



US 20170340133A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0340133 A1**
(43) **Pub. Date:** **Nov. 30, 2017**(54) **PASSIVE MATTRESS ENCASEMENT**(71) Applicant: **LEVITATION SCIENCES LLC**,
Chicago, IL (US)(72) Inventor: **William John Scarleski**, Chicago, IL
(US)(21) Appl. No.: **15/428,305**(22) Filed: **Feb. 9, 2017****Related U.S. Application Data**(63) Continuation-in-part of application No. 14/046,113,
filed on Oct. 4, 2013.**Publication Classification**(51) **Int. Cl.**
A47C 31/10 (2006.01)(52) **U.S. Cl.**
CPC **A47C 31/105** (2013.01)(57) **ABSTRACT**

A passive mattress encasement is disclosed which can be relatively easily installed or removed over a mattress supported by a foundation. The encasement is formed to encapsulate a mattress and includes a top panel, a bottom panel and multiple side panels. One or more of the side panels are zippered together. The unzipped side panels, i.e., the panels without zippers, fixedly connect the top panel to the bottom panel. The top and bottom panels as well as the side panels may be made from conventional materials. The underside of the top panel and optionally the inside of the side panels may be coated with a waterproof coating, such as thermoplastic polyurethane (TPU/PU), silicone, or urethane to form a waterproof membrane. In accordance with an important aspect of the invention, the bottom panel is formed with a slick interior surface and a non-slick exterior surface. The exterior non-slick surface allows a mattress to be rotated without affecting an optional underlying bed skirt while the slick interior surface facilitates rotation of the mattress. The present invention also facilitates easy installation and removal of the encasement over a mattress. Optional straps may be provided, fixedly attached to the encasement. The straps allow the encasement to be snugged against the mattress to enable the encasement to be used with a relatively wide range of mattress depths perimeter lengths and still provide a snug fit.

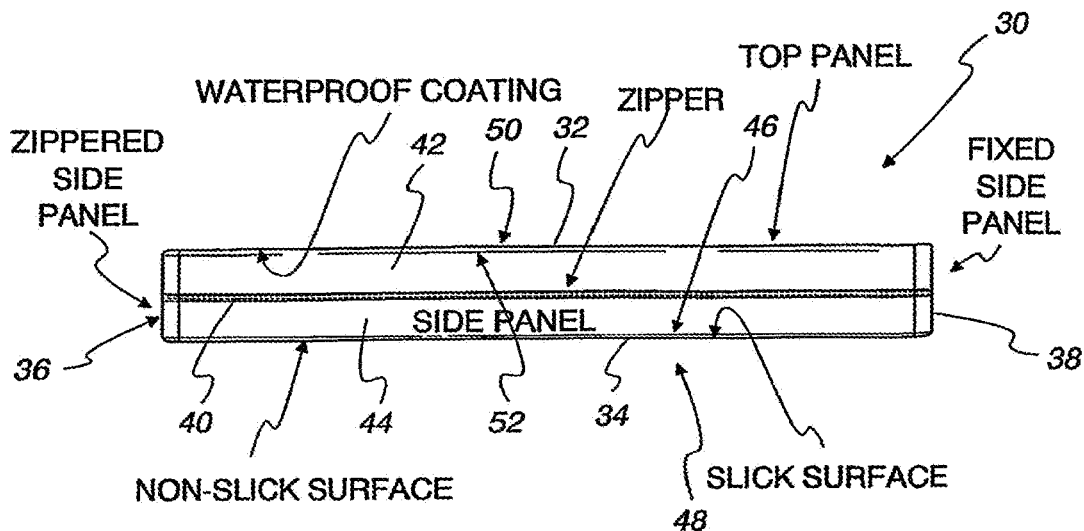


Fig. 1

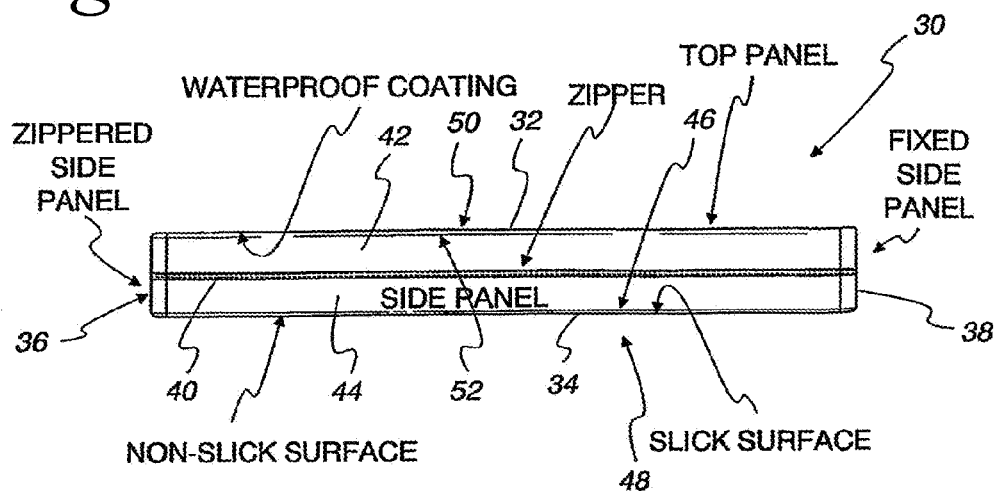


Fig. 1a

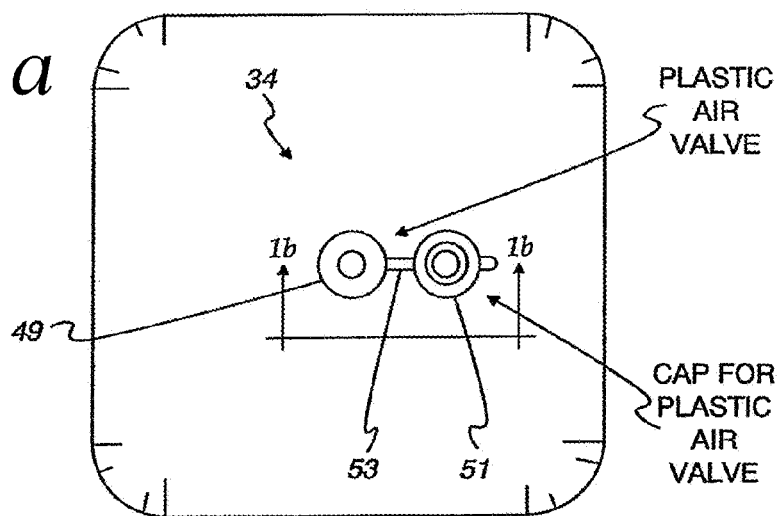
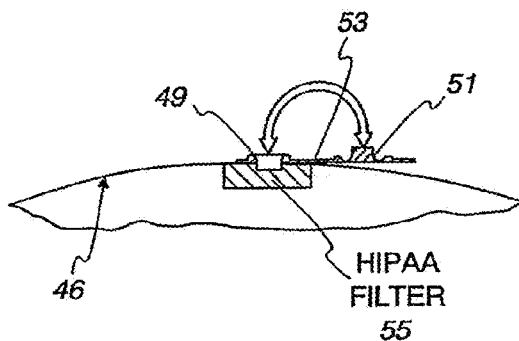


Fig. 1b



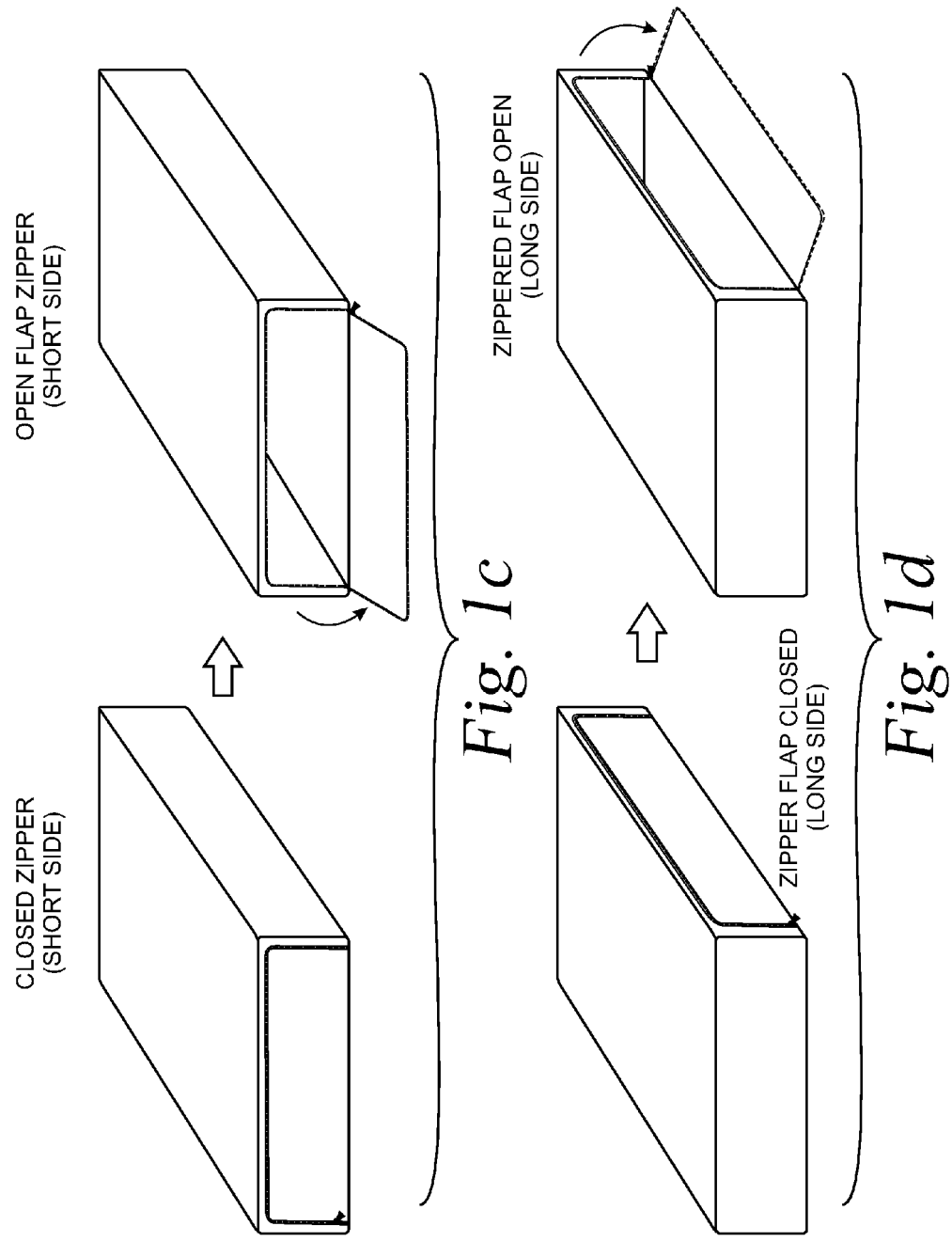


Fig. 2

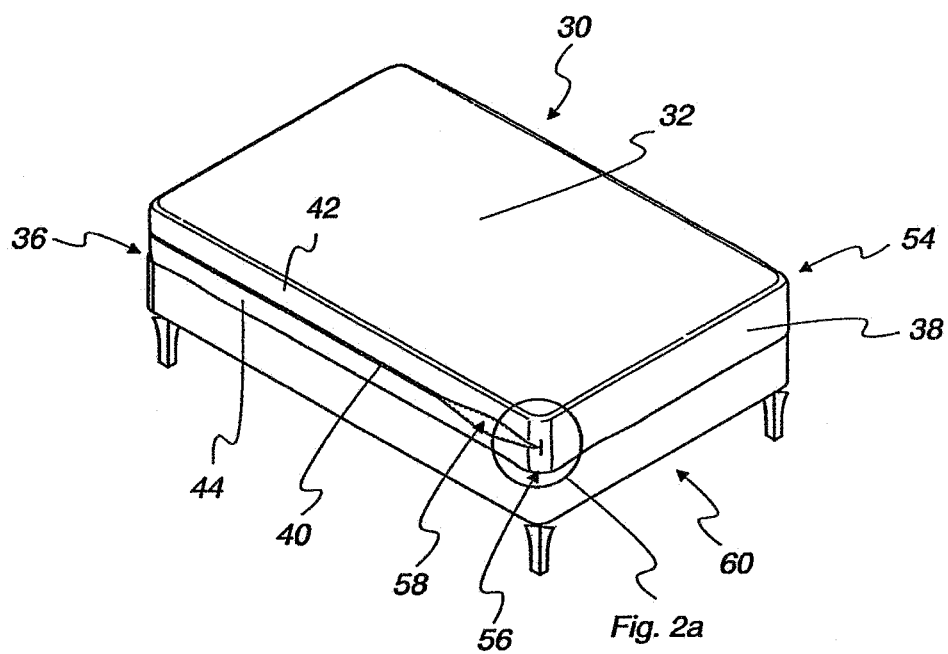


Fig. 2a

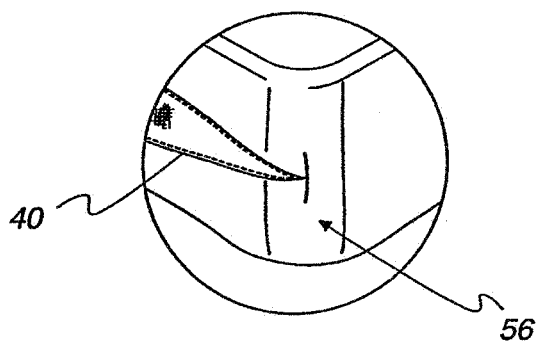


Fig. 3

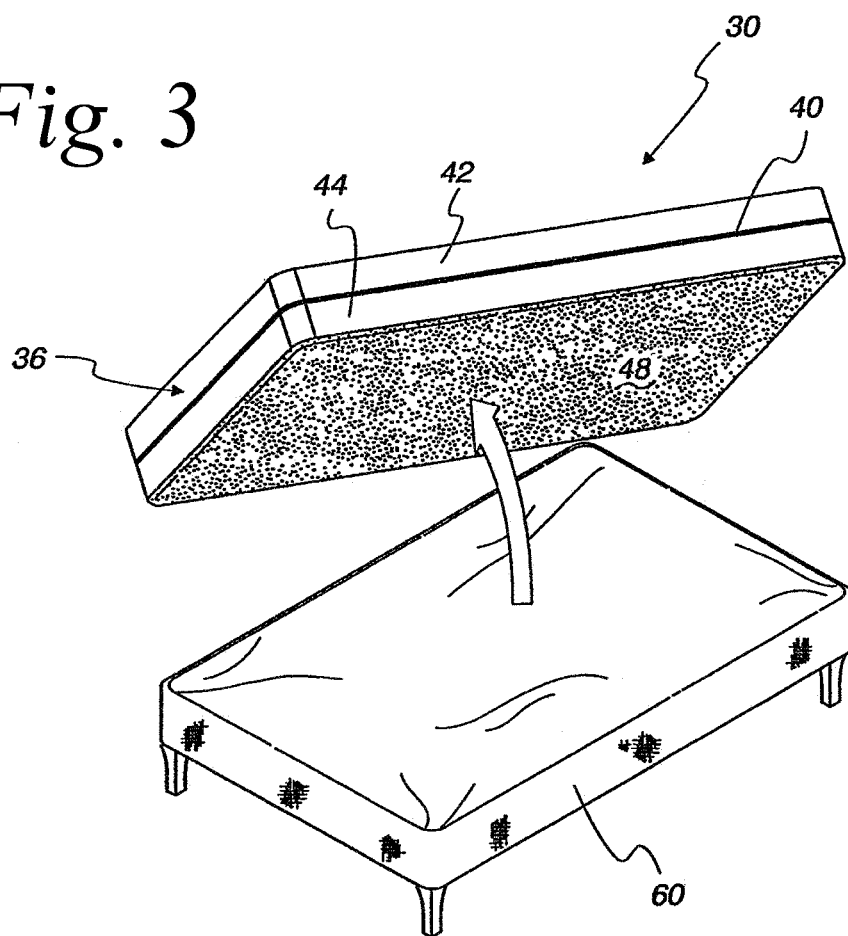


Fig. 4

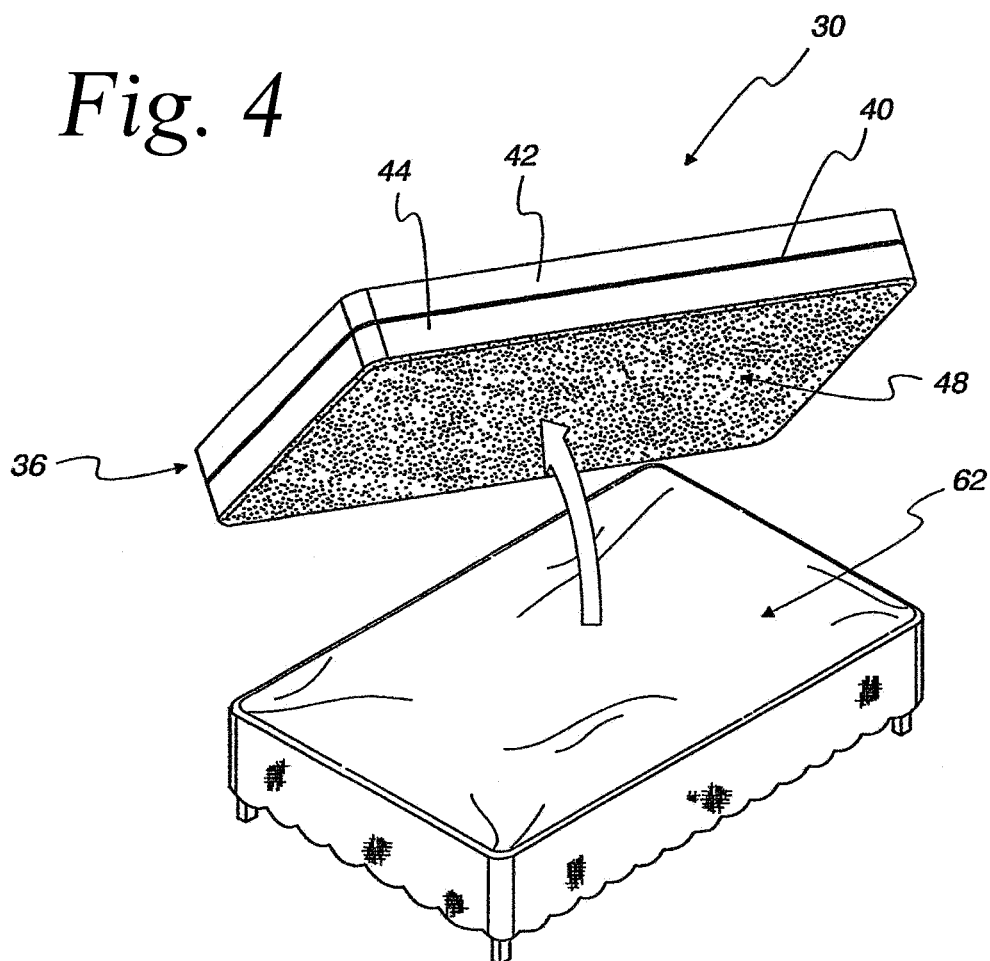


Fig. 5

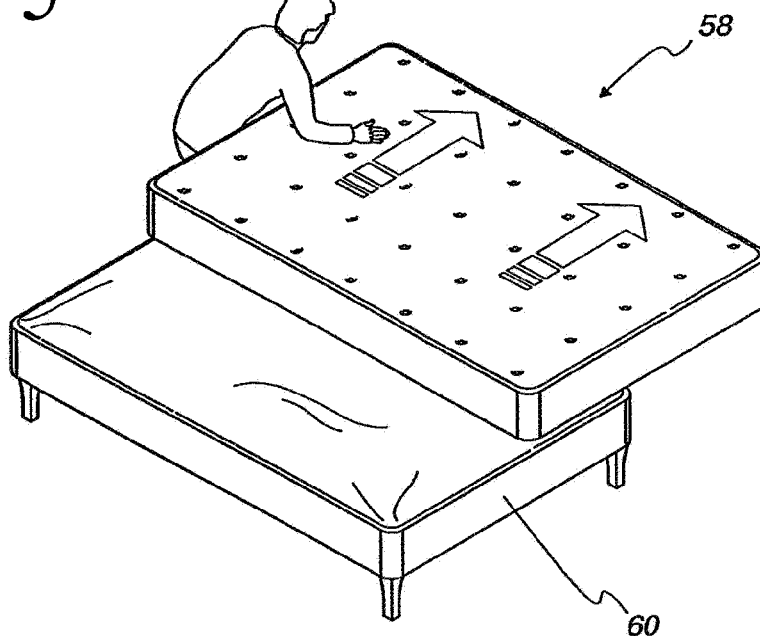


Fig. 6

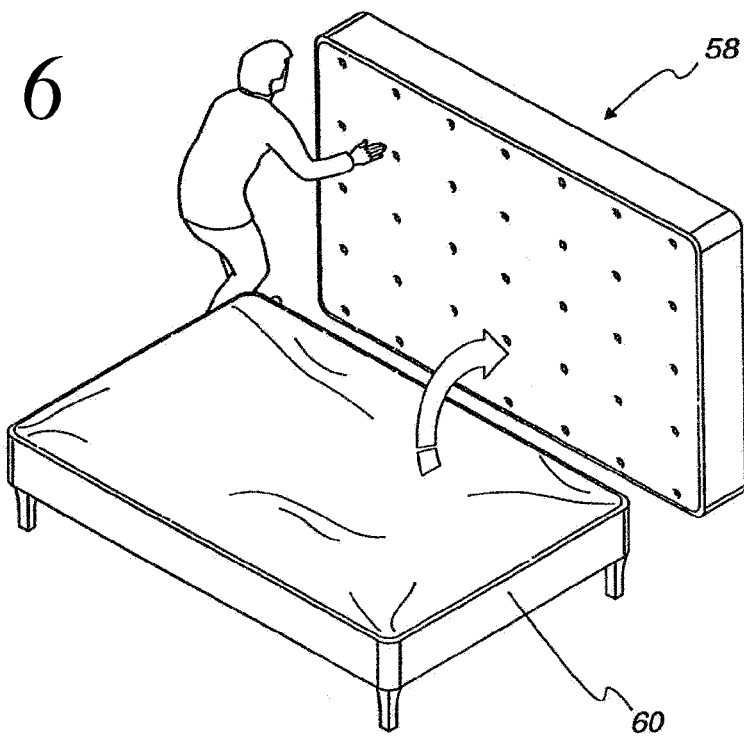


Fig. 7

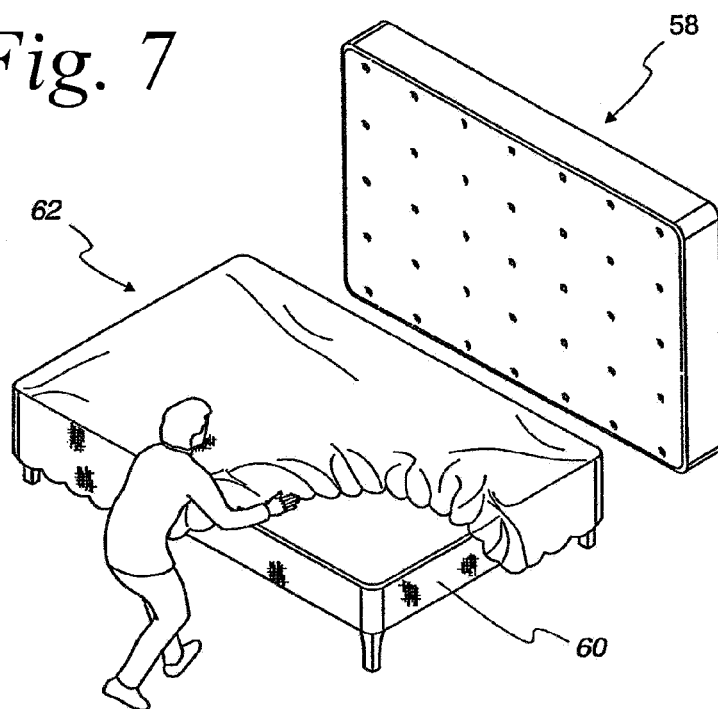


Fig. 8

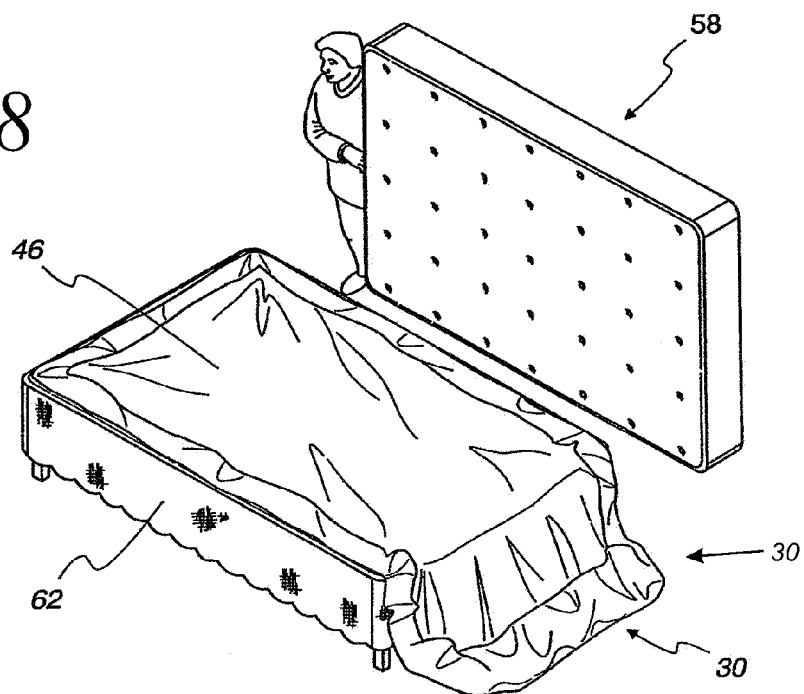


Fig. 9

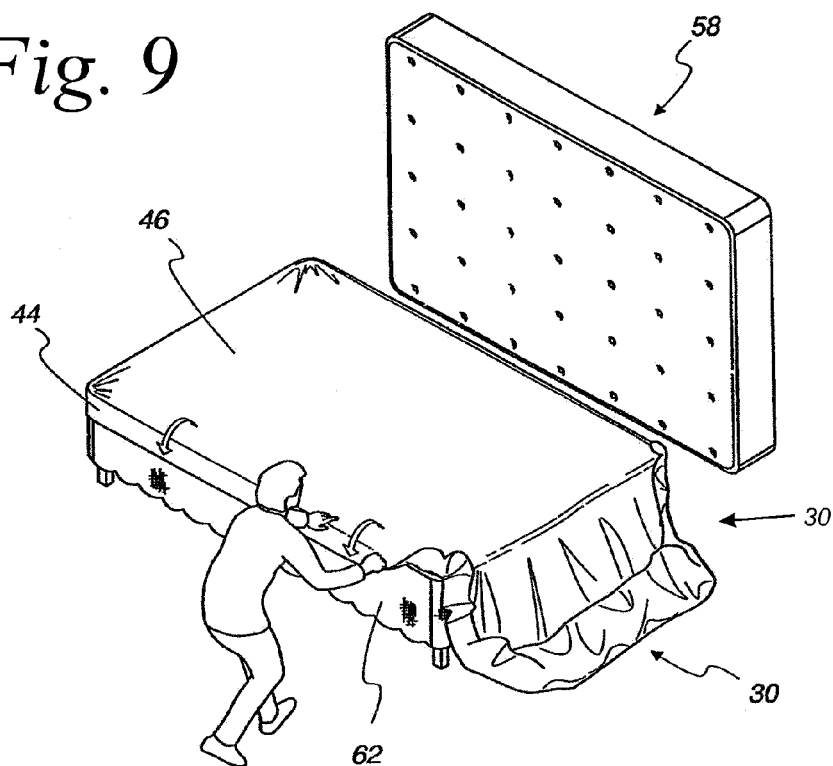


Fig. 10

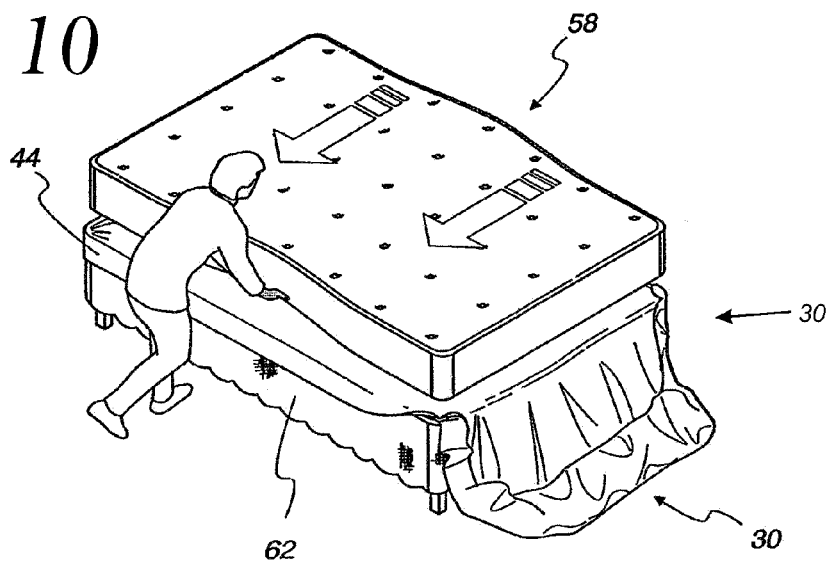


Fig. 11

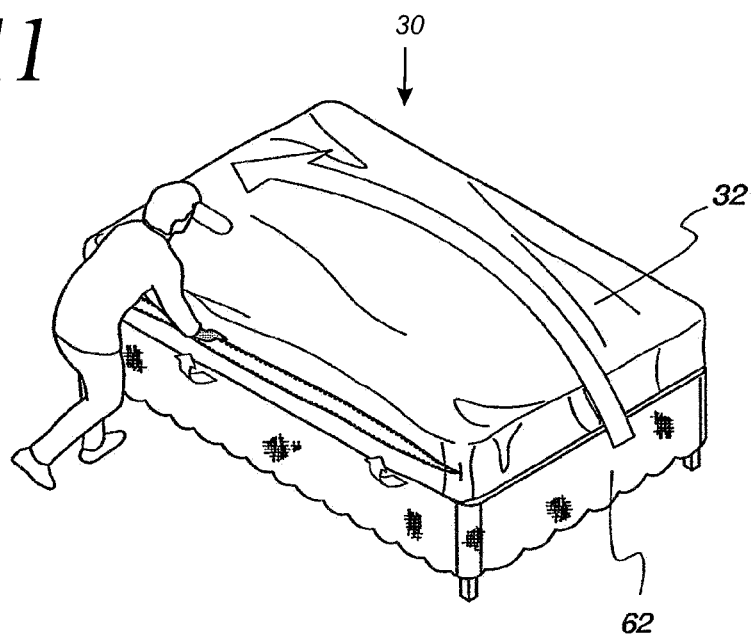


Fig. 12

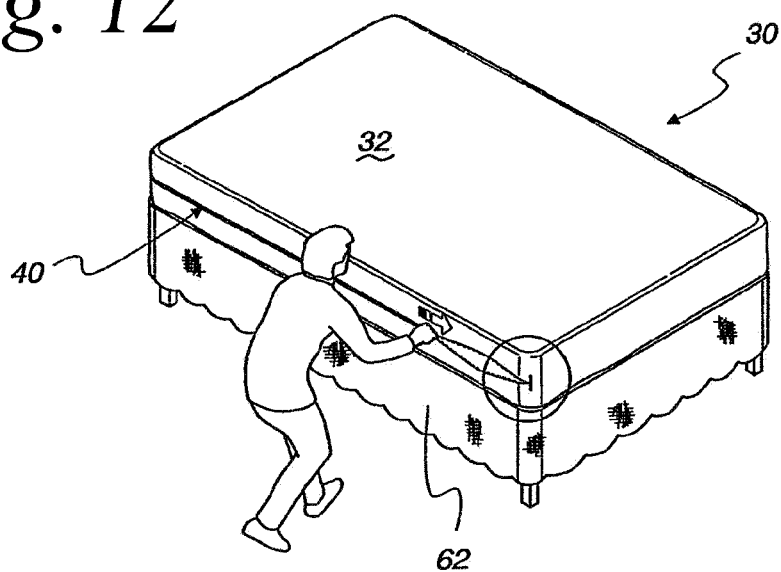


Fig. 13

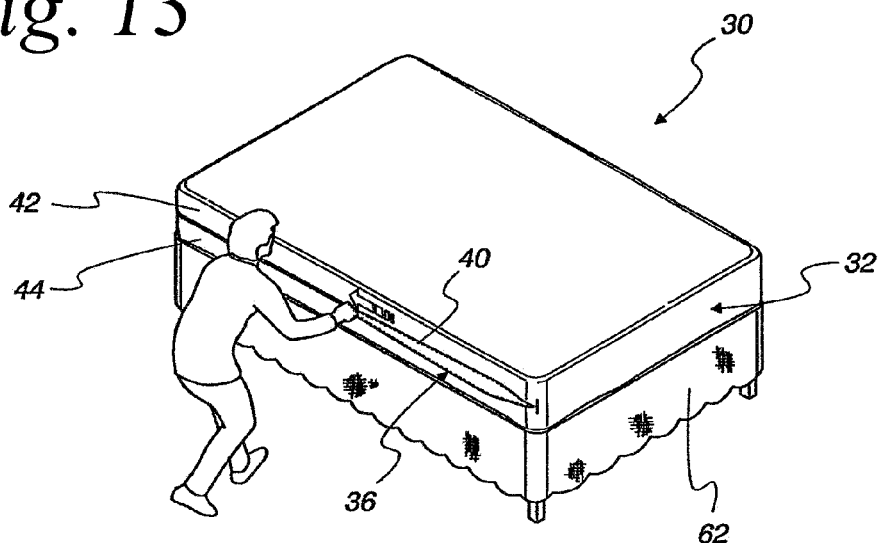


Fig. 14

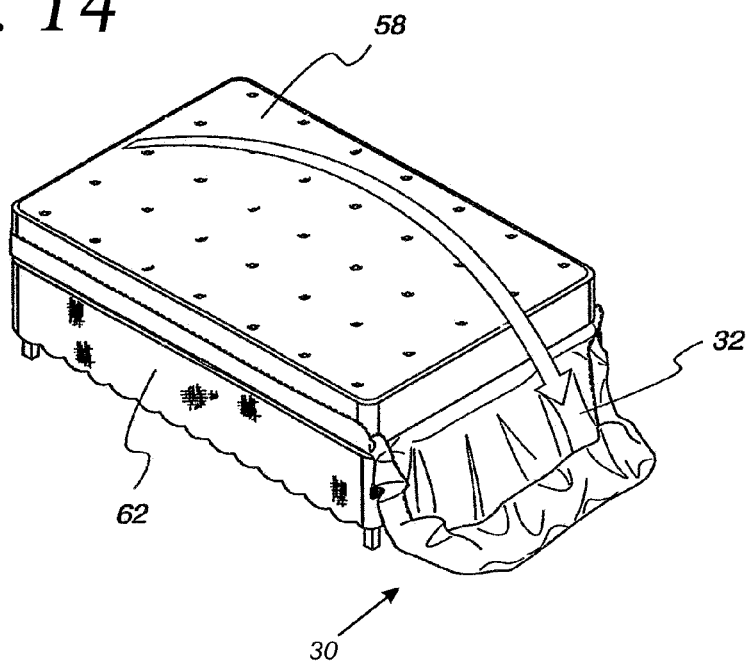


Fig. 15

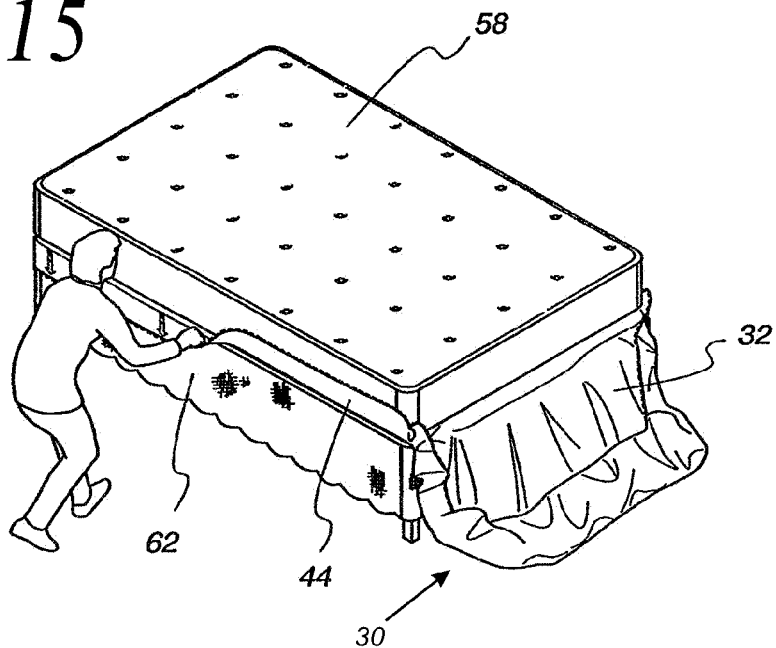


Fig. 16

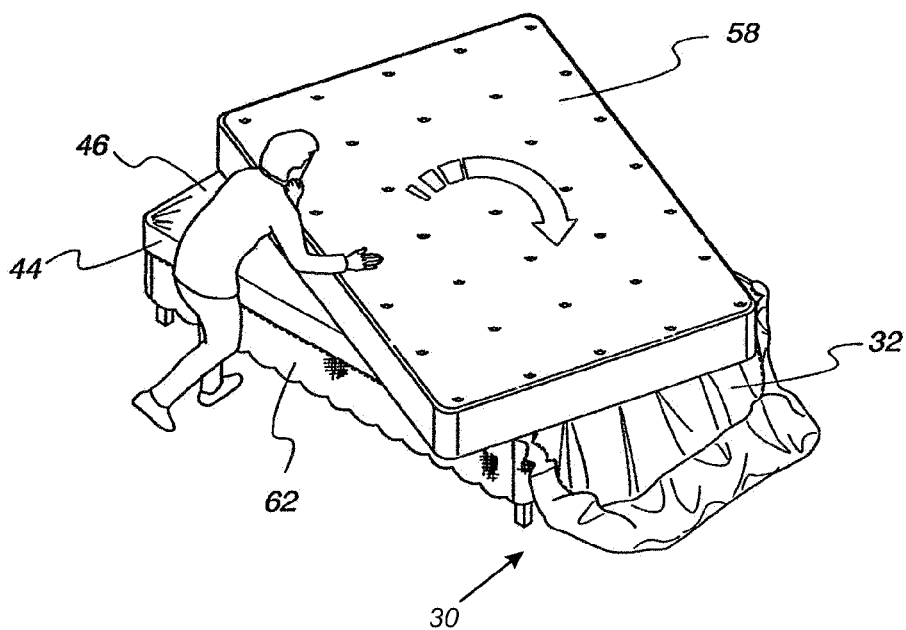


Fig. 17

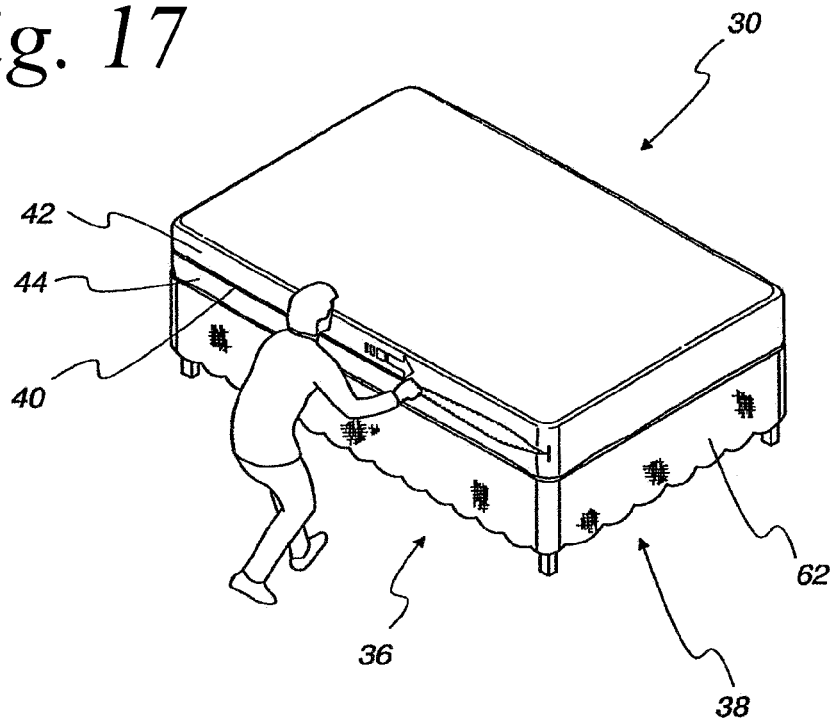


Fig. 17a

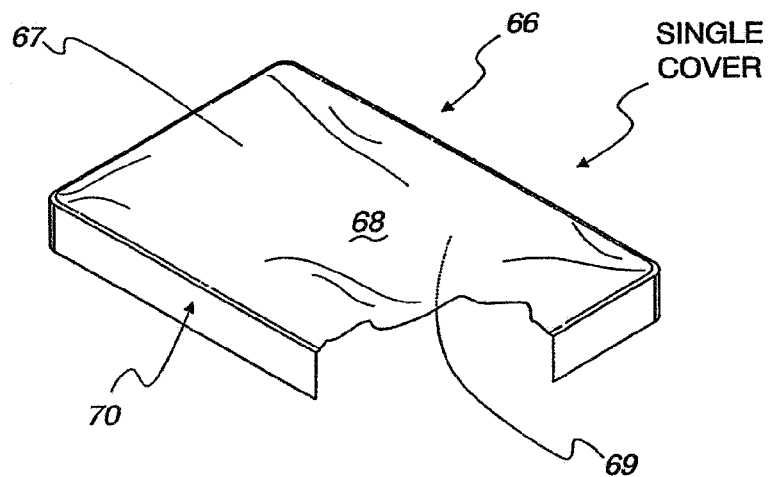


Fig. 17b

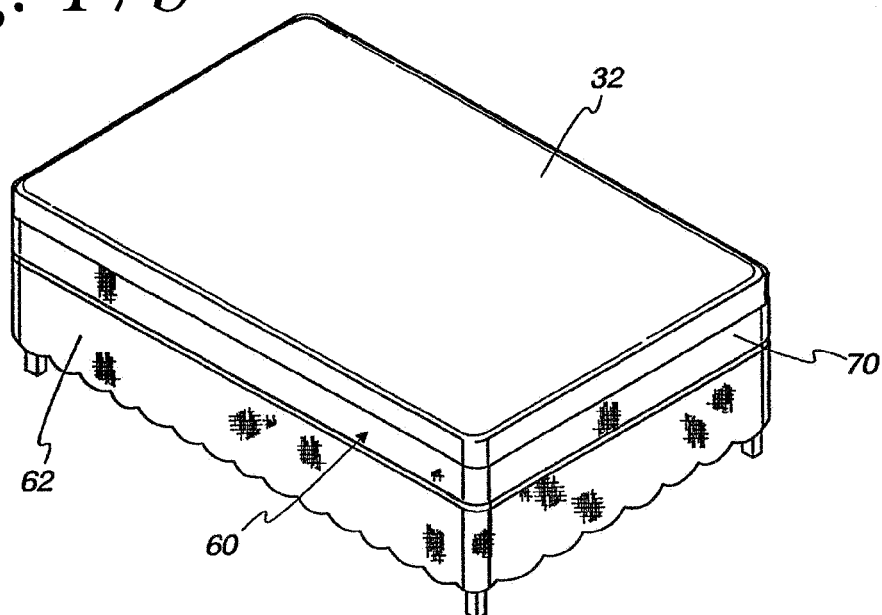


Fig. 17c

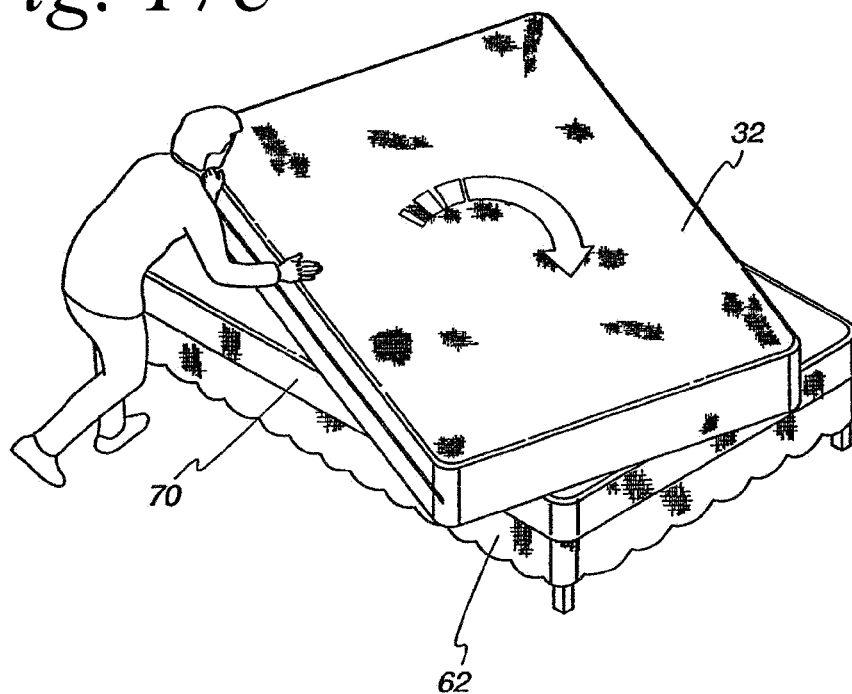
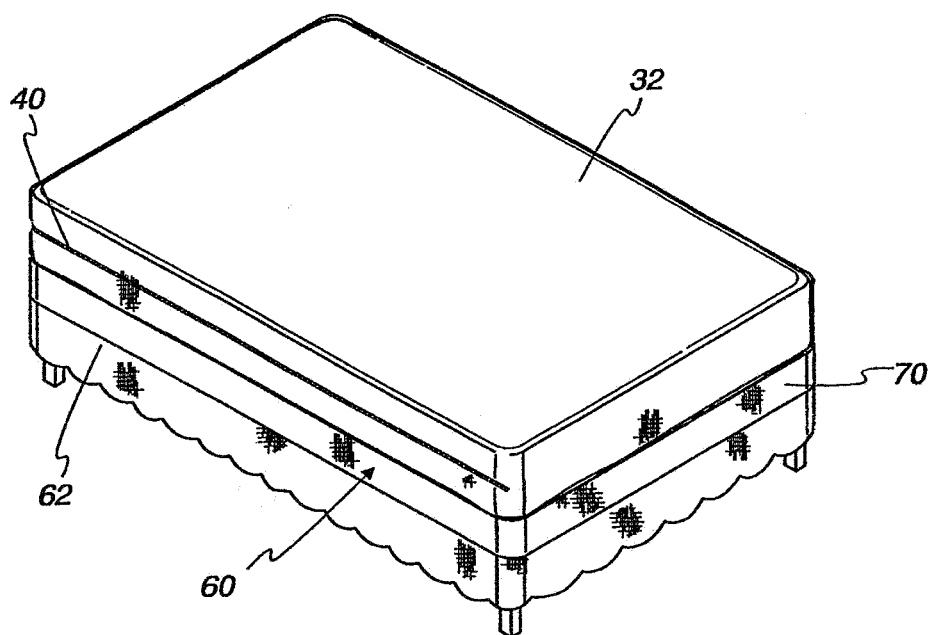


Fig. 17d



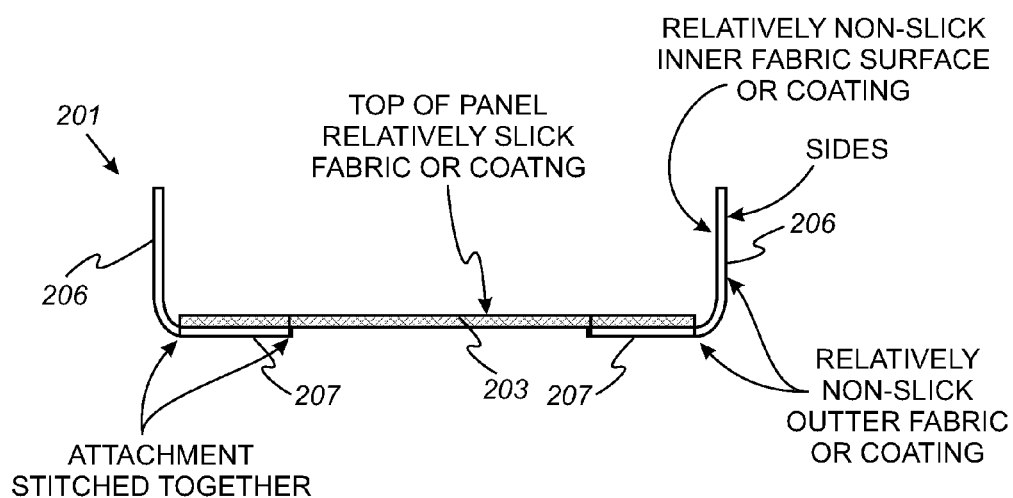


Fig. 17e

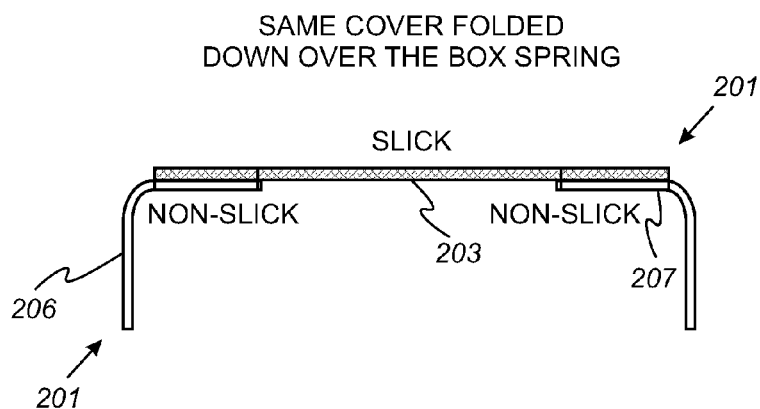


Fig. 17f

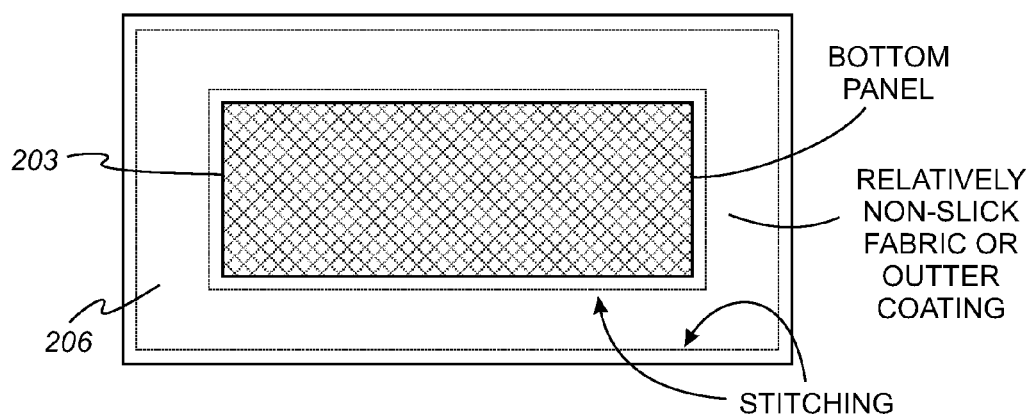


Fig. 17g

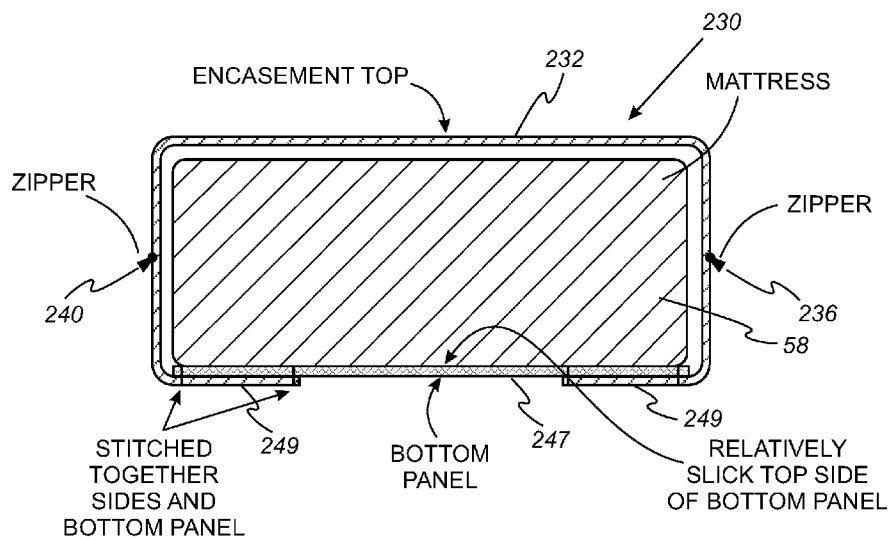


Fig. 17h

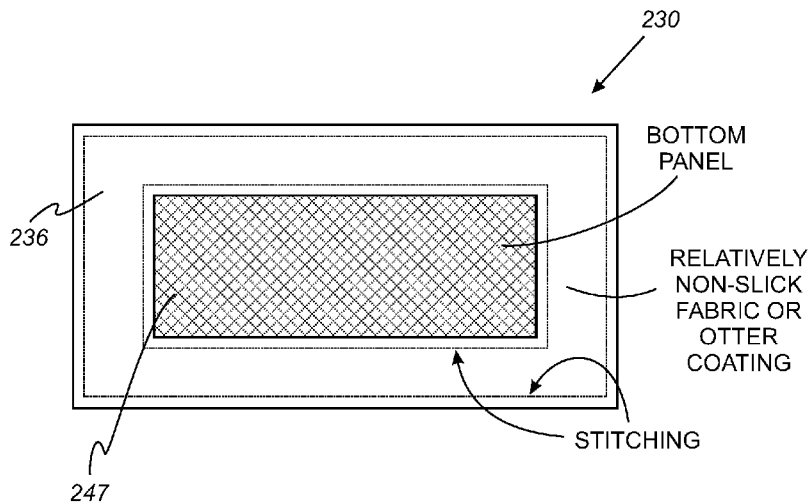


Fig. 17i

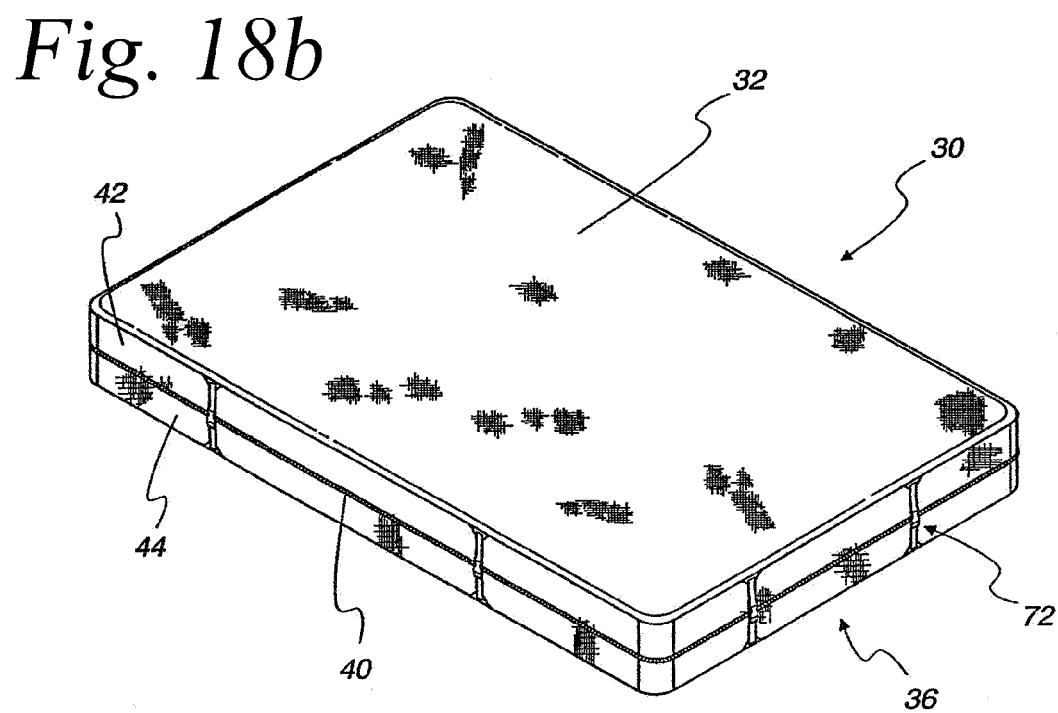
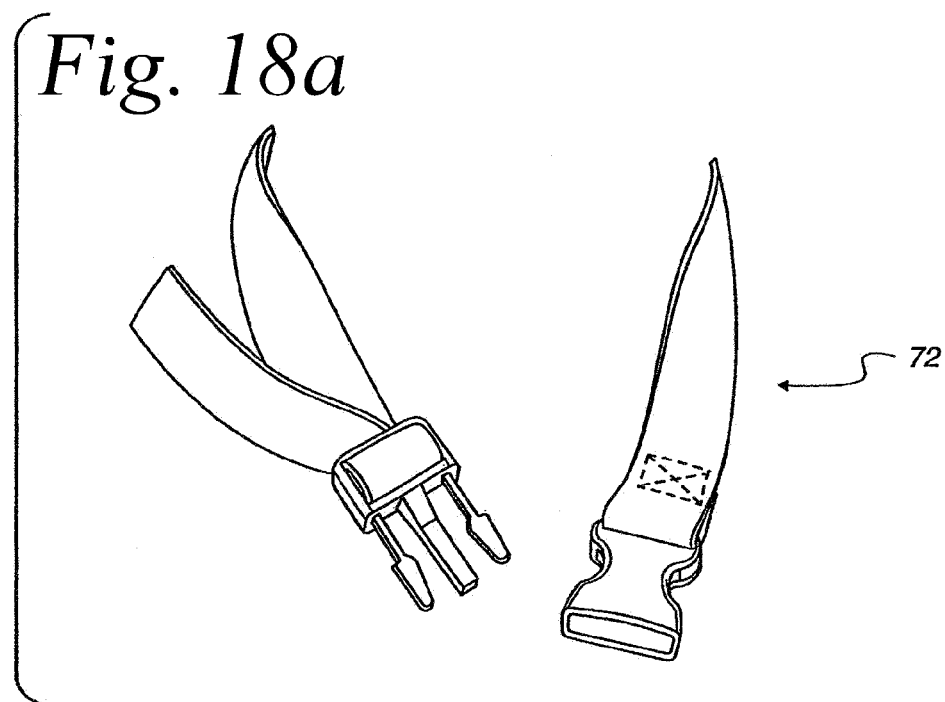


Fig. 19a

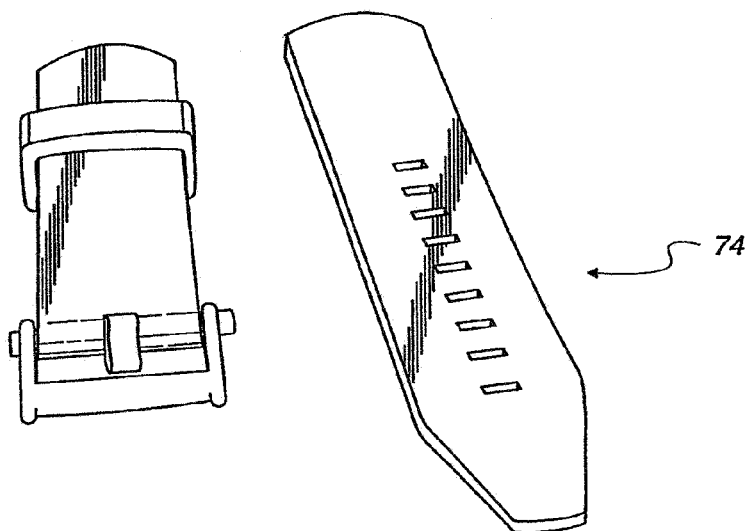


Fig. 19b

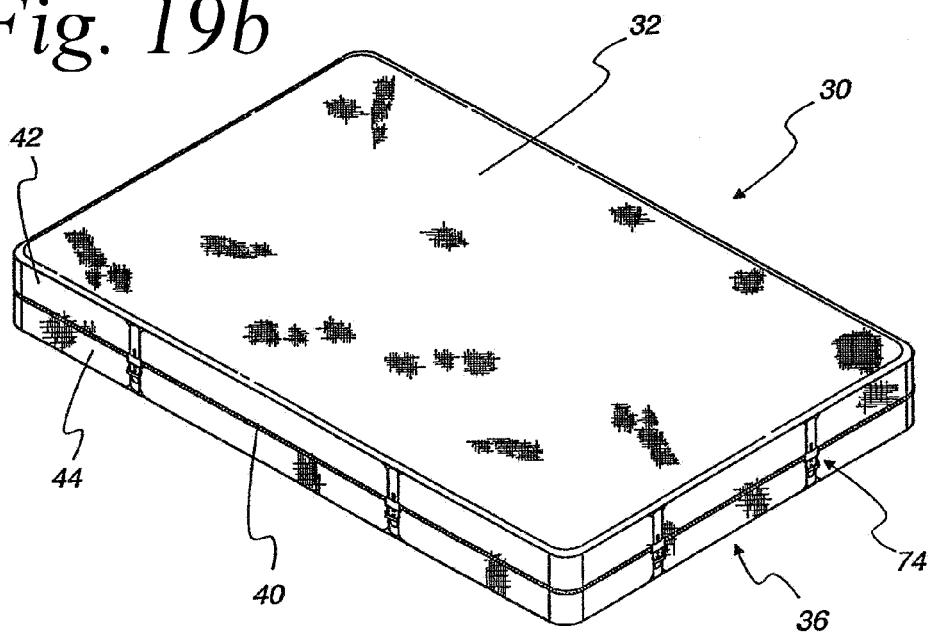


Fig. 20a

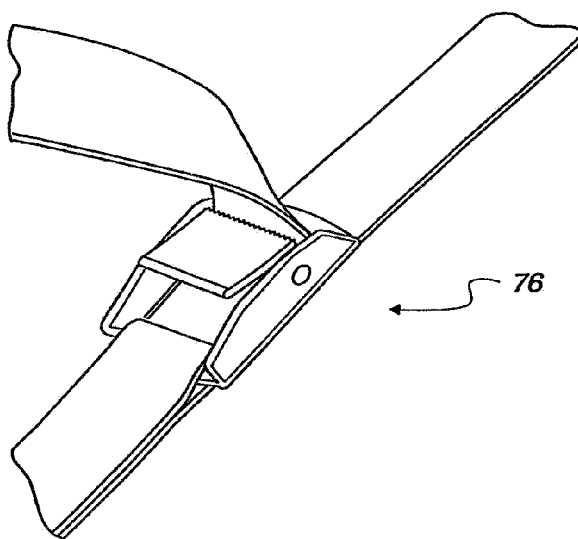


Fig. 20b

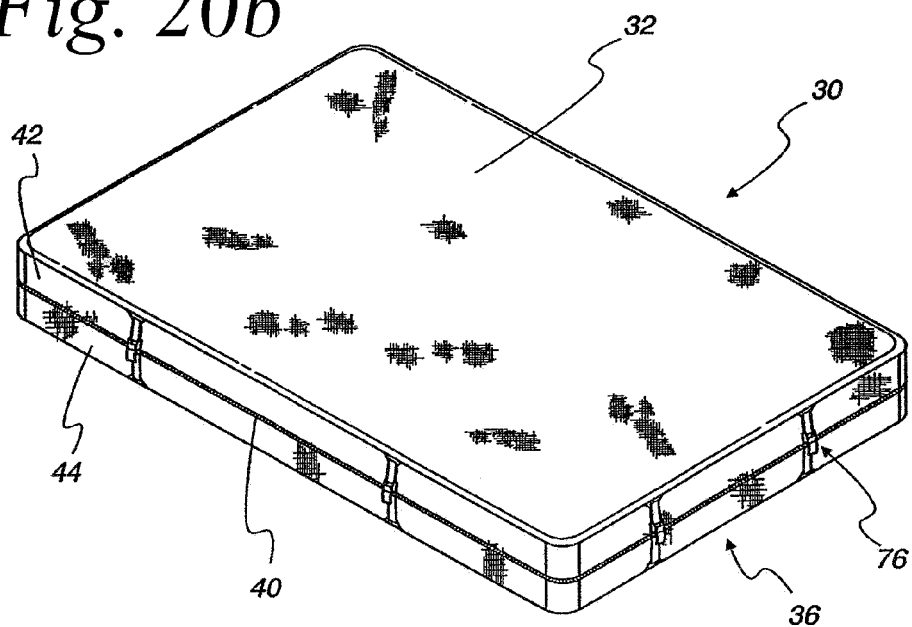


Fig. 21a

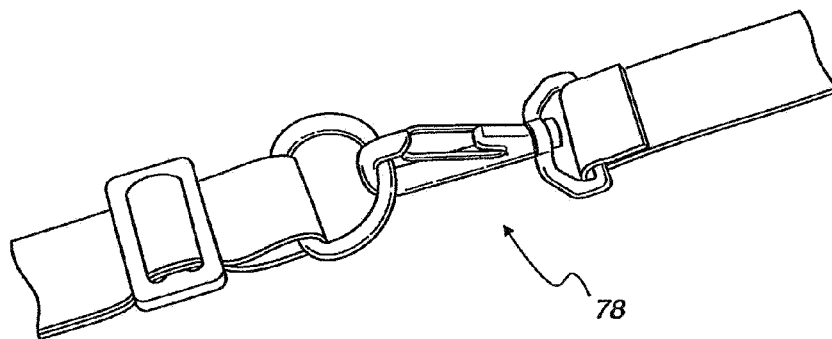


Fig. 21b

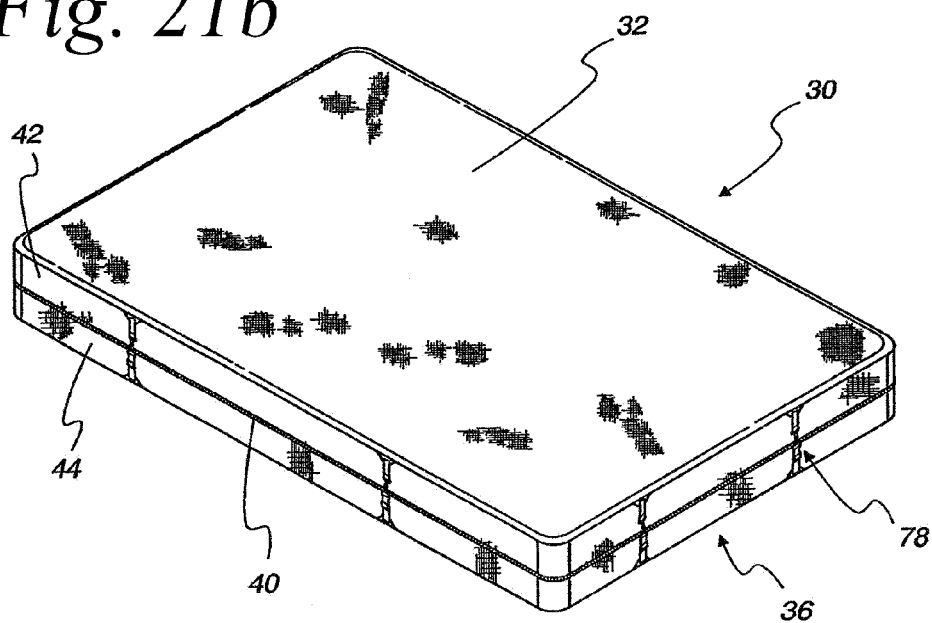


Fig. 22a

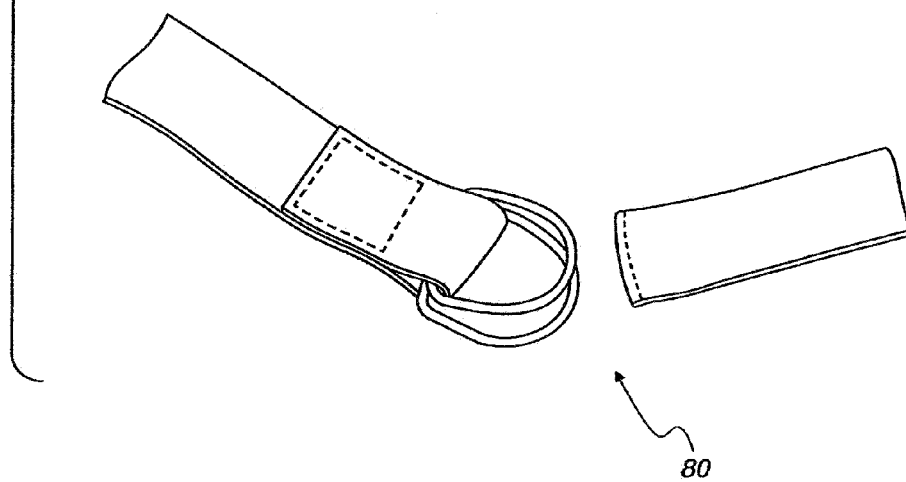


Fig. 22b

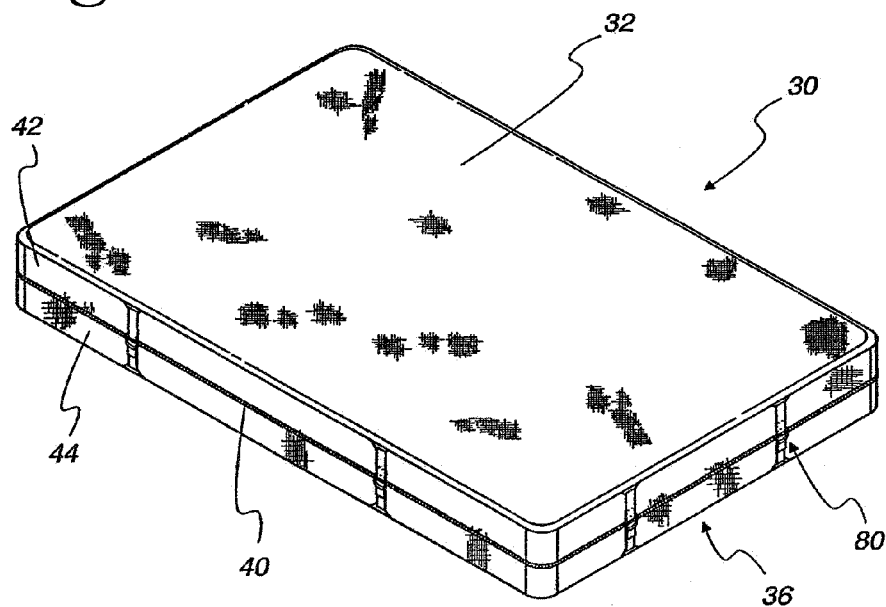


Fig. 23a

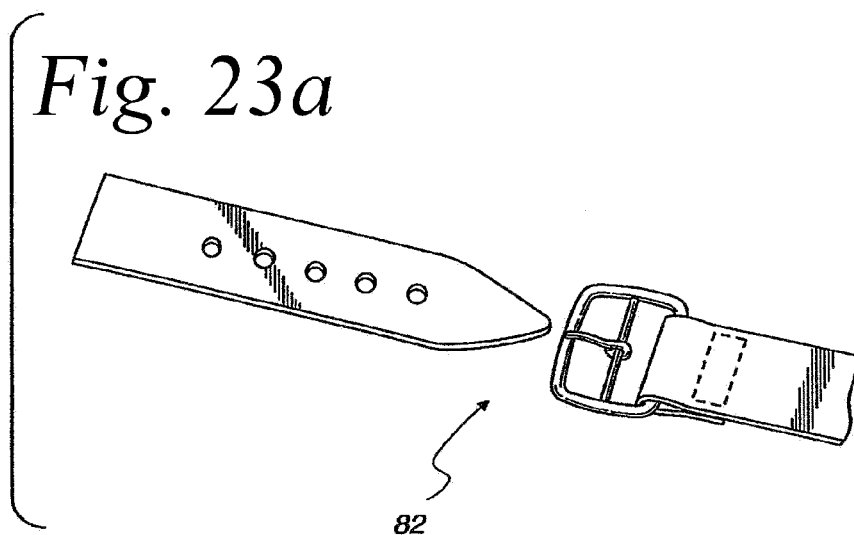


Fig. 23b

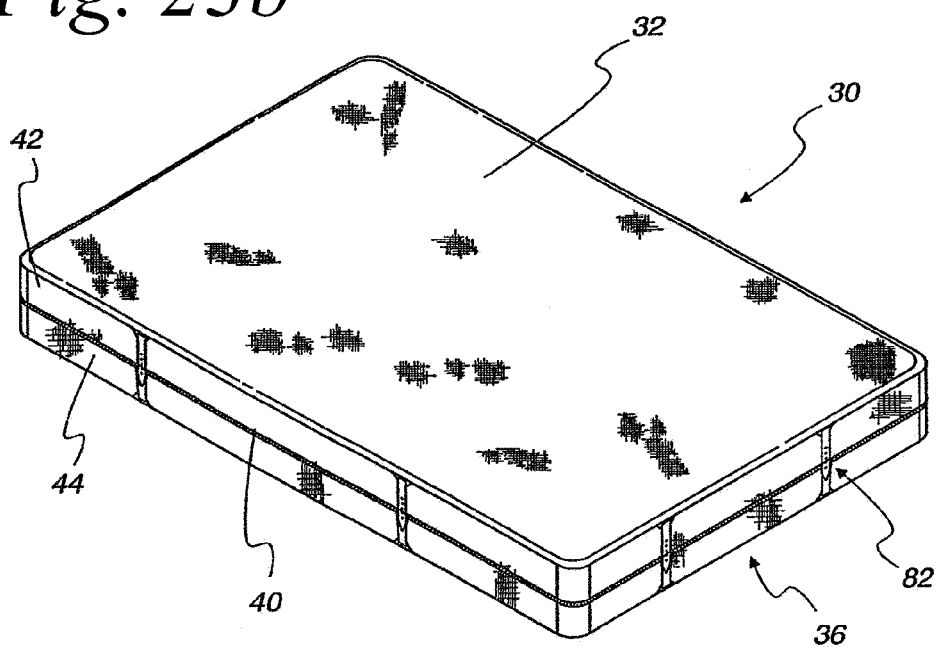


Fig. 24

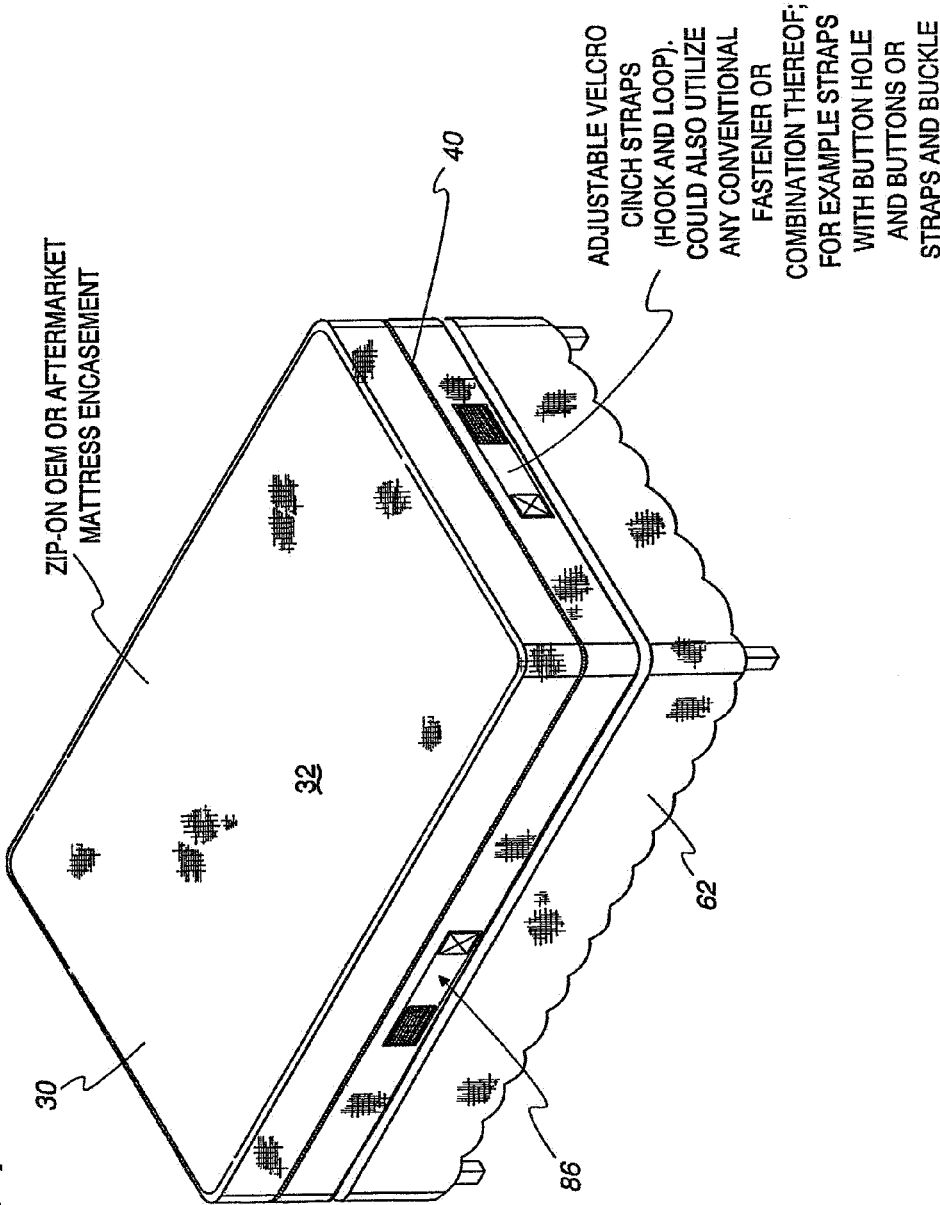


Fig. 25

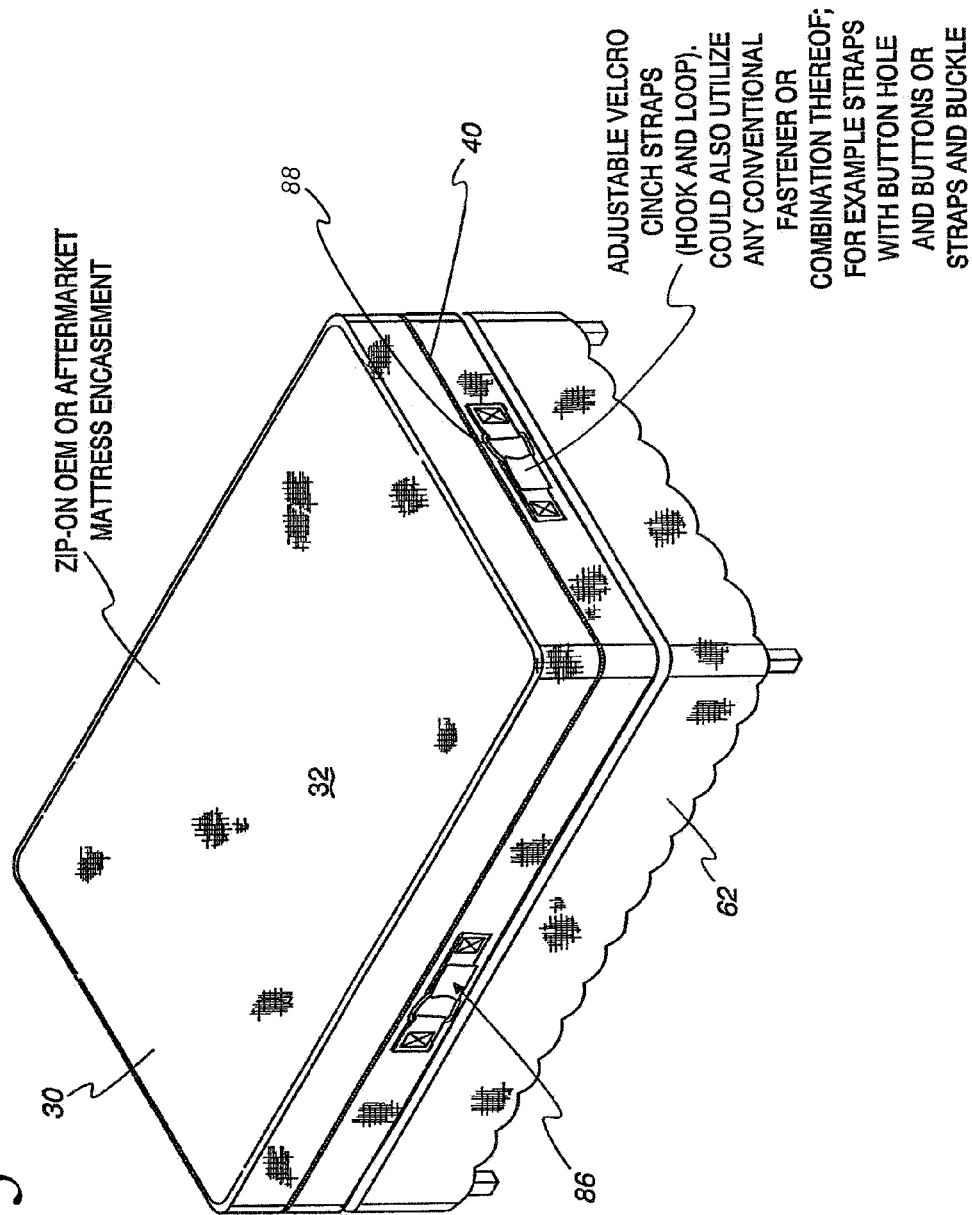


Fig. 26

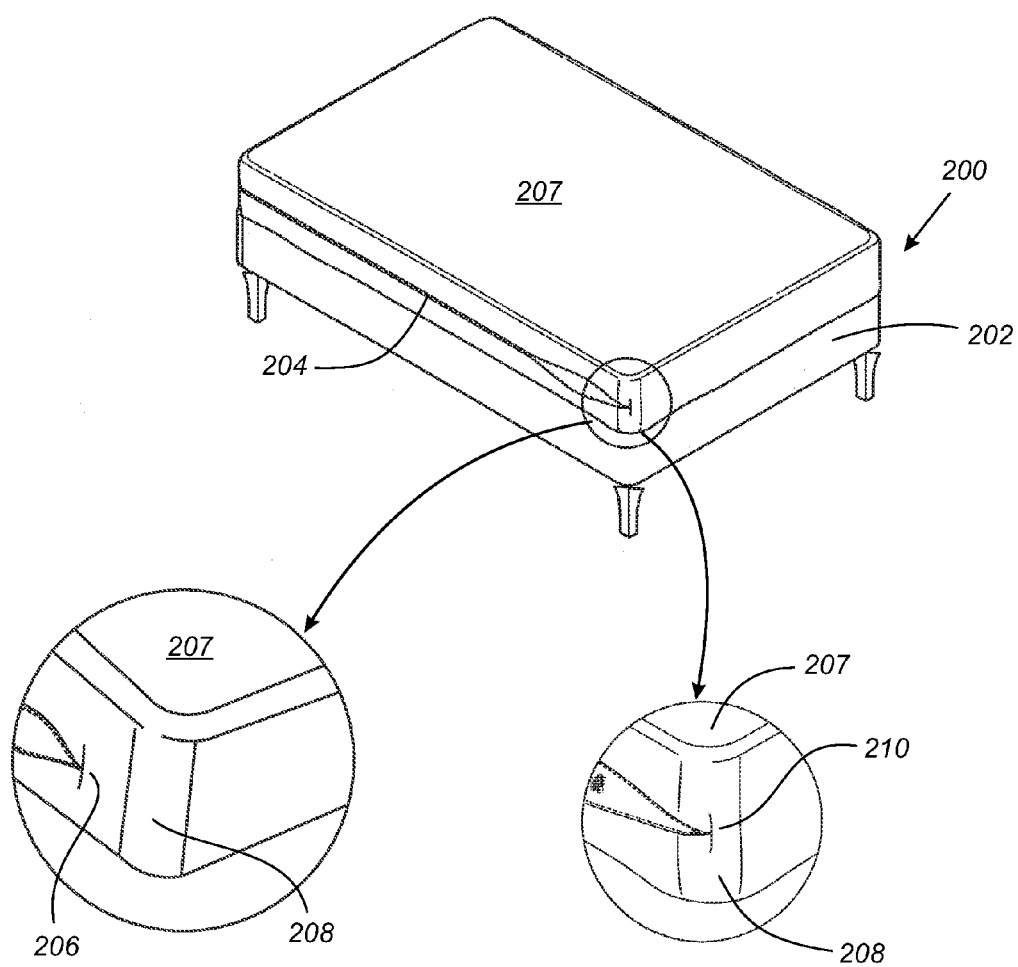


Fig. 26A

Fig. 26B

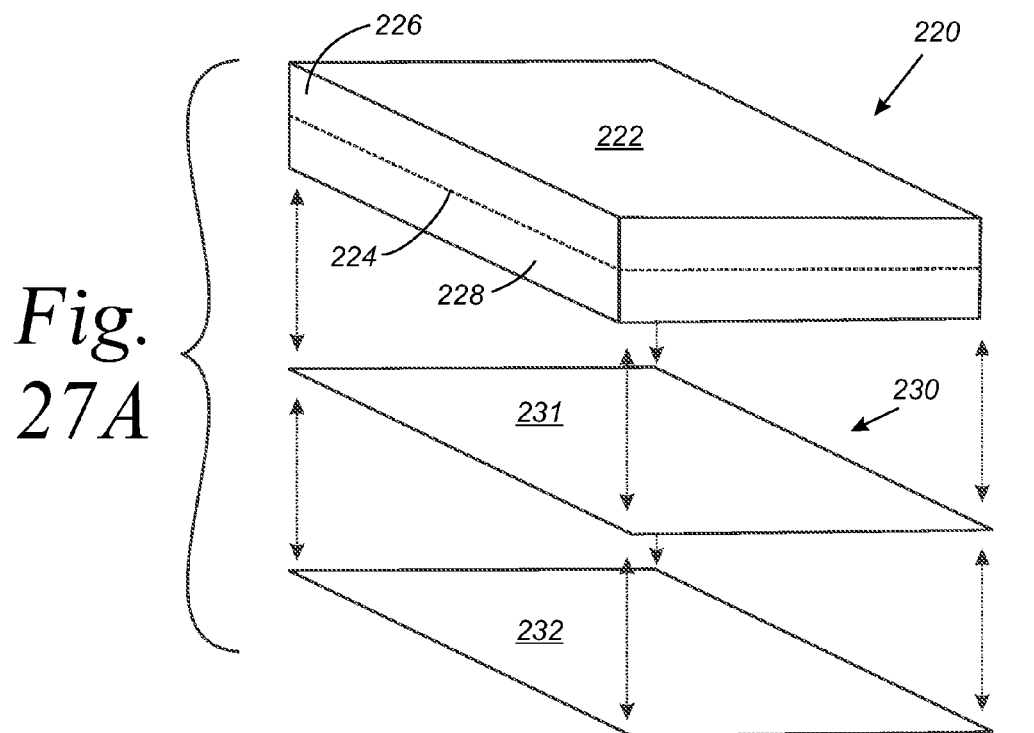


Fig. 27B

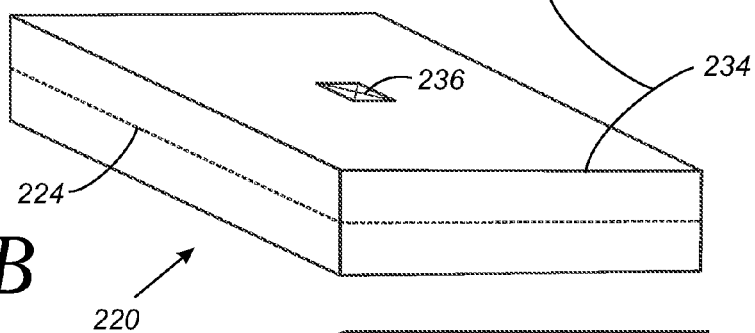


Fig. 27C

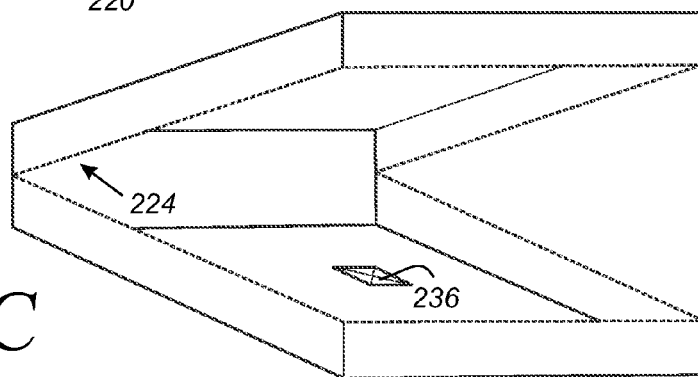


Fig. 28

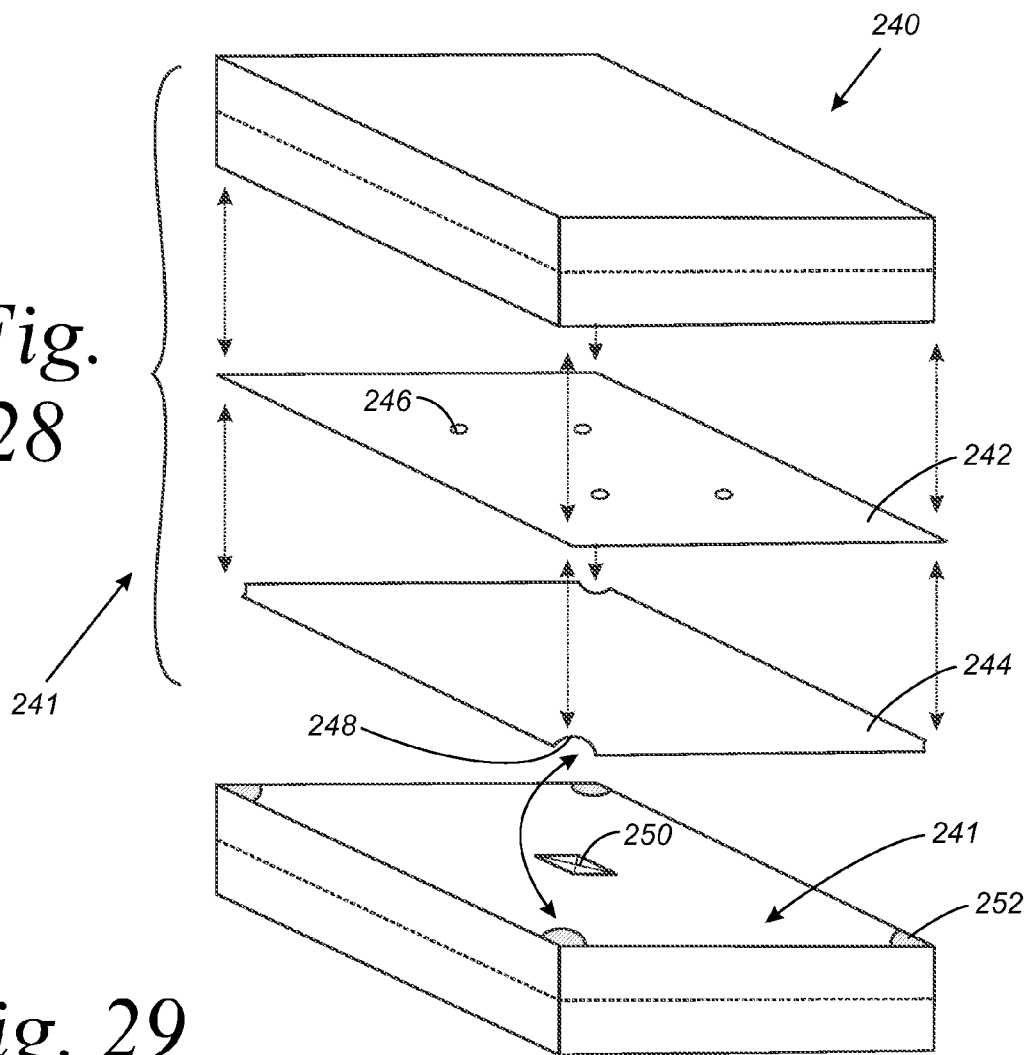


Fig. 29

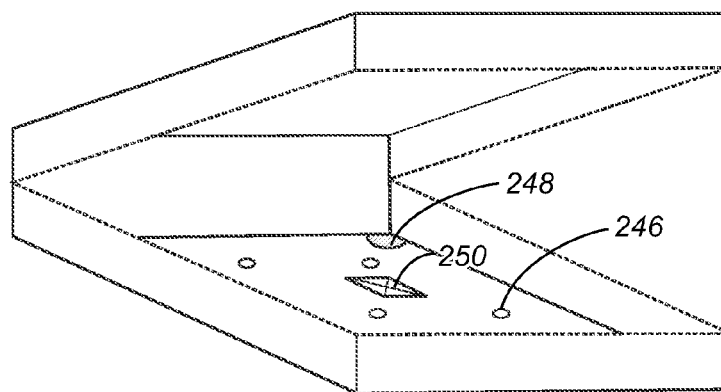
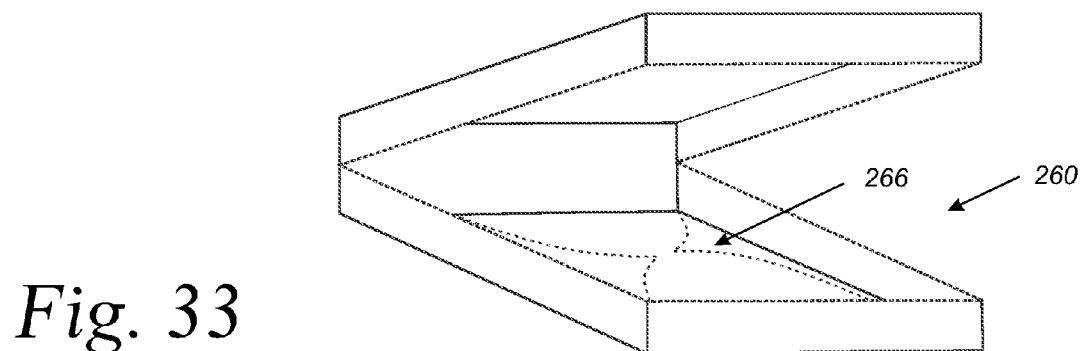
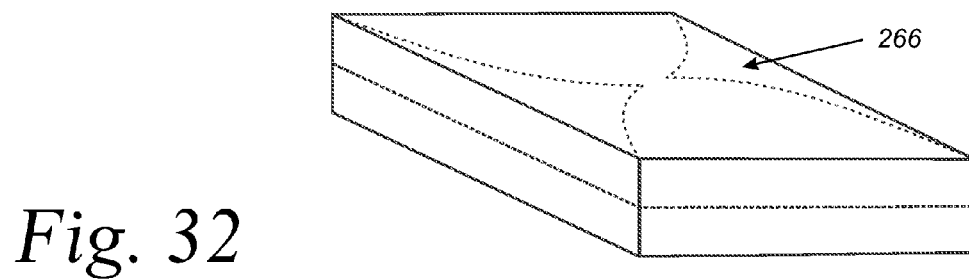
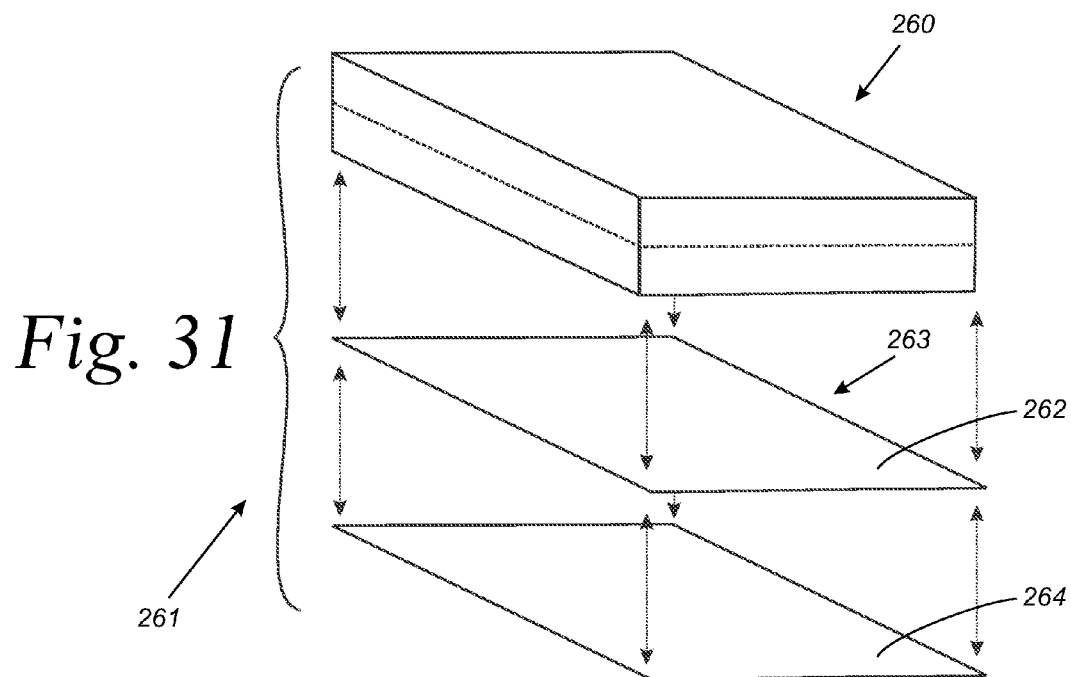
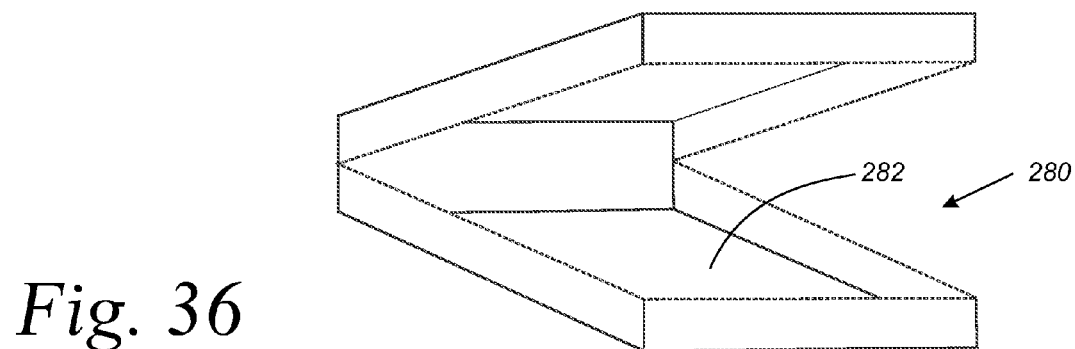
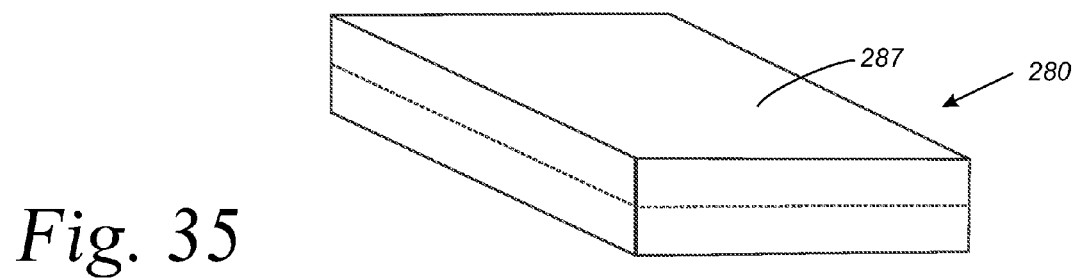
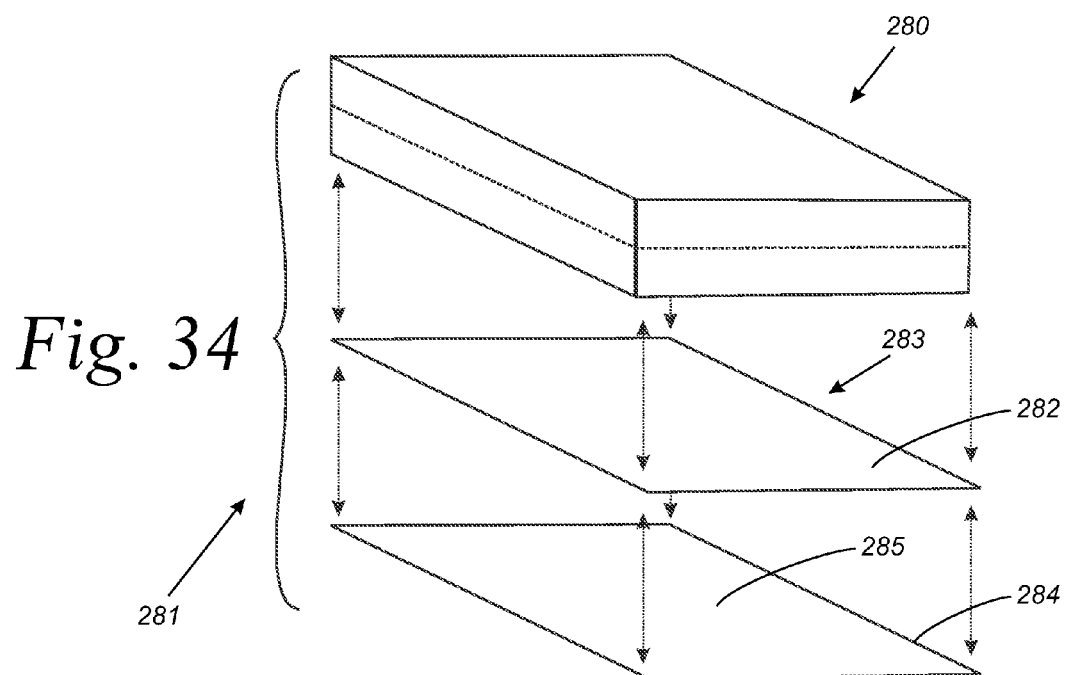
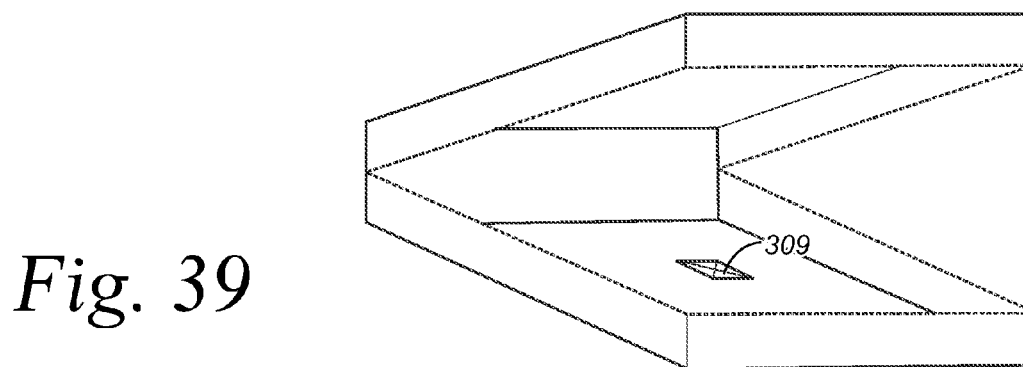
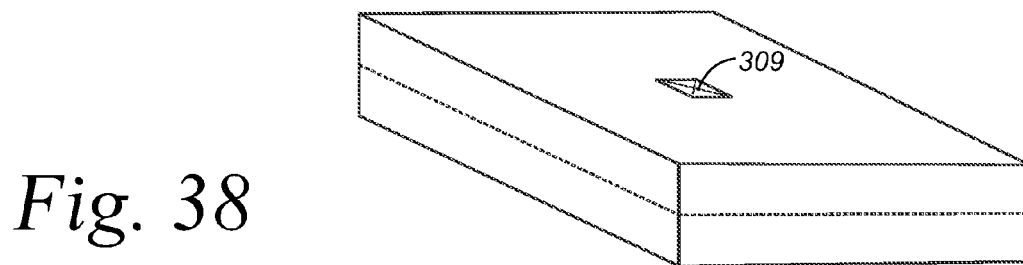
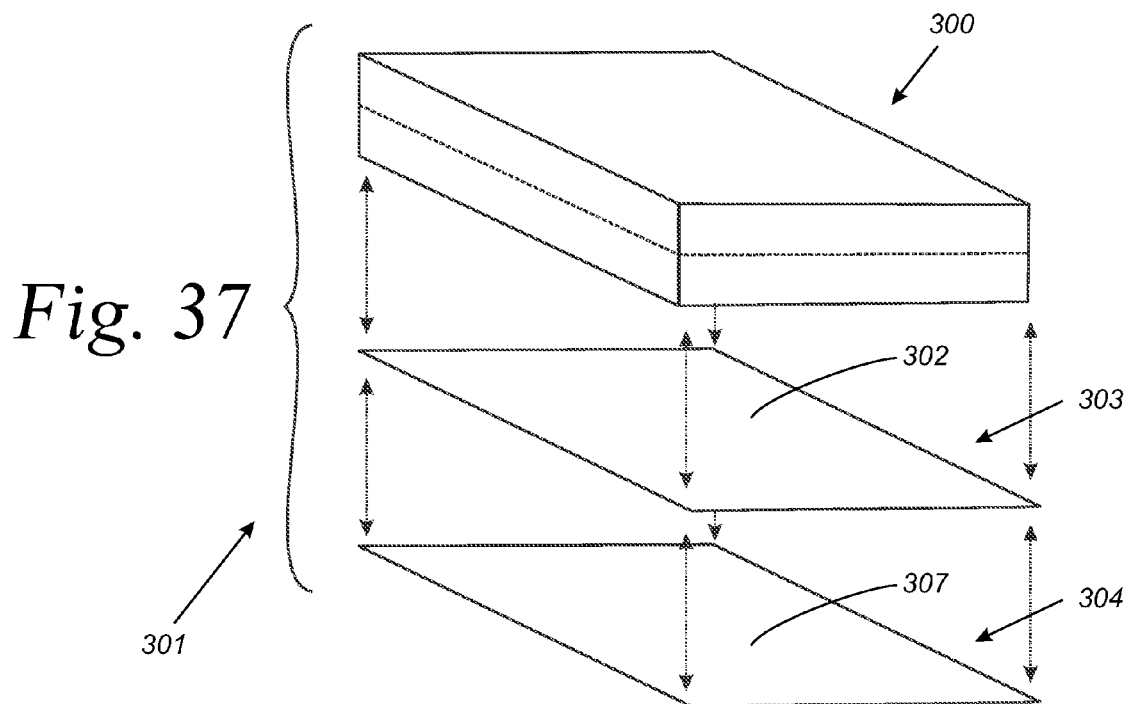
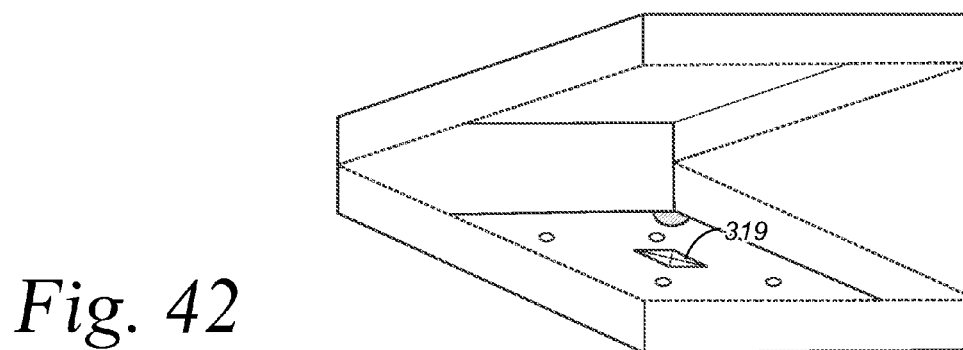
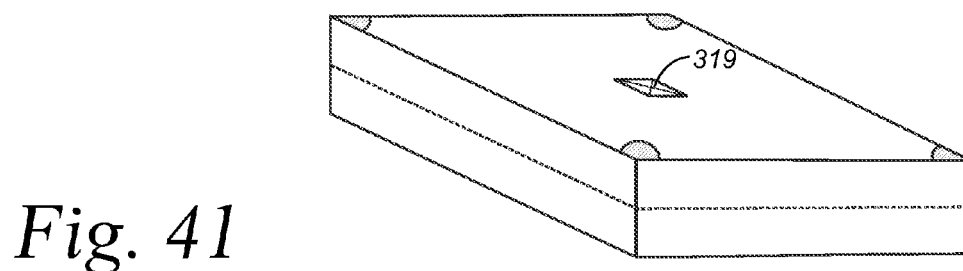
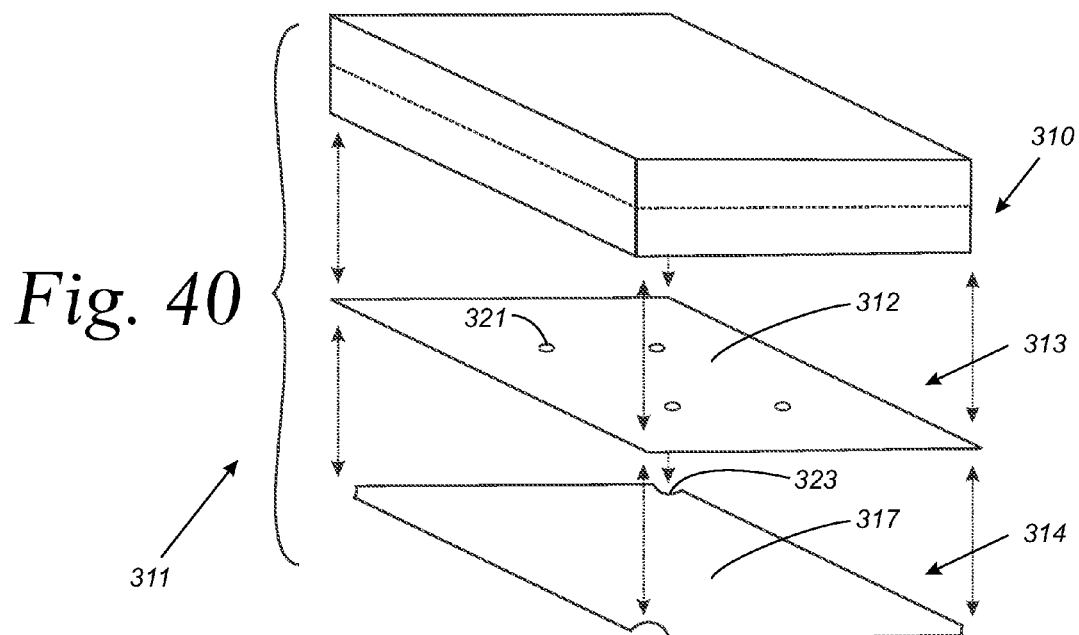


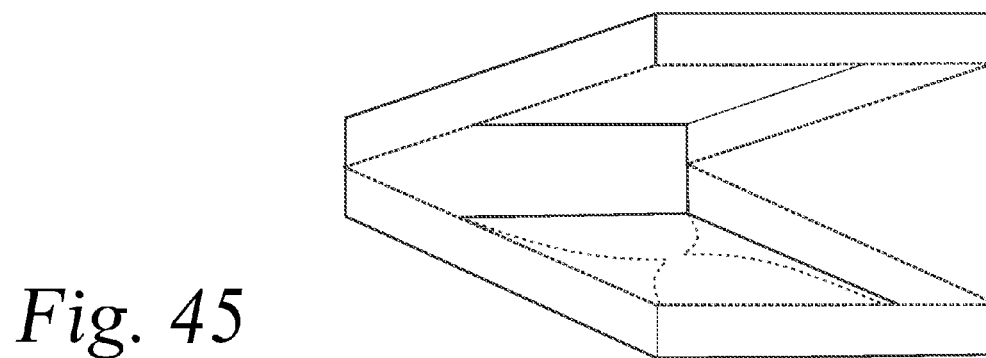
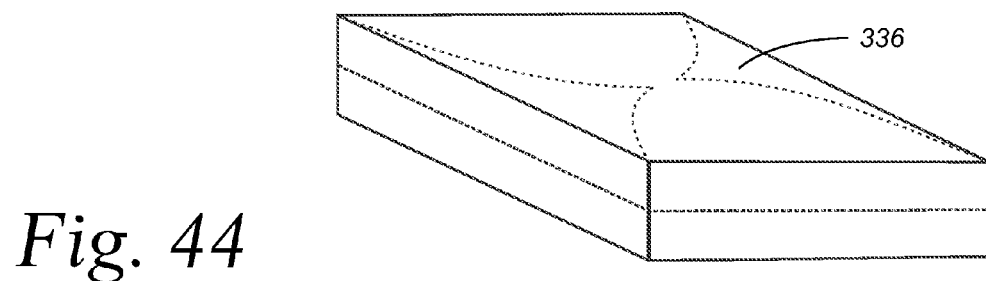
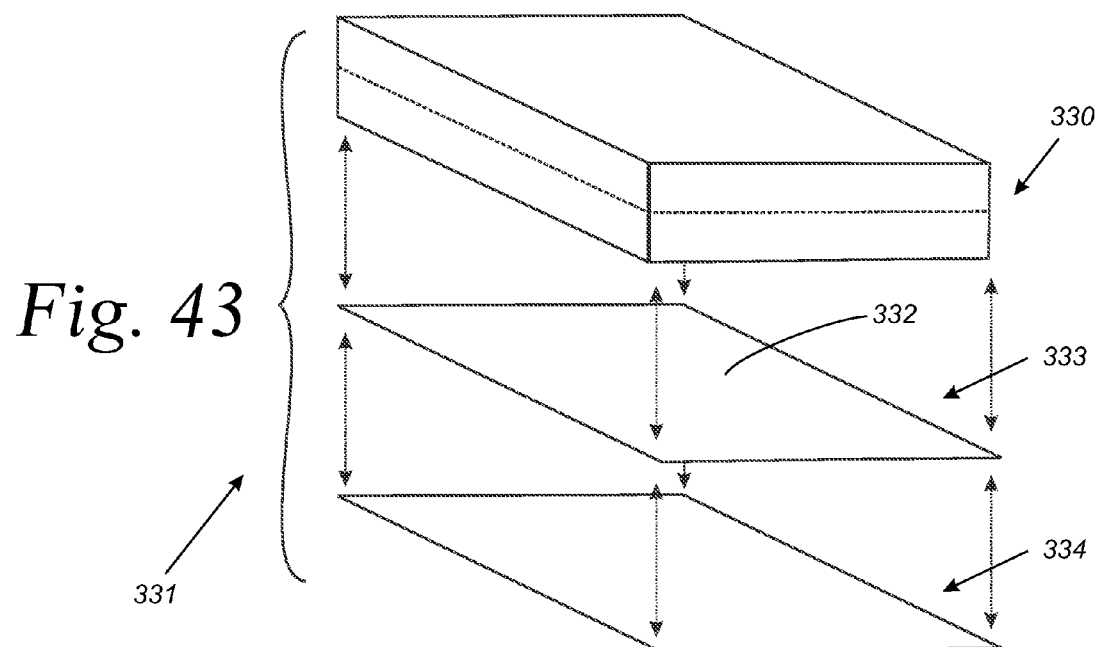
Fig. 30











PASSIVE MATTRESS ENCASEMENT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 14/046,113, filed on Oct. 4, 2013, hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a passive mattress encasement which can be relatively easily installed over a mattress supported by a box spring or fixed or adjustable platform (hereinafter “foundation”) which also facilitates rotation of the mattress even in applications in which a bed skirt is installed over the foundation and can accommodate a relatively wide range of mattress depths.

2. Description of the Prior Art

[0003] Mattress encasements are used as a prophylactic cover over the entire mattress to protect the mattress from various situations, such as parasites and stains, for example, pet stains. Such encasements are also available for box springs. As used herein, the term encasement refers to mattress encasements and box spring encasements individually and collectively. Examples of such encasements are disclosed in US Patent Application Publication Nos.: U.S. 2012/0260426; U.S. 2012/0255120; 2012/0192356; 2012/0167302; and 2011/00100856 as well as U.S. Pat. Nos. 8,087,111 and 8,156,588, all hereinafter incorporated by reference.

[0004] Some known encasements are made from a vinyl material. There are several problems with such vinyl encasements. One such problem is that they are uncomfortable. Another problem relates to cleaning them after being in contact with blood, urine or other matter. Such vinyl encasements cannot be laundered. In order to solve this problem, encasements made from launderable materials have been developed. For example, U.S. Pat. No. 8,087,111 discloses an encasement formed from two layers; an inner layer and an outer layer. The outer layer is formed from cotton or other common encasement material or a material commonly used for mattress protectors, as well as bedding fabric, such as polyester or a polyester-cotton blend. The inner layer is formed as a waterproof membrane, for example, by way of a polyurethane or other suitable waterproof coating.

[0005] Because of the need for laundering, known encasements are formed with a zipper along three sides forming a pocket on one end to enable removal for laundering. In order to launder the encasement, the mattress is normally flipped upside down so that the mattress top is in contact with the box spring and the mattress bottom or encasement bottom is facing upwardly. Next, the mattress is slid off one end to enable the pocket to be slipped over one end of the mattress. The encasement is then slipped over the rest of the mattress bottom. The mattress is again flipped over so that the mattress bottom is resting on the foundation and the comfort top is facing upwardly. The top layer of the encasement with the waterproof membrane is then zipped to the bottom layer to complete the installation. In order to remove an encasement, the zipper is unzipped along all three sides and the mattress is lifted to remove the encasement.

[0006] Mattresses are relatively heavy items. The weight of a mattress varies as a function of the coil core size, the gauge of the coil and the type of foam material used. An average king size mattress weighs between 85 and 115 pounds. High end king size mattresses with latex or memory foam can weigh as much as 300 pounds (<http://www.mattressdirectonline.com>). As such, lifting the mattress to remove the encasement and flipping it over twice to install a clean encasement can be an extremely difficult task, especially considering hotels and motels where multiple encasements may be changed in a single day.

[0007] Another problem relates to rotation of a mattress that is encased in an encasement. For one thing, the mattress handles are covered by the encasement making an encased mattress difficult to rotate. The problem is especially acute if there is a bed skirt on the foundation. In that case, rotation of the mattress would move the bed skirt out of position, essentially requiring the mattress to be rotated by lifting the mattress and rotating the mattress while lifted.

[0008] Another problem relates to the fact that there is no standard size for a mattress. Commonly available mattresses are normally 4" to 18" in depth. Some available mattresses are 20" in depth or more. Although the length and width measurements of various mattresses are fairly standard, there are known differences in the lengths of the perimeters of the various mattresses. Although different encasement sizes are manufactured to accommodate the various mattress depths, known encasements do not address the differences in perimeter lengths. As such, the encasements, depending on the mattress size, do not always provide a snug fit relative to the mattress, which is highly undesirable from a housekeeping standpoint.

[0009] Thus, there is a need for an encasement that can easily be installed or removed for changing or laundering and facilitates rotation of the mattress to even out body impressions, even in applications which include a bed skirt and can accommodate a range of mattress depths.

SUMMARY OF THE INVENTION

[0010] Briefly, the present invention relates to an active encasement, which can be relatively easily installed or removed over a mattress supported by a foundation. The encasement is formed to encapsulate a mattress and includes a top panel, a bottom panel and four side panels. One or more of the four side panels are zippered together. In an embodiment with one, two, or three zippered side panels, the unzipped side panels may be configured to fixedly connect the top panel to the bottom panel. The top and bottom panels as well as the side panels may be made from a conventional or non-conventional encasement material or a material commonly used for mattress protectors, as well as conventional bedding material and/or waterproof and/or spill proof and/or moisture proof and/or anti-bacterial and/or anti-allergen and/or anti-mite and/or bed bug proof material, such as TPU polyurethane coated terry cotton, polyester knit, vinyl, bamboo fabric, or silver infused or coated type material (hereinafter “materials”), or any combination of the above. The underside of the top panel and optionally the inside of the side panels may be coated or embossed with a waterproof layer or coating, such as polyurethane, to form a waterproof membrane.

[0011] In accordance with an important aspect of one embodiment of the invention, an interior surface of the bottom panel is formed with a slick surface while the

exterior surface of the bottom panel faces outwardly and is adapted to be in contact with the foundation or bed skirt. In this embodiment, the exterior surface of the bottom panel of the encasement is formed as a non-slick surface. The non-slick surface provides a frictional relationship between the exterior surface of the bottom panel of the encasement and the foundation or bed skirt while the encasement is being installed, removed, or rotated, over a mattress. The slick interior surface of the bottom panel allows a mattress to be rotated once the bottom panel is juxtaposed between the mattress and the foundation in an application in which the encasement is unzipped and the top panel is disposed on the floor adjacent one end of the mattress. The present invention also facilitates installation and removal of the encasement over a mattress. Optional straps may be provided, rigidly affixed to the encasement. The straps allow the encasement to be snugged against the mattress to enable the encasement to be used with a relatively wide range of mattress depths and perimeter lengths and still provide a snug fit.

DESCRIPTION OF THE DRAWING

[0012] These and other advantages of the present invention will be readily understood with reference to the following specification and attached drawing wherein:

[0013] FIG. 1 is a side elevational view of one embodiment of an encasement in accordance with the present invention.

[0014] FIG. 1a is a bottom view of the encasement shown in FIG. 1 illustrating an optional air valve with an optional cap integrally formed in a bottom panel of the encasement.

[0015] FIG. 1b is a section view along line 1b-1b of FIG. 1a illustrating an optional filter, such as a HEPA filter attached to an interior or exterior surface of the encasement for filtering air into and out of the encasement.

[0016] FIG. 1c is an alternate embodiment of the invention in which a zipper is disposed in a short side panel on one end along three (3) edges of the side panel, illustrating the encasement zipped and unzipped.

[0017] FIG. 1d is similar to FIG. 1e but illustrating a zipper on a long side panel.

[0018] FIG. 2 is an isometric view of mattress supported by a foundation in which the mattress is covered with an encasement, shown with the encasement partially unzipped.

[0019] FIG. 2a is an enlarged partial exploded view of one corner of the mattress illustrated in FIG. 2.

[0020] FIG. 3 is an isometric view of a mattress covered with an encasement, shown removed from the foundation.

[0021] FIG. 4 is similar to FIG. 3 except illustrating a bed skirt covering the foundation.

[0022] FIG. 5 is an isometric view of a mattress and a foundation illustrating one person removing the mattress from the foundation covered with a bed skirt, shown with the mattress partially removed.

[0023] FIG. 6 is similar to FIG. 5, but shown with the mattress totally removed.

[0024] FIG. 7 is similar to FIG. 6, but illustrating a person installing a bed skirt on a foundation.

[0025] FIG. 8 illustrates the bed skirt installed and an encasement in accordance with the present invention laying on top of the foundation, shown fully unzipped with a bottom panel in contact with the foundation and the top panel on the floor at one end of the bed and a lower portion of the unzipped side panel resting on an inner surface of the bottom panel.

[0026] FIG. 9 is similar to FIG. 8 illustrating a person unfolding a portion of the side panel that was resting on the inner surface of the bottom panel so that side panel portions of the encasement are folded down over the sides of the bed skirt.

[0027] FIG. 10 illustrates a person sliding the mattress on top of the inner surface of the bottom panel of the encasement.

[0028] FIG. 11 illustrates a top panel of the encasement being placed over the top of the mattress.

[0029] FIG. 12 illustrates an upper side panel portion and a lower side panel portion being zipped together.

[0030] FIG. 13 illustrates the upper and lower side panel portions of an encasement being unzipped in preparation for rotation of the mattress.

[0031] FIG. 14 illustrates the top panel of an encasement removed from the mattress and draped on the floor at one end of the mattress.

[0032] FIG. 15 illustrates the lower side panel portions of the encasement being folded down over the bed skirt.

[0033] FIG. 16 illustrates rotation of the mattress while the encasement and bed skirt remains in place.

[0034] FIG. 17 illustrates the upper and lower side panel portions being zipped together after the top panel of the encasement has been re-positioned over the top of the mattress, as shown in FIG. 11.

[0035] FIG. 17a is an isomeric drawing of a single cover that may be incorporated with the present invention.

[0036] FIGS. 17b-17d illustrate the process of rotating a mattress using the cover illustrated in FIG. 17a.

[0037] FIG. 17e is an alternate embodiment of the cover illustrated in FIG. 17a illustrating an embodiment in which the side panels overlap a portion of the rectangular panel of the cover, shown in a position in which it is attached to the underside of a mattress.

[0038] FIG. 17f is similar to FIG. 17d but shown in a position in which the cover is flipped down over a foundation.

[0039] FIG. 17g is a bottom view of the embodiment illustrated in FIG. 17e.

[0040] FIG. 17h is a cross-sectional view of an alternate embodiment of an encasement.

[0041] FIG. 17i is a bottom view of the cover illustrated in FIG. 17h.

[0042] FIG. 18a is an isometric view of a first embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0043] FIG. 18b is an isomeric view of the optional adjustable belt and buckle installed in various locations of an encasement installed on a mattress.

[0044] FIG. 19a is an isometric view of a second embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0045] FIG. 19b is an isomeric view of the optional adjustable belt and buckle illustrated in FIG. 19a installed in various locations of an encasement installed on a mattress.

[0046] FIG. 20a is an isometric view of a third embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0047] FIG. 20*b* is an isometric view of the optional adjustable belt and buckle illustrated in FIG. 20*a* installed in various locations of an encasement installed on a mattress.

[0048] FIG. 21*a* is an isometric view of a fourth embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0049] FIG. 21*b* is an isometric view of the optional adjustable belt and buckle illustrated in FIG. 21*a* installed in various locations of an encasement installed on a mattress.

[0050] FIG. 22*a* is an isometric view of a fifth embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0051] FIG. 22*b* is an isometric view of the optional adjustable belt and buckle illustrated in FIG. 22*a* installed in various locations of an encasement installed on a mattress.

[0052] FIG. 23*a* is an isometric view of a sixth embodiment of an optional adjustable belt and buckle for use on an encasement in accordance with an alternate embodiment of the invention.

[0053] FIG. 23*b* is an isometric view of the optional adjustable belt and buckle illustrated in FIG. 23*a* installed in various locations of an encasement installed on a mattress.

[0054] FIG. 24 is an isometric view of a bed shown with an encasement encasing a mattress illustrating optional horizontal straps to snug the encasement relative to the mattress.

[0055] FIG. 25 is similar to FIG. 24 and illustrates an alternative embodiment of the horizontal straps illustrated in FIG. 24.

[0056] FIG. 26 is an isometric view of an alternate passive 6-sided mattress encasement illustrating zipper start/stop positions shown with expanded views illustrating alternate zipper stop positions.

[0057] FIG. 26*A* illustrates a blow up of a corner of the encased mattress, shown with the zipper stop spaced away from the corner of the encasement.

[0058] FIG. 26*B* is similar but shown with the zipper stop located at the corner of the encasement.

[0059] FIG. 27*A* is an isometric view of a 6-sided mattress encasement illustrating a bottom panel formed from 2 layers removed.

[0060] FIG. 27*B* is an isometric view of the encasement illustrated in FIG. 27*A* fully assembled but shown with the bottom panel on top.

[0061] FIG. 27*C* is an isometric view of the fully assembled encasement illustrated in FIG. 27*B* but shown right side up and opened up.

[0062] FIGS. 28-30 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

[0063] FIGS. 31-33 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

[0064] FIGS. 34-36 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

[0065] FIGS. 37-39 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

[0066] FIGS. 40-42 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

[0067] FIGS. 43-45 are isometric views of an alternate embodiment of the encasement illustrated in FIG. 26.

DETAILED DESCRIPTION

[0068] The present invention relates to a passive encasement which can be relatively easily installed or removed over a mattress supported by a foundation. The encasement is formed to encapsulate a mattress and includes a top panel, a bottom panel and four side panels and a conventional, or alternatively, a non-conventional, zipper and zipper enclosure, as well as zippers and zipper enclosures typically used for encasements (hereinafter “zipper”). As used herein, a side panel is understood to mean those portions or the encasement that contact the side panels of the mattress when the encasement is installed. One or more of the side panels are zippered together. In embodiments in which one, two, or three panels are zippered together, the unzipped side panel(s) may be configured to fixedly connect the top panel to the bottom panel. The top and bottom panels, as well as the side panels, may be made from a conventional encasement material or a material commonly used for mattress protectors, as well as conventional bedding material, as described above. The underside of the top panel and optionally the inside of the side panels may be coated with a waterproof coating, such as polyurethane, to form a waterproof membrane.

[0069] In alternative embodiments, the bottom panel may be formed to attach directly to the side panels of the encasement. In this embodiment, the top panel and side panels may be integrally formed and zipper directly to the bottom panel.

[0070] In accordance with an important aspect of the invention, the bottom panel is formed with a slick interior surface and a non-slick exterior surface. The exterior non-slick surface allows a mattress to be rotated without affecting the position of an underlying bed skirt in applications in which a bed skirt is covering the foundation while the slick interior surface facilitates rotation of the mattress. The present invention also facilitates installation and removal of the encasement over a mattress or a foundation, such as a box spring. Optional straps may be provided, rigidly affixed to the encasement. The straps allow the encasement to be snugged against the mattress or foundation to enable the encasement to be used with a relatively wide range of mattress and foundation depths and still provide a snug fit.

[0071] Four embodiments of the encasement are illustrated. FIGS. 1, 2, and 2*a* illustrate one embodiment of the encasement. FIGS. 1*a* and 1*b* illustrate an optional second embodiment. FIGS. 18*a*-23*b* illustrate a third embodiment. FIG. 24 illustrates a fourth embodiment. The features of all of the embodiments may be combined to form an additional embodiment of the encasement. All of the embodiments are suitable for use on a mattress or box spring.

[0072] In addition to the physical embodiments discussed above, a novel method for installing the encasement on a mattress is illustrated in FIGS. 5-12 while maintaining a bed skirt in place. FIGS. 13-17 illustrate a novel method for rotating a mattress with an encasement. FIG. 17*a* illustrates a modular component for the encasement which provides additional mattress management capabilities, as discussed below.

[0073] Referring first to FIGS. 1, 2 and 2*a*, a passive encasement in accordance with the present invention is shown and identified with the reference numeral 30. As shown, the encasement includes a top panel 32, a bottom panel 34 and four side panels. In this embodiment, three of the side panels 36 include a zipper 40 or other conventional

attachment means which define an upper side panel portion 42 and a lower side panel portion 44. In embodiments in which one or more of the four side panels are zippered together, the unzipped side panel 38 may be formed as a single piece that connects the upper panel 32 to the lower panel 34 on one side.

[0074] Alternatively, only one side panel of the encasement may be zippered, as illustrated in FIGS. 1c and 1d. Referring first to FIG. 1c, an embodiment is illustrated in which a short side panel of the encasement is zippered. FIG. 1d illustrates an embodiment in which a long side panel is zippered.

[0075] FIGS. 1a and 1b illustrate a second embodiment with an optional feature of the invention. Specifically an optional air valve, such as a conventional plastic air valve 49 with an optional a cap 51 attached thereto with a strap 53 may be integrated into the encasement 30. Specifically, the air valve may be attached anywhere on the encasement 30, for example, the top panel 32 or bottom panel 34 or one of the side panels 36 or 38. The valve 49 facilitates packing the encasement 30 for travel for use on hotel and motel mattresses. The valve 49 allows air to be removed to minimize the space the encasement will take in a suitcase or travel bag. The air may be removed manually or mechanically, for example, by way of a vacuum cleaner.

[0076] After the encasement 30 is used on a hotel or motel mattress, it is preferable to zip up the encasement 30, remove the air, as discussed above, and transport the encasement in a zipped-up condition until the encasement can be laundered. This is done to prevent mites, bed bugs, allergens, certain microbes, and the like from the hotel or motel mattress from being released in a suitcase or travel bag. A HEPA filter 55 (FIG. 1b) may be fixedly attached to an interior or exterior surface of the encasement, for example, the surface 46, to cover the airway of the valve 49 to prevent bed bugs or dust mites or bacteria or allergens picked up from the hotel or motel mattress from escaping through the air valve 49. Alternatively, the air valve can be omitted and a small aperture formed anywhere on the encasement covered with a HEPA filter may be used.

[0077] Referring back to FIGS. 1 and 2, the top panel 32 and bottom panel 34 are generally rectangular in shape and are configured to fit the length and width of standard bed sizes. US standard mattress sizes are provided below in Table 1. It is to be noted that the principles of the invention are also applicable to non-US mattress sizes, as well as non-standard sizes. As will be discussed below, the principles of the invention also apply to mattresses having different depths, even so-called “deep pocket” mattresses.

TABLE 1

US Standard Mattress Sizes		
Common Term	Length × width dimension in inches	Length × width dimension in centimeters
Twin	39 × 75	99 × 190
X-Long Twin	39 × 80	99 × 203
Full	54 × 75	137 × 190
Queen	60 × 80	153 × 203
King	76 × 80	198 × 203
California King	72 × 84	182 × 213

[0078] The encasement 30 in accordance with the present invention provides standard protection for a mattress from

spills and/or allergens and/or parasites and/or stains but also provides additional features which relate to the management of the mattress, as discussed below. These features are provided by the novel construction of the encasement 30.

[0079] More particularly, the bottom panel 34 is configured to facilitate various mattress management features without compromising the ability of the encasement 30 to provide protection from spills and/or allergens and/or parasites and/or stains. Specifically, the bottom panel 34 includes an interior surface 46 and an exterior surface 48. The interior surface 46 is formed with a slick surface while the exterior surface 48 is formed with a non-slick surface.

[0080] Various materials described below can be used for the bottom panel 34 having a slick interior surface 46 and a non-slick exterior surface 48. All of the materials used for the encasement 30 may be launderable. As used herein, the terms “slick” and “non-slick” refer to their respective relative co-efficient of friction. In other words, the present invention contemplates materials in which the “slick” surface has a relatively lower co-efficient of friction than the “non-slick” surface. Exemplary materials are provided below. As used herein, the materials and or coatings may be formed as a single layer or multiple layers.

[0081] The non-slick exterior surface 48 can be created on one side of a slick material by way of a coating or sewing or fusing a non-slick backing to one side of the non-slick material. Various conventionally available materials are suitable for the bottom panel 34 having a slick interior surface 46 on one side and a non-slick exterior surface 48 on an opposing side. For example, 70 Denier Heat Sealable (back-side) 100% Nylon Rip Stop material is suitable for use for the bottom panel 34. Other materials with similar coefficients of friction with a coating on one side, for example, urethane, silicone, or coated or bonded or sewn or fused thermal plastic or heat sealable coatings are also suitable.

[0082] Such nylon or polyester rip stop material is known to come in widths of 32-104" inches wide and weigh about 0.9 to 4.4 ounces per square yard. Such material can easily be pieced together to accommodate various mattress widths if necessary. Nylon or polyester rip stop material suitable for use with the present invention is available from various sources, such as, Quest Outfitters of Sarasota, Fla. (<http://questoutfitters.com>). Nylon taffeta material is also suitable and is described in detail at http://questoutfitters.com/coated.html#HEAT_SEALABLE, hereby incorporated by reference. Suitable nylon or polyester taffeta material is also available from Rockywoods in Loveland, Colo. (<http://www.rockywoods.com>). Their nylon taffeta material is described in detail at <http://www.rockywoods.com/Fabrics-Hardware-Patterns-Kits/Medium-Weight-Nylon-Fabrics/Heat-Sealable-70-Denier-Nylon-Taffeta>, hereby incorporated by reference.

[0083] Non-woven materials may also be used for the bottom panel 34 having a slick interior surface 46 and a non-slick exterior surface 48. For example, Tyvek® polyethylene non-woven fabric, as manufactured by the DuPont Corporation and described in detail at http://www2.dupont.com/Products_and_Services/en_VN/nwn.html may be used. Other materials having two slick sides can also be used, such as, silicone impregnated nylon rip stop, for example, as available from Seattle Fabrics, Inc., <http://www.seattlefabrics.com/nylons.html>. Other materials can also be used with a coating applied to one side. Moreover, different materials can be used for each cover in an application.

[0084] Various other materials with a slick side and a non-slick side are also suitable for the bottom panel 34. For example, the following exemplary materials may be used:

- [0085] warp-knit fabric with a polyurethane laminate coating or a silicone coating.
- [0086] a non-woven material with a polyurethane laminate coating or a silicone coating.
- [0087] Tricot fabric with a polyurethane backing or a silicone coating.
- [0088] neoprene fabric with a polyurethane backing or a silicone coating.
- [0089] ballistic nylon or polyester fabric with polyurethane backing or a silicone coating.
- [0090] polyester knit fabric with a polyurethane backing or a silicone coating.
- [0091] cotton/polyester terry fabric with a polyurethane backing or a silicone coating.
- [0092] jacquard knit fabric with a polyurethane backing or a silicone coating.
- [0093] coral fleece fabric with a polyurethane backing or a silicone coating.
- [0094] microfiber/polyester knit with polyurethane backing or a silicone coating.
- [0095] a stitch bond fabric with a polyurethane laminate coating or a silicone coating.
- [0096] nylon or polyester rip stop with a silicone coating on one side and a polyurethane coating on the other side
- [0097] typical plastic sheeting with nylon or polyester rip stop with a silicone coating on one side and a polyurethane coating on the other side
- [0098] woven or non-woven fiberglass fabric with a silicone coating on one side and a polyurethane coating on the other side
- [0099] a stitch bond fabric, available from Tietex, item no 944164, style no. C243, wherein the fabric is 32% rayon, 22% polyester, 6% twaron and 40% coat.
- [0100] calendared nylon or polyester rip stop with a silicone coating on one side and a polyurethane coating on the other side
- [0101] calendared nylon or polyester taffeta with a silicone coating on one side and a polyurethane coating on the other side
- [0102] calendared suitable fabric with a silicone coating on one side and a polyurethane coating on the other side
- [0103] Materials having a similar co-efficient of friction and porosity characteristics may also be used. All such materials are considered to be within the broad scope of the invention.
- [0104] The following textile materials may also be used for the various surfaces discussed above. These textile materials can be used uncoated, coated, layered, bonded, laminated, embossed, impregnated, backed, or etched on one or both sides as indicated below to control the co-efficient of friction to create a slick surface or a non-slick surface relative to the co-efficient of friction on the opposite side.
- [0105] 70 DENIER×70 DENIER NYLON RIPSTOP
- [0106] 70 DENIER×70 DENIER POLYESTER RIPSTOP
- [0107] 70 DENIER NYLON & POLYESTER BLEND
- [0108] 70 DENIER NYLON TAFFETA
- [0109] 70 DENIER POLYESTER TAFFETA
- [0110] 30 DENIER POLYESTER OR NYLON RIPSTOP OR TAFFETA

- [0111] 210 DENIER OXFORD NYLON
- [0112] 210 DENIER OXFORD POLYESTER
- [0113] 210 DENIER NYLON & POLYESTER BLEND
- [0114] NEOPRENE
- [0115] BALLISTIC NYLON OR POLYESTER OR POLYESTER BLEND
- [0116] WARP-KNIT FABRIC
- [0117] POLYVINYL CHLORIDE (PVC)
- [0118] POLYETHYLENE SHEETING
- [0119] POLYPROPYLENE SHEETING
- [0120] NON-WOVEN FABRIC
- [0121] OLEFIN
- [0122] POLYOLEFIN
- [0123] POLYETHYLENE (PE, LLDPE, HDPE)
- [0124] POLYPROPYLENE
- [0125] STITCH-BOND FABRIC
- [0126] COTTON BLEND
- [0127] TERRY MATERIAL
- [0128] TRICOT
- [0129] NYLON COATED MATERIAL
- [0130] POLYESTER COATED MATERIAL
- [0131] PRESSURE SENSITIVE BACKED MATERIAL
- [0132] LAMINATED MATERIAL
- [0133] HIGH DENSITY & MOLECULAR WEIGHT POLYETHYLENE FILM
- [0134] POLYETHYLENE VINYL ACETATE
- [0135] The following materials may be coated, laminated, bonded, impregnated, embossed, fused, layered between, or backed onto a side of the textile material(s) to provide a relatively high co-efficient of friction and thus may be used to provide a relatively non-slick surface, relative to the opposite side.
- [0136] POLYURETHANE
- [0137] POLYVINYL CHLORIDE (PVC)
- [0138] POLYETHYLENE VINYL ACETATE
- [0139] THERMO PLASTIC
- [0140] RUBBER
- [0141] HEAT SEALABLE
- [0142] WATER REPELLENT
- [0143] ACRYLIC
- [0144] ADHESIVE
- [0145] RAISED NUBS or PATTERN
- [0146] BLENDED COATING OF ANY OF THE ABOVE
- [0147] UNCOATED or utilizing the inherently low friction coefficient of an uncoated fabric
- [0148] FOAM coated/laminated/bonded/impregnated/backing
- [0149] SILICONE coated/laminated/bonded/impregnated/backing
- [0150] BLENDED POLYMER coated/laminated/bonded/impregnated/backing
- [0151] NYLON coated/laminated/bonded/impregnated/backing
- [0152] POLYESTER coating coated/laminated/bonded/impregnated/backing
- [0153] THERMOPLASTICS ELASTOMER (TPE) coated/laminated/bonded/impregnated/backing
- [0154] The following materials may be coated, laminated, bonded, impregnated, embossed, fused, layered between, or backed onto a side of the textile material(s) to provide a

relatively low co-efficient of friction and thus may be used to provide a relatively slick surface, relative to the opposite side.

- [0155] SILICONE
- [0156] TEFLON
- [0157] PETROLEUM BASE
- [0158] POLYURETHANE
- [0159] DIRT WEAR RESISTANT
- [0160] HEAT SEALABLE
- [0161] BLENDED COATING OF ANY OF THE ABOVE
- [0162] SLICK FIBER WOVEN INTO FABRIC
- [0163] UNCOATED with an inherently low friction coefficient
- [0164] BLENDED POLYMERS
- [0165] NYLON
- [0166] POLYESTER
- [0167] THERMOPLASTIC ELASTOMER
- [0168] POLYETHYLENE VINYL ACETATE

[0169] The top panel 32 is formed with an interior surface 52 and an exterior surface 50. The interior surface 52 may be formed with a waterproof coating or membrane, for example, polyurethane or other conventional waterproof coating. The exterior surface 50 may be formed from cotton or other common encasement material or a material commonly used for mattress protectors, as well as conventional bedding or launderable fabric, such as polyester or a polyester-cotton. The waterproof membrane may be coated on one side of the upper panel 32.

[0170] Various other materials can be used which are waterproof and/or spill proof and/or, moisture proof and/or anti-bacterial and/or anti-allergen and/or anti-dust mite and/or bed bug proof. For example, a bamboo knit fabric with a TPU or PU lamination. Bamboo is naturally occurring anti-bacterial material. The TPU or PU lamination provides waterproofing and anti-allergen, anti-dust-mite, and anti-bed bug protection. Other fabrics with a nano-silver finish with a TPU or PU coating. The nano-silver finish is a non-allergic material. These materials can be used alone or in combination with other materials disclosed herein.

[0171] Various configurations for the side panels 36 and 38 are contemplated. For example, the side panels 36 and 38 may be formed from the same material as the bottom panel 34 or the top panel 32 or alternatively from other conventional materials, for providing stain and/or allergen and/or parasite protection. The side panel 38 may be integrally formed with either the top panel 32 or the bottom panel 34. The split side panels 36 define upper and lower side panel portions 42 and 44, respectively, and may be formed from the same material as the bottom panel 34 or top panel 32.

[0172] The upper and lower side panel portions 42 and 44, respectively, may be permanently attached to the upper panel 32 and lower panel 34, respectively, by permanent conventional and/or non-conventional means, such as by sewing and/or RF welding and/or heat sealing and/or dielectric sealing and/or welding and/or ultrasonic sealing and/or heat sealing and/or bonding and/or utilizing adhesive and/or weaving and/or may be formed as part of the upper and lower panels 32 and 34. Moreover, the upper and lower side panel portions 42 and 44, respectively, may be formed as a continuous strip serving all three side panels 36. The zipper 40 may be attached to the upper portion 42 and the lower portion 44 of the side panels 36 by permanent conventional means, such as sewing and/or RF welding and/or heat

sealing and/or dielectric sealing and/or welding and/or ultrasonic sealing and/or heat sealing and/or bonding and/or utilizing adhesive and/or weaving.

[0173] In order to facilitate installation of the encasement on a mattress or foundation, a zipper 40 is provided from corner to corner on each of the zippered side panels 36. The zipper 40 may be a conventional zipper that extends from one corner 54 on one side to the corner 56 on the third side, for example. The zipper 40 may be attached to the upper portion 42 and the lower portion 44 of the side panels 36 by permanent conventional and/or non-conventional means, such as by sewing and/or RF welding and/or heat sealing and/or dielectric sealing and/or welding and/or ultrasonic sealing and/or heat sealing and/or bonding and/or utilizing adhesive and/or or weaving. As will be discussed in more detail below, the configuration of the zipper 40 facilitates installation of the encasement and also facilitates rotation of the mattress 58.

[0174] FIGS. 17h and 17i illustrate an alternate embodiment of the encasement 30, illustrated in FIG. 1. In this embodiment, the encasement is configured to reduce the need for coatings on the material. Referring to FIG. 17h, an encasement 230 is illustrated. The encasement 230 is similar to the encasement 30 (FIG. 1) and may be used with a separate cover, such as the cover 66 (FIG. 17a) or the cover 201 (FIGS. 17g-17i).

[0175] This embodiment includes a top cover 232, side covers 236 and a zipper 240, as well as a bottom panel 247. Except for the bottom panel 247, the encasement 230 is similar to the encasement 30, illustrated in FIG. 1. In this embodiment, the bottom panel 247 may be formed from a homogeneous material with no coatings in which both sides are slick. Alternatively, the rectangular panel 203 can include a slick or non-slick coating on one side or be made from a slick or non-slick material. As shown best in FIG. 17h, the side panels 236 are formed to be extended so that the extensions 249 can be folded down over to overlap the underside of the bottom cover 247 and attached thereto by stitching or other permanent conventional means. In this embodiment, the side panels 236 are formed from a non-slick material, and may reduce the need to provide any coatings on the bottom panel 247. Similarly, the side panels 236 may be made from another homogeneous material with no coatings in which both sides are non-slick. Alternatively, the side panels 236 can include non-slick coatings and may be made from slick or non-slick material.

[0176] FIG. 2 illustrates a mattress 58 covered by an encasement 30, supported by a foundation 60. As shown, the zipper 40 is partially unzipped. FIG. 2a illustrates the zipper extending to the corner 56 of the encasement 30, for example.

[0177] FIGS. 3 and 4 illustrate a mattress covered by an encasement 30, shown removed from a foundation 60. FIG. 3 illustrates an application in which does not include a bed skirt 62. FIG. 4 is similar to FIG. 3 but illustrates a bed skirt 62 covering the foundation 60. As will be discussed in detail below, the mattress management features provided by the encasement 30 in accordance with the present invention work equally well whether or not a bed skirt 62 is provided on the foundation 60.

[0178] In accordance with one aspect of the invention, FIGS. 5-12 illustrate the installation of a bed skirt over a foundation and installation of an encasement 30 over a mattress 58 supported by a foundation 60. Unlike known

encasements, installation and removal of the encasement 30 does not require extensive lifting of the mattress 58, as discussed above. In addition to facilitating installation and removal of the encasement over a mattress 58, the encasement 30 provides various mattress management features, such as:

[0179] Holding a bed skirt 62 in place while the encasement 30 is being installed on the mattress 58.

[0180] Holding a bed skirt 62 in place while the mattress 58 is being rotated.

[0181] Enabling the mattress 58 to be more easily rotated without lifting the mattress 58.

[0182] Enabling the mattress 58 to be easily installed or removed to change and/or launder the bed skirt or the encasement.

[0183] Turning first to FIG. 5, the mattress 58 is slid off the foundation 60 and stood on one end, as illustrated in FIG. 6. If desired, a bed skirt 62 may be installed or removed over the foundation 60, as illustrated in FIG. 7. An important aspect of the encasement 30 is that it will hold the optional bed skirt 62 in place while the mattress 58 is being installed or removed or rotated on top of the foundation 60, with or without a bed skirt, and also while the mattress 58 is encased in an encasement 30 is rotated, as discussed below. The non-slick exterior surface 48 (FIG. 1) on the bottom panel 34 of the encasement 30 secures the bed skirt 62 in place. More particularly, as illustrated in FIG. 8, the encasement 30 is completely unzipped and placed on top of the foundation 60 or bed skirt 62, as shown. The encasement 30 is placed on top of the bed skirt 62 with the non-slick exterior 48 of the bottom panel 34 in contact with the bed skirt 62. The top panel 32 of the encasement 30 is draped on the floor on one end of the mattress. As shown in FIG. 8, the bottom portions 42 of the side panels 36 are resting on top of the slick interior surface 46 of the bottom panel 34. In applications without a bed skirt 62, the non-slick outer surface 48 of the bottom panel 34 will be in contact with the foundation 60.

[0184] As shown in FIG. 9, the bottom portions 44 of the side panels 36 are folded down to be in contact with the bed skirt 62 or alternatively, the foundation 60. Once the bottom portions 42 of the sides 36 are completely folded down, the mattress 58 is slid in place over the interior surface 46 of the bottom panel 34 of the encasement 30, as illustrated in FIG. 10. The interior surface 46 of the bottom panel 34 is formed with a slick surface to facilitate sliding the mattress 58 into place. The non-slick exterior surface 48 of the bottom panel 34 holds the encasement 30 in place over the bed skirt 62 or foundation 60 while the mattress 58 is being slid in place.

[0185] Once the mattress 58 is in place, the top panel 32 of the encasement 30 is placed over the top of the mattress 58, as shown in FIG. 11. The encasement 30 is then zipped up by way of the zipper 40, as shown in FIG. 12.

[0186] FIGS. 13-17 illustrate a novel method of mattress management which relates to rotating a mattress 58 with an encasement 30. As mentioned above, mattresses can be relatively heavy and difficult to rotate. Moreover, an encasement 30 covers up the mattress handles making it even more difficult to rotate the mattress. The novel method for rotating a mattress with an encasement overcomes these problems.

[0187] Initially, as shown in FIG. 13, the zipper 40 is unzipped around all three side panels 36. Once the zipper 40 is unzipped, the top panel 32 is draped on the floor on one end of the mattress, as shown in FIG. 14. Next, as illustrated in FIG. 15, the lower portions 44 of the side panels 36 are

folded down to be in contact with the bed skirt 62 or alternatively the foundation 60 in applications where a bed skirt 62 is not used. Once the lower portions 44 of the side panels 36 are all folded down, the mattress 58 can be rotated in a horizontal plane, for example, 180 degrees, as generally illustrated in FIG. 16. This is done to even out mattress wear and body impressions or indentations. In this application, the mattress handles are exposed to facilitate rotation. The slick interior surface 46 of the bottom panel 34 facilitates rotation while the non-slick exterior surface 48 of the bottom panel 34 holds the bottom panel 34 in place against the bed skirt 62 or alternatively, the foundation 60.

[0188] Once the mattress 58 is rotated in place, the top cover 32 is placed over the mattress 58, as shown in FIG. 11. The encasement 30 is then zipped up by way of the zipper 40, as shown in FIG. 17.

[0189] In an alternate embodiment, various mattress management features can be accomplished can also be accomplished with a modular component; namely a cover 66, for example, as illustrated in FIG. 17a-17d. The cover 66 may include a rectangular panel 68 and four side panels, generally identified with the reference numeral 70. The cover 66 may be configured with the same length and width dimensions as the encasement 30. One side 67 of the cover 66 is provided with a slick surface and an opposing side 69 of the cover 66 is provided with a non-slick surface. The side panels 70 may be formed from a stretchable material to enable the cover 66 to be held in place over a foundation 60 and optionally a bed skirt 62 or optionally a mattress 58 with an encasement. Alternatively, the cover 66 may be formed without sides. A suitable cover is described in detail in US Patent Application Publication No. U.S. 2013/0019411 A1, hereby incorporated by reference.

[0190] An alternate embodiment of the cover 66 is illustrated in FIGS. 17e, 17f and 17g and identified with the reference numeral 201. In this embodiment, the cover 201 includes a rectangular panel 203 and four (4) side panels 206. As shown best in FIG. 17e, the side panels 206 are extended and are folded over so as to overlap the underside of the rectangular panel 203. In this embodiment, the rectangular panel 203 may be made from a homogeneous material with no coatings in which both sides are slick. Alternatively, the rectangular panel 203 can include a slick or non-slick coating on one side or be made from a slick or non-slick material. Similarly, the side panels 206 may be made from another homogeneous material with no coatings in which both sides are non-slick. Alternatively, the side panels 206 can include or non-slick coatings and may be made from slick or non-slick material. The overlapping side panels 206 are fastened to the underside of the rectangular panel 203 by stitching or other permanent conventional means. By eliminating fabric coatings, the cover 201 can be made much less expensively than the cover 66. Alternatively, the cover 66 (FIG. 17a) as well as the cover 201 (FIGS. 17e-17g) may be formed from a single bottom panel with no side panels and attached to the encasement 30 (FIG. 1) by way of conventional or non-conventional fasteners, or not attached. The covers 66 and 201 may be attached by way of conventional means, such as Velcro, hook and loop, straps and/or buckle, buttons, snaps, zippers or other conventional fasteners as illustrated in FIGS. 18a, 19a, 20a, 21a, 22a, 23a, 24, and 25.

[0191] As used herein, the terms "attach" or "attached" means the side panels of the cover 66 (FIG. 17a), 201

(FIGS. 17e-17g) are juxtaposed over the sides of the encasement 30 or foundation 60 or bed skirt 62. Alternatively, “attach” or “attached” means attached by way of conventional fasteners, for example, as described herein.

[0192] In this application, in a normal mode of operation, as illustrated in FIG. 17b, the cover 66 is attached over the encasement 30 and over the zipper 40 so that the non-slick surface 69 of the cover 66 is in contact with the bed skirt 62 or foundation 60 and the slick surface 67 of the cover 66 is in contact with the encasement 30. In this mode of operation, the side panels 70 of the cover 66 may be configured to hide the zipper 40 on the encasement 30. Since the non-slick surface 69 of the cover 66 is in contact with the foundation 60 or bed skirt 62, the mattress 58 will not rotate.

[0193] In order to rotate the mattress 58 without removing the encasement 30, the cover 66 or the alternate cover consisting of a bottom panel with no side panels is detached if attached from the mattress 58 and encasement 30 and attached or juxtaposed over the bed skirt 66 or foundation 60 defining a rotate mode of operation. In this mode of operation, the non-slick surface 69 of the cover 66 will be in contact with the foundation 60 or bed skirt 62. The slick surface 67 of the cover 66 will be in contact with the exterior surface 48 of the bottom panel 34 of the encasement 30, as shown in FIGS. 17c and 17d. Even though the slick surface 67 of the cover 66 is in contact with the exterior surface 48 of the bottom panel 34, the slick surface 67 of the cover 66 will allow the mattress 58 to rotate while the non-slick surface 69 of the cover 66 holds the bed skirt 62 in place over the foundation 60. The mattress 58 can then be rotated 180 degrees, for example, in a horizontal plane, as illustrated in FIG. 16, without removing the encasement 30 from the mattress 58 while holding the bed skirt 62 in place. After the mattress 58 is rotated, the cover 66 may be re-attached to the encasement 30, which is over the underside of the mattress.

[0194] In embodiments, as illustrated in FIGS. 17e-17g, the side panel extensions 207 (FIG. 37a) may be formed from a slick material or material with a slick coating to facilitate tucking the sheets between the mattress 58 and a foundation 60 or platform. Alternatively, the side panel extensions 207 may be formed from a non-slick material or coated with a non-slick coating one or both sides. As mentioned above, although the length and width dimensions of mattresses are standard, the depth dimensions vary considerably. In order to reduce the number of encasements that need to be manufactured, encasements are known to be manufactured to accommodate several depths for each mattress standard length and width size. A few commonly available encasements have depth ranges as set forth below.

- [0195] 6-9" depth
- [0196] 7-12" depth
- [0197] 9-12" depth
- [0198] 11-18" depth

[0199] Unfortunately, depending on the actual mattress depth, such encasements do not provide a snug fit. For example, a 6 inch depth mattress will not fit very snug in an encasement made to fit mattresses 6 to 9 inches thick.

[0200] In order to provide a snug fit for encasements relative to the depth of mattresses and foundations, exemplary optional adjustable straps 72-82 are illustrated in FIGS. 18a-23a, respectively. Other adjustable straps are suitable. These adjustable straps are connected between the upper portion 42 and the lower portion 44 of the side panels 36, as shown in FIGS. 18b-23b. The straps 72-82 may also

be provided on the fixed side or un-zippered side panel 38 (FIG. 1) to allow the encasement 30 to be snugged up against the mattress. The side panels 36 and 38 may be pleated to allow the excess portions to be neatly folded. The straps 72-82 may also be used to attach and snug the cover 66 (FIG. 17a) to the encasement 30.

[0201] The straps illustrated in FIGS. 18a-23a may be incorporated with conventional and non-conventional encasements or alternatively in combination with the novel encasement 30 illustrated in FIG. 1 and described herein. All of such embodiments are contemplated by the present invention.

[0202] FIG. 24 illustrates optional horizontal straps, generally identified with the reference numeral 86. These horizontal straps 86 can be used to snug the encasement 30 with respect to the mattress 58 in a horizontal direction. The straps 86 may be disposed below the zipper 40. As shown, Velcro® cinch type straps may be provided. Other means are contemplated for tightening the encasement 30 relative to the mattress 58. For example, the straps 72-82, discussed above, as well as buttonholes and buttons, or other conventional means may be used. It is also contemplated that combinations of vertical and horizontal straps can be used.

[0203] FIG. 25 illustrates an alternate embodiment of the horizontal adjustment devices 86 in FIG. 24. In this embodiment, a ring 88 is provided to enable the strap 86 to be looped therethrough and tightened. Both embodiments, illustrated in FIGS. 24 and 25 may be used as horizontal adjustment devices, as shown, and/or vertical adjustment devices.

[0204] In accordance with another aspect of the invention, the encasement 30 (FIG. 1) can be configured so that a bottom portion of the encasement 30 is standard for all encasement depths. In this embodiment, a top portion of the encasement 30 is formed to accommodate various encasement depths. In such an embodiment, the encasement 30 is zippered on all four sides. The top portion includes the top panel 32 and the upper portions 42 of all four side panels 36. The bottom portion includes the bottom panel 34 and the lower portions 44 of all four side panels 36. In this embodiment, the transverse length (normal to the longitudinal length) of the upper portion 42 and the lower portion 44 of the side panels are not equal. The transverse length of the lower portion 44 of the side panel 36 may be set to a standard value. In order to accommodate encasements of different depths, the transverse length of the upper portions 42 of the side panels may vary as function of the overall depth of the encasement.

[0205] For example, a bottom portion of the encasement with a transverse length of 4 inches may be used with 8 inch and 10 inch encasements. For an mattress encasement with an 8 inch depth, an upper portion 42 with a 4 inch transverse length is used along with the 4 inch lower portion 44. For a 10-inch encasement, an upper portion 42 with a 6-inch transverse length is used along with the 4 in lower portion 44. Thus, the bottom portion of the encasement 30 may be standardized for different encasement depths.

[0206] FIGS. 26-45 illustrate alternate embodiments of the invention. Turning first to FIG. 26, an alternate embodiment of a passive 6-sided mattress encasement illustrating zipper start and stop positions. As shown, a mattress encased by an encasement 200 is shown supported by a foundation 202. The encasement 200 includes a zipper 204 shown partially open on one end.

[0207] FIG. 26A illustrates a blow up of a corner 208 of the encased mattress, shown with the zipper stop 206 spaced away from the corner 208 of the encasement. This allows an unzipped encasement top 207 to be at least partially removed from the mattress top to allow the mattress to slide relative to an interior surface of the encasement bottom.

[0208] FIG. 26B is similar but shown with the zipper stop 210 located at the corner 208 of the encasement. The zipper 204 may start and stop anywhere on the mattress encasement to allow a top portion of the encasement 200 to be at least partially removed from the mattress top so as to allow the mattress to be installed, removed, moved or maneuvered with respect to the interior surface of the bottom panel of encasement 200.

[0209] FIG. 27A is an isometric view of a 6-sided mattress encasement 220 illustrating a bottom panel 230 formed from 2 layers 231, 232, shown removed. FIG. 27B is an isometric view of the encasement illustrated in FIG. 27A but shown fully assembled but shown with the bottom panel on top. FIG. 27C is an isometric view of the fully assembled encasement illustrated in FIG. 27B but shown right side up and opened up.

[0210] Referring first to FIG. 27A, the passive encasement 220 includes an upper panel 222, a zipper 224, an upper side panel portion 226 and a lower side panel portion 228. The bottom panel 230 is formed from 2 layers of material; a top layer 230 and a bottom layer 232. The top layer 230 may be nylon ripstop or silicone coated or impregnated nylon ripstop. The bottom layer 232 may be polyurethane coated polyester knit fabric material. An interior panel surface of the top panel 230 material 231 may be either slick or slick coated to facilitate mattress installation and maneuvering. The exterior bottom panel 234 may be of conventional or non-conventional mattress protector material that is either inherently non-slick or coated to be relatively non-slick relative to the interior panel surface.

[0211] With reference to FIG. 27B, the 2-ply bottom panel 230 layers 231 and 232 may be stitched together along their perimeters. The two or more layers 231, 232 making up the bottom panel 230 may be attached together at least one point 236 within the perimeter of at least one layer 231, 232 of the 2-ply bottom panel 230. The two or more layers 231 and 232 making up the bottom panel 230 may be formed from 2 or more fabric layers at least partially attached together along the perimeter of the fabric layers 231 and 232. The layers 231 and 232 may be the same size and shape or may be of varying sizes and shapes relative to one another.

[0212] As shown in FIG. 27C, the zipper 224 is shown along 3 sides of the encasement. The zipper 224 may also be along 4 sides to allow the top portion 222 to be removable.

[0213] FIGS. 28-30 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 28 is an isometric view of an embodiment of an encasement 240, shown with its bottom panel 241 formed from 2 layers 242 and 244 removed. FIG. 29 is an isometric view of the encasement illustrated in FIG. 28 fully assembled but shown with the bottom panel on top. FIG. 30 is an isometric view of the fully assembled encasement illustrated in FIG. 28 but shown right side up and opened up.

[0214] With reference to FIG. 28, the bottom panel 241 may include air vent holes 246 or air vent corner cut-outs 248 on either on one layer 242 (as shown) or both layers 242 and 244. FIG. 29 illustrates an embodiment in which the corner cut-outs 248 are provided on the layer 244 but not the

layer 242. In such an embodiment, the inside material layer 252 of the bottom panel 244 will be exposed through the cut out 248. FIG. 30 illustrates an embodiment in which the air vent holes 246 and air vent cut outs are provided on the inner layer 242.

[0215] FIGS. 31-33 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 31 is an isometric view of an embodiment of an encasement 260, shown with its bottom panel 261 formed from 2 layers 263 and 264 removed. FIG. 32 is an isometric view of the encasement 260 illustrated in FIG. 31 fully assembled but shown with the bottom panel 261 on top. FIG. 33 is an isometric view of the fully assembled encasement illustrated in FIG. 32 but shown right side up and opened up.

[0216] Referring to FIG. 31, a top surface of the layer 262 may be formed from a non-slick material or a non-slick coated material or may be the same material as the layer 264 or any other part of the encasement 260. Referring to FIGS. 32 and 33, an optional stitch pattern 266 may define an inflatable volume or may be within the perimeter of the inflatable volume.

[0217] FIGS. 34-36 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 34 is an isometric view of an embodiment of an encasement 280, shown with its bottom panel 281 formed from 2 layers 283 and 284 removed. FIG. 35 is an isometric view of the encasement 280 illustrated in FIG. 34 fully assembled but shown with the bottom panel 281 on top. FIG. 36 is an isometric view of the fully assembled encasement illustrated in FIG. 34 but shown right side up and opened up.

[0218] Referring first to FIG. 34, the top surface 282 of the layer 283 may be formed from a slick material or have a slick coating. A top surface 285 of the bottom layer 284 may be TPU coated poly knit material. The bottom surface 287 of the bottom layer 283 may be formed with a poly knit fabric or formed with a non-slick surface or may be the same material as the sides and/or any surface of the encasement.

[0219] FIGS. 37-39 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 37 is an isometric view of an embodiment of an encasement 300, shown with its bottom panel 301 formed from 2 layers 303 and 304 removed. FIG. 38 is an isometric view of the encasement 300 illustrated in FIG. 37 fully assembled but shown with the bottom panel 301 on top. FIG. 39 is an isometric view of the fully assembled encasement illustrated in FIG. 37 but shown right side up and opened up.

[0220] Referring to FIG. 37, the surface 302 of the top layer 303 may be coated with a slick material or coated with a slick material. The surface 307 of the layer 304 may be an inherent typical encasement outer fabric layer. As illustrated in FIGS. 38 and 39, an optional attachment point 309 may be provided that connects both layers 303 and 304 of the bottom panel 301.

[0221] FIGS. 40-42 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 40 is an isometric view of an embodiment of an encasement 310, shown with its bottom panel 311 formed from 2 layers 313 and 314 removed. FIG. 41 is an isometric view of the encasement 310 illustrated in FIG. 40 fully assembled but shown with the bottom panel 311 on top. FIG. 39 is an isometric view of the fully assembled encasement illustrated in FIG. 41 but shown right side up and opened up.

[0222] Referring to FIG. 40, one or more vent holes 321 or corner cut-outs 323 may be provided on one or both of the

layers 313 and 314 to allow water to drain upon washing. FIGS. 41 and 42 illustrate an embodiment in which the cut-outs 323 are only provided on the bottom layer 314. FIGS. 41 and 42 also illustrate an optional attachment point 319 which may be formed from any stitch or attachment means.

[0223] FIGS. 43-45 illustrate an alternate embodiment of the encasement illustrated in FIGS. 27A-27C. Specifically, FIG. 43 is an isometric view of an embodiment of an encasement 330, shown with its bottom panel 331 formed from 2 layers 333 and 334 removed. FIG. 44 is an isometric view of the encasement 330 illustrated in FIG. 43 fully assembled but shown with the bottom panel 331 on top. FIG. 45 is an isometric view of the fully assembled encasement illustrated in FIG. 43 but shown right side up and opened up.

[0224] A surface 332 on the top layer 333 may be formed from a non-slick material or coated with a non-slick coating or may be the same material as the layer 334 or any other part of the encasement. The bottom panel 334 may be formed with an optional stitch pattern 336.

[0225] Obviously, many modifications and variations of the present invention are possible in light of the above teachings. For example, materials for the covers and slick surfaces other than those mentioned above can be which have similar co-efficient of friction characteristics. Thus, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described above.

[0226] What is claimed and desired to be secured by a Letters Patent of the United States is:

I claim:

1. An encasement for a mattress or foundation comprising:

- a rectangular top panel defining an exterior surface and an interior surface;
- a rectangular bottom panel having a slick interior surface and a non-slick exterior surface;
- a fixed side panel connecting one side of said top panel to one end of said bottom panel;
- a plurality of side panels, each side panel defining an upper portion and a lower portion, said upper portions connected to said upper panel and said lower portions connected to said bottom panel; and
- a zipper for connecting said upper portions to said lower portions.

2. The encasement as recited in claim 1, wherein said top panel, bottom panel and said side panels including said fixed side panel are made from a launderable material.

3. The encasement as recited in claim 1, wherein said top panel, bottom panel and said side panels including said fixed side panel are made from encasement material or a material commonly used for mattress protectors, as well as conventional bedding material.

4. The encasement as recited in claim 1, wherein said exterior surface of said top panel is made from a launderable material and said interior surface is formed from a waterproof material.

5. The encasement as recited in claim 1, wherein said upper portions and said lower portions of said side panels are formed as continuous strips.

6. A method for installing an encasement on a mattress supported by a foundation, the method comprising the steps of:

- (a) removing the mattress from the foundation;
- (b) placing an unzipped encasement on the foundation so that an exterior surface of the bottom panel is in contact with the foundation and the top panel is placed adjacent one end of the foundation;
- (c) sliding the mattress onto the foundation so that a bottom surface of the mattress is in contact with an interior surface of the bottom panel of the encasement;
- (d) placing the top panel of the encasement over a top surface of a mattress; and
- (e) zipping up the encasement.

7. The method as recited in claim 6 further including the step of installing a bed skirt after the mattress has been removed in step (a) and placing the encasement on top of the bed skirt so that an exterior surface of the encasement is in contact with the bed skirt.

8. A method for rotating a mattress encased by an encasement and supported by a foundation, the method comprising the steps of:

- (a) unzipping the encasement;
- (b) placing a top panel of the encasement on the floor adjacent one end of the mattress;
- (c) rotating the mattress 180 degrees; and
- (d) zipping up the encasement.

9. A method for rotating a mattress encased by an encasement and supported by a foundation, the method comprising the steps of:

- (a) attaching a cover having a slick side and a non-slick side to an underside of the mattress encased by an encasement so that the slick side is in contact with the foundation and the non-slick side is in contact with the encasement;
- (b) rotating said mattress 180 degrees with respect to the foundation.

10. The method as recited in claim 9 further including step (c) as follows:

- (c) detaching said cover from said mattress and attaching said cover to said foundation so that said slick side is in contact with said foundation and said non-slick side is in contact with said encasement.

11. An encasement for a mattress or foundation comprising:

- a rectangular top panel defining an exterior surface and an interior surface;
- a rectangular bottom panel;
- a fixed side panel connecting one side of said top panel to one end of said bottom panel;
- a plurality of side panels, each side panel defining an upper portion and a lower portion, said upper portions connected to said upper panel and said lower portions connected to said bottom panel;
- a zipper for connecting said upper portions to said lower portions; and
- one or more straps coupled to said upper and lower portions of one or more of said side panels in order to tighten the encasement with respect to said mattress or foundation.

12. The encasement as recited in claim 11, further including a cover having a slick side and a non-slick side for cooperating with said encasement to allow a mattress encased with an encasement to be rotated without removing the encasement, said cover configured to be strapped to said encasement.

13. The encasement as recited in claim **1**, further including a cover having a slick side and a non-slick side for cooperating with said encasement to allow a mattress encased with an encasement to be rotated without removing the encasement.

14. A method for rotating a mattress encased in an encasement supported on a foundation, the method comprising the steps of:

- (a) unzipping the encasement and rotating the mattress on an interior surface of a bottom panel of the encasement; and
- (b) rotating the mattress.

15. A method for rotating a mattress encased in an encasement supported on a foundation, the method comprising the steps of:

- (a) attaching a cover having a slick surface and a non-slick surface so that the slick surface is in contact with the foundation and the non-slick surface is in contact with the encasement; and
- (b) rotating the mattress.

* * * * *