



(11)

EP 4 772 074 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.07.2026 Bulletin 2026/28

(21) Application number: **24857947.6**

(22) Date of filing: **13.06.2024**

(51) International Patent Classification (IPC):
A47C 27/08^(2006.01) A47C 27/10^(2006.01)
A47C 27/06^(2006.01)

(52) Cooperative Patent Classification (CPC):
A47C 27/06; A47C 27/08; A47C 27/10

(86) International application number:
PCT/CN2024/098834

(87) International publication number:
WO 2025/044402 (06.03.2025 Gazette 2025/10)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **01.09.2023 CN 202322378257 U**

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(54) **AIRBAG CUSHION AND MATTRESS USING SAME**

(57) The present invention relates to an air cushion and a mattress using the same. In existing air cushions, a massage airbag may detach from a fixing layer due to deformation. The air cushion includes a fixing layer and a massage airbag. The massage airbag is mounted on a top surface of the fixing layer via a fixing tab. A bottom surface of the massage airbag is fixedly connected to a middle portion of the fixing tab, such that side edges of the fixing tab are exposed and fixedly connected to the fixing layer. By fixedly connecting the massage airbag to the fixing layer via the fixing tab, the present invention not only ensures that the massage airbag can freely deform during inflation and deflation, but also ensures a secure connection between the fixing tab and the fixing layer. It utilizes the deformation of a region between the side edges and the middle portion of the fixing tab to counteract a pulling force exerted on the fixing layer by the deformation of the massage airbag, thereby extending the service life of the air cushion and improving the user experience.

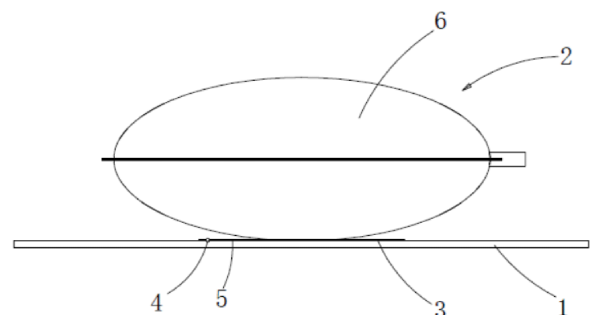


FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of bedding, and specifically relates to an air cushion and a mattress using the same.

BACKGROUND

[0002] An existing air cushion includes an airbag assembly, a fixing layer adhered to the airbag assembly, and a massage airbag arranged on the fixing layer. The massage airbag performs massage on a corresponding part of a user through inflation and deflation. To ensure the massage airbag can apply precise pressing on a preset area, the massage airbag needs to be firmly connected to the fixing layer. The massage airbag can be fixedly connected to the fixing layer by strapping or adhesion. When the massage airbag is fixed by strapping, both ends of the massage airbag are respectively bound and connected to the fixing layer via straps, such that the massage airbag closely fits the fixing layer. When the massage airbag is fixed by adhesion, a bottom surface of the massage airbag is adhesively bonded and fixedly connected to the fixing layer via glue.

[0003] During use, the massage airbag deforms upon inflation and generates relative displacement with respect to the fixing layer. Specifically, when strapping is used, the massage airbag pulls the fixing layer via the straps at both ends, causing local warping of the fixing layer. Long-term pulling may lead to tearing of the fixing layer and its detachment from the airbag assembly, resulting in damage to the air cushion and affecting its service life. When adhesion is used, the massage airbag deforms relative to the fixing layer due to inflation and deflation, causing the glue to tear due to relative offset between the components on both sides, resulting in displacement or even free rolling of the massage airbag within the mattress, thereby affecting the user experience.

SUMMARY

[0004] In order to overcome the deficiencies of the prior art, the present invention provides an air cushion and a mattress using the same. A massage airbag is fixedly connected to a fixing layer via a fixing tab, and deformation of the fixing tab itself is utilized to counteract a pulling force between the massage airbag and the fixing layer. This ensures that the massage airbag is firmly connected to the fixing layer, extends the service life of the air cushion, and improves the user experience.

[0005] The present invention is implemented by adopting the following technical solution: an air cushion, including a fixing layer and a massage airbag, where the massage airbag is mounted on a top surface of the fixing layer via a fixing tab, and a bottom surface of the massage

airbag is fixedly connected to a middle portion of the fixing tab, such that side edges of the fixing tab are exposed and fixedly connected to the fixing layer. By fixedly connecting the massage airbag to the fixing layer via the fixing tab, the present invention not only ensures that the massage airbag can freely deform during inflation and deflation, but also ensures a secure connection between the fixing tab and the fixing layer. It utilizes the deformation of a region between the side edges and the middle portion of the fixing tab to counteract a pulling force exerted on the fixing layer by the deformation of the massage airbag, thereby extending the service life of the air cushion and improving the user experience.

[0006] As a preferred embodiment, the side edges of the fixing tab are fixedly connected to the fixing layer by sewing with a stitching thread. The side edges of the fixing tab and the fixing layer are fixedly connected via the stitching thread. This not only facilitates processing and ensures a firm connection between the fixing layer and the massage airbag, but also weakens the impact of deformation of the fixing tab on the connection strength between the fixing layer and the massage airbag through the linear connection.

[0007] As a preferred embodiment, a horizontal distance between the stitching thread and a center line of the fixing tab is A , and $10\text{ mm} \leq A \leq 30\text{ mm}$. On one hand, by increasing the horizontal distance between them, the impact of the deformation of the massage airbag on the connection strength is reduced or counteracted. On the other hand, by limiting the horizontal distance, the horizontal displacement amplitude of the massage airbag is reduced, thereby ensuring that the relative positions between adjacent massage airbags are fixed and preventing mutual interference between adjacent massage airbags.

[0008] As a preferred embodiment, the fixing tab is elongated and is arranged in the same direction as a length direction of the massage airbag, and the stitching thread is arranged along a length direction of the fixing tab throughout. By increasing its length, the fixing tab extends the distance of its side edges, thereby enhancing the connection strength by providing a longer stitching thread and preventing the fixing tab from detaching from the fixing layer. The linear connection between the fixing tab and the fixing layer facilitates deformation of the fixing tab with the stitching thread as a center, thereby allowing the fixing tab to adapt to deformation of the massage airbag.

[0009] As a preferred embodiment, the middle portion of the fixing tab is provided with an adhesion part fixedly connected to the bottom surface of the massage airbag, a region of the fixing tab located between the adhesion part and the stitching thread forms a buffer part, and the buffer part counteracts a pulling force between the massage airbag and the fixing layer through its own deformation. The fixing tab is adhesively bonded and fixedly connected to the bottom surface of the massage airbag, which not only ensures a firm connection between them

but also prevents the adhesion part from interfering with the deformation of the massage airbag by reducing the contact area. The region of the fixing tab located between the adhesion part and the stitching thread forms a buffer part. The buffer part utilizes its own deformation to accommodate the deformation of the massage airbag, ensuring both that the buffer part provides offset space for the freely deforming massage airbag and that the massage airbag remains firmly connected to the fixing layer.

[0010] As a preferred embodiment, the bottom surface of the massage airbag is fixedly connected to the adhesion part by thermal fusion. This not only facilitates processing but also provides good connection strength, preventing detachment between the massage airbag and the fixing tab.

[0011] As a preferred embodiment, the stitching thread includes two threads symmetrically arranged on two side edges of the fixing tab, and the two side edges of the fixing tab are fixedly connected to the fixing layer via the stitching threads, such that the fixing tab can utilize its own structural strength to urge the bottom surface of the massage airbag to fit against the fixing layer, thereby effectively reducing the offset distance of the massage airbag during inflation deformation. Two side portions of the fixing tab form the buffer part. The buffer part can utilize its own elastic deformation to pull and position the massage airbag, and can also utilize its own elastic deformation to provide offset space for the massage airbag.

[0012] As a preferred embodiment, the stitching thread is a single thread, such that the massage airbag is adjustable for offset with the stitching thread as a center. One side edge of the fixing tab is fixedly connected to the fixing layer via the stitching thread, while the other side edge is freely movable, such that the massage airbag has a relatively large offset amplitude, thus ensuring that deformation of the massage airbag does not affect the connection strength between the fixing layer and the fixing tab.

[0013] As a preferred embodiment, the massage airbag includes at least one unit airbag, and the massage airbag is connected to an external environment via an air valve, such that an internal air pressure of the massage airbag is adjustable. The unit airbag is connected to an external control box via an air valve, serving to adjust air pressure. By adjusting the air pressure, the unit airbag achieves softness adjustment, allowing the user to make adjustments as needed.

[0014] As a preferred embodiment, the unit airbag includes an upper bladder sheet and a lower bladder sheet vertically stacked, and peripheries of the upper bladder sheet and the lower bladder sheet are bonded and enclosed to form the unit airbag. The periphery of the upper bladder sheet and the periphery of the lower bladder sheet are fixedly connected by high-frequency welding. This not only ensures a sealed connection between the upper bladder sheet and the lower bladder sheet, facilitating softness adjustment through inflation and de-

flation, but also guides the unit airbag for vertical expansion and contraction, thus ensuring that the unit airbag expands and contracts vertically, preventing mutual interference between unit airbags due to horizontal offset during inflation and deflation, and ensuring that the unit airbag can apply a massaging force to the user through vertical elongation when inflated.

[0015] As a preferred embodiment, two unit airbags are provided and vertically stacked, and opposing faces of the unit airbags are provided with a through hole, such that internal air pressures of the unit airbags are synchronously adjustable. This can not only increase the intensity of the massaging force by increasing the number of unit airbags, but also utilize a plurality of unit airbags to share the vertical deformation, thereby reducing the horizontal offset distance of each unit airbag.

[0016] As a preferred embodiment, the fixing layer includes a plurality of zones sequentially divided from front to back, at least one of the zones is provided with the massage airbag, and the zones include a shoulder and back zone, a lumbar zone, a hip zone, and a leg zone. A plurality of massage airbags may be provided and correspondingly arranged according to various body segments of the user to perform targeted massage on the user's body segments, thereby enhancing the comfort in use.

[0017] A mattress using the air cushion, where the mattress includes an upper quilted layer, the air cushion, a spring pad, and a lower quilted layer sequentially arranged from top to bottom, and a perimeter of the mattress is provided with a border. The upper quilted layer and the lower quilted layer envelop the air cushion, the spring pad, and the border through stitching. This not only ensures that the mattress maintains a predetermined contour but also protects the air cushion and the spring pad.

[0018] The present invention has the following beneficial effects: by fixedly connecting the massage airbag to the fixing layer via the fixing tab, the present invention not only ensures that the massage airbag can freely deform during inflation and deflation, but also ensures a secure connection between the fixing tab and the fixing layer. It utilizes the deformation of a region between the side edges and the middle portion of the fixing tab to counteract a pulling force exerted on the fixing layer by the deformation of the massage airbag, thereby extending the service life of the air cushion and improving the user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a schematic cross-sectional structural view of a massage airbag according to Embodiment 1.

FIG. 2 is a schematic exploded cross-sectional structural view of a massage airbag according to Embodi-

ment 1.

FIG. 3 is a schematic partial cross-sectional structural view of a massage airbag according to Embodiment 1.

FIG. 4 is a schematic cross-sectional structural view of a massage airbag having two unit airbags according to Embodiment 1.

FIG. 5 is a schematic partial cross-sectional structural view of a massage airbag having two unit airbags according to Embodiment 1.

FIG. 6 is a schematic structural view of a massage airbag according to Embodiment 1.

FIG. 7 is a schematic exploded structural view of a mattress according to Embodiment 2.

[0020] Description of reference numerals: 1- fixing layer, 2- massage airbag, 3- fixing tab, 4- stitching thread, 5- buffer part, 6- unit airbag, 7- upper bladder sheet, 8- lower bladder sheet, 9- shoulder and back zone, 10- lumbar zone, 11- hip zone, 12- leg zone, 13- upper quilted layer, 14- lower quilted layer, 15- border, 16- air cushion, 17- spring pad.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] The substantive features of the present invention will be further described below in conjunction with the drawings and specific embodiments.

Embodiment 1

[0022] This embodiment provides an air cushion.

[0023] As shown in FIG. 1 and FIG. 2, an air cushion 16 includes a fixing layer 1 and a massage airbag 2. The massage airbag 2 is mounted on a top surface of the fixing layer 1 via a fixing tab 3. A bottom surface of the massage airbag 2 is fixedly connected to a middle portion of the fixing tab 3, such that side edges of the fixing tab 3 are exposed and fixedly connected to the fixing layer 1. By fixedly connecting the massage airbag 2 to the fixing layer 1 via the fixing tab 3, it is ensured that the massage airbag 2 can deform freely during inflation and deflation, the fixing tab 3 is utilized to reduce the restraint of the fixing layer 1 on the deformation of the massage airbag 2, and it is also ensured that the massage airbag 2 is firmly connected to the fixing layer 1 through the fixing tab 3. The deformation of the fixing tab 3 is utilized to counteract the pulling force exerted on the fixing layer 1 by the deformation of the massage airbag 2, thereby extending the service life of the air cushion 16 and improving the user experience.

[0024] In this embodiment, a middle portion of the fixing tab 3 is provided with an adhesion part fixedly connected

to the bottom surface of the massage airbag 2. The side edges of the fixing tab 3 are fixedly connected to the fixing layer 1 by sewing with a stitching thread 4. A region of the fixing tab 3 located between the adhesion part and the stitching thread 4 forms a buffer part 5. The buffer part 5 counteracts a pulling force between the massage airbag 2 and the fixing layer 1 through its own deformation. Specifically, the massage airbag 2 is connected to the fixing layer 1 via the fixing tab 3, the fixing tab 3 is provided with a buffer part 5, and the buffer part 5 can adapt to deformation of the massage airbag 2 through its own deformation. This not only ensures that the massage airbag 2 can deform freely during inflation and deflation, providing deformation space for the massage airbag 2, but also ensures a firm connection between the fixing tab 3 and the fixing layer 1 to limit the massage airbag 2, ensuring that the massage airbag 2 remains within a preset range, preventing excessive offset, and guaranteeing that the massaging force generated by inflation of the massage airbag 2 can be accurately applied to the corresponding body segment of the user, thereby enhancing the comfort in use.

[0025] In this embodiment, a horizontal distance between the stitching thread 4 and a center line of the fixing tab 3 is A, and $A=20$ mm. On one hand, by increasing the horizontal distance between them, the impact of the deformation of the massage airbag 2 on the connection strength is reduced or counteracted. On the other hand, by limiting the horizontal distance, the horizontal displacement amplitude of the massage airbag 2 is reduced, thereby ensuring that the relative positions between massage airbags 2 are fixed and preventing mutual interference between adjacent massage airbags 2.

[0026] In this embodiment, the fixing tab 3 is elongated (as shown in FIG. 3) and is arranged in the same direction as a length direction of the massage airbag 2, and the stitching thread 4 is arranged along a length direction of the fixing tab 3 throughout. Increasing the length of the fixing tab 3 facilitates providing a longer stitching thread 4, thereby enhancing the connection reliability between the fixing tab 3 and the fixing layer 1. Specifically, the stitching thread 4 is a single thread and is arranged on one side edge of the fixing tab 3. This ensures that the massage airbag 2 can be adjusted for offset and swing with the stitching thread 4 as a center. By increasing the movement range of the massage airbag 2, the impact of its deformation on the connection strength between the fixing tab 3 and the fixing layer 1 is reduced.

[0027] In this embodiment, the bottom surface of the massage airbag 2 is fixedly connected to the adhesion part by thermal fusion. Since the deformation amount of the bottom wall of the massage airbag 2 is relatively small, the deformation of the massage airbag 2 has minimal impact on the reliability of the connection between its bottom surface and the adhesion part. This ensures both that the massage airbag 2 can deform freely and that the fixing tab 3 remains firmly connected to the massage airbag 2, thereby serving to position and limit

the massage airbag 2.

[0028] In this embodiment, the massage airbag 2 includes at least one unit airbag 6, and the massage airbag 2 is connected to an external environment via an air valve, such that an internal air pressure of the massage airbag 2 is adjustable. In this embodiment, the unit airbag 6 includes an upper bladder sheet 7 and a lower bladder sheet 8 vertically stacked, and peripheries of the upper bladder sheet 7 and the lower bladder sheet 8 are bonded and enclosed to form the unit airbag 6. The upper bladder sheet 7 and the lower bladder sheet 8 are vertically stacked and fixedly connected by bonding their peripheries. This encloses a sealed chamber with adjustable air pressure between the bottom surface of the upper bladder sheet 7 and the top surface of the lower bladder sheet 8, facilitating adjustment of the softness of the unit airbag 6 by an external control box via the air valve. In addition, two unit airbags 6 are provided and are vertically stacked (as shown in FIG. 4 and FIG. 15), and opposing faces of the unit airbags 6 are provided with a through hole, such that internal air pressures of the unit airbags 6 are synchronously adjustable. This can not only increase the lifting height of the massage airbag 2 by increasing the number of unit airbags 6, thereby increasing the intensity of the massaging force, but can also effectively reduce the lifting height of each unit airbag 6, thereby effectively reducing the horizontal offset amplitude of each unit airbag 6 and ensuring that the massage airbag 2 can perform vertical lifting along its axis. Such arrangement shall also be considered a specific implementation of this embodiment.

[0029] In this embodiment, the fixing layer 1 includes a plurality of zones sequentially divided from front to back, the zones include a shoulder and back zone 9, a lumbar zone 10, a hip zone 11, and a leg zone 12 (as shown in FIG. 6), and at least one of the zones is provided with the massage airbag 2. The user can set the number and positions of the massage airbags 2 according to their own needs, thus obtaining a comfortable massage experience. Specifically, the massage airbag 2 may be arranged on all zones simultaneously, or may be arranged on only some of the zones as needed. All such arrangements shall be considered specific implementations of this embodiment.

[0030] It can be understood that the parameter A may also be 10 mm, 15 mm, 25 mm, 30 mm, or the like, as long as it satisfies the requirement of $10 \text{ mm} \leq A \leq 30 \text{ mm}$.

Embodiment 2

[0031] Compared with Embodiment 1, this embodiment provides an air cushion.

[0032] In this embodiment, the stitching thread 4 includes two threads symmetrically arranged on two side edges of the fixing tab 3, and the two side edges of the fixing tab 3 are fixedly connected to the fixing layer 1, causing a middle portion of the fixing tab 3 to maintain a fitting state against the fixing layer 1. This effectively

reduces the movement space of the massage airbag 2, thereby enhancing the positioning effect on the massage airbag 2.

[0033] Other structures and effects of the air cushion 16 in this embodiment are the same as those in Embodiment 1, which will not be repeated here.

Embodiment 3

[0034] Compared with Embodiment 1 or Embodiment 2, this embodiment provides a mattress.

[0035] As shown in FIG. 7, the mattress includes an upper quilted layer 13, the air cushion 16, a spring pad 17, and a lower quilted layer 14 sequentially arranged from top to bottom, and a perimeter of the mattress is provided with a border 15. The upper quilted layer 13 and the lower quilted layer 14 envelop the air cushion 16, the spring pad 17, and the border 15 through stitching. This not only ensures that the mattress maintains a predetermined contour but also protects the air cushion 16 and the spring pad 17.

[0036] In this embodiment, peripheries of the upper quilted layer 13 and the lower quilted layer 14 are fixedly connected and completely envelop the air cushion 16 and the spring pad 17. This not only protects and shapes the mattress but also facilitates disassembly and cleaning.

[0037] In this embodiment, the spring pad 17 is arranged below the air cushion 16, providing vertical support for the air cushion 16. This ensures that the vertical deformation generated when the air cushion 16 is inflated can be transmitted upward and applied to the surface of the user, enhancing the lying experience of the user.

[0038] In this embodiment, the border 15 is arranged around the spring pad 17. This not only protects the spring pad 17 but also improves the softness of the sidewall of the mattress, providing comfortable support for the user leaning against the edge of the mattress.

[0039] Other structures and effects of the air cushion 16 in this embodiment are the same as those in Embodiment 1 or Embodiment 2, which will not be repeated here.

Claims

1. An air cushion, comprising a fixing layer (1) and a massage airbag (2), wherein the massage airbag (2) is mounted on a top surface of the fixing layer (1) via a fixing tab (3), and a bottom surface of the massage airbag (2) is fixedly connected to a middle portion of the fixing tab (3), such that side edges of the fixing tab (3) are exposed and fixedly connected to the fixing layer (1).
2. The air cushion according to claim 1, wherein the side edges of the fixing tab (3) are fixedly connected to the fixing layer (1) by sewing with a stitching thread (4).

3. The air cushion according to claim 2, wherein a horizontal distance between the stitching thread (4) and a center line of the fixing tab (3) is A, and $10 \text{ mm} \leq A \leq 30 \text{ mm}$.
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4. The air cushion according to claim 2, wherein the fixing tab (3) is elongated and is arranged in the same direction as a length direction of the massage airbag (2), and the stitching thread (4) is arranged along a length direction of the fixing tab (3) throughout.
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5. The air cushion according to claim 2, wherein the middle portion of the fixing tab (3) is provided with an adhesion part fixedly connected to the bottom surface of the massage airbag (2), a region of the fixing tab (3) located between the adhesion part and the stitching thread (4) forms a buffer part (5), the buffer part (5) counteracts a pulling force between the massage airbag (2) and the fixing layer (1) through its own deformation, and the bottom surface of the massage airbag (2) is fixedly connected to the adhesion part by thermal fusion.
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6. The air cushion according to any one of claims 2 to 5, wherein the stitching thread (4) comprises two threads symmetrically arranged on two side edges of the fixing tab (3); or the stitching thread (4) is a single thread, such that the massage airbag is adjustable for offset with the stitching thread as a center.
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7. The air cushion according to any one of claims 1 to 5, wherein the massage airbag (2) comprises at least one unit airbag (6), and the massage airbag (2) is connected to an external environment via an air valve, such that an internal air pressure of the massage airbag (2) is adjustable.
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8. The air cushion according to claim 7, wherein the unit airbag (6) comprises an upper bladder sheet (7) and a lower bladder sheet (8) vertically stacked, and peripheries of the upper bladder sheet (7) and the lower bladder sheet (8) are bonded and enclosed to form the unit airbag (6); or two unit airbags (6) are provided and vertically stacked, and opposing faces of the unit airbags (6) are provided with a through hole, such that internal air pressures of the unit airbags (6) are synchronously adjustable.
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9. The air cushion according to any one of claims 1 to 5, wherein the fixing layer (1) comprises a plurality of zones sequentially divided from front to back, at least one of the zones is provided with the massage airbag (2), and the zones comprise a shoulder and back zone (9), a lumbar zone (10), a hip zone (11), and a leg zone (12).
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10. A mattress using the air cushion according to any one of claims 1 to 9, wherein the mattress comprises an upper quilted layer (13), the air cushion (16), a spring pad (17), and a lower quilted layer (14) sequentially arranged from top to bottom, and a perimeter of the mattress is provided with a border (15).

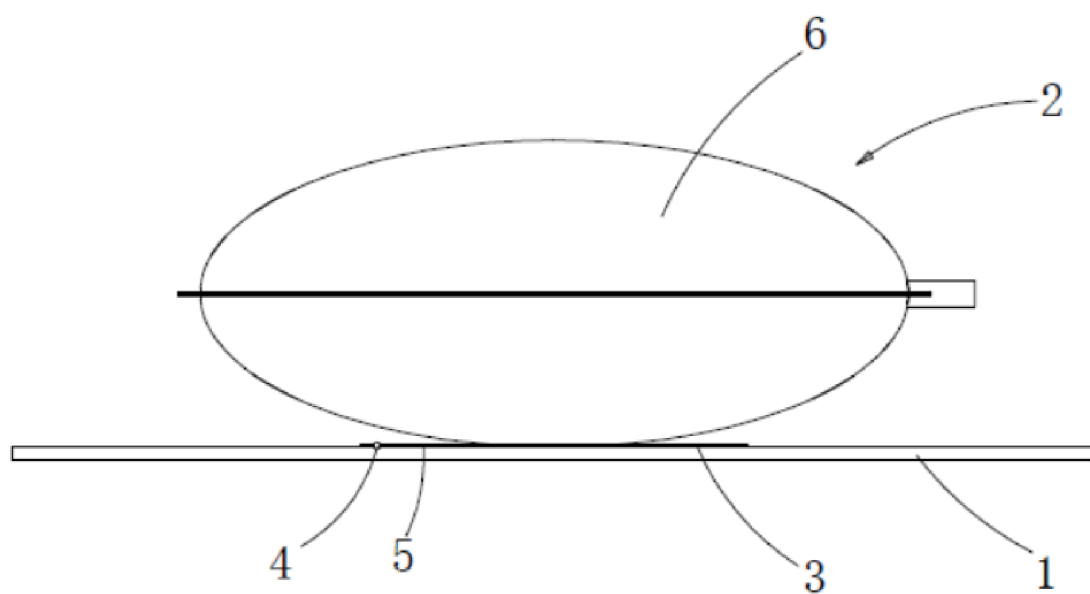


FIG. 1

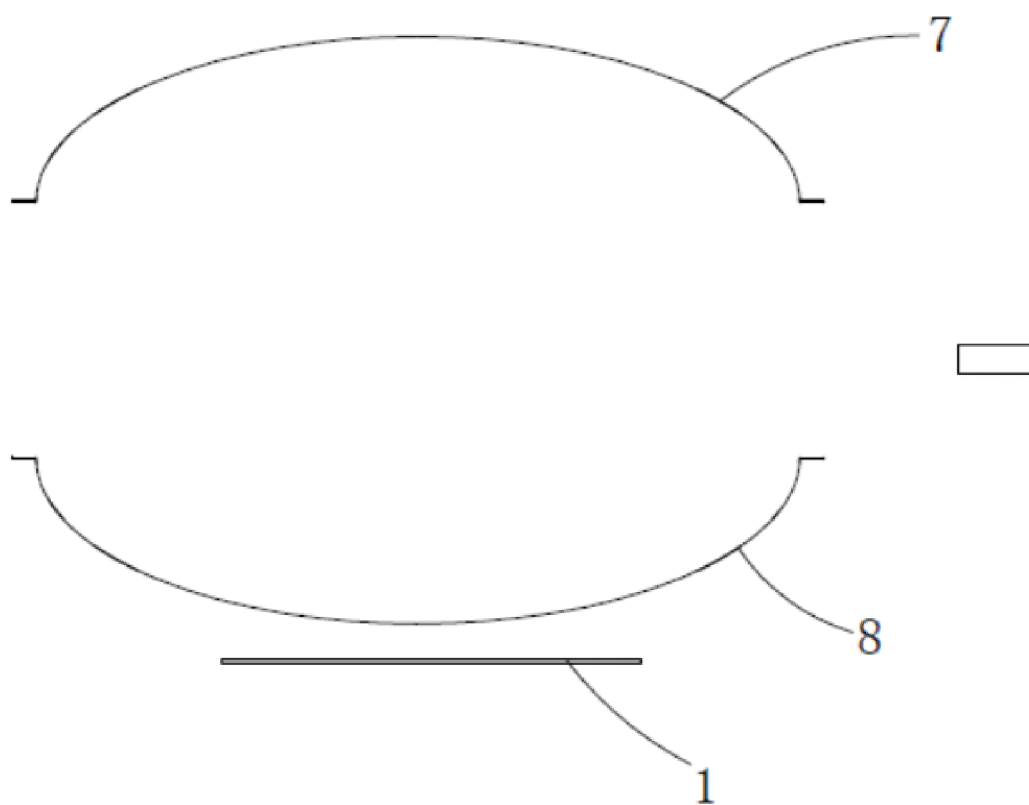


FIG. 2

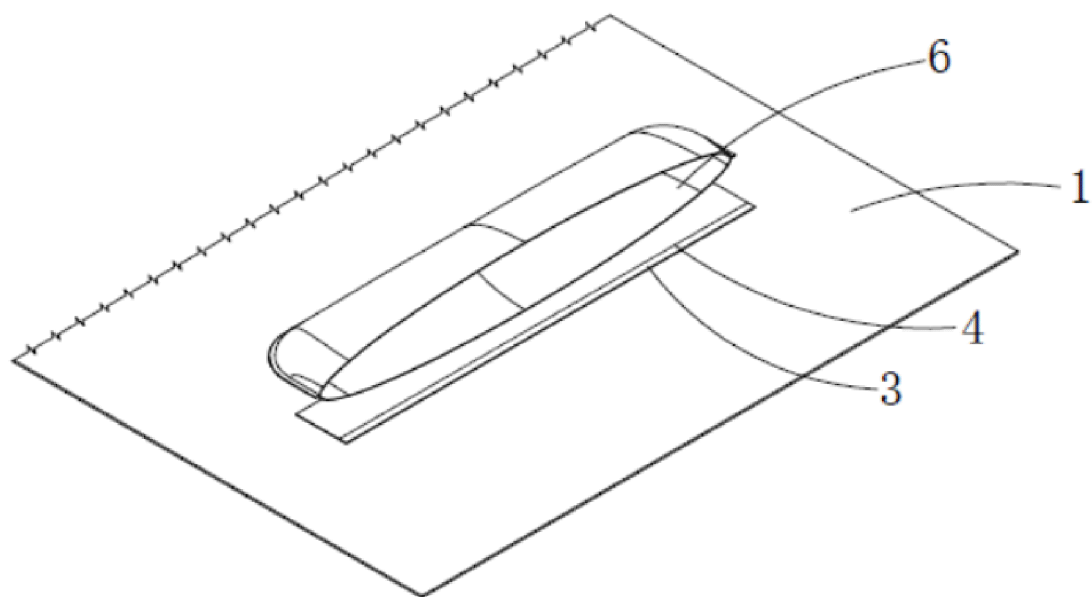


FIG. 3

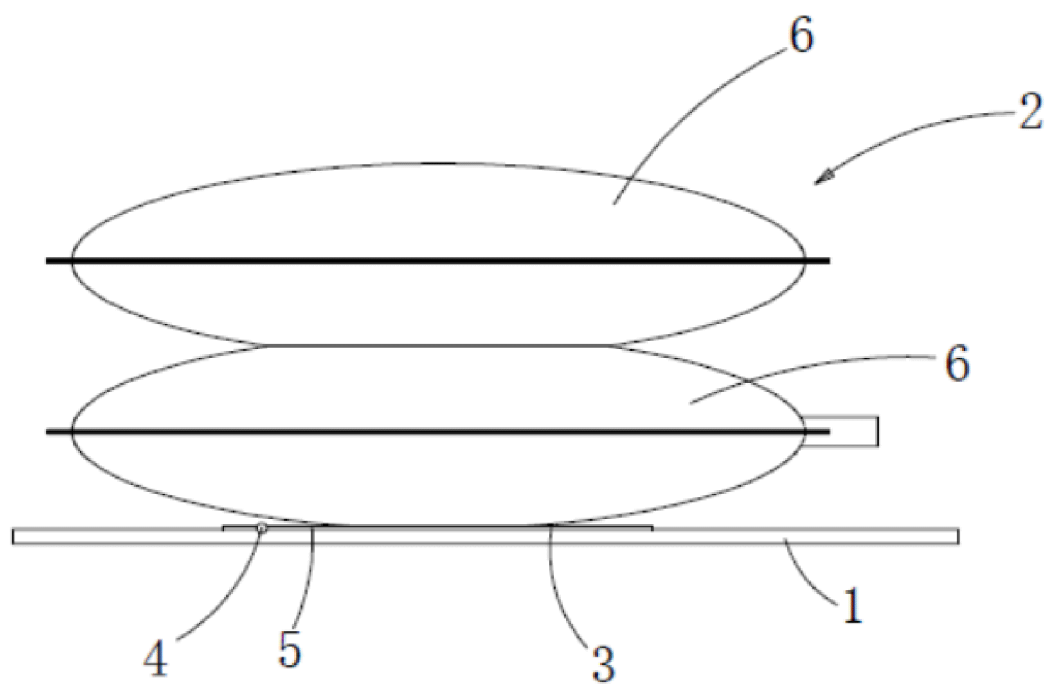


FIG. 4

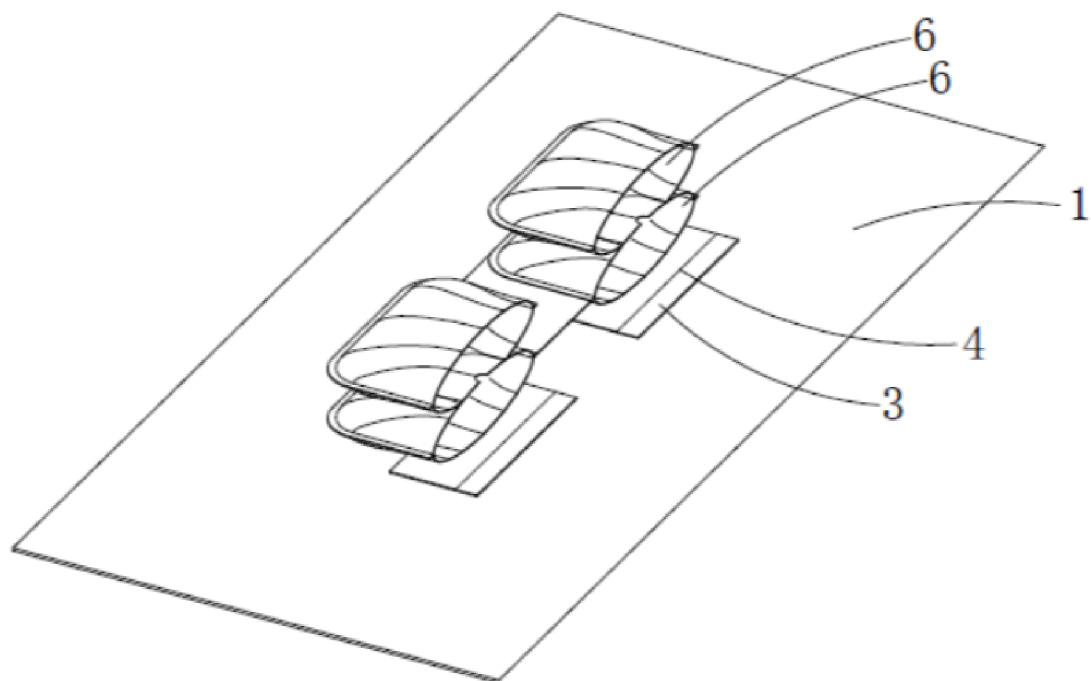


FIG. 5

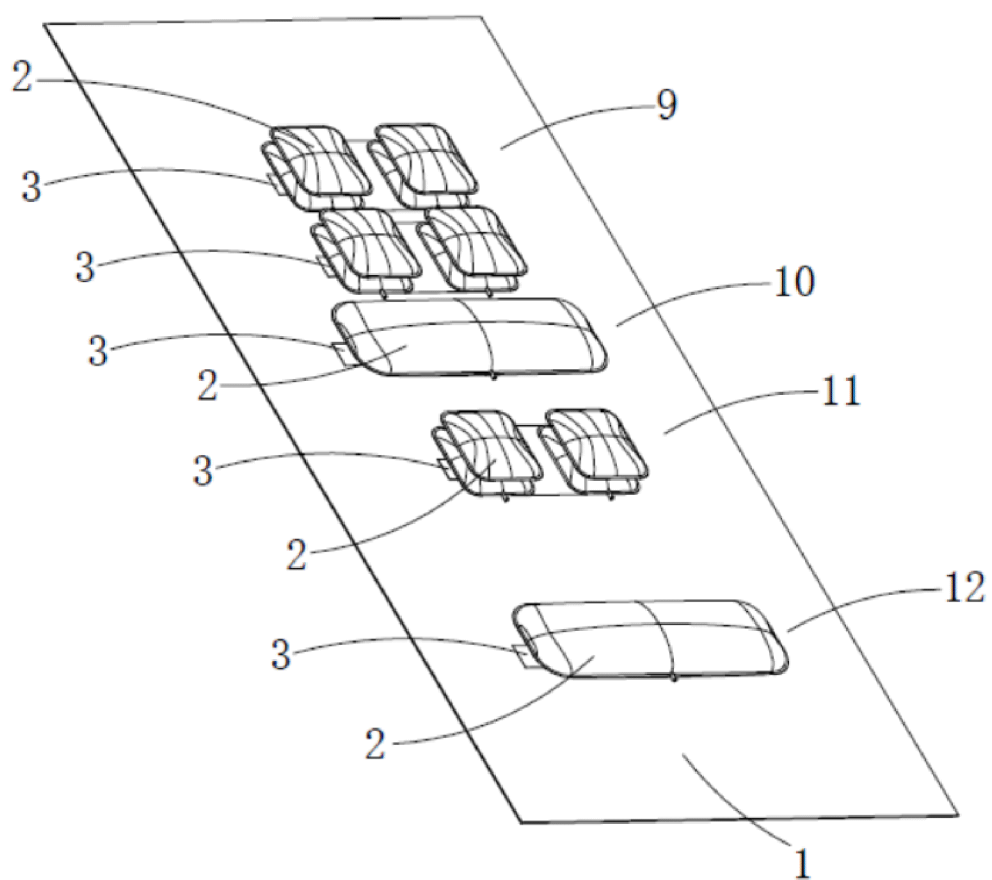


FIG. 6

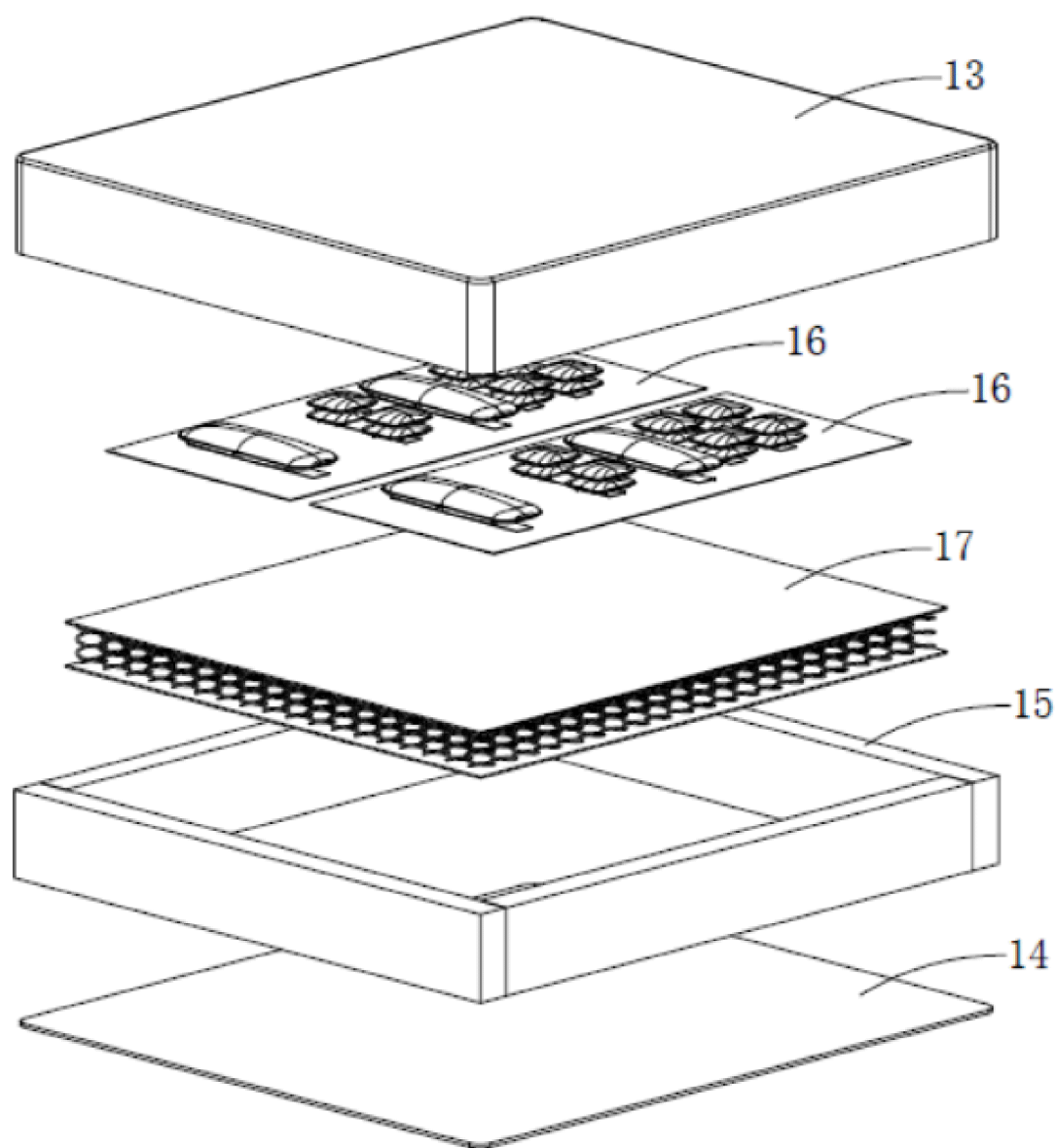


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/098834

A. CLASSIFICATION OF SUBJECT MATTER

A47C27/08(2006.01)i; A47C27/10(2006.01)n; A47C27/06(2006.01)n

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:A47C27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

CNTXT, ENTXTC, VEN, CNKI: 固定, 固定片, 片, 气囊, 床垫, 按摩, 固接, 弹簧, 垫, 边, air, gas, fix, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220587914 U (SLEEMON FURNITURE CO., LTD.) 15 March 2024 (2024-03-15) description, paragraphs 5-18, and figure 1	1-10
X	WO 2015078101 A1 (SHENZHEN BOXCON TECHNOLOGY CO., LTD.) 04 June 2015 (2015-06-04) description, paragraphs 4-9 and 27-46, and figure 1	1-9
Y	WO 2015078101 A1 (SHENZHEN BOXCON TECHNOLOGY CO., LTD.) 04 June 2015 (2015-06-04) description, paragraphs 4-9 and 27-46, and figure 1	10
Y	CN 212465515 U (CHENGDU QUSHUI SCIENCE AND TECHNOLOGY CO., LTD.) 05 February 2021 (2021-02-05) description, paragraphs 4-18, and figure 1	10
A	CN 217013350 U (SHAOXING KANGTEBAO MEDICAL TECHNOLOGY CO., LTD.) 22 July 2022 (2022-07-22) entire document	1-10
A	CN 204708357 U (SHEN BINXIAN) 21 October 2015 (2015-10-21) entire document	1-10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

19 September 2024

Date of mailing of the international search report

24 September 2024

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/098834

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 213218908 U (TAN XIANGQUN) 18 May 2021 (2021-05-18) entire document	1-10
A	US 5257430 A (YAMAGUCHI YOSHIHISA) 02 November 1993 (1993-11-02) entire document	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/098834

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