in the mounting frame (20). In addition, the sack element (10) incorporates an inverted transverse pocket (123) integrated into its back face (124) in close proximity to the upper edge (125).

[0104] When it is desired to assemble the mounting frame (20) and sack (10) elements together, the top edge (113) of mounting frame (20) is first located into transverse pocket (123) so that the transverse pocket (123) encloses the top edge (113) of the mounting frame (20). The purpose of pocket (123) is twofold; to locate the frame (20) to the sack (10) and also to help support the sack (10) and distribute forces equally along the top edge (113) of the support frame (20), particularly when a heavy payload is being carried within the sack (10).

[0105] The sack element (10) is then removably attached to the mounting frame (20) using two straps (126), positioned at the upper edge (125) of sack (10), and a single length of nylon cord (127) that is laced alternately through eyeleted holes (122) and frame holes (111) to bring sack (10) and frame (20) together. The cord (127) is then drawn tight to cause the flaps (121) to move into tight contact with the frame edges (112), the two ends of the cord (127) being knotted together at a convenient position near to the top edge (113) of frame (20).

[0106] Referring now to Figures 9a - 10, cushioning pads are provided, two vertical pads (130) are used to cushion the loads bearing against the wearer's shoulder blades and one horizontal pad (131) is used to support the frame (20) against the wearer's lower back. Cushioning pads (130, 131) may be made from plastic foam blocks and contained within fabric or plastic covers that can be easily removed and serviced, repaired or replaced whilst in the field. The cushioning pads (130, 131) are releasably attached to the frame using straps (not shown).

[0107] A single shoulder strap (132) is provided, the strap (132) being removably attached to the frame by threading the strap between and around support members of the mounting frame (20) in a figure-of-eight manner, the two ends of the strap (132) being then attached to the lower edge (114) of the frame (20), to allow the pack to be carried on the shoulders of the user. Detachable shoulder cushioning pads (133), with integral adjustment straps (134), are provided for insertion over the shoulder strap (132), one for each shoulder, to help protect the wearer's shoulders when heavy payloads are being carried.

[0108] Referring to Figs 11 & 12 a lid (19) is provided that is removably attached to the top of the sack (10) by two securing straps (141). The effective length of the sack (10) can be increased to accommodate increased payload, by loosening and extending straps (141); or the lid (19) can be removed from the sack (10) completely by undoing straps (141), permitting the backpack to be used open-topped as a general purpose carrier or whenever the payload is longer than can be accommodated beneath the lid (19).

[0109] It is also possible to remove the sack (10) from the frame (20), so that the sack can be used separately - for example as a stuff sack, utility bag or for any other general purpose.

[0110] Optionally, cushioning pad (131) may be provided with a rear opening to allow insertion of a waist strap (not shown) horizontally through between the pad and frame.

[0111] Referring to Figures 13a and 13b, the outer face of a foundation pack (210) is shown. The outer face of the foundation pack (210) defines a mounting face (212) onto which payload may be attached to be carried. The foundation pack (210) incorporates a plurality of vertically spaced, horizontal straps (211) that are attached to the mounting face (212) of the pack (210) using robust machine stitching (213) at predetermined intervals in order to create vertical channels (214) between the straps (211), the mounting face (212) and the stitching (213).

[0112] Referring to Figure 14a, a utility bag (215) which is attachable to the mounting face (212) of the pack (210) is shown. The utility bag (215) incorporates a plurality of vertically spaced, horizontal straps (216) that are attached to a mounting face (217) of the utility bag (215) to create vertical channels (218) between the straps (216), the mounting face (217) and the stitching (219). The utility bag (215) further comprises a plurality of toggles (220, 221), two toggles are shown in the figure, attached via elasticised cord loops (222, 223) to the central portion of the lowest horizontal strap (224) of the utility bag (215).

[0113] Figure 14b shows a locking strap (227) used to attach the utility bag (215) to the foundation pack (210).

[0114] In Figure 15a the utility bag (215) has been shown in a raised position, separated from the foundation pack (210) to more clearly show the paths or the two ends (225,226) of the locking strap (227) as they pass alternately through the channels (214) of the foundation pack (210), and the corresponding channels of the utility bag (215), the two ends (225,226) of the strap (227) being threaded through at a transverse distance apart, i.e. down both sides of the utility bag.

[0115] When the two ends (225, 226) of the locking strap (227) are fully inserted through the channels (214,218), see Figure 16a, the two ends (225, 26) are drawn tight so that the utility bag (215) is pulled into close contact with the foundation pack (210).

[0116] When the two small loops (228, 229) at the locking strap ends (225, 226) are passed over the security toggles (220, 221), as in Figure 16b, the locking strap (227) is then protected against accidental or unintended removal. Also, the main loop of the locking strap (227), at the opposite end of the utility bag (215), then forms a handle (230) (Figure 15b), which can accommodate a gloved hand.

[0117] When it is desired to disengage and remove utility bags or other objects from the foundation pack, the loops (228, 229) of the locking strap (227) are first detached from both security toggles (210, 221). The handle (230) of the locking strap (227) is then tightly grasped and the entire strap (227) is pulled upward and outward, to completely withdraw it in a single operation from the channel of the utility bag (214) and the channel (218) of the foundation pack. The utility bag or other object is thereby quickly and completely detached from the foundation pack.

[0118] It will be appreciated from the forgoing that the intention behind the development of this specialist pack is to provide a backpack that can be compressed or converted to a day pack, a specialised missile carrier, or a foundation for an assault pack or it can be used with the integral survival bag deployed.

[0119] It will be appreciated from the forgoing that the intention behind the development of this specialist pack is to provide a modular backpack that is fully field-serviceable and adaptable, allowing on-the-spot repairs to, or replacement of, any of the individual elements that make up the backpack, as well as allowing total improvisation for when the user is in a remote and harsh environment.

Claims

1. A backpack comprising a support frame (20) and a collapsible sack (10) being formed by at least one wall (50), the wall (50) having inner and outer surfaces (51, 52), the inner surface (51) defining an internal compartment (53) for containing an item; the sack (10) being mountable on the support frame (20); the at least one wall (50) comprising at least three fold lines (54) along which the at least one wall (50) is foldable so as to form at least one pleat (55); the pleat (55) being configured such that the outer surface (52) of the wall portion defining the pleat (55) is deployable so as to define an outer compartment (56) for containing an item; the at least one wall (50) being moveable between a first, extended position in which the volume of the internal compartment (53) is maximised and a second, collapsed position in which the at least one wall (50) is folded about the at least three fold lines (54) so as to form the at least one pleat (55) and to minimise the volume of the internal compartment (53).

2. A backpack according to claim 1 wherein the at least one wall (50) is foldable so as to form a plurality of

pleats (55).

3. A backpack according to claim 1 or 2 wherein the at least one wall (50) comprises at least three fold lines (54) along which the at least one wall (50) is foldable to define a first pleat (55) and at least two further fold lines (54) along which the at least one wall (50) is foldable to define a second pleat (55).

4. A back pack according to claim 3 wherein the first and second pleats (55) have a common fold line (54) therebetween.

5. A backpack according to any one of claims 2 to 4 wherein each pleat (55) is configured such that a portion of the outer surface (52) of the wall portion defining the pleat (55) is deployable so as to define an outer compartment (56) for containing an item.

6. A backpack according to claim 5 wherein the pleat (55) is defined by two outer fold lines (54a) and an inner fold line (54b).

7. A backpack according to claim 5 when dependent on claim 2 or any claim dependent directly or indirectly upon claim 2, further comprising at least one securing element (24, 27) operable to retain an item contained in the outer compartment(s) (56).

8. A backpack according to any one of the preceding claims further comprising at least one adjustable element (24, 27) operable to allow the at least one wall (50) to be moved between the first and second positions.

9. A backpack according to claim 1 further comprising at least one fastener element (26) for securing the at least one wall (50) in the second position.

10. A backpack according to any one of the preceding claims wherein the support frame (20) comprises a substantially rigid mounting frame comprising supporting members and attachment points for receiving elements of a modular backpack.

11. A backpack according to claim 10 further comprising a shoulder strap (21), the shoulder strap comprising a shoulder strap element (132) that is removably attached to the mounting frame by threading the shoulder strap element (132) between and around support members of the mounting frame.

12. A backpack according to any one of claims 10 to 11 further comprising a pair of shoulder blade cushioning pad elements (133) that are separately and removably attached to one or more support members of the mounting frame.

13. A backpack according to any one of claims 10 to 12 further comprising a back cushioning support element (23) that is removably attached to one or more support members of the mounting frame.

14. A backpack as in claim 10 to 13 wherein the sack (10) incorporates a transverse pocket (123) across a section (124) of the sack (10) for locating a top edge (113) of the mounting frame and to assist in distributing forces that result from the carriage of a heavy pay load.

15. A backpack as claimed in anyone of the preceding claims further comprising a completely detachable lid (19).

Patentansprüche

1. Ein Rucksack, der einen Stützrahmen (20) und einen zusammenlegbaren Sack (10), gebildet durch mindestens eine Wand (50), beinhaltet, wobei die Wand (50) innere und äußere Oberflächen (51, 52) aufweist, wobei die innere Oberfläche (51) eine interne Kammer (53) zum Enthalten eines Gegenstands definiert; wobei der Sack (10) an dem Stützrahmen (20) montierbar ist; wobei die mindestens eine Wand (50) mindestens drei Faltlinien (54) beinhaltet, entlang denen die mindestens eine Wand (50) faltbar ist, um mindestens eine Falte (55) zu bilden; wobei die Falte (55) so konfiguriert ist, dass die äußere Oberfläche (52) des Wandabschnitts, der die Falte (55) definiert, nutzbar ist, um eine äußere Kammer (56) zum Enthalten eines Gegenstands zu definieren; wobei die mindestens eine Wand (50) zwischen einer ersten, erweiterten Position, in der das Volumen der internen Kammer (53) maximiert ist, und einer zweiten, zusammengelegten Position, in der die mindestens eine Wand (50) an den mindestens drei Faltlinien (54) gefaltet ist, bewegbar ist, um die mindestens eine Falte (55) zu bilden und das Volumen der internen Kammer (53) zu minimieren.

2. Rucksack gemäß Anspruch 1, wobei die mindestens eine Wand (50) faltbar ist, um eine Vielzahl von Falten (55) zu bilden.

3. Rucksack gemäß Anspruch 1 oder 2, wobei die mindestens eine Wand (50) mindestens drei Faltlinien (54), entlang denen die mindestens eine Wand (50) faltbar ist, um eine erste Falte (55) zu definieren, und mindestens zwei weitere Faltlinien (54), entlang denen die mindestens eine Wand (50) faltbar ist, um eine zweite Falte (55) zu definieren, beinhaltet.

4. Rucksack gemäß Anspruch 3, wobei die erste und zweite Falte (55) eine gemeinsame Faltlinie (54) dazwischen aufweisen.

5. Rucksack gemäß einem der Ansprüche 2 bis 4, wobei jede Falte (55) so konfiguriert ist, dass ein Abschnitt der äußeren Oberfläche (52) des Wandabschnitts, der die Falte (55) definiert, einsetzbar ist, um eine äußere Kammer (56) zum Enthalten eines Gegenstands zu definieren.

6. Rucksack gemäß Anspruch 5, wobei die Falte (55) durch zwei äußere Faltlinien (54a) und eine innere Faltlinie (54b) definiert ist.

7. Rucksack gemäß Anspruch 5, wenn abhängig von Anspruch 2 oder einem beliebigen Anspruch, direkt oder indirekt abhängig von Anspruch 2, ferner beinhaltend mindestens ein Sicherungselement (24, 27), das betriebsfähig ist, um einen in der äußeren Kammer/den äußeren Kammern (56) enthaltenen Gegenstand zu halten.

8. Rucksack gemäß einem der vorhergehenden Ansprüche, der ferner mindestens ein einstellbares Element (24, 27) beinhaltet, das betriebsfähig ist, um der mindestens einen Wand (50) zu ermöglichen, zwischen der ersten und zweiten Position bewegt zu werden.

9. Rucksack gemäß Anspruch 1, der ferner mindestens ein Befestigungselement (26) beinhaltet, um die mindestens eine Wand (50) in der zweiten Position zu sichern.

10. Rucksack gemäß einem der vorhergehenden Ansprüche, wobei der Stützrahmen (20) einen im Wesentlichen steifen Montagerahmen beinhaltet, der Stützteile und Anbringungspunkte beinhaltet, um Elemente eines modularen Rucksacks aufzunehmen.

11. Rucksack gemäß Anspruch 10, der ferner einen Schulterriemen (21) beinhaltet, wobei der Schulterriemen ein Schulterriemenelement (132) beinhaltet, das durch das Winden des Schulterriemenelements (132) zwischen und um die stützenden Teile des Montagerahmens entfernbar an dem Montagerahmen angebracht ist.

12. Rucksack gemäß einem der Ansprüche 10 bis 11, der ferner ein Paar Schulterblattpolsterkissenelemente (133) beinhaltet, die separat und entfernbar an einem oder mehreren stützenden Teilen des Montagerahmens angebracht sind.

13. Rucksack gemäß einem der Ansprüche 10 bis 12, der ferner ein stützendes Rückenkissenelement (23) beinhaltet, das entfernbar an einem oder mehreren stützenden Teilen des Montagerahmens angebracht ist.

14. Rucksack gemäß Anspruch 10 bis 13, wobei der Sack (10) eine über einen Teilabschnitt (124) des Sacks (10) querverlaufende Tasche (123) zum Fixieren einer oberen Kante (113) des Montagerahmens und zum Unterstützen bei der Verteilung von Kräften, die aus dem Tragen einer schweren Nutzlast resultieren, einschließt.

15. Rucksack gemäß einem der vorhergehenden Ansprüche, der ferner einen vollständig abnehmbaren Deckelteil (19) beinhaltet.

Revendications

1. Un sac à dos comprenant un cadre de support (20) et un sac repliable (10) étant formé par au moins une paroi (50), la paroi (50) ayant des surfaces interne et externe (51, 52), la surface interne (51) définissant un compartiment intérieur (53) destiné à contenir un objet ; le sac (10) pouvant être monté sur le cadre de support (20) ; l'au moins une paroi (50) comprenant au moins trois lignes de pliage (54) le long desquelles l'au moins une paroi (50) peut être pliée de façon à former au moins un pli (55) ; le pli (55) étant configuré de telle sorte que la surface externe (52) de la portion de paroi définissant le pli (55) puisse être déployée de façon à définir un compartiment externe (56) destiné à contenir un objet ; l'au moins une paroi (50) pouvant être déplacée entre une première position étendue dans laquelle le volume du compartiment intérieur (53) est maximisé et une deuxième position repliée dans laquelle l'au moins une paroi (50) est pliée sur les au moins trois lignes de pliage (54) de façon à former l'au moins un pli (55) et à minimiser le volume du compartiment intérieur (53).

2. Un sac à dos selon la revendication 1 dans lequel l'au moins une paroi (50) peut être pliée de façon à former une pluralité de plis (55).

3. Un sac à dos selon la revendication 1 ou la revendication 2 dans lequel l'au moins une paroi (50) comprend au moins trois lignes de pliage (54) le long desquelles l'au moins une paroi (50) peut être pliée pour définir un premier pli (55) et au moins deux lignes de pliage supplémentaires (54) le long desquelles l'au moins une paroi (50) peut être pliée pour définir un deuxième pli (55).

4. Un sac à dos selon la revendication 3 dans lequel les premier et deuxième plis (55) ont une ligne de pliage commune (54) entre eux.

5. Un sac à dos selon l'une quelconque des revendications 2 à 4 dans lequel chaque pli (55) est configuré de telle sorte qu'une portion de la surface ex-

terne (52) de la portion de paroi définissant le pli (55) puisse être déployée de façon à définir un compartiment externe (56) destiné à contenir un objet.

6. Un sac à dos selon la revendication 5 dans lequel le pli (55) est défini par deux lignes de pliage externes (54a) et une ligne de pliage interne (54b).

7. Un sac à dos selon la revendication 5 lorsqu'elle dépend de la revendication 2 ou toute revendication dépendante directement ou indirectement de la revendication 2, comprenant en outre au moins un élément d'assujettissement (24, 27) pouvant être opéré pour retenir un objet contenu dans le(s) compartiment(s) externe(s) (56).

8. Un sac à dos selon l'une quelconque des revendications précédentes comprenant en outre au moins un élément ajustable (24, 27) pouvant être opéré pour permettre à l'au moins une paroi (50) d'être déplacée entre les première et deuxième positions.

9. Un sac à dos selon la revendication 1 comprenant en outre au moins un élément de fixation (26) destiné à assujettir l'au moins une paroi (50) dans la deuxième position.

10. Un sac à dos selon l'une quelconque des revendications précédentes dans lequel le cadre de support (20) comprend un cadre de montage substantiellement rigide comprenant des éléments pour supporter et des points d'attache destinés à recevoir des éléments d'un sac à dos modulaire.

11. Un sac à dos selon la revendication 10 comprenant en outre une bretelle (21), la bretelle comprenant un élément de bretelle (132) qui est attaché de façon amovible sur le cadre de montage en filetant l'élément de bretelle (132) entre et autour des éléments de support du cadre de montage.

12. Un sac à dos selon l'une quelconque des revendications 10 à 11 comprenant en outre une paire d'éléments de coussin d'amortissement pour omoplate (133) qui sont attachés de façon distincte et amovible sur un ou plusieurs éléments de support du cadre de montage.

13. Un sac à dos selon l'une quelconque des revendications 10 à 12 comprenant en outre un élément de support d'amortissement pour dos (23) qui est attaché de façon amovible sur un ou plusieurs éléments de support du cadre de montage.

14. Un sac à dos tel que dans la revendication 10 à la revendication 13 dans lequel le sac (10) incorpore une poche transversale (123) de part et d'autre d'une section (124) du sac (10) destinée à situer un bord de dessus (113) du cadre de montage et pour aider à répartir des forces qui résultent du port d'une charge utile lourde.

15. Un sac à dos tel que revendiqué dans l'une quelconque des revendications précédentes comprenant en outre un couvercle complètement détachable (19).

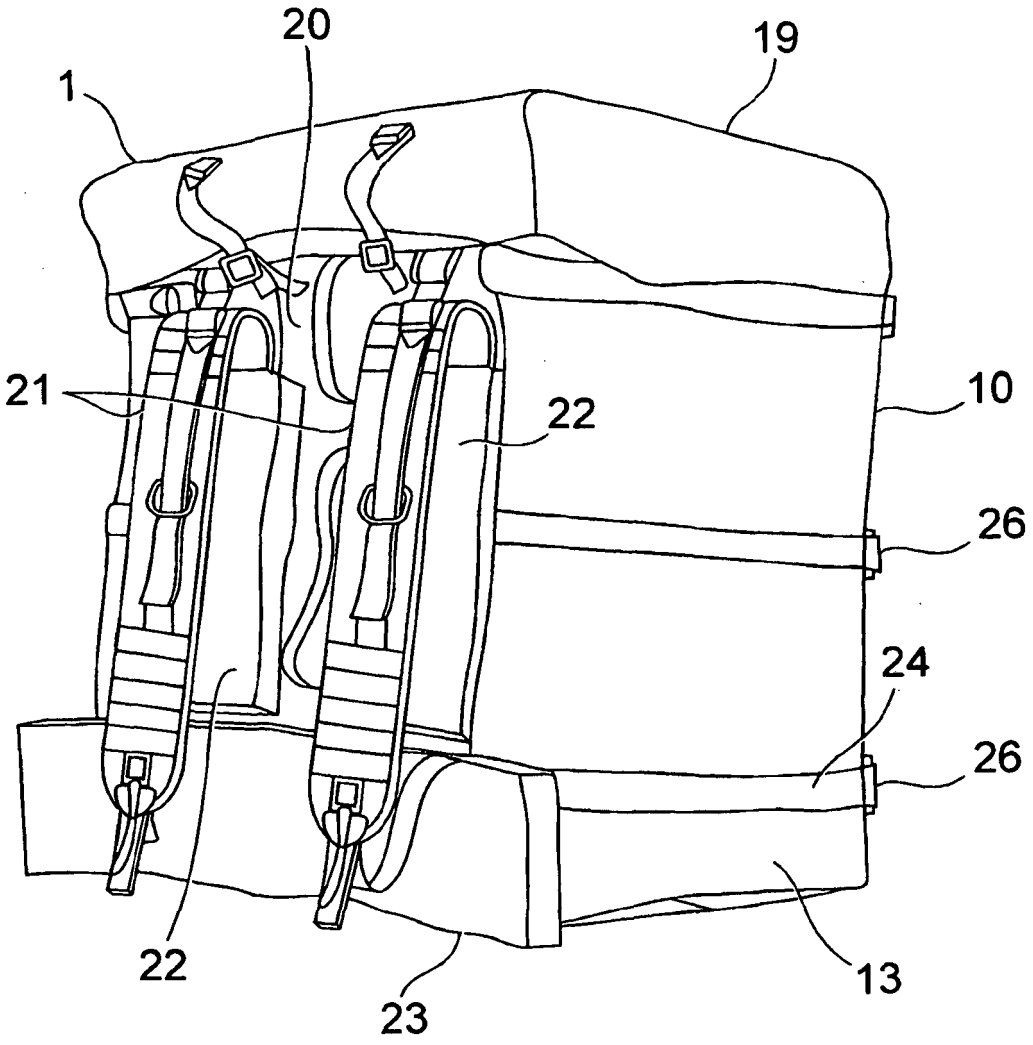


Fig. 1

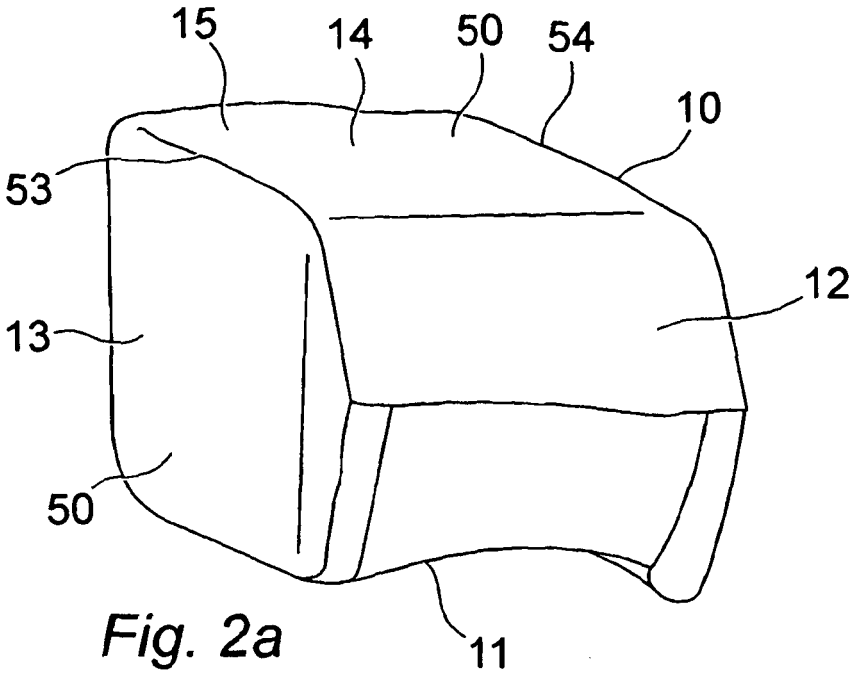


Fig. 2a

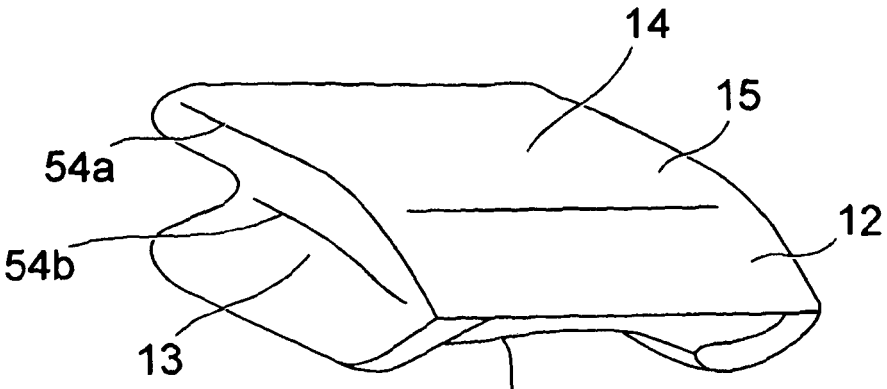


Fig. 2b

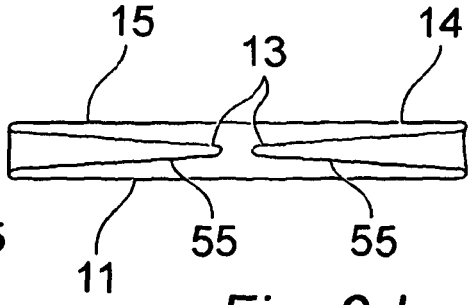


Fig. 2d

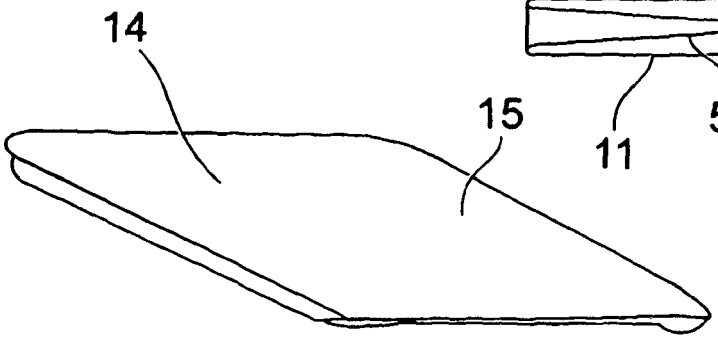


Fig. 2c

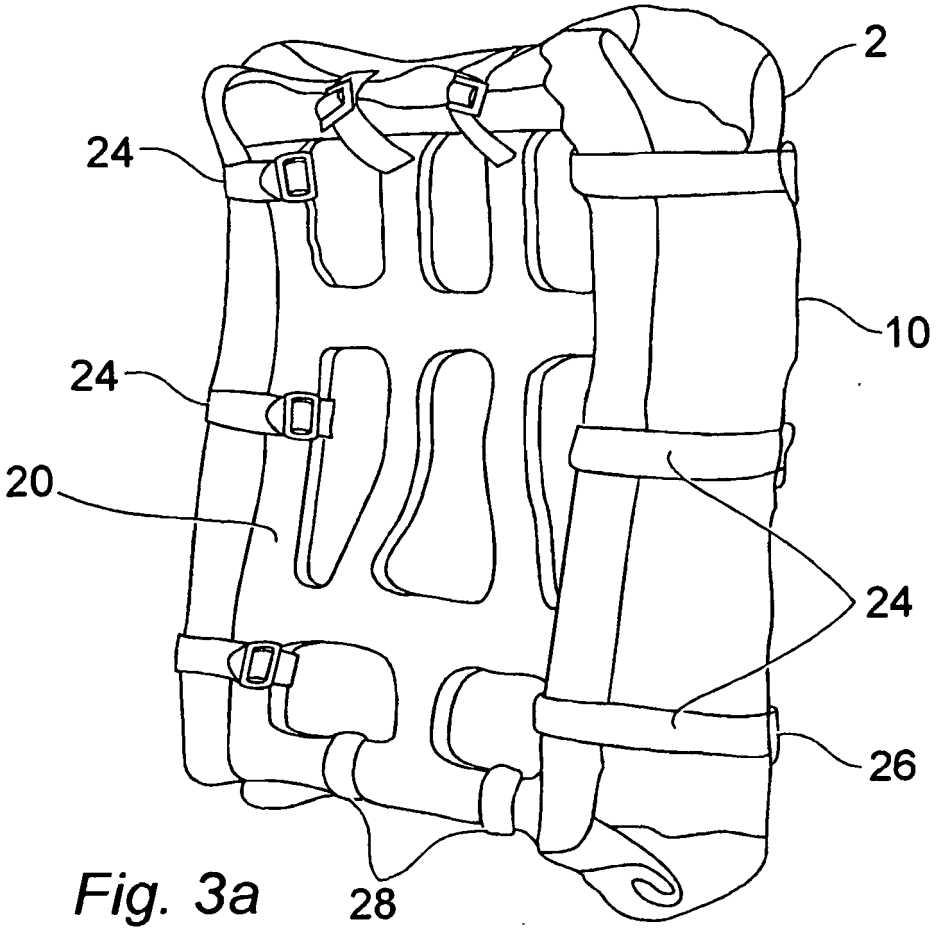


Fig. 3a

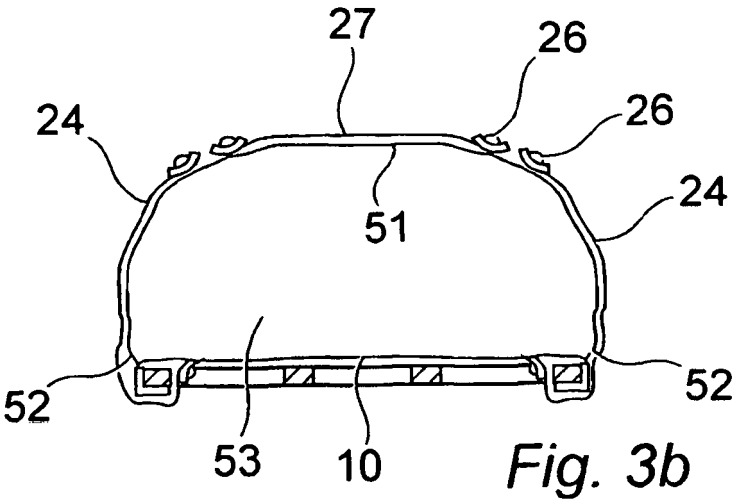


Fig. 3b

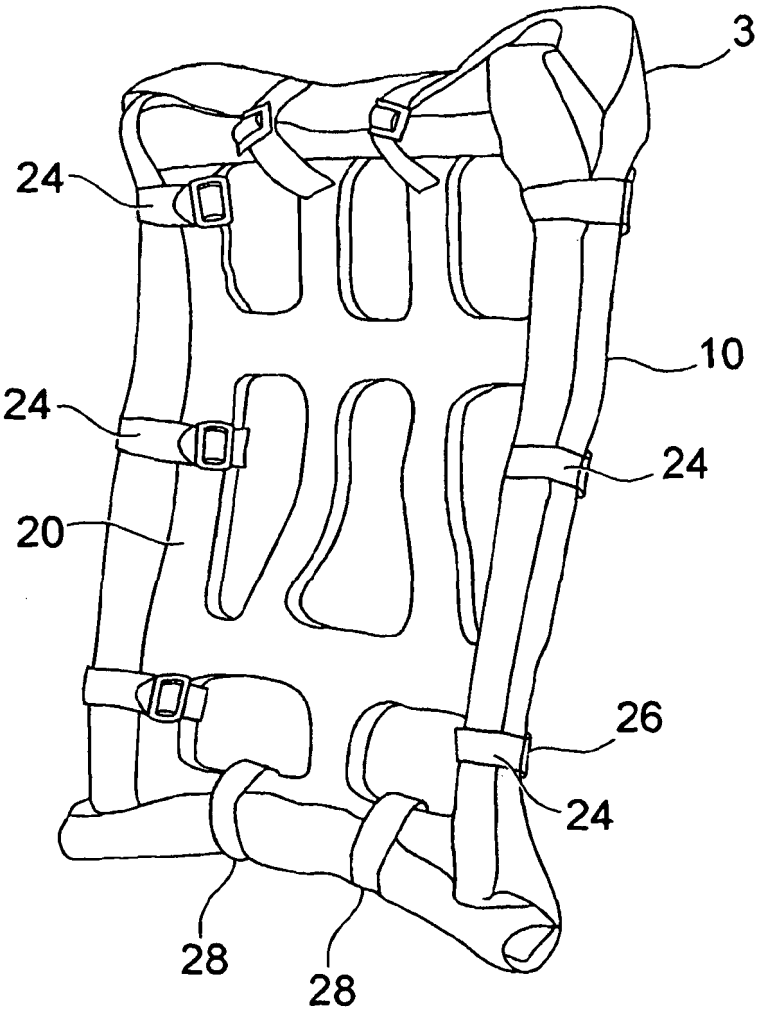


Fig. 4a

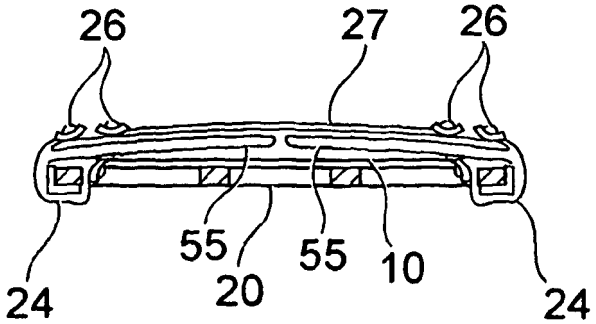


Fig. 4b

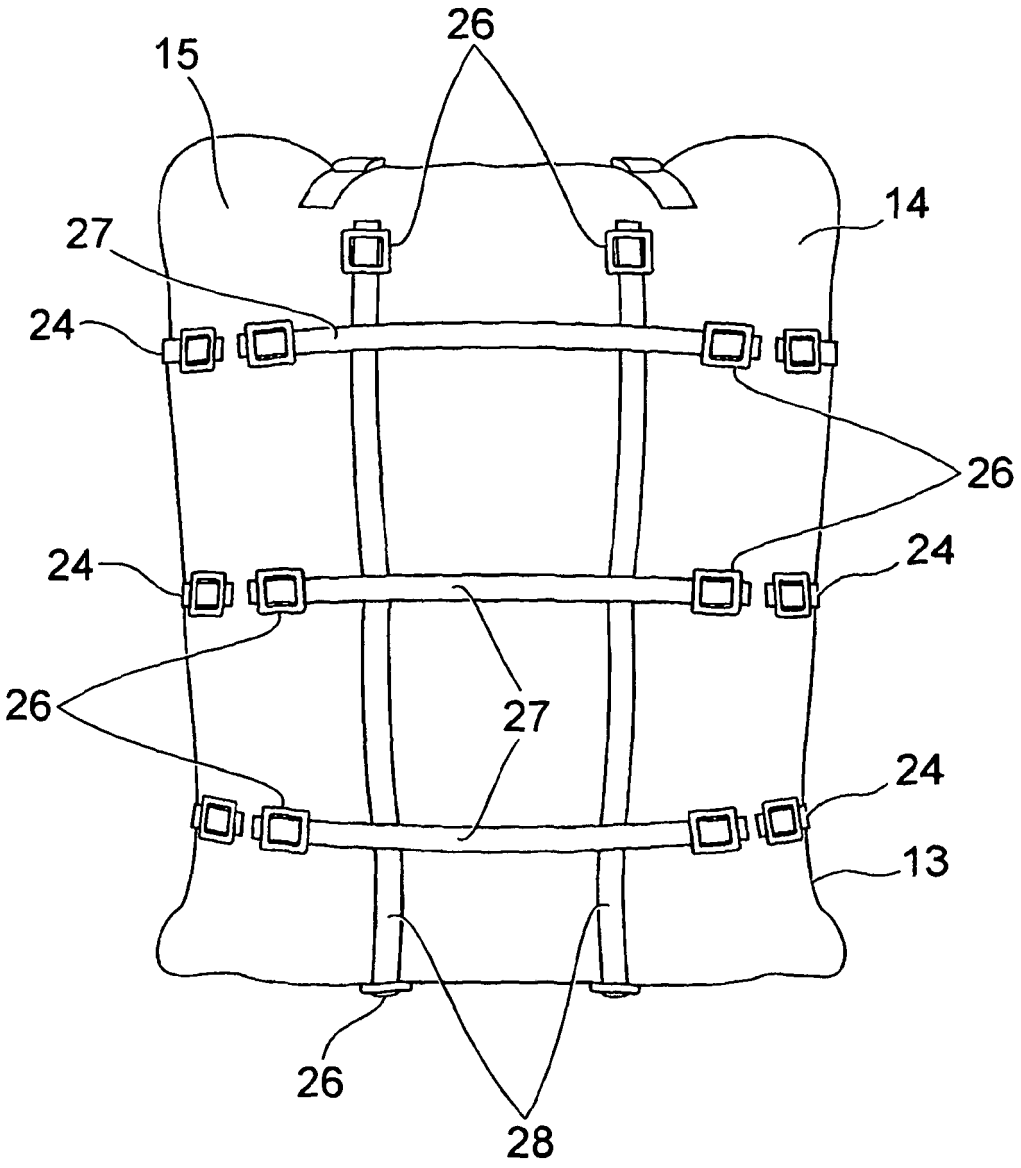


Fig. 5

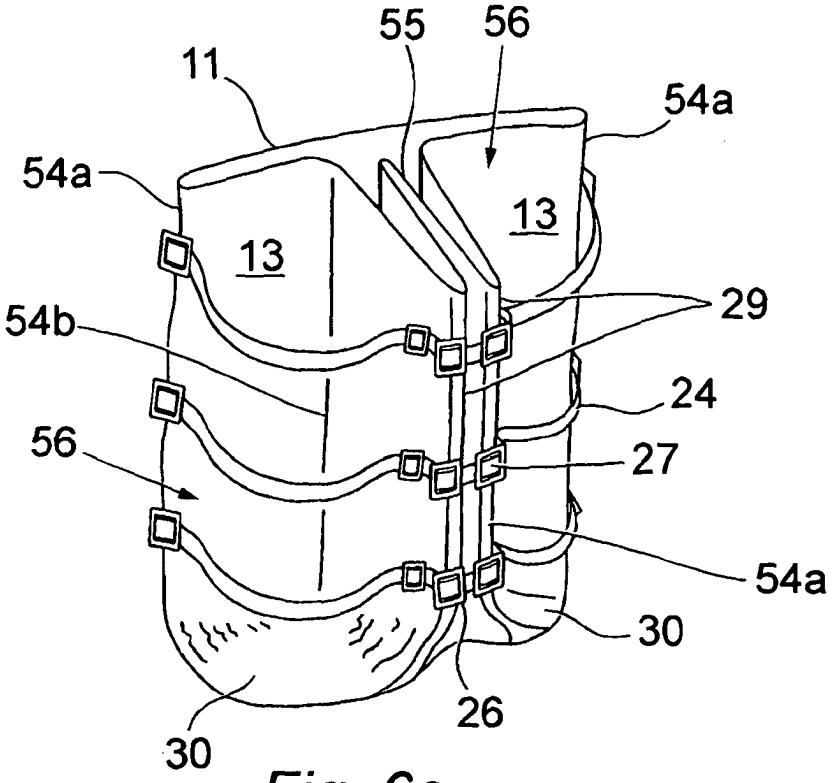

55
56
11
54a
54a
13
13
29
54b
24
56
27
54a
30
26
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Fig. 6a

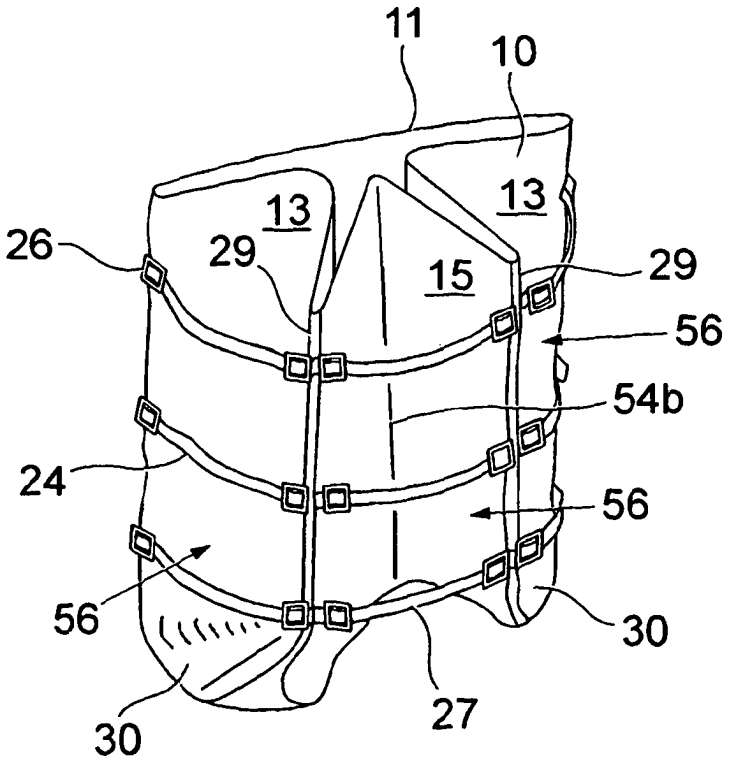

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54b
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Fig. 6b

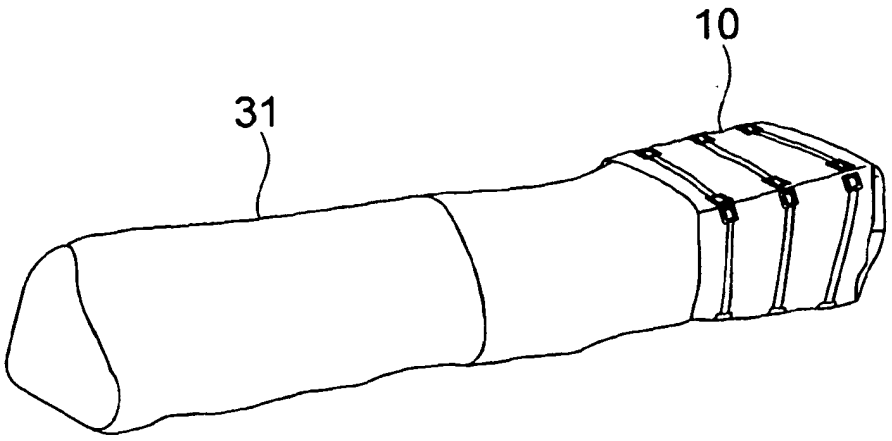


Fig. 7a

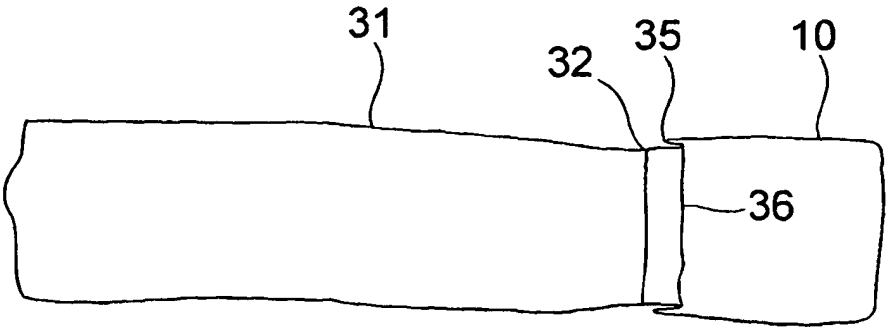


Fig. 7b

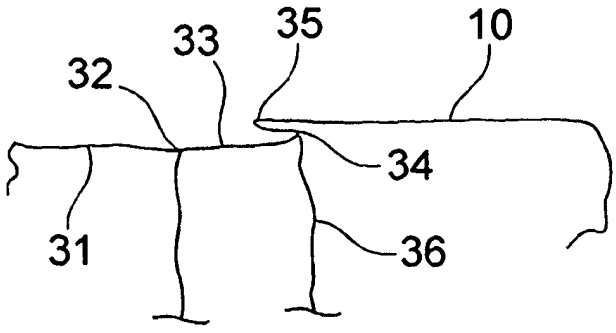


Fig. 7c

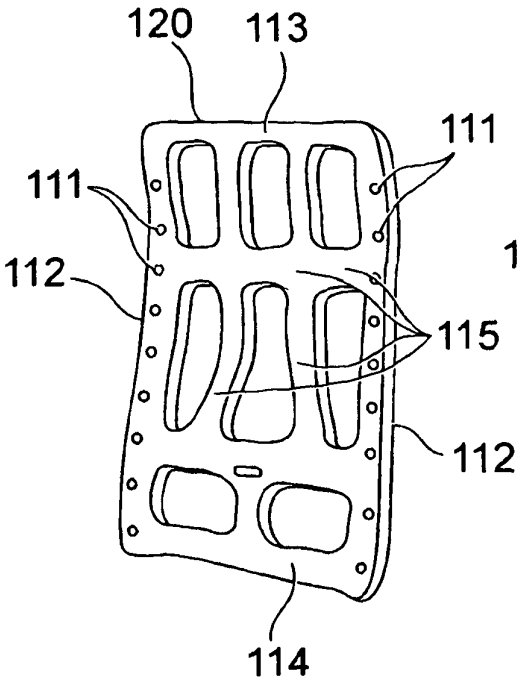


Fig. 8a

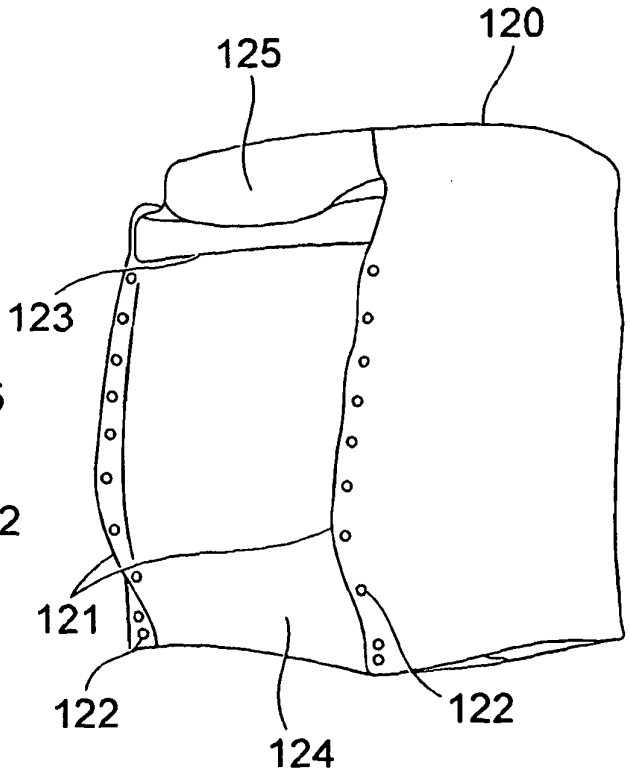


Fig. 8b

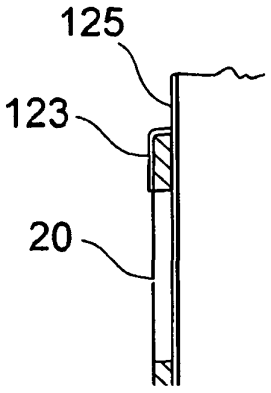


Fig. 8c

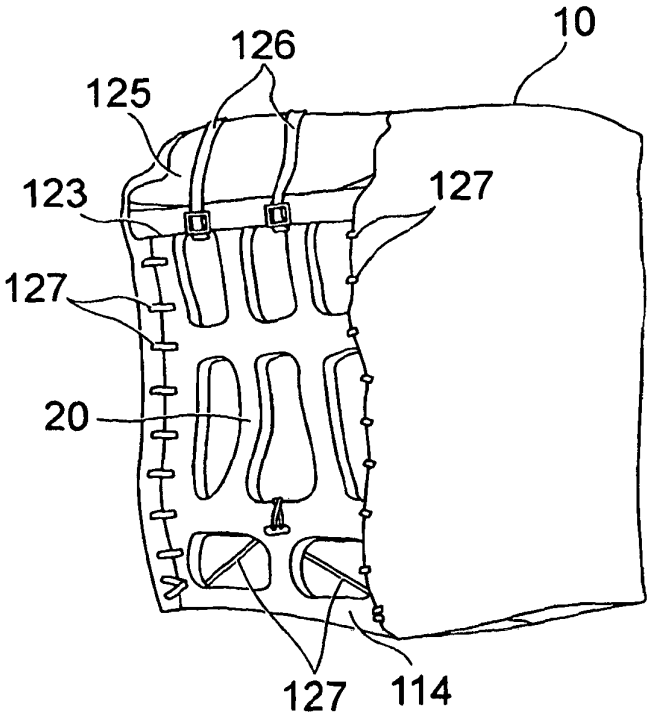


Fig. 8d

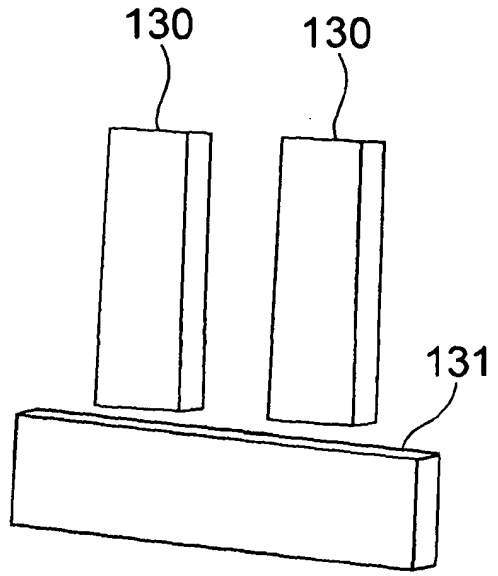


Fig. 9a

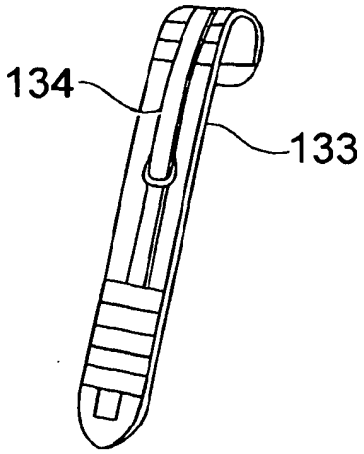


Fig. 9c

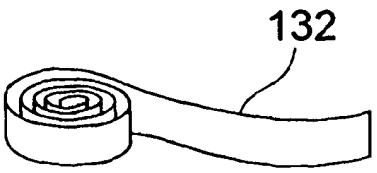


Fig. 9b

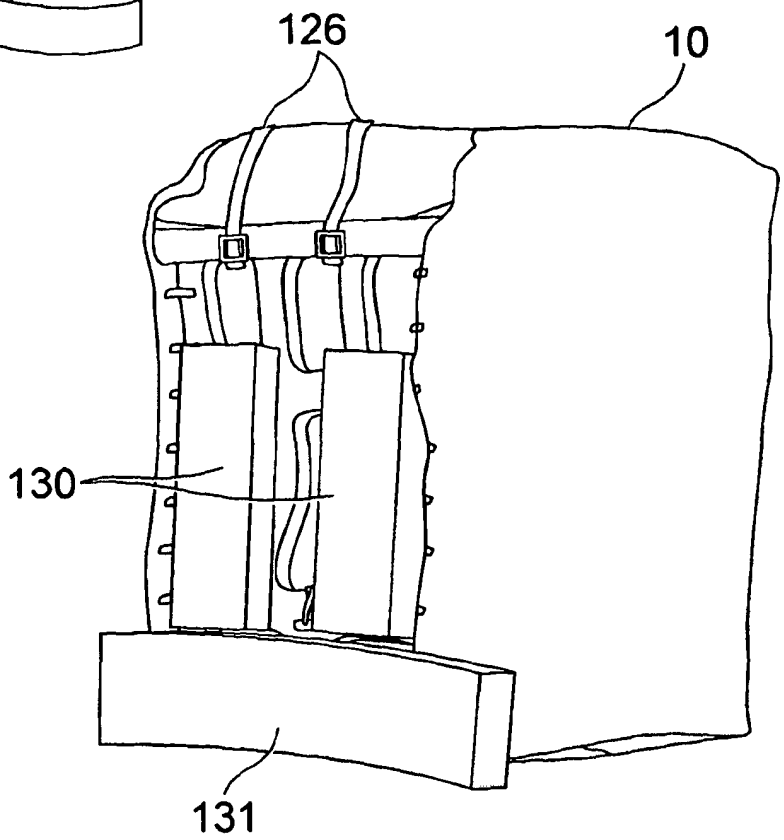


Fig. 10

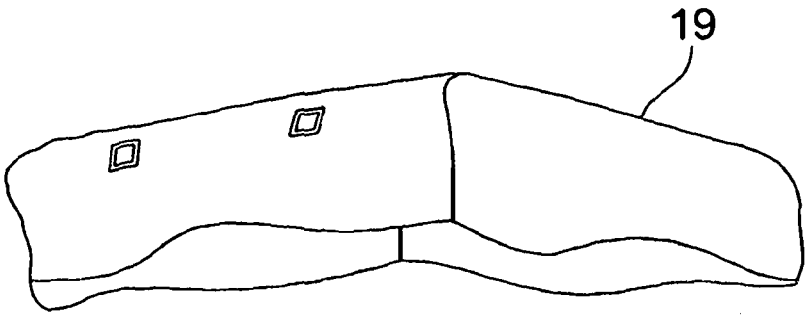


Fig. 11

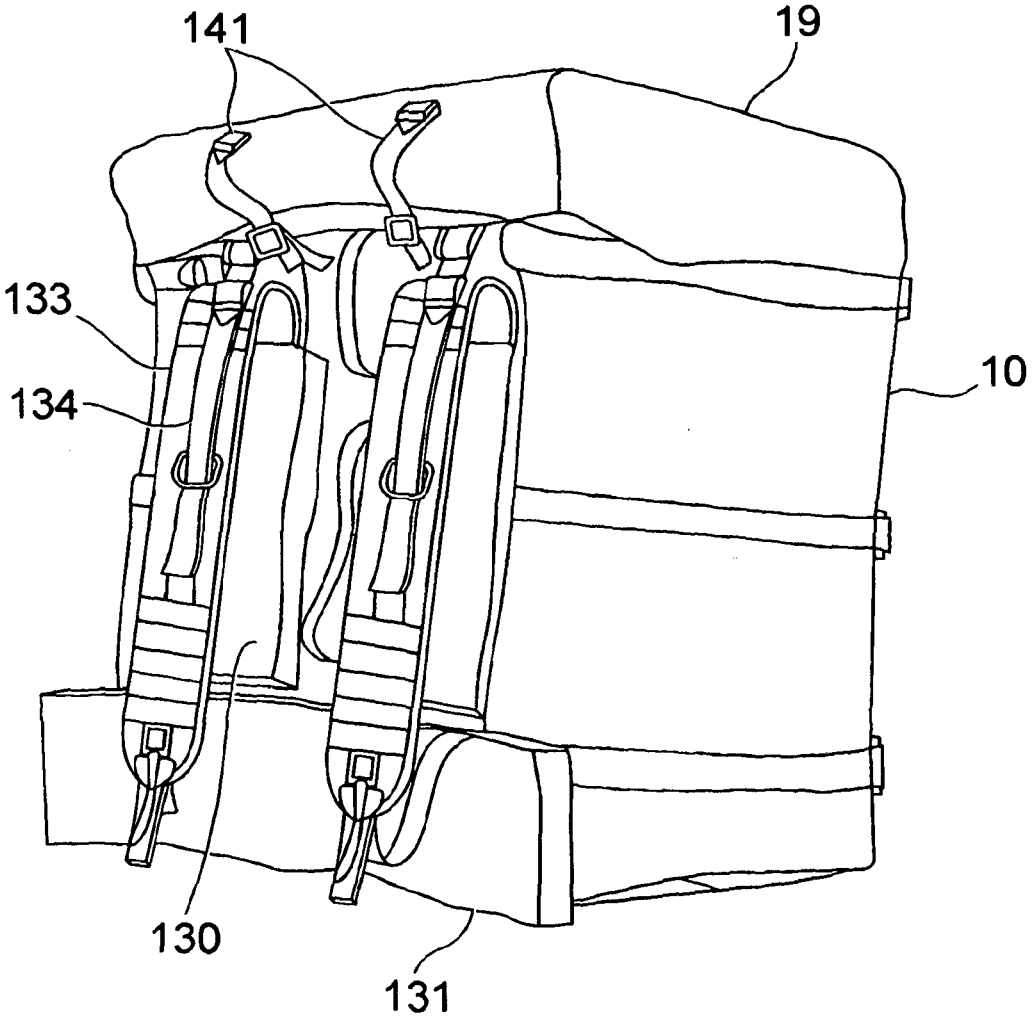


Fig. 12

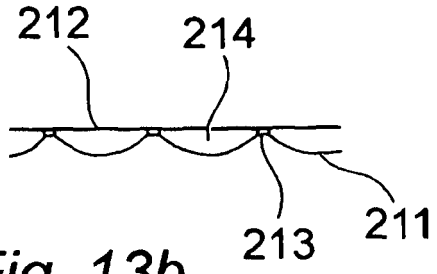


Fig. 13b

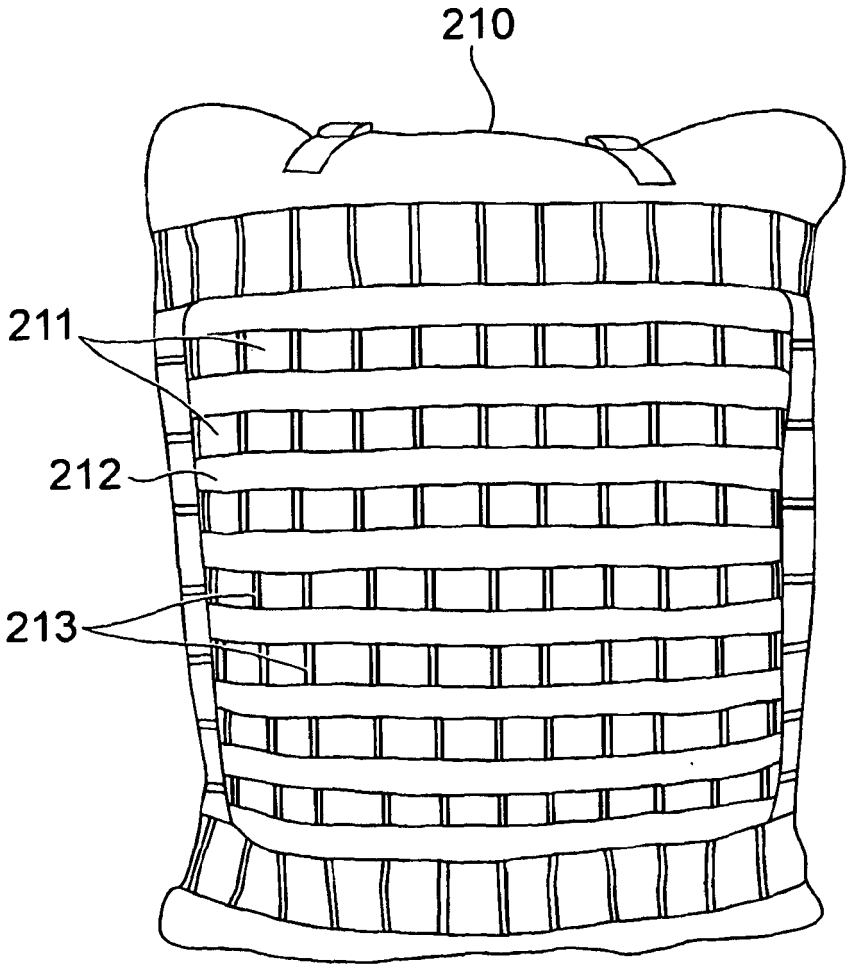


Fig. 13a

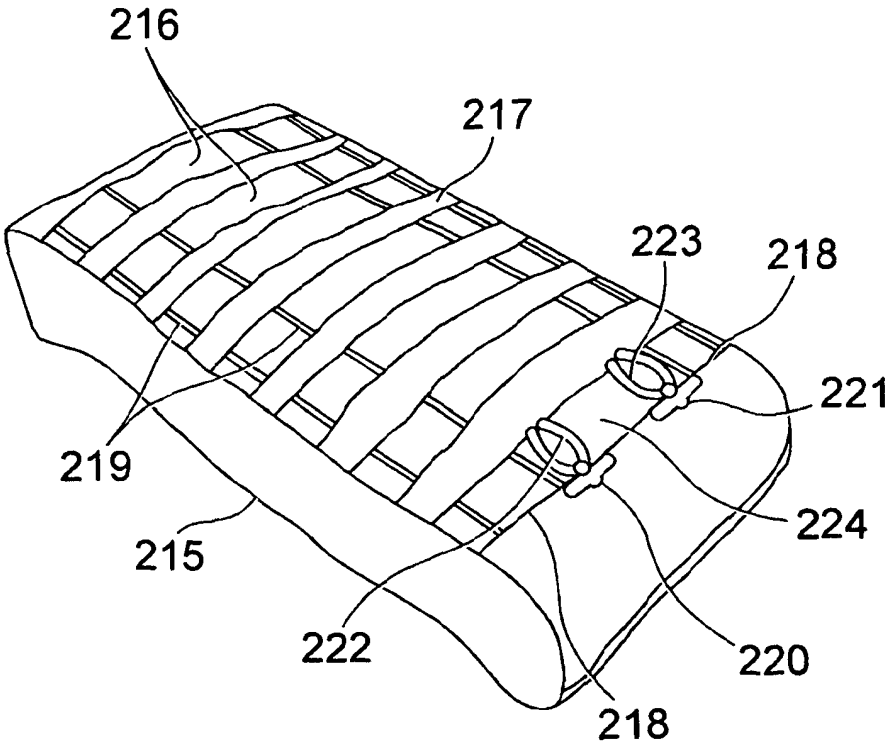


Fig. 14a

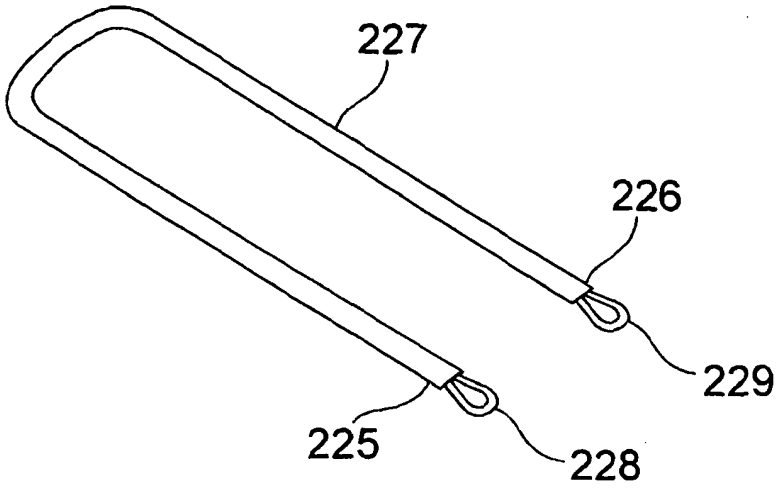


Fig. 14b

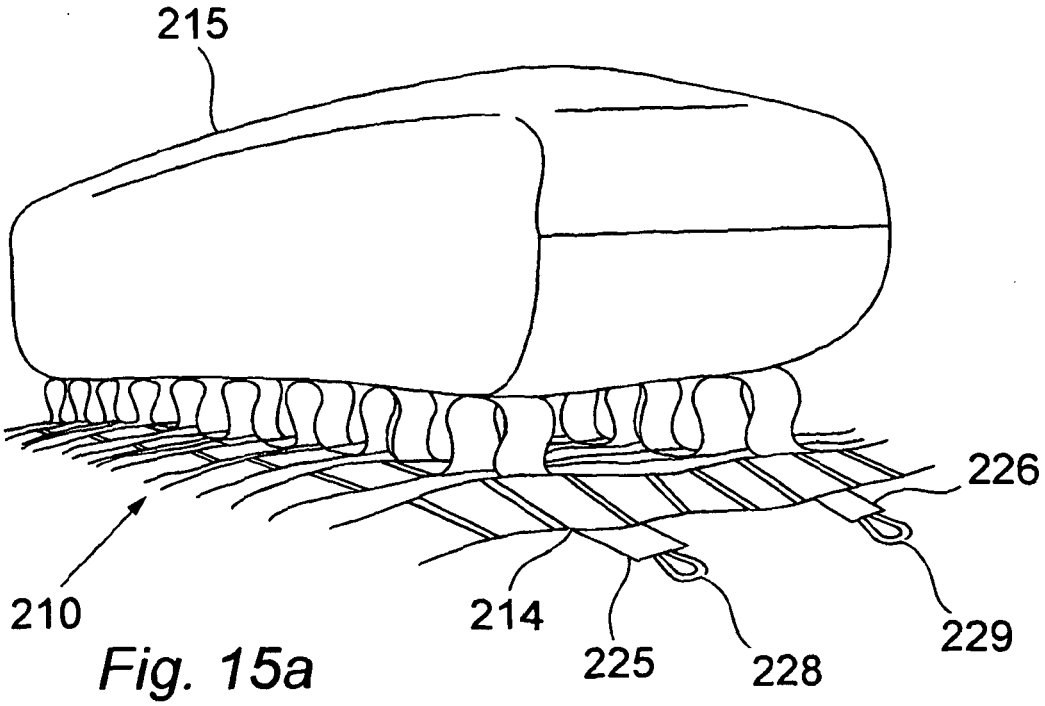


Fig. 15a

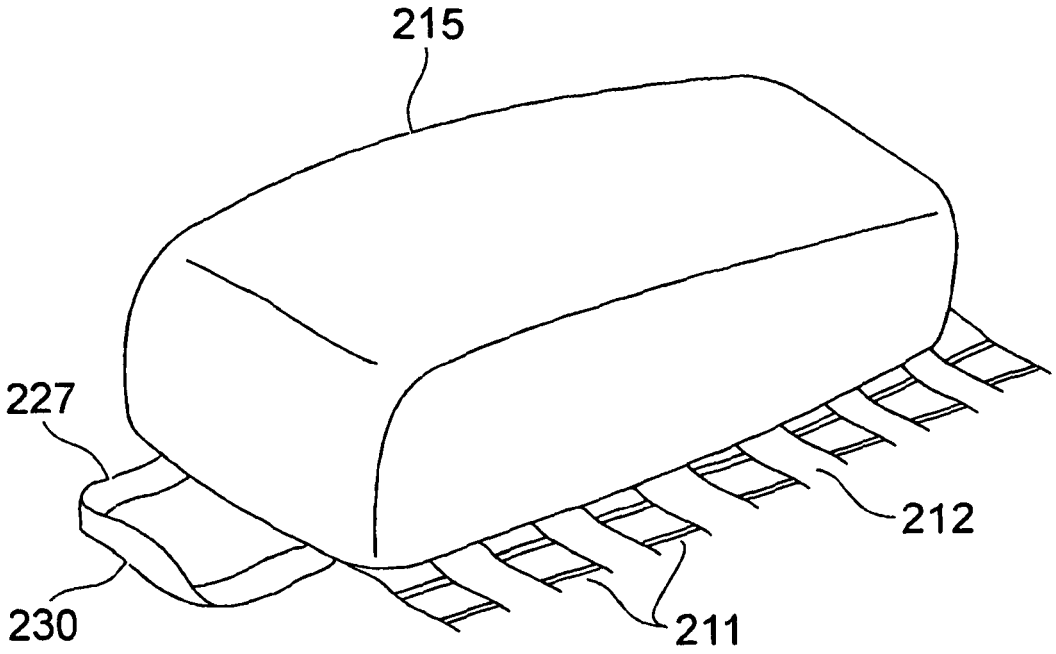


Fig. 15b

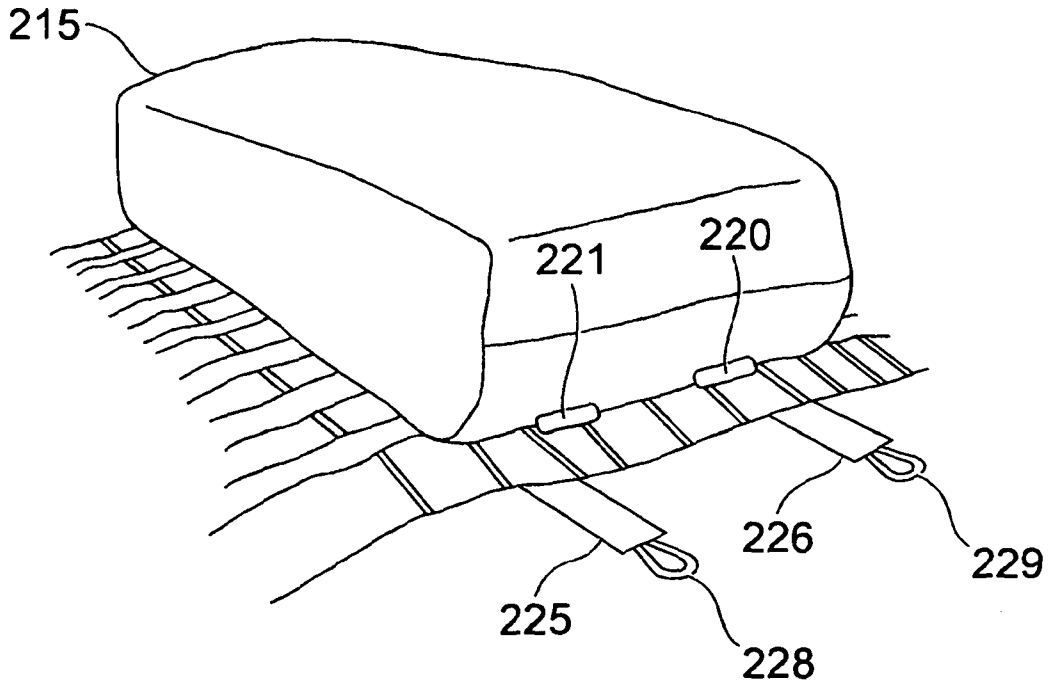


Fig. 16a

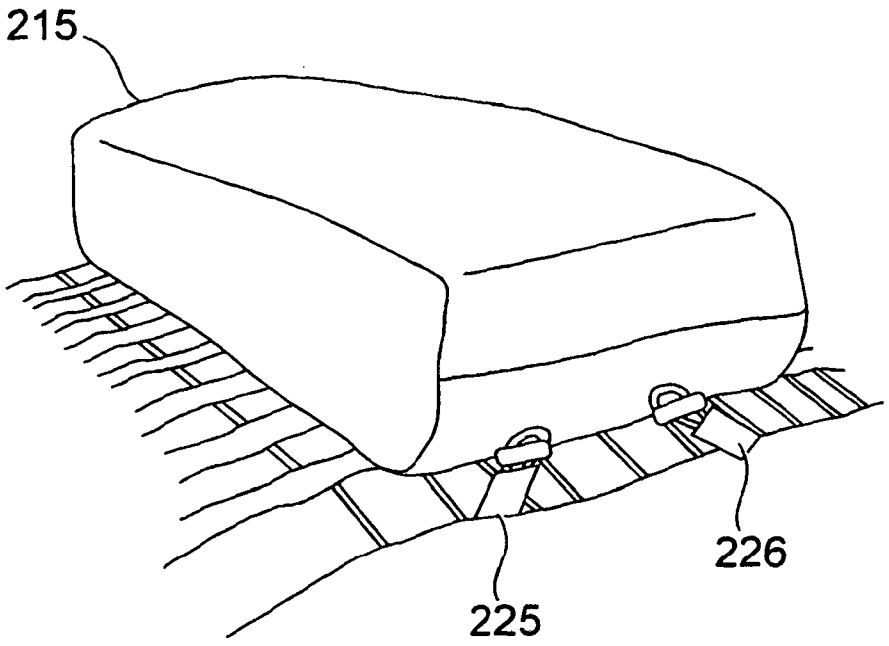


Fig. 16b

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- US 5724707 A **[0013]**
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