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### (54) PILLOW WITH END SECTIONS

(57)The present invention discloses a pillow comprising a first volume comprising multiple pieces of a stuffing material, said first volume being delimited by an outer boundary made of a flexible material, where the outer boundary is formed from a tube-shaped central section with opposing open ends, and a first and a second end section. The two end sections are adjoined said opposing open ends of the central section, such that said first and second end sections and said central section delimit the first volume, wherein the first volume is configured with at least two separate chambers extending along the length of said pillow between said opposing end sections. Thereby, the stuffing and properties of the multiple chamber pillow is distributed evenly across the entire length of the pillow, i.e. the comfort of the pillow is maintained across the entire length since the same amount of stuffing is present across the length of the pillow, where the length of the pillow is measured from the first end section to the second end section. The user of the pillow may then arrange its head arbitrarily across said length of the pillow without experiencing a variance in softness, i.e. stuffing.

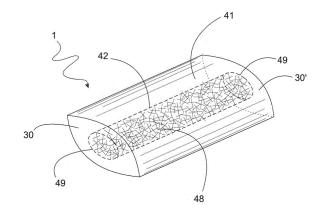


Fig. 4

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#### Description

#### **FIELD OF THE INVENTION**

**[0001]** The present invention relates to a pillow for human sleeping purposes. More specifically, the present invention relates to a pillow having an outer boundary comprising end sections.

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#### **BACKGROUND OF THE INVENTION**

[0002] Traditional pillows are usually designed by adjoining two pieces of fabric in parallel, applying a seam along their periphery, and stuffing the created inner volume with a stuffing such as synthetic fibres, down, or feathers. However, such design causes the pillow to have a varying thickness, which in turn means less stuffing is available along the periphery, i.e. close to the seam. This reduces the comfort of the pillow since the head resting on the pillow is required to stay in the central region where most stuffing is present to maximise the comfort of the pillow. Thus, turning the head or otherwise changing its position causes the head to rest on a declining slope towards the edge of the pillow. It should be understood from traditional sleeping patterns that the varying thickness of the pillow is mostly considered a problem in a direction perpendicular to the extension of the human body.

**[0003]** Further, in traditional pillows, the above-described design restricts an optimised use of chambers within the internal volume, i.e. using internal chambers with varying softness of stuffing for optimising the comfort of the pillow.

### **GENERAL DESCRIPTION**

[0004] The object of the invention is to solve some of the above-mentioned problems. More specifically, the present invention discloses a pillow comprising a first volume comprising multiple pieces of a stuffing material, said first volume being delimited by an outer boundary made of a flexible material. The outer boundary is formed from a tube-shaped central section, first and second end sections, said two end sections being adjoined said opposing open ends of the central section, such that said first and second end sections and said central section delimit the first volume, wherein the first volume is configured with at least two separate chambers extending along the length of said pillow between said opposing end sections.

**[0005]** Preferably, the pillow is shaped as a traditional rectangular pillow. The first volume may comprise further features. By a stuffing material is meant any type of material commonly used in the field of pillows, such as synthetic fibres, down, feathers, foam pieces, or mixtures thereof. By the outer boundary being made of a flexible material is meant that the first volume is delimited by a flexible material such as a fabric or plastic. The type of

fabric or plastic may be any fabric or plastic commonly used in the industry. The central section of the outer boundary may be formed from two pieces of fabric arranged in parallel and adjoined along a first set of parallel edges, thereby creating a tube with open ends. A tube should be understood as a hollow body partly delimited by a flexible material. The open ends of said tube-shaped central section are adapted to receive the end sections. Being adapted should be understood such that the size of the open ends are approximately equal to the size of the end sections. An exact fit may not be necessary due to the flexible properties of the flexible material.

[0006] The first volume is configured with at least two separate chambers extending along the length of the pillow.

[0007] By a chamber is meant a closed volume restricting escape of stuffing material. Thus, exchange or communication of material between the chambers may be said to be prohibited. A realisation of such a configuration could be to provide a wall or partition within the first volume thereby dividing said first volume into two chambers. Another way of realising such a configuration is by enclosing a first chamber within a second chamber, e.g. by providing a chamber in the shape of a tube comprising a first stuffing material within a second chamber, where the outer periphery of said second chamber may be identical to the outer boundary of the pillow. The chambers may be attached to the end sections of the pillow thereby extending in the entire length of the pillow, said length being measured from the first end section to the second end section. The uniform dimensions of the pillow along the length of the pillow also ensure uniform properties of the pillow between the two end sections and thereby similar effects of combining two types of material in the chambers are obtained along the entire length of the pillow.

[0008] Thereby, a pillow according to the invention may be designed with different properties, such as softness, in different regions, i.e. allowing full control of the hardness and support of the pillow. For example, the pillow may be designed to comprise a chamber comprising down adjacent the head of the user and chambers comprising feathers elsewhere. When used in a pillow according to the invention, it is further ensured that said chambers are only minimally bended or deformed close to the ends of the pillow, such that the properties of using chambers in a pillow is enhanced. By the chambers being attached to the end sections, it is ensured that support is consistent throughout the entire length of the pillow.

**[0009]** Preferably, the end sections are identical in shape. The end sections are designed to have a first length and a first width. Preferably, the first length equals the distance measured from one extremity of the shape of the end section to another. Preferably, the first width is a distance perpendicular to the first length. More preferably, said width is the distance measured across the widest part of the end section in a direction perpendicular to the first length. In other words, said width is the maximum width of the end section in a direction perpendicular

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to the first length. According to the invention, the first length is larger than the first width, i.e. the end sections have a length being larger than its width. In other words, the length is the distance from one extremity to another, i.e. the greatest possible distance measured in a straight line, and where the width is the greatest possible distance measured in a straight line being perpendicular to the length of the end section. For simplicity, the first length may be denoted "the length", and the first width may be denoted "the width" in the following.

**[0010]** At an appropriate point during production of the pillow, the stuffing is added to the first volume delimited by the outer boundary. When stuffed, the end sections of the pillow are substantially parallel, such that any given cross section of the pillow in a plane parallel to the end sections resembles the shape of the end sections, where the amount of resemblance is governed by the amount of stuffing.

**[0011]** Thereby, the stuffing of the pillow is distributed evenly or uniformly across said pillow, i.e. the comfort of the pillow is increased since the same amount of stuffing is present across the length of the pillow, where the length of the pillow is measured from the first end section to the second end section. The user of the pillow may then arrange its head arbitrarily across said length of the pillow without experiencing a variance in softness, i.e. stuffing. [0012] In an embodiment, the first and second end sections may be elliptic, or lens-shaped, or oval, or shaped as a lens with truncated vertices. Preferably, the lens shape is that of a convex lens, i.e. where two sectors of a circle converge towards each other at two points known as vertices in the field of geometry. Said vertices may be truncated, i.e. cut off, to form a lens-shaped end section with truncated vertices. A truncation may also be introduced in an elliptic or oval-shaped end section. A truncation provides two substantially parallel sidewalls extending between the two end sections.

**[0013]** Thereby, the first length of the end section is greater than the first width of said end section using the definitions said forth above. Further, the pillow attains a shape comfortable for use during sleep.

**[0014]** In an embodiment, the multiple pieces of a stuffing material may be pieces of synthetic fibres, down, or feathers.

**[0015]** Preferably, the stuffing material is a material comprising a plurality of individual elements. For example, down is composed of a plurality of individual down feathers, and feathers are composed of individual feathers. Such kind of stuffing is highly adaptable by being movable relative to each other.

**[0016]** Thereby, the pillow is stuffed with a material commonly used as stuffing material for pillows designed for sleeping purposes, i.e. a material having a desired softness. A mix of synthetic fibres, down, or feathers is further foreseen within the scope of the invention.

**[0017]** In an embodiment, the flexible material may be a fabric.

[0018] By a fabric is meant any type of textile commonly

used in the industry, e.g. cotton. The fabric may be woven. Further, the use of plastic is foreseen within the scope of the invention, e.g. to form a liquid-resistant pillow

**[0019]** Thereby, the pillow attains a desired flexibility, softness, and comfort.

**[0020]** In an embodiment, the first volume may be configured with at least three separate chambers. In other words, the first volume may be said to comprise at least three chambers. A four-chamber configuration or a multiple-chamber configuration (more than four chambers) is likewise foreseen within the scope of the invention.

**[0021]** Ways of realising such a configuration is closely related to the above-described way of realising a two-chamber configuration. Likewise, the advantages of a three-chamber configuration, or multiple-chamber configuration, are close to those of a two-chamber configuration. However, a three-chamber configuration (or a configuration comprising more than three chambers) inevitably increases the ways of optimising the comfort and properties of the pillow due to the increased number of possible arrangements of stuffing material and size of the chambers.

**[0022]** In an embodiment, the aspect ratio of the length to the width of said end sections may be at least 2:1. In other words [length]:[width] is at least 2:1. An aspect ratio of at least 3:1 or at least 4:1 is foreseen within the scope of the invention.

[0023] In other words, the length may be at least twice as long as the width.

**[0024]** In an embodiment, the first and second end sections may be substantially parallel when the pillow is stuffed with a stuffing material.

[0025] By substantially parallel should be understood that the parallelism is governed by the amount of stuffing in the pillow, where a large amount of stuffing may result in the end sections bulging slightly outwards, whereas a low amount of stuffing may result in the end sections collapsing slightly. Further, such discrepancies may be due to the flexibility of the fabric forming the outer boundary. Nonetheless, the end sections are arranged relative to the central section such that their mutual orientation may be described as being substantially parallel. In other words, at least the planes wherein the seams, which adjoin the end sections to the central section, are arranged substantially parallel. In this definition, bulging of the end sections is not relevant when considering the parallelism. [0026] Thereby, it is ensured that the pillow has a constant thickness in a direction from the first end section to the second end section. In turn, the constant thickness ensures a constant amount of stuffing across the pillow. [0027] In an embodiment, a cross section of the pillow substantially parallel to the first and second end sections may have a shape substantially identical to the shape of the first and second end sections.

**[0028]** Such a cross section is given when the pillow is stuffed by an amount of stuffing material sufficient to form a constant thickness in a direction between the two

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end sections. By substantially identical should be understood that discrepancies may arise due to varying amount of stuffing and the flexible material used to form the outer boundary.

**[0029]** Thereby, the pillow is ensured to have a constant thickness, which equals the first width of the end sections, in a direction between the two end sections. In other words, homogeneity is created across the pillow in the direction between the two end sections.

[0030] In an embodiment, the end sections may be identical.

**[0031]** Thereby, cross sections of the pillow being substantially parallel to the first and second end sections are indistinguishable, i.e. the thickness of the pillow is unchanged when going from the first end section to the second end section assuming a sufficient stuffing is provided in the first volume of the pillow.

[0032] In an embodiment, the tube-shaped central section may be made of two pieces of fabric.

**[0033]** Said two pieces of fabric may be identically shaped rectangles, such that, when arranged in parallel planes and adjoined along two parallel edges, a tube-shaped central section is formed.

**[0034]** In an embodiment, the tube-shaped central section may be made of a single piece of fabric.

**[0035]** Said single piece of fabric may either be understood as a piece of fabric, preferably being rectangular, bended midways between two parallel-arranged edges, and followed by adjoining said edges, e.g. by a seam. Another way of forming a tube-shaped central section may be through weaving said section in one piece.

**[0036]** In an embodiment, a piping may be arranged along the circumference of the pillow.

[0037] By the circumference may be understood all apparent edges, part of the edges or seams of the pillow. For example, a piping may be used to cover and/or reinforce the seam used to form the tube-shaped central section. Further, a piping may be preferable if end sections shaped as truncated lenses are used since the width of the piping may match the size of the truncation to form a support along the edge of the central section, i.e. to ensure the truncation is visible in any cross section parallel to the end sections. In other words, the piping aids to reinforce and maintain cross sections of the pillow made in parallel to the substantially parallel-arranged end sections in accordance with previous descriptions.

**[0038]** In an embodiment, the existence and/or position of at least one chamber within the first volume may be indicated using an indication on at least one end section.

**[0039]** For example, the indication may be an embroidery or a print. The embroidery may be a seam sewed into the end sections. Thereby, the user of the pillow may distinguish the different chambers visually in order to arrange the pillow relative to the head, e.g. by choosing to have down arranged adjacent to the head of the user and feathers arranged adjacent to the underlying surface, e.g. the bed. Further, an indication of the existence and/or

position of chambers within the chamber allows the user to choose the right pillow based on his/her need for support and comfort.

#### 5 SHORT LIST OF THE DRAWINGS

**[0040]** In the following, example embodiments are described according to the invention, where

Fig. 1 illustrates an embodiment of elements of a pillow,

Fig. 2 illustrates a second embodiment of elements of a pillow according to the invention,

Fig. 3 illustrates embodiments of the end sections of a pillow according to the invention,

Fig. 4 illustrates a pillow with two chambers according to the present invention,

Fig. 5 illustrates alternative cross sections of a pillow with multiple chambers according to the invention,

Figs. 6a and 6b illustrate a further alternative cross section of the pillow with multiple chambers according to the invention.

Figs. 7a and 7b are schematic drawings explaining the concept of the pillow according to the present invention.

### **DETAILED DESCRIPTION OF DRAWINGS**

**[0041]** In the following, the invention is described in detail through embodiments thereof that should not be thought of as limiting to the scope of the invention.

**[0042]** Fig. 1 a illustrates an exploded view of an embodiment of a pillow 1. The pillow 1 comprises a first 11 and a second 12 piece of fabric and a first 30 and a second 30' end section, likewise made from fabric. Each piece of fabric 11,12 comprises a first edge 111,121, a second edge 112,122, a third edge 113,123, and a fourth edge 114,124. Preferably, the first 111,121 and the second edge 112,122 are parallel to each other and perpendicular to the third 113,123 and fourth edge 114,124.

**[0043]** A possible step in assembling the pillow comprises adjoining the first edge 111 of the first piece of fabric 11 with the corresponding first edge 121 of the second piece of fabric 12 and likewise adjoining the second edge 112 of the first piece of fabric 11 with the corresponding second edge 122 of the second piece of fabric 12. The edges may be adjoined using a seam. Thereby, the first 11 and second 12 piece of fabric form a tube-shaped central section with open ends.

**[0044]** Preferably, the first 30 and second 30' end sections are identically shaped. A further possible step in assembling the pillow comprises adjoining the open ends

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of the tube formed from the first 11 and second 12 piece of fabric with the first 30 and second 30' end sections. The end sections 30,30' may be adjoined to the tube using a seam.

[0045] Fig. 1b illustrates a perspective view of the pillow 1 based on the exploded view of Fig. 1a. A first volume 100 is illustrated. Further, a first length L and a first width W of the first end section 30 are included. The dimensions for the second end section 30' are the same. A pillow length M is included as well.

**[0046]** At an appropriate point during the assembly of the outer boundary of the pillow 1, the first volume 100 of said pillow 1 is stuffed with a stuffing (not shown). Said appropriate point in time may be before adjoining the last end section to the tube-shaped central section assuming the first and second end sections are not adjoined simultaneously. When stuffed, the end sections 30,30' are arranged substantially in parallel. However, it should be understood that the parallelism of the two end sections 30,30' may be governed by the amount of stuffing capable of expanding the first volume 100 and the flexible material used to form the outer boundary.

**[0047]** It should be understood that other ways of assembling the pillow are foreseen within the scope of the invention. For example, the tube formed from adjoining a first and a second piece of fabric may be formed from weaving said tube in one piece instead, thereby reducing the need for seams in the pillow.

[0048] Due to the identical shape of the end sections 30,30', it is ensured that the pillow has a constant thickness in at least the direction given by the pillow length M as indicated in Fig. 1b. Preferably, said direction is the direction extending between the substantially parallel-arranged end sections 30,30'. In other words, the pillow is uniform or homogenous in the direction extending between the substantially parallel-arranged end sections in regard to thickness and amount of stuffing.

[0049] Fig. 2 illustrates a second exploded view of a pillow according to the invention illustrating a second way of realising the fabrication. As illustrated, the first and second piece of fabric described in relation to Fig. 1 have been substituted by a single piece of fabric 201 comprising a first edge 211 and a second edge 221. Said single piece of fabric 201 is bended midway between the first 211 and second edge 221 as illustrated by the arrow B and the dashed bend 202, and said first edge 211 and second edge 221 are adjoined, e.g. using a seam. Thereby, no seam is used where the bend 202 is made. However, a seam may be applied to the bend 202 for other reasons, e.g. cosmetic or reinforcement reasons. At one point during the production, the end sections 30,30' are adjoined the tube-shaped central section formed from the single piece of fabric 201, and a stuffing is stuffed into the formed first volume (not shown).

**[0050]** Fig. 3 illustrates embodiments of the end sections 30,30', i.e. preferred shapes/designs of the end sections to be included in a pillow according to the invention. A lens-shaped end section 30 is illustrated, where its edg-

es converge towards a first 300 and second 300' vertex. A lens-shaped end section 31 is illustrated having truncated vertices 310,310'. Such truncations form substantially parallel sidewalls extending between the two end sections, such that the pillows attain a box-shaped outer boundary, but where the requirement of the length of the end sections being greater than the width of the end sections still applies. An elliptic end section 32 is also illustrated and finally an end section 33 with semicircle ends 330,330' is illustrated connected by a rectangular section 31 which has been highlighted using dashed lines. A rectangle with rounded corners (not shown) may also be utilised.

[0051] Fig. 4 illustrates a pillow 1 according to the invention comprising a first volume configured in a twochamber configuration. Thus, the first volume is divided into an outer chamber 41 and an inner chamber 42 encased by said outer chamber 41. The inner chamber 42 extends from the first end section 30 to the second end section 30'. However, the size or extension of the inner chamber 42 may be varied. A stuffing 48 is added to the inner chamber, whereas the stuffing of the outer chamber 41 is omitted in this drawing for clarity. Preferably, the inner chamber 42 is stuffed with another stuffing than the outer chamber 41, the difference being for example different materials and/or amount of stuffing, both affecting the experienced softness. An embroidery 49 on the end sections 30,30' may highlight the position of the inner chamber 42. Such highlighting may be desired when the chambers within the first volume require the user to orient the pillow correctly for optimised comfort during use. In an embodiment, the inner chamber 42 may be divided into multiple sub chambers, such that a central region (in respect to its length) is stuffed with one type of stuffing material, e.g. down, whereas the outer regions are stuffed with a second type of stuffing material, e.g. feathers. The chambers in the pillow will typically extend along the length of the pillow from end section to end section. The outer chamber will typically comprise the soft filling, since it is adjacent the surface in contact with the user resting his or her head on the pillow.

[0052] The shown two-chamber configuration may be changed from the illustrated tube-shaped inner chamber 42 to a more rectangular inner chamber, e.g. such that the inner chamber mimics the shape of the outer chamber 41, but in a smaller size. Thereby, the entire core (i.e. the inner chamber 41) of the pillow may be stuffed with a different stuffing than the stuffing of the surrounding outer chamber 41. Said inner chamber may further be divided into two or more chambers, such that the hardness and softness of the pillow may be engineered further. Alternatively, also multiple tube shaped inner chambers could be positioned inside the pillow, e.g. along the width of the pillow.

**[0053]** Fig. 5 illustrates possible cross sections of a pillow according to the invention comprising multiple chambers. Reference is drawn to Fig. 4, wherein a perspective view of a pillow comprising a two-chamber con-

figuration is illustrated. In Fig. 5, further multi-chamber configurations are disclosed. It should be noted that the illustrated outer boundary of the shown embodiments is an ellipse 32, but that it may as well be substituted by any desired shape within the scope of the invention, e. g. shapes disclosed in Fig. 3.

**[0054]** Fig. 5a illustrates an example of a pillow having a single chamber 100 expanding the entire first volume bounded by the outer boundary 32.

[0055] Fig. 5b illustrates a four-chamber configuration, wherein the inner volume is divided into four chambers 541-544 extending along the pillow length M. The chambers may be defined along the entire length of the pillow, i.e. extending from the first end section to the second end section of the pillow, or the chambers may be present in solely a part of the pillow. Said chambers restrict mixing of stuffing between each other, thereby creating an opportunity to have different stuffing in each chamber for optimising the comfort of the pillow. Further, different amounts of stuffing may be provided, such that different hardness/softness across the pillow is experienced. For example, the upper 544 and lower 542 chamber may comprise down, whereas the two outer chambers 541,543 may comprise a mix of down and feathers or feathers only.

**[0056]** Fig. 5c illustrates a three-chamber configuration, wherein two of said chambers are arranged within the third chamber 530, i.e. said two chambers 531,532 are encased by the stuffing of the third chamber 530. As it was the case above, the chambers restrict mutual mixing of stuffing, thereby creating an opportunity to control the position of stuffing within the pillow.

[0057] Fig. 5d illustrates a two-chamber configuration, wherein a single chamber 521 is encased by a second chamber 520. The cross section resembles the one shown in the perspective view in Fig. 4. The advantages of such a configuration are similar to those laid out above. [0058] Fig. 5e illustrates a two-chamber configuration, wherein an upper chamber 510 and a lower chamber 510' are provided. The boundary between the upper chamber 510 and the lower chamber 510' may be shaped to resemble a wave or a yin-yang shape illustrated by the dashed yin-yang partition 511.

[0059] Figs. 6a and 6b illustrate yet an embodiment, figure 6a illustrates a cross section perpendicular to the length of the pillow and figure 6b illustrates a cross section along a center line C parallel with the length of the pillow. In the embodiment the upper surface 601 and lower surface 603 is a chamber e.g. comprising a softer material or at least a material comfortable for the user. The central part 605 comprises filling with other properties influencing the total properties of the pillow. Both chambers 601, 603 and 605 extends from end section to end section of the pillow and thereby the user can positioned the head along the entire length of the pillow and obtain the same support properties.

**[0060]** Figs. 7a and 7b illustrate yet an embodiment, figure 7a illustrates a cross section perpendicular to the

length of the pillow and figure 7b illustrates a cross section along a center line C parallel with the length of the pillow. Fig. 7 illustrates the concept of the present invention exemplified by embodiments illustrated in fig. 5b, 5c, 5d and 6, and in these embodiments the upper and lower surfaces 701, 703 can comprise a filling suitable for a comfortable contact with the users head, whereas the central chamber or chambers below are providing support and stability to the pillow. In general the pillow would therefore comprise separate chambers both along the length and the height of the pillow.

**[0061]** In an embodiment, the chambers extending along the length of the pillow could be divided into sub chambers, e.g. where the central part is separated with a softer filling than the two neighbouring parts. This is all in order to adapt the comfort of the pillow to the user.

**[0062]** The dividing into chambers could be marked on the top surface similar to the markings on the end sections.

[0063] It should be understood from the description of the figures that the size, extension, and shape of the chambers may vary, but the overall scope of using chambers is unchanged, i.e. to restrict mixing of stuffing between the chambers and to allow optimising the comfort of the pillow through varying materials or amount of stuffing, thereby altering the hardness/softness across the pillow.

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- A pillow comprising a first volume comprising multiple pieces of a stuffing material, said first volume being delimited by an outer boundary made of a flexible material, where the outer boundary is formed from
  - a tube-shaped central section with opposing open ends, and
  - a first and a second end section, where said two end sections are adjoined said opposing open ends of the central section, such that said first and second end sections and said central section delimit the first volume, wherein the first volume is configured with at least two separate chambers extending along the length of said pillow between said opposing end sections.
- 2. A pillow according to claim 1, wherein the length of said end sections is larger than the width of said end sections.
- **3.** A pillow according to claims 1-2, wherein said end sections are elliptic, or lens-shaped, or oval, or shaped as a lens with truncated vertices.
- **4.** A pillow according to claims 1-3, wherein said multiple pieces of stuffing material is synthetic fibres,

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down or feathers.

**5.** A pillow according to any of the preceding claims, wherein the flexible material is a fabric.

**6.** A pillow according to any of the preceding claims, wherein the first volume is configured with at least three separate chambers.

**7.** A pillow according to any of the preceding claims, wherein the aspect ratio of the length to the width of said end sections is at least 2:1.

**8.** A pillow according to any of the preceding claims, wherein the first and second end sections are substantially parallel.

9. A pillow according to any of the preceding claims, wherein a cross section of the pillow being substantially parallel to the first and second end sections has a shape substantially identical to the shape of the first and second end sections.

**10.** A pillow according to any of the preceding claims, wherein the end sections are identical.

**11.** A pillow according to any of the preceding claims, wherein the tube-shaped central section is made from two pieces of fabric.

**12.** A pillow according to any of the preceding claims, wherein the tube-shaped central section is made from a single piece of fabric.

**13.** A pillow according to any of the preceding claims, wherein a piping is arranged along the circumference of the pillow.

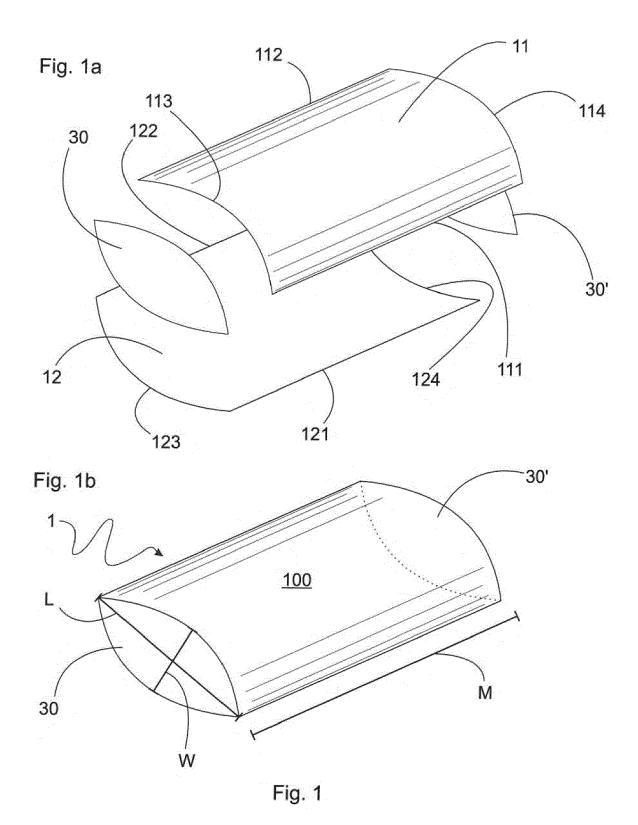
**14.** A pillow according to any of the preceding claims, wherein the existence and/or position of at least one chamber within the first volume is indicated using an indication on at least one end section.

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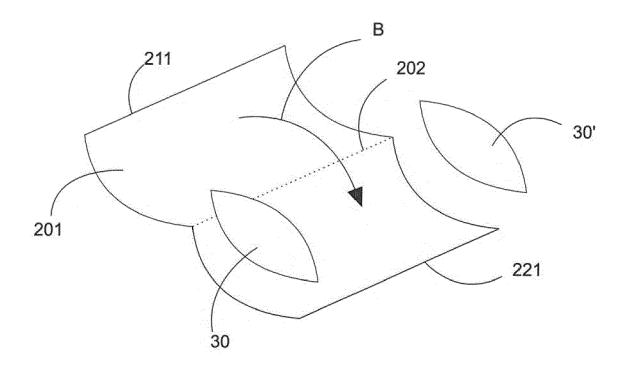


Fig. 2

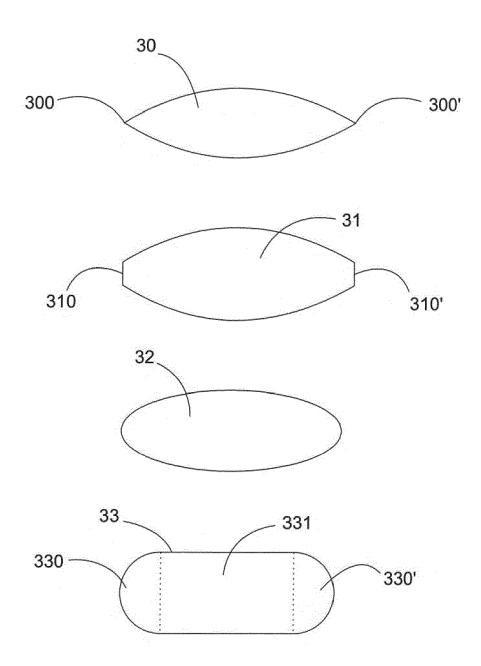


Fig. 3

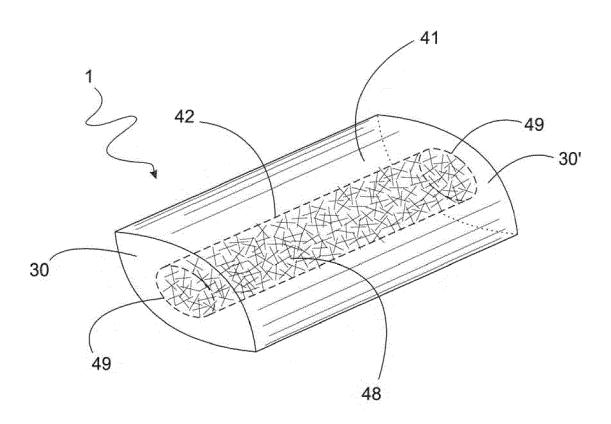


Fig. 4

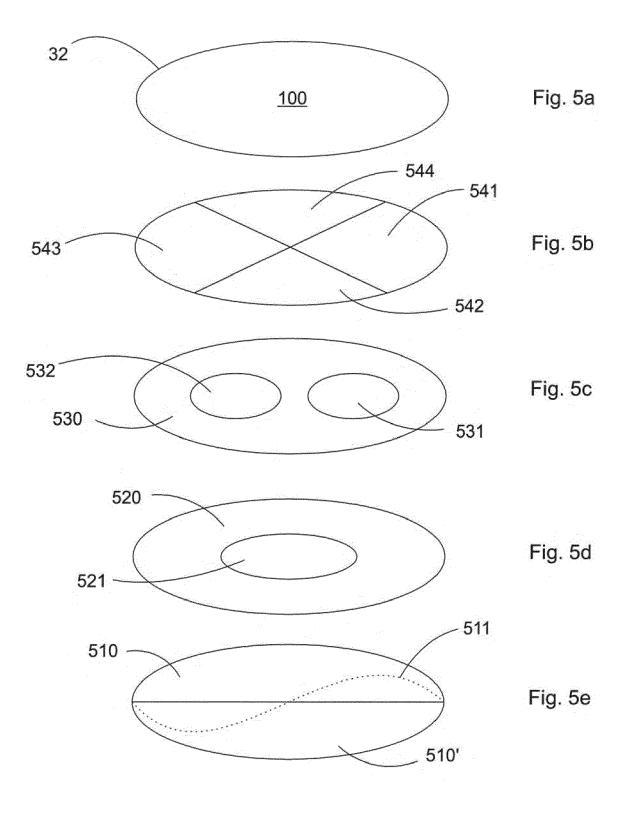
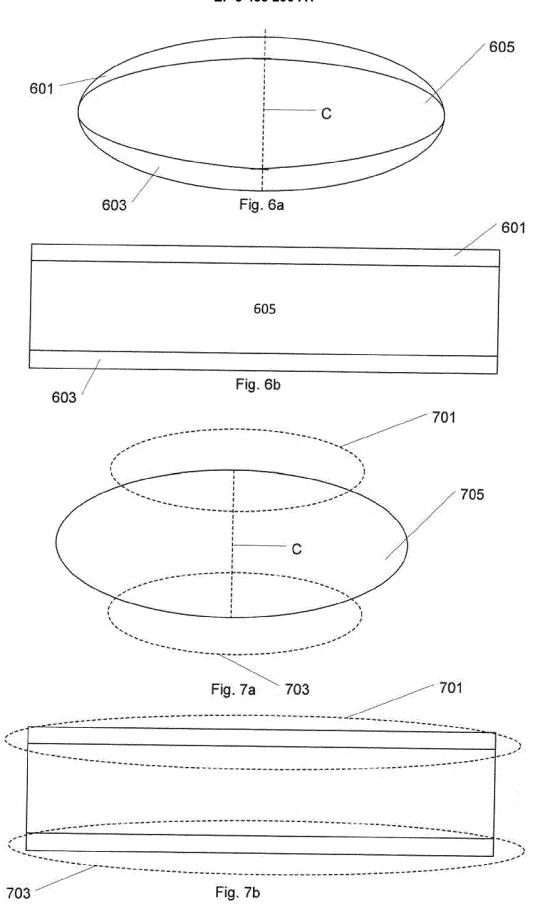


Fig. 5





### **EUROPEAN SEARCH REPORT**

**Application Number** 

EP 18 19 4053

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X	FR 80 884 E (CARREZ   28 June 1963 (1963-06 * claim 1; figure * & FR 1 269 814 A (CAI 18 August 1961 (1961- * page 2, line 2; fig	5-28) RREZ & CIE) -08-18)	1-10,		/. 7G9/10
Х <sub>Y</sub>	FR 1 558 979 A (CARR) 7 March 1969 (1969-0) * the whole document	3-07)	1-5, 7-10, 6,11,		
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Y	WO 2014/059611 A1 (ZI 24 April 2014 (2014-0 * claim 9; figures *	HANG) 04-24)	6,11, 14	,13,	
A	US 2007/261170 A1 (H0 15 November 2007 (200 * paragraphs [0028], 14; figures 10, 11 *	97-11-15)	1-5,7	7-13	
14; figures 10, 11	14; rigures 10, 11 "				CHNICAL FIELDS ARCHED (IPC)
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	The present search report has bee	en drawn up for all claims  Date of completion of the se	arch	Exa	aminer
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