

[54] **CARRIER DEVICES FOR SHOULDER-STRAP SUPPORT ON THE BACK**

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[58] Field of Search224/8 R

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[57] **ABSTRACT**

Load-carrying devices adapted to be supported on the back by means of shoulder straps are provided with a resilient or inflatable cushion to yield to the load on the back. The cushion is specially designed to provide the correct support of the load on the back, being formed with a bottom portion extending widthwise of the cushion to provide a main band of support around the small of the wearer's back and being narrower in width in an upper portion thereof to provide an upper zone of support which leaves the shoulder blades of the wearer substantially free. The cushion is preferably designed to form a pneumatic frame in place of the rigid frame used in framed-rucksacks, its shape being chosen according to whether the rucksack is of the truncated triangular form or of the rectangular form. A development of the invention is the application of the resilient or inflatable cushion to what may be basically termed a ruckbox, preferably comprising a box-like carrier attached to a shallow frame fitted with the resilient or inflatable cushion and carrying the shoulder straps.

15 Claims, 19 Drawing Figures

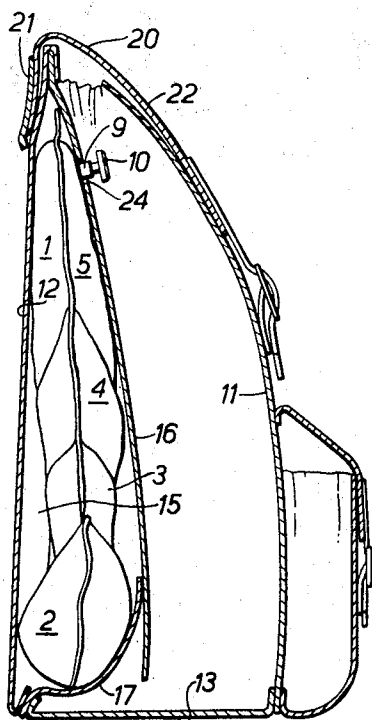


FIG. 1.

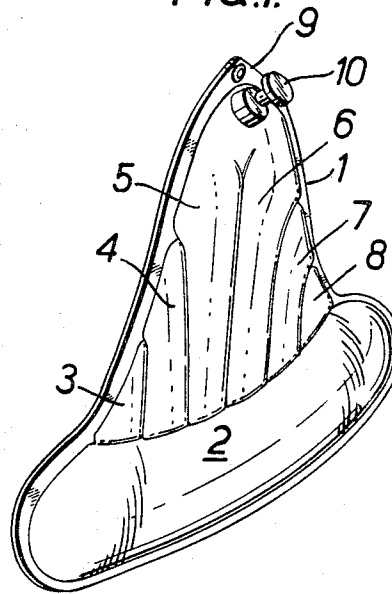
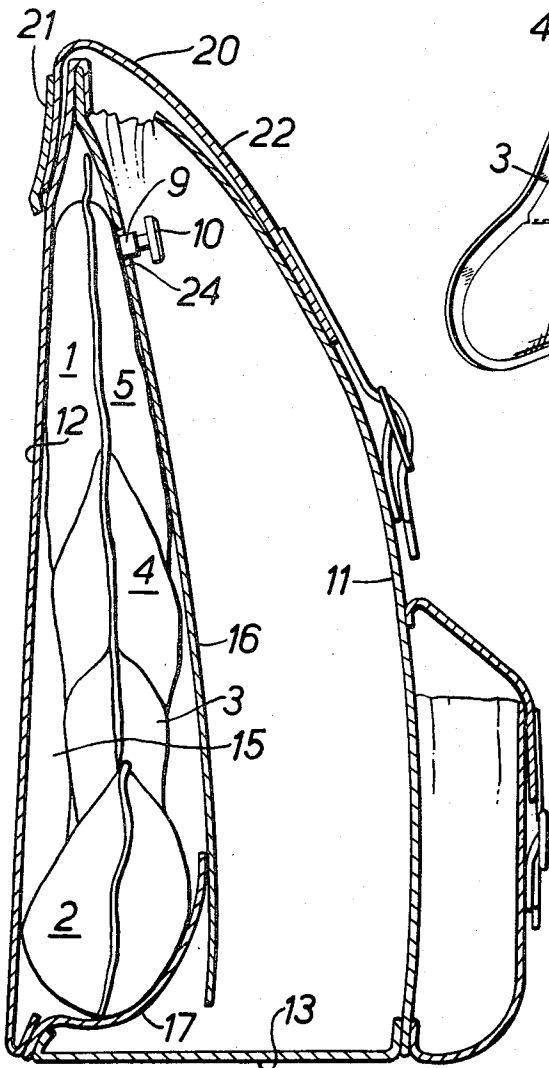
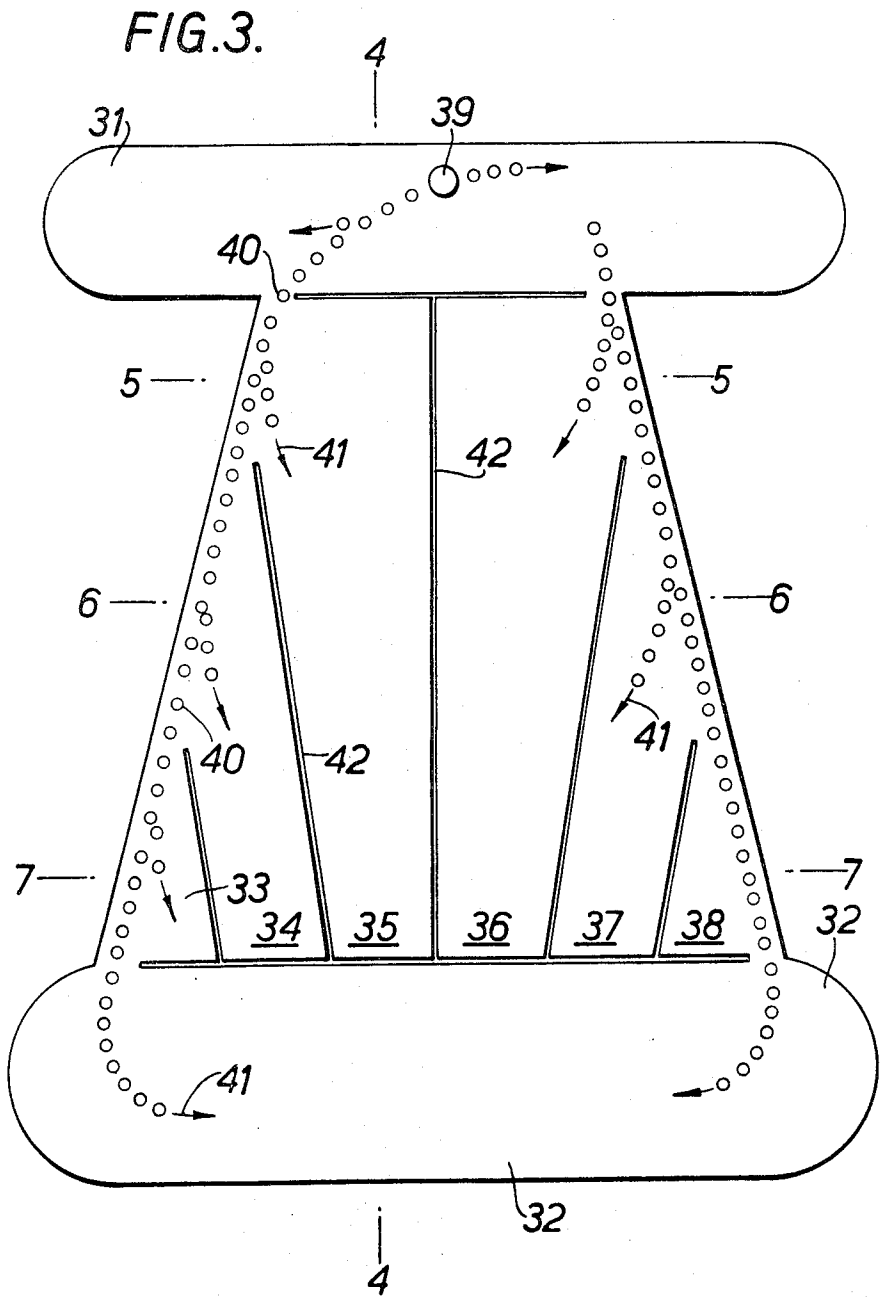
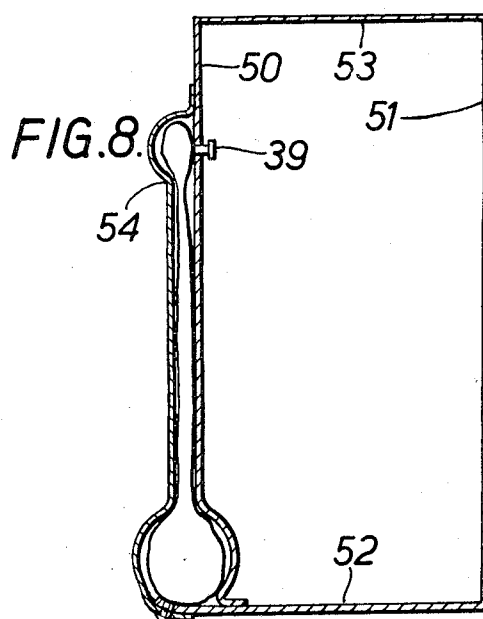
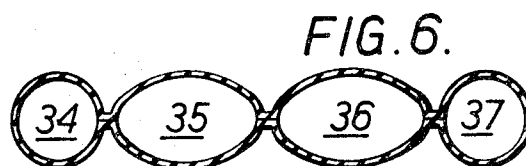
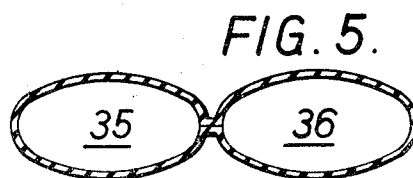
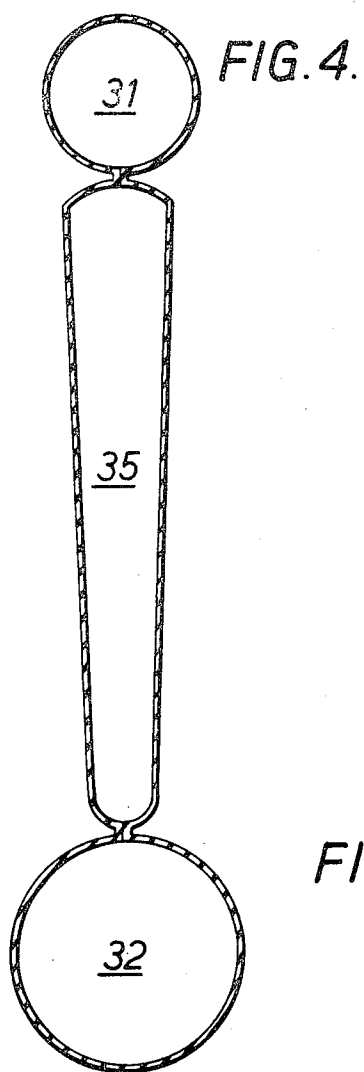
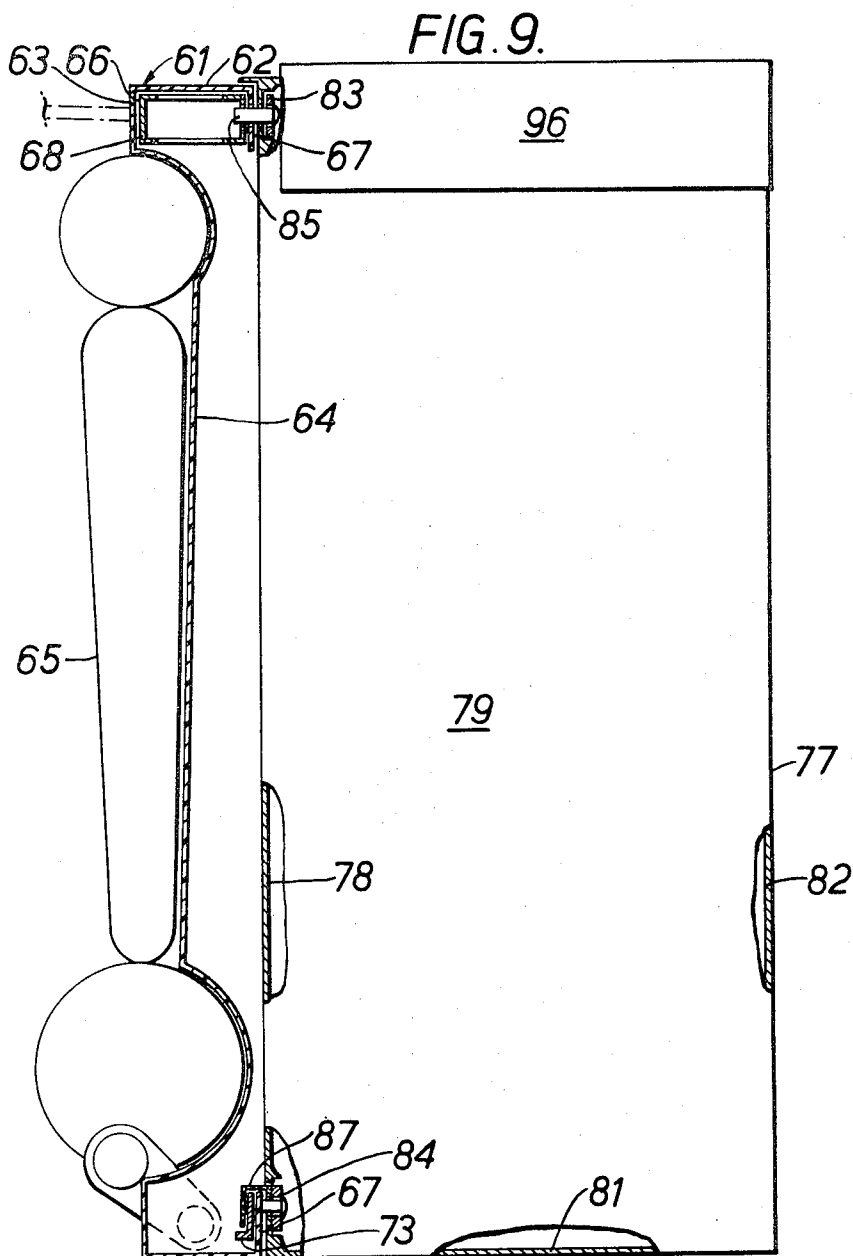


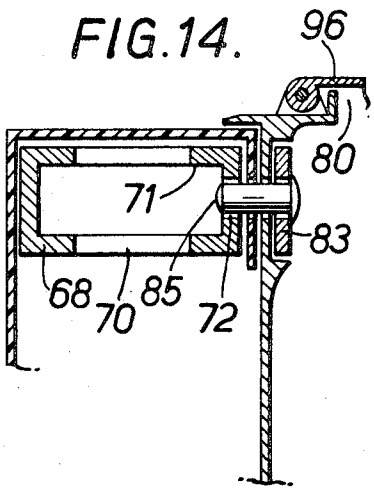
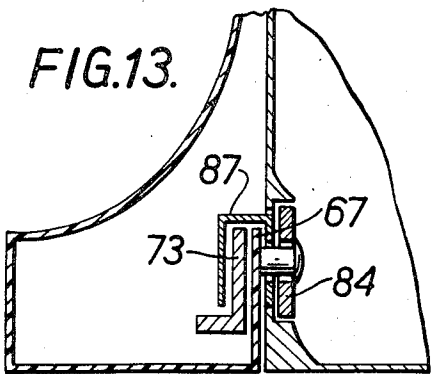
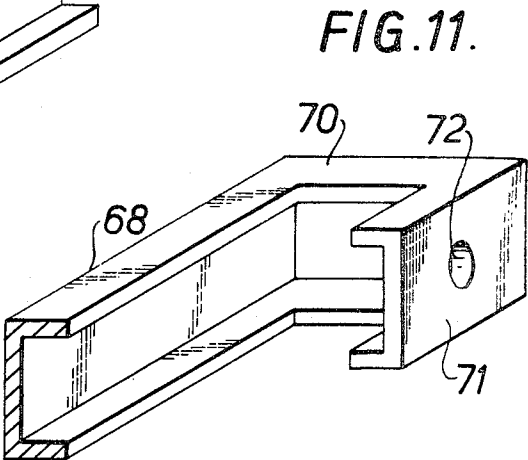
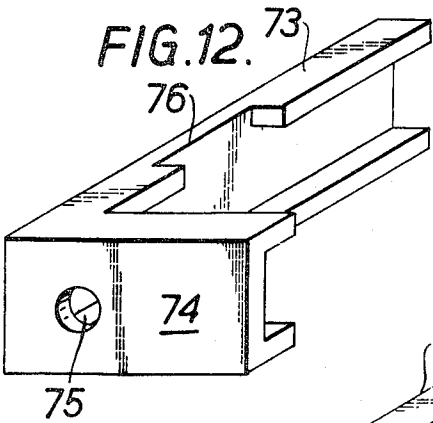
FIG. 2.

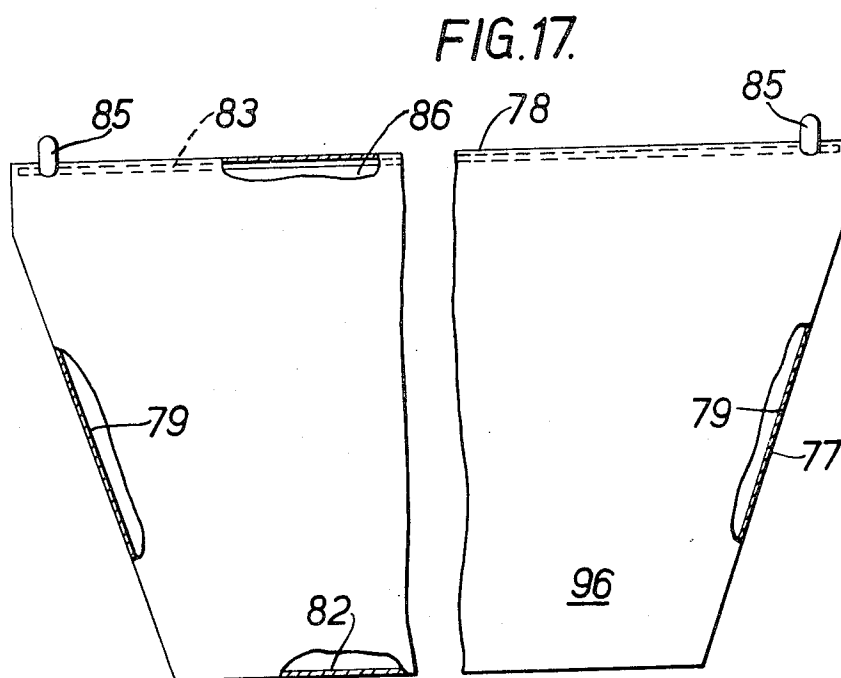
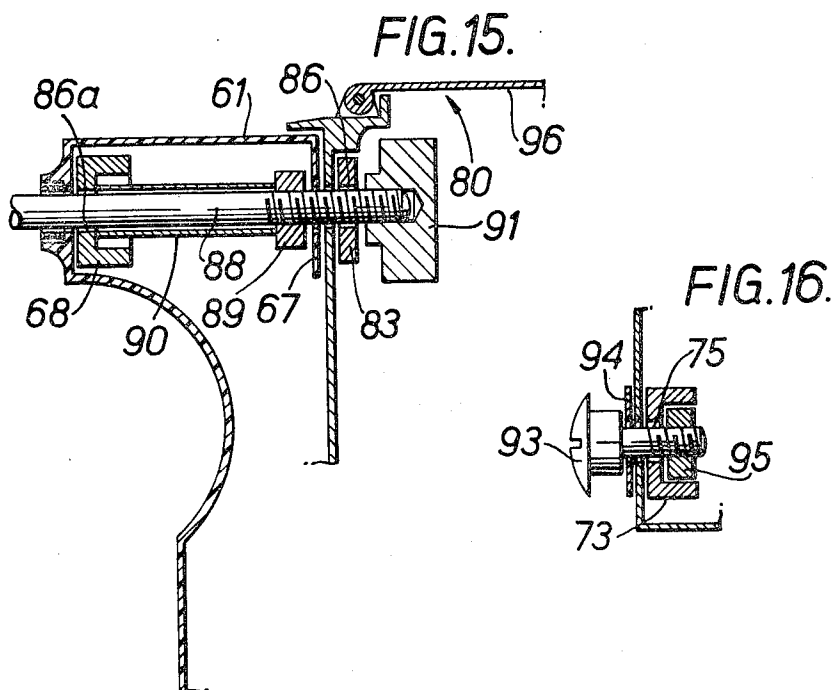


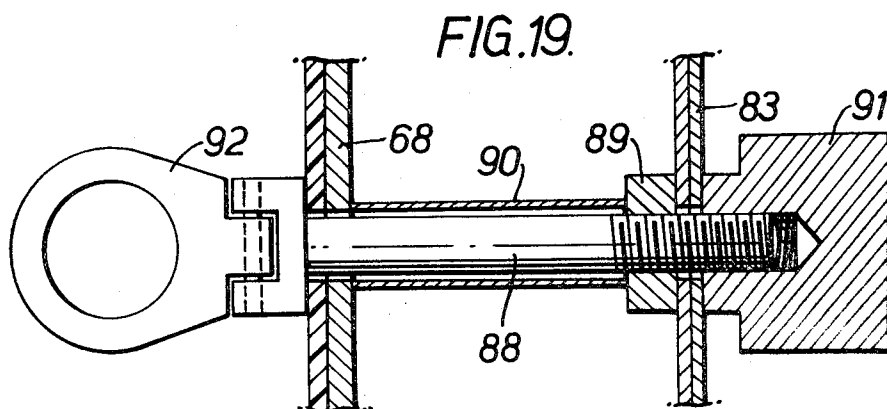
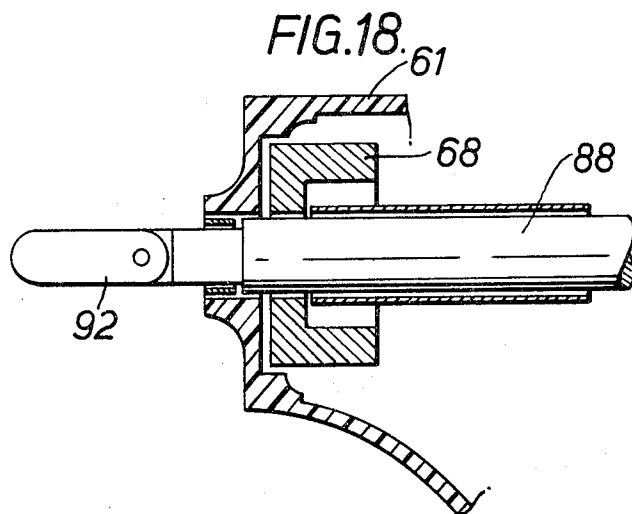












CARRIER DEVICES FOR SHOULDER-STRAP SUPPORT ON THE BACK

The present invention relates to load-carrying devices adapted to be supported on the back by means of shoulder straps. Such devices usually consist of flat fabric bags and are known as rucksacks.

Pressure of a loaded rucksack on the back of the person, especially when the rucksack contains hard, heavy or angular articles can be very uncomfortable and this the more so during long carrying-periods while walking over uneven ground.

A walker conscious of the discomfort he may otherwise suffer will often carefully pack soft, bulky articles such as woollens at the back of the rucksack to serve as padding, especially in the frameless rucksack, but this is not always satisfactory as the walker may desire to wear the garment so packed when the temperature conditions so require.

The present invention aims to incorporate in a load-carrying device as aforesaid a resilient or inflatable cushion to yield to the load on the back.

The form of the cushion is important to provide the correct support of the load by the back of the wearer. It is also highly desirable to provide adequate ventilation between the back of the wearer and the front of the load-carrier as a means of minimizing discomfort from perspiration.

The invention provides a resilient or inflatable cushion for a load-carrying device adapted to be supported on the back by means of shoulder straps, said cushion being formed with a bottom portion extending widthwise of the cushion to provide a main band of support around the small of the wearer's back, and being narrower in width in an upper portion thereof to provide an upper zone of support which leaves the shoulder blades of the wearer substantially free.

The medial portion of the cushion between the bottom and upper portions may be divided into side-by-side sections forming ventilating grooves in the face of the pad to be presented to the back of the wearer. The medial portion may taper upwardly from the bottom portion. The upper portion of the cushion may extend horizontally beyond each side of the medial portion to lie in the shoulder region wholly or mainly above the shoulder blades.

It is advantageous for the cushion to be inflatable to the required shape and proportions. The bottom portion may be inflated to a greater thickness than the sections of the medial portion and the upper portion may be inflated to a thickness intermediate that of the upwardly extending sections and the bottom portion.

The cushion may be inflatable by way of an inflation valve in the upper portion whereby compartments constituting the bottom and upper portions and the upwardly extending sections can be inflated to the required thicknesses.

The upwardly extending compartments may be separated by upwardly extending seams and a substantially horizontal seam may separate these compartments from the bottom compartment, all the seams terminating short of the edge of the cushion to enable air blown into the cushion through the common inlet to reach all of the compartments.

The bottom portion of the cushion may be curved to fit the small of the back.

The cushion may be fitted in a compartment or pocket internally or externally of a rucksack.

For some years it has been common to provide a rucksack, especially a large rucksack, with a metal frame, but rucksacks when provided with an inflatable air cushion as is herein described do not need a metal frame. The inflatable pad may then be regarded as a pneumatic rucksack frame. In the case of the frameless rucksacks of substantially triangular form with a truncated apex, a cushion which tapers between the bottom compartment and a top compartment, which can lie substantially between the shoulder blades, will serve well. The more modern rucksacks are of near rectangular shape. It is then advantageous for the upper portion of the cushion to extend horizontally beyond each side of the medial portion so that the bottom portion and the upper portion are of a length approximately equal to the width of the rucksack at the lower

and upper ends thereof. The cushion will then the better serve as a pneumatic frame for such a rucksack, or in other words, the cushion is enabled the better to maintain the shape of the rucksack, while leaving the shoulder blades substantially free. The upper and lower compartments may be approximately of cylindrical shape. The conception of applying a resilient or inflatable cushion to a rucksack has led to the devising of a load-carrier device which is adapted to be supported on the back by shoulder straps and is not open to many disadvantages which are attributable to the conventional rucksack.

The conventional fabric rucksack hangs from the shoulders with a sagging, lumpy effect; the fabric's resistance to water (i.e. rain) is generally an uncertain factor and it is liable to saturation, when its weight increases considerably. Unless the rucksack is fully packed, which is not always necessary, the contents form a bulging lump at the bottom of the sack. Moreover the conventional rucksack requires precision tailoring, involving careful cutting-out of materials and intricate stitching. The material is always liable to tear, or wear through abrasion and, under excessive strain, or with ageing, the stitching can give way.

The invention also provides what may be basically termed a ruckbox, i.e., a device for supporting on the back by means of shoulder straps, consisting of a box-like carrier and a resilient or inflatable cushion to serve as a resilient element between the carrier and the back of the wearer.

For such a device, a shallow frame fitted with a resilient or inflatable cushion may be provided with shoulder straps by which it can be supported on the back and be adapted to form a support for a separate box-like carrier.

The frame may comprise a moulded plastic housing, providing a recess for one part of the cushion, the other part protruding, and metal bracing bars, the shoulder strap anchorages being carried by these bars.

The box-like carrier may be of plastics material braced by metal bars and the connections between the carrier and the frame may be between the brace bars of the carrier and those of the frame.

The box-like carrier and the frame may be constructed so that the carrier can be readily hooked into engagement with the frame, located by locating pins, and finally the carrier and the frame firmly secured together by means of a single locking not.

Reference will now be made to the accompanying drawings, in which embodiments of the invention are illustrated by way of example.

FIG. 1 shows one form of inflatable cushion according to the invention and

FIG. 2 shows a rucksack incorporating the cushion.

FIG. 3 is a front view of a fully inflated modified form of air cushion;

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 3;

FIGS. 5, 6 and 7 are sectional views taken on the lines 5—5, 6—6, 7—7 of FIG. 3; and

FIG. 8 is a side view illustrating the application to a rucksack of the air cushion of FIGS. 3 to 7.

FIG. 9 is a side elevation partly in section of a ruckbox incorporating an air cushion;

FIG. 10 is a view looking in the direction of the arrow 10 in FIG. 9 to show what will be hereinafter regarded as the front of the device.

FIG. 11 is a fragmentary sectional view of a top brace provided in a frame of the device and

FIG. 12 is a fragmentary view of a bottom brace provided in the frame.

FIG. 13 is an enlarged fragmentary sectional view on the line 13—13 of FIG. 10 showing the way a box-like carrier of the device is hooked onto the bottom brace of the frame (two such hooked connections being provided as can be seen in FIG. 10).

FIG. 14 is an enlarged sectional view on the line 14—14 of FIG. 10 showing a pin locating means between the carrier and the frame.

FIG. 15 is a sectional view on the line 15—15 of FIG. 10 showing the means by which the carrier is finally secured to the frame.

FIG. 16 is a sectional view taken on the line 16—16 of FIG. 10 and showing one of the bottom anchorages for the shoulder strap.

FIG. 17 is a view partly in section looking down on to the box-like carrier.

FIGS. 18 and 19 are views of the top central connection of the frame and the carrier and showing the shoulder strap attachment at this region.

Referring to FIG. 1, the air cushion 1 is formed of close woven rubberized material or of a suitable, flexible plastics material and is divided into compartments, namely a large transverse or substantially horizontal compartment 2 at the lower broad end thereof and substantially vertical compartments 3, 4, 5, 6, 7, 8 thereabove. Substantially vertical seams which separate compartments 3, 4, 5, 6, 7, 8 and a substantially horizontal seam which separates compartment 2 from the substantially vertical compartments all terminate short at the edge of the cushion to enable air blown into the cushion through a valve 9 to reach all of the compartments. The valve 9 comprises a rubber or plastic tube which projects from the cushion 1 and is closed by a plug 10.

The cushion is shown in FIG. 2 incorporated in a rucksack.

The rucksack comprises a front panel 11, a rear panel 12 and a base panel 13, each of stout flexible textile material. The lower ends of panels 11 and 12 are seamed to the front and rear margins of the base panel 13 and are seamed together along their sides. The air cushion 1 is received in an internal compartment 15 formed by the rear panel 12, an internal upper panel 16 and an internal lower panel 17. Panel 16 is seamed along its sides and along its upper margin to rear panel 12 and panel 17 is seamed along its sides and along its lower margin to rear panel 12. The air cushion 1 is inserted into and withdrawn from the compartment 15 by passing it between the lower portion of panel 16 and the upper portion of panel 17 which are not interconnected otherwise than at the margins of the rear panel 12.

A rucksack cover 20 and upper anchorage 21 for shoulder straps 22 are secured by stitching to the upper part of the rear panel 12.

An eyeletted hole 24 is provided in the upper part of internal panel 16, to enable the valve 9 in the upper part of cushion 1 to pass therethrough and thus to be readily accessible when the rucksack is opened.

The air cushion illustrated in FIGS. 3 to 8 comprises parallel transverse upper and lower compartments 31, 32 which are spaced apart and interconnected by substantially vertically extending compartments 33, 34, 35, 36, 37, 38. The compartments 31 to 38 are inflated through a valve 39 and the access of air from the valve 39 to the various compartments is roughly indicated by bubble tracks 40 and arrows 41.

As is clear especially from FIG. 4 the girth of the upper transverse compartment 31 is less than that of the lower transverse compartment 32 but the thickness of compartments 35 and 36 from front to back decreases downwardly towards compartment 32.

In FIG. 3 the heavy lines 42 represent seams running between adjacent compartments.

The modified air cushion shown in FIGS. 3 to 8 is particularly applicable to frameless rucksacks of the rectangular or squared pattern as illustrated in side view in FIG. 8 where rucksack walls 50, 51, 52, 53 are such as to provide a rucksack of rectangular cross-section. The rear wall 50 of the rucksack is provided with an external panel or flap 54 to enclose the air cushion as illustrated in FIGS. 3 to 7.

For insertion of the cushion in the compartment provided between wall 50 and flap 54 an opening is provided along the lower rear edge of the rucksack adjacent to the junction between the walls 50 and 52, the opening being secured by means of a flap secured by press studs. The opening may be in the flap 54 or in the wall 50 or at the junction therebetween.

The inflation valve 39 projects through a small hole or eyelet in wall 50.

The cushion, when inflated, will act as a pneumatic frame to impart shape to the rucksack.

Suitable dimensions of the cushion shown in FIGS. 3 to 7 to function as required by the invention are as follows: Length (widthwise of the cushion) and average diameter of the bottom compartment 32, 12 inches and 13 inches respectively; overall height of the cushion, 14 inches, length (widthwise of the cushion) and average diameter of the upper compartment 31, 11 inches and 2 inches respectively; width across the top of the medial section approximately 5 inches and across the bottom of that section approximately 9½ inches, thickness of the medial compartments on the line 5—5, 1½ inch, on the line 6-6, 1¼ inch and on the line 7—7, 1 inch. Other dimensions are of substantially the same scale as FIG. 3.

Referring to FIGS. 9 to 19 of the drawings, a frame is generally indicated by the numeral 61. It comprises a plastics housing 62, the sectional configuration of which is shown by the thick black line in FIG. 9. The front wall 63 of the housing is recessed at 64 substantially to the contour of an inflatable cushion 65 so that substantially one-half of the cushion will be housed in the recess and the other half will protrude. The frame has a perimetral wall 66 and rear flange 67 extending inwardly from each side of the frame.

The protruding part of the cushion may be covered by a flexible covering sheet (not shown) which may or may not conform to the inflated cushion.

A channel-section brace bar 68 extends across the top of the frame within the housing adjacent the front wall 63 and (see FIG. 11) has right-angled end arms 70 and terminals 71 extending inwardly parallel to the main section of the bar. These terminals are each provided with a hole or socket 72.

A further brace 73 extends across the bottom of the frame. This brace is of channel-section as more clearly shown in FIG. 12 with forwardly extending end arms 74 provided each with a hole 75. The forwardly extending top flange of the channel is notched at each end of the brace as shown by 76. The transversely extending main length of the channel lies against the inside of the bottom flange 67 of the frame housing as shown in FIGS. 9 and 13, i.e., is at the rear of the frame.

The box-like carrier 77 in the selected form shown comprises a front wall 78 two rearwardly converging side walls 79, open top 80 (FIG. 14), bottom 81 and rear wall 82.

The front wall 78 is braced by top and bottom bars 83 and 84 respectively, the bars being of a strip-like character.

The top bar 83 is provided with forwardly projecting pins 85, one at each end, passing through the front wall of the carrier. A central hole 86 is provided in this bar. A hook member 87 is riveted near each end of the bottom bar 84, see FIG. 13.

The box-like carrier is readily locatable on the back of the frame and can then be firmly secured to form a unit therewith. The carrier is located by hooking the hook members 87 onto the notched portions 76 (FIG. 12) of the bottom brace bar 73 of the frame 61 and passing the pins 85 on the top bar of the carrier 77 through the holes 72 in the terminals 71 of the top bar 18 of the frame 61.

As shown in FIG. 15 the threaded end of a screw 88 is passed through the central holes 86 in the top brace bar 83, registering hole 86a in the front of the frame, engaging a nut 89 held by a spacer tube 90, and engageable with the top flange 67 of the frame. The threaded end of the screw passes through the said flange 67 and through the front wall of the carrier and the central hole 86 in the top brace bar 83 of the carrier and a box locking nut 91 is screwed tight to secure the carrier firmly to the frame.

The shoulder strap anchorage assembly 92 may be appropriately fitted to the left-hand end of the screw.

FIG. 16 shows one of the anchorage bolts 93 for the shoulder strap lower anchorages, the bolt passing through a washer 94 and one of the holes 75 in the lower brace bar 73 of the frame and being secured by a nut 95.

The open carrier top is closed by a hinge lid 96.

The carrier box may be internally pocketed, shelved, or compartmented or externally pocketed in any suitable way and easier accommodation is provided for fragile articles such as optical instruments, glass containers, vacuum flasks and the like, which frequently are padded in conventional rucksacks by means of woollen garments which often have to be taken out and worn when the temperature drops as when the colder air of high ground is reached. The box may be constructed to give external access to internal pockets or compartments.

The frame aforesaid and the box like carrier may be made of plastics, or of glass fibers (fiber glass), or of a combination of both.

The frame and the carrier may be moulded with raised portions to permit the brace bars to be pushed into and gripped in position.

The embodiments have been described where the cushion is inflatable, but in any of the embodiments, the inflatable cushion could be replaced by a cushion of foamed rubber or plastics of substantially the shape of the inflatable cushion when inflated. An inflatable cushion is to be preferred, inter alia, because it allows the size to which the cushion is inflated to be chosen as desired within certain limits.

What is claimed is:

1. A load-carrying device comprising a container for the load, strap means for securing the container to the back of a wearer and an inflatable cushion formed with intercommunicating sections, the cushion having a bottom portion extending widthwise of the cushion to provide a main band of support around the small of the wearer's back and being narrower in width in an upper portion thereof to provide an upper zone of support which leaves the shoulder blades of the wearer substantially free.

2. A load-carrying device according to claim 1 in which the medial portion of the cushion between said bottom and upper portions is divided into side-by-side upwardly extending sections forming ventilating channels in the face of the cushion to be presented to the back of the wearer.

3. A load-carrying device according to claim 2 in which the said medial portion tapers upwardly from the bottom portion.

4. A load-carrying device according to claim 2 in which the upper portion of the cushion extends horizontally beyond each side of the medial portion to lie in the shoulder region wholly or mainly above the shoulder blades.

5. A load-carrying device according to claim 1 in which the intercommunicating sections of the cushion include a bottom section to extend around the small of the wearer's back and sections thereabove, said bottom section being inflatable to a greater thickness than the said sections thereabove.

6. A device according to claim 5 in which the upper portion is inflatable to a thickness intermediate that of the bottom section and the said sections thereabove.

7. A load-carrying device according to claim 6 in which the cushion comprises a valve in the upper portion thereof whereby the said sections and the upper portion can be inflated to the required thickness.

8. A load-carrying device according to claim 7 in which the sections above said bottom section are separated by upwardly extending seams and a substantially horizontal seam separates them from the bottom section, all the seams terminating short of the edge of the cushion to enable air blown into the cushion through the valve to reach all of the sections.

9. A load-carrying device according to claim 1 in which the bottom portion is inflatable to a curved tube formed to fit the small of the back.

10. A load-carrying device comprising a frameless rucksack, strap means for securing the rucksack to the back of a wearer and an inflatable cushion divided into intercommunicating sections to distribute the cushion pressure around the small of the wearer's back and in the region of the back thereabove and to impart shape to the rucksack.

11. A device according to claim 1 in which the container is a box-like carrier and comprising means retaining said cushion and carrying said strap means for securing said carrier to the wearer's back, said cushion comprising intercommunicating pressure distributing sections for distributing the cushion pressure around the small of the wearer's back and in the regions of the back thereabove.

12. A device according to claim 11 in which said means comprise a shallow frame carrying the strap means, and the box-like carrier and said frame having cooperating fastening means whereby the carrier can be detachably secured to the frame.

13. A device according to claim 12 in which said frame comprises a moulded plastic housing providing a recess for one part of the cushion, the other part of the cushion protruding, and said frame having metal bracing bars, the strap anchorages being carried by these bars.

14. A device according to claim 13 in which the carrier is of plastic material braced by metal bars and the connections between the carrier and the frame are between the brace bars of the frame and the brace bars of the carrier.

15. A device according to claim 14 comprising hook means by which the carrier is hooked to the frame, pin means locating the carrier with respect to the frame and screw and lock nut means securing the carrier firmly to the frame.

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