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(54) Title: MATTRESS

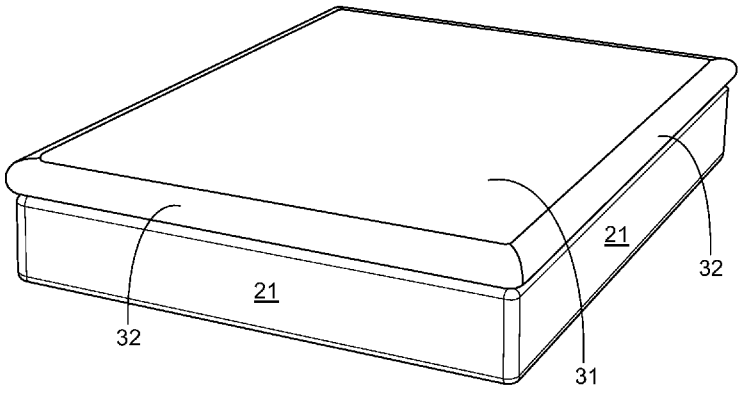

FIG. 3

(57) Abstract: A mattress with a top section that extends beyond the vertical sides of a main or base section. The top section includes a firmer or reinforced outer portion that surrounds a softer or less resilient inner portion. A cover encloses the top section and base section, thereby securing them together. The softer inner portion includes a plurality of foam layers, where the layers have different firmness.

SPECIFICATION

TITLE OF INVENTION: Mattress

CROSS REFERENCE TO RELATED APPLICATIONS: This application claims the benefit of U.S. Prov. Pat. App. No. 61757109 filed on January 26, 2013, the entirety of which is hereby incorporated by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT: This invention was not federally sponsored.

APPLICANT and INVENTOR: David L. Farley

Background of the Invention

[0001] Field of the invention: This invention relates to the general field of mattresses, and more specifically toward a mattress with a top section that extends beyond the vertical sides of a main or base section. The top section includes a reinforced outer portion that surrounds a less resilient inner portion.

[0002] Mattresses have been around for thousands of years. In the first half of the twentieth century, innerspring mattresses and upholstered foundations become widely used. As the top upholstery layers (top sleep surface) in wire unit mattresses were made softer, higher loft and “fluffier”, there was still a need to connect these layers to the underlying wire units, which resulted in a mounting conflict. The more securely the top sleep surface was affixed of the underlying wire units of the mattress, the more effort and expense was required to make the top sleep surface softer and more accommodating to counteract the stiffening effects of such an attachment.

[0003] One of the relatively more recent advancements in mattress technology is the addition of a “pillow top” or additional padded or cushioned layer to the top of a

mattress. The answer was to “disconnect” the top surface by the invention of a separate pocketed construction element (the pillow top) to house the softest upholstery layer materials directly above the underlying wire unit’s border and fully across the sleep support surface. The pillow top is affixed atop the wire unit by a connection between the base of the pillow top construction element and the top of the underlying construction (wire unit), thus eliminating the distortion created by pulling down the edges of the top surface fabrics. The pillow top design introduced a way to enhance the top sleep surface of innerspring and pocketed coil mattresses. The pillow top has also resulted in a distinctive look that has captured the shopper’s eye and has become associated as a premium product attribute.

[0004] The question then arises, with the advent of foam material mattresses, just how effective are pillow top construction elements on foam mattresses that were first designed and intended to work in conjunction with a wire unit? The answer is that these pillow top construction elements can be made to work with foam mattress; however, before the current invention, the aesthetics expected by the shopper and lack of functionality atop foam material mattress cores made them more expensive and in many cases cost prohibitive compared to their use atop innerspring or pocketed coil units.

[0005] Poor transitions occur in foam raw material mattress constructions when there is a difference between the load bearing characteristics from one layer to the next such that a user feels the compression transition between the adjacent layers as a "bump" when sitting or lying on the mattress. The best foam raw material mattress designs involve multiple progressive layers with as many layers as possible, thereby resulting in a reduced probability that these transitions are detected.

[0006] It is also typical that the uppermost foam raw material layers are glued on a one-hundred percent (100%) contact surface basis or minimally around the perimeter in a three to six inch wide band. This gluing increases the firmness of the overall mattress as each of the involved foam material layers together with the adhesive residue deliver

a slightly firmer feel. When such gluing is necessary, mattress raw material foam grades have to be adjusted to get the desired feel, primarily for two reasons.

[0007] First, if these softer, thinner (and heavier in the case of memory foam) and more pliable uppermost foam raw material layers are not securely connected to one another, the mattress cannot be stored in a vertical position (on its edge) without deformation. In such a configuration, each layer may be displaced relative to another, resulting in a functionally and aesthetically unacceptable product. One of the specific difficulties associated with both storing and handling pillow top foam raw material mattresses is that the elastic fabrics typically used to created these uppermost construction elements do not offer enough stability and containment, thereby necessitating that these layers are appropriately glued together.

[0008] Second, it is typical that the key uppermost foam material layers, at a minimum, are glued about the perimeter. This allows for the alignment of each single foam layer around the perimeter to form a smooth side look and reduce or even eliminate the potential that the mattress layering will be visible through the side border upholstery materials of the mattress.

[0009] Additionally, foam material mattress constructions generally do not call for vertical gluing in close proximity to the top sleep surface, as these glued vertical interfaces create yet another undesirable transitional feel. If the glue used produces a dried (hard) residual, these vertical glued interfaces can be brutally hard and easily detected by a user, whereby it presents as if there were a "knife blade" buried in the underlying construction. Some past approaches addressing this issue involve the use of adhesive materials that never become fully dried or hard. They remain soft and therefore cannot be detected by the end users. However, these soft adhesives create other problems, namely, that the finished product may take a compression set (human body impression) while in use, may not present well, or may not recover to full dimensions upon release from compression packaging.

[0010] Each user may be subjected to toxic fumes emitted by certain adhesives used in mattress construction. The user can be only inches away from the glues and adhesives

in the mattress, creating the potential for inhaling unhealthy fumes for 8 hours per night, 365 days a year. The EPA (Environmental Protection Agency) observes that some adhesives used in mattresses may irritate the skin and the eye if a user comes in contact with these substances. Furthermore, other VOC (volatile organic compounds) present as contaminants in these adhesives can accumulate in an individual building up to potentially harmful levels.

[0011] Thus there has existed a long-felt need for a mattress, such as a memory foam mattress, with a separate but affixed top portion that includes multiple layers of foam material with variable resiliency and cushion that do not require the use of adhesives during normal use, storage, and transport.

Summary of the Invention

[0012] The current invention provides just such a solution by having a mattress with a top section that extends beyond the vertical sides of a main section. The top section includes a reinforced outer portion that surrounds a less resilient inner portion.

[0013] The top portion of the mattress of the current invention, or the "Comfort Top," extends the functionality of a pillow top particularly in foam raw material mattresses, but can also just as easily be integrated into more traditional innerspring and pocketed coil core units. It delivers unique mechanics because of the bolsters (load bearing edge) built into the cover itself. A load bearing topside edge near the top sleep surface of the mattress is created that has multiple benefits while delivering a significant new look, thanks to a bulbous topside edge. It increases the size of the overall mattress top sleep surface, provides edge support for safety and security, allows construction without gluing for a newly experienced smooth feel, and also, due to the removal of the adhesive chemicals, is better for human health and the environment. All of this while at the same time the top surface fabrics are suspended from edge-to-edge in a unique manor that enhances top sleep surface and ultimately the shared comfort of individuals in recline.

[0014] To the extent the "Comfort Top" design approach allows for the inclusion of additional foam layers from an economic perspective, the cost of gluing can be eliminated, and serves to facilitate smooth transitions in the horizontal plane. Accordingly, it is estimated that for every one-thousand (1,000) seven layered mattresses produced, an estimated 2.5 tons of glue is saved over the prior art mattresses.

[0015] In a particular embodiment, the current invention is a mattress that includes a base portion and a top portion. The top portion has a sleep surface box surrounded by a topside edge, where the top portion is secured to the base portion. A cover upholstery system covers and retains the topside edge and sleep surface box in their appropriate relative positions. The sleep surface box may contain one or more foam material layers. The top sleep surface is made up of the sleep surface box and topside edge together with the cover upholstery system.

[0016] The sleep surface box and the uppermost foam material layers are now away from the mattress edge and the sleep surface box also allows for an infinite number of foam material layers, without the use of any glue either for side border alignment or stability, thereby removing the negative cost and environmental impact of gluing from prior art mattresses. This frees up the designer to increase the number of foam layers resulting in overall better product performance at any given retail price point.

[0017] Also, the further expansion of the design approach to include the development of more complex top sleep surface configurations (within the sleep surface box) is possible, where the topside edge and cover upholstery system (in and of itself) provides vertical alignment of foam materials of different load bearing capabilities. Just as the uppermost cushioning materials have been brought into alignment with the topside edge, so the same design approach can be used to produce various points, areas or zones on the mattress top sleep surface that present as having different load bearing capabilities without the "knife blade" feel created by vertical gluing or the use of adhesives. Additional bolsters, or separate discrete fill boxes (similar in function to the topside edge) within the sleep surface box may make it possible to vary top surface load

physics and anatomics in an infinite number of configurations. In essence, different load bearing profiles can be created without the use of glue or an adhesive because the cover upholstery system itself brings the underlying foam materials into proper alignment and secures them there. Also, concerning the issue of improved recovery from compression packaging, these complex sleep surface box configurations can be created without concern for body impressions or poor recovery from compression packaging.

[0018] It is a principal object of the invention to provide a mattress with multiple foam material layers secured together without the use of glue.

[0019] It is another object of the invention to provide a top portion of a mattress that extends beyond the vertical sidewalls or side border of a base portion.

[0020] It is a further object of this invention to provide an environmentally friendly mattress.

[0021] It is an additional object of this invention to provide a mattress with a topside edge of a top portion that provides a firmer and more resilient edge for safety and support.

[0022] References to "foam raw material," “foam layer” or simply “foam material” includes conventional urethane foam, memory foam, gel infused memory foam, phase change memory foam or latex, or other natural and synthetic flexible materials commonly used in mattress construction.

[0023] There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto. The features listed herein and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims.

Brief Description of the Figures

[0024] The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of this invention.

[0025] Fig. 1 is a schematic view of a mattress according to selected embodiments of the current disclosures.

[0026] Fig. 2 is a front perspective view of a mattress according to selected embodiments of the current disclosure.

[0027] Fig. 3 is an alternative perspective view of a mattress according to selected embodiments of the current disclosure.

[0028] Fig. 4 is a close-up perspective view of a corner of a mattress according to selected embodiments of the current disclosure.

Detailed Description of the Invention

[0029] Many aspects of the invention can be better understood with the references made to the drawings below. The components in the drawings are not necessarily drawn to scale. Instead, emphasis is placed upon clearly illustrating the components of the present invention. Moreover, like reference numerals designate corresponding parts through the several views in the drawings.

[0030] Fig. 1 is a schematic view of a mattress according to selected embodiments of the current disclosures. The mattress 10 includes a base portion 20 and a top portion 30. The base portion 20 includes side borders 21 that are vertical walls. While a rectangular shape is shown, with four side borders that are vertical walls, other shapes

are possible without departing from the scope of the invention. For example the side borders could be circular, trapezoidal, square, or hexagonal in shape. Furthermore, the side borders could be oblique walls. The top portion 30 includes sleep surface box 31, also referred to as an inner section, and topside edge 32, also referred to as a top border member, which together have portions that form the top sleep surface 34. The topside edge 32, and thus the top portion 30 and the top sleep surface 34, extend beyond the side borders 21 of the base portion 20.

[0031] Fig. 2 is a front perspective view of a mattress according to selected embodiments of the current disclosure. The top sleep surface 34 extends beyond the side border 21 of the base portion. The cover upholstery system 33, or simply the cover, covers the topside edge 32 and sleep surface box 31 and secures the two together. The topside edge restrains the sleep surface box (and foam material layers contained therein), and the cover upholstery system restrains the topside edge 32 and sleep surface box 31.

[0032] Fig. 3 is an alternative perspective view of a mattress according to selected embodiments of the current disclosure. The topside edge 32 surrounds the sleep surface box 31.

[0033] Fig. 4 is a close-up perspective view of a corner of a mattress according to selected embodiments of the current disclosure. The topside edge 32, including its corners, extends beyond the vertical side borders 21 of the base portion 20.

[0034] In a particular embodiment, the base portion includes a single foam layer. This single layer of foam material has a uniform resiliency and firmness throughout. In another embodiment, the base portion includes a plurality of foam layers. The plurality of foam layers each may have a different firmness.

[0035] A particular embodiment of the current invention provides for a top portion that includes an inner section and a top border member. The inner section has four sides, a top, and a bottom. The sides of the inner section form a rectangular shape and are bounded by the top border member. The top border member is firmer or more resilient

than the inner section. Furthermore, the top border member has a unique shape, with a vertical wall on its inner surface, and a curved wall on its outer surface. The inner vertical wall of the top border member is adjacent to the inner section. The outer curved wall of the top border member extends away from the inner section and beyond the plane of the side borders of the base portion. The inner section itself includes a plurality of layers of foam material. The foam layers closer to the top sleep surface are softer, or less resilient, while the foam layers further away from the top sleep surface are firmer, or more resilient. In fact, adjacent layers can each have a different firmness, whereby the firmness decreases as the layers approach the top sleeping surface, thereby creating a plurality of layers of foam material where at least one of the layers of foam is firmer than another layer of foam.

[0036] A cover is used to enclose the base portion and the top portion, thereby securing together the base portion and top portion. The cover also encloses the inner section and top border member of the top portion, thereby helping to retain the inner section within the confines of the top border member. Said another way, the cover encloses and restrains the inner section and the top border member. Since the top border member and the cover bound the inner section, no glue is required to secure together the plurality of foam layers of the inner section.

[0037] Frequently the side borders of foam raw material core mattresses and hybrids, made from multiple foam material layers, tend to "lean in" at the top surface. This has both a negative impact on the shopper's visual response to the mattress and it also makes the top sleep surface smaller. The correct way to include layered foam raw material designs into these mattresses is to have as many layers in number as is economically possible, with each layer being progressively softer beginning with firmer layers at the base ranging to softer layers as the top mattress surface is approached. It is not uncommon for these mattresses to have three to ten foam material layers, each progressively softer as the layers approach the top sleep surface.

[0038] The approach of the current invention is intended to cause a visual break whereby the shopper will either not notice any lean in or otherwise will notice something that appears to be properly tailored.

[0039] It is common for mattresses to include a pillow top or separate top construction element that is attached to the mattress's top surface that typically includes the softest cushioning materials in the mattress. This tends to minimally counter both the visual and size issues associated with lean in. So, the approach of the current invention builds on the concept of a mattress top construction element containing the softest cushioning materials, that also brings the top surface into a correct side border vertical alignment or even beyond that visual for contrast with other traditionally configured products at retail. Thus, the top portion of the mattress of the current invention has an exaggerated topside edge that stands out visually.

[0040] The design of the current invention draws attention, as the mattress appears less like a rectangular, cube or block, and stands out as being unique and novel in appearance with a distinctive bulbous top-side edge. The visual break created by the top portion of the mattress of the current invention may cause the perception that the mattress is better tailored, or it may also serve as a visual "stand out" in comparison to other mattresses involved in the same sales display.

[0041] Leaning in is also contributed to by tight fitting or elastic covering fabrics commonly used, which tend to preload the mattress top sleep surface and side border surfaces, resulting in "lean in" toward the center with the side borders leaning inward from the vertical thus creating a smaller top sleep surface. The design disclosed herein increases the size of the mattress top sleep surface.

[0042] The top portion disclosed herein is dependent on there being some structural means of extending the mattress top portion or its top surface beyond the vertical side border without the materials involved collapsing in use.

[0043] The construction of the supportive topside edge is from materials similar to the load bearing capability of the mattress base materials upon which the supportive

topside edge sits, including without limitation foam materials. It is also, therefore, significantly firmer than the top sleep surface cushioning materials in the sleep surface box, creating a supportive edge that makes side edge sitting more secure and generally improves the ingress and egress ability to and from the mattress top sleep surface, which is diminished in typical foam and hybrid mattress constructions. The greater the emphasis on multiple progressively foam raw material build configurations, in any mattress, the less likely it is that the mattress serves well for sitting and the more difficult entering and exiting the mattress. Thus, the current invention improves mattress safety and well as increasing its ease of use as well as creates a new box like chamber directly at the mattress top sleep surface (the sleep surface box) that allows for additional design opportunities.

[0044] No glue is used in the mattress foam material upper layers inside of the sleep surface box or to attach the supportive topside edge. The anchoring mechanics of the cover upholstery system affects the elastic performance delivered by the top surface. The ham-mocking of the top surface covering fabric of the sleep box surface works with the supportive topside edge to affect the elastic properties of the top sleep surface and creates new mattress properties.

[0045] It should be understood that while the preferred embodiments of the invention are described in some detail herein, the present disclosure is made by way of example only and that variations and changes thereto are possible without departing from the subject matter coming within the scope of the following claims, and a reasonable equivalency thereof, which claims I regard as my invention.

CLAIMS

That which is claimed:

1. A device comprising

a base portion, a top portion, and a cover

where the base portion comprises side borders, where the side borders are vertical walls, where the base portion comprises one or more foam layers,

where the top portion comprises an inner section and a top border member, where the top portion extends beyond the side borders of the base portion, where the top border member bounds the inner section on four sides, where portions of the inner section and top border member form a top sleep surface,

where the inner section comprises a plurality of layers of foam, where the layers of foam further from the top sleep surface are firmer than the layers of foam closer to the top sleep surface, where the inner section comprises no glue,

where the cover encloses the base portion and the top portion, where the cover secures the top portion to the base portion; where the cover further encloses the inner section and the top border member, where the cover helps retain the inner section within the top border member.

2. The device of claim 1, where the top border member is firmer than the inner section.

3. The device of claim 1, where the top border member comprises an inner vertical wall, where the vertical wall is adjacent to the inner section.

4. The device of claim 1, where the top border member comprises an outer curved wall.

5. A mattress comprising

a base portion, a top portion, and a cover,

where the base portion comprises side borders,

where the top portion comprises an inner section and a top border member,

where the top portion extends beyond the side borders of the base portion, where the top border member bounds the inner section on four sides,

where the inner section comprises a plurality of layers of foam, where at least one of the layers of foam of the inner section is firmer than another layer of foam of the inner section, where the inner section comprises no glue,

where the cover encloses the base portion and the top portion, where the cover secures the top portion to the base portion; where the cover further encloses and restrains the inner section and the top border member,

where the top border member is firmer than the inner section, where the top border member comprises an inner vertical wall and an outer curved wall, where the vertical wall is adjacent to the inner section.

6. The mattress of claim 5, where the side borders of the base portion are vertical walls.

7. The mattress of claim 5, where the base portion comprises a layer of foam material.

8. The mattress of claim 5, where the base portion comprises a plurality of layers of foam material.

9. A mattress comprising

a base portion and a top portion,

where the base portion comprises side borders, where the top portion and base portion are secured together,

where the top portion comprises an inner section and a top border member, where the top portion extends beyond the side borders of the base portion, where the inner section has one or more sides, a top, and a bottom, where the top border member bounds the sides of the inner section.

10. The mattress of claim 9, where the top border member is firmer than the inner section.

11. The mattress of claim 9, where the top border member comprises an inner vertical wall, where the vertical wall is adjacent to the inner section.

12. The mattress of claim 9, where the top border member comprises an outer curved wall.

13. The mattress of claim 9, further comprising a cover, where the cover encloses the base portion and the top portion, where the cover secures the top portion to the base portion.

14. The mattress of claim 9, where the cover further encloses and restrains the inner section and the top border member.

15. The mattress of claim 9, where the side borders are vertical walls.

16. The mattress of claim 9, where the base portion comprises one or more foam layers.

17. The mattress of claim 9, where the inner section comprises a plurality of layers of foam material.

18. The mattress of claim 17, where at least one of the layers of foam material of the inner section is firmer than another layer of foam material of the inner section.

19. The mattress of claim 17, where adjacent layers of foam material of the inner section have a different firmness.

20. The mattress of claim 9, where inner section comprises no glue.

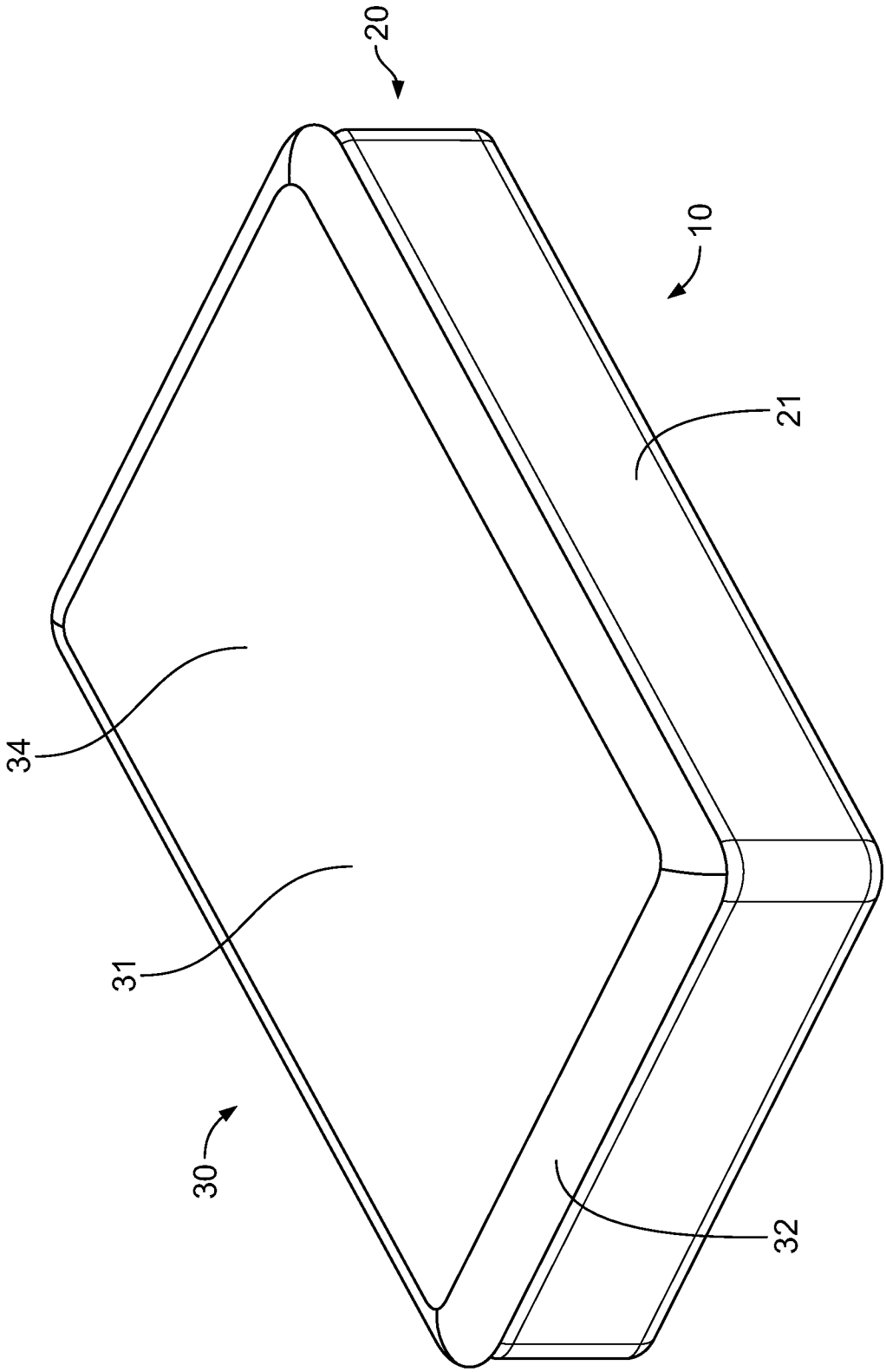

FIG. 1

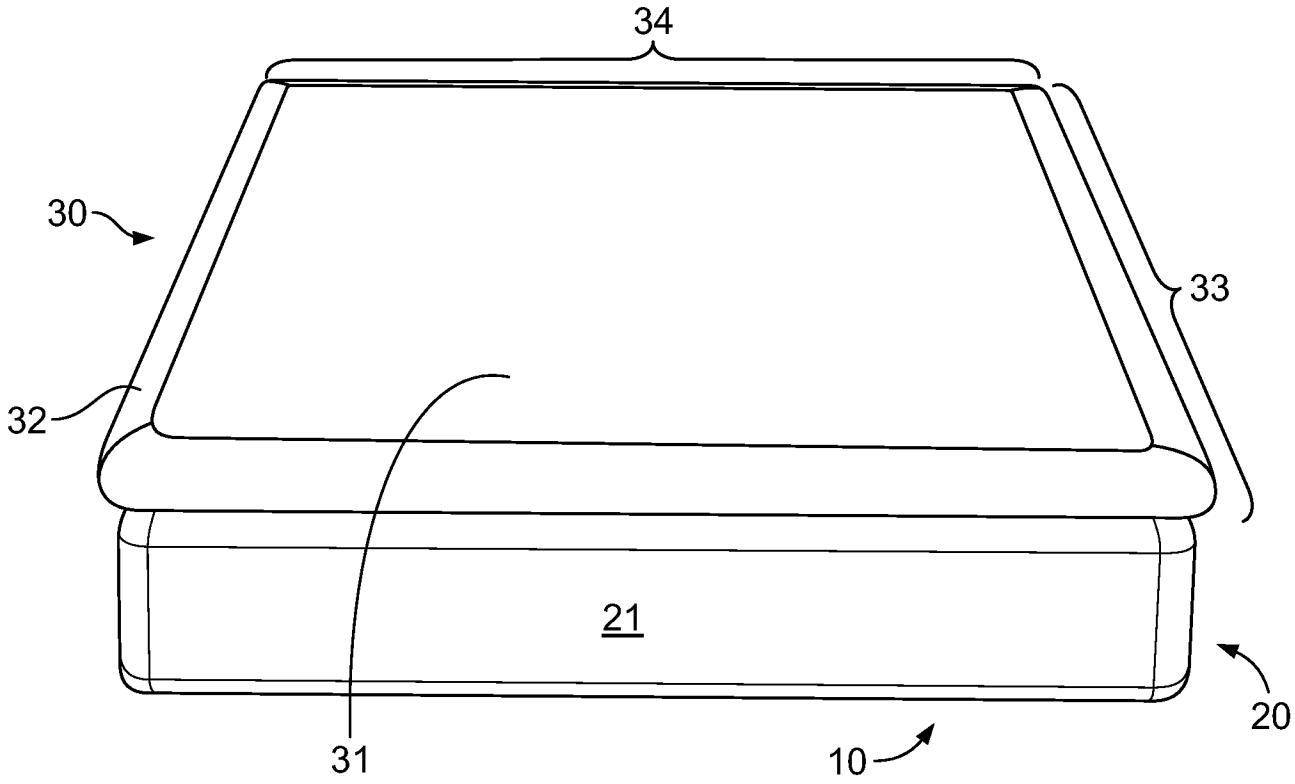

FIG. 2

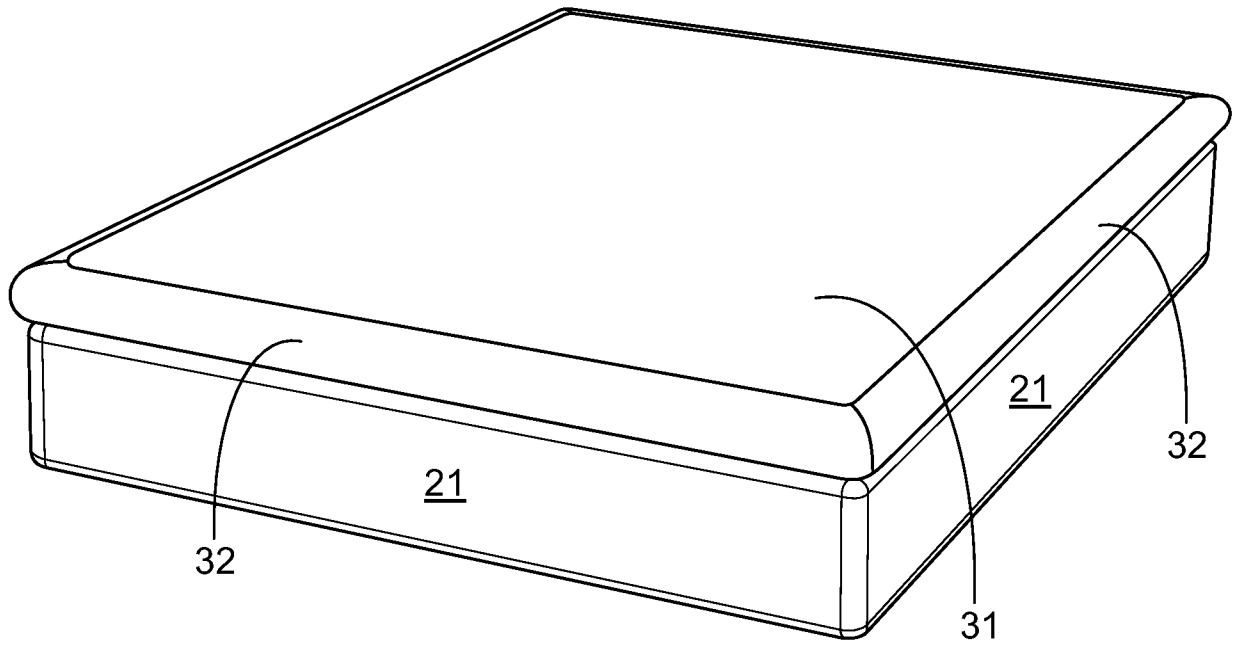

FIG. 3

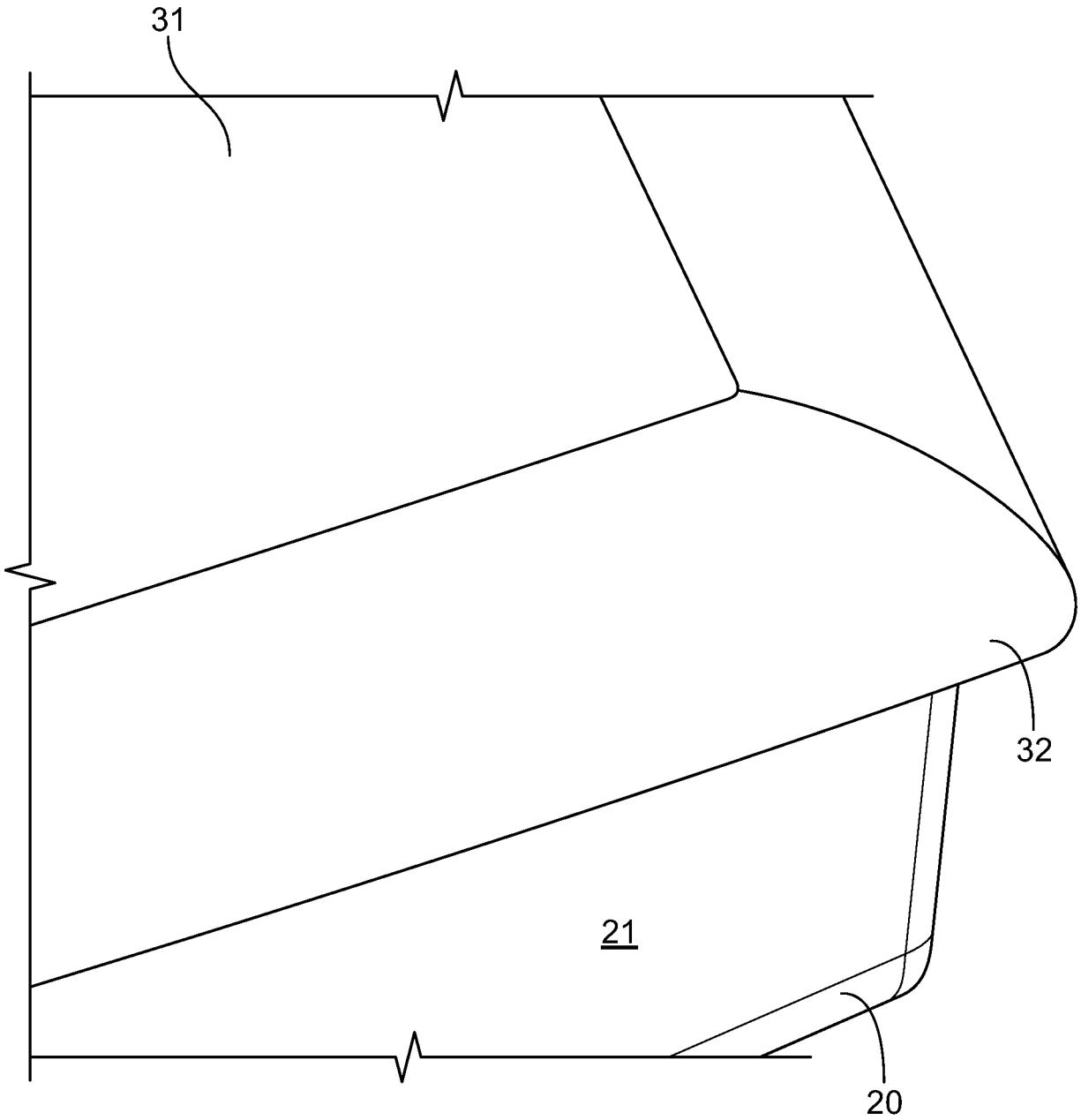

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/013082

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A47C 17/00 (2014.01)
USPC - 5/727
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A47C 17/00, 21/02, 21/08, 23/04, 27/00, 27/15; A47D 15/00 (2014.01)
USPC - 5/12.1, 37.1, 41, 69, 74, 181, 690, 691, 692, 717, 718, 719, 727, 728, 730, 731, 732, 739, 740; 297/284.11

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - A47C 17/00, 21/02, 21/08, 23/04, 27/00, 27/001, 27/14, 27/148, 27/15; A61G 7/0507 (2014.02)
USPC - 5/all subclasses, 297/all subclasses

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2005/0188467 A1 (WOOLFSON) 01 September 2005 (01.09.2005) entire document	1-20
Y	US 2011/0078854 A1 (SHAW) 07 April 2011 (07.04.2011) entire document	1-20
Y	US 6,189,971 B1 (WITZIG) 20 February 2001 (20.02.2001) entire document	4-8, 12
A	US 6,557,198 B1 (GLADNEY et al) 06 May 2003 (06.05.203) entire document	1-20
A	US 6,601,253 B1 (TARQUINIO) 05 August 2003 (05.08.2003)	1-20

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 April 2014	22 MAY 2014
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774