MULTI-LAYER MATTRESS

30a

30b

24a

24c

30d

30e

30f

24b

30c

24

24d

30g

Title: MULTI-LAYER MATTRESS

Abstract: A breathable mattress including a plurality of layers, where one of the mattress layers is further comprised of a plurality of sections and the sections are comprised of different types of materials, which have varying firmnesses and feel, and where each of the layers is comprised of material that is perforated or of an open-cell structure to allow for air circulation.
SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

— of inventorship (Rule 4.17(iv)) for US only

Published:
— without international search report and to be republished upon receipt of that report

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MULTI-LAYER MATTRESS

BACKGROUND OF THE INVENTION

The present invention relates generally to mattresses and, more particularly, to a multi-layer mattress, which is comprised of various foam materials.

A common problem associated with mattresses is that they are not customized to support the bodies of their users. In fact, most mattresses are comprised of materials which have the same hardness or firmness throughout the mattress. To customize mattresses with respect to multiple users, customized mattresses have been provided, which have two zones of hardness or firmness. Although these mattresses are customized to meet user preferences with respect to hardness or firmness for each of the users, these mattresses are not customized to meet user preferences with respect to the different areas of the body for each of the respective users.

SUMMARY OF THE INVENTION

To overcome the disadvantages noted above, the present invention is directed to a breathable mattress including a plurality of layers, where one of the mattress layers is further comprised of a plurality of sections and the sections are comprised of different types of materials, which have varying firmnesses and feel and which may also be comprised of material that is perforated or of an open-cell structure to allow for air circulation.

A better understanding of the objects, advantages, features, properties and relationships of the invention will be obtained from the following detailed description and
accompanying drawings which set forth an illustrative embodiment and which are indicative of the various ways in which the principles of the invention may be employed.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be had to a preferred embodiment shown in the following drawings in which:

Figure 1 shows a perspective view of a mattress, which is partially sectioned to show a plurality of foam layers;

Figure 2 shows a side view of the foam layers that form the mattress shown in Fig. 1;

Figure 3 shows an exploded, perspective view of the foam layers shown in Fig. 2, without the outer mattress cover; and

Figure 4 shows a top view of the contour layer shown in Fig. 3.

DETAILED DESCRIPTION

Turning now to the figures, wherein like reference numerals refer to like elements, there is illustrated a mattress 20, which is comprised of multiple foam layers. More particularly, as shown in Figs. 1 and 2, the mattress 20 is comprised of a comfort layer 22, a contour layer 24, an air foam layer 26, and a foam base layer 28. Although the mattress shown in Figs. 1 and 2 shows the mattress with comfort layer 22 forming the top layer of mattress 20, contour layer 24 positioned underneath comfort layer 22, air foam layer 26 positioned underneath contour layer 24 and foam base layer 28 forming the bottom layer of mattress 20, it should be understood by those with skill in the art that the order of these layers 22, 24, 26, 28 may be changed.
The comfort layer 22 is preferably positioned on the top of the mattress 20 and is comprised of material that is soft and breathable. For example, materials, including, but not limited to, convoluted latex, regular latex, viscoelastic polyurethane, regular polyurethane or convoluted polyurethane may be used. While it is preferred that the comfort layer 22 be comprised of material having an open-cell structure or being perforated for use in connection with the mattress 20, it should appreciated that other materials may also be used, as long as they possess similar characteristics as the materials mentioned above. Although the comfort layer 22 may be of a varying thicknesses, the preferred embodiment of the present invention includes a comfort layer 22 having a thickness between ½ and 4 inches.

As will be discussed in more detail below, the contour layer 24 will include a plurality of zones, where each of the zones may vary in firmness and feel. For example, the embodiment shown in Figs. 1 - 4 depicts a seven-zoned layer that utilizes a combination of viscoelastic foam, which is perforated, and conventional polyurethane foam, which may or may not be perforated. Because the viscoelastic foam is perforated and the conventional polyurethane foam is of an open-cell structure, each of these materials will allow air to circulate through the contour layer 24. While this embodiment includes seven zones, it should be appreciated that the number of zones and the material forming each of these zones may be changed to achieve different firmnesses and feel and air circulation qualities; for example, it is also envisioned that a mattress having a contour layer with five zones may also be manufactured. Although the contour layer 24 may be of a varying thicknesses, the preferred embodiment of the present invention includes a contour layer 24 having a thickness between 1 and 4 inches.
The air foam layer 26 may be comprised of reticulated foam, which has an open-cell structure and allows air to circulate through the air foam layer 26. Reticulated foam is strong, easily fabricated and resistant to chemicals. In addition, reticulated foam typically has pore sizes that range from 4 to 100 pores per inch. This enables reticulated foam to be used in a wide array of applications and also helps to control the permeability associated with those applications. While reticulated foam has been commonly used in connection with a variety of products, it has not been used in connection with mattresses. It should be understood by those with skill in the art that other materials having similar characteristics may also be used to form the air foam layer 26. Although the air foam layer 26 may be of a varying thicknesses, the preferred embodiment of the present invention includes an air foam layer 26 having a thickness between 2 and 4 inches.

The foam base layer 28 is normally positioned on the bottom of the mattress 20 and comprised of material that is firmer and more supportive, such as polyurethane. The foam base layer 28 may also be comprised of a material having an open-cell structure for allowing air to circulate through the foam base layer 28. It should be understood by those with skill in the art that other materials or manufacturing techniques, such as perforation, may also be employed to form the foam base layer 28 in order to achieve different firmnesses and feel and air circulation qualities. Although the foam base layer 28 may be of a varying thicknesses, the preferred embodiment of the present invention includes a foam base layer 28 having a thickness between 2 and 6 inches.

For creating the mattress 20 shown in Figs. 1 and 2, the foam layers 22, 24, 26, 28 extend in a substantially parallel, horizontal direction and are stacked in vertical relation to one another. As is known in the art, each of the foam layers 22, 24, 26, 28 are
substantially aligned and interface with each other on their horizontal planes. Each of the foam layers 22, 24, 26 and 28 may be attached by adhesives, such as Simalfa glue.

For exemplary purposes only, the mattress 20 should be viewed as comprising a first side 21a and a second side 21b, where the first side 21a and second side 21b form substantially planar surfaces. More specifically, the first side 21a and second side 21b for the mattress also includes a top portion 20a, a bottom portion 20b, a left side 20c and a right side 20d. In addition, the top portion 20a will correspond to what is commonly referred to as the head of the mattress 20 and the bottom portion 20b will correspond to what is commonly referred to as the foot of the mattress 20. It should be appreciated that each of the foam layers 22, 24, 26, 28 also include a first side, a second side, a top portion, a bottom portion, a left side and a right side, with reference numerals associated with each of those portions or sides that correspond to the reference numerals used to describe the same portions or sides on mattress 20.

To create a breathable mattress 20 that has a plurality of zones having varying firmnesses, which correspond to different parts of a user’s body, the contour layer 24 includes a plurality of sections 30 that extend from the left side 24c of the contour layer 24 to the right side 24d of the contour layer 24. Also, it should be appreciated that sections 30 extend in a substantially perpendicular direction as compared to the space extending between the top portion 20a and the bottom portion 20b. Moreover, each of these sections 30 may be comprised of different foam types, such as latex, viscoelastic, polyurethane and other similar materials, which may also be perforated if necessary. These sections 30 may be attached to each other by adhesives, such as Simalfa glue, or by using other techniques that are well-known in the industry. The benefits of using
different foam types is that the contour layer 24 and the mattress 20 may include a
plurality of zones associated with each of these section 30, where each of these zones
possess a different firmness and feel. In addition, the benefits of using materials that are
either perforated or of an open-cell structure is that air will be allowed to circulate
throughout the entire mattress 20, thereby allowing the mattress to provide a "cooler"
surface and a more comfortable sleep for its users, which may also reduce tossing and
turning.

As mentioned above, it is preferred that each of the foam layers 22, 24, 26, 28 and
sections 30 be comprised of materials that are perforated or of an open-cell structure, and
that provide the desired firmness and feel. For example, viscoelastic is a unique open cell
foam that continuously molds to the shape of an object interfacing with the viscoelastic
material based on the temperature of the viscoelastic material. Therefore, viscoelastic
foam gets softer as its ambient temperature rises. This is important because mattress
users are known to have pressure points associated with different portions of their body.

In addition, these pressure points will generate heat. Thus, the viscoelastic foam will
become softer and mold itself around the pressure points to reduce the amount of force
displaced against those points.

Additionally, latex foam, also known as latex foam rubber, is known in the
industry and consists of a network of open, or inner-connecting, cells, which are uniform
in size and character. It is advantageous to use latex foam in connection with mattresses
because latex foam is capable of molding to the shape of an object that interfaces with the
latex foam, while also providing support to the object. Also, because of its open and
inner-connecting cell structure, latex foam allows for air circulation, which is consistent
with the functional specifications required by the present invention. Since latex foam is more breathable than viscoelastic foam, it retains less heat, which may also reduce the surface temperature of the mattress. Therefore, latex foam may be preferable in some instances.

As mentioned above, the contour layer 24 includes a plurality of zones, for each of the zones possesses a different firmness and feel. Moreover, each of these zones will correlate to one of the sections 30 that form the contour layer 24. Fig. 4 shows a top view of the contour layer 24, including seven sections 30, which may each be comprised of different materials. For example, one embodiment of the present invention includes a contour layer 24 that is comprised of seven sections 30a, 30b, 30c, 30d, 30e, 30f, 30g. Moreover, each of the sections are comprised of polyurethane foam or viscoelastic foam and each of those sections 30 may possess the following technical specifications. It should be understood that the density and firmness ranges provided below are only preferred and that materials with a density or firmness outside of the defined ranges may be used without departing from the teachings included herein.

Section 30a, which may also be referred to as the head portion, may be comprised of polyurethane foam, which may be solid or perforated, having a minimum density of 1.5 lbs./cu. ft. and a firmness rating of between 20-45 Initial Firmness Deflection ("IFD").

Section 30b, which may also be referred to as the shoulder portion, may be comprised of viscoelastic foam having a density of between 3-5 lbs./cu. ft. and a firmness rating of between 10-20 IFD.
Section 30c, which may also be referred to as the lumbar section, may be comprised of solid polyurethane foam having a minimum density of 1.5 lbs./cu. ft. and a firmness rating of between 20-45 IFD.

Section 30d, which may also be referred to as the hip portion, may be comprised of perforated viscoelastic foam having a density of between 3-5 lbs./cu. ft. and a firmness rating of between 10-20 IFD.

Section 30e, which may also be referred to as the lower lumbar portion, may be comprised of solid polyurethane foam having a minimum density of 1.5 lbs./cu. ft. and a firmness of between 20-45 IFD.

Section 30f, which may also be referred to as the leg portion, may be comprised of perforated viscoelastic foam having a density of 3-5 lbs./cu. ft. and a firmness rating of between 10-20 IFD; and

Section 30g, which may also be referred to as the foot portion, may be comprised of polyurethane foam, which may be solid or perforated, having a minimum density of 1.5 lbs./cu. ft. and a firmness rating of between 20-45 IFD.

To increase the air flow/circulation of the mattress 20, a fan 40 or similar device may also be provided. The fan may be positioned underneath the mattress 20 or on any of the sides that are formed by the mattress. Because of the preference that the mattress layers 22, 24, 26, 28 be comprised of material that is perforated or of an open-cell structure, the mattress 20 will facilitate the flow/circulation of air and may allow air to pass through the entire mattress. It should also be appreciated by those with skill in the art that the fan 40 may supply air of varying temperatures depending on the effect the manufacturer is aiming to achieve.
While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. For example, different materials possessing similar characteristics may be used and the positioning of each of the layers with respect to one another may be changed. Accordingly, the particular arrangement disclosed is meant to be illustrative only and not limiting as to the scope of the invention which is to be given the full breadth of the appended claims and any equivalents thereof.
CLAIMS

What is claimed is:

1. A mattress, comprising:

   a plurality of layers, where each layer extends in a substantially parallel, horizontal direction and is positioned in vertical relation to the other layers and where each layer has a top portion, a bottom portion, a left side and a right side;

   wherein at least one of the layers is further comprised of a plurality of sections that are formed between the top portion of the mattress and the bottom portion of the mattress; and

   wherein the sections are comprised of more than one type of material.

2. The mattress according to Claim 1, wherein each of the sections extend from the left side of the mattress to the right side of the mattress.

3. The mattress according to Claim 1, wherein the sections are comprised of material selected from the group comprising latex, viscoelastic, or polyurethane foam.

4. The mattress according to Claim 1, wherein the sections are attached to one another by an adhesive materials.

5. The mattress according to Claim 1, wherein the mattress is further comprised of a comfort layer, a contour layer, an air foam layer and a foam base layer.

6. The mattress according to Claim 5, wherein the contour layer is comprised of a plurality of sections.

7. The mattress according to Claim 6, wherein at least one section is comprised of latex.
8. The mattress according to Claim 6, wherein at least one section is comprised of viscoelastic.

9. The mattress according to Claim 6, wherein at least one section is comprised of polyurethane foam.

10. The mattress according to Claim 1, wherein each of the layers is comprised of a material that allows air to circulate throughout the mattress.

11. The mattress according to Claim 10, wherein the mattress further includes a fan.

12. A mattress, comprising:

   a plurality of layers, where each layer extends in a substantially parallel, horizontal direction and is positioned in vertical relation to the other layers and where each layer has a first side, a second side, a top portion, a bottom portion, a left side and a right side;

   the layers are stacked, where the first side of one layer interfaces with the second side of the layer immediately above that layer;

   wherein at least one of the layers is further comprised of a plurality of sections that are formed between the top portion of the mattress and the bottom portion of the mattress; and

   wherein the sections are comprised of more than one type of material.

13. The mattress according to Claim 12, wherein each of the sections extend from the left side of the mattress to the right side of the mattress.

14. The mattress according to Claim 12, wherein the sections are comprised of material selected from the group comprising latex, viscoelastic, or polyurethane.

15. A mattress, comprising:
a plurality of layers extending in a substantially parallel, horizontal direction and positioned in vertical relation to one another;

wherein each of the layers is substantially comprised of a material that allows air to circulate throughout the mattress.

16. The mattress according to Claim 15, wherein the mattress is partially comprised of material having an open-cell structure.

17. The mattress according to Claim 15, wherein the mattress is partially comprised of material that is perforated.
FIG. 4