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(54) **MATTRESS ASSEMBLY WITH CONVERTIBLE TOPPER**

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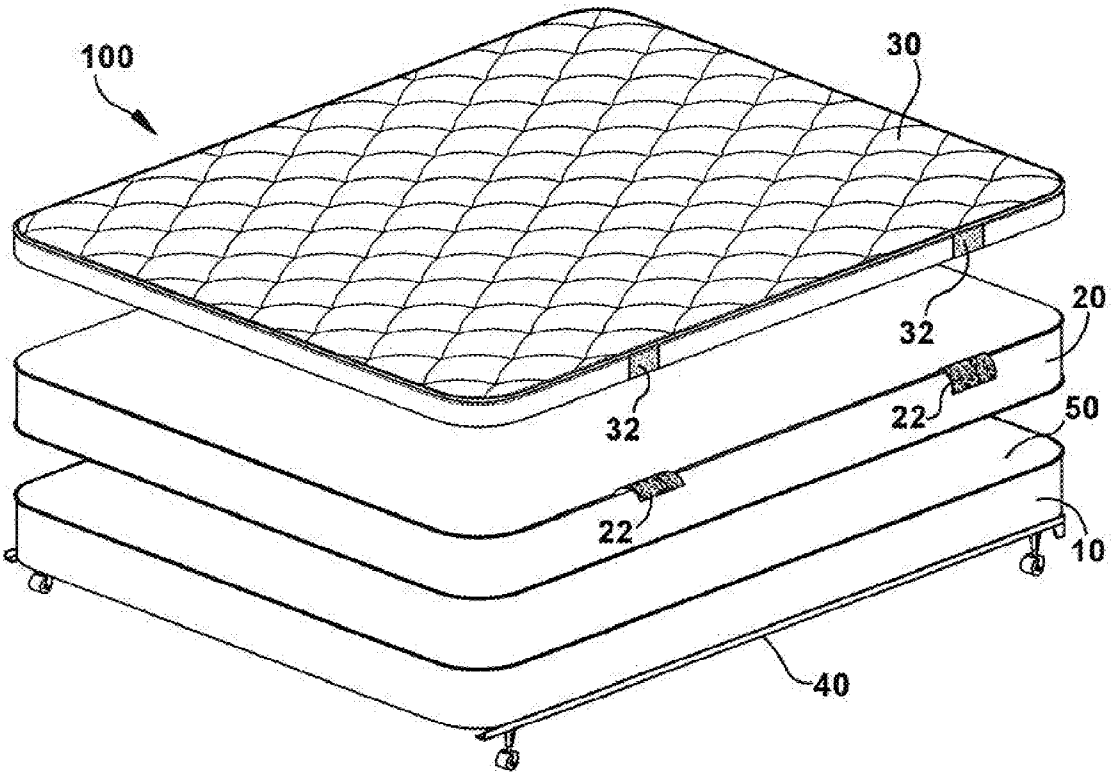
(57) **ABSTRACT**

A convertible mattress including a foundation unit, a support unit and a comfort unit. The foundation unit includes several spring elements that provide flexible support for an overlying grid which defines the foundation surface. The foundation unit may be supported by a bed frame which may further include side boards, a head board and foot board. The comfort unit, or innerspring, is located atop the foundation unit and contains several interconnected spring coils or a foam core structure. The top and bottom surface of the comfort unit contain minimal covering to provide a smooth surface over the ends of the coils of the innerspring. The comfort unit is located atop the support unit and has a generally horizontal top and bottom and generally vertical sides extending between the top and bottom that defines a central space containing support and cushioning components such as foam. A series of Velcro™ straps are attached to the perimeter of the support unit that connect to Velcro™ target straps located along the perimeter of the comfort unit. The straps secure the comfort unit to the support unit and enable quick and easy removal and replacement of the comfort unit. Different comfort units may contain different materials that have varying support characteristics. The comfort unit can be either one- or two-sided.



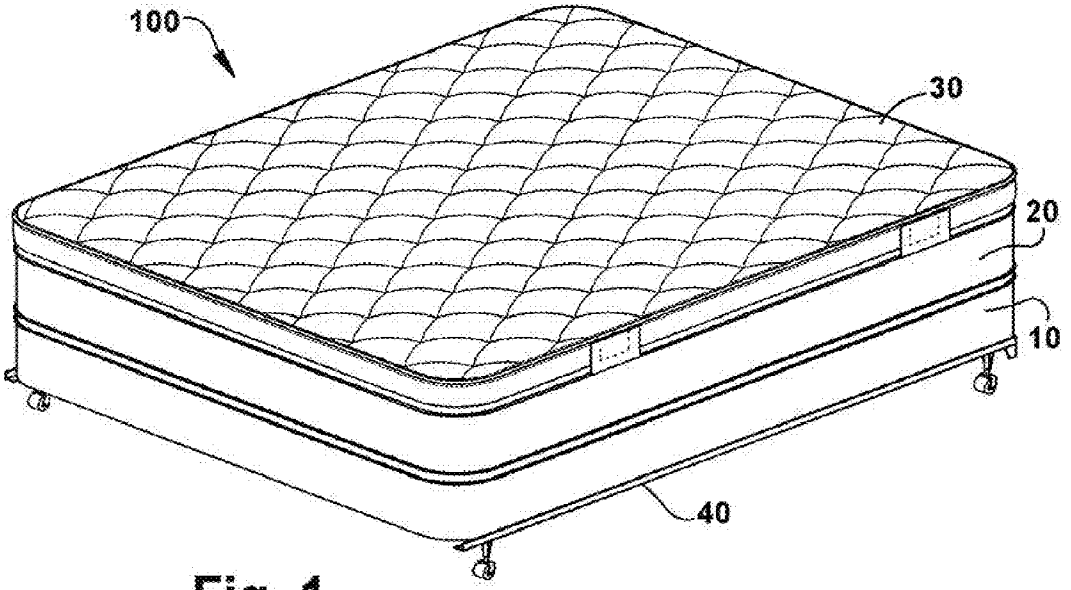


Fig. 1

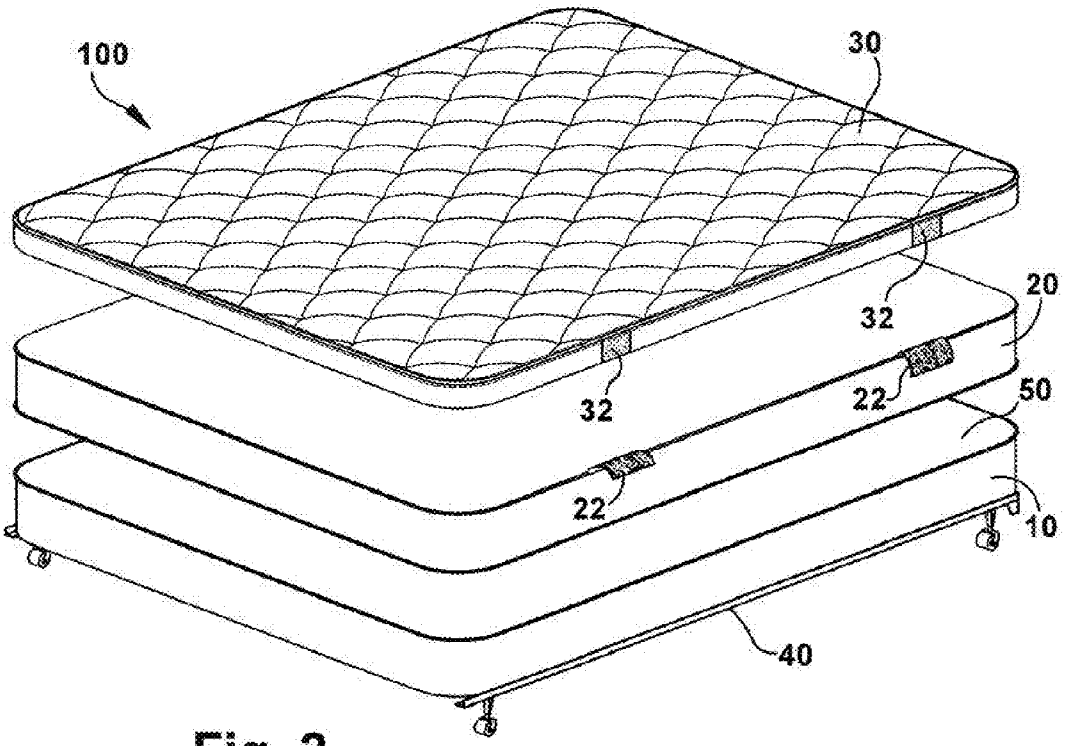


Fig. 2

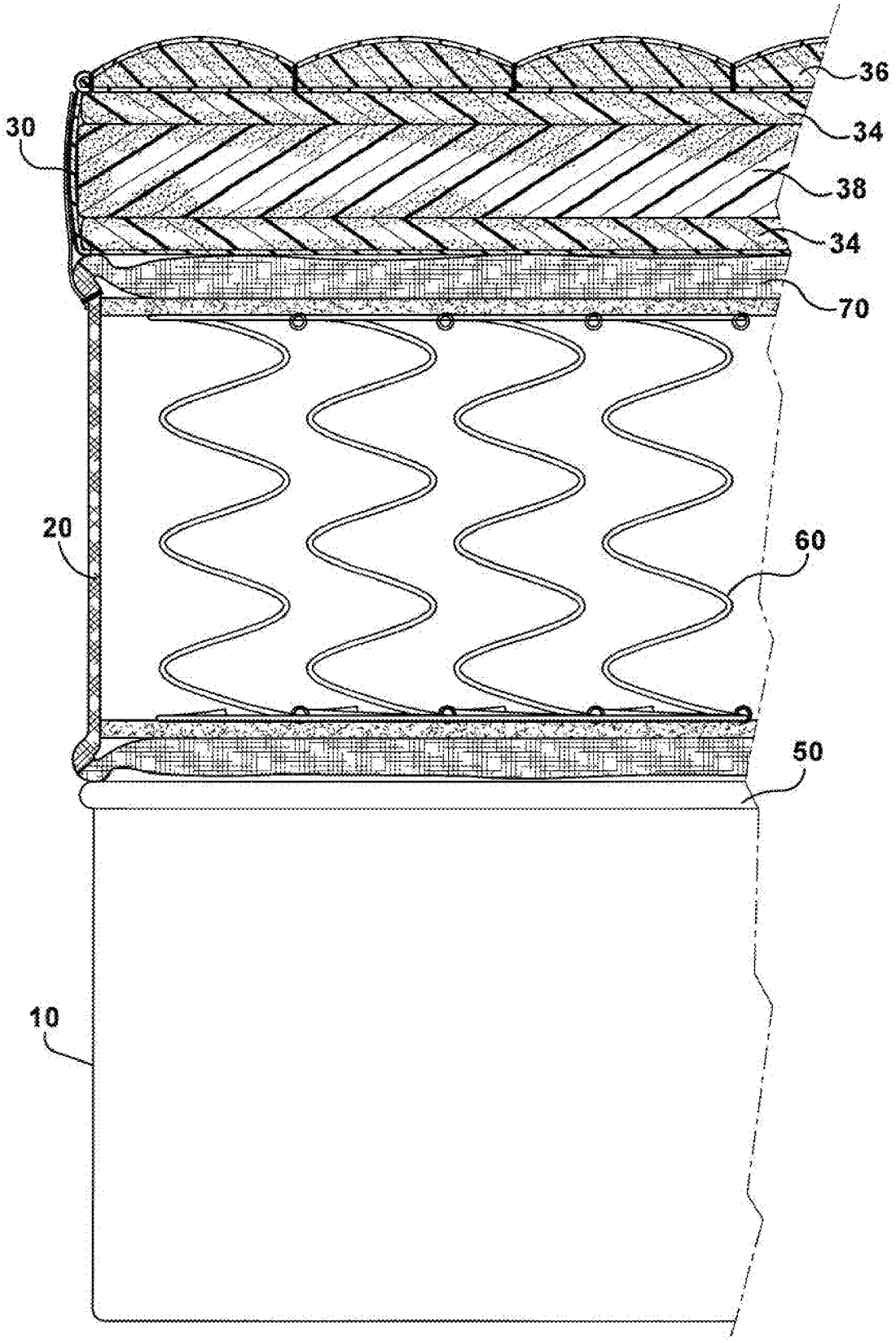


Fig. 3

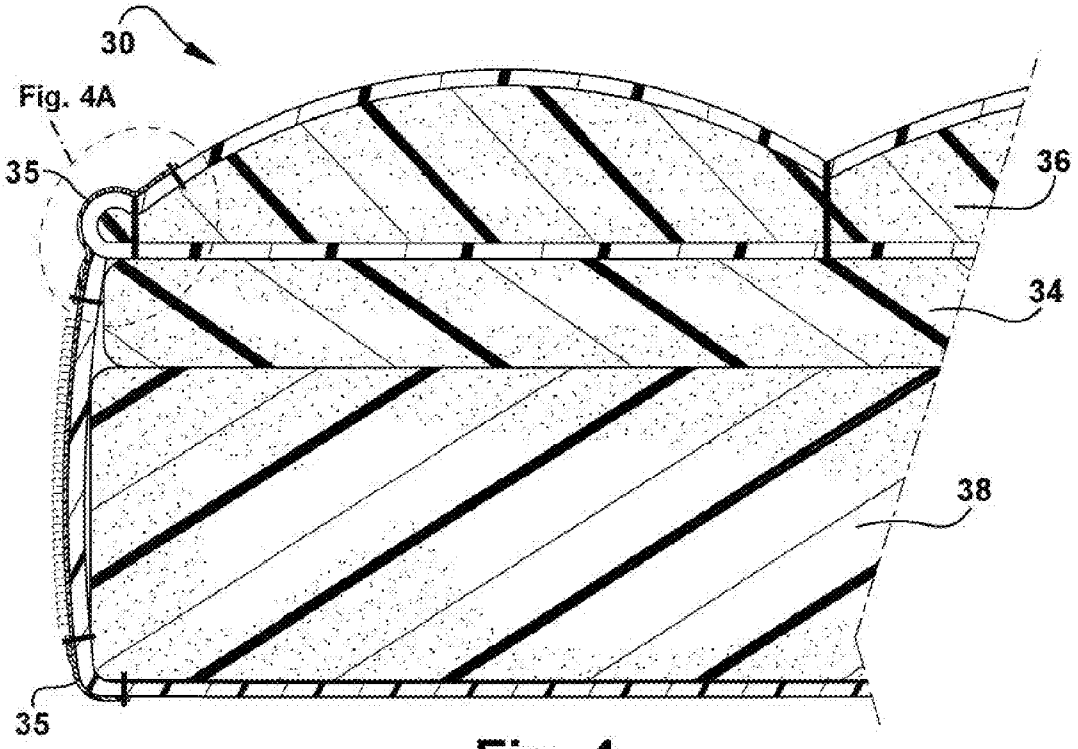


Fig. 4

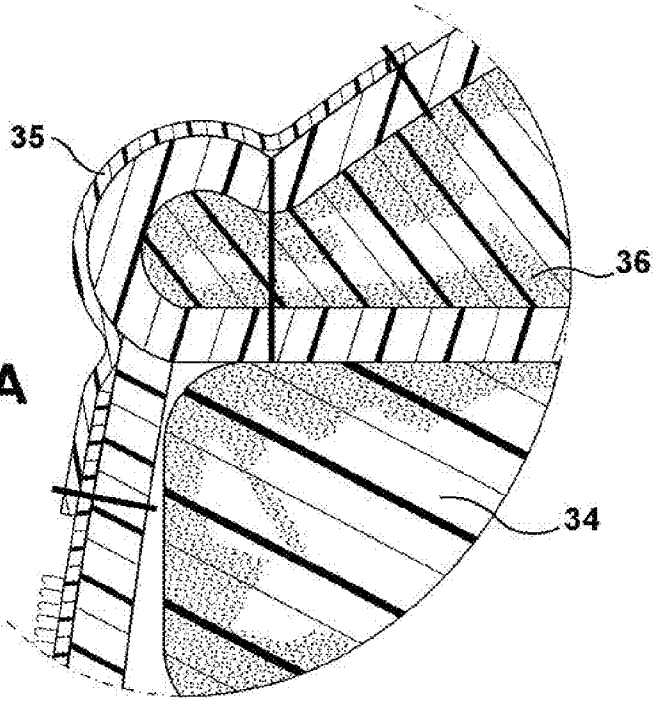


Fig. 4A

MATTRESS ASSEMBLY WITH CONVERTIBLE TOPPER

RELATED APPLICATIONS

[0001] There are no applications related to this application.

FIELD OF THE INVENTION

[0002] The present invention pertains generally to support structures for sleeping, and more specifically to adaptable support structures that can be easily replaced with alternate upper support layers containing different insert materials with varying support characteristics.

BACKGROUND OF THE INVENTION

[0003] Devices for supporting the human body while sleeping have evolved generally from pads, to pads in combination with or supported by springs such as the common mattress, and further in combination with stiffer springs such as in mattress foundations or box springs. In a conventional mattress, springs or coils are interconnected in a matrix array, and covered on each side with layers of padding and fabric. Much of the innovation in mattresses and box springs is in the area of spring design, seeking configurations which provide optimal support of the body, in combination with the padding layers. There are certain design constraints on mattress innersprings, such as the gauge of wire of the coils, the diameter, height, and number of coils in the array.

[0004] There is greater design flexibility in the material layers which cover the springs, particularly in the foam layers. The upper layers or "toppers" are conventionally made up of one or more layers of non-woven insulation material over the terminal ends of the coils, one or more layers of polymer foam, and a padded upholstery material or "tick" layer.

[0005] In recent years, a significant portion of the additional mattress padding has been placed in the so-called pillowtop, i.e., an enclosed panel containing multiple layers of various foams and fiber batting which is sewn or otherwise fixedly attached to both sides of the mattress innerspring. See for example, U.S. Pat. No. 5,787,532. For permanent attachment to the mattress innerspring upholstery, in one type of construction a gusset is formed to extend from the underside of the pillowtop, which is sewn to a mating gusset of the mattress upholstery material, along a tape edge of the pillowtop. Placing most of the comfort forming material (specifically, the fibrous materials) in a permanently attached pillowtop is made increasingly difficult by greater numbers of layers of material, and by the sheer size and weight of the mattress. The approach also necessitates that equal numbers of compressible material layers be included on both sides of the innerspring, adding significantly to the cost of the mattress.

[0006] A large number of layers of material in the pillowtop, including high density foam, natural and man made fiber batts, in combination with other padded or quilted upholstery, has made pillowtops very bulky and rounded at the edges. High bulk material layers, such as thick layers of high density foam, directly affect the height of the mattress, and the total height when combined with a foundation and bed frame. As a result, a pillowtop border section is used, requiring two tape edge perimeters to be sewn on each side of the pillowtop. It is a difficult assembly to sew together around the periphery with a tape edge, requiring expert operation of a large sewing machine mounted at an oblique angle to the mattress. The sewing head must of course traverse the entire perimeter of the mattress. In the case of mattresses with bordered pillowtops, this sewing process is required four to six times, to create two tape seams for each pillowtop (both sides) and two tape seams for both sides of the mattress.

SUMMARY OF THE INVENTION

[0007] The present invention provides a sleep system including a foundation unit, a support unit or innerspring and a convertible topper. The foundation unit may be of conventional design and construction and contain flexible grid over the top surface of the foundation unit or may be constructed entirely of wood. The support unit or innerspring sits atop the foundation unit and provides support for the sleep surface of the mattress. It may contain the conventional interconnected spring coil array or may contain a high performance high support factor foam core structure. The comfort unit sits atop the support unit and may contain a variety of support and cushioning materials. Attachment means are installed on the sides of the support unit that attach to corresponding attachment means installed at the left and right sides of the comfort unit. The attachment means prevent lateral or sliding motion of the comfort unit relative to the support unit.

DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1** is a perspective view of the sleep system of the present invention.

[0009] FIG. **2** is a perspective view of the sleep system of FIG. **1** illustrating the removable comfort unit.

[0010] FIG. **3** is a cross-sectional view of the sleep system of FIG. **1**.

[0011] FIG. **4** is a cross-sectional view of one embodiment of the comfort unit.

[0012] FIG. **4**A is a perspective view of the tape edge of the comfort unit of FIG. **4**.

DETAILED DESCRIPTION OF PREFERRED AND ALTERNATE EMBODIMENTS

[0013] FIG. **1** shows a mattress assembly with convertible topper sleep system of the present invention **100**, which includes a foundation unit **10**, a support unit or innerspring **20**, and a comfort unit or pillowtop **30**. The foundation unit **10** can be of conventional internal design and construction, having a rectangular frame on which are mounted a plurality of spring elements or modules (not shown) to provide flexible support for an overlying grid (not shown) which defines the foundation surface **50**. The spring module may be formed of wire or made of composite material. Alternatively, the foundation unit **10** can be made entirely of wooden materials. This design eliminates metal-to-metal contact, thus reducing noise and also provides a stronger, more durable bed foundation. The wooden foundation unit also provides high sway resistance and prevents uncomfortable sinking and sagging where weight is concentrated. The wooden unit also ensures longer life, making such foundation appropriate for high-traffic hospitality environments. Foundation units **10** are typically supported by a bed frame **40** which may further include side boards, a head board and foot board (not shown).

[0014] The support unit **20** is dimensioned to fit upon the foundation surface **50** and be fully supported thereby. The support unit or innerspring **20** may be of conventional design, containing a plurality of interconnected spring coils **60**. The support unit **20** may alternatively be a high performance foam core structure without any internal wire or spring elements.

The support surface **70** has relatively few layers of material which cover the innerspring **20**, such as one or two more layers of mat or foam or other sheet-like fabric or non-woven material. The primary purpose of layers is to provide a smooth surface over the ends of the coils of the innerspring **20**.

[0015] The comfort unit **30** or pillowtop is dimensioned to fit upon the support unit **20**. It has a generally horizontal top and bottom and generally vertical sides extending between the top and bottom to define a central space containing supporting and cushioning components. The comfort unit contains the majority of compressible, conformable internal layers of materials in the sleep system. As shown in FIG. **3**, the comfort unit may contain one or more foam core layers **38**, and intermediate **34** and outer layers **36** made of matted material, synthetic or organic, such as cotton or wool fibers, polyester, or hybrid material mats. Extra material layers may also be used, such as woven cotton, wool or synthetic cloth or hybrids thereof, or sheet materials such as plastic films, solid or perforated, which may serve as moisture barriers, aeration promoters, liners or flame or heat retardants. The feel of the comfort unit may be adjusted by using different insert materials such as polyurethane foams, visco-elastic foams, latex foams, innersprings, fibers, gels or various combinations thereof.

[0016] The comfort unit **30** is releasably attached to the support unit **20** via a suitable attachment device. In a preferred embodiment, the comfort unit **30** is attached to the support unit **20** by Velcro™ hook tabs **22** attached to the upper edge or perimeter of the left and right sides of the support unit **20** and preferably sewn into and integrally attached to the tape edge **35**, which extend upward and attach to Velcro™ loop tabs **32** located on the left and right sides of the comfort unit **30**. Attaching the Velcro™ hook tabs **22** to the support unit **20** beneath the tape edge **35**, as shown in FIG. **4**A, strengthens the attachment of the Velcro™ hook tabs **22** to the comfort unit **22** but also saves time in the manufacture of the mattress as the attachment of the Velcro™ hook tab can be attached at the same time, using the same equipment, as the tape edge **35**. The Velcro™ hook **22** and loop tabs **32** prevent lateral or sliding motion of the comfort unit **30** relative to the support unit **20**. There are four attachment positions placed on the support unit **20** of a king, queen, full or twin size bed. Two attachment devices are located on the left side of the upper perimeter of the support unit **20** and two attachment devices are placed on the right side of the upper perimeter support unit **20**, as shown in FIG. **2**. In a preferred embodiment, the Velcro™ loop tabs **32** attached to the sides of the comfort unit are approximately 4.5 inches long. The Velcro™ hook tabs **22** are typically attached to the top edge of the support unit **20** and are preferably sewn into the tape edge **35** as shown in detail in FIG. **4**A, whereby they are integrally attached to the tape edge **35**. The Velcro™ loop tabs **32** are preferably sewn into the comfort unit **30** at the upper and lower edge of the Velcro™ loop tabs **32**. Both the Velcro™ hook **22** and loop **32** tabs are attached to the respective unit at approximately 15 inches inward from the head or foot of the unit. The Velcro™ hook tabs **22** are wider than the Velcro™ loop tabs **32** so that the comfort unit **30** does not have to be placed in an exact position with respect to the support unit **20** in order for attachment of the comfort unit to the support unit. To attach a comfort unit **30** to a support unit **20**, the Velcro™ hook tabs **22** located at the sides of the support unit **20** must be lifted upward and placed atop the corresponding Velcro™ loop tabs **32** located at the sides of the comfort unit **30**. Similarly, to detach a comfort unit **30** from a support unit **20**, the Velcro™ hook tabs **22** can be peeled away from the corresponding Velcro™ loop tabs **32**. This allows for easy removal of the comfort unit **20** for flipping, fluffing or replacement. Once the attachments are released, the comfort unit **20** may be rolled away from the support unit **30** in any manner or direction or it may be removed by sliding lateral displacement. In alternate embodiments, the comfort unit **20** may be attached to the support unit **30** via buttons, snaps, or any other suitable, easily releasable means.

[0017] In a preferred embodiment, as shown in FIG. **4**, the comfort unit is one-sided. A one-sided comfort unit requires fewer layers of materials since the materials do not have to be duplicated in a symmetrical manner within the unit. This embodiment necessarily contains a slimmer profile than the two-sided comfort unit embodiment. The unit may be removed and fluffed back into original shape or it can be removed and replaced with an alternate comfort unit.

[0018] All of the layers of the comfort unit **30** are encapsulated in woven upholstery which may have a backing layer and be sewn with stitches in a quilted pattern. The panels of upholstery are joined at the edges of the comfort unit by tape edge **35**.

[0019] The ease of replacement and the wide variety of different types of internal layers which can be used in the comfort unit **30** make the sleep system highly versatile. The entire feel and function of the sleep system **100** can be altered by simply and easily exchanging the comfort unit with a different comfort unit having significantly different support and functional characteristics.

[0020] The foregoing embodiments of the present invention have been presented for the purposes of illustration and description. These descriptions and embodiments are not intended to be exhaustive or to limit the invention to the precise form disclosed, and obviously many modifications and variations are possible in light of the above disclosure. The embodiments were chosen and described in order to best explain the principle of the invention and its practical applications to thereby enable others skilled in the art to best utilize the invention in its various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the invention be defined by the following claims.

1. A convertible mattress comprising:

a foundation unit supported by a rectangular frame;

a support unit that sits atop the foundation unit having substantially the same shape, length and width dimensions as the foundation unit and having a tape edge located around an upper perimeter of the support unit;

a comfort unit that sits atop the support unit having substantially the same shape, length and width dimensions as the support and foundation units and having a generally horizontal top and bottom and generally vertical sides extending between the top and bottom that define a central space;

at least four attachment devices integrally attached to the tape edge and located around the upper perimeter of the support unit which extend upward and outward; and

at least four attachment devices attached at an upper edge and a lower edge to the perimeter of the comfort unit that join with the at least four attachment devices integrally attached to the tape edge located around the perimeter of the support unit to secure the comfort unit to the support unit.

2. The convertible mattress of claim **1**, wherein the support unit includes an innerspring made of a plurality of interconnected spring coils.

3. The convertible mattress of claim **1**, wherein the support unit includes a foam core structure.

4. The convertible mattress of claim **1**, wherein the comfort unit contains at least two layers of compressible, conformable material.

5. The convertible mattress of claim **1**, wherein the comfort unit contains at least one foam core layer.

6. The convertible mattress of claim **1**, wherein the comfort unit contains at least one layer selected from the group of moisture barriers, aeration promoters, and flame retardants.

7. The convertible mattress of claim **1**, wherein there the foundation unit is made of wood.

8. The convertible mattress of claim **1**, wherein the at least four attachment devices attached below the tape edge located around the upper perimeter of the support unit are Velcro™ hook tabs and the at least four attachment devices attached at an upper edge and a lower edge to the perimeter of the comfort unit are Velcro™ loop tabs.

9. The convertible mattress of claim **1**, wherein the at least four attachment devices attached below the tape edge located around the upper perimeter of the support unit are wider than the at least four attachment devices attached at an upper edge and a lower edge to the perimeter of the comfort unit.

10. A convertible mattress comprising:

a foundation unit having a rectangular frame on which are mounted a plurality of spring elements and an overlying grid that defines the surface foundation;

a support unit having a rectangular frame that sits atop the foundation unit having substantially the same length and width dimensions as the foundation unit that provides support for a sleeping surface;

a comfort unit having a rectangular frame that sits atop the support unit having substantially the same length and width dimensions as the support and foundation units and having a generally horizontal top and bottom and generally vertical sides extending between the top and bottom that define a central space;

at least four Velcro™ hook tabs integrally attached to the tape edge to the upper perimeter of the support unit which extends upward and outward; and

at least four Velcro™ loop tabs attached at an upper edge and a lower edge to the perimeter of the comfort unit that join with the at least four attachment devices integrally attached to the tape edge to the upper perimeter of the support unit to secure the comfort unit to the support unit.

11. The convertible mattress of claim **10**, wherein the support unit includes an innerspring made of a plurality of interconnected spring coils.

12. The convertible mattress of claim **10**, wherein the support unit includes a foam core structure.

13. The convertible mattress of claim **10**, wherein the comfort unit contains at least two layers of compressible, conformable material.

14. The convertible mattress of claim **10**, wherein the comfort unit contains at least one foam core layer.

15. The convertible mattress of claim **10**, wherein the comfort unit contains at least one layer selected from the group of: moisture barriers, aeration promoters, and flame retardants.

16. The convertible mattress of claim **10**, wherein the comfort unit is encapsulated in woven upholstery.

17. The convertible mattress of claim **10**, wherein the comfort unit contains at least one layer of material selected from the group of: woven cotton, polyester, wool, and synthetic cloth.

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