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(19) **United States**(12) **Patent Application Publication**
SEGAL et al.(10) **Pub. No.: US 2017/0156508 A1**(43) **Pub. Date: Jun. 8, 2017**(54) **SIMULATED ZERO "G" MATTRESS AND COVER**(71) Applicant: **Polar Generation LLC**, White Plains, NY (US)(72) Inventors: **Nicholas SEGAL**, Old Greenwich, CT (US); **Eric CHAN**, New York, NY (US); **Evan L. RYAN**, Brooklyn, NY (US)(21) Appl. No.: **15/369,201**(22) Filed: **Dec. 5, 2016****Related U.S. Application Data**

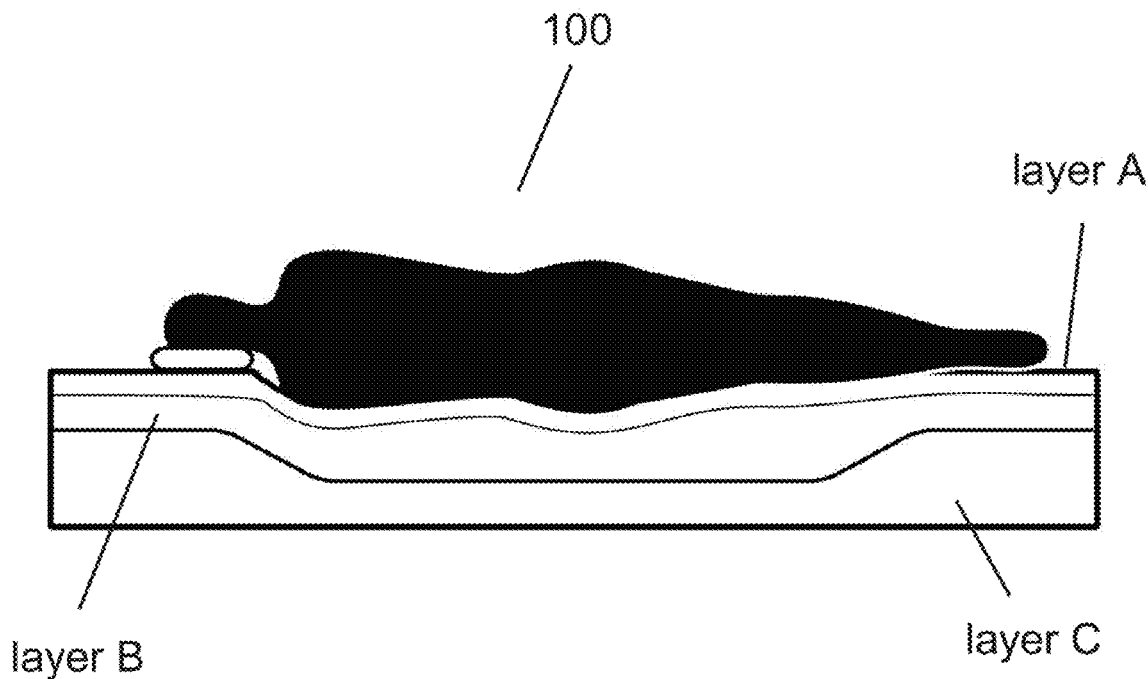
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(57)

ABSTRACT

A mattress is provided having three layers of differing properties stacked on top of each other which together have the effect of letting the user sleep in a simulated Zero G position without the aid of an articulating base. Two layers are contoured within the mattress let specific areas of the user's body sink further into the mattress than others. A cover with removable inserts is also provided for the mattress.



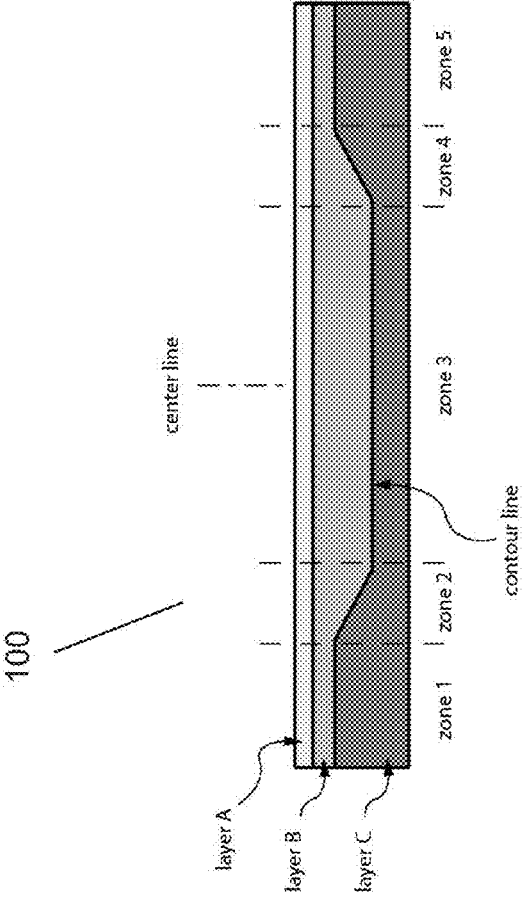
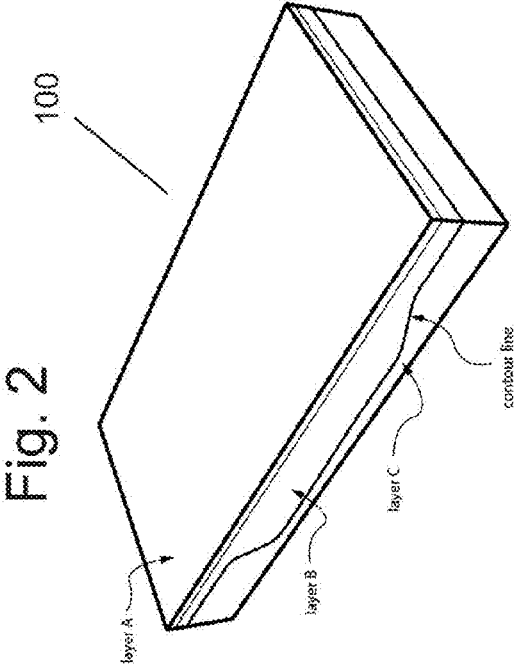


Fig. 1

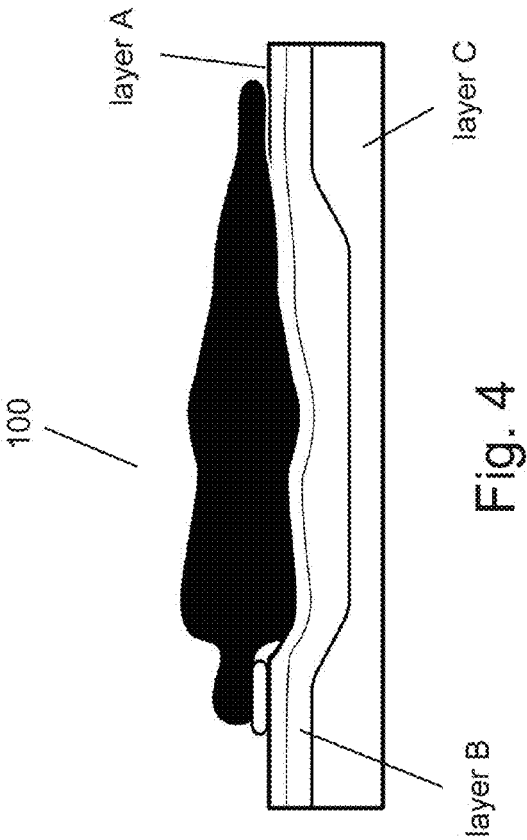


Fig. 4

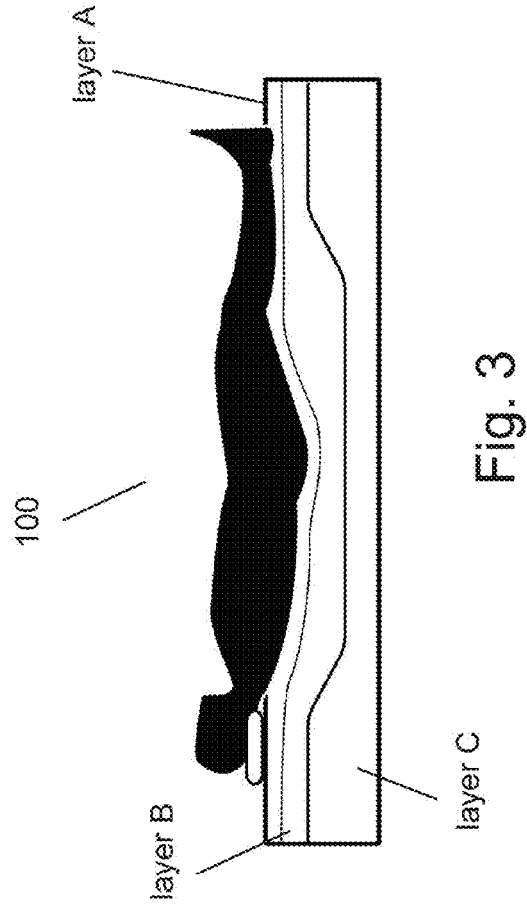


Fig. 3

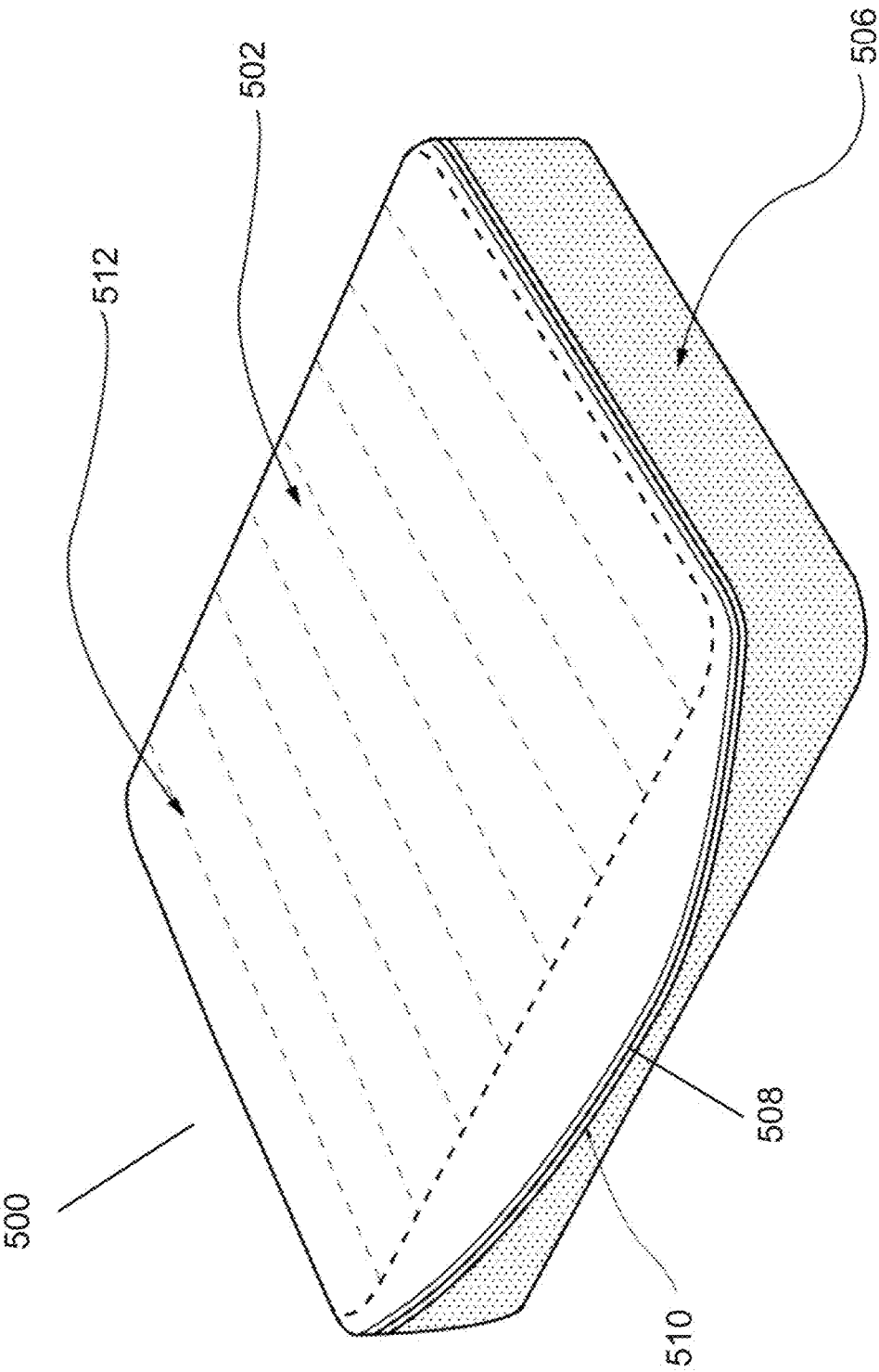


Fig. 5

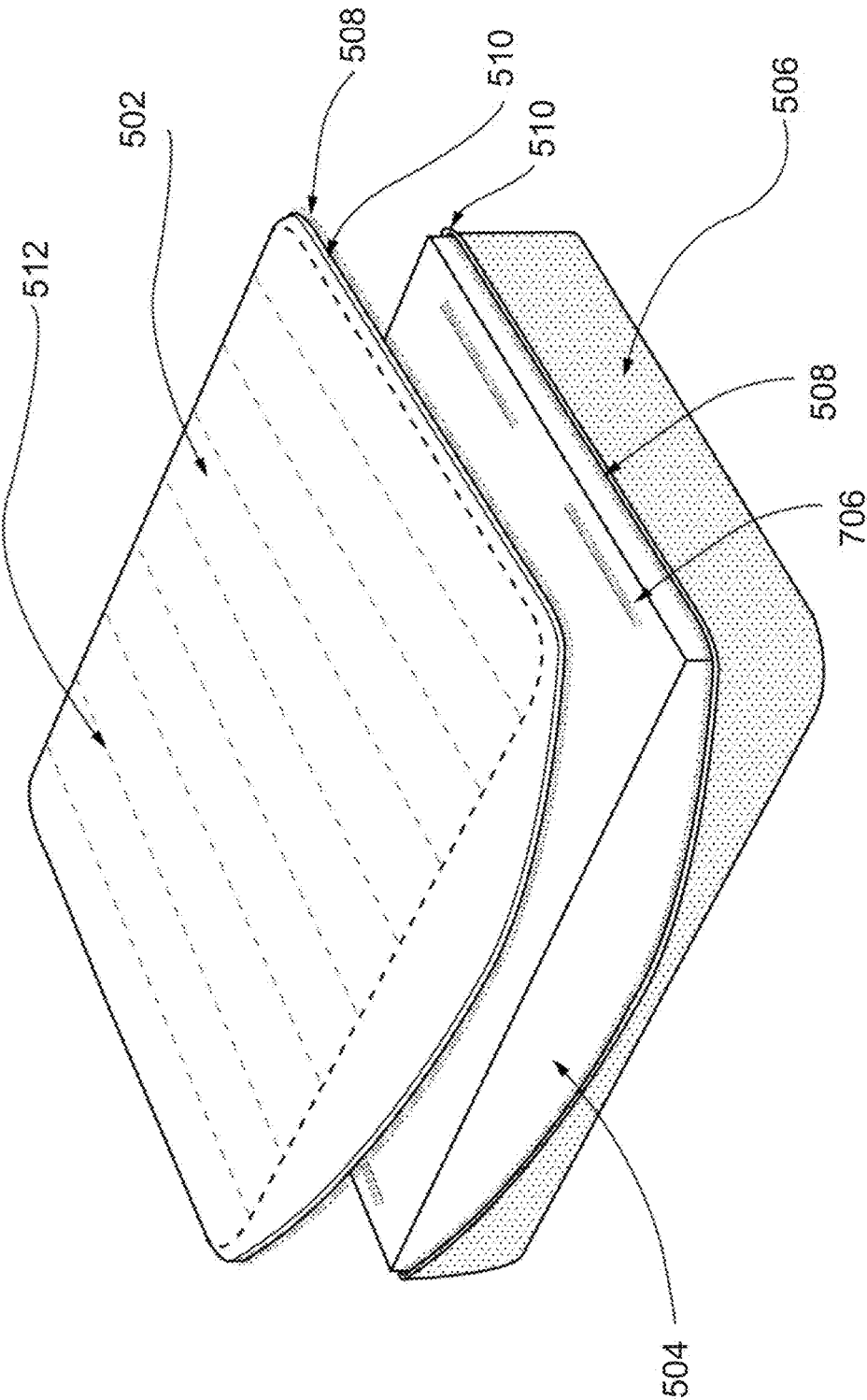


Fig. 6

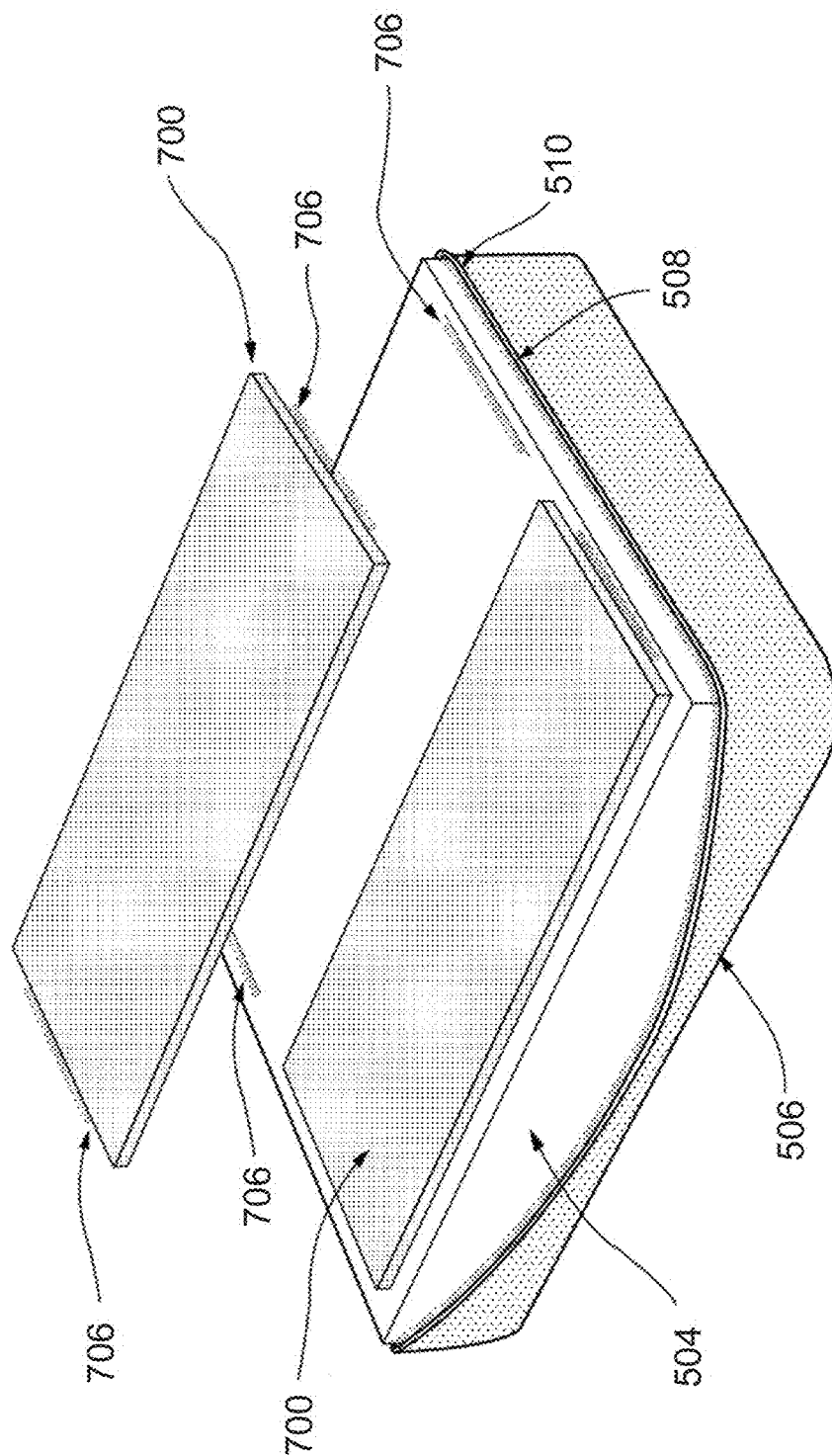


Fig. 7

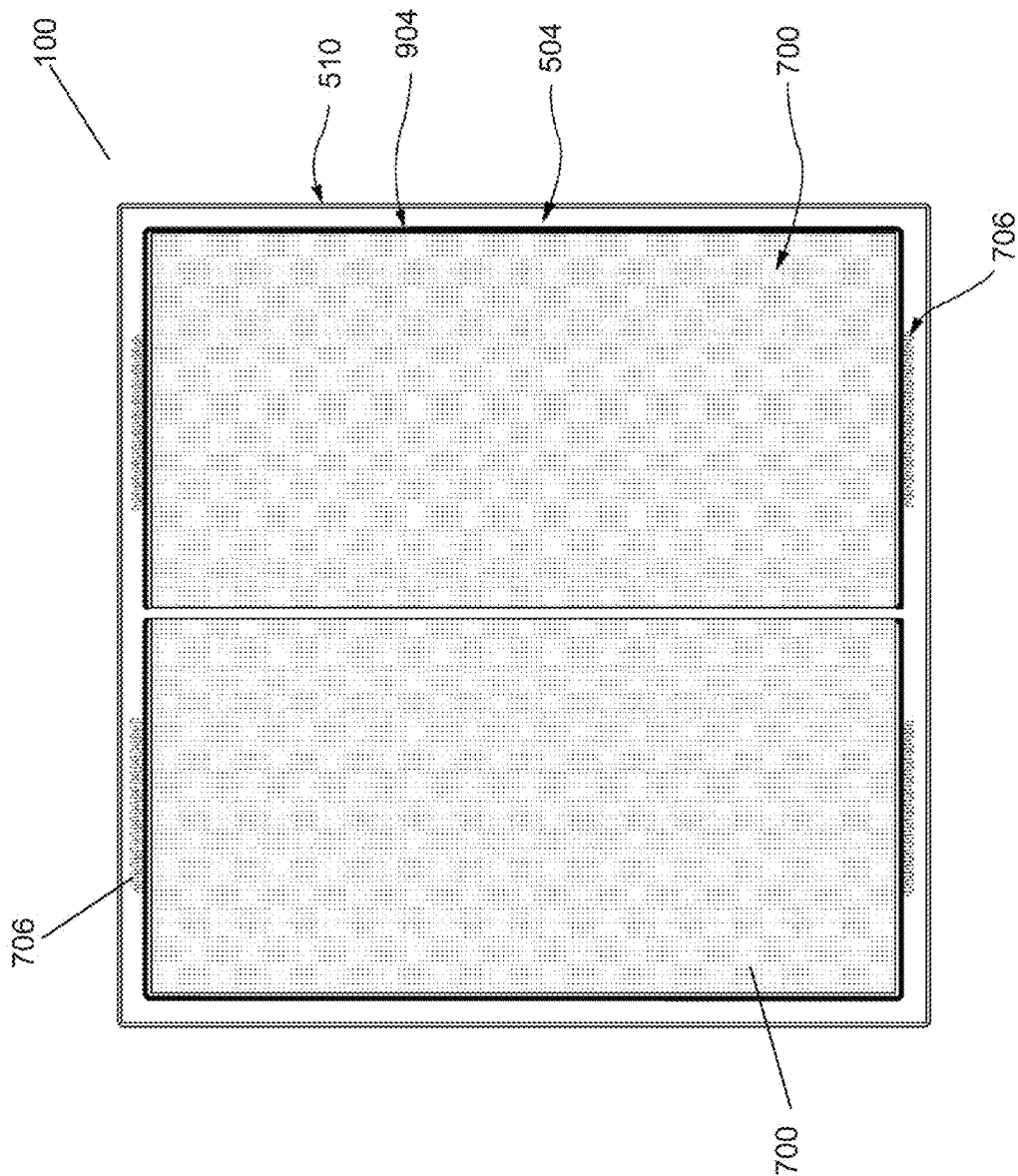
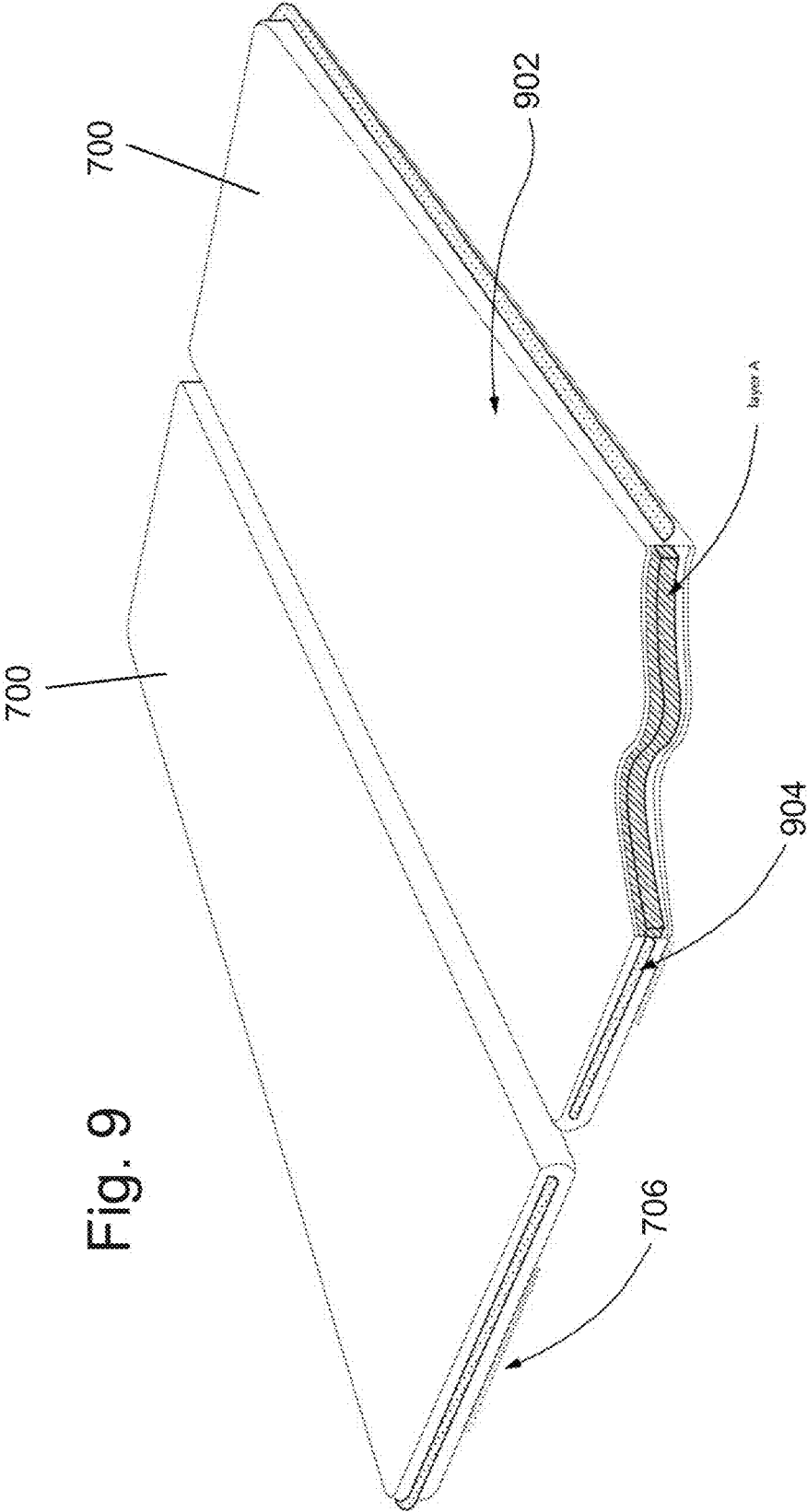


Fig. 8



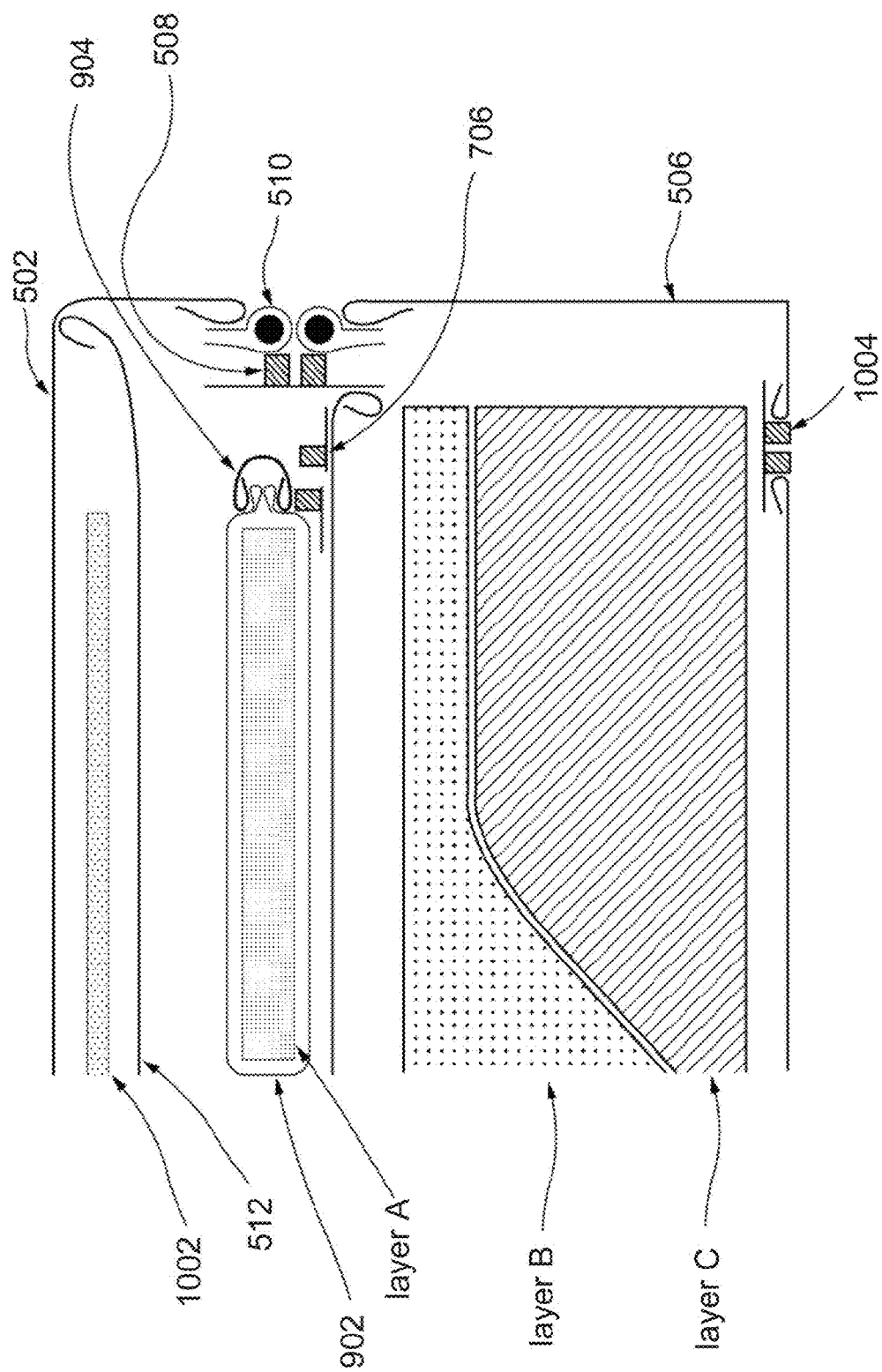


Fig. 10

Fig. 11

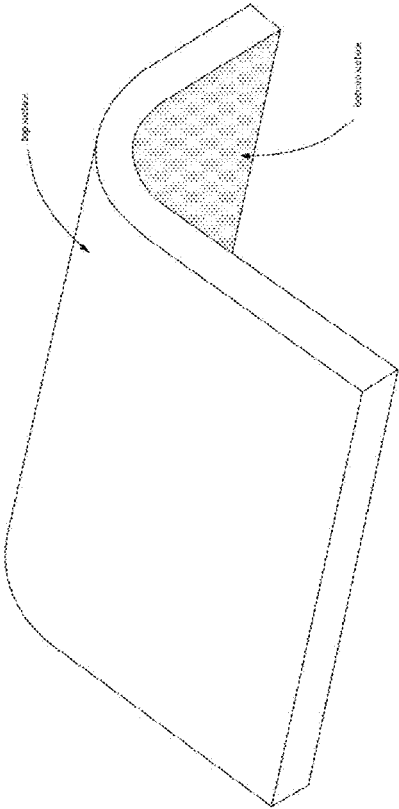


Fig. 13

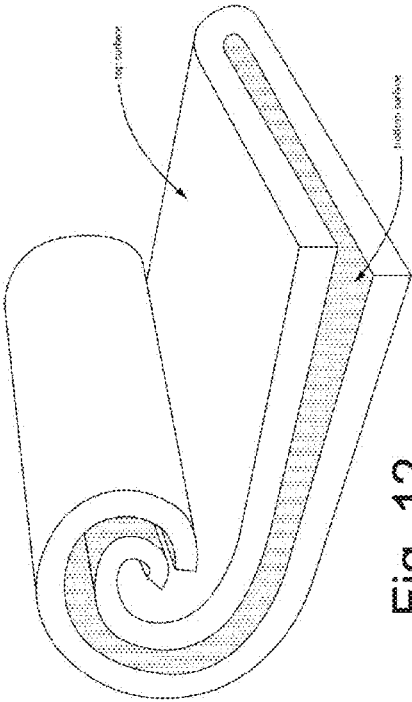
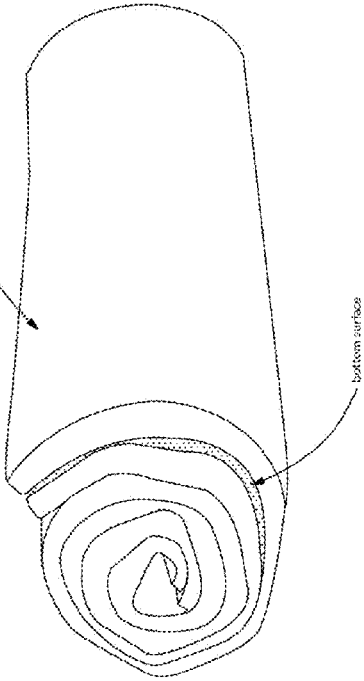


Fig. 12

SIMULATED ZERO "G" MATTRESS AND COVER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to U.S. Provisional Application Ser. No. 62/262,579, filed Dec. 3, 2015 and U.S. Provisional Application Ser. No. 62/410,584, filed Oct. 20, 2016, both of which are incorporated by reference herein in their entirety.

FIELD OF THE INVENTION

[0002] The present invention provides a mattress capable of letting a user sleep in a simulated zero G position.

BACKGROUND

[0003] In recent years, many new mattress types have come to market to address various deficiencies in the industry. For example, memory foam mattresses have become very popular. However, these mattresses can often be uncomfortable because the memory foam is not very breathable and can create hot spots. Further, memory foam mattresses do not provide any capability for a user to adjust the softness or firmness of the mattress, leading to further user discomfort. The mattress of the present invention has been designed to address these and other various deficiencies.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 depicts a view a side cutaway view of a first view of the mattress.

[0005] FIG. 2 depicts a perspective view of the mattress without a cover.

[0006] FIG. 3 depicts a user on their back laying on the mattress.

[0007] FIG. 4 depicts a user on their side laying on the mattress.

[0008] FIG. 5 depicts a view of the mattress with a cover.

[0009] FIG. 6 depicts a view of the mattress with the cover partially removed.

[0010] FIG. 7 depicts a view of the mattress with inserts added.

[0011] FIG. 8 depicts a top view of the mattress with two inserts attached.

[0012] FIG. 9 depicts a cutaway view of the inserts showing the inner construction.

[0013] FIG. 10 depicts a full cutaway view of the mattress.

[0014] FIGS. 11-13 show a view of the mattress being packaged for transport with the inserts attached.

SUMMARY

[0015] Disclosed herein is a mattress comprised of different layers of material stacked on top of each other which together have the effect of letting the user sleep in a "simulated Zero G" position without the aid of an articulating base. Contoured layers within the mattress let specific areas of the user's body sink further into the mattress than others which create the Zero G effect when sleeping on the back (FIG. 3), and contour to the user's body when sleeping on the side (FIG. 4). Specifically, when sleeping on the back, the user's head, upper back and feet are supported at mattress level, while the torso and hips sink into the mattress on an even slope. This position is more natural to the human

body than laying on flat surface with a consistent amount of give & support throughout. Additionally, there is a top layer of material specifically designed to retain minimum heat and to dissipate body heat over time, keeping the user cooler while sleeping and to retain the feeling of "bounce" or "springiness" in the mattress.

DETAILED DESCRIPTION

[0016] FIG. 1 shows a side view of mattress 100 with internal layers A-C visible. Layer A is a breathable, springy and bouncy structural mesh layer (polymer material or other materials) between one inch and three inches thick which does not retain heat and serves to add spring and comfort for the user. For example, Layer A may be a material such as Airstring offered by Spec Tex® or any other similar material. Layer B is formed from a visco-elastic polyurethane foam (memory foam) which has a horizontal top surface and has a contoured bottom surface so that it is not a uniform thickness. The purposes of the "zones" formed by the various contours of the bottom surface of layer B will be explained later. In a preferred embodiment, the visco-elastic polyurethane foam of Layer B has a density in the range of 3-8 lb/ft³, preferably 4 lb/ft³.

[0017] Layer C is a High Density polyurethane foam (HD foam) which has a horizontal bottom surface and is cut on a contour on its top surface so that it perfectly matches and fits together with the bottom contour of layer B. Preferably, the high density polyurethane foam has a density range of 1-3 lb/ft³, but preferably 2.8 lb/ft³. When fully assembled, the mattress 100 is flat on both top and bottom, appearing similar in shape and size to a traditional mattress.

[0018] Preferably, layers B-C are permanently bonded to each other while layer A is removable as will be described later. However, it should be apparent that layers A-C can all be permanently bonded or attached to each other using known methods in the art.

[0019] The mattress is divided laterally by five "zones" which are defined by the contour line (FIG. 1) (or contact area between the bottom of layer B and the top of layer C). Zone 1 is a fully horizontal section starting at the head of the bed and extending from one inch in length to 18 inches along a length of mattress 100. Zone 2 is a transition area between Zone 1 and Zone 3, and extends from the end of Zone 1 from 1 inch to 20 inches along a length of mattress 100. As previously explained, the top surface of layer 2 is flat while the bottom surface of layer 2 extends downward toward a bottom of mattress 100 at an angle which can vary from 5 degrees to 85 degrees from horizontal. The transition of layer B in zone 2 from flat to sloped can either be a sharp transition, as shown in FIG. 1, or a smooth transition with a convex surface into zone 1 and a concave surface into zone 3.

[0020] Zone 3 is a horizontal section symmetrical about the centerline of the bed connecting zone 2 and zone 4 in which layers A-C have a constant thickness. In zone 3, layer B is the thickest layer. Zone 4 is a mirror image of zone 2 and zone 5 is a mirror image of zone 1 about the centerline of the mattress 100. Because mattress 100 is symmetrical, a user can lie lengthwise in either direction. Table 1 below summarizes the thicknesses of the various layers in the various zones:

TABLE 1

	Zones 1 & 5	Zones 2 & 4	Zone 3
Layer A	1-4"	1-4"	1-4"
Layer B	1-4"	Start—1-4" End—2-10"	2-10"
Layer C	3-16"	Start—3-16" End—1-10"	1-10"

[0021] Layers B and C work together to create a support system for the body that allow for the “simulated Zero G position.” The HD foam of layer C provides support which will give less under the user’s weight, thus defining the user’s sleeping position. The memory foam of layer B provides comfort and “give”, letting the user sink into the mattress 100. Areas where the memory foam is thicker in layer B, such as zone 3, provide a deeper sink and a more customized contour for the user’s body. Areas with thicker HD foam in layer C, such as zones 1, 2, 4, and 5, provide more support and definition.

[0022] Layer A has a number of distinct roles. Its first function is to be breathable, retain as little heat as possible and dissipate body heat over time, keeping the user cool while sleeping and separating the user from the memory foam of layer B which otherwise would retain much of the user’s body heat. Secondly, layer A functions to distribute the weight of the user onto layer B. Memory foam deflects at highly local levels which can create a “sunk in” feeling, which prevents the user from easily moving/changing-position during sleep and also does not provide the ideal amount of support for all areas of the body. Layer A deflects in a very broad way, conforming to the body contour while distributing the weight of the user evenly over the memory foam’s surface. In this way the memory foam will still offer the benefit of its “give” or vertical deflection, but layer A will prevent the “sunk in” feeling. Layer A also offers a desirable level of spring or bounce, common to an innerspring mattress, which foam alone cannot provide.

Zone Roles for Back Sleeping (FIG. 3)

[0023] As shown in FIG. 3, when a user lays on their back on mattress 100, zone 1 supports the user’s head, keeping it raised above the mattress. Zone 2 supports the user’s shoulders and upper back and defines the angle from horizontal that the user will sleep at. Zone 3 has a deeper area of memory foam in layer B that lets the user’s hips and lower back sink into the mattress. Zones 4 and 5 support the user’s legs but the contour underneath does not affect leg resting position as the legs are not heavy enough to sink into the mattress. Zone’s 4 and 5 exist in order to keep the mattress 100 symmetrical, in this way the user can not set up the mattress in an incorrect orientation.

[0024] If the user sets up the mattress 100 in reverse (head resting on Zone 5), zones 5 and 4 will function identically to zones 1 and 2 respectively. Together, these zones create the “simulated Zero G” position where the back/spine is in alignment in a downward slope (head rests higher than the hips) and the legs are elevated in a semi bent position.

Zone Roles for Side Sleeping (FIG. 4)

[0025] As shown in FIG. 4, when a user lays on their side on mattress 100, zone 1 supports the user’s head, keeping it raised above the mattress. Zone 2 offers a thicker section of

memory foam to allow the user’s shoulders to sink in further by following the neck, shoulder and arm and body profile. Zone 3 offers the thickest section of memory foam to allow the heaviest areas of the body, the hips and torso, to sink in. Sections 4 and 5 offer less memory foam which still provide adequate support for the legs. This setup for side sleeping keeps the head supported and keeps the spine relaxed and naturally straight and in a parallel alignment with the floor.

Cover Construction (FIG. 5)

[0026] In some embodiments, mattress 100 is further provided with a cover 500 which comprises top cover 502, inner cover, 504, and lower portion 506. Top cover 502 is joined to lower portion 506 through exterior zipper 508 which can be used to completely separate top cover 502 from lower portion 506. Piping 510 can be used to conceal the path of zipper 508 so the user never feels the metal or plastic zipper around the edge of the mattress cover 500 (FIG. 5, FIG. 6). The zipper 508 and piping 510 follow the same path around the perimeter of the mattress 100. On the short ends of the mattress 100, the zipper 508 and piping 510 are on a straight line near the top of mattress 100. On the long sides of mattress 100, the zipper 508 and piping 510 dip downward in a consistent convex arc ranging anywhere from 3" to 10" deep (FIG. 5). The other side of mattress 100 not shown in FIG. 5 is a mirror image of that shown in FIGS. 5-6.

[0027] The cover 500 is constructed so that the user can unzip the top layer 502 as shown in FIG. 6 (FIG. 6). This is primarily so the user can access inner cover 504 located beneath top layer 502 (FIG. 7). The top layer 502 can be removed for spot washing, washing in a washing machine, dry cleaning, or replacement.

[0028] Top layer 502 generally comprises two distinct materials. The first material, ticking 512, is a soft fabric which is quilted to an internal spacer fabric 1002 (FIG. 10) in consistent width increments (FIG. 5). As an example, ticking 512 may be 500 gram 100% polyester. A fire retardant fabric, such as Palidn FR fiber, may also be used.

[0029] The internal spacer fabric enhances the breathability of the entire mattress and adds a plush-like topper to mattress 100. Spacer fabrics are generally made up of two breathable pieces of fabric that have fine plastic threads oriented vertically between the two fabrics to create a defined space between the two pieces of fabric. The thickness of the spacer fabric located internal to ticking 512 can vary from 2 mm to 75 mm in thickness.

Inner Cover Construction (FIG. 7)

[0030] In some embodiments, inner layer A of the mattress 100 shown in FIGS. 1-4 may be inside one or more removable inserts 700 as depicted in FIG. 7. For full, queen, king and California king mattresses, layer A is made up of 2 inserts 700. However, in some embodiments, layer A may be made up on a single insert 700 that is the full length and width of mattress 100. Each insert 700 is preferably zippered to inner cover 504 using insert zippers 706. However, other connection means, such as hook and loop fasteners, may also be used to attach inserts 700 to inner cover 504.

[0031] Inner cover 504 and lower portion 506 fully encase layers B and C so that the user is never exposed to those layers (FIG. 7). In some embodiment, inner cover 504 is formed from a waterproof fabric to prevent any spills from

traveling to parts of the mattress that are not washable. Inner cover **504** extends around the border of the mattress **100** and is attached to lower portion **506** along the same convex arc as top layer **502**. Preferably, inner cover **504** is sewn to lower portion **506** so it is not removable for holding the piping **510** and zipper **508** in place on mattress **100**. Inner cover **504** also prevents the user from smelling layers B and C of mattress **100** off-gassing, a natural property in foam. When the user removes top layer **502** to adjust inserts **700**, they only see a finished case. The user is never subjected to raw materials as in other foam mattresses (FIG. 7).

[0032] The bottom of lower portion **506** comprises a hidden zipper **1004** (FIG. 10) which is used to attach lower portion **506** and inner cover **504** to mattress **100** during production. The construction of cover **500** allows the user to remove top layer to adjust the firmness using inserts **700** having varying densities while still maintaining the look and feel of a finished product (FIG. 6).

Insert Construction (FIG. 9)

[0033] In a preferred embodiment, layer A is contained within inserts **700** which are removable from mattress **100** as has been described. This allows users to select different densities of layer A to suit two users' unique sleeping preferences. This can be due to heat, softness/firmness preferences, change in sleeping behavior, medical reasons, pregnancy, etc.

[0034] As depicted in FIG. 9, Layer A is encased in fabric **902** using a folded fabric construction in which fabric **902** underneath layer A and is folded over the top of layer A. In the preferred embodiment, the fabric **902** is lightweight and breathable to optimize the breathability of layer A. The open edges of fabric **902** are then sewn shut. In the preferred embodiment, the open edges are sewn shut with bias tape **904**. Layer A is completely encased in the fabric **902** so the user never sees or touches the raw material. As shown in FIG. 8, the folded fabric construction allows for the two inserts **700** to sit side by side with no gap or crease between the two inserts **700** when users are laying on mattress **100**.

[0035] At each end of insert **700** is a zipper **706** used to attach insert **700** to inner cover. In the preferred embodiment, zippers **706** are used to prevent the inserts from shifting while moving the mattress **100**. Other methods of securing the mattress include Velcro strips, strips of fabric, or strips of elastic on the corners of the mattress case which are pulled over layer A to keep inserts **700** in place. The zippers **706** on each end are designed so an insert can be zipped to either side of the mattress **100** by simply rotating the insert 180 degrees.

Roll Pack Packaging

[0036] The mattress **100** is packaged for shipment with inserts **700** attached using a roll packing method in which the mattress **100** is first compressed and sealed in plastic. As shown in FIG. 11, the compressed mattress **100** is then folded in half along the centerline (FIG. 1) so that both inserts **700** face outward. Mattress **100** is then rolled up as depicted in FIGS. 12-13 and sealed with a plastic sheet. In the preferred embodiment, the mattress **100** is folded in the reverse along the center line. This prevents any permanent

creasing or folding lines to layer A or the mattress case **500** during shipping.

1. A mattress having a length greater than a width, the mattress comprising:

- a first layer formed from a breathable and spring-like material;
- a second layer formed from a visco-elastic polyurethane (memory foam);
- a third layer formed from a high density polyurethane foam (HD foam);
- wherein the mattress is divided into five zones along the length of the mattress;
- wherein a thickness of the third layer in a first zone and a fifth zone is greater than a thickness of the second layer;
- wherein a thickness of the second layer in a third zone is greater than a thickness of the third layer; and
- wherein a thickness of the first layer is the same in each of the five zones.

2. The mattress according to claim 1, wherein a density of the second layer is 3-8 lb/ft³ and a density of the third layer is 1-3 lb/ft³.

3. The mattress according to claim 1, wherein a thickness of the second layer in a second zone increases in thickness from 1-4" at a beginning of the second zone to 2-10" at an end of the second zone.

4. The mattress according to claim 3, wherein a thickness of the third layer in the second zone decreases in thickness from 3-16" at the beginning of the second zone to 1-10" at the end of the second zone.

5. The mattress according to claim 3, wherein the thickness of the second layer in the second zone increases at a constant rate.

6. The mattress according to claim 1, wherein the fifth zone is a mirror image of the first zone and a fourth zone is a mirror image of a second zone.

7. The mattress according to claim 1, further comprising a cover for the mattress, wherein the cover comprises:

- a bottom portion fully surrounding a bottom of the mattress and an outer periphery of the mattress,
- wherein, along the length of the mattress, a top of the bottom portion extends downward in a consistent convex arc from 3" to 10", and
- wherein, along the width of the mattress, the top of the bottom portion is parallel to a top surface of the a mattress.

8. The mattress according to claim 7, further comprising: an inner cover connected to the bottom portion along the top of the bottom portion,

wherein the top portion and the bottom portion fully surround the second layer and the third layer.

9. The mattress according to claim 8, further comprising: a top cover, wherein the top cover is releasably connected to the top of the bottom portion, wherein the first layer is located between the inner cover and the top cover.

10. The mattress according to claim 8, wherein the inner cover is formed from a waterproof material.

11. The mattress according to claim 8, wherein a top surface of the inner cover comprises at least two zippers, with a first zipper along a top portion of the top surface and a second zipper along a bottom portion of the top surface, and

wherein a rectangular insert containing at least a portion of first layer is attached to the top portion using the first zipper and the second zipper.

12. The mattress according to claim **11**, wherein the rectangular insert comprises:

- a fabric layer folded over an edge of the first layer, wherein the edges of the fabric layer are joined on three sides to fully surround first layer, and
- a pair of zippers on opposing ends of the fabric layer for mating with the first zipper and the second zipper on the top surface of the inner cover.

13. The mattress according to claim **11**, further comprising:

- a third zipper aligned adjacent the first zipper;
- a fourth zipper aligned adjacent the second zipper adjacent the first zipper; and
- a second rectangular insert containing a remainder of the first layer not contained within the rectangular insert, wherein the second rectangular insert is attached to the top portion using the third zipper and the fourth zipper.

14. The mattress according to claim **11**, wherein the first rectangular insert and the second rectangular insert substantially cover the top surface of the mattress.

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