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MATTRESS WITH QUILTED ZONED TOPPER

The present invention relates to structures and materials and manufacturing
5 methods for quilted bedding products, and particularly for a mattress with a quilted zoned
topper.

Some mattress technologies provide somewhat uniform support using a
combination of inner springs and one or more foam layers provided under a mattress
cover. However, uniform support presents a problem, because the weight distribution of
10 the human body is not at all uniform. In fact, the lumbar region is where approximately 70
percent of the body weight of a sleeper lies. Although weight distribution of a sleeper is,
of course, different from person to person, for a large majority, a sleeper's hips or buttocks
will tend to sink excessively far into such mattresses as the foam layers breakdown from
normal use over time. This problem is exacerbated when the mattress is used by two
15 persons sleeping together.

This deficiency in support will tend to reduce the sleeper's comfort, to a greater or
lesser degree depending on the person. However, a more important effect is that this
deficiency in support may permit a person to sleep in a condition of postural
misalignment. Spinal alignment, in a good sleeping posture, should be the same as that in
20 a good standing posture. Thus a sleeper should be supported so that his or her spine will
be laterally straight, and will be curved with no more (and no less) than normal lumbar and
thoracic arch and pelvic tilt. Distortions of this sleeping posture will produce immediate
or gradual discomfort, and may also lead to backaches, or to vague discomforts which
reduce the sleeper's overall level of health and well-being.

25 The present invention overcomes these and other disadvantages of the prior art by
providing an improved bedding structure, in which added lumbar support is provided
under a quilted zoned topper that is used in making a mattress cover. This innovative
structure provides advantages of better postural support, and/or reduced manufacturing
costs, and/or better in-service durability, and/or extra thermal insulation and padding

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and/or better comfort. This invention provides a method of offering variable support over the surface of a mattress by a simpler and therefore less expensive means.

In one embodiment, a quilted zoned topper is disclosed, and comprises a quilted panel having a ticking material, a backing material, and a support material having a degree
5 of compression provided between the ticking and backing materials. The ticking material, the support material and the backing material all are quilted together by a stitching pattern providing an increased amount of stitching in a center section of the quilted panel than adjacent head and foot sections of the quilted panel such that the support material pre-compresses in the center section thereby defining a pocket. A memory foam is provided
10 in the pocket.

In another embodiment, a mattress is disclosed. The mattress comprises an innerspring assembly having a plurality of spring elements and defining a support surface, at least one convoluted foam layer positioned over the support surface of the innerspring assembly, and a memory foam layer positioned over the convoluted foam layer opposite to
15 the support surface. The memory foam layer has a density greater than the convoluted foam layer. The mattress further comprises a quilted panel having a ticking material, a backing material, and a support material having a degree of compression provided between the ticking and backing materials. The ticking material, the support material and the backing material all are quilted together by a stitching pattern providing an increased
20 amount of stitching in a center section of the quilted panel than adjacent head and foot sections of the quilted panel such that the support material pre-compresses in the center section thereby defining a pocket. The quilted panel is provided over the convoluted and memory foam layers such that the memory foam layer is provided in the pocket.

These and other aspects of the invention are described herein in particularized detail
25 with reference to the accompanying Figures, wherein like reference numerals refer to like parts.

FIG. 1 is a top view schematically showing shape and typical dimensions of a mattress with a quilted zoned topper according to the present invention; and

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FIG. 2 is a sectional view of the mattress of FIG. 1 taken along section line 2-2 showing the construction of the quilted zone topper.

The numerous innovative teachings of the present application will be described with particular reference to the presently preferred embodiment. However, it should be understood that this class of embodiments provides only a few examples of the many advantageous uses of the innovative teachings herein. In general, statements made in the specification of the present application do not necessarily delimit any of the various claimed inventions. Moreover, some statements may apply to some inventive features but not to others.

FIG. 1 is a top view schematically showing shape and typical dimensions of a mattress **10** with a mattress quilt panel **12** having a stitching pattern **13** according to the present invention. As shown, the stitching pattern **13** provides a center section **14** of the quilt panel **12** that has at least 2 times the amount of pattern stitching **16** than adjacent head and foot sections **18, 20**. In one embodiment, the center section **14** represents approximately 1/3 of the mattress **10**. In other embodiment, the center section **14** may range in size from about 1/4 to about 1/2 of the mattress. In other words, the center section **14** can range in size from about 1/4 to about 1/2 of the total area of the quilt panel **12** in top view. In the illustrated embodiment, the pattern stitching **16** is provided in a star pattern (e.g., 2.85" x 2.85") with a six inch jump between patterns, but in other embodiments may be any other pattern, such as for example, a circle pattern (e.g., 1.6" x 1.6"), a swoop pattern (e.g., 3" x 2"), with other jumps ranging from 3 to 9 inches depending on desired comfort. In still other embodiments, the pattern stitching **16** may be a ribbon pattern (e.g., 6" x 3"), a 213 pattern (e.g., 6" x 3"), or a 301 pattern (e.g., 12" x 6", or 6" x 3"). It is to be appreciated that a smaller jump spacing will tend to provide firmer support, and wider spacings will provide a softer, more plush surface. The overall dimensions of the mattress **10** may be any standard mattress size, e.g., Twin, Full, Queen, King, and California King.

With reference to the FIG. 2, the mattress **10** is shown in cross-section. The quilt panel **12** is formed from a sheet of upholstery ticking **22** stitched to a backing layer **24** along with a support material **26**, such as a relatively thin and less dense foam or fill layer

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provided therebetween. To stitch the quilt panel, the materials **22**, **24**, and **26** are fed into a conventional quilting machine, such as for example, a GI-4300-WCS class III computer driven double lock chain stitch quilter, made by Gribetz International, Inc., Sunrise, Fla. In one embodiment, the stitching is a top thread, such as for example, a 3-ply, 150 denier polyester, 475 total denier, and a bottom thread, such as a 2-ply, 150 denier polyester, 340 total denier, stitched with a needle having a #24 gauge with a stitch size of 6-9 per inch. In other embodiments, other thread types, gauges, and stitch sizes may be used. In one embodiment, the ticking **22** may be 100-150 end Damask, and the backing layer **24** a non-woven fabric, e.g. Accord™ or Vantex™ of 0.5 to 1.5 ounce weight, and combinations thereof. In one embodiment, support material **26** is a polymer foam or fill layer, and in other embodiments may be any foam or fill layer that compresses when stitched to provide the quilted zoned pattern according to the present invention. Once the quilting has been done, the resulting quilted material is fed into a panel cutting machine, such as the OCS-90, by Gribetz, where panels of appropriate lengths (widths of finished products) are cut. The resulting quilt panels **12** may then be used in the manufacture of mattresses, such as for example, innerspring mattresses.

As shown in FIG. 2, stitching the quilt panel **12** in the stitching pattern **13** results in the center section **14** having a narrower cross section than the head and foot sections **18**, **20** with the same quilt fill provided by foam or fill layer **26**. It is to be appreciated that providing the center section **14** of the quilt panel **12** with at least 2 times the amount of pattern stitching **16** then in the adjacent head and foot sections **18**, **20**, the support material **26** is pre-compressed in the center section **14** to a greater degree than in the adjacent sections **18**, **20**, thereby forming a pocket **28**. Within this formed pocket **28**, directly adjacent and under the center section **14** of the quilt panel **12**, a high density foam layer **30** is provided. The high density foam layer **30** is sized and shaped to fill the pocket **28** in order to make the upholstery ticking **22** in the center section **14** the same level in height as in the head and foot sections **18**, **20** to provide a level sleep surface.

As shown in FIG. 1, the high density foam layer **30**, indicated in dashed lines, extends across the entire width of the mattress **10**. In one embodiment, the high density foam layer **30** is a memory foam (i.e., polyurethane foam) with a density in the

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approximate range of 1.8 to 4.0 pounds per cubic foot, and in one preferred embodiment, 3 pounds per cubic foot. In one embodiment, the high density foam layer **30** has an indentation load deflection ILD rating greater than 60. In one embodiment, the high density foam layer **30** has a thickness ranging from ½ inch to 1 inch, and in one preferred
5 embodiment, a thickness of ¾ inch, whereby the quilt panel **12** has an uncompressed overall thickness of an inch.

Turning back to FIG. 2, in the illustrated embodiment, the head and foot sections **18, 20** of the quilt panel **12** and the high density foam layer **30** overlay and are in contact with a convoluted foam layer **32**. In one embodiment, the high density foam layer **30** is
10 glued to either the backing layer **24**, the convoluted foam layer **32**, or both. The convoluted foam layer **32** may have convolutions that are generally dome shaped and have the approximate dimensions of 1" diameter base and 1/2" height, though other configurations and dimensions may be suitably employed. For example, a ripple pattern, or another self-complementary pattern, or a pair of different but complementary patterns,
15 could alternatively be used instead of the illustrated egg-crate pattern. In one embodiment, the maximum thickness of the convoluted foam layer **32** is greater than the thickness of the high density foam layer **30**. In one embodiment, the convoluted foam layer **32** has a base thickness of ½ inch, and an overall height of 1 ½ inches. In one embodiment, the convoluted foam later is an open-cell polyurethane foam of about 1 pound per cubic foot
20 bulk density, and with an ILD rating of about 30. In other embodiments, the convoluted foam layer **32** has a density and ILD rating less than the high density foam layer **30**.

In the illustrated embodiment, a non-woven fabric **34** may be applied to under the convoluted foam layer **32** and secured to a flange **36**. The flange **36** at one end is stitched to binding tape or piping **38** at the edges of the mattress **10** and at the other is tied to spring
25 elements **40** of an innerspring assembly **42** at the perimeter by hog rings **44** or other means. The innerspring assembly **42** includes a plurality of spring elements **40** held in an array by interconnection with crosswires **46** and at their terminal ends by lacing wires **48**. The terminal ends of the spring elements **40** as well as the crosswires **46** are held in a common plane which defines opposed top and bottom supporting surfaces of the

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innerspring assembly **42** over which the quilt panel **12**, the high density foam layer **30**, the convoluted foam layer **32**, and the non-woven fabric **34** are provided.

Although the quilt panel **12**, the high density foam layer **30**, and the convoluted foam layer **32** are provided to both top and bottom sides of the mattress **10**, in other
5 embodiments, such materials may be provided to only one side of the mattress **10**.
Furthermore, although the mattress **10** is depicted in FIG. 2 as generally symmetrical or identical sequences of layers of material over the innerspring assembly **42**, it is understood that other arrangements and sequences of materials, including non-identical or non-symmetrical layers of material relative to the opposed sides of the mattress could be
10 employed within the scope of the invention. Moreover, additional supporting surfaces, for example, woven, non-woven, and foam layers may be provided in and around the innerspring assembly **42** in still other embodiments.

By this arrangement, the quilt panel **12** and the high density foam layer **30** together form a quilted zoned topper **50** according to the present invention. The quilted zoned
15 topper **50** provides a center section **14** which is of substantially greater density than the other compressible layers of material in the mattress **10**, and being provided in a pocket **28** provides a level support height to the mattress **10**. It is to be appreciated that although the quilted zoned topper **50** has been shown as a non-removable covering to an innerspring assembly, in other embodiments the quilted zoned topper **50** may be fitted to lay atop a
20 mattress, or in still another embodiment may have an elasticized skirt to hold it removably in place over an existing mattress.

As will be recognized by those skilled in the art, the innovative concepts described in the present application can be modified and varied over a tremendous range of applications, and accordingly the scope of patented subject matter is not limited by any of
25 the specific exemplary teachings given.

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CLAIMS

1. A quilted zoned topper comprising:

a quilted panel having a ticking material, a backing material, and a support material having a degree of compression provided between the ticking and backing materials, the ticking material, the support material and the backing material all being quilted together by a stitching pattern providing an increased amount of stitching in a center section of the quilted panel than adjacent head and foot sections of the quilted panel such that the support material pre-compresses in the center section thereby defining a pocket; and

a memory foam provided in the pocket.
2. The quilted zoned topper of claim 1, wherein the ticking material comprises an upholstery ticking.
3. The quilted zoned topper of claim 1, wherein the backing material comprises a non-woven fabric.
4. The quilted zoned topper of claim 1, wherein the support material comprises a polymer foam or fill layer.
5. The quilted zoned topper of claim 1, wherein the center section ranges in size from about 1/4 to about 1/2 of the total area of the quilted zoned topper.
6. The quilted zoned topper of claim 1, wherein the stitching pattern is selected from a star pattern, a circle pattern, a swoop pattern, a ribbon pattern, a 213 pattern, and a 301 pattern.
7. The quilted zoned topper of claim 1, wherein the memory foam is a polyurethane foam with a bulk density ranging from about 1.8 to about 4.0 pounds per cubic foot.

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8. The quilted zoned topper of claim 1, wherein the memory foam has a thickness ranging from ½ inch to 1 inch.
9. The quilted zoned topper of claim 1, further comprising an elasticized skirt of material which is attached to the periphery of the topper.
- 5 10. A mattress comprising the quilted zoned topper of claim 1.
11. A mattress comprising:
- an innerspring assembly having a plurality of spring elements and defining a support surface;
- at least one convoluted foam layer positioned over the support surface of
- 10 the innerspring assembly and having a first density, and
- a memory foam layer positioned over the convoluted foam layer opposite to the support surface, the memory foam layer having a density greater than the convoluted foam layer, and
- a quilted panel having a ticking material, a backing material, and a support
- 15 material having a degree of compression provided between the ticking and backing materials, the ticking material, the support material and the backing material all being quilted together by a stitching pattern providing an increased amount of stitching in a center section of the quilted panel than adjacent head and foot sections of the quilted panel such that the support material pre-compresses in the center section thereby defining a
- 20 pocket, wherein the quilted panel is provided over the convoluted and memory foam layers such that the memory foam layer is provided in the pocket.
12. The mattress of claim 11, wherein the convoluted foam layer has a bulk density of about 1 pound per cubic foot.

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13. The mattress of claim 11, wherein the ticking material comprises an upholstery ticking.
14. The mattress of claim 11, wherein the backing material comprises a non-woven fabric.
- 5 15. The mattress of claim 11, wherein the support material comprises a polymer foam or fill layer.
16. The mattress of claim 11, wherein the center section ranges in size from about 1/4 to about 1/2 of the total area of the mattress.
17. The mattress of claim 11, wherein the stitching pattern is selected from a star
10 pattern, a circle pattern, a swoop pattern, a ribbon pattern, a 213 pattern, and a 301 pattern.
18. The mattress of claim 11, wherein the memory foam layer is a polyurethane foam with a bulk density ranging from about 2.6 to about 4.0 pounds per cubic foot.
19. The mattress of claim 11, wherein the memory foam layer has a thickness ranging from 1/2 inch to 1 inch.
- 15 20. The mattress of claim 11, wherein the convoluted foam layer has an egg-carton pattern.