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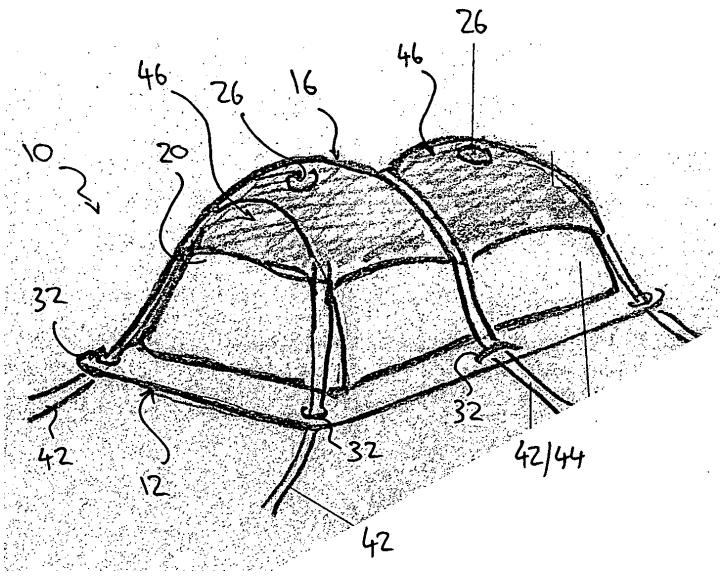
(54) Flexible waterproof flood protection container

(57) A flexible waterproof flood protection container (10) for protecting possessions from flood water, comprises a variable volume housing (12) into which possessions can be placed and which can be water tightly sealed; means for stabilising the sealed housing (12) when subjected to flood water, and two or more one-way valves (26) for discharging air from the housing (12). The in use stabilising means defines two or more chambers (46) in the housing (12) as the interior volume of the housing (12) varies. The chambers (46) stabilise the housing (12) when buoyant in flood water. The two or more one-way valves (26) discharge air from the housing (12) via the chambers (46), each one-way valve in use being in direct communication with one of the chambers (46) defined by the stabilizing means. Due to the variable volume housing (12), when the housing (12) is subjected to external pressure, the housing (12) at least partially conforms to the possessions therein. Preferably, the housing (12) has at least an expandable base (18) by which the volume of the housing (12) varies in use.

Fig. 5



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Description

[0001] The present invention relates to a flexible waterproof flood protection container for protecting possessions from flood water.

[0002] The increasing risk of flooding in numerous areas of the world requires ready protection for personal belongings, as well as for commercial and business items, such as furniture, electronic equipment, and food.

[0003] Devices have been suggested, such as in US6273113 which relates to a flexible waterproof container for a car. However, the container of US6273113 is not of variable volume, and has only one valve for the expulsion of air. The fixed volume allows only vehicles of a certain size to be accommodated therein, and the single valve results, when in use, in a single air pocket being formed at the upper part of the container. A single air pocket causes instability, especially in the event that the container breaks free from its moorings.

[0004] Furthermore, damage is easily caused to the contents of the container of US6273113 by the anchoring straps, when the container and contents are subjected to the forces of flood water.

[0005] The present invention seeks to provide, amongst other things, a flexible waterproof flood protection container with improved stability when subjected to flood water, results in no or a minimum amount of damage to items placed within the container, and which has an adaptable volume.

[0006] According to the present invention, there is provided a flexible waterproof flood protection container for protecting possessions from flood water, the flexible container comprising : a variable volume housing into which possessions can be placed and which can be water tightly sealed; means for stabilising the sealed housing when subjected to flood water, the in use stabilising means defining two or more chambers in the housing as the interior volume of the housing varies, the chambers stabilising the housing when buoyant in flood water; and two or more one-way valves for discharging air from the housing via the chambers so that, when the housing is subjected to external pressure, the housing at least partially conforms to the possessions therein, each one-way valve in use being in direct communication with one of the chambers defined by the stabilizing means.

[0007] Advantageously, the variable volume housing enables a wide variety of items of varying dimensions to be held within the container, while allowing the housing to conform to the contents under the pressure of external flood water. The two or more valves allow the two or more respective chambers to vent equally or substantially equally, thus maintaining stability during turbulent flood waters.

[0008] Preferable and/or optional features of the present invention are set forth in claims 2 to 10, inclusive.

[0009] The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which :

Figure 1 is a diagrammatic perspective view from above of one embodiment of a flexible waterproof flood protection container, in accordance with the present invention;

Figure 2 is a diagrammatic perspective view from above of a housing of the container, following removal of stabilising means;

Figure 3 is a view similar to that of Figure 2, but showing an open flap which is formed in the top of the housing and through which items can be placed within the housing;

Figure 4 is a diagrammatic perspective view from below of the housing; and

Figure 5 is a diagrammatic perspective view of the container in use, showing the housing with air chambers formed at a top thereof.

[0010] Referring firstly to Figures I to 4, there is shown a flexible waterproof flood protection container 10 which comprises a flexible envelope-type housing 12, a protective base layer 14 on which the housing 12 is provided, and a stabilising sheet 16 which extends across an upper surface of the housing 12, opposite to the base layer 14. As such, the housing 12 is interposed between the stabilising sheet 16 and the base layer 14.

[0011] The housing 12 is formed from flexible water impermeable material, such as or including polychloroprene, for example Neoprene RTM. The housing 12 has a base 18 adjacent to and in contact with the protective base layer 14, a top 20 opposite the base 18, and a large flap 22 which is formed in the top 20 to allow access to the interior of the housing 12.

[0012] The flap 22 is closed via a waterproof, and typically air tight, toothed fastening device 24, such as a diving zip. Such a device is a Pro-Seal RTM TZNC-41 AFHR2 Z CR W-SEAL zipper, available from YKK.

[0013] With the flap 22 closed and the fastening device 24 fully engaged, the housing 12 is water tightly sealed to prevent the ingress of water.

[0014] Two one-way air valves 26 are provided in spaced relationship in the flap 22. Typically, the air valves 26 are symmetrically positioned in the top 20 of the housing 12 for reasons which will become apparent hereinafter. The air valves 26 can be adjustable Low Profile Auto Dump Valves typically used in diving applications and available from Apex Marine Equipment Ltd.

[0015] The base 18 of the housing 12 includes a gusseted, folded, concertinaed, or pleated base portion 28 which allows expansion of the base 18 into the interior of the housing 12, and a flange portion 30 which surrounds the base portion 28 and in and/or on which stabilising sheet locating elements 32 are provided. As can be seen in Figure 1, the stabilising sheet locating elements 32 are typically eyelets 34 and straps 36 forming

loops. The expandable base portion 28 allows expansion in any direction.

[0016] The top 20 of the housing 12 also includes a flange portion 38 which is water tightly attached to the flange portion 30 of the base 18 to form the housing 12.

[0017] The protective base layer 14 on which the housing 12 is located is water permeable, and is formed of a tough resilient web, mesh or net material which prevents or limits, typically external, objects or surfaces from puncturing or abrading the base 18 of the housing 12 when the container 10 is in use. The protective base layer 14 does not impede the passage of water to the base 18 of the housing 12.

[0018] The stabilising sheet 16 comprises a flexible sheet body 40 formed from a resilient air permeable material, and a plurality of anchoring straps 42 which extend from the sheet body 40 and which are fed through the stabilising sheet locating elements 32 provided on the housing 12. The stabilising sheet 16 is separable from the housing 12, and the sheet body 40 covers the air valves 26. However, since the sheet body 40 is air permeable, the discharge of air through the air valves 26 is not restricted.

[0019] Four of the anchoring straps 42 are provided at respective corners of the sheet body 40, and a single middle strap 44 of greater length than the corner straps is provided midway or substantially midway between the air valves 26 and bisecting the longitudinal extent of the housing 12, as best shown in Figure 1.

[0020] For storage, the flexible waterproof flood protection container 10 can be easily and conveniently folded or rolled to assume a compact size.

[0021] In use, the flexible waterproof flood protection container 10 is laid out as shown in Figure 1, the stabilising sheet 16 is removed, and the flap 22 is unfastened to expose the interior of the housing 12, as in Figure 3. Items to be protected from flood water damage are then placed into the housing 12, the housing 12 is drawn up and around the items, and the flap 22 is closed and fastened so as to water tightly seal the items within the housing 12.

[0022] The stabilising sheet 16 is then positioned on top of the housing 12, and the anchoring straps 42 are fed through the respective stabilising sheet locating elements 32. Distal free ends of the anchoring straps 42 are either securely fastened to an immovable object, such as the ground, or are weighted down.

[0023] When the sealed container 10 is subjected to flood water, the flood water will first tend to push the housing 12 against the items contained therein. The expandable base 18 of the housing 12 will be forced by the pressure of the flood water to project into the interior of the housing 12, resulting in the base 18 at least partially conforming to the shape of the contents. The expansion of the base 18 in this manner acts to reduce the interior volume of the housing 12, and thus air within the housing 12 is forced upwards towards the one-way valves 26.

[0024] Due to the stabilising sheet 16 extending across the top 20 of, and being held against, the housing 12, the container 10 does not, at least initially, become buoyant. The middle anchoring strap 44 which extends fully across the lateral extent of the stabilising sheet 16 is dimensioned such that, as air inside the housing 12 is forced upwards towards the one-way valves 26, thus causing the housing 12 to balloon, the middle anchoring strap 44 causes two dome-shaped air pocket chambers 46 to be defined in the housing 12. See Figure 5. The one-way air valves 26 are positioned in the top 20 of the housing 12 so that they correspond to the or substantially the apex of each dome, thus allowing maximum discharge of air from the housing 12.

[0025] In the case when the flexible waterproof flood protection container 10 is anchored to an immovable object or surface, as flood water rises, all or substantially all air will be expelled from the housing 12, via the initially formed dome-shaped chambers 46, through the one-way air valves 26, due to the housing 12 being compressed against the stabilising sheet 16. Consequently, the flexible housing 12 will tend to conform completely or substantially completely to the contents, and the previously defined dome-shaped chambers 46 will collapse as the air is expelled. The housing 12 is thus held stationary or substantially stationary against the forces of the flood water by the stabilising sheet 16.

[0026] In the case when the flexible waterproof flood protection container 10 does become buoyant, as the flood water rises, the dome-shaped air pocket chambers 46 in the housing 12 are maintained by the stabilising sheet 16 being biased downwards against, and therefore compressing, the housing 12. The plurality of air pocket chambers 46 increases the stability of the container 10 when afloat in the water, limiting damage to the contents.

[0027] An air permeable sheet body for stabilizing the housing is beneficial due to the reduction in pressure on the contents within the housing. However, other means for stabilizing the housing can be used. For example, straps can replace the sheet body. However, solely using straps will localize the pressure on the contents, thus resulting in the greater likelihood of damage. Alternatively, the housing can be formed integrally with the stabilizing means, and/or have the stabilizing means attached permanently thereto.

[0028] It will be understood that, although a zipped flap within the top of the housing is suggested, the whole of the top of the housing can be formed as a flap, or the flap can be dispensed with entirely and the top of the housing can simply be removable from the base of the housing to provide access to the interior. Additionally, although the flap is foldable, it can be entirely removable.

[0029] The housing and stabilizing means can be arranged to define more than two air pocket chambers. In this case, a respective number of one-way air valves are also provided.

[0030] Although the air pocket chambers are dome-shaped, other shapes are possible, such as parabolic, conical, frusto-conical, pyrammidical, and ogival.

[0031] Other types of watertight fastening devices may also be utilized. However, the toothed fastening device described above is extremely convenient and allows the flexible waterproof flood protection container to be easily reusable.

[0032] Although only a protective base layer is suggested for preventing damage to the base of the housing, one or more surfaces of the housing can include a protective external layer to prevent or reduce the risk of damage, such as puncturing and abrasion.

[0033] Furthermore, although only the base portion is described as being expandable, additional portions of the housing can be formed in a similar manner to also be expandable and thus allow a reduction in volume of the housing and conforming of the housing to the contents.

[0034] It is thus possible to provide a flexible waterproof flood protection container which not only reduces the risk of damage to contents therein, but also has improved stability. Furthermore, the container can be compactly stored and reused many times. By providing an expandable base which acts to reduce the interior volume of the housing when subjected to flood water pressure, buoyancy also becomes more controllable, again reducing the risk of damage to items held within the container.

[0035] The embodiments described above are given by way of examples only, and various other modifications will be apparent to persons skilled in the art without departing from the scope of the invention, as defined by the appended claims.

Claims

1. A flexible waterproof flood protection container (10) for protecting possessions from flood water, the flexible container (10) comprising :

a variable volume housing (12) into which possessions can be placed and which can be water tightly sealed;
means for stabilising the sealed housing (12) when subjected to flood water, the in use stabilising means defining two or more chambers (46) in the housing (12) as the interior volume of the housing (12) varies, the chambers (46) stabilising the housing (12) when buoyant in flood water; and
two or more one-way valves (26) for discharging air from the housing (12) via the chambers (46) so that, when the housing (12) is subjected to external pressure, the housing (12) at least partially conforms to the possessions therein,
each one-way valve (26) in use being in direct communication with one of the chambers (46) defined by the stabilizing means.

2. A flexible waterproof flood protection container (10) as claimed in claim 1, wherein each chamber (46) is defined by an in use upper surface of the housing (12).

3. A flexible waterproof flood protection container (10) as claimed in claim 1 or claim 2, wherein one or each chamber (46) definable by the stabilizing means is dome-shaped, and the respective one-way valve (26) is positioned at or adjacent to an apex of the dome.

4. A flexible waterproof flood protection container (10) as claimed in any one of the preceding claims, wherein the variable volume housing (12) comprises a base (18) and a top (20) opposite the base (18), at least a portion of the top (20) being openable and closeable to enable insertion and extraction of possessions.

5. A flexible waterproof flood protection container (10) as claimed in claim 4, wherein the housing (12) further comprises a water tight releasable fastener (24) by which the said at least a portion of the top (20) is water tightly closeable to water tightly seal the housing (12).

6. A flexible waterproof flood protection container (10) as claimed in any one of the preceding claims, wherein the housing (12) is expandable to in use vary the volume of the housing (12).

7. A flexible waterproof flood protection container (10) as claimed in claim 6, wherein a base (18) of the housing (12) is expandable, so as to be at least partly conformable to possessions located within the cavity.

8. A flexible waterproof flood protection container (10) as claimed in any one of the preceding claims, wherein the container (10) further comprises a water permeable protective external layer (14) on or adjacent to the housing (12) to prevent or limit damage to the housing (12).

9. A flexible waterproof flood protection container (10) as claimed in any one of the preceding claims, wherein the stabilizing means includes means for compressing the housing (12), so that the said two or more chambers (46) are formable.

10. A flexible waterproof flood protection container (10) as claimed in any one of the preceding claims, wherein the stabilizing means comprises an air permeable sheet (16) positioned or positionable on the top (20) of the housing (12), and means for biasing the sheet (16) downwards relative to the housing (12) so that the housing (12) is compressible against the sheet (16) to form the chambers (46) and to expel

air through the one-way valves (26).

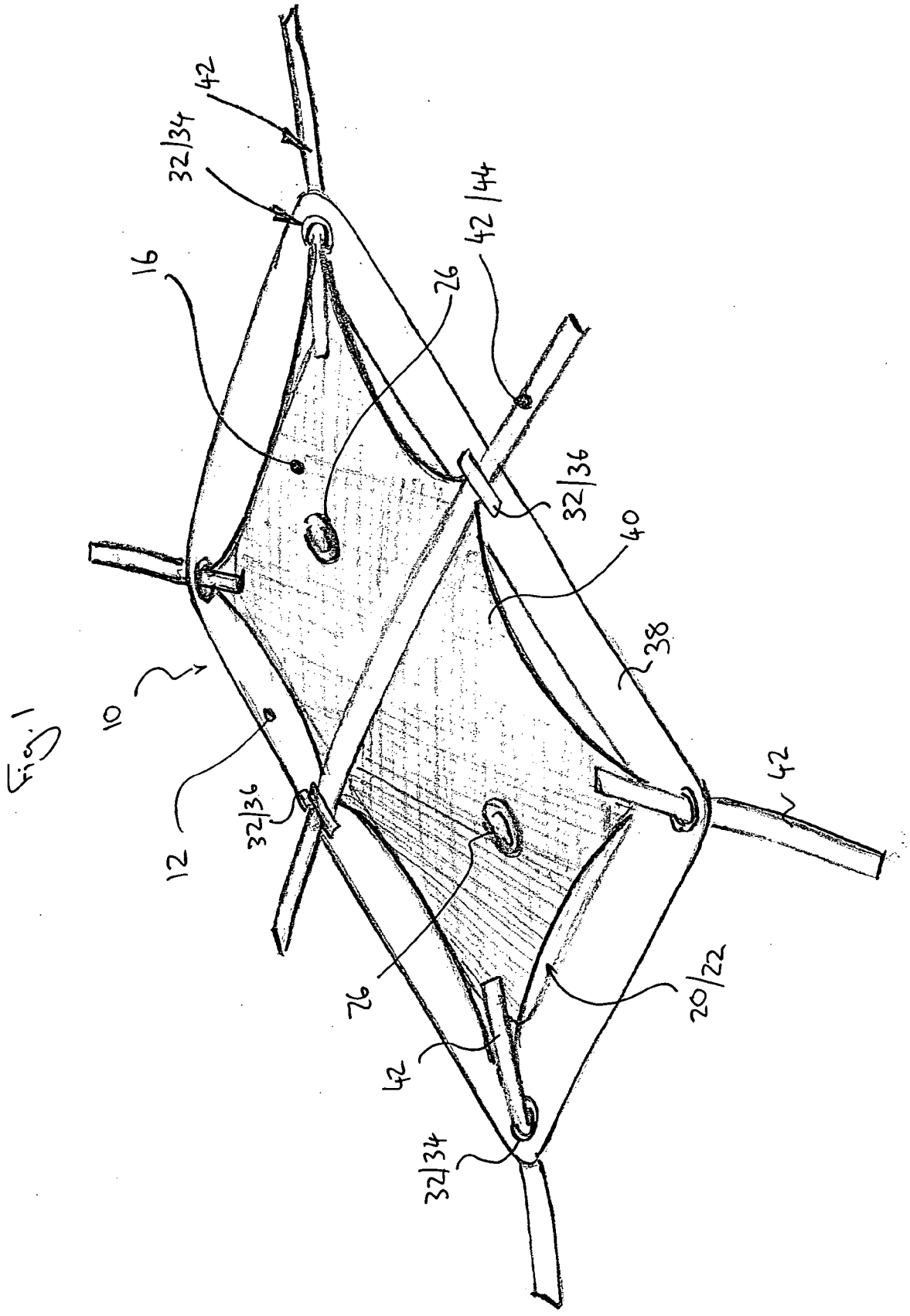
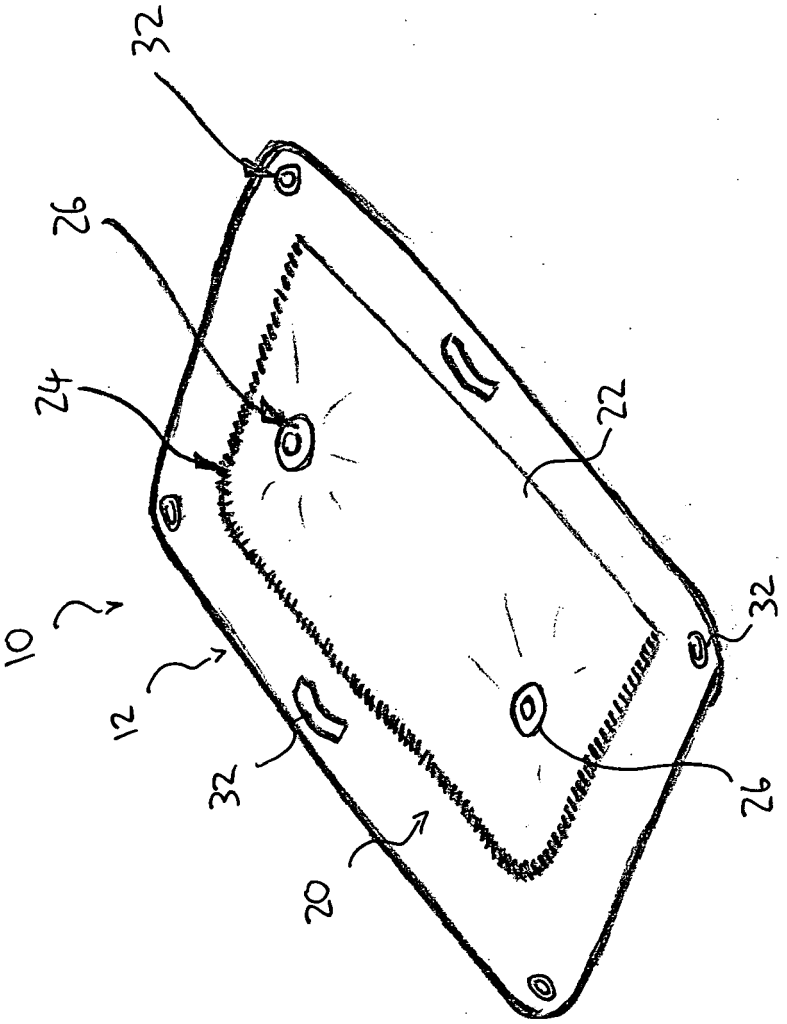


Fig. 1

Fig 2



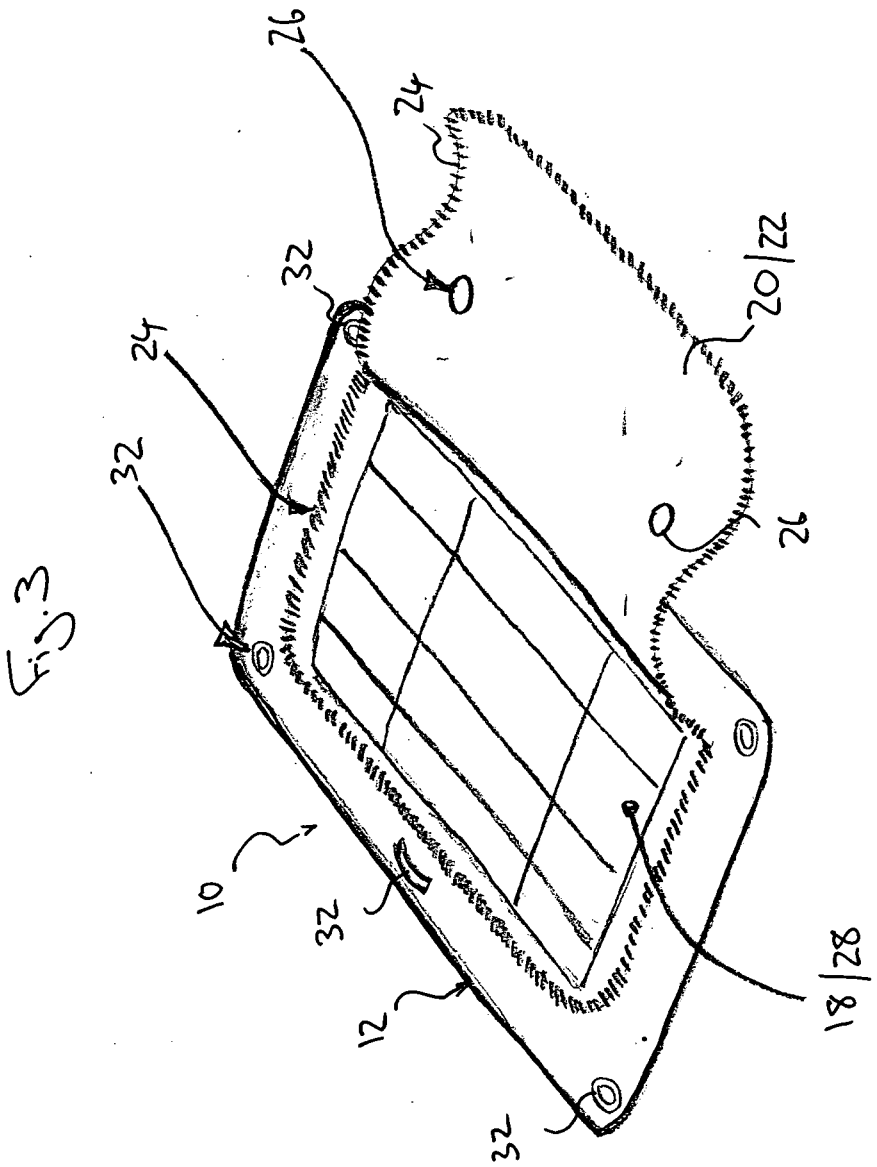


Fig.3

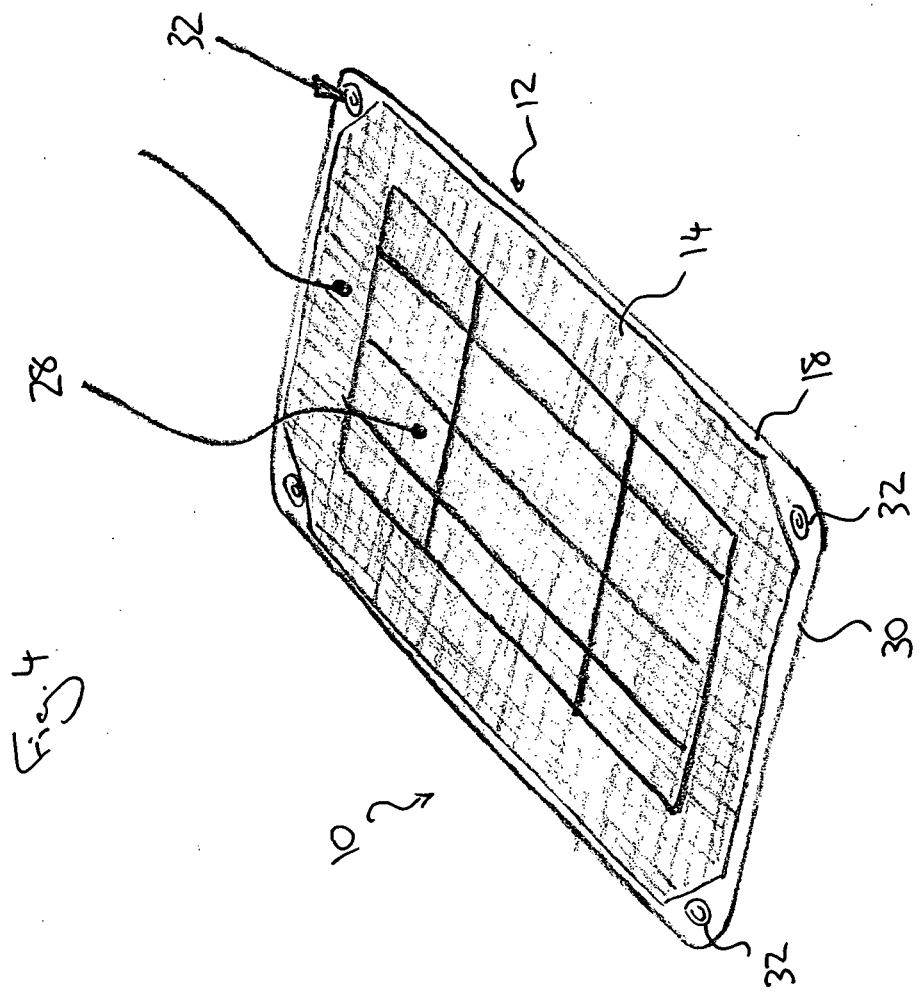
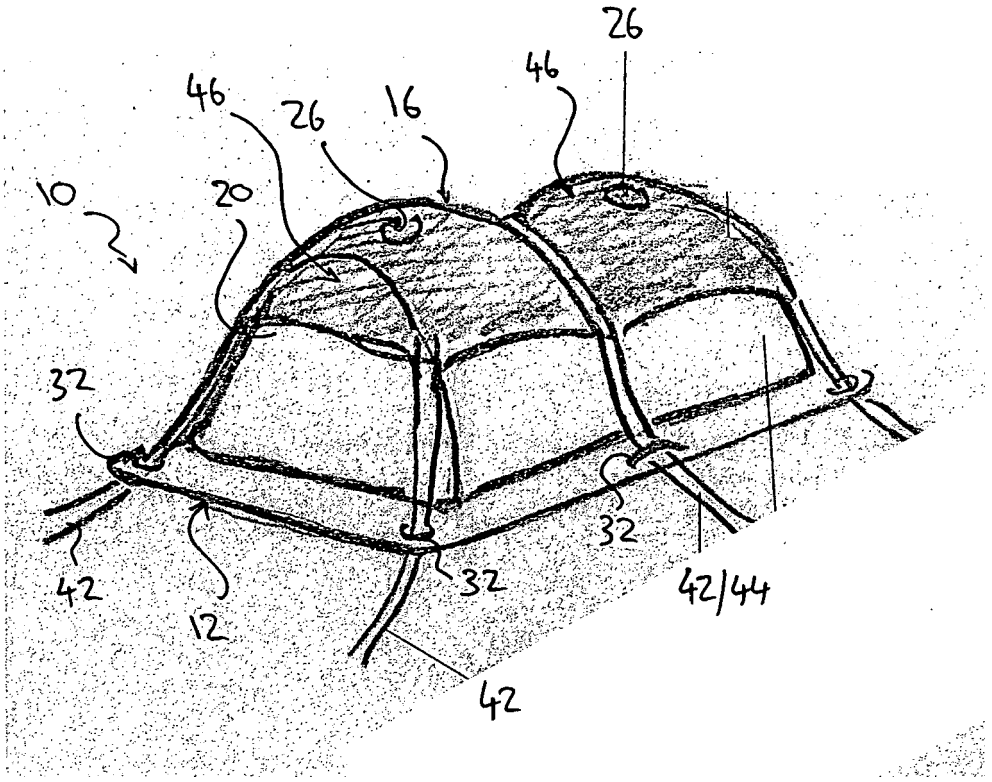


Fig. 4

Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 07 25 1597

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
P,X	WO 2006/124528 A (ILLINOIS TOOL WORKS [US]; HENN STEVEN M [US]; CREVIER DONALD L [US]) 23 November 2006 (2006-11-23) * page 8, line 3 - page 10, line 23 * -----	1-7	INV. B65D33/01 A45C7/00
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TECHNICAL FIELDS SEARCHED (IPC)

A45C
B65D
A45F
A47C
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B60J
B23Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 August 2007	Koob, Michael

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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