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(54) **IMPROVEMENTS RELATING TO FOLDING BEDS AND BED CHAIRS**

(57) A removable sheet assembly (100) for a foldable bed system is disclosed. The bed system has sheet attachment means for releasably securing the removable sheet assembly to the bed system, and the removable sheet assembly comprises a fabric top sheet (102) having at least one seam region (106) disposed at an edge of the top sheet (102), sheet fastener means (126) for securing a periphery of the removable sheet assembly (102) to the sheet attachment means of the bed system, at least one electrical heating pad (108a, 108b) underlying the top sheet (102), a power connector (116) for connection to a portable power supply, and at least one supply cable (110) for supplying power from the power connector (114) to the heating pad (108a, 108b), the supply cable (110) being disposed at least partially within the seam region (106).

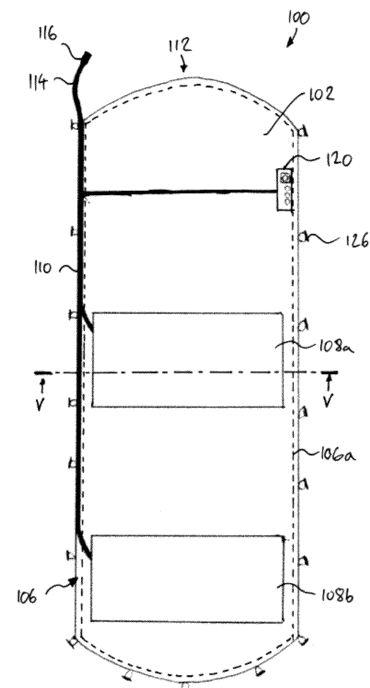


Fig. 4

Description

FIELD OF THE INVENTION

[0001] The present invention relates to folding beds and bed chairs, in particular for use by anglers. Aspects of the invention relate to a removable sheet assembly for use with such beds and bed chairs and to sleep systems including a removable sheet assembly.

BACKGROUND TO THE INVENTION

[0002] Some recreational and sporting activities, such as certain types of angling, involve waiting for long periods of time, sometimes overnight. Various products have been developed to provide an angler with a comfortable, dry and warm environment for use in such circumstances.

[0003] European Patent No. EP 2 298 134 B1 describes a folding bed system or bed chair designed for use by anglers, and Figure 1 illustrates a typical bed chair of this type. The bed chair 10, also known as a sleep system, includes a folding tubular frame 12 with folding legs 14 of adjustable length, and an insulated mattress 16 secured to the frame by an elastic cord. A pillow 18 is secured to the mattress 16 by toggles. A cover 20 is secured to the perimeter of the mattress 16 by a first zip fastener 22a. The cover 20 includes a first layer 20a and a second layer 20b that can be secured to one another by a second zip fastener 22b. The first and second layers 20a, 20b of the cover can be used individually or together to provide different levels of insulation depending on personal preference and the prevailing weather conditions.

[0004] Optionally, as shown in Figures 2 and 3, a sheet 24 can be provided to overlie and protect the mattress 16. The optional sheet 24 may be attached to the mattress 16 with toggles 26 or a similar releasable fastening to allow the sheet to be removed for washing. In the illustrated example, a plurality of toggles 26 are arranged around the periphery of the sheet 24 for attachment to loops 28 disposed around the periphery of the mattress 16 and inward of the first zip fastener 22a. Although not clearly visible in Figures 2 and 3, the sheet 24 may be formed with a pocket at one or both ends to receive a corresponding end of the mattress 16.

[0005] In use of the bed chair, the user lies on the mattress 16 (and on the sheet, when provided), with the cover 20 overlying the user. In this way, thermal insulation in the cover 20 and the mattress 16 help to keep the user warm without the need for a separate sleeping bag. The bed chair 10, with the cover 20 attached, can be folded into a compact configuration for transport.

[0006] Bed chairs of the type shown in Figure 1 have proved to be a popular and effective way of providing warmth and comfort to anglers during long waiting periods and across a range of weather conditions. A variety of folding beds and bed chairs of different designs are also known.

[0007] To increase further the comfort of the user in particularly cold conditions, it is known to use hot-water bottles to warm the bed chair and/or the user. While hot-water bottles can be effective, they have several disadvantages. For example, it is necessary to provide a suitable supply of hot water, which may not always be convenient, the heat provided lasts for only a limited period of time, the carry weight of the water is relatively high, and there is a possibility of deterioration with age with an associated increased risk of leakage or failure.

[0008] Accordingly, it would be desirable to provide improved beds and bed chairs and accessories for beds, bed chairs and sleep systems that offer improved comfort and utility in extremely cold conditions, and it is against that background that the present invention has been devised.

SUMMARY OF THE INVENTION

[0009] A first aspect of the present invention provides a removable sheet assembly for a foldable bed system with sheet attachment means for releasably securing the removable sheet assembly to the bed system. The removable sheet assembly comprises a fabric top sheet having at least one seam region disposed at an edge of the top sheet, sheet fastener means for securing a periphery of the removable sheet assembly to the sheet attachment means of the bed system, at least one electrical heating pad underlying the top sheet, a power connector for connection to a portable power supply, and at least one supply cable for supplying power from the power connector to the heating pad, the supply cable being disposed at least partially within the seam region.

[0010] This arrangement provides a compact, lightweight and safe way of warming the bed system for prolonged periods of time. The use of one or more electrical heating pads avoids many of the disadvantages associated with hot water bottles. By arranging the supply cable at least partially within the seam region, the risk of the user becoming tangled in or otherwise contacting the supply cable is considerably reduced.

[0011] In some embodiments, the bed system comprises a mattress, and the sheet attachment means of the bed system is provided on the mattress. In such cases, the sheet fastener means may be arranged to secure a periphery of the removable sheet assembly to the mattress. In other embodiments, the sheet attachment means of the bed system may be provided in a sleeping bag or on a removable cover of the bed system, and the sheet fastener means may be arranged to secure a periphery of the removable sheet assembly to the sleeping bag or the cover.

[0012] The sheet assembly may comprise a power lead for connection to the power connector. Preferably, the power lead emerges from the seam region at a head end of the sheet assembly. In this way, in embodiments in which a removable cover is attached to a mattress of the sleep system, the cover can be fitted to the mattress

using a zip fastener or similar attachment means that extends around the whole periphery of the mattress except for the head end, and the power lead can exit the bed system for connection to a suitable power supply without interfering with the attachment of the cover to the mattress. Similarly, in embodiments in which the removable sheet assembly is secured inside a sleeping bag, the power lead can exit the sleeping bag without interfering with the fastening of the sleeping bag.

[0013] The sheet assembly may comprise a fabric undersheet secured to the top sheet at the seam. In this case, the or each heating pad may be disposed between the top sheet and the undersheet.

[0014] The seam region may have various configurations. The seam region preferably includes at least one line of stitching. In some embodiments a line of stitching may be replaced or augmented by a line of adhesive, a thermal weld, or by another suitable joining method. In one embodiment, the seam region comprises a folded seam secured by a line of stitching, and the supply cable is disposed at least in part between a folded edge of the folded seam and the line of stitching. In another embodiment, the seam region comprises a pair of parallel lines of stitching, and the supply cable is disposed at least in part between the parallel lines of stitching.

[0015] The power connector preferably comprises a universal serial bus connector, for connection to a portable power bank type power supply.

[0016] The removable sheet assembly may comprise a control unit for controlling the supply of power from the power connector to or each the heating pad. The control unit may be secured to the top sheet.

[0017] The removable sheet assembly may comprise at least two heating pads including a first heating pad disposed adjacent a foot end of the sheet assembly and a second heating pad spaced from the first heating pad. In this way, effective warmth can be provided to the user efficiently, since the heat can be delivered in optimally in specific areas of the sheet assembly, leaving other areas of the sheet assembly unheated. The first and second heating pads may be independently controllable.

[0018] In another aspect, the present invention resides in a foldable bed system having a tubular frame supported on foldable legs, a mattress secured to the frame, a removable thermally insulating cover for covering an occupant of the bed system, and a removable sheet assembly according to the first aspect of the invention for underlying the occupant of the bed system and overlying the mattress. The mattress includes a releasable cover fastener means for securing the removable thermally insulating cover to a periphery of the mattress, and a sheet attachment means cooperable with the sheet fastener means of the removable sheet assembly for releasably securing the removable sheet assembly to the mattress.

[0019] The sheet attachment means is disposed inwardly with respect to the releasable cover fastener means. In this way, the cover can be attached around the periphery of the mattress to cover and enclose the

sheet assembly.

[0020] At least one retainer may be disposed on the frame and/or the legs for retaining one or more of the supply cable, the power connector and, when provided, the power lead.

[0021] Similarly, the foldable bed system may include a power supply holder. The power supply holder may be disposed on one of the frame, the legs, the mattress and the cover.

[0022] The foldable bed system may comprise a portable power supply for connection to the power connector, the portable power supply comprising a battery pack.

[0023] In an embodiment, one of the sheet attachment means and the sheet fastener means comprises a plurality of loops, and the other of the sheet attachment means and the sheet fastener means comprises a corresponding plurality of toggles for engagement with the loops. The releasable cover fastening means may comprise a zip fastener.

[0024] The foldable bed system may provide a bed chair arrangement, in which the frame can be moved between a bed configuration in which the mattress lies substantially flat and a chair configuration in which part of the frame is pivoted upwardly to provide a backrest in the manner of a chair. The frame may be adjustable to provide several intermediate configurations. The foldable bed system may instead provide only a single configuration (which may be as a bed, a chair or any intermediate configuration).

[0025] The bed system may be configured so that the removable sheet assembly is attachable to the removable cover, instead of to the mattress. Accordingly, in another aspect of the invention, a removable cover assembly for a foldable bed system comprises a thermally insulated cover for attachment to a mattress of the bed system, a removable sheet assembly according to the first aspect of the invention, and a sheet fastening means disposed on the cover, the sheet attachment means being cooperable with the sheet fastener means of the removable sheet assembly for releasably securing the removable sheet assembly to the cover.

[0026] In another arrangement, the bed system may be provided with a sleeping bag, instead of a removable cover. In such cases, the removable sheet assembly may be attachable to the sleeping bag. A further aspect of the invention therefore provides a sleeping bag assembly for a foldable bed system, comprising a sleeping bag, a removable sheet assembly according to the first aspect of the invention, and a sheet fastening means disposed in an interior of the sleeping bag, the sheet attachment means being cooperable with the sheet fastener means of the removable sheet assembly for releasably securing the removable sheet assembly to the sleeping bag.

[0027] Further modifications and variations not explicitly described above can also be contemplated without departing from the scope of the invention as defined in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which like reference signs are used for like features, and in which:

Figure 1 shows a foldable bed chair;

Figure 2 shows another foldable bed chair with which the present invention can be used;

Figure 3 shows the foldable bed chair of Figure 2 in more detail;

Figure 4 is a schematic plan view of a sheet assembly according to the invention;

Figure 5 is a schematic cross-sectional view on line V-V of part of the sheet assembly of Figure 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0029] Figures 4 and 5 show a sheet assembly 100 according to an embodiment of the invention. The sheet assembly 100 is for use with a folding bed system 10, such as the bed chair of the type shown in Figures 1 to 3. In the following example, the sheet assembly 100 is intended to be used in place of the optional sheet 24 shown in Figures 2 and 3.

[0030] The sheet assembly 100 includes a top sheet 102 and an undersheet 104, shown most clearly in Figure 5, that are sewn to one another at a peripheral seam region 106. The seam region 106 includes two parallel rows of stitches 106a, 106b, with a gap between them. Only the inner row of stitches 106a is shown in Figure 4 for clarity.

[0031] The top sheet 102 and undersheet 104 are of a fabric material, preferably a lightweight, washable material such as nylon.

[0032] A pair of heating pads 108a, 108b are disposed between the top sheet 102 and the undersheet 104. Each heating pad 108a, 108b includes a flexible electrical heating element (not shown) arranged in a suitable manner to generate heat in a relatively uniform way across the area of the pad. Each heating pad 108a, 108b can be suitably secured in position, for example by attachment to the top sheet 102 and/or the undersheet 104 using stitching or an adhesive (not shown).

[0033] Each heating pad 108a, 108b is connected to a supply cable 110 that supplies electrical power to the heating pad 108a, 108b. Referring in particular to Figure 5, the supply cables 110 are partially disposed in the seam region 106, between the parallel rows of stitches 106a, 106b. In this way, the majority of each supply cable 110 is concealed and retained between the top sheet 102 and the undersheet 104, preventing the user from contacting the supply cables 110 when the bed chair is in

use, which might otherwise become tangled or damaged.

[0034] The supply cables 110 are routed along the seam region 106 to the head end 112 of the sheet assembly 100, and a power lead 114 connected to the supply cables 110 emerges from the seam region 106 at the head end 112 and is terminated at a power connector 116. With this arrangement, the power lead 114 can emerge from the bed chair without the need to breach the fastening between the cover (20 in Figure 1) and the mattress.

[0035] A control unit 120 is provided to control the delivery of electrical power to the heating pads 108a, 108b. In the illustrated embodiment, the control unit 120 is disposed adjacent the head end 112 of the sheet assembly 100, and is fitted in an aperture of the top sheet 102 to allow access to user controls on the control unit 120. In this example, the control unit 120 is disposed on the opposite side of the sheet assembly 100 to the supply cables 110, although it will be appreciated that the control unit 120 could be placed on the same side as the supply cables 110.

[0036] The control unit 120 receives power from the power connector 116, via the power lead 114, and supplies power to each of the heating pads 108a, 108b, through its corresponding supply cable 110, in accordance with the user settings of the control unit 120. In an embodiment, the control unit 120 is configured so that power to each of the heating pads 108a, 108b can be controlled independently, and so that each of the heating pads 108a, 108b is switchable between an off state and several on states corresponding to different heat levels. Any suitable control scheme could be used for such purposes, including for example the use of pre-programmed duty cycles or variable power outputs. Thermostatic control is also possible. Additional functionality, such as a timer for switching off the heating pads 108a, 108b after a selectable time period, may also be included.

[0037] The control unit 120 may incorporate one or more illuminated indicators or a text or graphical display to display the current settings of the control unit 120. The indicators or display may dim or switch off after a pre-set period of time.

[0038] The sheet assembly 100 includes sheet fastener means for securing a periphery of the top sheet 102 to a sheet attachment means of the mattress. In the illustrated example, the sheet fastener means comprises a plurality of toggles 126 arranged around the periphery of the assembly 100 that engage with loops 28 provided on the mattress 16 (as shown in Figure 3). Additionally, the head end 112 of the sheet assembly 100 is formed with a pocket (not visible in Figure 4) to accept the head end of the mattress 16; for this reason, in this embodiment it is not necessary to provide toggles 126 at the head end 112 of the sheet assembly 100.

[0039] Accordingly, the sheet assembly 100 can be fitted to the mattress 16 of the bed chair of Figures 2 and 3, in place of the conventional sheet 24. Once fitted, the cover 20 can be attached to the periphery of the mattress

16 as described with reference to Figure 1, so that the cover 20 overlies the sheet assembly 100 and the mattress 16. The sheet assembly 100 may itself be washable, or it may be fitted with a removable top cover that can be detached for washing. Alternatively, a conventional washable sheet 24 could be attached over the top of the sheet assembly 100 to protect the sheet assembly 100.

[0040] The sheet assembly 100 can be powered by any suitable power source, and the power connector 116 is suitably selected to connect with the appropriate power source. In a preferred embodiment, the power source is a compact portable battery pack of the type known as "power banks" or "portable chargers", which typically include a high-capacity lithium ion or lithium polymer battery together with a built-in universal serial bus (USB) connector and associated control electronics. The power connector 116 may therefore comprise a USB connector, and the heating pads 108a, 108b and control unit 120 may be configured to accept a 5 V supply. Suitable high-capacity power bank devices are capable of supplying sufficient energy to power the heating pads 108a, 108b for several hours, and offer a compact, lightweight, silent and fuel-free source of power.

[0041] The bed chair may be provided with a holder for the power supply, in the form of a fabric or mesh pocket, a clip, a strap, or other suitable device. The holder is preferably disposed on the frame, the legs, the mattress or the cover of the bed chair, in a suitable location for keeping the power supply off the ground and out of the user's way.

[0042] Similarly, one or more clips, straps or other suitable retainers may be provided on the frame or the legs of the bed chair for retaining the power lead, the supply cable and/or the power connector.

[0043] With the arrangement described above with reference to Figures 4 and 5, the present invention provides a safe, convenient, lightweight and easily portable way of providing heat to the user of a bed chair for extended time periods.

[0044] The heating pads 108a, 108b may be arranged in any suitable configuration and position to optimise user comfort. In the illustrated example, one of the heating pads 108b is disposed adjacent to the foot end of the sheet assembly 100, opposite the head end 112. This heating pad 108b delivers warmth to the occupant's feet. The other heating pad 108a is disposed closer to the head end 112, and delivers warmth to the occupant's back. The target temperature of each heating pad is preferably adjustable in discrete steps or continuously up to a maximum of approximately 50°C. Suitable thermal insulation may be provided within or on top of each of the heating pads 108a, 108b to moderate heat flow through the top sheet 102.

[0045] It will be appreciated that the heating pads 108a, 108b could be positioned in different locations, and that fewer or more heating pads could be provided. It is also conceivable that a single heating pad with multiple independently controllable regions could be provided. In a

further variation, the arrangement of heating elements within the or each heating pad could be adapted to increase or decrease the heating effect in certain areas of the pad for a given input power. The or each heating pad may be incorporated into or attached to a carrier layer that extends to at least some of the periphery of the sheet assembly for attachment to the top sheet and the under-sheet at the seam region.

[0046] The seam region 106 of the sheet assembly 100 can take any suitable form, and several different ways of routing the supply cable or cables within the seam region can be envisaged. For example, in a variant, the seam region includes a folded seam secured by a line of stitching. In this case, a supply cable can be positioned at least in part between a folded edge of the folded seam and the line of stitching.

[0047] The control unit 120 need not be affixed to the top sheet 102, but could instead be disposed in a different position. For example, the control unit 120 may be positioned in line with the power lead 114. The control unit 120 may be connectable to a wireless control unit, which could be a dedicated unit or a smartphone.

[0048] In the above-described examples, the removable sheet assembly is attachable to the mattress of a bed system 10, but other arrangements are possible. For example, the sheet assembly of Figures 4 and 5 could be attachable to the removable cover of the bed system 10. In such a case, the cover could include suitable sheet attachment means, such as loops, on its underside to allow the sheet assembly to overlie the user in use. The sheet attachment means could be disposed inwardly with respect to the zip fastener or other attachment means used for attaching the cover to the mattress.

[0049] In another example, the sheet assembly of Figures 4 and 5 can be used with a bed system 10 of the type in which a sleeping bag is supported by a mattress. In this case, the sleeping bag may include sheet attachment means to allow the sheet assembly to be secured inside the sleeping bag. For example, a plurality of loops may be provided around the edge of the interior of the sleeping bag. In this arrangement, the sleeping bag itself may or may not be attachable to the mattress, and the mattress may or may not be insulated.

[0050] Further modifications and variations not explicitly described above can also be contemplated without departing from the scope of the invention as defined in the appended claims.

Claims

1. A removable sheet assembly (100) for a foldable bed system (10), the bed system (10) having sheet attachment means for releasably securing the removable sheet assembly (100) to the bed system (10), the removable sheet assembly (100) comprising:

a fabric top sheet (102) having at least one seam

- region (106) disposed at an edge of the top sheet (102);
 sheet fastener means (126) for securing a periphery of the removable sheet assembly (100) to the sheet attachment means of the bed system (10);
 at least one electrical heating pad (108a, 108b) underlying the top sheet (102);
 a power connector (116) for connection to a portable power supply; and
 at least one supply cable (110) for supplying power from the power connector (116) to the heating pad (108a, 108b), the supply cable (110) being disposed at least partially within the seam region (106).
2. A removable sheet assembly (100) according to Claim 1, comprising a power lead (114) for connection to the power connector (116), wherein the power lead (114) emerges from the seam region (106) at a head end (112) of the sheet assembly (100).
 3. A removable sheet assembly (100) according to Claim 1 or Claim 2, comprising a fabric undersheet (104) secured to the top sheet (102) at the seam region (106), and wherein the or each heating pad (108a, 108b) is disposed between the top sheet (102) and the undersheet (104).
 4. A removable sheet assembly (100) according to any preceding claim, wherein the seam region (106) comprises a folded seam secured by a line of stitching, and wherein the supply cable (110) is disposed at least in part between a folded edge of the folded seam and the line of stitching.
 5. A removable sheet assembly (100) according to any of Claims 1 to 3, wherein the seam region (106) comprises a pair of parallel lines of stitching (106a, 106b), and wherein the supply cable (110) is disposed at least in part between the parallel lines of stitching (106a, 106b).
 6. A removable sheet assembly (100) according to any preceding claim, wherein the power connector (116) comprises a universal serial bus connector.
 7. A removable sheet assembly (100) according to any preceding claim, comprising a control unit (120) for controlling the supply of power from the power connector (116) to or each the heating pad (108a, 108b) and wherein the control unit (120) is secured to the top sheet (102).
 8. A removable sheet assembly (100) according to any preceding claim, comprising at least two heating pads (108a, 108b) including a first heating pad (108b) disposed adjacent a foot end of the sheet assembly (100) and a second heating pad (108a) spaced from the first heating pad (108b) and wherein the first and second heating pads (108a, 108b) are independently controllable.
 9. A removable sheet assembly (100) according to any preceding claim, wherein the sheet attachment means of the bed system (10) is provided on a mattress (16) of the bed system (10), and wherein the sheet fastener means are arranged to secure a periphery of the removable sheet assembly (100) to the mattress (16).
 10. A removable sheet assembly (100) according to any of Claims 1 to 8, wherein the sheet attachment means of the bed system (10) is provided in a sleeping bag of the bed system (10), and wherein the sheet fastener means are arranged to secure a periphery of the removable sheet assembly (100) to the sleeping bag.
 11. A foldable bed system (10) having:
 - a tubular frame (12) supported on foldable legs (14);
 - a mattress (16) secured to the frame (12);
 - a removable thermally insulating cover (20) for covering an occupant of the bed system (10); and
 - a removable sheet assembly (100) according to any one of Claim 1 to Claim 9 for underlying the occupant of the bed system (10) and overlying the mattress (16);
 - the mattress (16) having a releasable cover fastener means for securing the removable thermally insulating cover (20) to a periphery of the mattress (16), and a sheet attachment means cooperable with the sheet fastener means of the removable sheet assembly (100) for releasably securing the removable sheet assembly (100) to the mattress (16), the sheet attachment means being disposed inwardly with respect to the releasable cover fastener means.
 12. A foldable bed system (10) according to Claim 11, comprising:
 - at least one retainer disposed on the frame (12) and/or the legs (14) for retaining one or more of the supply cable (110), the power connector (116) and, when provided, the power lead (114);
 - a power supply holder disposed on one of the frame (12), the legs (14), the mattress (16) and the cover (20); and
 - a portable power supply for connection to the power connector (116), the portable power supply comprising a battery pack.

13. A foldable bed system (10) according to Claim 11 or Claim 12, wherein one of the sheet attachment means and the sheet fastener means comprises a plurality of loops, and the other of the sheet attachment means and the sheet fastener means comprises a corresponding plurality of toggles (126) for engagement with the loops. 5

14. A removable cover assembly for a foldable bed system (10), the cover assembly comprising: 10

a thermally insulated cover (20) for attachment to a mattress (16) of the bed system (10);
 a removable sheet assembly (100) according to Claim 1 wherein the sheet attachment means of the bed system (10) is provided on the removable cover (20) of the bed system (10), and wherein the sheet fastener means are arranged to secure a periphery of the removable sheet assembly (100) to the cover (20); and 15
 a sheet fastening means disposed on the cover (20), the sheet attachment means being cooperable with the sheet fastener means of the removable sheet assembly (100) for releasably securing the removable sheet assembly (100) to the cover (20). 20 25

15. A sleeping bag assembly for a foldable bed system (10), the sleeping bag assembly comprising: 30

a sleeping bag;
 a removable sheet assembly (100) according to Claim 10; and
 a sheet fastening means disposed in an interior of the sleeping bag, the sheet attachment means being cooperable with the sheet fastener means of the removable sheet assembly (100) for releasably securing the removable sheet assembly (100) to the sleeping bag. 35 40

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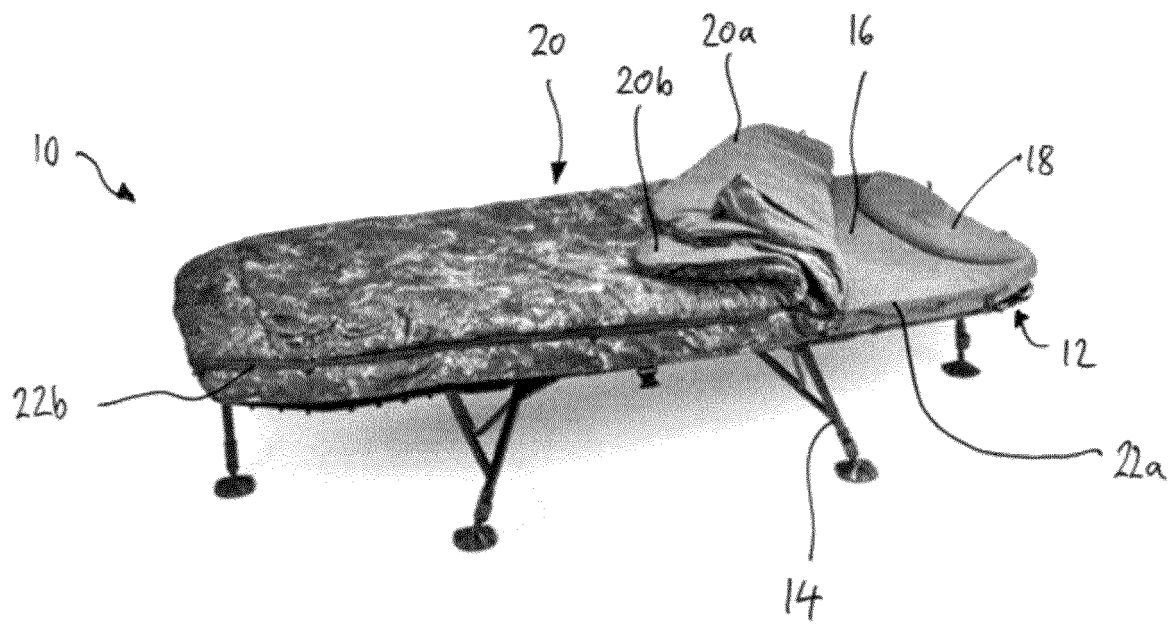
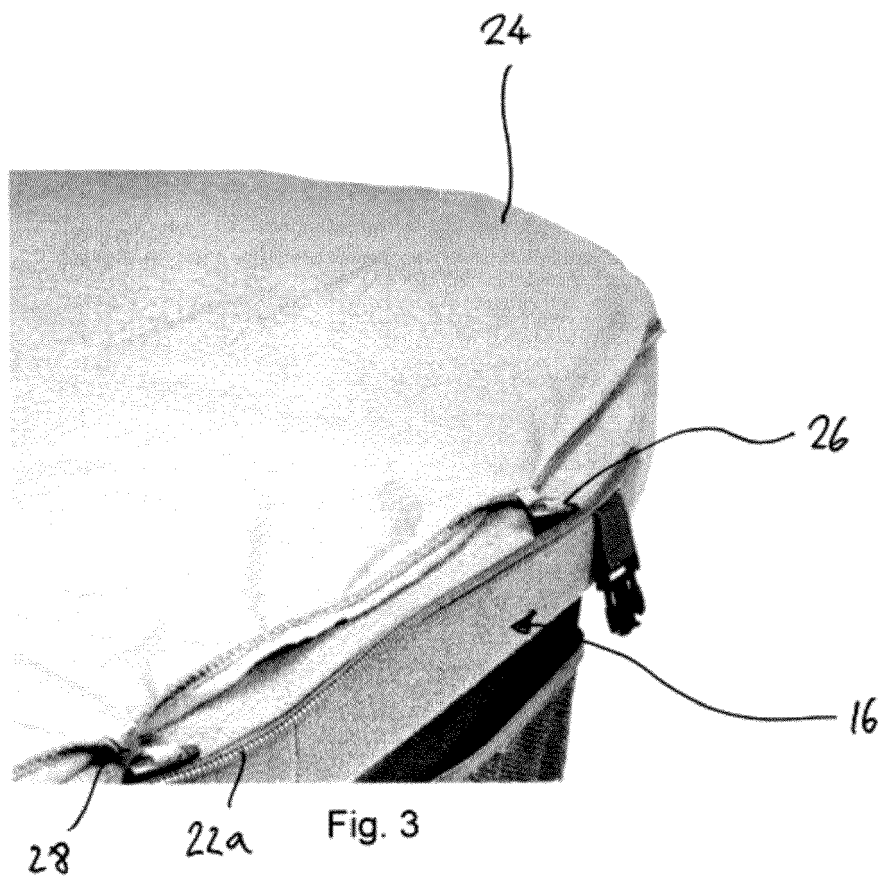
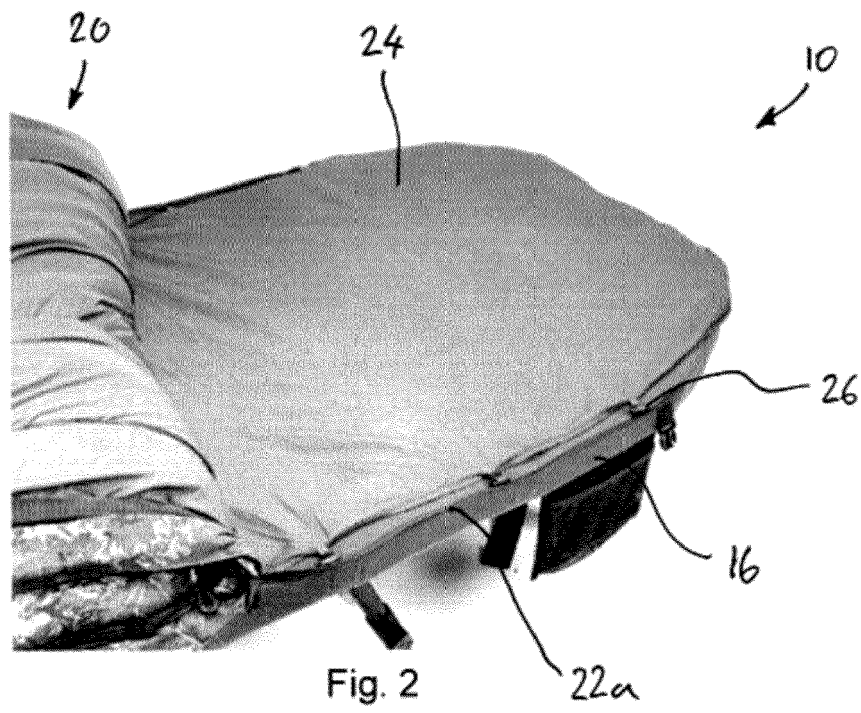


Fig. 1



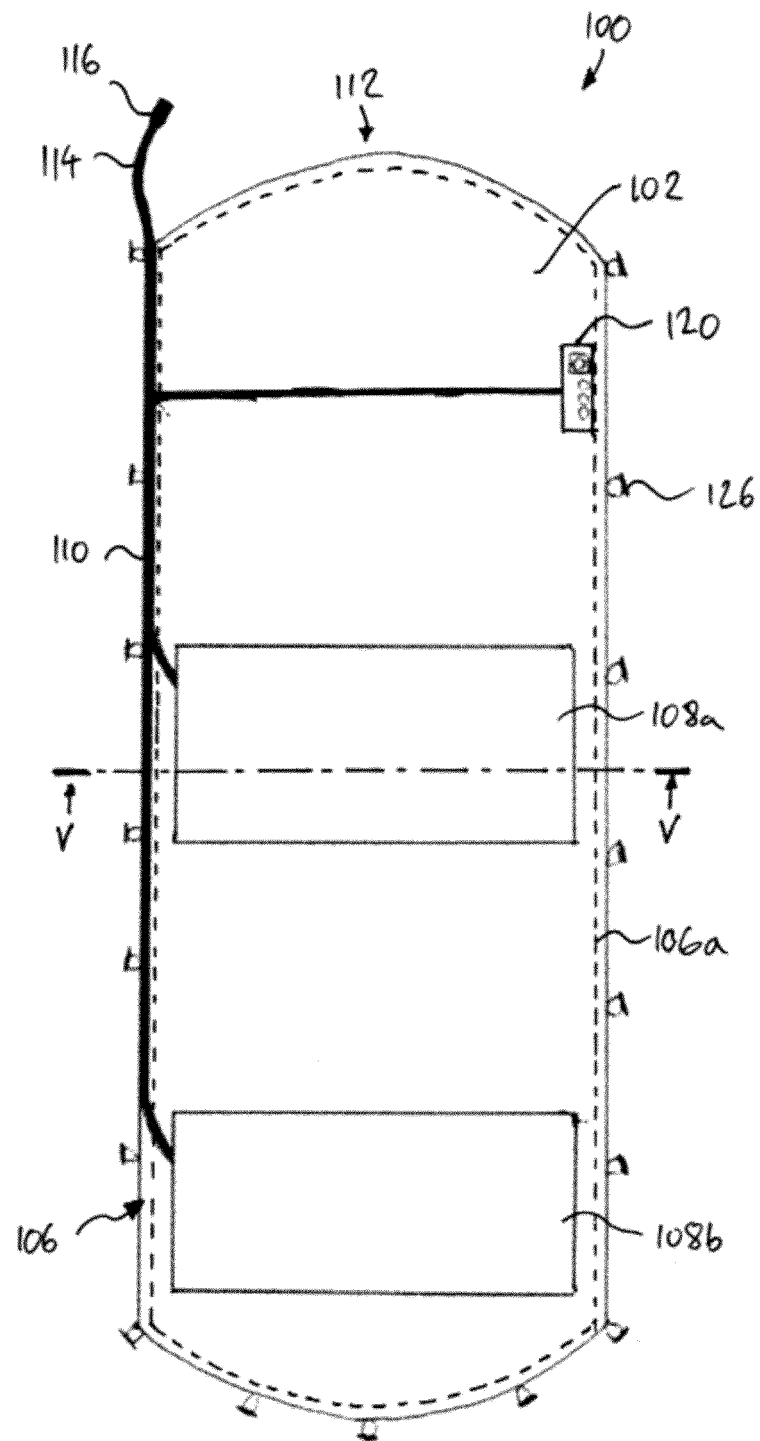


Fig. 4

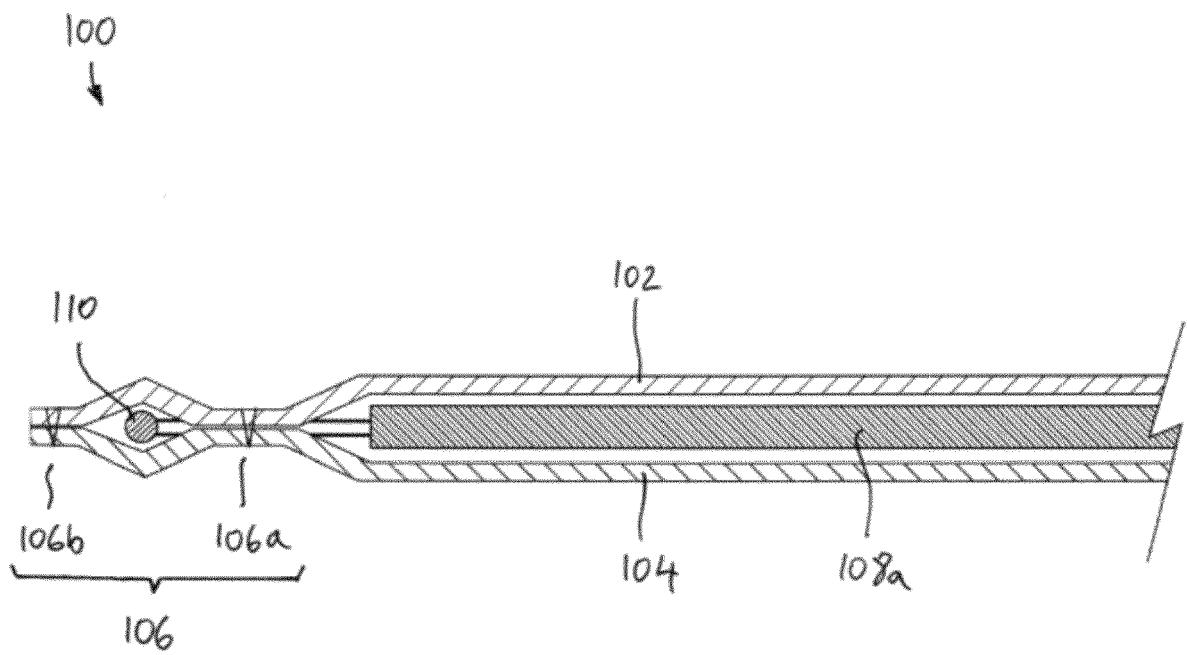


Fig. 5



EUROPEAN SEARCH REPORT

Application Number

EP 21 20 9695

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 298 134 A1 (CATCHUM 88 LTD [GB]) 23 March 2011 (2011-03-23) * claims; figures *	11	INV. A47C17/64 A47G9/02 A47G9/08
Y	WO 2020/110159 A1 (NAIMOLI TECH S R L [IT]) 4 June 2020 (2020-06-04) * page 6, line 1 - page 9, line 21; figures *	1-3, 6, 8-11	
A		4, 5, 7, 12-15	
A	KR 2013 0002938 U (UNKNOWN) 20 May 2013 (2013-05-20) * abstract; claims; figures *	1-15	
Y	US 2017/303694 A1 (XIA YONGHUI [CN] ET AL) 26 October 2017 (2017-10-26) * paragraphs [0069], [0114] - [0126] *	1-3, 6, 8-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C A47G
The present search report has been drawn up for all claims			

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EPO FORM 1503 03.82 (P04C01)

Place of search	Date of completion of the search	Examiner
The Hague	11 April 2022	Zattoni, Federico
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 20 9695

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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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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Patent documents cited in the description

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