# United States Patent [19]

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[11] **3,740,095**

[45] **June 19, 1973**


[54] **INFLATABLE SUPPORT STRUCTURE**


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[22] Filed: **Jan. 5, 1971**

[21] Appl. No.: **104,085**

[52] **U.S. Cl.** ..... **297/454,** 9/347

[51] **Int. Cl.** ..... **A49b 19/00**

[58] **Field of Search** ..... 297/DIG. 3, 445; 9/12, 347



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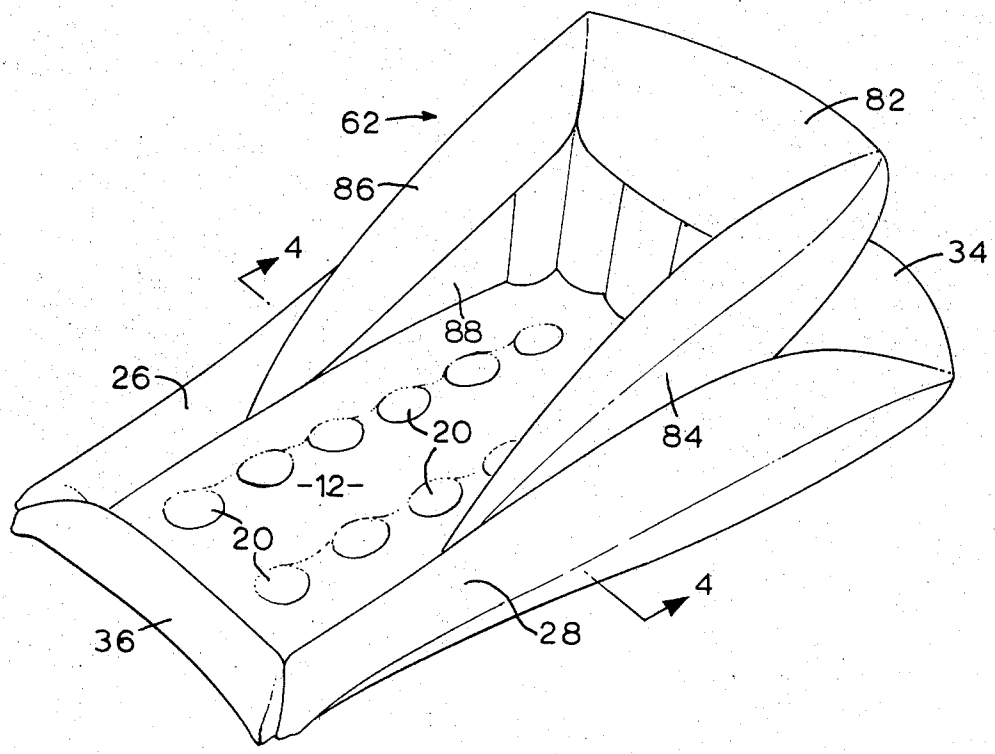
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[57] **ABSTRACT**

The invention is directed to a lounge of sturdy construction having special merit as a safe reliable sea lounge and is characterized by the provision of an inflatable generally flat central platform which is buoyant and substantially rigid when inflated and which is surrounded with a plurality of separate inflatable peripheral compartments rising above the platform when inflated. The invention is further characterized by the arrangement of the peripheral compartments which provide a buoyancy distribution that will impart complete stability to the lounge when in use in the water and yet will enable the lounge to be easily mounted by a person in the water. The invention is further characterized by the provision of a back and sides to support a person on the lounge in a comfortable reclining position with his weight properly oriented on the lounge.


**10 Claims, 4 Drawing Figures**



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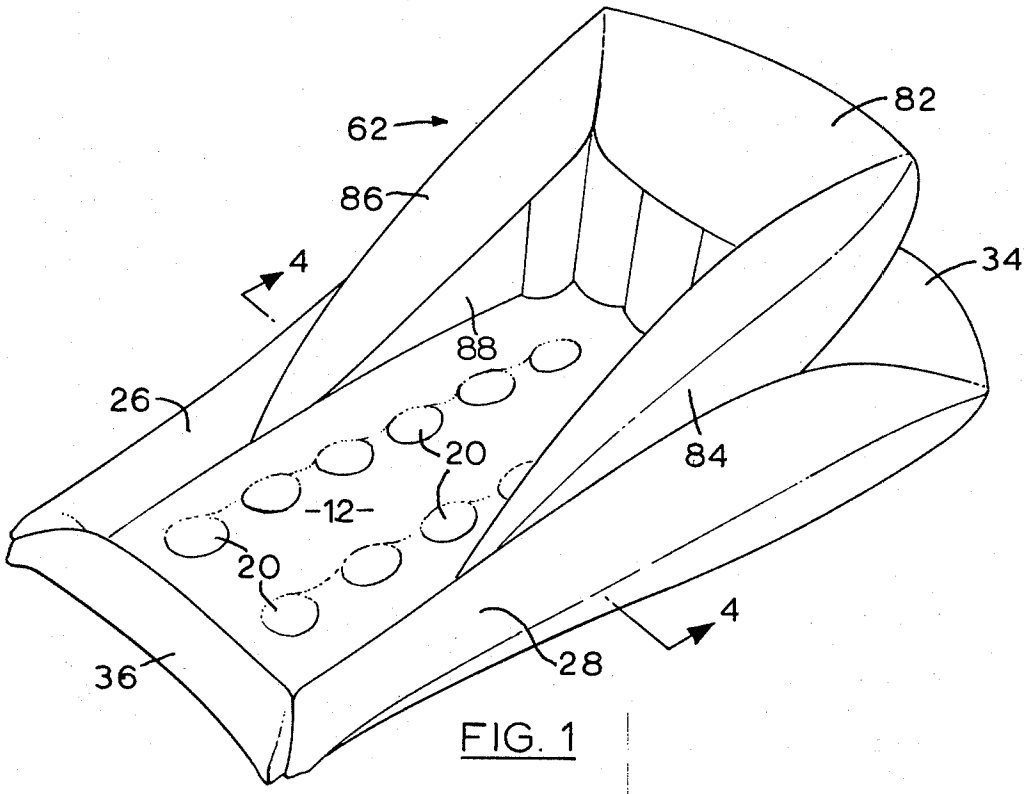



FIG. 1

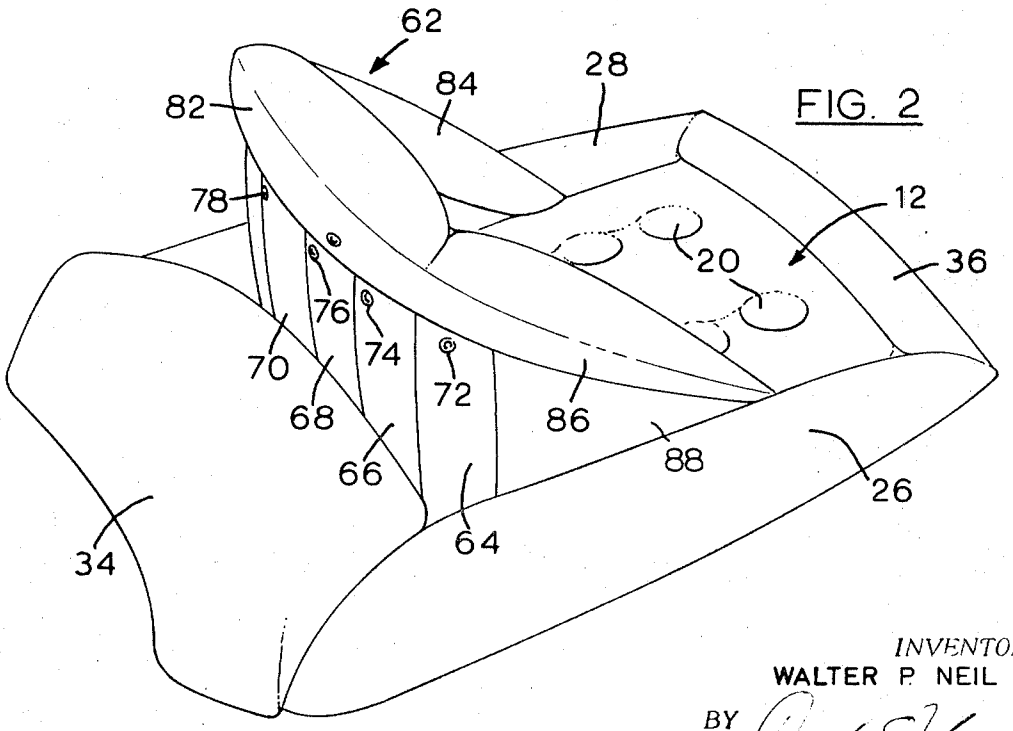



FIG. 2

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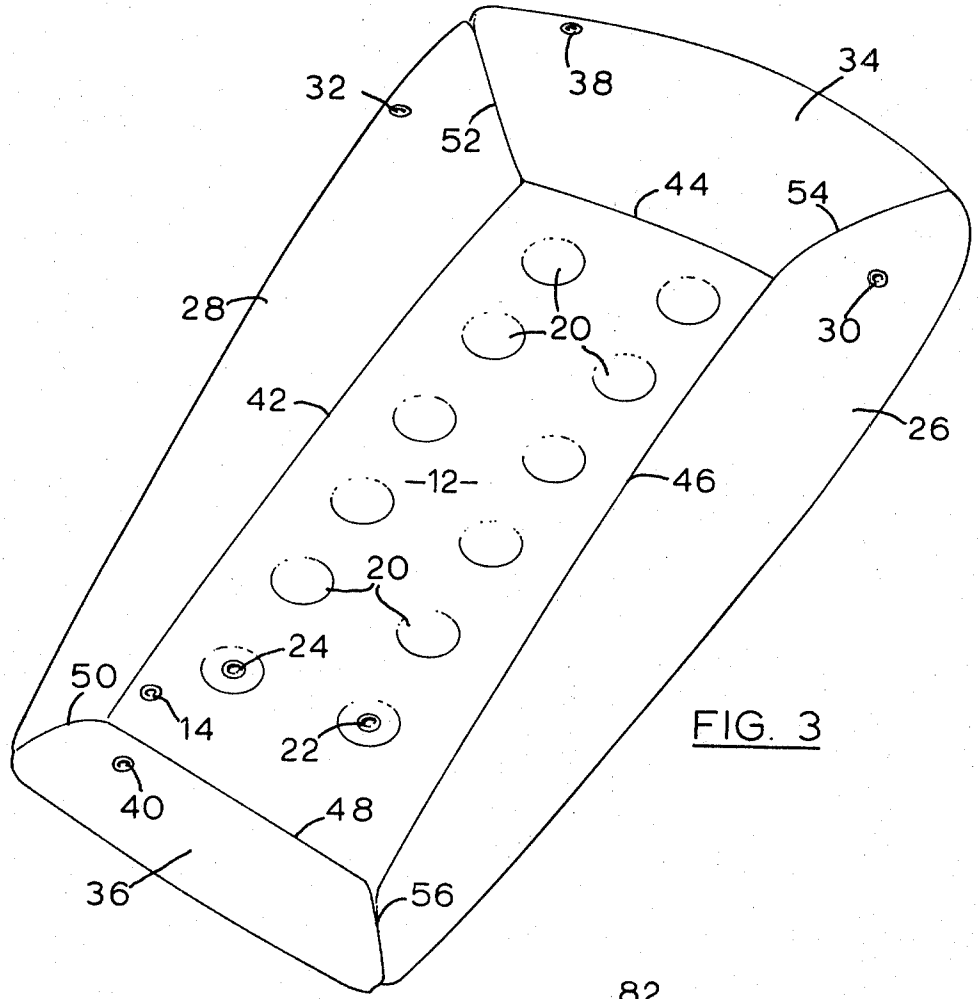



FIG. 3

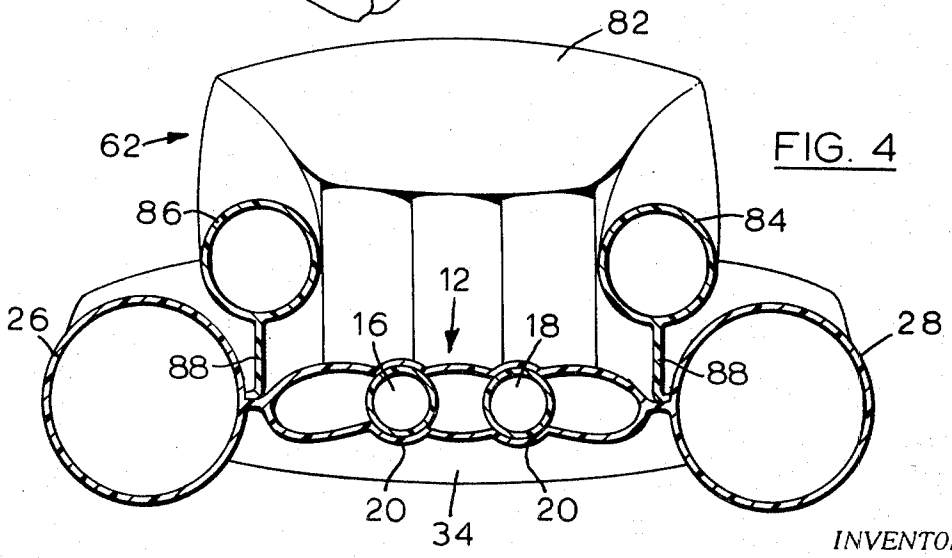



FIG. 4

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# INFLATABLE SUPPORT STRUCTURE

## FIELD OF INVENTION

This invention relates to inflatable articles which may be used either on land or water, in particular, to an inflatable lounge.

## BACKGROUND OF INVENTION

In recent years, articles for use in the water have been quite popular, especially those inflatable. However, due to their construction, they have had a tendency to tear, puncture easily, leak, and, in particular, lacked stability when in the water, tipping easily in normal use. One such article comprises an inflatable water raft or air mattress having a base and head rest, attached at one end, both disposed substantially horizontal, the head rest floating somewhat higher in the water when both were fully inflated. However, again these air mattresses were unstable, uncomfortable, usually small, and lacked durability, due to their construction, not having enough buoyancy to maintain a body lying thereon, substantially out of the water, and tearing away easily from said head rest.

## SUMMARY OF INVENTION

It is an object of the present invention to overcome these problems of a lack of durability, stability and comfort by providing a lounge composed of inflatable chambers, joined one to the other or preferably, formed from an overfolded single sheet or a pair of superimposed sheets and heat sealed to form an integral unit as will be described hereinafter. With this preferred formation, since there are few actual junctures, but rather heat seal lines dividing a single sheet of material into specified compartments, the internal stress is lessened and where junctures do exist between individual compartments, the length of these junctures is maximized so that the resultant stress affects are minimized. In addition, the invention further provides a lounge that is stable in the water while in normal use, capable of supporting a user above the water quite comfortably and securely. This is accomplished by providing a central highly buoyant and substantially rigid inflated platform and surrounding the platform with a distribution of buoyant inflated chambers to accommodate the user's weight distribution when on the lounge but affording easy mounting.

More particularly according to the present invention the basic lounge is comprised of an inflatable, substantially rigid horizontal central or base platform or mattress having upper and lower surfaces maintained in substantially parallel horizontal relation, and a plurality of inflatable peripheral compartments encompassing said central platform, an inflatable back rest formation and means for inflation, for example, a conventional valve. The inflatable compartments preferably are joined one to the next in the required formation by the preferable method of heat sealing their respective edges.

Normally a compartment when inflated tends to balloon. In the past, to prevent ballooning, the compartment was heat sealed longitudinally to form narrow longitudinal tubes, their cumulative effect was to retain a body lying thereon in a substantially horizontal position. However, this formation diminished the buoyant force exerted by the enclosed volume of air from that of the ballooning compartment due to the volume of air decreased. Moreover, such a structure has relatively little rigidity and will fold under a concentration of weight at a particular point. It has been left to the present invention to maximize the volume of air contained for a greater buoyant force and to provide rigidity. This is accomplished by the minimum of a plurality of tubes or air means disposed in spaced relationship within the central platform and attached to both the upper and lower surfaces thereof by heat sealing at intervals. These seals may be accomplished along a specific line of both surfaces, however, for greater durability, circular heat seals are preferable, sealing the maximum allowable areas for greater retention, thereby resisting tearing.



The peripheral compartments are disposed about the periphery of the central platform for stability and support. Preferably the platform is rectangular, and the plurality of compartments will number four, two disposed longitudinally, on either side and the remaining two, one at either end, each being heat sealed to the adjacent so as to completely encompass the central platform. In stabilizing the lounge, these compartments act as an outrigger, resisting capsizing under abnormal conditions, for example, children playing thereon, while in their supporting role, they aid the buoying of the body therein. Since most of the weight is centered on the platform near the back rest formation, the greater buoyancy force must be exerted there. To accomplish this end, the end compartment adjacent said back rest formation is enlarged, the side compartments being enlarged in the area adjacent said back rest formation tapering to said other end and said end compartment opposite said back rest formation being smaller and narrower allowing for easier access to the lounge, as will be described hereinafter. Although the platform and encompassing compartments may be manufactured separately and subsequently joined, the preferred method comprises the use of a single sheet of material, preferably heat sealable, folding it over and heat sealing the two sides together along specific lines to give the required formation. In this way, when the support is inflated, stress is minimized due to the one piece construction and lack of actual juncture lines.

Upstanding at the heat seal juncture of the platform the enlarged end compartment is a back rest formation comprising a plurality of substantially parallel vertical compartments juxtaposed and joined along their longitudinal edges, each to the adjacent, each compartment upstanding on one of its ends at said juncture. A horizontal inflatable compartment is preferably surmounted thereon for greater strength, comfort and stability. Though individual compartments may be joined, the preferable method comprises the heat sealing of a single folded sheet of material into individual compartments, as discussed previously.

The back rest formation may then be secured to the juncture of the platform and the enlarged end compartment.

For added stability and support of said back rest formation, the enlarged end compartment is preferably disposed so that the back rest formation is retained substantially upright, thereby minimizing the stress at its juncture if it were free to sway. Side arms may be added for additional support of the back rest by extending the horizontal surmounted chamber or adding side compartments thereto, disposed substantially perpendicular to the back rest and the platform, to be joined to the

platform. However, this will involve joining of two distinct compartments, the platform and side arm; therefore to maximize the length of juncture, the arms are tapered and angled from their juncture with the horizontal compartment to meet the platform obliquely, as will hereinafter be described; the diameter of the oblique cross-section of each arm forming the line of juncture, the cross-section found by taking a plane parallel to the platform through the heat seal line between the platform and side compartment and having the plane cut the angled side arms to expose an oblique cross-sectional area, the side arm being sealed along the diameter of said cross-section to the platform to form a closed compartment. The construction of the side arms as indicated, leaves a substantial triangular area between each side arm, base, and back rest. For increased strength nd greater distribution of the stress, a stress panel may be inserted into that area, or preferably, the back rest, side arms and side panels, one of each disposed on each side of said back rest, comprise a single sheet of material folded over and heat sealed. This stress panel further lengthens the juncture of the side arms to said platform and back rest, thereby minimizing stress and affording greater resistance to tearing.

## BRIEF DESCRIPTION OF DRAWINGS

The invention will now be described in relation to the accompanying drawings, in which:

FIG. **1** is a perspective view of an inflatable bodily support structure constructed according to a preferred embodiment of the invention;

FIG. **2** is another perspective view of the structure shown in FIG. **1**;

FIG. **3** is a perspective view of the reverse side of the structure shown in FIG. **1**;

FIG. **4** is a section taken along the lines **4—4** of FIG. **1**.

The inflatable lounge described below may be constructed of a variety of materials, for example, rubber, but the construction particularly lends itself as stated, to the use of heat sealable material. With reference to the FIGS. **1, 3** and **4**, the lounge has an inner portion **12**, the base compartment or mattress, provided with a conventional valve **14**, see FIG. **3**, for inflation. A preferred construction of the inner portion **12** is more particularly shown in FIG. **4** and consists of at least a pair of internally situated spaced inflatable tubes **16** and **18**, each tube being heat sealed to the inner surface of the base compartment **12** to form a circular seal at intervals indicated by these circular seals **20** to add stability to said base when in the water and to retain the shape of said base as a substantially flat horizontal mattress. Each tube **16** and **18** is provided with an individual conventional valve **22** and **24** conveniently located in an individual one of a circular seal **20**. After air is applied to valves **14, 22** and **24**, the inner portion **12** with the enclosed tubes **16** and **18** constitutes an excellent mattress.

Extending from the periphery of the base **12** are side chambers **26** and **28**, each provided for independent inflation with an individual conventional valve **30** and **32**, see FIG. **3**. Extending outward from the opposed ends of the inner mattress **12** are further chambers **34** and **36**, each provided also for independent inflation with an individual valve **38** and **40** respectively. Though each of the chambers **26, 28, 34** and **36** is inflatable independently of the others, they are preferably constructed, along the base **12**, of a single sheet of heat sealable plastic material folded over and heat sealed along lines **42, 44, 46, 48, 50, 52, 54** and **56**.

The upper surface of the base **12** when it is inflated and in the positions shown in FIGS. **1** and **3** it is below the level of the side chambers **26** and **28** and the end chambers **34** and **36** when they are also inflated. Further it will be observed that the end chamber **36** is somewhat narrower and lower than the end chamber **34**, in order to make it easier to board the lounge when it is floating in the water. So that a greater buoyant force is applied to the area where the user lies, the end compartment **34** is enlarged to hold a greater volume of air, the side compartments **26** and **28** tapering from an enlarged cross-sectional area at the end adjacent said enlarged end compartment to a somewhat narrower cross-sectional area at the other end, where compartment **36** has been narrowed to facilitate boarding. In addition, compartment **34** is disposed so as to aid the retention of the back rest formation **62** substantially erect. See FIG. **2**.

As indicated more particularly in FIGS. **1** and **2**, an inflatable back rest formation, generally denoted by the numeral **62**, is secured to the lounge outward of the base **12** and inward of the side chambers **26** and **28** and the end chambers **34** and **36**. The inflatable back rest formation, including side arms **62** is preferably made of heat sealable material, and is secured to the lounge along the heat seal line **44**, and the side arms on each side along the heat seal lines **42** and **46**. The back rest **62** when inflated is preferably formed from a single sheet of plastic material, heat sealed into separate, vertically extending compartments **64, 66, 68** and **70**, each provided with an individual valve **72, 74, 76** and **78** respectively. Surmounting the vertically extending compartments **64, 66, 68** and **70** is a separate, somewhat larger, horizontally disposed chamber **82** which is joined by the heat sealing of the plastic tube to separate side chambers, side arms **84** and **86** or extended as a continuous compartment to form those side arms, which angle and taper downwardly as shown in a direction towards but short of the end chamber **36**, all of which back rest, including the side arms, may have been formed from a single sheet of plastic, folded over and heat sealed to form the desired configuration of compartments. This tapering assists in preventing tearing and consequent separation of the inflatable back rest, which includes the side arms, **62** at its forwardmost juncture with the inner portion **12** along the heat seal lines **42** and **46**, said juncture accommodated along lines **42** and **46** with the diameter of an oblique cross-section of each side arm, formed by taking a plane parallel to the upper panel of said base **12** through the heat seal lines **42** and **46** cutting said angled side arm obliquely to expose said horizontal cross-section. A stress panel **88** on either side in the area between the inflatable tapering side arm, the back rest and base further distributes the stress over the resultant greater length of juncture between said side arms and said base and back rest preventing the side arms from tearing away from said base or back rest at their points of juncture during normal use.

What is claimed is:

**1.** An inflatable lounge comprising an inflatable generally flat platform, said platform having upper and lower panels, when said platform is inflated and main-

tained in substantially parallel relation by a plurality of inflatable air compartments disposed in spaced relation within said platform joined to said upper and lower panels whereby the volume of air contained in said platform and said plurality of air compartments disposed therein, is maximized for greater buoyancy and rigidity, and a plurality of separate peripheral compartments completely surrounding said central platform when inflated, and means for inflating said central platform, said plurality of air components disposed within said platform and said peripheral compartments surrounding said platform.

**2.** An inflatable lounge as claimed in claim **1** wherein said peripheral compartments surrounding said platform rise above said central platform when both said platform and said peripheral compartments are inflated.

**3.** An inflatable lounge as claimed in claim **2** wherein said central platform is rectangular in shape, said plurality of peripheral compartments number **4,** two disposed longitudinally on either side and the others, one at either end, each peripheral compartment being secured to its adjacent compartment.

**4.** An inflatable lounge as claimed in claim **3** wherein one of said end compartments in substantially larger than the other of said end compartment and said longitudinal compartments taper from said larger end compartment towards said smaller end compartment.

**5.** An inflatable lounge as claimed in claim **4** further including a back rest formation comprising a plurality of compartments upstanding from and joined at the juncture of said enlarged end compartment and said platform.

**6.** An inflatable lounge as claimed in claim **5** wherein said plurality of compartments of said back rest formation are juxtaposed and joined along their adjacent longitudinal sides, the length of their respective edges secured to the juncture of said base and enlarged end compartment.

**7.** An inflatable lounge as claimed in claim **6** in which said back rest formation further comprising a substantially horizontally disposed compartment surmounted on said upstanding plurality of compartments.

**8.** An inflatable lounge as claimed in claim **7** wherein said back rest formation further comprises on both sides of said horizontally surmounted compartment and adjacent thereto, a plurality of inflatable side compartments, forming side arms, disposed substantially perpendicular to said base and upstanding back rest formation, each of said side arms angled and tapered from said horizontal compartment to meet the platform along the diameter of an oblique cross-section through each arm cut by a plane parallel to said upper and lower panel of said platform and passing through the heat seal juncture of said platform and side compartment adjacent to each side arm, said platform and side are being secured along said diameter.

**9.** An inflatable lounge as claimed in claim **8** wherein a stress panel is disposed in the area between each of said side arms, said platform and said back rest heat sealed thereto.

**10.** An inflatable lounge comprising an inflatable generally flat platform, said platform having upper and lower panels, when said platform is inflated and maintained in substantially parallel relation by means disposed therein whereby the volume of air contained in said platform is maximized for greater buoyancy and rigidity, and a plurality of separate peripheral compartments completely surrounding said central platform when inflated, and means for inflating said central platform, and said peripheral compartments surrounding said platform.

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