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(54) **Titre : SYSTEME DE SUR-MATELAS OU D'OREILLER DOTE DE ZONES D'ELASTICITE VARIABLES**
(54) **Title: PILLOW AND MATTRESS PAD SYSTEM WITH VARIABLE ZONES OF ELASTICITY**

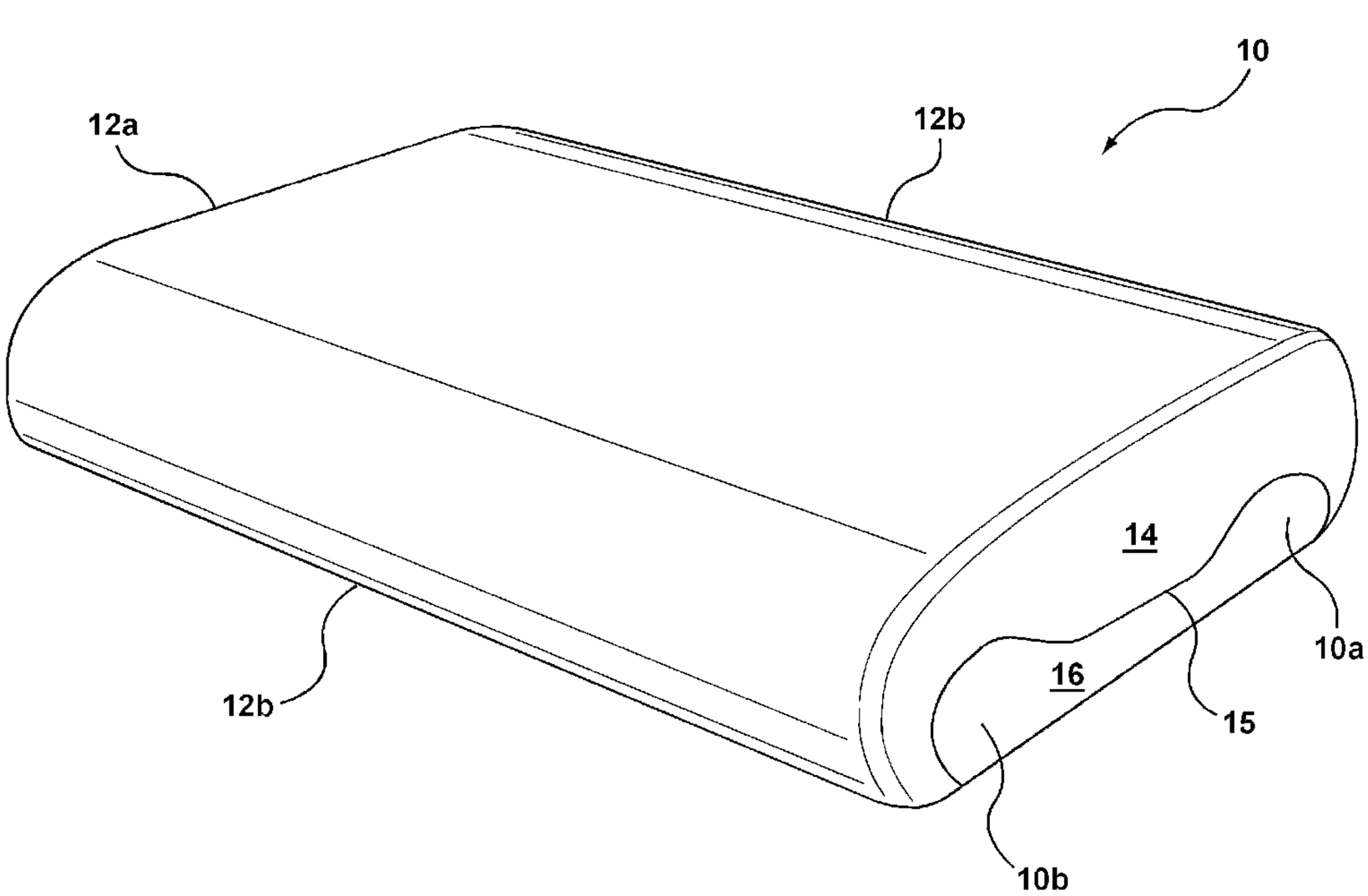


FIG. 1

(57) **Abrégé/Abstract:**
A pillow, mattress pad, mattress pad and pillow system, and mattress are provided having a plurality of zones for providing a selected distribution of pressure across different parts of a sleeper's body. The pillow has a first zone of elasticity for supporting the head of a sleeper and an integral second zone of elasticity for supporting the neck and upper thoracic spine, said pillow comprising a firm high resistance foam lower portion and a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

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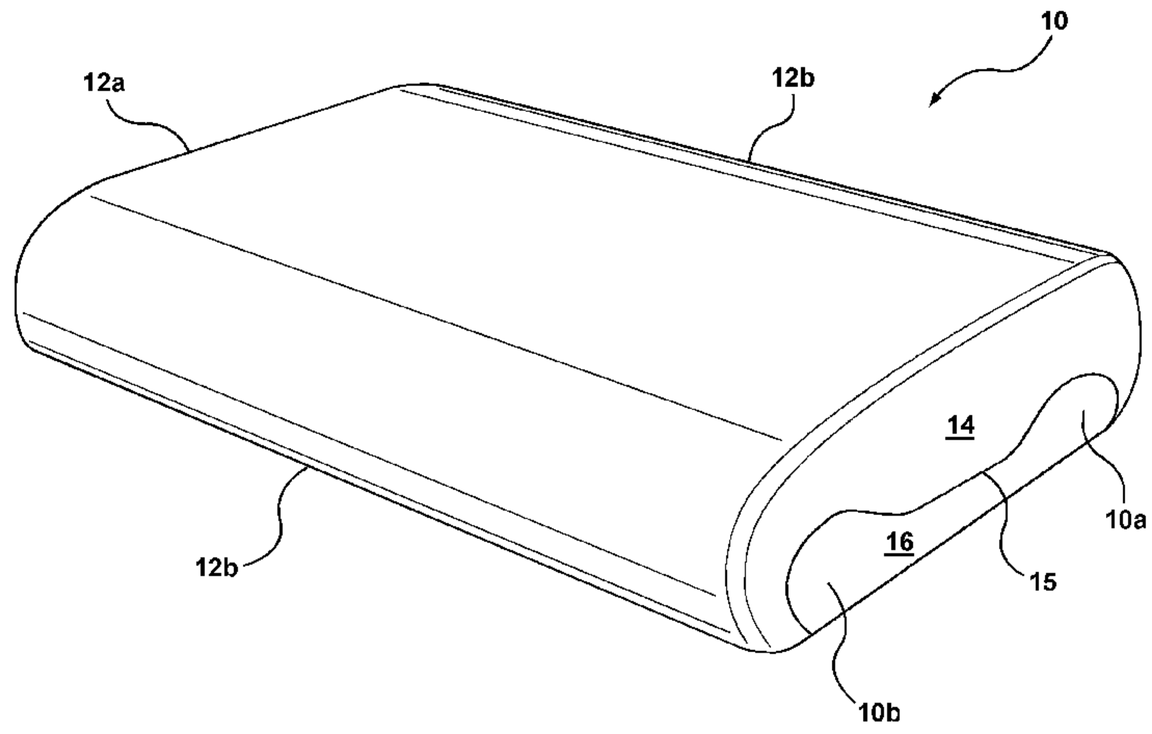


FIG. 1

(57) Abstract: A pillow, mattress pad, mattress pad and pillow system, and mattress are provided having a plurality of zones for providing a selected distribution of pressure across different parts of a sleeper's body. The pillow has a first zone of elasticity for supporting the head of a sleeper and an integral second zone of elasticity for supporting the neck and upper thoracic spine, said pillow comprising a firm high resistance foam lower portion and a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

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PILLOW AND MATTRESS PAD SYSTEM WITH VARIABLE ZONES OF ELASTICITY

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application claims the benefit of and priority to United States Provisional Patent Application No. 61/508,274 filed July 15, 2011 under the title PILLOW AND MATTRESS PAD SYSTEM WITH VARIABLE ZONES OF ELASTICITY and to United States Provisional Patent Application No. 61/542,458 filed October 3, 2011 under the title PILLOW AND MATTRESS PAD SYSTEM WITH VARIABLE ZONES OF ELASTICITY.

[002] The content of the above patent applications is hereby expressly incorporated by reference into the detailed description hereof.

TECHNICAL FIELD

[003] The present application relates to pillows, mattresses, and mattress pads, and specifically to pillows, mattresses, and mattress pads having a plurality of zones formed from materials having different properties.

BACKGROUND

[004] High resilience foams in a pillow are effective in supporting the weight of a sleeper's head but often do not provide an entire night's comfort. As HRFs respond with reactive force to the applied weight, they develop a resistance to deflection directly in proportion to the load applied. Points of greater deflection accordingly exert a greater reactive force. These uneven return pressures in such pillows can lead to "hot spots", where the sleeper may experience reduced blood circulation resulting in physical discomfort or fatigue.

[005] A large number of "composite" pillows with multiple layer construction -vertical and/or horizontal - for therapeutically supporting the head and neck of a person lying in a supine position are known in the art. Representative examples are afforded by United States patents 4,777,855

(Cohen); 4,803,743 (Greenawalt); 5,307,532 (Connell); 5,638,564 (Greenawalt et al.); and 5,689,844 (Liu).

[006] With the relatively recent advent of viscoelastic foam materials, pillows and mattresses have been produced which take advantage of the "memory" and other properties of VEFs. U.S. patent publication 2004/0074008 (Martens et al.) entitled MEMORY FOAM MATTRESS SYSTEM describes a mattress system having a core layer of polyurethane or latex foam to provide a base support and a top layer of VEF disposed atop the core layer, as well as a pillow comprising a body of viscoelastic foam, with a top side contoured to the head and neck of the sleeper and one or more HEF inserts adapted to be inserted in a pocket through the VEF body of pillow.

[007] U.S. patent publication 2005/0278852 (Wahrmund et al.) describes a pillow having a urethane foam core with sufficient firmness to provide effective support for a user and a hypersoft, high- airflow viscoelastic foam shell surrounding the core with sufficient firmness to maintain a conventional outer pillow shape when supporting only a pillowcase or other bed coverings.

[008] U.S. patent publication 2006/0064819 (Mollett) is directed to an orthopedic therapeutic memory form pillow having upper and lower sections made of memory foam, both of essentially crescent shaped outer perimeter, with a quarter-round cut out section removed from the lower surface of the bottom section, adapted to receive a patient's head and neck.

SUMMARY OF THE INVENTION

[009] A foam pillow is provided. The design relies on a model for an optimal foam pillow based on chiropractic and biomechanical expertise, which prescribes a pillow of conventional shape, but having an optimized profile of effective spinal pressure across its width. Such a pillow can be made by using a two-stage mold for HEF and VEF portions meeting seamlessly along a semi-rigid skin across the pillow interior, thereby creating zones of differing elasticity based on the differing thicknesses of each HRF and VEF portion at each zone.

[0010] According to a first aspect, there is provided a pillow, the PIP™, having a first zone of elasticity for supporting the head of a sleeper and a second zone of elasticity for supporting the neck and upper thoracic spine, said pillow comprising a firm high resistance foam lower portion and a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

[0011] According to a second aspect, the pillow includes an array of parallel cylindrical perforations therethrough, for modification of the weight, softness and/or firmness of the pillow to suit the subjective preferences of the sleeper.

[0012] According to a further aspect, the pillow has a substantially rectangular shape corresponding to a conventional bed pillow.

[0013] According to a further aspect, the pillow has a substantially horseshoe-like shape for supporting the neck of a sitting sleeper.

[0014] According to a further aspect, there is provided a mattress pad, the SSR (Sleep Surface Rejuvenation) 1 system, for providing a selected distribution of pressure across all spinal levels of a sleeper.

[0015] According to a further aspect, the mattress pad comprises a bottom portion comprising a polyurethane foam core of uniform thickness; a recessed central portion adapted to receive viscoelastic pads of selected firmness for support of sub-cervical regions of the spine of a sleeper; and a top portion concavely recessed to receive a pillow such that the top surface of the pillow is presented to the head of a sleeper at a desired height above the generally coplanar upper surfaces of said central and lower portions.

[0016] According to a further aspect, said pillow is as defined above.

[0017] According to a further aspect, the mattress pad further comprises a plurality of viscoelastic pads for placement in the recessed central portion of the mattress pad, each viscoelastic pad being shaped to provide support to a single

sleeper on either a left half or a right half of the central portion of the mattress pad.

[0018] According to a further aspect, the mattress pad defines an array of parallel cylindrical perforations therethrough for modification of the weight, softness, and/or firmness of the mattress to suit the subjective preferences of the sleeper.

[0019] According to a further aspect, there is provided a multi-zoned reversible mattress, the OMF (Orthopedic Memory Foam) mattress, for providing a selected distribution of pressure across all spinal levels of a sleeper, comprising a top layer comprising a mattress pad as described above; a middle layer comprising a uniform pad or mattress having substantially uniform firmness and resilience across its entire area; and a bottom layer comprising a mattress pad as described above.

[0020] According to a further aspect, there is provided a mattress pad and pillow system, the SSR 2 system, for providing a selected distribution of pressure across all spinal levels of a sleeper, comprising a fitted fabric mattress cover having at least one pocket corresponding to each of a body zone and a head zone of a sleeping surface, each pocket being adapted to receive at least one pad insert.

[0021] According to a further aspect, the at least one pocket corresponding to each of a body zone and a head zone comprises a single pocket corresponding to the body zone for receiving a body pad insert; and two side-by-side pockets corresponding to the head zone for receiving a left-side pad to elevate a pillow on the left side of the mattress protector and a right-side pad to elevate a pillow on the right side of the mattress protector.

[0022] According to a further aspect, the mattress pad and pillow system further comprises a composite body zone insert pad having a central zone portion and a lower zone portion, the lower zone portion comprising a polyurethane foam core of uniform thickness, and the central zone portion comprising two viscoelastic pads of selected firmness for support of sub-cervical

regions of the spine of a sleeper.

[0023] According to a further aspect, the mattress pad and pillow system further comprises one or more pillow elevation pads for insertion into the head zone pockets to elevate the pillow on one or both sides.

[0024] According to a further aspect, the mattress pad and pillow system further comprises two pillows as defined above.

[0025] According to a further aspect, each pocket further comprises a fastener for securing an inserted pad or pillow to the pocket.

[0026] According to a further aspect, there is provided a knee pillow having at least one knee support zone for supporting at least one knee of a sleeper, said pillow comprising a firm high resistance foam lower portion; and a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

[0027] Further aspects will be apparent to a skilled person based on the description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The present application in its aspects of pillow composition and design, mattress surface composition and design and the integration of the two will now be described in greater detail with reference to the accompanying drawings of example embodiments in which:

[0029] Figure 1 is a schematic perspective drawing in transverse cross-section of an example embodiment of the dual-zoned pillow according to the invention.

[0030] Figure 2 is a schematic depiction in top perspective view of an example embodiment of a mattress pad [SSR 1] according to the invention, with central drop-in pads displaced to one side of the mattress pad core.

[0031] Figure 3 is a schematic representation in longitudinal cross-section of an example embodiment of a full mattress [OMF] according to the invention, with central drop-in pads shown in place for use.

[0032] Figure 4 is a schematic representation of a pillow corresponding to the pillow of Figure 1, but provided with an array of top-two-bottom ventilation holes (perforations) 40 [PIP Light].

[0033] Figure 5 is a schematic representation in longitudinal cross-section of a mattress pad corresponding to that of Figure 2, but provided with perforations through the bottom and central portions thereof and the rectangular central drop-in pads for placement on the central portion of the mattress pad [SSR Light].

[0034] Figure 6 is a schematic depiction in top perspective view of an inverted modular zoned mattress protector and pad/pillow system according to an example embodiment [SSR 2].

[0035] Figure 7 is a cross-sectional front view of a modular zoned mattress protector and pad/pillow system [SSR 2] viewed through the middle or lower zone.

[0036] Figure 8 is a front cross-sectional view of a zoned neck pillow showing the user's head and shoulders in dashed lines.

[0037] Figure 9 is a top view of a zoned neck pillow showing the user's head and shoulders in dashed lines.

[0038] Figure 10 is a top view of a zoned knee pillow.

[0039] Figure 11 is a front cross-sectional view of a zoned knee pillow.

[0040] Figure 12 is a front cross-sectional view of a zoned knee pillow folded in half.

[0041] Figure 13 is a schematic depiction in top perspective view of an inverted modular zoned mattress protector and pad/pillow system according to an alternate example embodiment [SSR 2].

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

[0042] The present application relates to an integral, dual-zoned molded pillow composed of high resilience foam (HRF) and viscoelastic foam (VEF) contoured to form selected zones of elasticity; to a separate tri-zoned HRF and VEF mattress pad; to a reversible mattress having a tri-zoned sleep surface; and to a mattress protector having one or more pouches for accommodating pad inserts to create a multi-zoned sleep surface. The shape and thickness of the HRF and VEF portions are selected to achieve integration of the pillow with the sleep surface to provide optimal support for the entire spinal column of a sleeper, namely upper back, cervical and cranial therapeutic support by the pillow and superior spinal support by the mattress surface.

(i) Dual Zoned Pillow

[0043] Referring to Fig. 1, a pillow 10 according to an example embodiment is of a standard shape – typically 21” width, 16” length and 5” inch thickness – with tapered edges 12a and 12b along its length and width respectively. The pillow is formed by a two-stage molding process to produce an upper portion 14 of soft VEF and a lower portion 16 of firm HRF. By proper selection and control of the chemistry and the molding process the body of the pillow emerges from the mold, after curing, with a thin, semi-rigid “skin” 15 intimately sealing portion 14 to portion 16.

[0044] Unique shaping of the pillow HRF and VEF portions and their volumes are designed to provide improved orthopedic benefit over prior known pillows. The HEF inner/lower part 16 appears in vertical cross section as an upwardly concave asymmetrical “paisley” or “dumbell” shape which forms the bottom portion, foot 10a, and crown 10b of pillow 10. The softer VEF

outer/upper part 14 of the pillow overlies lower part 16 and embraces and encapsulates the transverse edges thereof, defining the transverse edges 12b of pillow 10.

[0045] In use, the cranial region of the sleeper subsides into the soft foam and is brought to rest by impinging against the firm HRF. The cranium is effectively and comfortably cradled in the concave "valley" formed between the differently thickened ends of portion 14. Thus, the pillow provides two different zones of support for the head and for the upper neck and spine: each zone has differing elasticity based on the thicknesses of HRF and VEF underlying that zone.

[0046] In one example embodiment, the PIP^{TM} 5, the polymer foaming chemistry is selected to specify about 5 lb/ft^3 density VEF for the outer core 14 and about 3 lb/ft^3 density HRF for the inner core 16. The total weight of the PIP^{TM} 5 is approximately 5 lbs. In another embodiment, the PIP^{TM} 4, the polymer foaming chemistry is selected to specify about 3 lb/ft^3 density VEF for the outer core 14 and about 3 lb/ft^3 density HRF for the inner core 16. The total weight of the PIP^{TM} 4 is approximately 4 lbs.

[0047] The choice and design of high resilience foam for the inner core may be made with a view to the modulus ("sag factor") of the material, i.e. its ability to support weight with an ever-increasing resistance (force of reaction) so that the head does not bottom out. This consideration is of particular importance for supporting the head of a side-sleeper above the surface of the mattress.

[0048] The choice and design of viscoelastic memory foam for the outer core may be made with a view to fitting the pillow, in use, as closely as possible to suit the personal morphology of the sleeper. Indeed the two-foam molding process to produce pillows of the invention lends itself to customization over a variety of upper body, neck and cranial types.

[0049] The density of the VEF and HRF portions may be chosen independently of the choice of modulus or firmness.

[0050] In alternate embodiments, the pillow may be varied as to its size and/or shape. In one embodiment, the pillow has a thickness between 3" and 4", and is referred to as the PIP™ Silhouette. The PIP™ Silhouette retains the same essential structure as the PIP™ described above, but uses proportionally thinner portions of the two foam sections.

[0051] In another example embodiment illustrated in Fig. 8 and Fig. 9, the pillow comprises a neck pillow 100 for travel having a substantially horseshoe-like shape. This travel pillow comprises a section of HRF 102 shaped to provide a base of support for the body of the pillow on the user's shoulders and neck, and a crown section of VEF 104 positioned on top of the HRF section 102 and on the inside surfaces facing the user's head to provide padding and support for the user's head as it leans against the top and inside surfaces of the pillow 100. Fig. 8 shows a front cross-sectional view of the neck pillow 100 showing a user's head and shoulders in dashed lines. Fig. 9 shows a top view of the neck pillow 100 showing a user's head and shoulders in dashed lines.

[0052] In another example embodiment illustrated in Fig. 10 through Fig. 12, the pillow comprises a knee pillow 152 designed for placement between a user's knees and presenting two zones of elastic resistance integrally formed of HRF and VEF portions contoured for optimizing support of the knees and legs of a user. This knee pillow 152 has a substantially rectangular and elongate profile in top view, as seen in Fig. 10, with two raised knee-support mounds 154 for supporting the knees of a user lying on his or her back with the pillow 152 placed under the knees. In front cross-sectional view, as shown in Fig. 11, the pillow 152 is seen to comprise two HRF sections 156 underlying the two knee-support mounds 154, covered with a VEF section 158 that extends across the entire length of the pillow 152. In some embodiments, the HRF sections may be approximately ½ inch in thickness at their apices, while the VEF section has a uniform thickness of 1 inch. Fig. 12 shows the knee pillow 152 being used as a knee support, e.g., for a user lying on his or her side, to provide padding between the user's knees. The pillow 152 is folded in half lengthwise, creating a doubly thick support zone comprising both mounds 154. The user's knees can then be separated by this doubly-thick support zone.

(ii) Zoned Mattress Pad and Pad/Pillow System

[0053] In a mattress pilot study related to the pillow embodiments described above, a three-zoned mattress or mattress pad is found to provide a desirably even distribution of pressure across all spinal levels, leading to the development of a three-zone mattress/pillow system for healthful support and comfort along the entire vertebral chain.

[0054] Referring to Fig. 2, an example embodiment of an SSR 1 mattress topper pad of rectangular dimensions 79”x 59” or 80” x 60” is illustrated, indicated generally by reference numeral 20. The mattress pad 20 is a unitary core fabricated of a conventional bedding foam such as polyurethane foam, over and around which a quilted or non-quilted fabric (not shown) may be placed. A bottom portion 20a, for supporting the lower body of the sleeper, extends over about one-half the length of mattress pad 20 and comprises the thickest part thereof, in this example embodiment having a thickness of about 3”.

[0055] A central downwardly-recessed central portion 20b of the core is about 2” thick in this example embodiment and extends longitudinally about 20” from its lower margin 21a to upper margin 21b. As may be seen in Fig. 2, the 1” drop from bottom portion 20a to central portion 20b allows for the side-by-side insertion placement of 1” thick rectangular central drop-in pads 22b and 23b of selected firmness, not necessarily the same for each pad. Drop-in pads 22b and 23b are fabricated of extra high density VEFs. The resulting double layer constitutes a second zone which is best suited for therapeutic support of the sub-cervical regions of the spine and contributes to the sleeper’s comfort, the firmness of the various insert pads being selected to meet individual needs. By using two side-by-side pads, two sleepers lying side-by-side may use insert pads having different thicknesses or different densities.

[0056] The top portion 20c of the core is concavely depressed from the upper margin 21b of central portion 20b and ends at the top in a horizontal retainer ledge 25. Top portion 20c constitutes the third zone of the SSR 1 and is designed as a cradle to receive and hold a pillow and to select the vertical level of the pillow’s upper surface relative to the adjacent upper surface of the

mattress pad in use, by choosing a pillow of a desired thickness.

[0057] The zoned mattress pad/pillow system thus provides a sleep surface covering for a conventional innerspring mattress affording superior spinal support. The pillow fully integrates with the sleep surface and may in some embodiments provide the particular advantages and customizability described above.

[0058] The dimensions of the pad 20 may vary in different embodiments, as may the relative dimensions of the various zones 20a-c. In some embodiments, the pad is 59”-60” wide and 79”-80” long, with a lower portion 20a 38” long, a central portion 20b 20” long, and a top portion 19”-20” long, with a retainer ledge 2” long. In some embodiments, the lower portion 20a is 3” thick, the central portion 20b is 2” thick, and the top portion 20c is 1.25” thick. In other embodiments, the lower 20a and central portions 20b may each be closer to 30” in length.

(iii) Zoned Mattress and Mattress/Pillow System

[0059] A further embodiment is the OMF mattress, a reversible orthopedic mattress composed partially of memory foam with equivalent topside and underside sleeping surfaces featuring a pillow cradle (as in the SSR 1) and respective central regions to accommodate VEF insert pads.

[0060] Referring to Fig. 3, an OMF mattress of conventional rectangular dimensions (double, queen, or king) is schematically illustrated in cross-section and indicated generally by reference numeral 30. The main body (core) of the OMF mattress 30 is fabricated of a conventional bedding foam such as polyurethane foam. As oriented in Figure 3, relative to a sleeper, mattress 30 has a bottom portion 30a for supporting the lower body of the sleeper, extending over about one-half the length of the mattress and comprises the thickest part thereof, typically about five inches.

[0061] Downwardly-recessed central region 30b of the core constitutes the second zone of the mattress where therapeutic support of the sub-cervical

regions of the spine is provided by virtue of a side to side pair of drop-in pads 32. The top most portion 30c of the mattress core, as in the SSR 1 pad, is configured to receive and hold a pillow, in particular a pillow according to the present application, and to set the vertical level of the pillow's upper surface relevant to the adjacent upper surface of the mattress in use, through the choice of a pillow of desired thickness.

[0062] The flip-side sleeping surface of mattress 30 has corresponding bottom, central and top most portions 30'a, 30'b, and 30'c, respectively. Since each of recessed portions 30b and 30'b accommodate the ready insertion and removal of adjacent drop in pads 32 and 32' ("inserts"), which may be provided in preselected levels of firmness from soft to hard, each double, queen or king OMF mattress can have "his and hers" insert selections to accommodate the preferences of two sleepers situated side by side. As each side of a sleeping surface is ideally provided with a pillow as described above (i.e. having an optimized profile of effective spinal pressure for the sleepers' head, neck, and upper thoracic spine), a truly customized mattress/pillow sleeping system can be provided on order. If, over time, a different level of firmness is required, replacement inserts are readily available and easy to install.

[0063] With each reversible mattress 30 having two pairs of pads, each pad potentially of a different density and firmness, pads can be shifted from one side to another if the users wish to trade positions.

[0064] In some embodiments, the OMF mattress may comprise an SSR 1 mattress topper pad as described above, bonded or placed on top of a mattress core having a pocketed coil construction, a bonnell (conventional open-coil inner-spring) construction, a latex construction, a foam construction, or a continuous coil construction. In some embodiments, the mattress core is encapsulated in foam. In some embodiments, the SSR 1 has an overall thickness of approximately 3.5", and it is bonded to a mattress core of approximately 6" thickness.

[0065] In a further embodiment, the mattress core as described above may have multi-zone SSR 1 structures bonded to both sides, thereby reproducing the reversibility feature described above.

[0066] A potential advantage of both the SSR 1 pad and the OMF mattress in some embodiments stems from the economical use of costly memory foam where it is really of therapeutic need and value.

(iv) "Light" Variants of Manufactures (i) to (iii)

[0067] In the testing of pillows and mattresses according to the present application, it was found that some of the consumers who would benefit therapeutically from their use preferred the characteristic of firmness and feel of pillows and mattresses which have additionally been made with ventilation holes 40 tunneled therethrough, as illustrated in Figures 4 and 5.

[0068] The ventilating perforations 40 may be produced by a "clicker" punch apparatus that forms circular holes of about ¼ inch diameter through the memory foam.

[0069] Comfort-testing of variants on a number of subjects may extend the range of those properties for the PIP™, SSR 1 pad, SSR 2, and OMF mattress favoured by different individuals. No quantitative relationship between the tensile properties of the product and the diameter and areal density of cylindrical voids is postulated here. Evidently, the reduction in weight of the PIP™ and the other embodiments resulting from the removal of foamed material is economically and ecologically desirable, particularly if the punched-out cylinders are used as padding in other cushioning products. Most importantly, however, the "light" products have been found to afford the same therapeutic benefits as the unperforated, while affording changes in the sense of "softness" and "firmness" which better suited the preference of some test users.

(v) Modular Zoned Mattress Pad/Pillow System with Skirt

[0070] Referring to Fig. 6, a fitted modular zoned mattress pad and pillow system of rectangular dimensions 79"x 59" is illustrated, indicated generally by reference numeral 60. The mattress pad and pillow system comprises several foam inserts attached to the bottom surface of a fitted fabric mattress protector

or cover having a skirt to secure it to the top of a mattress. The mattress cover 60 is a substantially flat, rectangular piece of fabric fitted with pockets 62a, 62b, 62c corresponding to various body zones 64a, 64b, 64c. Each pocket in the fabric mattress cover 60 is adapted to receive a single foam insert 66a, 66b, 66c. The cover 60 has a pair of pockets 62a corresponding to a bottom zone 64a, for supporting the lower body of the sleeper, which extends over about 30" in the illustrated embodiment. The inserts 66a used in this zone may comprise rectangular, 5 lb. HRF pads having a thickness of about 3" or less.

[0071] The cover has a second pair of pockets 62b corresponding to central region 64b where therapeutic support of the sub-cervical regions of the spine is provided by virtue of another pair of inserts 66b. The topmost zone 64c of the cover has two pockets 62c each configured to receive and hold one or more elevational insert pads 66c to elevate a pillow. In some embodiments, the cover 60 is configured to work with a multi-zoned pillow according to the present application, and to set the vertical level of the pillow's upper surface relevant to the adjacent upper surface of the inserts in use, through the choice of a multi-zoned pillow of desired thickness and/or the use of one or more elevational insert pads 66c.

[0072] The pockets 62a-c each has means for receiving the inserts 66a-c, such as openings 68. In some embodiments, these openings 68 may be releasably sealable by mechanisms such as buttons, zips, snaps, or strips or pads of hook and loop fasteners 70 such as Velcro™.

[0073] The cover 60 is secured to the mattress by means of a skirt 72 which may be fitted about the perimeter of the mattress. It may be assisted in this function by an elastic portion 74 about its bottom edge.

[0074] The cover 60 illustrated in Figure 6 is upside-down, with the skirt inverted, to show detail; the pockets 62a-c have their openings 68 situated on the underside of the cover next to the mattress. However, in some embodiments, the pockets may instead open on their top sides.

[0075] In some embodiments, the fasteners 70 may be situated along the central spine of the cover 60 separating the left and right sides. In some

embodiments, these fasteners 70 or additional fasteners may be used for securing the inserts 66a-b and/or pillows instead of, or in addition to, sealing the pocket openings 68. In such embodiments, the inserts 66a-b and/or pillows may be fitted with complementary fastener parts, such as complementary hook-and-loop fastener patches or strips.

[0076] Such an example embodiment is shown in Figure 7. The system is seen cross-sectionally through either the middle zone 64b or lower zone 64a, showing two inserts 66 in place in their respective pockets 62. Each insert 66 has a strip of hook and loop fasteners 80 affixed or molded along its upper surface near the inner edge, the strip running lengthwise and seen in narrow cross-section. The strip 80 corresponds to a complementary strip of hook and loop fasteners 78 affixed to the inside upper surface of each pocket 62. In use, the inserts 66 are received into the pockets 62 via openings 68, and they are then fixed in place using the corresponding strips of hook and loop fasteners 78, 80. The skirt 72 is allowed to drape down from the upper fabric surface or pad 76 of the cover 60, and it is secured in place around the mattress using the elastic portion 74.

[0077] In other embodiments, the pockets of the upper zone 64c, middle zone 64b, and/or lower zone 64a may comprise only a single pocket rather than two pockets side-by-side. Further embodiments may combine two or more zones, such as the lower and middle zones 64a-64b, into a single pocket or a pair of side-by-side left and right pockets. In one example embodiment, the middle and lower zones 64a-b use only a single pocket that accommodates a single large pad providing a sleep surface for the bodies of both sleepers. The body zone pad may in some embodiments be a multi-zoned pad having a uniform, medium-resistance HRF lower portion and a variable-resistance middle zone having its level of resistance on one or both sides determined by the use of one or two VEF insert pads. Fig. 13 shows an example embodiment of the protector comprising a cover 60 having two side-by-side pockets 62c for the upper zone 64c and a single large pocket 62d for the entire body zone comprising both left and right middle and lower zones 64a-b. The two upper zone pockets 62c are adapted to accommodate pillow elevational insert pads. The body zone pocket 62d is adapted to receive a multi-zoned body zone pad

66d having a lower portion 67a comprising a polyurethane foam core of uniform thickness, and a central zone portion 67b comprising two VEF pads 69b of selected firmness for support of sub-cervical regions of the spine of each sleeper. The multi-zoned body zone insert pad 66d in some embodiments may join the central zone portion insert pads 69b to the lower portion 67a of the multi-zoned pat 66d using suitable fasteners, including hook and loop fasteners, or by permanent joining through adhesives, bonding or integral molding.

[0078] In some embodiments, the protector cover 60 may be quilted to a layer of synthetic or natural fiber, or of foam. In some embodiments, it may be formed from a stretchable material to maximize the transmission of the resilient properties of the underlying foam pads and pillows to the user's body. In some embodiments, the skirt 72 may be replaced with other means for fastening or securing the cover 60 to the bed or mattress, such as a system of straps or other suitable fastening or securing means.

[0079] In some embodiments of the SSR 2 mattress pad and pillow system, the body zone is 59"-60" wide and 60" long, with a lower zone 30" long and a central zone 30" long, and the top zone is 20" long. In some embodiments of the body zone insert pad, the lower portion is 3" thick, and the central portion is 2" thick, leaving 1" for central zone portion insert pads 69b. Other embodiments may vary these dimensions.

[0080] While the SSR 1 is described above as being approximately 3" thick at its thickest portion, it may in practice vary from 2" to 4" in various embodiments. Similarly, in the case of the OMF mattress, the thickness of the mattress core bonded to the SSR 1 may vary from 2" to 15". The thickness of this mattress core may vary depending on whether one or two SSR 1 pads are bonded to it, and also based on the thickness of those SSR 1 pads. The insert pads, and the corresponding drops in SSR 1 pad or OMF mattress thickness at the various zones, is described above as being approximately 1", but may vary in different embodiments between .5" and 5".

[0081] The present disclosure may be embodied in other specific forms without departing from the full scope of the claims. The described embodiments are to be considered in all respects as being only illustrative and not restrictive.

The present disclosure intends to cover and embrace all suitable changes in technology.

CLAIMS:

1. A pillow having a first zone of elasticity for supporting the head of a sleeper and a second zone of elasticity for supporting the neck and upper thoracic spine, said pillow comprising:

a firm high resistance foam lower portion; and

a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

2. A pillow according to claim 1, including an array of parallel cylindrical perforations therethrough, for modification of the weight, softness and/or firmness of the pillow to suit the subjective preferences of the sleeper.

3. A pillow according to claim 1 or 2, wherein the pillow has a substantially rectangular shape corresponding to a conventional bed pillow.

4. A pillow according to claim 1 or 2, wherein the pillow has a substantially horseshoe-like shape for supporting the neck of a sitting sleeper.

5. A mattress pad for providing a selected distribution of pressure across all cranial and spinal levels of a sleeper.

6. A mattress pad according to claim 5 which comprises:

a bottom portion comprising a polyurethane foam core of uniform thickness;

a recessed central portion adapted to receive viscoelastic pads of selected firmness for support of sub-cervical regions of the spine of a sleeper; and

a top portion concavely recessed to receive a pillow such that the top surface of the pillow is presented to the head of a sleeper at a desired height above the generally coplanar upper surfaces of said central and lower portions.

7. A mattress pad according to claim 6, wherein said pillow is as defined in any one of claims 1 to 3.

8. A mattress pad according to claim 6, further comprising:

a plurality of viscoelastic pads for placement in the recessed central portion of the mattress pad, each viscoelastic pad being shaped to provide support to a single sleeper on either a left half or a right half of the central portion of the mattress pad.

9. A mattress pad according to any one of claims 5 to 8, wherein the mattress pad defines an array of parallel cylindrical perforations therethrough for modification of the weight, softness, and/or firmness of the mattress pad to suit the subjective preferences of the sleeper.

10. A multi-zoned reversible mattress for providing a selected distribution of pressure across all cranial and spinal levels of a sleeper, comprising:

a top layer comprising a mattress pad according to any one of claims 5 to 9;

a middle layer comprising a uniform pad or mattress core having substantially uniform firmness and resilience across its entire area; and

a bottom layer comprising a mattress pad according to any one of claims 5 to 9.

11. A mattress pad and pillow system for providing a selected distribution of pressure across all spinal levels of a sleeper, comprising:

a fitted fabric mattress cover having at least one pocket corresponding to each of a body zone and a head zone of a sleeping surface, each pocket being adapted to receive at least one pad insert.

12. The mattress pad and pillow system of claim 11, wherein the at least one pocket corresponding to each of a body zone and a head zone comprises:

a single pocket corresponding to the body zone for receiving a body pad insert; and

two side-by-side pockets corresponding to the head zone for receiving a left-side pad to elevate a pillow on the left side of the mattress protector and a right-side pad to elevate a pillow on the right side of the mattress protector.

13. The mattress pad and pillow system of claim 11 or 12, further comprising:

a composite body zone insert pad having a central zone portion and a lower zone portion,

the lower zone portion comprising a polyurethane foam core of uniform thickness, and

the central zone portion comprising two viscoelastic pads of selected firmness for support of sub-cervical regions of the spine of a sleeper.

14. The mattress pad and pillow system of claim 11 or 13, further comprising:

one or more pillow elevation pads for insertion into the head zone pockets to elevate the pillow on one or both sides.

15. The mattress pad and pillow system of any one of claims 11 to 14, further comprising two pillows as defined in any one of claims 1 to 3.

16. The mattress pad and pillow system of any one of claims 11 to 15, wherein each pocket further comprises a fastener for securing an inserted pad or pillow to the pocket.

17. A knee pillow having at least one knee support zone for supporting at least one knee of a sleeper, said pillow comprising:

a firm high resistance foam lower portion; and

a viscoelastic foam upper portion matingly contoured to the lower portion and internally sealed to the lower portion along a surface of predetermined curvature.

18. A multi-zoned reversible mattress for providing a selected distribution of pressure across all cranial and spinal levels of a sleeper, comprising:

a top layer comprising a mattress pad according to any one of claims 5 to 9; and

a bottom layer comprising a uniform pad or mattress core having substantially uniform firmness and resilience across its entire area.

19. A method for manufacturing the pillow of any one of claims 1 to 3, comprising:

providing a firm high resistance foam pillow; and

molding a viscoelastic foam upper portion contoured to the top of the foam pillow and internally sealed to the foam pillow along its top surface.

20. A method for manufacturing the pillow of claim 4, comprising:

providing a firm high resistance foam neck pillow; and

molding a viscoelastic foam upper portion contoured to the top and inside of the foam neck pillow and internally sealed to the foam pillow along its top and inside surfaces.

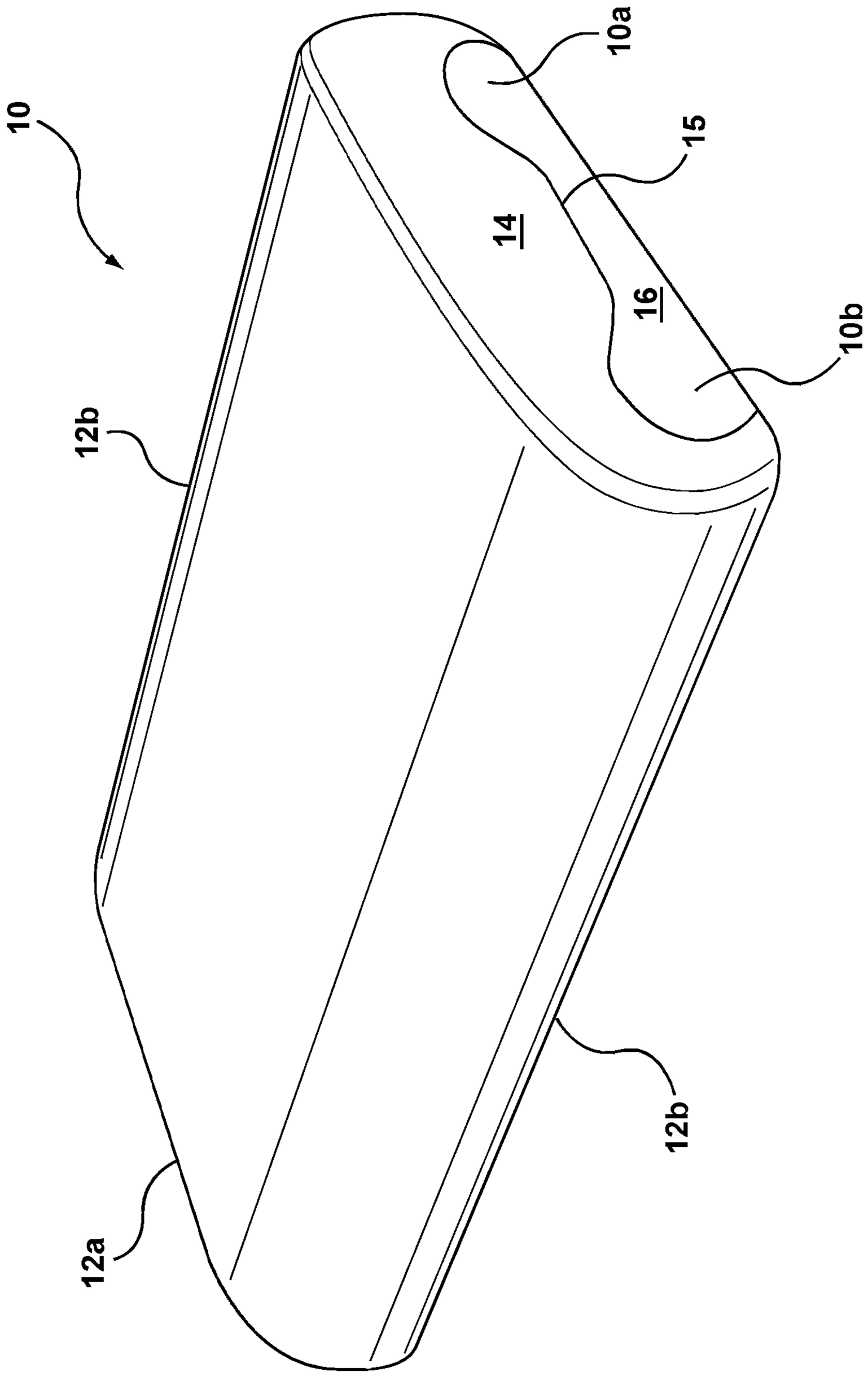


FIG. 1

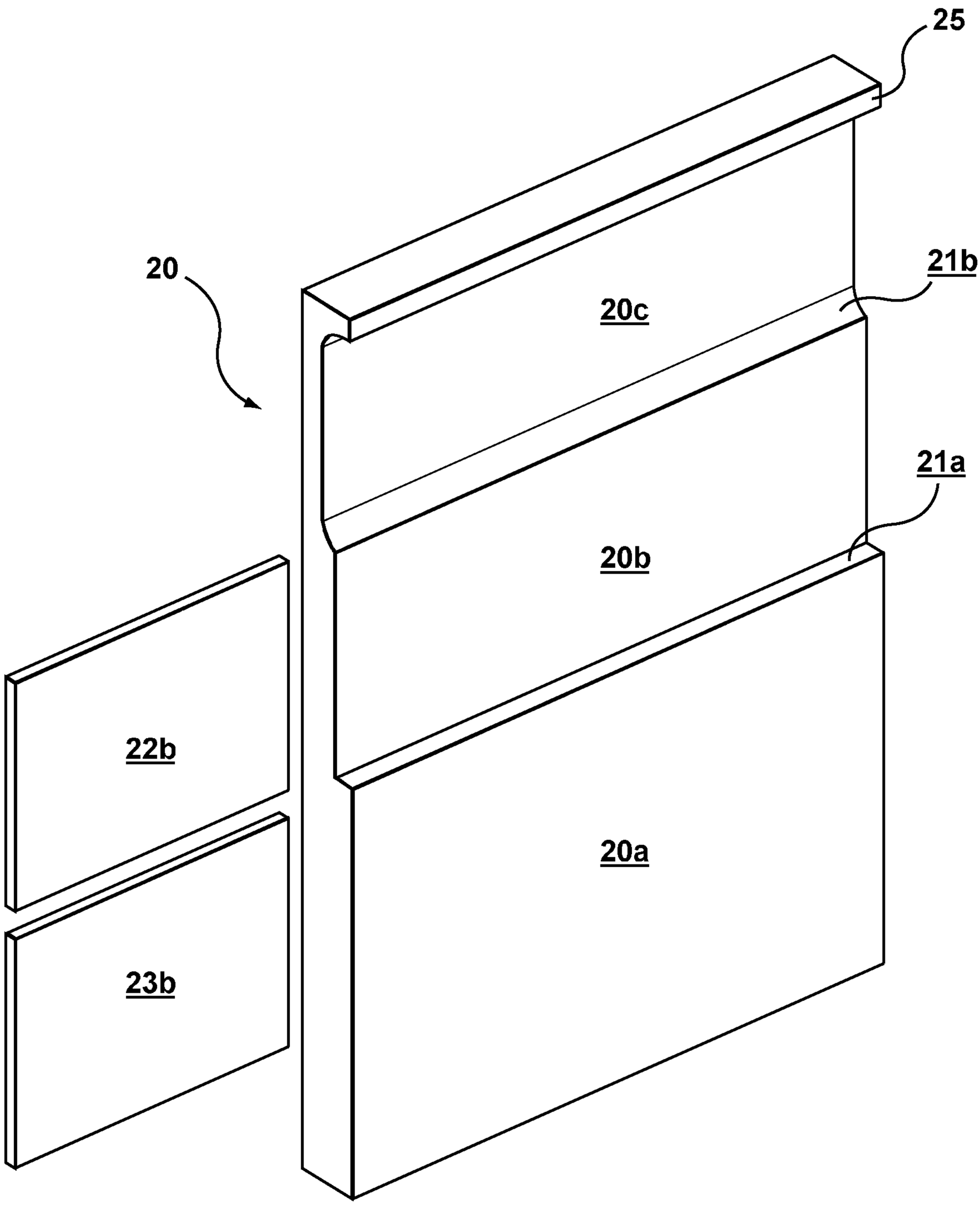


FIG. 2

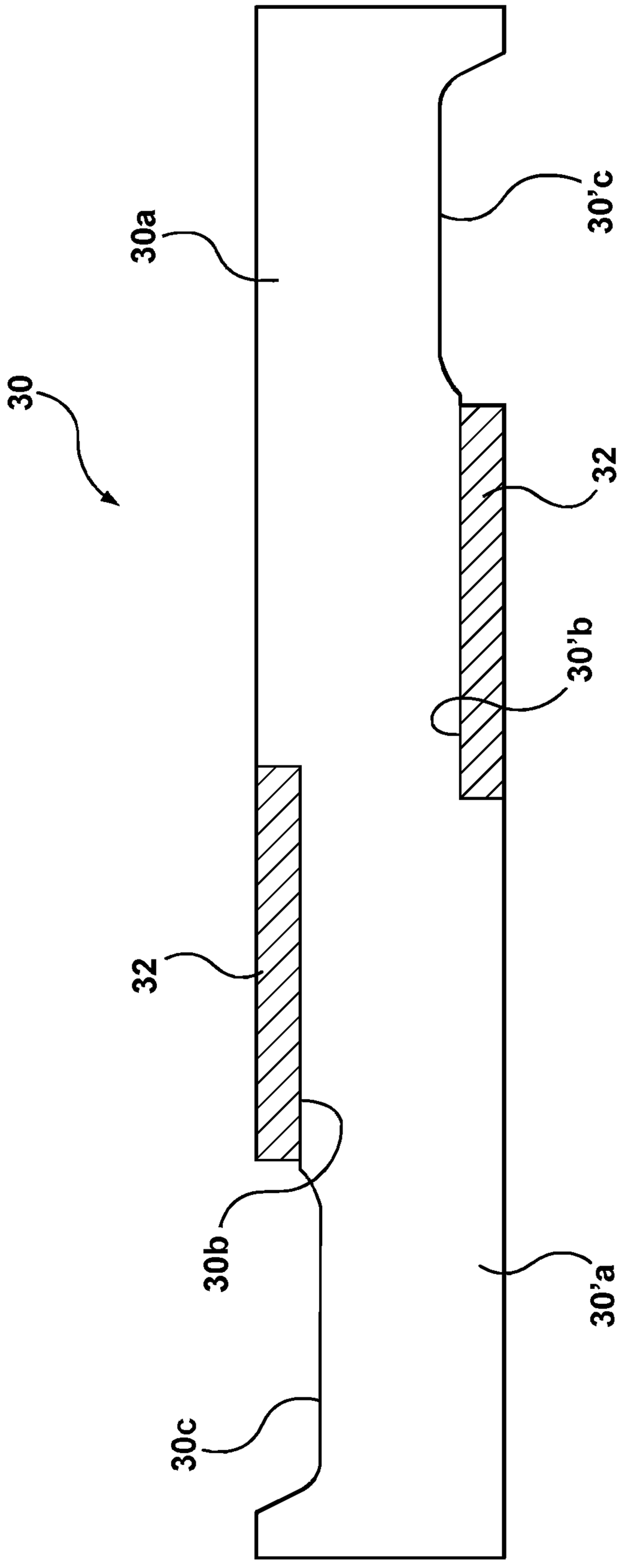


FIG. 3

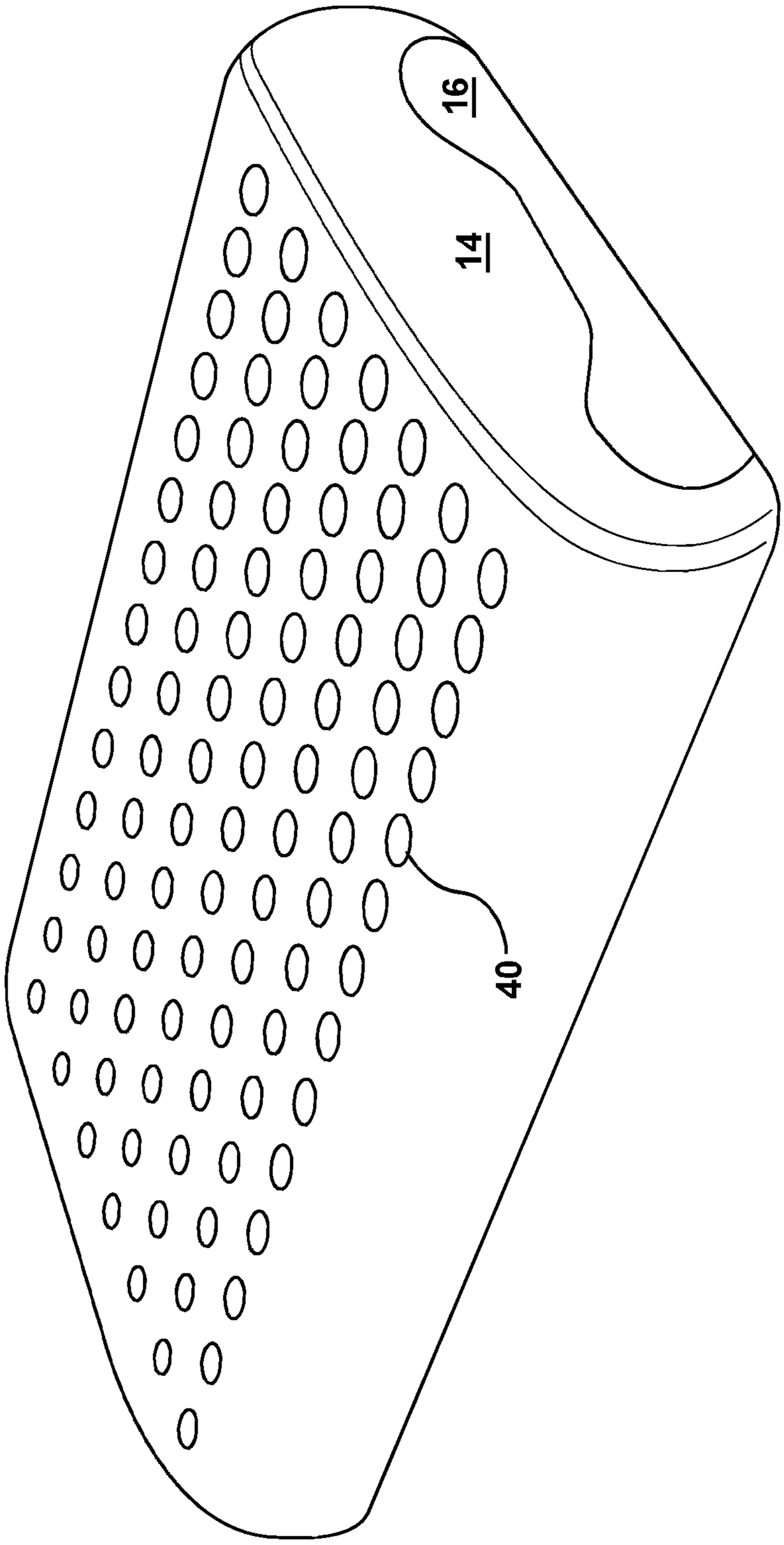


FIG. 4

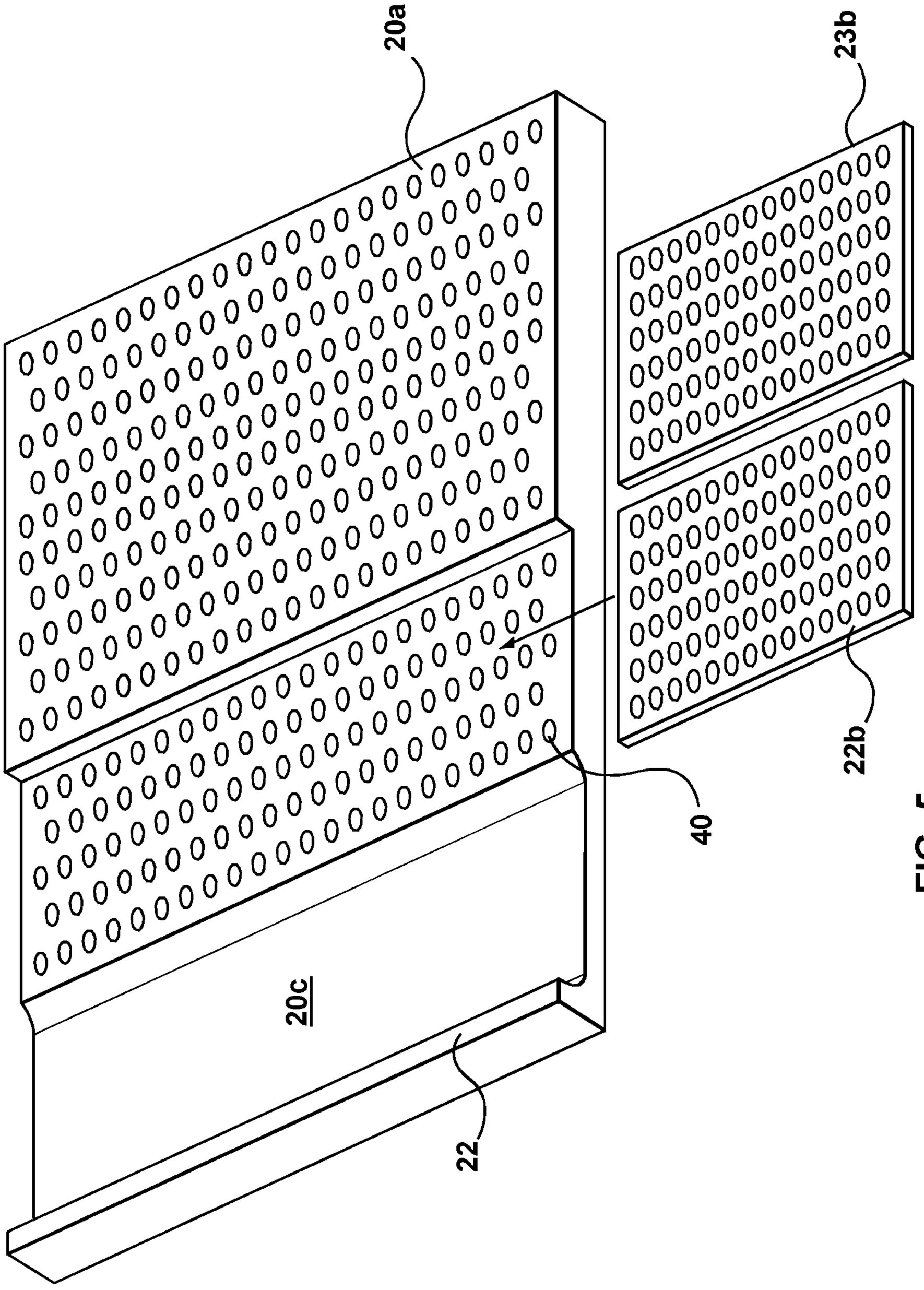


FIG. 5

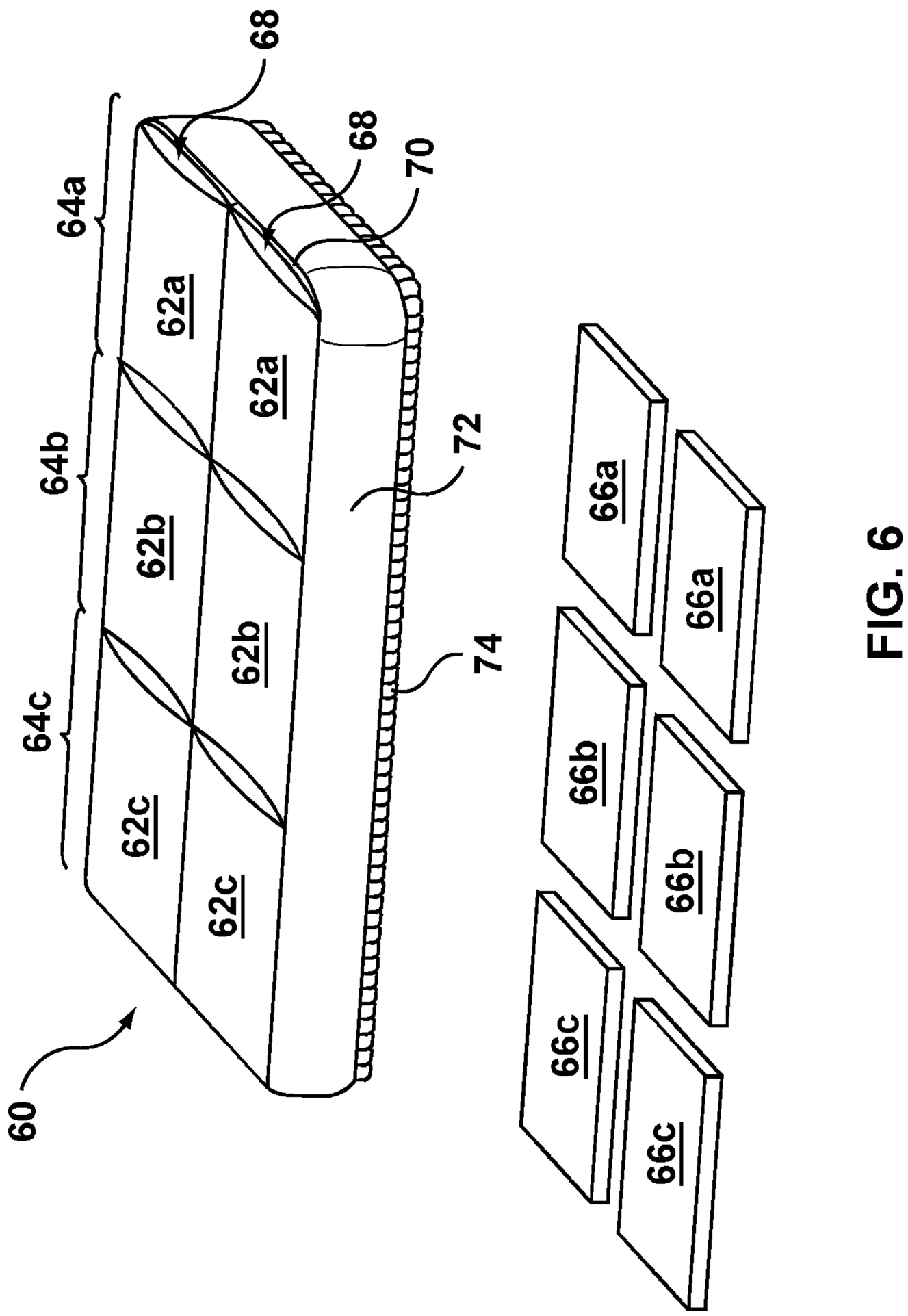

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FIG. 6

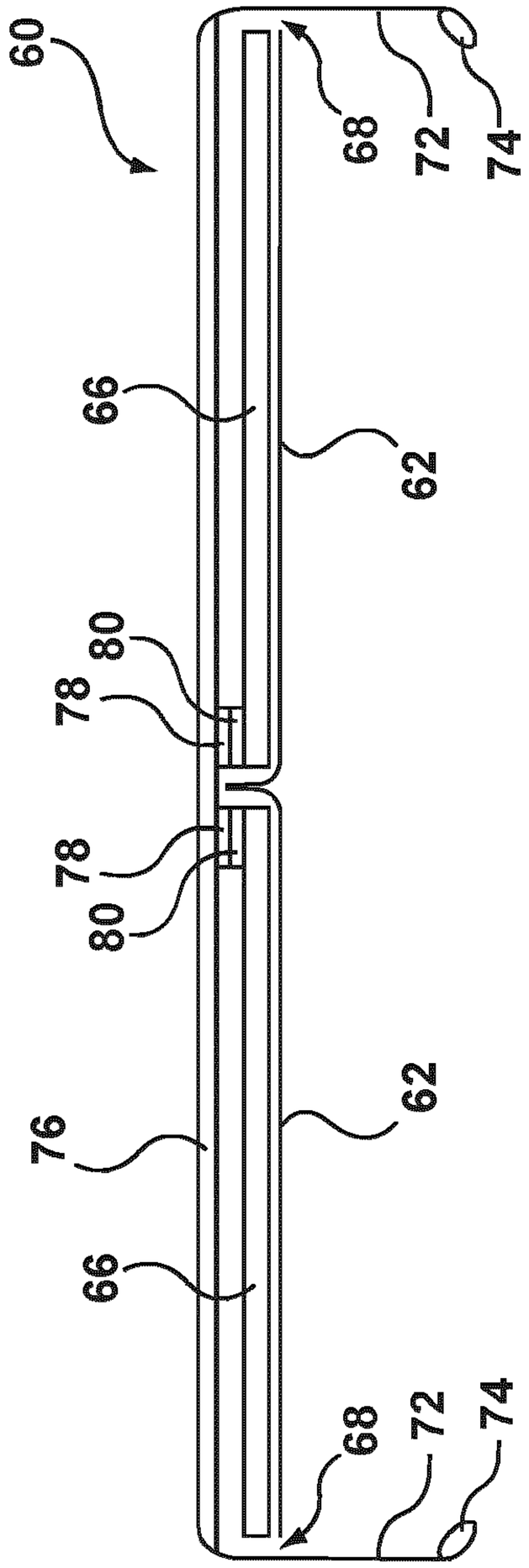


FIG. 7

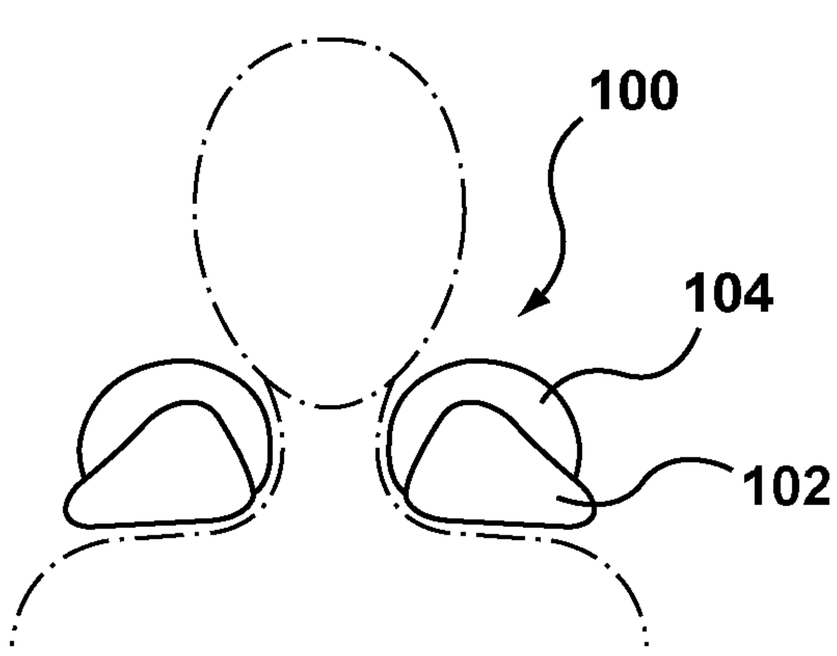


FIG. 8

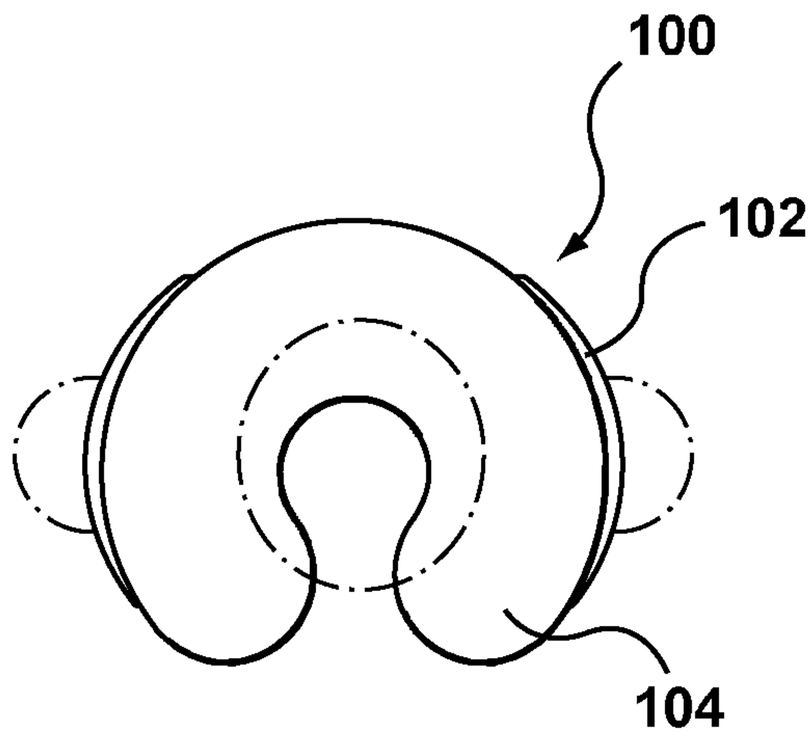


FIG. 9

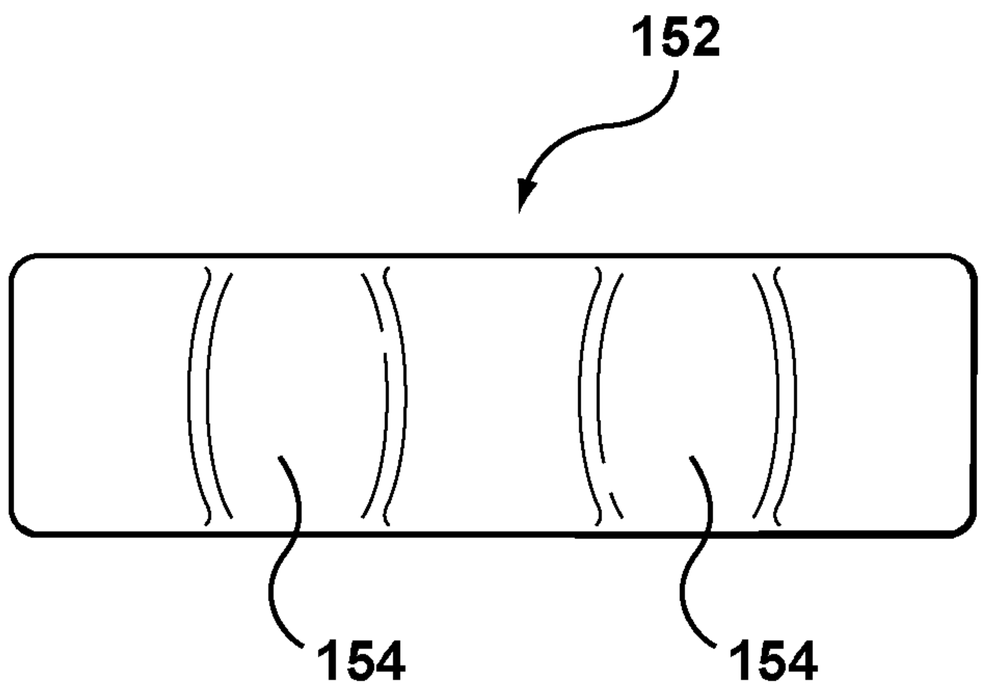


FIG. 10

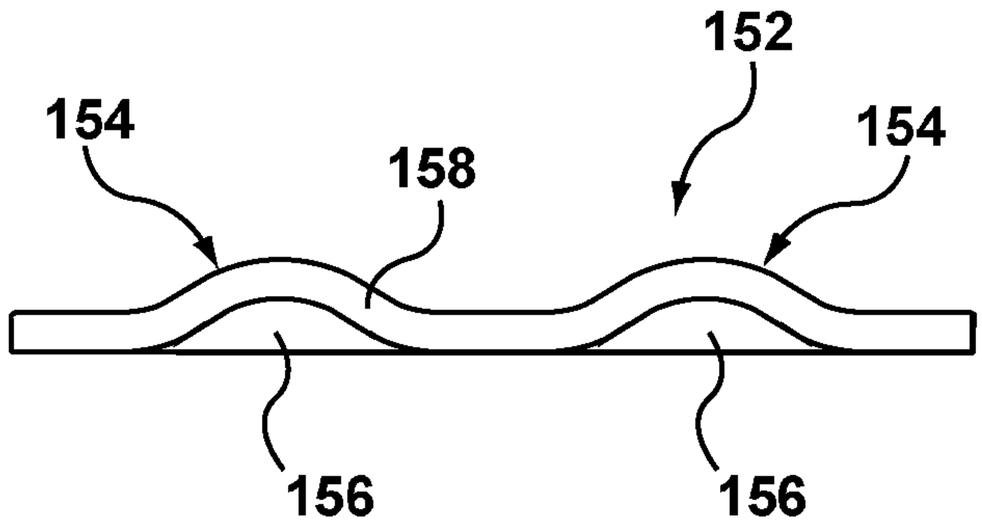


FIG. 11

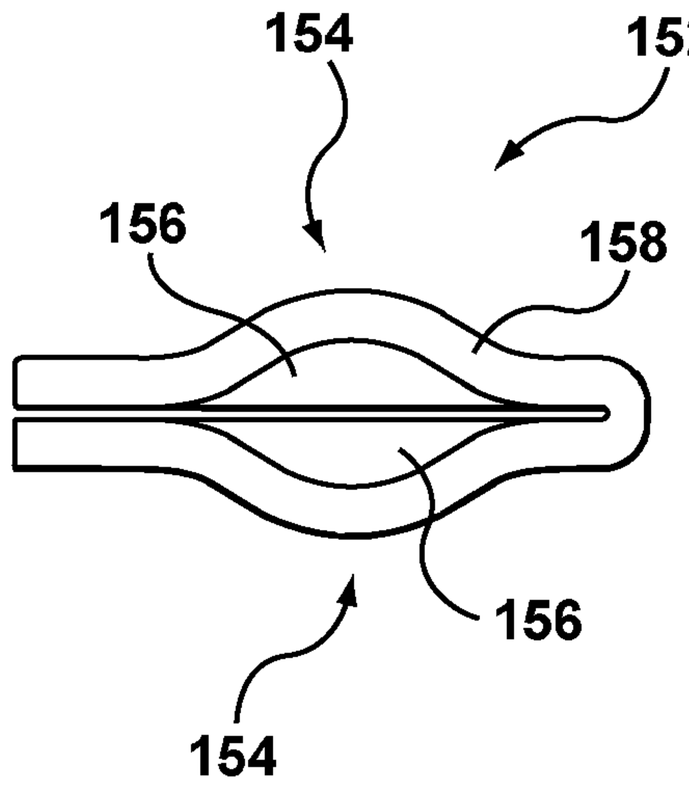

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FIG. 12

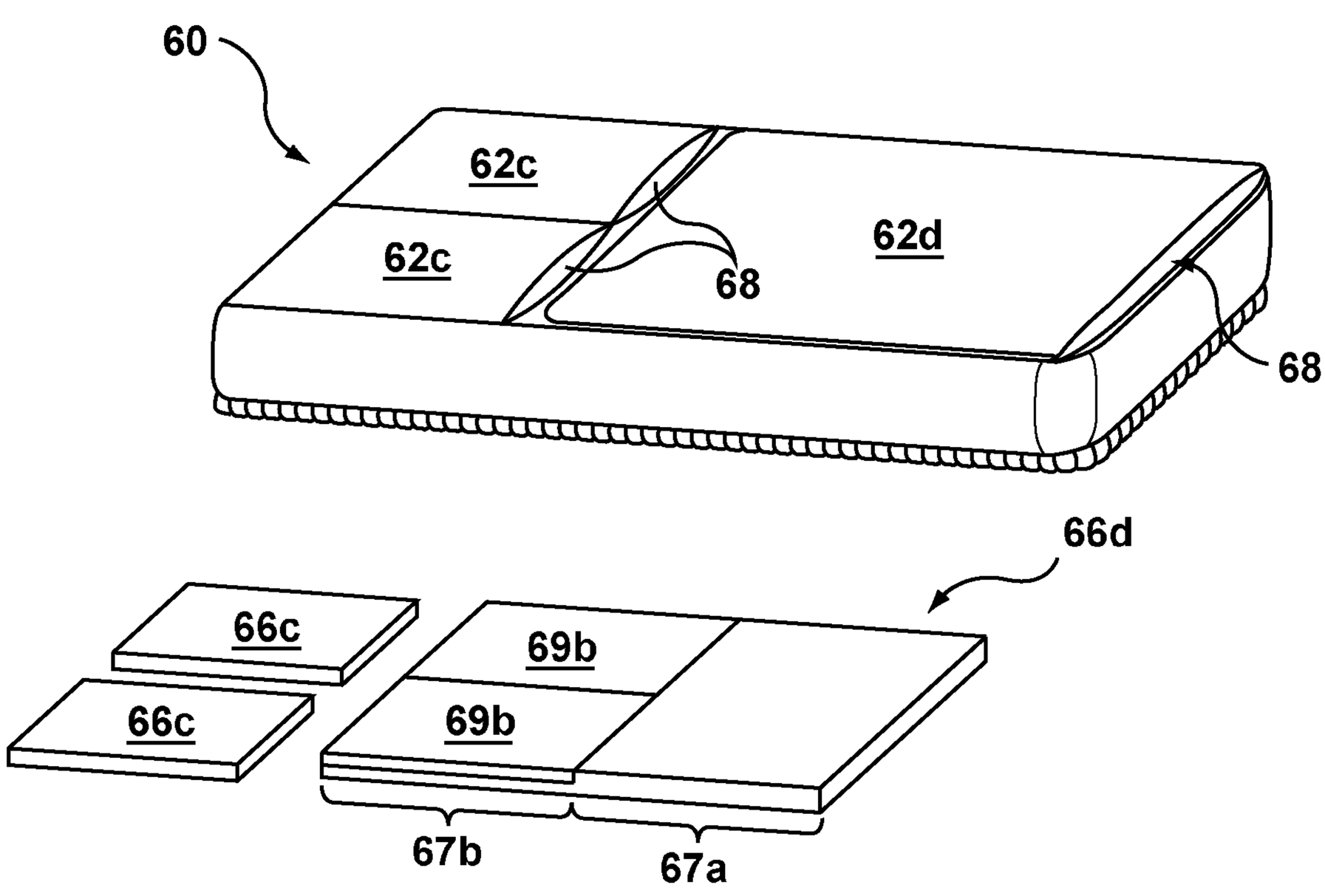

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67a

FIG. 13

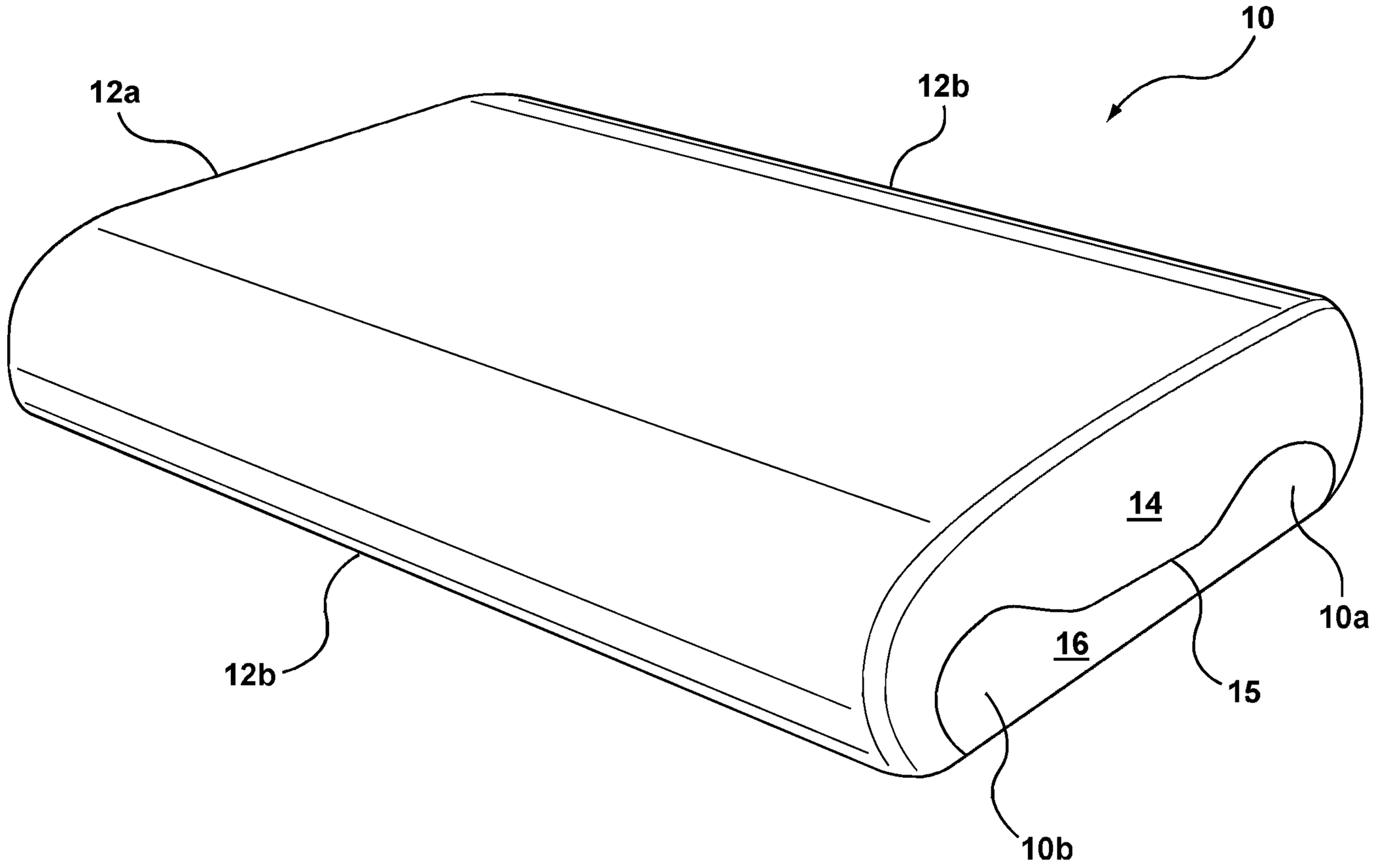


FIG. 1