US 20190038043A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2019/0038043 A1**

Fisher (43) **Pub. Date: Feb. 7, 2019**

(54) **DUAL DENSITY SYSTEMS AND METHODS FOR BEDDING APPLICATIONS**

(71) Applicant: **Sleeptech, LLC**, Milwaukee, WI (US)

(72) Inventor: **Herman Franklin Fisher**, Franklin, OH (US)

(21) Appl. No.: **16/050,919**

(22) Filed: **Jul. 31, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/542,106, filed on Aug. 7, 2017.

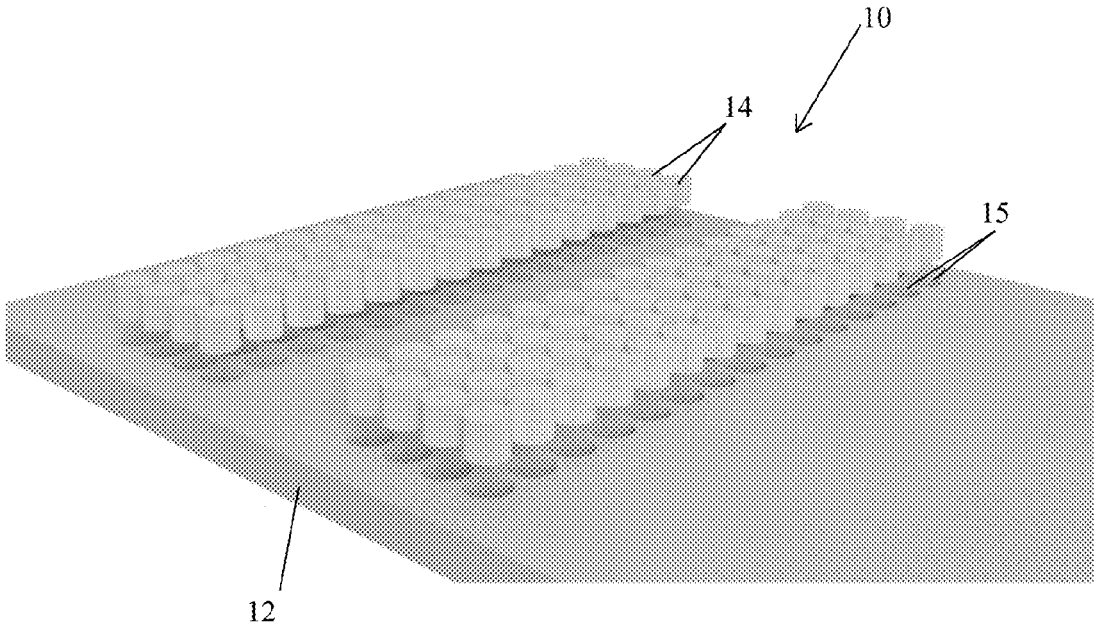
Publication Classification

(51) **Int. Cl.**
A47C 27/14 (2006.01)

(52) **U.S. Cl.**
CPC ***A47C 27/148*** (2013.01); ***A47C 27/144*** (2013.01)

(57) **ABSTRACT**

Embodiments include a dual density mattress including a base, the base having a first density, a plurality of cavities, where the plurality of cavities are defined by the base, a plurality of foam pillars, the foam pillars having a second density different from the first density, where the plurality of foam pillars are operably configured to be positioned within the plurality of cavities.



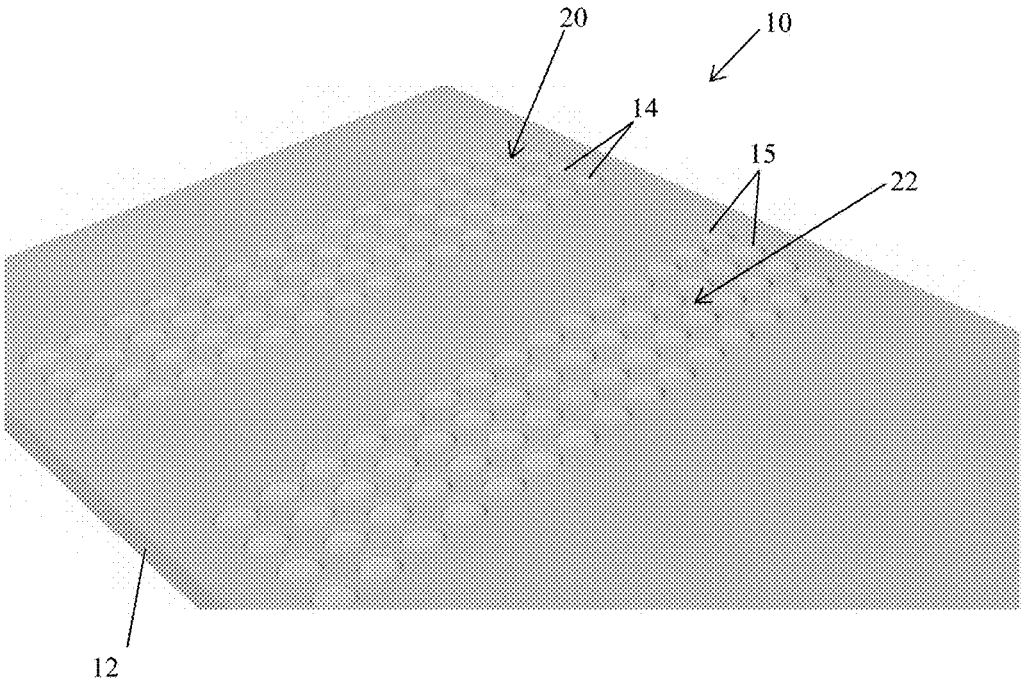


FIG. 1

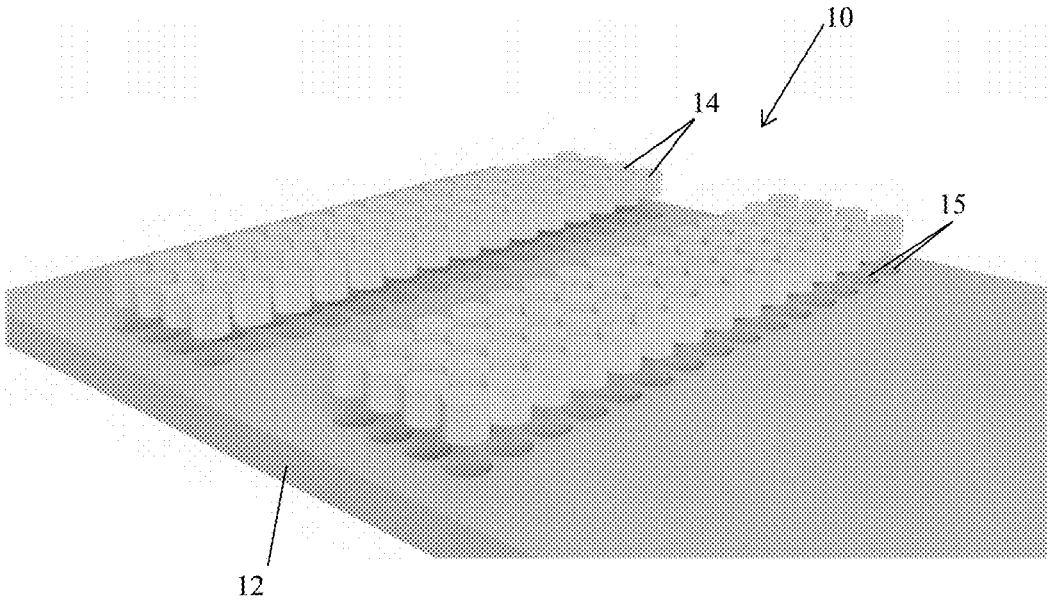


FIG. 2

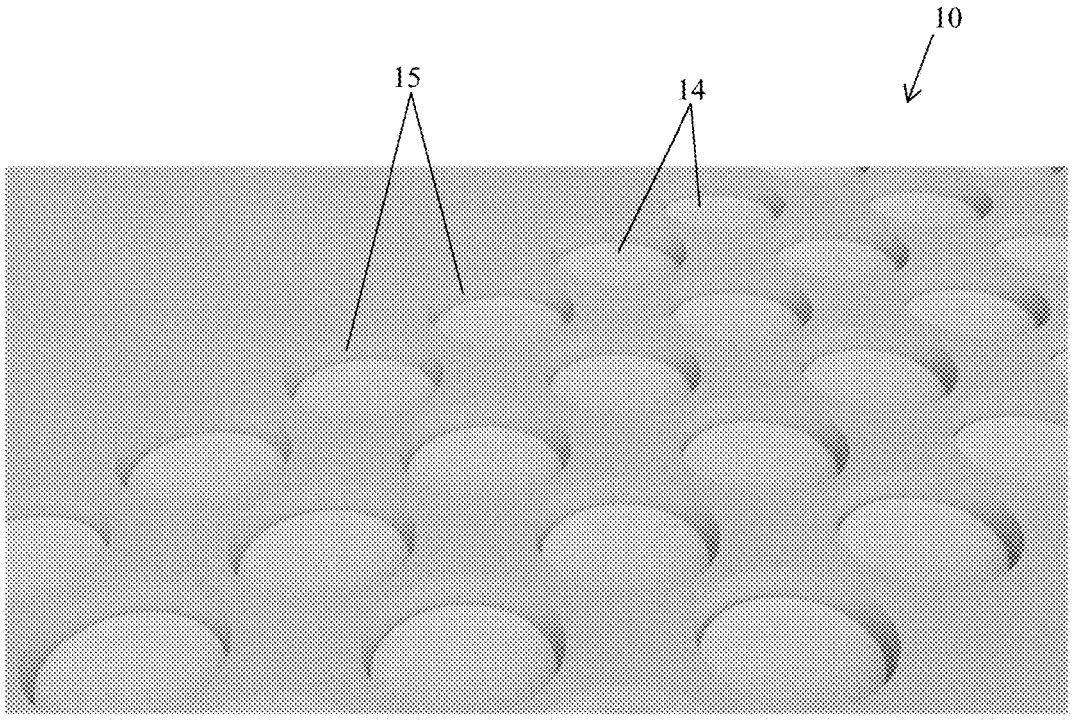


FIG. 3

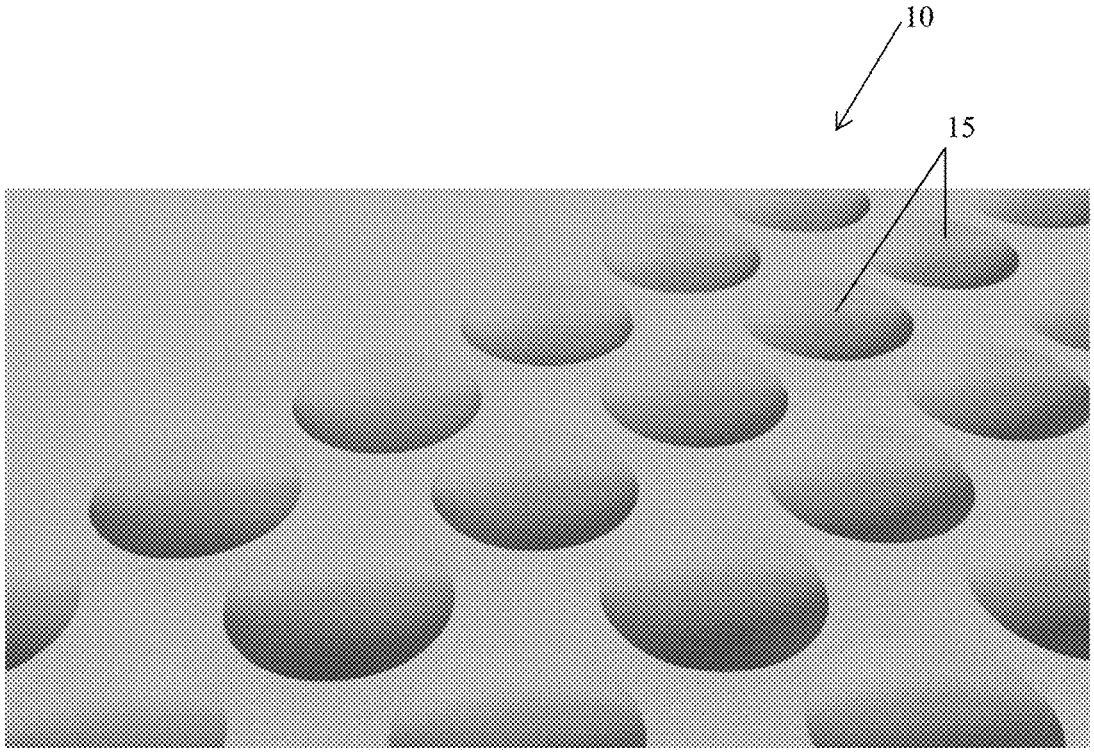


FIG. 4

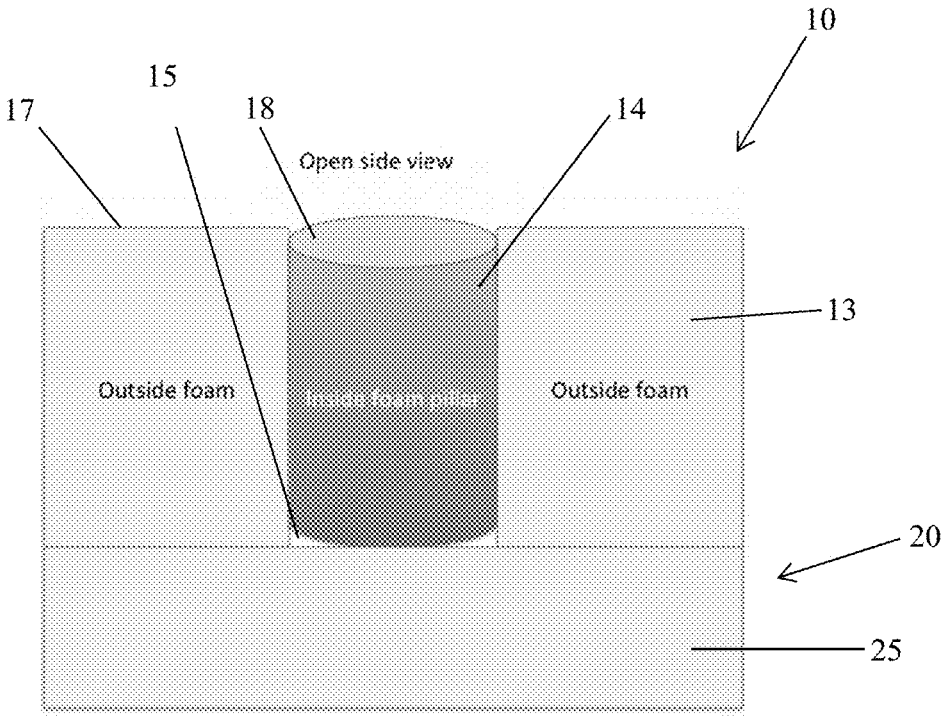

10
15
17
18
14
Open side view
13
Outside foam
Outside foam
20
25

FIG. 5

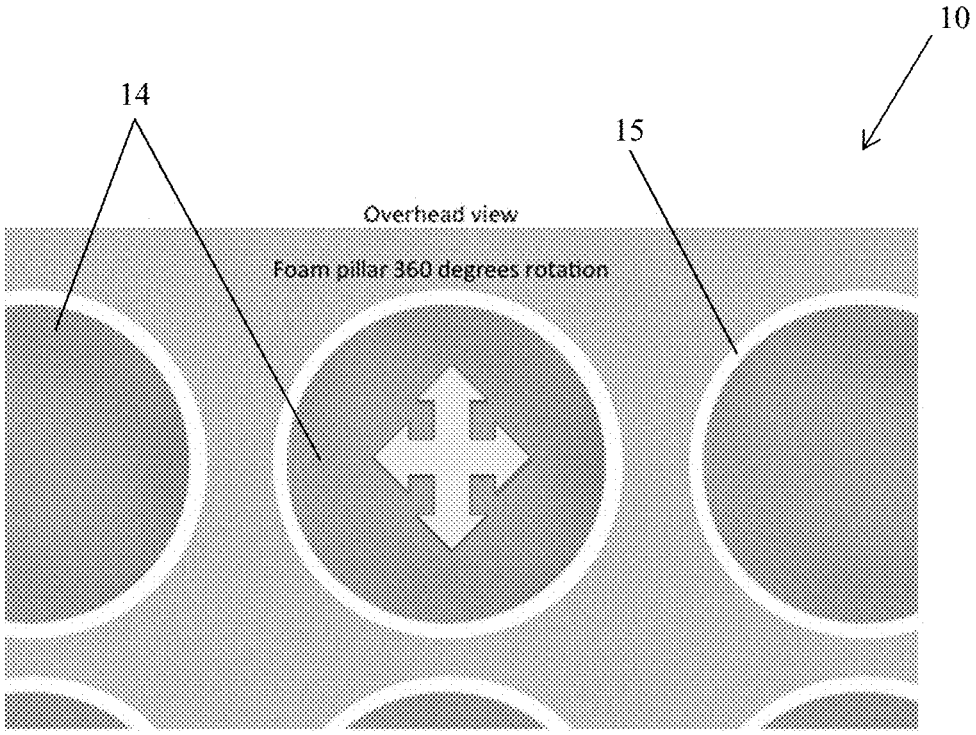


FIG. 6

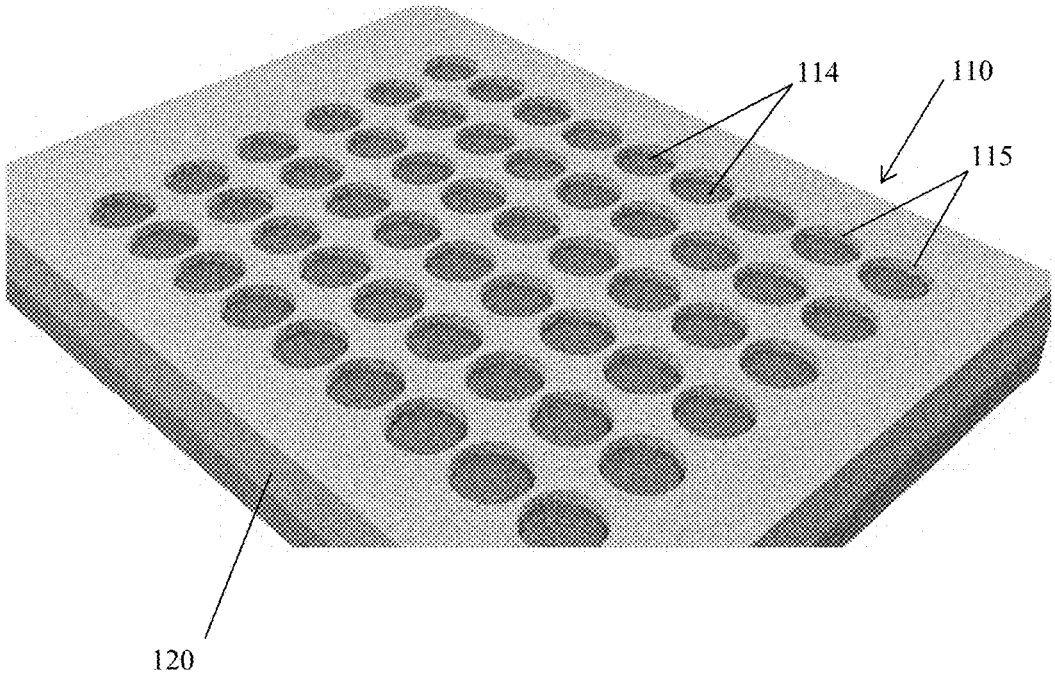


FIG. 7

DUAL DENSITY SYSTEMS AND METHODS FOR BEDDING APPLICATIONS

RELATED APPLICATION

[0001] The present application is a non-provisional application claiming priority to U.S. Provisional Application No. 62/542,106, filed on Aug. 7, 2017, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the technology relate, in general, to bedding, mattress, and toppers, and in particular to bedding, mattresses, and toppers incorporating dual density systems and methods.

BACKGROUND

[0003] A mattress is a large pad for supporting the reclining body, used as a bed or as part of a bed. Mattresses may consist of a quilted or similarly fastened case, usually of heavy cloth, that contains hair, straw, cotton, foam rubber, etc., or a framework of metal springs. Mattresses may also be filled with air or water.

[0004] Mattresses are usually placed on top of a bed base which may be solid, as in the case of a platform bed, or elastic, e.g. with an upholstered wood and wire box spring or a slatted foundation. Mattresses may be supplied with a secondary mattress and/or a removable "topper." A mattress may include an innerspring core and cotton batting or fiberfill. Modern mattresses usually contain either an inner spring core or materials such as latex, viscoelastic or other flexible polyurethane foams. Other fill components include insulator pads over the coils that prevent the bed's upholstery layers from cupping down into the innerspring, as well as polyester fiberfill in the bed's top upholstery layers. In 1899 James Marshall introduced the first individually wrapped pocketed spring coil mattress now commonly known as Marshall coils. Mattresses may also be filled with air or water, or a variety of natural fibers, such as in futons.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The present disclosure will be more readily understood from a detailed description of some example embodiments taken in conjunction with the following figures:

[0006] FIG. **1** is a partial front perspective view of a dual density mattress according to one embodiment.

[0007] FIG. **2** is a partial exploded view of the dual density mattress of FIG. **1**, shown with a plurality of foam pillars removed from a plurality of mattress cavities.

[0008] FIG. **3** is a more detailed partial front perspective view of the dual density mattress shown in FIG. **1**.

[0009] FIG. **4** is a partial front perspective view of the dual density mattress of FIG. **3**, shown with the plurality of foam pillars removed.

[0010] FIG. **5** is a right side cross-sectional view of a dual density mattress shown defining a cavity that is configured to retain a foam pillar according to one embodiment.

[0011] FIG. **6** is a top view of a dual density mattress shown with a plurality of foam pillars that are rotatable within a plurality of cavities according to one embodiment.

[0012] FIG. **7** is a partial front perspective view of a dual density mattress according to an alternate embodiment.

DETAILED DESCRIPTION

[0013] Various non-limiting embodiments of the present disclosure will now be described to provide an overall understanding of the principles of the structure, function, and use of the apparatuses, systems, methods, and processes disclosed herein. One or more examples of these non-limiting embodiments are illustrated in the accompanying drawings. Those of ordinary skill in the art will understand that systems and methods specifically described herein and illustrated in the accompanying drawings are non-limiting embodiments. The features illustrated or described in connection with one non-limiting embodiment may be combined with the features of other non-limiting embodiments. Such modifications and variations are intended to be included within the scope of the present disclosure.

[0014] Reference throughout the specification to "various embodiments," "some embodiments," "one embodiment," "some example embodiments," "one example embodiment," or "an embodiment" means that a particular feature, structure, or characteristic described in connection with any embodiment is included in at least one embodiment. Thus, appearances of the phrases "in various embodiments," "in some embodiments," "in one embodiment," "some example embodiments," "one example embodiment," or "in an embodiment" in places throughout the specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner in one or more embodiments.

[0015] Described herein are example embodiments of apparatuses, systems, and methods for bedding, mattress, padding, cushion, seating, reclining, and furniture applications. In one example embodiment, one or a plurality of cavities or apertures can retain a plurality of foam components to form a padding system or assembly. In some embodiments, each cavity can partially, substantially, or wholly retain a foam or padding component. In some embodiments, each cavity can contain a plurality of foam components having the same or different shapes, sizes, and materials. In some embodiment, each pocket can contain a combination of foam components, springs, innersprings, coils, padding, support material, cushion material, absorbent material, elastic material, memory retention material, combinations thereof, or the like.

[0016] The examples discussed herein are examples only and are provided to assist in the explanation of the apparatuses, devices, systems and methods described herein. None of the features or components shown in the drawings or discussed below should be taken as mandatory for any specific implementation of any of these the apparatuses, devices, systems or methods unless specifically designated as mandatory. For ease of reading and clarity, certain components, modules, or methods may be described solely in connection with a specific figure. Any failure to specifically describe a combination or sub-combination of components should not be understood as an indication that any combination or sub-combination is not possible. Also, for any methods described, regardless of whether the method is described in conjunction with a flow diagram, it should be understood that unless otherwise specified or required by context, any explicit or implicit ordering of steps performed in the execution of a method does not imply that those steps must be performed in the order presented but instead may be performed in a different order or in parallel.

[0017] Referring now to FIGS. **1-6**, one embodiment of a dual density mattress **10** is shown having a base **12** that can incorporate a plurality of foam pillars **14**. The base **12** can include a substantially contiguous bottom layer **25** (see FIG. **5**) that can cooperate with an upper layer **13** (FIG. **5**) to define a plurality of apertures **15**. In the illustrated example the apertures **15** can have a substantially cylindrical shape. The apertures **15** can be sized to accept a plurality of foam pillars **14** such that the foam pillars are seated within the apertures **15**. Referring to FIG. **5**, the foam pillars **14** can be positioned within the apertures **15** such that the apertures **15** are substantially filled by the foam pillars **14**. For example, when the foam pillars **14** are positioned within the apertures **15** a top surface **17** of the upper layer **13** may be substantially contiguous and/or planar with a top surface **18** of the foam pillar **14**. The upper layer **13** and bottom layer **25** can be fused or welded, for example, such that the upper layer **13** and bottom layer **25** are shipped as a single component. Alternatively, the upper layer **13** and bottom layer **25** can be monolithically formed as a unitary, one piece construction. The base **12** can have a first density, where the foam pillars **14** can have a second density, such that a dual density system can be achieved.

[0018] In embodiments incorporating a foam pillar **14** it will be appreciated that the foam pillar can have the shape of a cylinder, hour glass, barrel, square, triangle, square, pentagon, hexagon, heptagon, octagon, nonagon, decagon, cube, cuboid, sphere, cone, hexagonal prism, pyramid base, dissimilar geometries, polygons, or the like. It will be appreciated that any suitable aperture **15** is contemplated having any suitable configuration or position.

[0019] Dual density mattresses **10** in accordance with versions described herein can be made with memory or viscoelastic foam, latex, or urethanes which can create a comfortable bedding surface. The dual density mattresses **10** can incorporate dual density features, such as those described herein, having any suitable configuration.

[0020] Example configurations of the dual density mattress **10** can have aperture **15** height of from about 0.25 inches to about 4 inches, from about 1 inch to about three inches, from about 2 inches to about 5 inches, from about 5 inches to about 12 inches, or any suitable combination thereof. It will be appreciated that the apertures **15** associated with the dual density mattress **10** can vary in size and shape to create, for example, ergonomic configurations.

[0021] The dual density mattress **10** can include foam pillars **14** constructed from any suitable material such as polyurethane foam, polyethylene foam, polyether foam, viscoelastic memory foam, polyester fibers, gel foam, latex foam, other chemistry based technologies, or combinations thereof. Individual pockets can include any suitable foam components having any suitable shape such as cylinder, hour glass, barrel, square, triangle, square, pentagon, hexagon, heptagon, octagon, nonagon, decagon, cube, cuboid, sphere, cone, hexagonal prism, pyramid base, dissimilar geometries, or combinations thereof. It is also contemplated that the cavities can be adjustable, such as with air pressure or temperature, to change the sleep conditions. It is also contemplated that the mattress can normalize or adjust to a pre-programmed user condition, such as a desired temperature, automatically. The foam pillars can be configured from a uniform material, can include different layers of material, can have uniform characteristics, or can have variable characteristics. For example, a foam pillar (not shown) may have a top portion that is formed from a soft breathable material, where a bottom portion of the same foam pillar may be formed from a more rigid foam.

[0022] The dual density mattress **10** can encase the plurality of foam pillars **14**, such as with a sheet or layer of material, or the top surface **18** of the foam pillars **14** can be exposed. The apertures **15** can be sized to partially accept the foam pillars **14**, to accept the foam pillars **14** in a friction fit, to accept the foam pillars such that an air gap (not shown) is present between the pillars and the cavity, or any other suitable arrangement. The foam pillars **14** can be positioned wholly within the apertures **15** of the dual density mattress **10** and can be retained with an adhesive, seal, weld, or can be seated without an attachment feature.

[0023] It will be appreciated that any suitable layer or section of material can retain any suitable component in any suitable fashion to form a topper, mattress, bedding, pad, or the like. In one version, each cavity of the dual density mattress can have a slot into which a component, such as a foam padding component, is inserted to complete the mattress, where different types of components can be used with the same base **12** to provide a desirable configuration.

[0024] Referring to FIG. **1**, the dual density mattress **10** can be divided into a first section **20** and a second section **22**, where the first section **20** can be associated with a first sleeping individual and the second section **22** can be associated with a second sleeping individual. Each of the individuals may have different preferences for bedding comfort, hardness, elasticity, etc. In an example embodiment, the first individual may choose a first type of foam pillar **14** for insertion into the apertures **15** of the first section **20**. The second individuals may select a different type of foam pillar **14** for insertion into the apertures **15** of the second section **22**, where each section **20**, **22** is customizable. In an example embodiment, a base **12** may be standard or universal, where customization of the dual density mattress **10** can be achieved by interchanging desirable foam pillars **14** having any suitable characteristics. In one embodiment, the foam pillars or other components can be removable or replaceable from the dual density mattress **10** such that changes can be made over time based upon user preference.

[0025] It will be appreciated that within a particular section, such as sections **20**, **22**, a user may vary the type and placement of foam pillars **14**, or the like. For example, a user may desire more support near their legs and a softer feel near their head. It is contemplated that the foam pillars **14** can be rated so as to be selectable by a user for different regions. The foam pillars can be colored, marked, or otherwise indicate the characteristics for proper placement by a user.

[0026] Example embodiments described herein can include any suitable feature, component, device, or mechanism wholly or partially retained within a cavity, pocket, pod, enclosure, capsule, or the like. In one embodiment, a user can select from a variety of core, layer, and/or pillar options to obtain the desired characteristics of softness, comfort, rigidity, heat retention, durability, stiffness, elasticity, memory retention, or the like.

[0027] It is contemplated that the dual density mattress **10** may be shipped using a novel method. The plurality of apertures **15** in the dual density mattress may allow for the dual density mattress **10** to be compressed or otherwise packaged to take up very little space. In particular, the spacing of the apertures **15** may allow for the dual density mattress **10** to be easily rolled into a compact shape. The

foam pillars **14**, or other insertable element, can be shipped separately and inserted by the user after unrolling the base **12**, for example. The foam pillars **14** can also be compacted for ease of packaging and/or shipment.

[0028] Referring to FIG. **7**, an alternate embodiment of a dual density mattress **110** is shown. As illustrated, it will be appreciated that any suitable arrangement of cavities or apertures **115** is contemplated to accommodate any suitable number and arrangement of foam components **114**. As illustrated, a base **120** defining the apertures **120** can have an offset height of, for example, from about 0.25 inches to about 0.5 inches relative to the inside foam component **114**. The offset height, or gap between the top of the foam component and the top of the base **120**, can be from about 0.10 inches to about 1 inch, from about 0.25 inches to about 1 inch, or any other suitable distance. The base **120** or support layer can have an uncompressed height of, for example, from about 0.5 inches to about 8 inches. Each foam component **114** or support pillar can have an uncompressed height of, for example, from about 0.5 inches to about 8 inches. In one embodiment, a first diameter of the aperture **115** or cavity can be greater than a second diameter of the inside pillar foam or foam component **114**. The first diameter can be from about ⅛ inch to about 1/16 inch less than the second diameter. The base **120** can have an aperture **115** depth of, for example, from about 3 inches to about 8 inches. The inside pillar or foam component **114** can have a height of from about 2.75 inches to about 3 inches.

[0029] It will be appreciated that any suitable features and characteristics are contemplated. For example, the foam pillars (e.g., **14**) can have a compressed deflection strength of from about 0.5 psi to about 4.6 psi in accordance with ASTM D1056. The foam pillar density can be from about 1 pcf to about 11 pcf in accordance with ASTM D1056. The compression set can be from about 2% to about 3(%) in accordance with ASTM D1056. Any suitable number of zones or sections (e.g., sections **20**, **22**) are contemplated having any number of associated foam pillars, having any suitable shape, etc. Foam pillars or foam components can be formed by any suitable process. Pillars can be converted by water jet or a die cutter system. Pillars can be poured in cavity using a foam processing system.

[0030] In various embodiments disclosed herein, a single component can be replaced by multiple components and multiple components can be replaced by a single component to perform a given function or functions. Except where such substitution would not be operative, such substitution is within the intended scope of the embodiments.

[0031] Some of the figures can include a flow diagram. Although such figures can include a particular logic flow, it can be appreciated that the logic flow merely provides an exemplary implementation of the general functionality. Further, the logic flow does not necessarily have to be executed in the order presented unless otherwise indicated. In addition, the logic flow can be implemented by a hardware element, a software element executed by a computer, a firmware element embedded in hardware, or any combination thereof.

[0032] The foregoing description of embodiments and examples has been presented for purposes of illustration and description. It is not intended to be exhaustive or limiting to the forms described. It will be appreciated that systems and embodiments described herein can be applied to mattresses, mattress cores, toppers, supportive layers, and any layer associated with bedding, bedding materials, padding, padding materials, or the like. Numerous modifications are possible in light of the above teachings. Some of those modifications have been discussed, and others will be understood by those skilled in the art. The embodiments were chosen and described in order to best illustrate principles of various embodiments as are suited to particular uses contemplated. The scope is, of course, not limited to the examples set forth herein, but can be employed in any number of applications and equivalent devices by those of ordinary skill in the art. Rather it is hereby intended the scope of the invention to be defined by the claims appended hereto.

We claim:

1. A dual density mattress comprising:

(a) a base, the base having a first density;

(b) a plurality of cavities, wherein the plurality of cavities are defined by the base;

(c) a plurality of foam pillars, the plurality of foam pillars having a second density different from the first density, wherein the plurality of foam pillars are operably configured to be positioned within the plurality of cavities.

2. The dual density mattress of claim **1**, wherein the plurality of foam pillars are identical.

3. The dual density mattress of claim **1**, wherein the plurality of foam pillars are constructed from different materials.

4. The dual density mattress of claim **1**, wherein the base has a first section with a first set of properties and a second section with a second set of properties, wherein the first set of properties are different from the second set of properties.

5. The dual density mattress of claim **4**, wherein the first section includes foam pillars constructed from a first material and the second section includes foam pillars constructed from a second material, wherein the first material is different from the second material.

6. The dual density mattress of claim **4**, wherein the first section includes foam pillars having a first density and the second section includes foam pillars having a second density, wherein the first density is different from the second density.

7. The dual density mattress of claim **6**, wherein the first section and the second section include foam pillars constructed from the same type of material.

8. The dual density mattress of claim **1**, wherein the each of the plurality of cavities has a substantially cylindrical configuration.

9. The dual density mattress of claim **1**, wherein each of the plurality of foam pillars has a substantially cylindrical configuration.

10. The dual density mattress of claim **1**, wherein each of the plurality of foam pillars is rotatable within each of the plurality of cavities.

11. The dual density mattress of claim **1**, wherein a top of each of the plurality of foam pillars is planar with a top of an upper section of the base.

12. The dual density mattress of claim **1**, wherein the base has an upper section and a lower section.

* * * * *