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(54) A MATTRESS AND A METHOD OF MANUFACTURING A MATTRESS

(57) The present disclosure envisages a mattress (100,200,300,400) that comprises a resiliently compressible foam shell (104,204,304,404) defining a plurality of pockets along the breadth of the mattress (100,200,300,400), a bottom layer (102,202,302,402), a plurality of resiliently compressible block elements (106,206,306,406) receivable in the plurality of pockets having predetermined varying compressibility values, and a flexible top layer (108,308). In one aspect of the present disclosure, the plurality of pockets is configured in the form of an array of rows and columns, wherein the rows are in parallel to a width of mattress (100,200,300,400) and preferably seven in numbers and the columns are in parallel to length of mattress (100,200,300,400) and number of columns varies with the width of the mattress (100,200,300,400). In another aspect of the present disclosure, the plurality of pockets is in the form of horizontal slots along the breadth of the mattress(100,200,300,400).

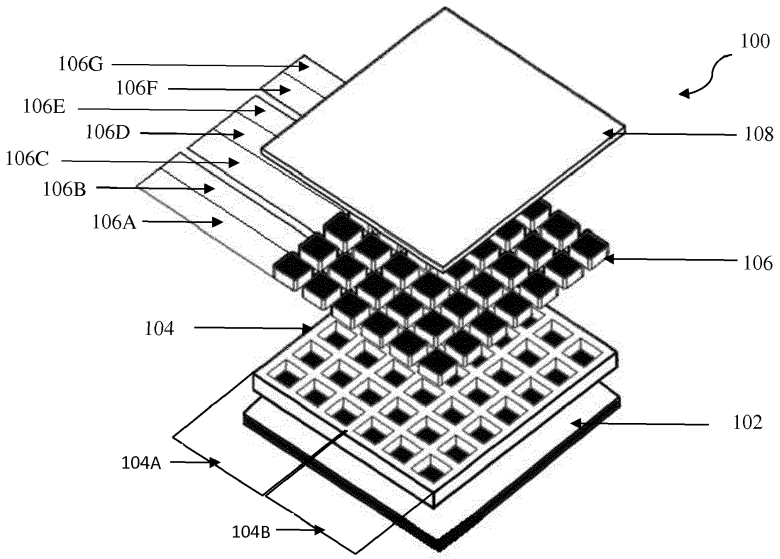

FIGURE 1

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Description

CROSS-REFERENCE RELATED TO APPLICATIONS AND PRIORITY

[0001] The present application claims priority from two Indian Patent Applications No. 3487/MUM/2015 dated 11.09.2015 and 201623003911 dated 03.02.2016, the entirety of which is hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of bedding systems.

DEFINITIONS

[0003] **Density** of a foam material herein refers to the measurement of mass per unit volume of the foam material. The quality of foam material used in the manufacturing of the mattress is classed in density rating and is expressed as a two digit number which may range from 10-80.

[0004] **Compressibility value** of a mattress herein relates to density of a material used to manufacture the mattress. The denser the material, or the more material used to manufacture it, the more material there is in the mattress to provide support for weight of a body. Consequently, aA high compressibility value indicates low density of the material and a low compressibility value indicates high density of the material.

[0005] **Resiliently compressible block elements** herein refer to the blocks of material used to fill the mattress that provides a sufficient degree of resiliency to absorb compressive forces and return substantially to its original shape or form.

[0006] **Mattress Ticking:** hereinafter refers to a cotton or linen textile that is tightly woven for durability and to prevent down feathers from poking through the fabric, and used to cover mattresses and bed pillows.

BACKGROUND

[0007] A mattress is a large pad required to provide comfortable support to a user resting thereon, thereby ensuring comfortable, deep, and uninterrupted rest to the user.

[0008] Traditionally, mattresses are made by adding horizontal layers of cushioning materials. Such materials provide comfort to the user resting on them but do not provide support to the user as a result of which the resting user tends to sink into mattress causing harm to the body of the user. Also, mattresses designed to provide orthopedic support to the resting user are made of layers of materials which do not allow the resting user to sink into the mattress and are thus uncomfortable.

[0009] Both of the abovementioned mattresses do not meet the modem health-care requirements of providing both comfort and orthopedic support, as one provides comfort without giving proper support to the resting user thereby inducing pain, the other provides a good support thereby sparing the user of induced pain, at the cost of comfort to the resting user.

[0010] There is, therefore, felt a need for a mattress which provides both comfort and support to the resting user.

OBJECTS

[0011] Some of the objects of the present disclosure, which at least one embodiment herein satisfies, are as follows:

[0012] It is an object of the present disclosure to provide a mattress that affords comfort to a user resting thereupon.

[0013] Another object of the present disclosure is to provide a mattress that affords orthopedic support to the user resting thereupon so as to reduce pain or any harm to the body-parts of the user.

[0014] Yet another object of the present disclosure is to provide a mattress which is customizable so as to meet specific comfort and health requirements of the user resting thereupon.

[0015] Still another object of the present disclosure is to provide a mattress which uses lesser components and is easier to assemble.

[0016] Other objects and advantages of the present disclosure will be more apparent from the following description, which are not intended to limit the scope of the present disclosure.

SUMMARY

[0017] The present disclosure envisages a mattress that comprises a resiliently compressible foam shell defining a plurality of pockets along the breadth of the mattress, a bottom layer, a plurality of resiliently compressible block elements receivable in the plurality of pockets having predetermined varying compressibility values, a flexible top layer, and a

mattress ticking enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer.

[0018] In one aspect of the present disclosure, the plurality of pockets is configured in the form of an array of rows and columns, wherein the rows are in parallel to a width of mattress, preferably seven in number and the columns are in parallel to length of mattress and the number of columns varies with the width of the mattress.

[0019] In another aspect of the present disclosure, the plurality of pockets is in the form of horizontal slots and said plurality of horizontal slots are configured in rows along the breadth of said mattress such that the number of said rows is in multiple of seven.

[0020] In one embodiment, the shell, the bottom layer, and the flexible top layer of the mattress are of a material selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam and combinations thereof. In another embodiment, the plurality of block elements is of a material selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, polyester wadding, cotton, springs made of steel wire or plastic, polyester fiber, wool, Down & Feather and combinations thereof.

[0021] In yet another embodiment, the bottom layer of the mattress is integral with the shell and the plurality of pockets is recessed in the shell. In still another embodiment, the shell is configured with a plurality of slits through the shell, the bottom layer which is fixed to the shell, and the plurality of pockets that is defined by the walls of the slits and the bottom layer.

[0022] In yet another embodiment, the upper surface of the flexible top layer of the mattress is configured with a layer of gel pad.

[0023] In still another embodiment, an adhesive layer can be provided between the plurality of block elements and the inner surface of the plurality of pockets in the shell, i.e., either on the block elements or on the inner surface of the plurality of pockets in the shell, or on both. Further, the walls of the shell may have perforations, enabling venting of air through the shell.

[0024] In an alternative embodiments, the plurality of block elements is configured such that the upper surface of the plurality of block elements is flush with the upper surface of the shell, or the plurality of block elements is configured such that predetermined rows of block elements selected from the plurality of block elements is raised above the upper surface of the shell to define a pillow formation on the mattress.

[0025] In still another embodiment, the plurality of block elements selected to be received in the pockets are such that the compressibility value of the plurality of block elements received in the pockets increases sequentially from the center of the shell towards the ends of the shell. Further, the compressibility of the plurality of block elements received in each of the plurality of pockets may vary along the width of the mattress.

[0026] The present disclosure also envisages a method of manufacturing a mattress. The method of manufacturing a mattress comprises the following steps: (i) fabricating a resiliently compressible foam shell defining a plurality of pockets configured along the breadth of the mattress; (ii) integrally providing or securing a bottom layer to the shell; (iii) fabricating a plurality of resiliently compressible block elements having shapes complementary to the plurality of pockets and configured to be received in the plurality of pockets in a predetermined varying arrangement; (iv) securing a flexible top layer to the shell; and (v) enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer in a mattress ticking.

[0027] The method of manufacturing a mattress can further comprise a step of applying an adhesive between the plurality of block elements and the inner surface of the plurality of pockets in the shell either on the block elements or on the inner surface of the plurality of pockets in the shell, or on both.

[0028] An alternative method of manufacturing a mattress that includes customization in accordance with the requirement of at least one user depending on the need for orthopedic support of the at least one user is also envisaged in the present disclosure. The alternative method comprises the following steps: (i) fabricating a resiliently compressible foam shell defining a plurality of pockets configured in rows along the breadth of the mattress; (ii) integrally providing or securing a bottom layer to the shell; (iii) determining an orthopedic need of the at least one user; (iv) selecting a plurality of resiliently compressible block elements with shapes complementary to the plurality of pockets having predetermined compressibility values suited to the orthopedic needs of the at least one user and configured to be received in the plurality of pockets in a predetermined varying arrangement; (v) securing a flexible top layer to the shell; and (vi) enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer in a mattress ticking.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWING

[0029] A mattress and a method of the manufacturing of the mattress, in the instant disclosure will now be described with the help of the accompanying drawing.

Figure 1 illustrates an exploded view of different layers of a mattress in accordance with an embodiment of the first

aspect of the present disclosure;

Figure 2 illustrates an exploded view of the layers of a mattress in accordance with another embodiment of the first aspect of the present disclosure.

Figure 3 illustrates an exploded view of the different layers of a mattress, in accordance with an embodiment of the second aspect of the present disclosure; and

Figure 4 illustrates an exploded view of the layers of a mattress, in accordance with another embodiment of the second aspect of the present disclosure.

DETAILED DESCRIPTION

[0030] The present disclosure provides a mattress. and a method of manufacturing the same.

[0031] A mattress is a large pad for supporting a resting user. The mattress provides both support and comfort to the resting user. Neither the traditional mattresses, that provide only comfort, nor the mattresses designed to provide only orthopedic support to the resting user, meet the modern health-care requirements of providing both comfort and support to the user.

[0032] The perfect balance of comfort and support is specific to each individual user resting upon the mattress and is based on the individual characteristics such as age, body mass index (BMI) and lifestyle. The traditional designs and manufacturing techniques do not support adjusting the compressibility of mattresses to suit individual needs.

[0033] The compressibility profile of the mattress depends upon the compressibility value of the materials used in the manufacture of the mattress which in-turn depends upon the density of the materials.

[0034] In case of foam materials, the foam material density is a measurement of mass per unit volume; thus more the mass of the material used to manufacture the mattress, more is the support provided by the mattress to the weight of the user resting thereupon, implying an inverse proportionality between the density and the compressibility of the foam material. Consequently, low density of foam material indicates a high compressibility value and high density of foam material indicates a low compressibility value.

[0035] The present disclosure provides a mattress and a method of manufacturing the mattress. The mattress of the present disclosure provides the option of predetermining compressibility profiles for balancing the comfort and support to meet specific comfort and health requirements of individual user(s) resting on the mattress.

[0036] The first aspect of the present disclosure is described herein with reference to Figure 1 and Figure 2. Figure 1 illustrates an exploded view of a mattress 100 in accordance with the embodiments of the present disclosure. The mattress 100 comprises a resiliently compressible foam shell 104 defining a plurality of pockets that is fixed on or integral with a bottom layer 102, a plurality of resiliently compressible block elements 106 receivable in plurality of pockets in the shell 104 having predetermined compressibility values; and a flexible top layer 108 sealing the shell 104.

[0037] In accordance with the first aspect of the present disclosure, the shell 104 is defining the plurality of pockets configured in the array form of rows and columns. The rows are in parallel to a width of mattress and preferably seven in numbers along the length of mattress. The columns are in parallel to length of mattress and number of columns varies with the width of the mattress. The bottom layer 102 is either integrated with the shell 100 or is secured therewith. The plurality of block elements 106 are fabricated having shapes complementary to the plurality of pockets and are received in the plurality of pockets of the shell 104 in a predetermined varying arrangement such that a compressibility profile is realized to provide orthopedic comfort. The shell 104 is secured with the top layer 108.

[0038] The material of the shell 104 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, and combinations thereof. The material of the plurality of block elements 106 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, polyester wading, cotton, rubberized coir, springs made of steel wire or plastic, polyester fiber, wool and combinations thereof. The material of the top layer 108 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, polyester wading, cotton, polyester fiber, wool, and combinations thereof. The material of the bottom layer 102 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, and combinations thereof.

[0039] In an embodiment, the bottom layer 102 is integral with the shell 104 wherein the plurality of pockets are recessed in the shell 104. In another embodiment, the shell 104 is configured with a plurality of holes through the shell 104 which is fixed to the bottom layer 102 wherein the plurality of pockets are defined by the walls of the plurality of holes and the bottom layer 102.

[0040] In an embodiment, an adhesive layer is provided between the plurality of block elements 106 and the inner surface of the plurality of pockets in the shell 104. In another embodiment, the mattress 100 is configured such that the walls of the shell 104 have perforations or through-holes, enabling venting of air through the shell 104 thereby allowing the shell 104 to be a breathable shell.

[0041] In yet another embodiment, the cross-section of the plurality of pockets in the shell 104 is selected from the group consisting of polygonal, quadrilateral, square, triangular, circular, petal-shaped, and combinations thereof; and the cross-section of the block elements 106 is complementary to the cross-section of the pockets in the shell 104.

[0042] In still another embodiment, the mattress 100 is enclosed within a mattress ticking which may be stitched to encase the bottom layer 102, the plurality of block elements 106 received in the shell 104 and the top layer 108, or may be zipped to allow for the opening and closing of the mattress 100 for reconfiguration.

[0043] In one embodiment, the plurality of pockets are arranged in the form of rows and columns wherein the columns define the length of the mattress 100 and the rows define the width of the mattress 100, and the block elements 106 are selected to be received in the pockets such that the compressibility value of the plurality of block elements 106 received in the rows increases from center of the shell 104 towards the ends of the shell 104. In another embodiment, the increase in compressibility value of the block elements 106 from the center of the shell 104 towards the ends of the shell 104 is sequential. In yet another embodiment, the compressibility value of the block elements 106 received in the pockets on one half of the columns of the shell 104A varies from the compressibility value of the block elements 106 received in the pockets on the other half of the columns of the shell 104B to support multiple users.

[0044] In an exemplary embodiment, the mattress 100, for a queen sized bed, is optimized for providing orthopedic support and comfort to a user resting thereon, the mattress 100 having the following configuration:

i. the bottom layer 102 having a thickness of at least 2 inches;

ii. the resiliently compressible foam shell 104, having a rectangular shape with thickness of at least 4 inches and 2 meter length by 1.6 meter breadth, fixed on the bottom layer 102 forming the plurality of pockets thereon;

iii. each of the plurality of pockets having a square cross-section with a length of 8 inches and a breath of 8 inches, configured in the form of an array with five columns and seven rows, wherein the plurality of square shaped pockets in the shell 104 are spaced apart from each other by the walls of the shell 104 having a thickness of 3 inches;

iv. the plurality of resiliently compressible block elements 106 made of foam material, having a shape complementary to that of the plurality of square shaped pockets, receivable in the plurality of pockets of the shell 104;

v. the compressibility value of the foam block elements 106 received in the rows of the plurality of pockets is sequentially increased from the center of the shell 104 towards the ends of the shell 104 or the density rating of the foam block elements 106 received in the plurality of pockets is sequentially decreased from the center of the shell 104 towards the ends of the shell 104, such that:

~ foam block elements 106G and 106A having density rating of 26 are received by the rows, first from both the ends of the shell 104,

~ foam block elements 106F and 106B having density rating of 30 are received by the rows, second from both the ends of the shell 104,

~ foam block elements 106E and 106C having density rating of 40 are received by rows, third from both the ends of the shell 104, and

~ foam block elements 106D having density rating of 50 are received by the center row or the row fourth from either ends of the shell 104,

thereby achieving a compressibility profile that provides orthopedic support to the user and maintain horizontal alignment of the resting user on the mattress 100; and

vi. the top layer 108 having thickness of 2 inches.

[0045] In another exemplary embodiment, the mattress 100 for a king sized bed is optimized for providing orthopedic support and comfort to two users resting thereon, the mattress having the same configuration as the one disclosed in the aforementioned embodiment (which is not repeated herein for the sake of brevity) with the following variations / modifications :

i. the shell 104, is 2 meter length by 1.8 meter breadth;

ii. the plurality of square shaped pockets, are configured in the form of an array with six columns and seven rows;

iii. the compressibility value of the block elements 106 received in the pockets on one half of the columns of the shell

104A varies from the compressibility value of the block elements 106 received in the pockets on the other half of the columns of the shell 104B; the compressibility profiles for the male and the female user are configured such that (an exemplary table of the density of foam block elements filled in is shown below as **Table 1**.):

Table 1.

Columns of pockets	104A			104B		
Rows of Foam block elements	Density Rating of Resiliently Compressible Foam Block Elements					
106G	23	23	23	26	26	26
106F	28	28	28	30	30	30
106E	35	35	35	40	40	40
106D	45	45	45	50	50	50
106C	35	35	35	40	40	40
106B	28	28	28	30	30	30
106A	23	23	23	26	26	26

thereby achieving a compressibility profile such as to orthopedically support a female user on one side and a male user on the other side respectively, corresponding to their different body weights, maintaining a horizontal alignment of both users resting thereon the mattress 100.

[0046] In alternate variations of the above exemplary embodiment, the shape, size and material of the resiliently compressible foam shell 104 and the plurality of resiliently compressible foam block elements 106 are chosen such as to achieve the predetermined compressibility profile of the mattress 100.

[0047] In alternate embodiments, the plurality of block elements 106 is configured such that either the upper surface of the block elements 106 is flush with upper surface of the shell 104, or predetermined set of block elements selected from the plurality of block elements 106 are raised above the surface of the shell 104 to define a pillow formation on the mattress 100.

[0048] In another embodiment, the shape, size, and material of the shell 104, and the shape, size and compressibility value of the plurality of block elements 106 may be chosen such as to achieve predetermined compressibility profiles of the mattresses 100 to meet specific comfort and health requirements of individual(s). Examples of the mattress 100 having pre-determined compressibility profiles to meet specific comfort and health requirements of individual(s) are as follows:

i. the mattress 100 for individual(s) with shoulder pain wherein predetermined set of block elements selected from the plurality of block elements 106 are raised above the surface of the shell 104 to define an arm-rest or support on one top-end of the mattress 100 for the individual(s) to rest the affected arm during the course of sleeping,

ii. the mattress 100 for individual(s) with back pain wherein predetermined set of block elements selected from the plurality of block elements 106 are raised above the surface of the shell 104 to define a slightly raised platform under the small of back and pillow formation under knees for the individual(s) to maintain an orthopedically supporting profile to the spine while resting,

iii. the mattress 100 for individual(s) with gastro-esophageal reflux disease wherein predetermined set of block elements selected from the plurality of block elements 106 are raised above the surface of the shell 104 to define a pillow formation on the top of the mattress 100 for raising the resting head of the individual(s); and additionally for individual(s) with a chronic/advanced state of the ailment the compressibility value of the plurality of block elements 106 received in the rows decreases from bottom of the shell 104 towards the top of the shell 104 sequentially to achieve a raised from the top profile of the mattress 100 suited to the orthopedic requirement of the individual(s),

iv. the mattress 100 for individual(s) with bed sores wherein predetermined set of block elements selected from the plurality of block elements 106 are made of special cushioning material, memory foam or are air-filled block elements or water-filled block elements to protect bony areas with proper positioning and cushioning for the body of the individual(s); or predetermined set of block elements selected from the plurality of block elements 106 filled in the shell 104 having varying compressibility values for relieving pressure and protecting vulnerable body parts of the individual(s) such as elevating the head, supporting the back or front, cushioning or "floating" the heels below the

calves and the like,

v. the mattress 100 for individual(s) with nocturnal neuropathic pain in diabetic patients or complaints of peripheral neuropathy wherein predetermined set of block elements selected from the plurality of block elements 106 such that the upper and lower portions of the mattress are raised, or other variations with different levels of density of the block elements 106, with different types of top cover(s) 108, and

vi. the mattress 100 for individual(s) prescribed heat treatments to certain body parts wherein predetermined set of block elements selected from the plurality of block elements 106 include electrical heating elements configured to provide optimum therapeutic heat to the body parts of the individual(s).

[0049] In another embodiment, the mattress 100 is configured to support two users sharing the mattress 100 such that the shape, size and compressibility value of the plurality of block elements 106 received in the pockets on one half of the columns of the shell 104A varies from the compressibility value of the block elements 106 received in the pockets on the other half of the columns of the shell 104B, to meet the different orthopedic and comfort requirements of both the users.

[0050] The mattress and the method of manufacturing the mattress 100 described herein above, maintains a horizontal alignment of the resting user by ensuring that the weight of the torso is supported by high density material (having a low compressibility value) than the limbs of the user, which are supported by low density material (having a high compressibility value) owing to the relative difference between the weights of the torso and the limbs of the user.

[0051] Figure 2 illustrates an exploded view of a mattress 200 in accordance with an embodiment of the present disclosure. The mattress 200 comprises a resiliently compressible foam shell 204 defining a plurality of pockets that is integral with a bottom layer 202, a plurality of resiliently compressible block elements 206 received in plurality of pockets in the shell 204 having predetermined compressibility values such that the plurality of block elements 206 are raised above the surface of the shell 204 to define a pillow formation on the mattress 200.

[0052] In an embodiment, predetermined set of block elements selected from the plurality of block elements 206 are raised above the surface of the shell 204 to define a walled formation on the center of the mattress 200 enclosing an infant from falling off the mattress when left unsupervised.

[0053] The second aspect of the present disclosure is described herein with reference to Figure 3 and Figure 4. Figure 3 illustrates an exploded view of a mattress 300 in accordance with an embodiment of the present disclosure. The mattress 300 comprises a resiliently compressible foam shell 304 (hereinafter referred to as "the shell 304") defining a plurality of horizontal slots along the breadth of the mattress 300 that is fixed on or integral with a bottom layer 302. A plurality of resiliently compressible block elements 306 (hereinafter referred to as "the block elements 306") is received in a plurality of horizontal slots in the shell 304 having predetermined compressibility values. A flexible top layer 308 is provided for sealing the shell 304.

[0054] In accordance with the second aspect of the present disclosure, the shell 304 is fabricated, defining the plurality of horizontal slots configured in the form of rows along the breadth of the mattress such that the number of rows is in multiples of seven.

[0055] The bottom layer 302 is either integrated with the shell 300 or is secured therewith. The plurality of block elements 306 are fabricated having shapes complementary to the plurality of horizontal slots and are received in the plurality of horizontal slots of the shell 304 in a predetermined varying arrangement such that a compressibility profile is realized to provide orthopedic comfort. The shell 304 is secured with the flexible top layer 308. The process of fabricating inter alia involves the process of molding.

[0056] The material of the shell 304 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, and combinations thereof. The material of the plurality of block elements 306 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, polyester wadding, cotton, springs made of steel wire or plastic, polyester fiber, wool, Down & Feather, and combinations thereof. The material of the flexible top layer 308 is selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, polyester wadding, cotton, polyester fiber, wool, and combinations thereof. The flexible top layer 308 is provided with a layer of a gel pad on its upper surface. The bottom layer is of a material selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, and combinations thereof.

[0057] In an embodiment, the bottom layer 302 is integral with the shell 304 wherein the plurality of horizontal slots are recessed in the shell 304. In another embodiment, the shell 304 is configured with a plurality of slits through the shell 304 which is fixed to the bottom layer 302 wherein the plurality of horizontal slots are defined by the walls of the plurality of slits and the bottom layer 302.

[0058] In an embodiment, an adhesive layer is provided between the plurality of block elements 306 and the inner surface of the plurality of horizontal slots in the shell 304.

[0059] In one embodiment, the mattress 300 is configured such that the walls of the shell 304 have perforations or

through-holes, enabling venting of air through the shell 304, thereby allowing the shell 304 to be a breathable shell.

[0060] In yet another embodiment, the cross-section of the plurality of horizontal slots in the shell 304 is selected from the group consisting of polygonal, quadrilateral, square, and combinations thereof. The cross-section of the plurality of block elements 306 is complementary to the cross-section of the horizontal slots in the shell 304.

[0061] In still another embodiment, the mattress 300 is enclosed within a mattress ticking which may be stitched to encase the bottom layer 302, the plurality of block elements 306 received in the shell 304 and the flexible top layer 308. In yet another embodiment, the mattress 300 may be zipped to allow for the opening and closing of the mattress 300 for reconfiguration.

[0062] In one embodiment, the plurality of horizontal slots is arranged in the form of rows wherein the rows define the breadth of the mattress 300, and the plurality of block elements 306 are selected to be received in the horizontal slots such that the compressibility value of the plurality of block elements 306 received in the rows increases from the center of the shell 304 towards the ends of the shell 304. In another embodiment, the increase in compressibility value of the block elements 306 from the center of the shell 304 towards the ends of the shell 304 is sequential. In yet another embodiment, two halves of each of the block elements 306 are received in each of the plurality of horizontal slots such that compressibility value of one-half of each of the block elements 306 received in each of the plurality of horizontal slots on one half portion of the shell 304A varies from compressibility value of one-half of each of the block elements 306 received in each of the plurality of horizontal slots on the other half portion of the shell 304B to support multiple users.

[0063] In an exemplary embodiment, the mattress 300, for a queen sized bed, is optimized for providing orthopedic support and comfort to a user resting thereon, the mattress 300 having the following configuration:

i. the bottom layer 302 having a thickness of at least 2 inches;

ii. the resiliently compressible foam shell 304, having a rectangular shape with a thickness of at least 4 inches, a length of 2 meters and a breadth of 1.6 meters, fixed on the bottom layer 302 forming the plurality of horizontal slots along the breadth of the mattress 300 thereon;

iii. each of the plurality of horizontal slots having a rectangular cross-section with a length of 8 inches / 20.3 centimeters and a breadth of 184.76 centimeters, configured in the form of seven rows, wherein the plurality of rectangular shaped horizontal slots in the shell 304 are spaced apart from each other by the walls of the shell 304 having a thickness of 3 inches;

iv. the plurality of resiliently compressible block elements 306 made of foam material, having a shape complementary to that of the plurality of rectangular shaped horizontal slots, receivable in the plurality of horizontal slots of the shell 304;

v. compressibility value of each of the foam block elements 306 received in the rows of the plurality of horizontal slots is sequentially increased from the center of the shell 304 towards the ends of the shell 304, or the density rating of the foam block elements 306 received in the plurality of horizontal slots is sequentially decreased from the center of the shell 304 towards the ends of the shell 304, such that:

a. foam block elements 306G and 306A having a density rating of 26 are received by the rows, first from both the ends of the shell 304,

b. foam block elements 306F and 306B having a density rating of 30 are received by the rows, second from both the ends of the shell 304,

c. foam block elements 306E and 306C having a density rating of 40 are received by rows, third from both the ends of the shell 304, and

d. foam block element 306D having a density rating of 50 is received by the center row or the row, fourth from either end of the shell 304,

e. thereby achieving a compressibility profile that provides orthopedic support to the user and maintains horizontal alignment of the user resting on the mattress 300; and

f. the flexible top layer 308 having thickness of 2 inches.

[0064] In another exemplary embodiment, the mattress 300 for a king sized bed is optimized for providing orthopedic

support and comfort to two users resting thereon, the mattress having the same configuration as the one disclosed in the aforementioned embodiment (which is not repeated herein for the sake of brevity) with the following variations / modifications:

i. the shell 304, having a lenngth of 2 meters and a breadth of 1.8 meters;

ii. the plurality of rectangular shaped horizontal slots, are configured in the form of seven rows;

iii. two halves of the block elements 306 are received in each of the plurality of horizontal slots; and

iv. compressibility value of one-half of each of the block elements 306 received in each of the plurality of horizontal slots on one half portion of the shell 304A, varies from compressibility value of one-half of each of the block elements 306 received in each of the plurality of horizontal slots on the other half portion of the shell 304B.

[0065] **Table 2.** illustrates the density of foam block elements 306 filled in the two half portions of the shell 304 to achieve an exemplary predetermined compressibility profiles for the male and the female.

Half portions of the shell	304A	304B
Rows of Foam block elements	Density Rating of Resiliently Compressible Foam Block Elements	
306G	23	26
306F	28	30
306E	35	40
306D	45	50
306C	35	40
306B	28	30
306A	23	26

Table 2.

[0066] The compressibility profile shown in Table 2 orthopedically supports a female user on one portion of the shell 304A and a male user on the other half portion of the shell 304B respectively, corresponding to their different body weights, and maintaining a horizontal alignment of both users resting thereon the mattress 300.

[0067] In alternate variations of the above exemplary embodiment, the shape, size and material of the resiliently compressible foam shell 304 and the plurality of resiliently compressible foam block elements 306 are chosen so as to achieve the predetermined compressibility profile of the mattress 300.

[0068] In alternate embodiments, the plurality of block elements 306 is configured such that either the upper surface of the block elements 306 is flush with the upper surface of the shell 304, or predetermined rows of block elements selected from the plurality of block elements 306 are raised above the surface of the shell 304 to define a pillow formation on the mattress 300.

[0069] In another embodiment, the shape, size, and material of the shell 304, and the shape, size and compressibility value of the plurality of block elements 306 may be chosen such as to achieve predetermined compressibility profiles of the mattress 300 to meet specific comfort and health requirements of individual(s). Examples of the mattress 300 having pre-determined compressibility profiles to meet specific comfort and health requirements of individual(s) are as follows:

i. The mattress 300 for individual(s) with back pain wherein predetermined rows of block elements selected from the plurality of block elements 306 are raised above the surface of the shell 304 to define a slightly raised platform under the small of back and pillow formation under the knees for the individual(s) to maintain an orthopedically supporting profile to the spine while resting.

ii. The mattress 300 for individual(s) with gastro-esophageal reflux disease wherein predetermined rows of block elements selected from the plurality of block elements 306 are raised above the surface of the shell 304 to define a pillow formation on the top of the mattress 300 for raising the resting head of the individual(s). Additionally, for

individual(s) with a chronic/advanced state of the ailment, compressibility value of the plurality of block elements 306 received in the rows decreases from bottom of the shell 304 towards the top of the shell 304 sequentially to achieve a raised from the top (inclined) profile of the mattress 300 suited to the orthopedic requirement of the individual(s).

iii. The mattress 300 for individual(s) with nocturnal neuropathic pain in diabetic patients or complaints of peripheral neuropathy wherein predetermined rows of block elements selected from the plurality of block elements 306 such that the upper and lower portions of the mattress are raised, or other variations with different levels of density of the block elements 306, with different types of flexible top layer(s) 308.

[0070] In another embodiment, the mattress 300 is configured to support two users sharing the mattress 300, wherein two halves of the plurality of block elements 306 are received in each of the plurality of horizontal slots such that the shape, size, and compressibility value of one-half of each of the plurality of block elements 306 received in each of the plurality of horizontal slots on one half portion of the shell 304A varies from compressibility value of one-half of each of the block elements 306 received in each of the plurality of horizontal slots on the other half portion of the shell 304B, to meet the different orthopedic and comfort requirements of both the users.

[0071] Figure 2 illustrates an exploded view of a mattress 400 in accordance with another embodiment of the present disclosure. The mattress 400 comprises a resiliently compressible foam shell 404 defining a plurality of horizontal slots that is integral with a bottom layer 402. A plurality of resiliently compressible block elements 406 is received in the plurality of horizontal slots in the shell 404 having predetermined compressibility values such that the plurality of block elements 406 are raised above the surface of the shell 404 to define a pillow formation on the mattress 400.

[0072] The mattress and the method of manufacturing the mattress 400 described herein above, ensures a lighter mattress which maintains a horizontal alignment of the resting user by ensuring that the weight of the torso is supported by rows of high density material (having a low compressibility value) than the limbs of the user, which are supported by row of low density material (having a high compressibility value) owing to the relative difference between the weights of the torso and the limbs of the user.

[0073] The mattress also requires limited number of components is thus easier to assemble.

TECHNICAL ADVANCEMENTS AND ECONOMICAL SIGNIFICANCE

[0074] The mattress and the method for the manufacture of a mattress described herein above have several technical advantages including but not limited to the realization of:

- a mattress that provides comfort to the user resting thereon;
- a mattress that provides orthopedic support to the user resting thereon;
- a mattress which is customizable so as to meet specific comfort and health requirements of the user resting thereon;
- a mattress that maintains a horizontal alignment of the resting user thereby eliminating the chances of pain or any harm to the user resting thereon;
- a mattress that provides the user with the choice of filling materials suited to his needs and requirements;
- a mattress that provides the option of unique configurations for various medical requirements of supporting particular body parts of the user resting thereon; and
- a mattress which uses fewer inventories and is easy to assemble.

[0075] The disclosure is described herein above with reference to the accompanying embodiments which do not limit the scope and ambit of the disclosure. The description provided is purely by way of example and illustration.

[0076] The embodiments herein above and the various features and advantageous details thereof are explained with reference to the non-limiting embodiments in the foregoing description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein above are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein above.

[0077] The foregoing description of the specific embodiments so fully reveals the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope

of the embodiments as described herein.

[0078] Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

[0079] The use of the expression "at least" or "at least one" suggests the use of one or more elements or ingredients or quantities, as the use may be in the embodiment of the disclosure to achieve one or more of the desired objects or results.

[0080] Any discussion of documents, acts, materials, devices, articles or the like that has been included in this specification is solely for the purpose of providing a context for the disclosure. It is not to be taken as an admission that any or all of these matters form a part of the prior art base or were common general knowledge in the field relevant to the disclosure as it existed anywhere before the priority date of this application.

[0081] The numerical values mentioned for the various physical parameters, dimensions or quantities are only approximations and it is envisaged that the values higher/lower than the numerical values assigned to the parameters, dimensions or quantities fall within the scope of the disclosure, unless there is a statement in the specification specific to the contrary.

[0082] While considerable emphasis has been placed herein on the components and component parts of the preferred embodiments, it will be appreciated that many embodiments can be made and that many changes can be made in the preferred embodiments without departing from the principles of the disclosure. These and other changes in the preferred embodiment as well as other embodiments of the disclosure will be apparent to those skilled in the art from the disclosure herein, whereby it is to be distinctly understood that the foregoing descriptive matter is to be interpreted merely as illustrative of the disclosure and not as a limitation.

Claims

1. A mattress comprising:

i. a resiliently compressible foam shell defining a plurality of pockets along the breadth of said mattress
ii. a bottom layer ;
iii. a plurality of resiliently compressible block elements receivable in said plurality of pockets having predetermined varying compressibility values;
iv. a flexible top layer; and
v. a mattress ticking enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer.

2. The mattress of claim 1, wherein said plurality of pockets are configured in the form of an array of rows and columns, wherein said rows are in parallel to a width of mattress and preferably seven in numbers and said columns are in parallel to length of mattress and number of columns varies with the width of the mattress.

3. The mattress of claim 1, wherein said plurality of pockets is in the form of horizontal slots and said plurality of horizontal slots are configured in rows along the breadth of said mattress such that the number of said rows is in multiple of seven.

4. The mattress as claimed in claim 1, wherein said shell, said bottom layer and said flexible top layer are of a material selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam and combinations thereof.

5. The mattress as claimed in claim 1, wherein said plurality of block elements are of a material selected from the group consisting of latex foam, polyurethane foam, visco-elastic foam, coir foam, polyester wadding, cotton, springs made of steel wire or plastic, polyester fiber, wool, Down & Feather and combinations thereof.

6. The mattress as claimed in claim 1, wherein said bottom layer is integral with said shell and said plurality of pockets are recessed in said shell.

7. The mattress as claimed in claim 1, wherein said shell is configured with a plurality of slits through said shell and said bottom layer is fixed to said shell and said plurality of pockets are defined by the walls of said slits and said bottom layer.

8. The mattress as claimed in claim 1, wherein the upper surface of said flexible top layer is configured with a layer of

gel pad.

9. The mattress as claimed in claim 1, wherein an adhesive layer is provided between said plurality of block elements and the inner surface of said plurality of pockets in said shell; either on said block elements or on the inner surface of said plurality of pockets in said shell, or on both.

10. The mattress as claimed in claim 1, wherein the walls of said shell have perforations, enabling venting of air through said shell.

11. The mattress as claimed in claim 1, wherein said plurality of block elements are configured such that

- the upper surface of said plurality of block elements is flush with the upper surface of said shell; or
- predetermined rows of block elements selected from said plurality of block elements are raised above the upper surface of said shell to define a pillow formation on said mattress.

12. The mattress as claimed in claim 1, wherein

- the plurality of block elements selected to be received in said pockets are such that the compressibility value of said plurality of block elements received in said pockets increases sequentially from the center of said shell towards the ends of said shell; and
- the compressibility of the plurality of block elements received in each of said plurality of pockets varies along the width of the mattress.

13. A method of manufacturing a mattress, said method comprising the following steps:

i. fabricating a resiliently compressible foam shell defining a plurality of pockets configured along the breadth of said mattress;
ii. integrally providing or securing a bottom layer to said shell;
iii. fabricating a plurality of resiliently compressible block elements having shapes complementary to said plurality of pockets, received in said plurality of pockets in a predetermined varying arrangement;
iv. securing a flexible top layer to said shell; and
v. enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer in a mattress ticking.

14. The method as claimed in claim 13, wherein an adhesive is applied between said plurality of block elements and the inner surface of said plurality of pockets in said shell either on said block elements or on said inner surface of said plurality of pockets in said shell, or on both.

15. A method of manufacturing a mattress customized to requirement of at least one user depending on the need for orthopedic support of said at least one user, said method comprising the following steps:

- fabricating a resiliently compressible foam shell defining a plurality of pockets configured in rows along the breadth of said mattress;
- integrally providing or securing a bottom layer to said shell;
- determining an orthopedic need of said at least one user;
- selecting a plurality of resiliently compressible block elements with shapes complementary to said plurality of pockets having predetermined compressibility values suited to said orthopedic needs of said at least one user, received in said plurality of pockets in a predetermined varying arrangement;
- securing a flexible top layer to said shell; and
- enclosing the assembly of said bottom layer, said plurality of resiliently compressible block elements received in said plurality of pockets, and said flexible top layer in a mattress ticking.

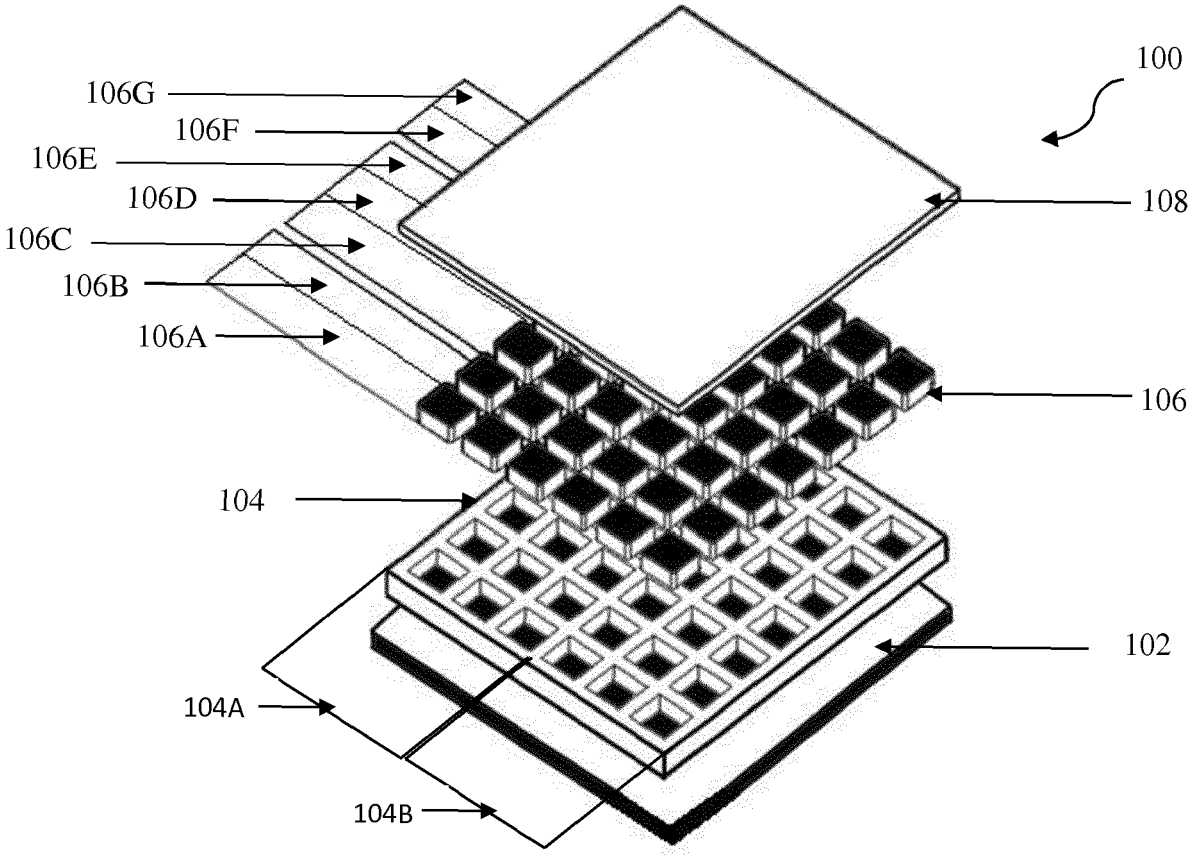
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FIGURE 1

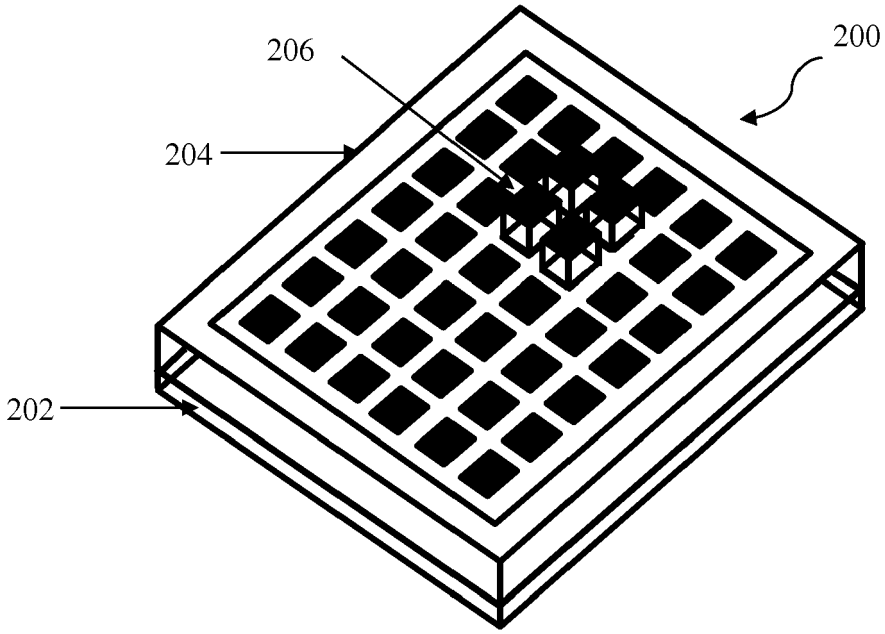

FIGURE 2

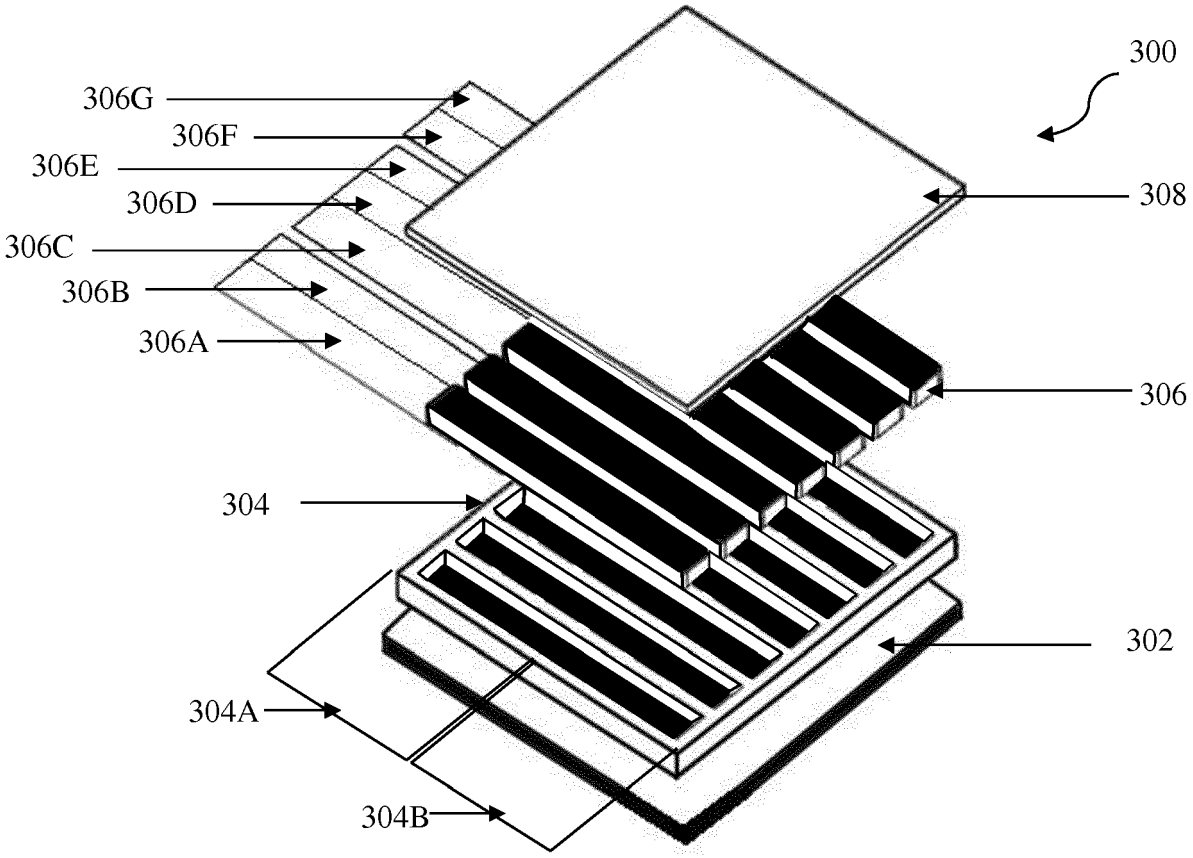
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FIGURE 3

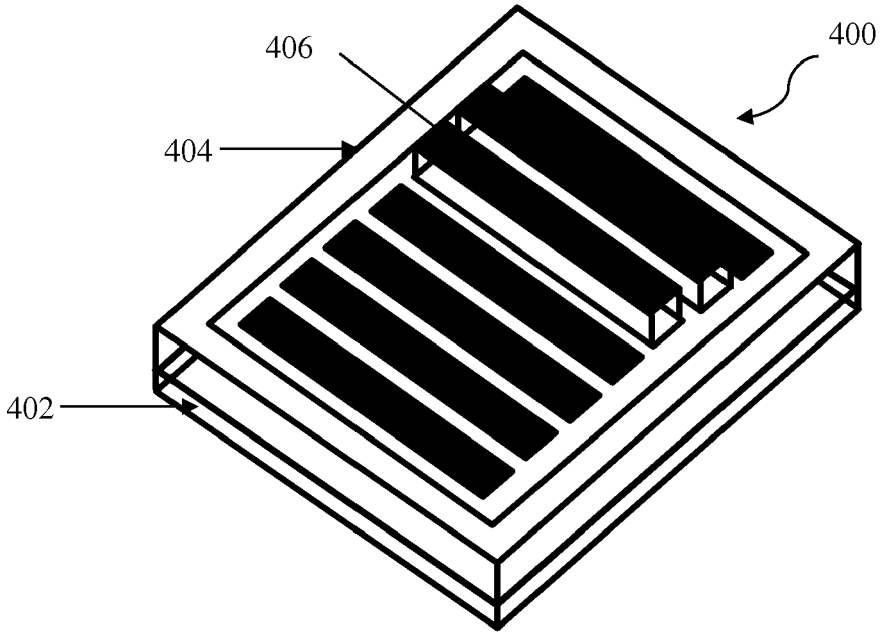

FIGURE 4

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 9601

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 January 2017	Amghar, Norddin

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