United States Patent [19]

Gaiser

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[45] **Mar. 26, 1974**

[54] **SELF INFLATABLE AIR MATTRESS, AND SLEEPING BAG**

[75] Inventor: **Conrad J. Gaiser,** Zephyr Cove, Nev.

[73] Assignee: **Gaiser Enterprises, Inc.,** Zephyr Cove, Nev.

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[52] **U.S. Cl.** **5/343,** 5/348

[51] **Int. Cl.** **A47g 9/00,** A47c 23/00

[58] **Field of Search** ..... 5/343, 344, 347, 348, 349, 5/350, 355; 9/11 A, 11, 13, 2 A

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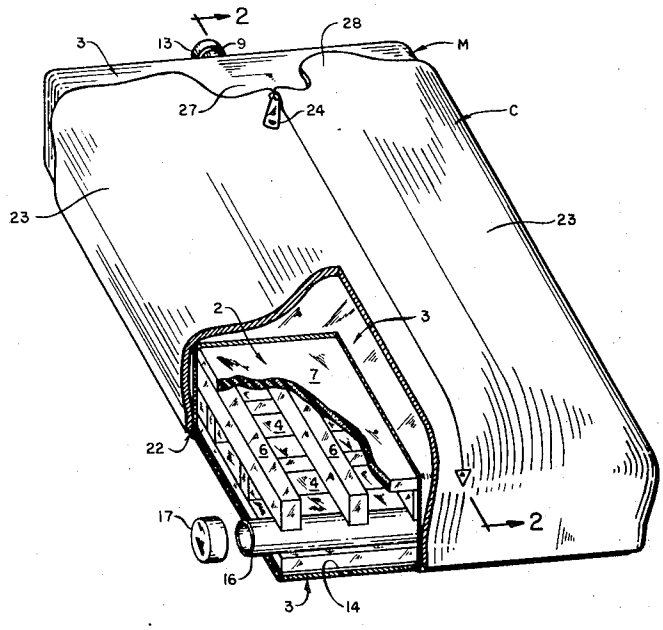
Primary Examiner—Bobby R. Gay
Assistant Examiner—Andrew M. Calvert
Attorney, Agent, or Firm—Stanley Bialos

[57] **ABSTRACT**

A self inflatable air mattress provided with a core of flexible and resilient cellular material of the open cell type, and an air tight flexible jacket enclosing the core. A tube communicating with the interior of the jacket allows flow of air into and from the core cells; and a closure for the tube maintains the cells filled to form a resilient air cushion. A cover attached to the jacket provides a sleeping bag. Because of the nature of the material, the entire construction can be readily wound into a compact roll.

11 Claims, 4 Drawing Figures



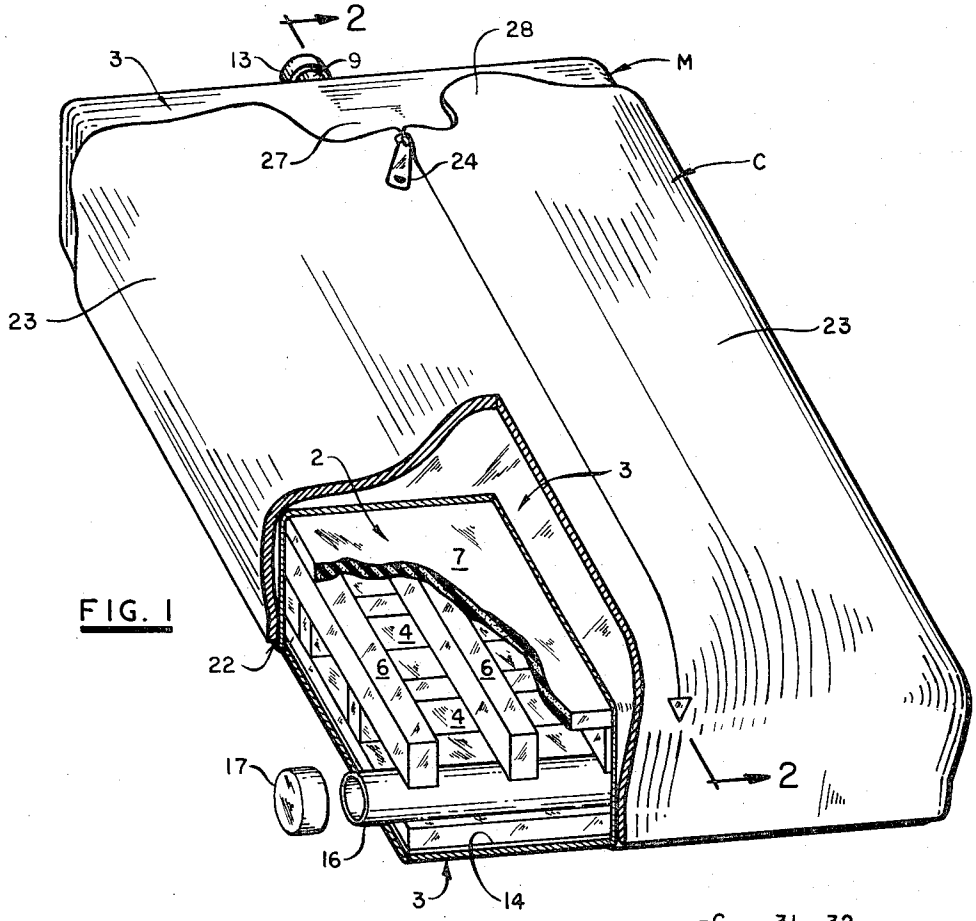


FIG. 1

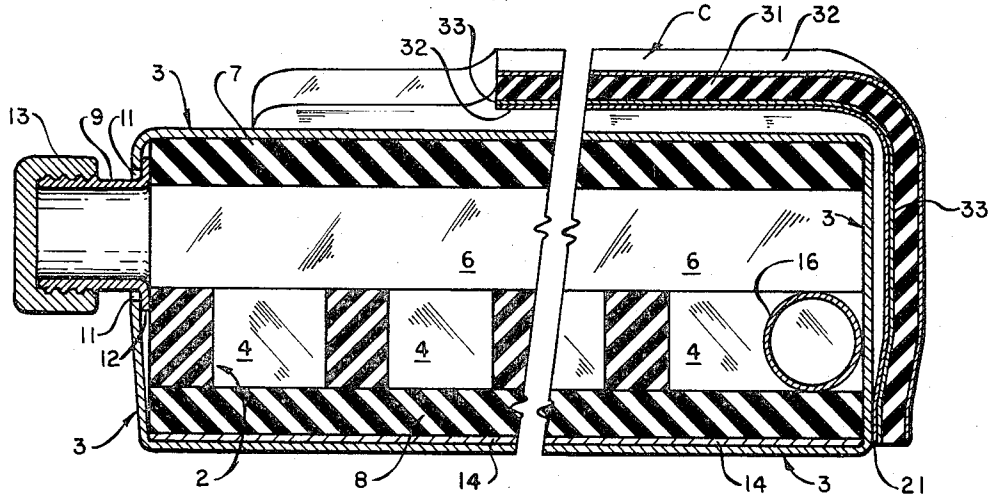


FIG. 2

INVENTOR:
CONRAD J. GAISER

BY: Stanley Bialos
ATTORNEY

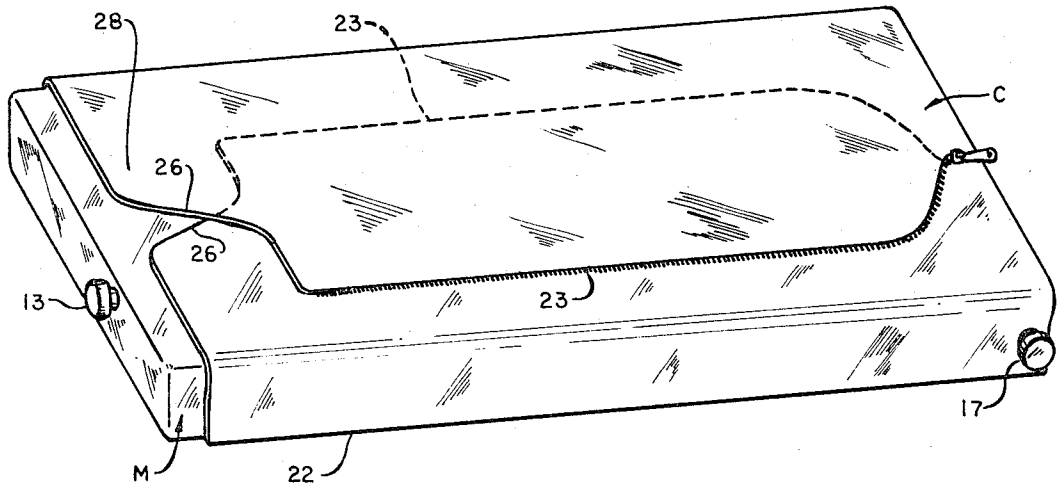


FIG. 3

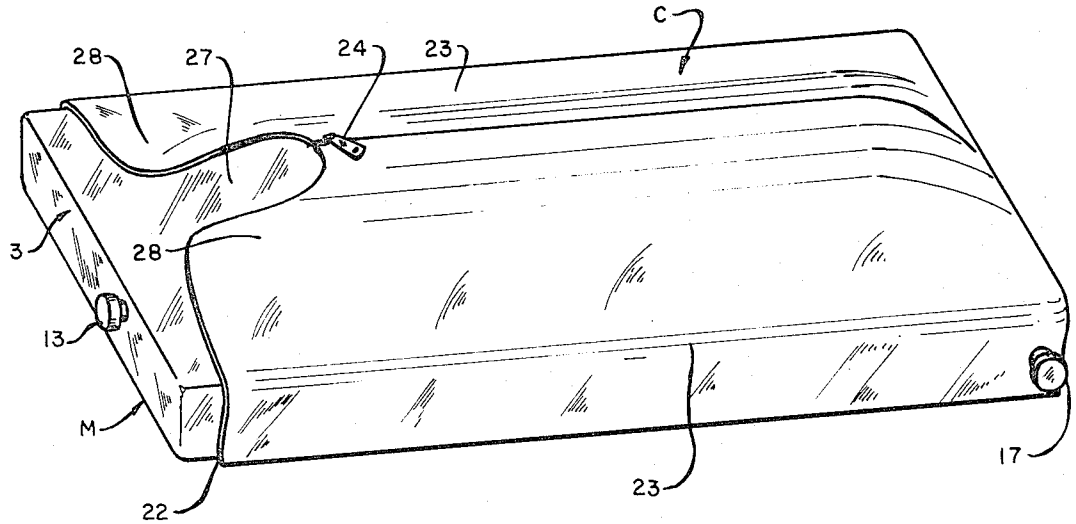


FIG. 4

INVENTOR:
CONRAD J. GAISER
BY: S. Bradley Gaiser
ATTORNEY

SELF INFLATABLE AIR MATTRESS, AND SLEEPING BAG

This invention relates to an air mattress which is self inflatable, and which is particularly adapted as part of a sleeping bag when attached to a cover portion, which is openable and reclosable by conventional fastening means.

SUMMARY AND OBJECTS

Summarizing the invention, the air mattress is formed of a core of any suitable light weight open cell type cellular material, such as polyether foam, which allows free passage of air therethrough. The core is enclosed within an air tight, light weight flexible jacket, desirably adhesively bonded to the core and which is of any suitable material, such as non-ripping light weight nylon.

A valve tube communicates with the interior of the jacket from exteriorally thereof through which air can readily flow into and from the cells of the core, and other voids in the form of enclosed spaces desirably provided therein; the tube being provided with an openable and reclosable closure. When the closure is open all the core cells become automatically filled because of the intercommunication between the cells, and because of the elasticity of the cell walls, which expand the construction and suck in air. When the closure is closed, after the cells have been filled, air is maintained filled within the cells and other enclosed voids because it can not escape through the air tight jacket, to thus provide a resilient air cushion.

Advantageously, to lighten the core it comprises tiers of spaced apart ribs with the ribs of the adjacent tiers extending transversely with respect to each other, thus forming a lattice structure with open spaces allowing rapid diffusion of air. Also, the foam core is adhesively bonded at contact areas to the air tight jacket to thus hold the mattress in place and prevent ballooning of one area when weight, such as a person's body, lies on another area of the mattress. Thus, a light weight structure obtains which can be readily wound into a compact roll.

Because it is self inflating, the mattress is particularly adapted for incorporation in a sleeping bag unit, but it also can be employed alone. When part of a sleeping bag, a cover is provided which overlies the air tight jacket of the mattress and is attached thereto adjacent one end and opposite sides thereof. The cover has a pair of adjacent portions provided with an openable and reclosable closure, desirably a slide fastener, to enable the cover to be opened and closed.

From the preceding, it is seen that the invention has as its objects, among others, the provision of an improved air mattress which is self inflatable, and is thus, particularly adapted as a built-in mattress forming part of sleeping bag unit, is of light weight material that can be readily wound into a compact roll, and which is of simple and economical construction. Other objects will become apparent from the following detailed description and accompanying drawings, in which:

DESCRIPTION OF DRAWINGS

FIG. 1 is an isometric view of the mattress forming part of a sleeping bag, with a corner portion out away and parts shown in section to illustrate the construction; a cover of the bag being illustrated in closed position.

FIG. 2 is a longitudinal section taken in a plane indicated by the line 2—2 in FIG. 1; the view being broken away to shorten the same.

FIG. 3 is an isometric view illustrating the mattress in inflated flat condition but with adjacent side cover portions of the sleeping bag disconnected.

FIG. 4 is a similar view with the side cover portions attached and in closed position, thus providing room for accommodating a person under the cover.

DETAILED DESCRIPTION

The mattress (indicated generally by the letter M) comprises a core 2 enclosed within an air tight flexible jacket 3. Core 2 is formed entirely of resilient flexible cellular material of the open cell type which allows free passage of air therethrough because in such material all the cells of the material are in intercommunication. As a result, when the core is placed under compression air will escape from the cells and other voids or open spaces, and when the pressure is relieved and the core is exposed to the atmosphere, the cells and other open voids will become automatically filled with air resulting from expansion of the cells to their original shape.

Any suitable elastomeric material may be used for such purpose, such as polyurethane or polyether foam, silicone rubbers, neoprene polymer foams, low density polyethylene foam, polyisoprene sponges, or the like. Light weight material having a density in the range of about 0.8 to 1.5 pounds per cubic foot is preferable; an advantageous material being polyether foam of a density of about 1.1 pounds per cubic foot. A desirable foam product is AP 22/24 manufactured by Expanded Rubber & Plastics Corp. of Gardena, Calif.

Although the core may be a substantially unitary or solid mass of such material, it is desirable that it comprise a lattice structure of spaced apart ribs forming open spaces therebetween and extending transversely with respect to each other for a reason to be explained subsequently. With reference to FIGS. 1 and 2, the ribs comprise a lower tier of transversely extending members 4, and an upper tier of longitudinally extending members 6 which are desirably adhesively bonded together at all contact areas, by any suitable adhesive such as those of the latex type, epoxy resin cements, or polyester resins. Although more than two tiers of such ribs may be provided, for practical purposes and to provide thinness, the lattice structure comprises a pair of tiers of the transversely extending ribs.

Also, the core includes an upper sheet 7 overlying the lattice structure 4–6 and a lower sheet 8 underlying the same to provide pads. Sheets 7 and 8 are of the same open cell type of resilient foam material as the ribs, and are desirably adhesively bonded to the ribs at all areas of contact to provide a dimensionally stable structure.

Core 2 is adhesively bonded by any suitable adhesive, such as those previously mentioned, to enclosing jacket 3 at all areas of contact therewith, to provide a unitary and stable mattress structure. As previously mentioned, the jacket is of air tight flexible material. Any suitable material may be employed for such purpose, such as nylon of the non-rip type, or relatively thick polyethylene film desirably about 4 mils. in thickness. Other suitable materials are air impervious rubberized fabrics, and saran type films.

At one end of jacket 3, a valve tube 9 extends through an aperture 11 so as to communicate with the

interior of the jacket from exteriorally thereof, whereby air may flow into and from the cells and the intercommunicating spaces between ribs **4, 6** of the core **2.** Tube **9** is provided with an inner flange **12** which is adhesively bonded by any suitable adhesive of the type mentioned, in sealed relationship to both the adjacent end portion of the core and to the portion of jacket **3** about aperture **11.** As a result, tube **9** has an air tight connection with jacket **3** and core **2.**

A closure cap **13** is removably mounted on the exterior end of the tube **9** by a threaded connection and can thus be readily manually closed on the tube and removed therefrom. When cap **13** is open, atmospheric air can quickly fill all the voids of the core; and when the cap is screwed onto the tube to close the same, air can not escape through air tight jacket **3** from the core cells and other open spaces, thus providing a resilient air cushion. By the same token, when the mattress is wound into a roll about the end opposite tube **9** while the cap is removed, air within the core voids will be expelled under compression resulting from the rolling. After the air is thus expelled and the cap is again closed, the mattress will be flattened because of collapse of the cells and spaces between the ribs **4,6,** resulting from the expulsion of the air. It is desirable that tube **9** have a relatively wide mouth to allow rapid ingress and egress of air; a suitable size being about three-fourths of an inch.

As previously related, because of the lattice structure that the transversely extending ribs **4,6** form, intercommunicating spaces exist between the ribs of both tiers. This allows for rapid diffusion of air throughout the entire volume of the core to enable quick inflation and deflation of the mattress. Also, the criss-cross or transverse arrangement of ribs **4,6** provide a spring effect for sucking air into the core voids without undue bulk when the mattress is rolled up. Such arrangement also cooperates in preventing ballooning of the mattress in use because each place where ribs **4,6** and pads **7,8** are cemented together forms a tie between top and bottom surfaces of the mattress. While these ties will compress when the mattress is rolled up, they will not stretch as air pressure forces the surfaces apart.

As previously related, the mattress is particularly adapted as part of a sleeping bag. For such purpose, it is desirable to provide a heat reflective barrier sheet **14** between the bottom of core **2** and jacket **3** so as to retain body heat; the barrier sheet underlying the entire bottom area of the core and being preferably adhesively bonded to both the core and the inner surface of the bottom of jacket **3.** A suitable material for such purpose is metal foil, such as aluminum, steel, or copper foil, and preferably aluminized mylar of about 2 mil. thickness.

To enhance winding of the mattress into a compact roll, a mandrel **16** is adhesively bonded at one end of the mattress opposite tube valve **9.** Mandrel **16** is desirably in the form of a plastic tube which extends a short distance beyond one side of the mattress, and is provided with a removable and reclosable closure cap **17.** The tube forms storage space for implements, such as a fishing rod which may thus be readily transported. This is for fishermen in camping. It will be noted that because valve tube **9** and mandrel **16** are at opposite ends of the mattress, expulsion of air is facilitated when the mattress is wound about the mandrel. However, valve tube **9** may be at any other location desired.

When built-in as part of a sleeping bag, a cover portion (generally indicated by letter C) overlies jacket **3** and is fixedly attached thereto adjacent one end thereof at its lower edge indicated at **21,** and to opposite sides at the lower edges as indicated at **22.** The attachment of cover C to the mattress is by a suitable adhesive of the type related.

Cover C is formed of adjacent portions **23,** which are provided with an openable and reclosable closure, preferably in the form of a slide fastener **24.** Each cover portion **23** is greater than one-half the width of the mattress so that in the open position of closure **24** (as shown in FIG. **3**) the cover portions overlap and flatten out to form a smooth structure for winding over mandrel **16.** When in use with the fastener **24** closed, cover portions **23** form a cover of increased width to provide plenty of room over the mattress for a person, as is indicated in FIG. **4.**

The inner edge portions of the cover portions **23** at the head of the bag are cut away as indicated at **26.** Thus when the cover portions are closed, a central space **27** is formed to accommodate the neck of a person lying on the bag, leaving protective flaps **28** for overlying the person's shoulders, as can be seen from FIGS. **1** and **4.**

Desirably, cover C is formed of an interior pad of flexible insulating material **31,** such as any suitable foam material of the same type employed for the mattress core, enclosed within a moisture resistant flexible envelope **32** preferably of a breathing type nylon. As with respect to the mattress, a sheet **33** of heat reflective material is positioned in envelope **32** between insulating pad **31** and the inside face of the envelope.

From the proceeding, it is seen that for carrying the sleeping bag one first uncovers closure **13** to allow expulsion of air from the core cells, and winds up the bag into a roll about mandrel **16,** which results in expulsion of air from the core cells through tube valve **9.** When the bag is completely wound into roll to form a compact package, valve **9** is manually closed by closure **13,** which prevents ingress of air and thus maintains the mattress compressed. To use the bag, it is unrolled with the valve still closed; and the outside atmospheric air pressure maintains the mattress compressed. Upon uncovering closure **13,** atmospheric air automatically enters the core cells to expand the mattress; and upon closing the cover, the mattress provides a resilient air cushion upon which a person may rest or sleep comfortably since the air in the core cells and other voids can not escape through jacket **3** but becomes trapped within the core cells. If desired, but not necessary, an auxiliary valve may be optionally connected to the mattress for introduction of pressure air by an air mattress pump or the like, or to release captured air thus to adjust support to individual needs.

In the sleeping bag embodiument of the invention which is illustrated, the mattress is about 79 inches long and about 28 inches wide. Ribs **4–6** are desirably spaced apart about 2.5 inches between centers in each direction; the ribs being about 1 inch high and three-fourths of an inch in width. Pads **7** and **8** are about five-eighths inch in thickness. Thus the overall thickness of the core is about 2¼inches, and with the cover C in flattened condition on the mattress, the overall thickness of the bag is about 2½ to 3 inches depending on the thickness of the cover, but these dimensions are not critical.

Instead of making upper sheet or pad 7 part of the core, it may be outside of air tight jacket 3, so as to serve as a moisture diffusing layer at the bottom of cover C.

I claim:

1. A sleeping bag comprising a self inflatable air mattress having a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core, a tube communicating with the interior of the jacket from exteriorally thereof for flow of air into and from the cells of said core, an openable and reclosable closure for said tube which in its closed condition with the cells filled with air prevents escape of air from said cells and maintains them filled with air to provide a resilient air cushion, and which when open and the mattress placed under compression allows escape of air from said cells and flattening of said mattress, and a cover overlying the top of said jacket and fixedly attached thereto adjacent one end and opposite sides thereof, said cover having adjacent portions each greater than one-half the width of the mattress so as to be capable of overlapping, the adjacent portions being provided with an openable and reclosable closure to enable opening and closing of the cover while attached to the jacket.

2. A sleeping bag comprising a self inflatable air mattress having a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core and adhesively bonded thereto, a tube communicating with the interior of the jacket from exteriorally thereof for flow of air into and from the cells of said core, a manually removable cap for said tube whereby air can fill the core cells when the cap is removed and upon closing of said cap maintain the cells filled to provide a resilient air cushion, a cover overlying said jacket and attached thereto adjacent one end and opposite sides thereof, said cover having adjacent portions provided with an openable and reclosable closure to enable opening and closing of the cover, and said sleeping bag having adjacent an end thereof a mandrel about which the bag can be wound into a roll.

3. A sleeping bag comprising a self inflatable air mattress having a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core, a tube communicating with the interior of the jacket from exteriorally thereof for flow of air into and from the cells of said core, a manually removable cap for said tube whereby air can fill the core cells when the cap is removed and upon closing of said cap maintain the cells filled to provide a resilient air cushion, and a cover overlying said jacket and attached thereto adjacent one end and opposite sides thereof, said cover having adjacent portions provided with an openable and reclosable closure to enable opening and closing of the cover, and said bag having a heat reflective barrier sheet positioned between the bottom of said core and such jacket.

4. A self inflatable air mattress comprising a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core, a tube communicating with the interior of said jacket from exteriorally thereof for flow of air into and from the cells of said core, and an openable and reclosable closure for said tube which in its closed condition with the cells filled with air prevents escape of air from said cells and maintains them filled with air to provide a resilient air cushion, and which when open and the mattress placed under compression allows escape of air from said cells and flattening of said mattress, said mattress having a mandrel about which said mattress can be wound into a roll to compress the same and thus expel air from said tube and flatten the mattress when said closure is open.

5. A self inflatable air mattress comprising a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core, a tube communicating with the interior of said jacket from exteriorally thereof for flow of air into and from the cells of said core, and an openable and reclosable closure for said tube which in its closed condition with the cells filled with air prevents escape of air from said cells and maintains them filled with air to provide a resilient air cushion, and which when open and the mattress placed under compression allows escape of air from said cells and flattening of said mattress, said mattress being in combination with a mandrel about which the mattress can be wound to effect expulsion of air from the cells of the core when the mattress is wound about the mandrel and the closure is open.

6. The sleeping bag of claim 2 wherein said mandrel is a storage tube which projects beyond the bag, and a removably mounted cap is provided for closing the projecting end of the storage tube.

7. The sleeping bag of claim 2 wherein the tube for flow of air is at the end of the bag opposite to the mandrel end to allow rapid expulsion of air from the cells of the core when the bag is wound about the mandrel and the cap for said air flow tube is removed.

8. The sleeping bag of claim 3 wherein said core comprises a lattice structure of spaced apart ribs extending transversely with respect to each other, and an upper sheet overlying said lattice structure and a lower sheet underlying said lattice structure.

9. The sleeping bag of claim 3 wherein said core is of elastomeric foam material.

10. The mattress combination of claim 5 in further combination with an openable cover secured to said jacket to provide a sleeping bag.

11. The sleeping bag of claim 8 in combination with a mandrel adjacent one end of the bag about which the bag can be wound to effect expulsion of air from the cells of the mattress core when the mattress is wound about the mandrel and the closure is open.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,798,686 Dated March 26, 1974

Inventor(s) Conrad J. Gaiser

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 55 (claim 11, line 1 of the claim), the numeral "8" should read numeral --3--.

Signed and sealed this 30th day of July 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.