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(54) **ELASTIC MODULE BALANCING CUSHION, ELASTIC CUSHION AND FURNITURE**

(57) The present disclosure relates to the field of furniture and provides a balancing pad in use with elastic modules, an elastic pad and a furniture. The balancing pad comprises a pad body having a first pad surface and a second pad surface opposite to the first pad surface in a thickness direction of the pad body, wherein the first pad surface is formed thereon with a plurality of receiving holes extending in the thickness direction of the pad body, each of the plurality of receiving holes is configured to receive a portion of a corresponding elastic module of an elastic base pad to restrict movement of the corresponding elastic module in the transverse direction of the pad body, and the second pad surface is provided thereon with a vent structure. After assembled to form an elastic pad, the balancing pad can not only restrict movement of elastic modules in the transverse direction, but can also enable the elastic pad to be rapidly restored and produce a good support property to the elastic pad. In addition, the balancing pad can effectively improve the elastic pad in terms of stability, recoverability and support performance when a force is applied thereto, thereby providing a higher comfort, a good support performance and a more hygienic environment.

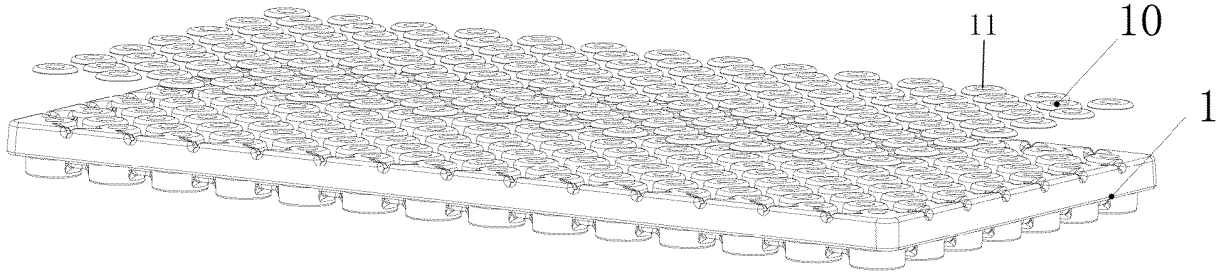


Fig. 1

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## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to the field of furniture, and particularly to a balancing pad in use with elastic modules, and an elastic pad and a furniture comprising the same.

### BACKGROUND

**[0002]** Furniture such as beds is an indispensable object in people's life. Most of the conventional large-sized furniture is not easily disassembled or not easily restored after disassembly. However, with the development of modern life, it is required furniture especially such as beds are able to be disassembled and assembled more and more frequently to meet the needs of population migration and field leisure. During transportation, it is very difficult to disassemble and assemble the beds, resulting in that the beds which are still in use are sometimes discarded to reduce the transportation burden.

**[0003]** A bed normally consists of a bed frame, an elastic pad, and an outer cover. A conventional elastic pad is usually one-piece, non-detachable and integral pad formed from a plurality of superimposed layers and springs. The integral pad is large in size and is not easy to be disassembled and stored.

**[0004]** A conventional separately-pocketed spring mattress is intended to avoid two or more people lying in bed at the same time from affecting each other (e.g., if a weight difference between individuals is relatively large, one of them will inevitably affect the other when turning over or moving the body). In this type of mattresses, each spring is individually packaged in a pocket or sleeve made of a nonwoven fabric or other material. The spring pockets are arranged in a pattern and then the outside of the arranged set of spring pockets is covered by a whole piece of foam rubber by adhesion, gluing or the like to form a furniture pad or a desired elastic pad in the form of the furniture pad. However, the separately-pocketed spring mattress is still an integral product that cannot be disassembled and is not easily transported. In addition, in the separately-pocketed spring mattress, non-woven fabrics used for wrapping the pocketed springs are adhered to each other, and when the mattress is pressed, the plurality of pocketed springs cannot move up and down separately, thereby affecting the comfort of the mattress.

**[0005]** Additionally, the conventional mattresses also have a disadvantage that they are not easy to clean. For a typical mattress, only the outer cover is often removable, and the sponge portion cannot be removed and not easily cleaned. Even though some treated sponges might have a certain anti-mite effect, since the mattress might be usually used for years, the sponge portion that is not easily cleaned might cause a large hygienic hazard.

### SUMMARY

**[0006]** To address at least some of the problems existing in the prior art products, one of the objective of the present disclosure is to enable an elastic pad to have a better comfort, a good support performance and a more hygienic environment.

**[0007]** In order to achieve the above objective, in the first aspect, the present disclosure provides a balancing pad in use with elastic modules, comprising a pad body having a first pad surface and a second pad surface opposite to the first pad surface in a thickness direction of the pad body, wherein the first pad surface is formed thereon with a plurality of receiving holes extending towards the second pad surface in the thickness direction of the pad body, each of the plurality of receiving holes is configured to receive a portion of a corresponding elastic module of an elastic base pad to restrict movement of the corresponding elastic module in a transverse direction of the pad body, and the second pad surface is provided thereon with a vent structure.

**[0008]** In the said technical solution, the first pad surface is formed thereon with a plurality of receiving holes extending towards the second pad surface in the thickness direction of the pad body, each of the plurality of receiving holes is configured to receive a portion of a corresponding elastic module of an elastic base pad to restrict movement of the corresponding elastic module in a transverse direction of the pad body, and the second pad surface is provided thereon with a vent structure. In this way, when assembled to form an elastic pad, the balancing pad can be laid over the elastic base pad including a plurality of elastic modules, and a portion of each of the elastic modules can be received within a corresponding receiving hole. At this time, due to the restriction effect produced by the receiving hole of the pad body, the movement of the respective elastic modules in a transverse direction (i.e., a direction parallel to the pad body) can be effectively restricted so as to prevent the respective elastic modules from tilting due to a force applied thereon, thereby effectively maintaining the support stability of the respective elastic modules. In addition, in a procedure where the upper surface of the elastic pad is compressed due to a compressive force applied thereon and in a restoration procedure of the elastic pad after the compressive force is removed, the vent structure on the second pad surface of the pad body allows rapid airflow exchange between the inside of the elastic pad and the outside at the pressurized area of the elastic pad. With the rapid airflow exchange with the outside, it can not only prevent mold and bacteria from growing in the inside of the elastic pad, but also can allow rapid restoration after the elastic pad is compressed, thereby avoiding of forming a long-term dent. In this way, a dent will not be formed in the area of the elastic pad that is frequently subject to a press, and the elastic pad can still have a good support performance. Therefore, the balancing pad can not only restrict the movement of the

elastic modules in the transverse direction, but also enable the elastic pad to be rapidly restored and introduce a good support property to the elastic pad. After the balancing pad is assembled to form the elastic pad, it can effectively improve the elastic pad in terms of stability, recoverability and support performance at the time when a force is applied thereto, so that the elastic pad can provide a higher comfort, a good support performance and a more hygienic environment.

**[0009]** In some embodiments, the vent structure comprises a plurality of protrusions protruding from the second pad surface, and the plurality of protrusions are spaced apart to form therebetween vent spaces that are communicated with between each other.

**[0010]** In some embodiments, the plurality of protrusions include a plurality of first protrusions, wherein, in an axial direction of the receiving holes, each of the plurality of first protrusions corresponds to a corresponding receiving hole of the plurality of receiving holes and forms a top wall of the receiving hole.

**[0011]** In some embodiments, the top wall of the receiving hole is formed with at least one vent hole communicating with the receiving hole.

**[0012]** In some embodiments, the at least one vent hole is formed on the top wall to extend axially.

**[0013]** In some embodiments, an outer surface of the top wall is provided with a gel pad which is formed with at least one vent opening communicating with the at least one vent hole.

**[0014]** In some embodiments, the plurality of protrusions comprise a plurality of second protrusions arranged to space apart from each other, wherein each of the plurality of second protrusions is surrounded by multiple of the first protrusions, and each of the plurality of first protrusions is surrounded by multiple of the second protrusions.

**[0015]** In some embodiments, the second protrusions comprise tapered extensions extending towards gaps formed among the adjacent first protrusions in their surroundings, such that an outer peripheral surface of each of the second protrusions comprises a mating segment that matches an outer peripheral surface of a portion of the first protrusion in shape.

**[0016]** In some embodiments, a gel pad is disposed on an outside top surface of each of the plurality of protrusions.

**[0017]** In some embodiments, an outer surface of the gel pad is formed with a vent groove which extends to an edge of the gel pad and communicates with the vent space.

**[0018]** In some embodiments, the pad body is an elastic body.

**[0019]** In some embodiments, an inner dimension of the receiving hole is gradually increased in a direction from the bottom to the opening of the receiving hole.

**[0020]** In some embodiments, the first pad surface is formed thereon with a plurality of sleeves surrounding the receiving holes respectively and projecting from an opening edge of the respective receiving holes, such that each of the receiving holes comprises an inner space of a correspoinding sleeve.

**[0021]** The present disclosure provides an elastic pad comprising: an elastic base pad comprising a plurality of elastic modules; and the balancing pad according to any of the above embodiments; wherein the balancing pad is laid over the elastic base pad, and a portion of each of the plurality of elastic modules is received and located within a corresponding one of the plurality of receiving holes, and wherein the plurality of receiving holes can restrict movements of the plurality of elastic modules in a transverse direction.

**[0022]** As describe above, the balancing pad can not only restrict the movement of the elastic modules in the transverse direction, but can also enable the elastic pad to be rapidly restored and produce a good support property for the elastic pad, thereby effectively improving the elastic pad in terms of stability, recoverability and support performance when a force is applied thereto. In this way, the elastic pad can provide a higher comfort, a good support performance and a more hygienic environment.

**[0023]** In some embodiments, each of the plurality of elastic modules is in a truncated conical shape and is fit within the corresponding receiving hole which has a matched shape.

**[0024]** In some embodiments, the elastic pad further comprises an outer cover covering the balancing pad and wrapping the balancing pad and at least a portion of the elastic base pad.

**[0025]** Further, the present disclosure provides a furniture comprising the elastic pad as described above. The comfort of the furniture can be improved significantly.

**[0026]** The furniture includes, is not limited to, a mattress, a sofa, a chair, a sofa bed, an upholstered bench and the like.

**[0027]** Obviously, elements or features as described in a single embodiment can be used, alone or in combination, in other embodiment(s).

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0028]** Dimensions and proportions in the drawings do not represent the dimensions and proportions of actual products. The drawings are only provided illustratively, and some unnecessary elements or features are omitted therefrom for clarity.

Fig. 1 is an exploded view schematically showing a balancing pad in use with elastic modules according to an embodiment of the present disclosure;

Fig. 2 is a perspective view schematically showing a balancing pad and an elastic base pad when in a separated state according to a further embodiment of the present disclosure;

Fig. 3 is a perspective view schematically showing

the balancing pad and the elastic base pad in Fig. 2, when in an assembled state, to form an elastic pad;

Fig. 4 is a perspective view schematically showing a local structure of the cut elastic pad in Fig. 3 when in an assembled state;

Fig. 5 is an exploded view schematically showing a balancing pad in use with elastic modules according to a further embodiment of the present disclosure;

Fig. 6 is a perspective view schematically showing the balancing pad and the elastic base pad in Fig. 5 when in an assembled state;

Fig. 7 is an exploded view schematically showing an elastic pad according to an embodiment of the present disclosure;

Fig. 8 is a schematic diagram of a structure of an elastic module of an elastic base pad of the elastic pad in Fig. 4.

Reference signs

**[0029]** 1 - balancing pad, 2 - pad body, 3 - receiving hole, 4 - elastic base pad, 5 - elastic module, 6 - vent space, 7 - first protrusion, 8 - top wall, 9 - vent hole, 10 - gel pad, 11 - vent opening, 12 - second protrusion, 13 - extension, 14 -mating segment, 15 - vent groove, 16 - sleeve, 17 - elastic pad, 18 - outer cover, 19 - conical spring, 20 - spring bracket.

## DETAILED DESCRIPTION OF EMBODIMENTS

**[0030]** Reference now will be made to the drawings to describe in detail the present disclosure. What will be described herein will only cover preferred embodiments of the present disclosure, and those skilled in the art would envision, on the basis of the preferred embodiments, other possible manners which also fall into the scope described herein.

**[0031]** Fig. 1 schematically shows a balancing pad 1 in use with elastic modules according to an embodiment of the present disclosure, Fig. 2 schematically shows a balancing pad 1 in use with elastic modules according to a further embodiment of the present disclosure, and Fig. 5 schematically shows a balancing pad 1 in use with elastic modules according to a still further embodiment of the present disclosure. Referring to Figs. 1, 2, 4 and 5, the balancing pad according to the present disclosure includes a pad body 2 having a first pad surface and a second pad surface opposite to the first pad surface in a thickness direction of the pad body, the first pad surface is formed thereon with a plurality of receiving holes 3 extending towards the second pad surface in the thickness direction of the pad body, each of the plurality of receiving holes 3 is configured to receive a portion of a corresponding elastic module 5 of an elastic base pad 4 to restrict movement of the corresponding elastic module in a transverse direction of the pad body 2, and the second pad surface is provided thereon with a vent structure.

**[0032]** As described above, the first pad surface of the pad body 2 is formed thereon with a plurality of receiving holes 3 extending towards the second pad surface in the thickness direction of the pad body, each of the plurality of receiving holes 3 is configured to receive a portion of a corresponding elastic module 5 of an elastic base pad 4 to restrict movement of the corresponding elastic module 5 in the transverse direction, and the second pad surface of the pad body 2 is provided thereon with a vent structure. In this way, when assembled to form an elastic pad 17, the balancing pad 1 can be laid over the elastic base pad 4 including a plurality of elastic modules 5, and a portion of each elastic module 5 can be received within a corresponding receiving hole 3. At this time, due to the restriction effect produced by the receiving hole 3 of the pad body 2, the movement of the respective elastic modules 5 in a transverse direction (i.e., a direction parallel to the pad body 2) can be effectively restricted so as to prevent the respective elastic modules 5 from tilting due to a force applied thereon, thereby effectively maintaining the support stability of the respective elastic modules 5. In addition, in a procedure where the upper surface of the elastic pad 17 is compressed due to a compressive force applied thereon and in a restoration procedure of the elastic pad after the compressive force is removed, the vent structure on the second pad surface of the pad body 2 allows rapid airflow exchange between the inside of the elastic pad and the outside at the pressurized area of the elastic pad 17. With the rapid airflow exchange with the outside, it can not only prevent mold and bacteria from growing in the inside of the elastic pad 17, but also can allow rapid restoration after the elastic pad is compressed, thereby avoiding of forming a long-term dent. In this way, a dent will not be formed in the area of the elastic pad that is frequently subject to a press, and the elastic pad 17 can still have a good support performance. Therefore, the balancing pad 1 cannot only restrict the movement of the elastic module 5 in the transverse direction, but can also enable the elastic pad 17 to be rapidly restored and introduce a good support property to the elastic pad 17. After the balancing pad 1 is assembled to form the elastic pad 17, it can effectively improve the elastic pad 17 in terms of stability, recoverability and support performance at the time when a force is applied thereto, so that the elastic pad 17 can provide a higher comfort, a good support performance and a more hygienic environment.

**[0033]** In addition, the balancing pad can be used to make an elastic pad.

**[0034]** In the balancing pad 1, the vent structure may be of multiple types. For example, in some embodiments, the vent structure may be a vent hole formed on the top wall of the receiving hole 3. As such, when the elastic pad is subject to a pressure, an airflow is formed between

the pressurized portion of the elastic pad and the interior of the receiving hole 3 via the vent hole. Alternatively, in some other embodiments, referring to Figs. 1, 2, 4 and 5, the vent structure includes a plurality of protrusions protruding from the second pad surface, and the plurality of protrusions are spaced apart to form therebetween vent spaces 6 that are communicated with between each other. Therefore, the plurality of protrusions can form a support to buffer and absorb a portion of the pressure applied to the elastic pad. Furthermore, referring to Figs. 3 and 4, the gaps among the plurality of protrusions communicate with one another to form vent spaces 6 communicating with one another. In the case, after the protrusions of the pressurized portion of the elastic pad is compressed, the air within the vent spaces 6 of the pressurized portion flows into the vent spaces 6 of other unpressurized portions and the external environment. After the pressure is removed, the air flowing to the vent spaces 6 of the other unpressurized portions and the air from the external environment can quickly fill the pressurized portion via the communicated gaps, to enable the pressurized portion of the elastic pad to rapidly restore to thus provide a good support.

**[0035]** In some embodiments, the protrusion and the receiving hole 3 are staggered from each other, rather than aligned with each other, in the axial direction of the receiving hole (i.e., the thickness direction of the pad body). At this time, a vent hole may be formed on the top wall of the staggered receiving hole 3, which may be located in the gap between the respective protrusions. Alternatively, in some other embodiments, referring to Fig. 4, the plurality of protrusions includes a plurality of first protrusions 7 , wherein in an axial direction of the receiving holes 3, each of the plurality of first protrusions 7 corresponds to a corresponding receiving hole 3 of the plurality of receiving holes and forms a top wall 8 of the receiving hole 3. In the case, the first protrusion 7 can increase the thickness of the top wall of the receiving hole 3. After a portion of each elastic module 5 on the elastic base pad 4 is received within the corresponding receiving hole 3, when a force is applied, the top wall of the receiving hole 3 and the portion of the elastic module 5 are displaced relative to each other to generate friction. Besides, the thickened top wall can improve the wear resistance, thereby restrict the elastic module 5 for a longer time.

**[0036]** In some embodiments, when one first protrusion 7 corresponds to one receiving hole 3 to act as the top wall of the receiving hole 3, the gaps among the respective first protrusions 7 can communicate with one another to form vent spaces 6 communicating with one another. At this time, the hole wall of the receiving hole 3 may not be formed thereon with a vent hole communicating the inside with the outside. In the case, after the first protrusion 7 of the pressurized portion of the elastic pad is compressed, the air within the vent space 6 of the pressurized portion flows to the vent spaces 6 of other unpressurized portions and the external environment. After the pressure is removed, the air flowing to the vent spaces 6 of the other unpressurized portions and the air from the external environment can quickly fill the pressurized portion via the communicating gaps, to enable the pressurized portion of the elastic pad to rapidly restore to thus provide a good support.

**[0037]** In some other embodiments, when one first protrusion 7 corresponds to one receiving hole 3 to act as the top wall 8 of the receiving hole 3, the gaps among the respective first protrusions 7 can communicate with one another to form vent spaces 6 communicating with one another. At this time, the hole wall of the receiving hole 3 is formed thereon with at least one vent hole 9 communicating with the receiving hole 3. In the case, after the first protrusion 7 of the pressurized portion of the elastic pad is compressed, the air within the vent space 6 of the pressurized portion flows to vent spaces 6 of other unpressurized portions and the external environment. In addition, an airflow is formed between the pressurized portion and the interior of the receiving hole 3 via the vent hole 9. After the pressure is removed, the air flowing to the vent spaces 6 of other unpressurized portions and the air from the external environment can quickly fill the pressurized portion via the communicating gaps and the vent hole 9, to enable the pressurized portion of the elastic pad to rapidly restore to thus provide a good support.

**[0038]** The vent hole 9 may be formed at any location of the hole wall of the receiving hole 3 as long as it can communicate the interior of the receiving hole 3 with the second pad surface of the pad body 2. For example, the vent hole 9 may be a hole formed on the side hole wall of the receiving hole 3 and extending obliquely upwards. Alternatively, referring to Fig. 4, the top wall of the receiving hole is formed with at least one vent hole communicating with the receiving hole. In some embodiments, at least one vent hole 9 extends axially and is formed on the top wall 8. In some embodiments, one first protrusion 7 corresponds to one receiving hole 3 to act as the top wall 8 of the receiving hole 3. Moreover, the vent hole 9 axially passes through the first protrusion 7. In this way, the first protrusion 7 can increase the thickness of the top wall of the receiving hole 3 to improve the wear resistance, and with the vent hole 9 formed thereon, the interior of the receiving hole 3 and the second pad surface can communicate with each other. Further, such structure can also facilitate formation of the first protrusion 7 and the vent hole 9 while reducing the manufacturing cost.

**[0039]** In some embodiments, referring to Fig. 1, an outer surface of the top wall 8 is provided with a gel pad 10 which is formed with at least one vent opening 11 communicating with the at least one vent hole 9. As such, the gel pad 10 can increase the thickness as well as the elasticity of the first protrusion 7, to exhibit better support and recovery performances. The gel pad 10 may be bonded, ultrasonically welded, fastened via magic fasteners, or connected in other manners (e.g. integrated

grouting), to the top wall 8.

**[0040]** Fig. 5 schematically show a balancing pad in use with elastic modules 1 according to a further embodiment of the present disclosure. Referring to Fig. 5, the plurality of protrusions includes a plurality of first protrusions 7. In some embodiments, in the axial direction of the receiving hole 3, one first protrusion 7 corresponds to one receiving hole 3 to act as a top wall 8 of the receiving hole 3. The plurality of protrusions further includes a plurality of second protrusions 12 arranged to space apart from each other, wherein each of the plurality of second protrusions 12 is surrounded by plurality of first protrusions 7, and each of the plurality of first protrusions 7 is surrounded by plurality of second protrusions 12. In the case, the first protrusion 7 can be aligned with the receiving hole 3, and the second protrusion 12 can fill other gaps among the first protrusions 7 not aligned with the receiving holes 3, such that communicated gaps can be formed between the the first protrusions 7, between the second protrusions 12, and between the first protrusions 7 with the second protrusions 12, thereby being formed as the vent spaces 6. In this way, the second protrusions 12 can correspondingly increase the overall strength of the pad body 2, and the first protrusions 7 and the second protrusions 12 can form, as a whole, a more stable and more reliable support.

**[0041]** The first protrusion 7 and the second protrusion 12 may be of any shape, and the present disclosure does not intend to limit the shapes of the first protrusion 7 and the second protrusion 12 to a certain specific form. For example, in an alternative embodiment, referring to Fig. 5, the second protrusions 12 comprise tapered extensions 13 extending towards gaps formed among the adjacent first protrusions 7 in their surroundings, such that an outer peripheral surface of each of the second protrusions 12 comprises a mating segment 14 that matches an outer peripheral surface of a portion of the first protrusion 7 in shape. With the tapered extensions 13, a plurality of second protrusions 12 can extend at the periphery of the first protrusion 7 as far as possible. A plurality of second protrusions 12, for example four as shown in Fig. 5, are arranged about a first protrusion 7, to further reinforce the strength of the portion of the pad body 2 located around the first protrusion 7. In the case, the pad body 2 and the receiving hole 3 can restrict transverse movement of the elastic module 5 in a more stable and more reliable manner.

**[0042]** In some embodiments, referring to Figs. 5 and 6, a gel pad 10 is disposed on an outside top surface of each of the plurality of protrusions. The gel pad 10 can increase the thickness of the respective protrusion, for example, the first protrusion and/or second protrusion, and can also improve the elasticity of the respective protrusion, to exhibit better support and recovery performances. The gel pad 10 may be bonded, ultrasonically welded, fastened via magic fasteners, or connected in other manners (e.g. integrated grouting), to the outer top surface of the protrusions.

**[0043]** In some embodiments, referring to Figs. 5 and 6, an outer surface of the gel pad 10 is formed with a vent groove 15 which extends to an edge of the gel pad 10 and communicates with the vent space 6. That is, the vent structure includes a vent groove 15 communicating with the vent space and located on the gel pad 6. When a pressure is applied to the elastic pad, the airflow can flow through the vent groove 15 to/from the vent space 6, to further improve the ventilation effect. The vent groove 15 may be of multiple shapes, for example, at least one of a cross shape, a straight-line shape and an S shape. With respect to shape, the vent grooves 15 on the respective gel pad 10 may be identical or different, or some are identical while some other are different.

**[0044]** In the balancing pad 1, a dimension of a cross section of the receiving hole 3 may be identical in the axial direction thereof, i.e., the receiving hole 3 may be a hole consistent in diameter, so that the portion of the elastic module 5 can abut against the top wall (for example the first protrusion) of the receiving hole. Alternatively, the dimension of the cross section of the receiving hole 3 may be varied stepwise in the axial direction thereof to form a stop step within the receiving hole 3, so that the portion of the elastic module 5 can abut against the stop step after entering the receiving hole 3. Alternatively, referring to Fig. 4, an inner dimension of the receiving hole 3 is gradually increased in a direction from the bottom to the opening of the receiving hole 3, i.e. the dimension of cross section of the receiving hole 3 is gradually increased in the direction from the second pad surface to the first pad surface, to form a frustum hole. In practice, the portion of the elastic module 5 can abut against the conical inner peripheral surface of the receiving hole 3 after entering the receiving hole 3. Optionally, as matching the frustum hole, the elastic module 5 may be formed as a frustum, where the cone slope of the frustum may be identical to that of the receiving hole 3. In this way, a portion of the frustum may fit in the frustum hole in shape, to form cone-fit therebetween. Therefore, the portion of the elastic module 5 can mate with the receiving hole 3 in a more stable and more reliable manner, so that the balancing pad 1 can provide more stable and more reliable restriction for the elastic module 5. In addition, the receiving hole 3 may be a square hole, or may be a round hole. For example, the receiving hole may be a square or round frustum hole.

**[0045]** In the balancing pad 1, in some embodiments, the pad body 2 may not be elastic, for example, which may be a thin plastic panel or flexible body. The flexible body may be a fabric body which may be canvas or non-woven fabric. The non-woven fabric can introduce good moisture-proof and vent properties to the balancing pad, and can also make the balancing pad more flexible and thinner. This can further make the elastic pad more comfortable. In other embodiments, the pad body 2 is an elastic body. After the elastic body is laid over the elastic base pad 4 to form an elastic pad 17, when a pressure is applied to the elastic pad, the elastic module 5 is com-

pressed correspondingly to provide a support. As an elastic body, the elastic body 2 is elastically deformed to provide a buffer, to further restrict the movement of the respective elastic module 5 in the transverse direction while effectively improving the stability of the elastic pad 17 when being subject to a pressure. In this way, the elastic pad 17 can provide a higher comfort.

**[0046]** The elastic body may be of multiple types. For example, the elastic body may be a silicone body. Alternatively, the elastic body may be a sponge body, for example, a sponge body with a high elasticity, which can be easily formed in a desired shape, has a low cost, and is advantageous in ventilation.

**[0047]** In some embodiments, referring to Figs. 1 and 4, the first pad surface is formed thereon with a plurality of sleeves 16 surrounding the receiving holes 3 respectively and projectiong from an opening edge of the respective receiving holes, such that each of the receiving holes 3 comprises the inner space of a corresponding sleeve 16. With the sleeve 16, the present disclosure can enlarge the axial receiving space of the receiving hole 3, to receive and locate the elastic module 5 in a better effect, and thus further restrict the transverse movement of the elastic modules 5.

**[0048]** In some embodiments, the pad body 2, the sleeve 16 and the respective protrusions may be integrally formed from the same material. For example, they are integrally formed from sponge as a balancing pad 1.

**[0049]** In addition, referring to Figs. 2, 3, 4 and 6, the elastic pad 17 according to the present disclosure comprises an elastic base pad 4 and the balancing pad 1 according to any one of the embodiments as described above, wherein: the elastic base pad 4 includes a plurality of elastic modules 5; the balancing pad 1 is laid over the elastic base pad 4, and a portion of each elastic module 5 is located within a corresponding one of the plurality of receiving hole 3; and the plurality of receiving holes 3 can restrict the movements of the plurality of elastic modules 5 in a transverse direction.

**[0050]** As aforementioned, the balancing pad can not only restrict the movement of the elastic modules in the transverse direction, but can also enable the elastic pad to be rapidly restored and produce a good support property for the elastic pad, thereby effectively improving the elastic pad in terms of stability, recoverability and support performance when a force is applied thereto. In this way, the elastic pad can provide a higher comfort, a good support performance and a more hygienic environment.

**[0051]** The elastic module 5 may be of multiple types. For example, the elastic module 5 may be a shape of a cylinder, truncated cone, or column. In some embodiments, referring to Fig. 8, each of the plurality of elastic modules 5 is in a truncated conical shape and is fit within the corresponding receiving hole 3 which has a matched shape, that is the receiving hole 3 is in a form of a truncated conical hole. As such, the truncated conical shaped elastic module 5 has the same cone slope as the receiving hole 3 in the form of a truncated cone, thereby forming a form-fit match between the receiving hole 3 and the portion of the elastic module 5. Accordingly, the portion of the elastic module 5 can be mated with the receiving hole 3 more stably and more reliably, and the balancing pad 1 can provide more stable and more reliable restriction for the elastic module 5.

**[0052]** The elastic module 5 may be of multiple types. For example, the elastic module 5 may be a cylindrical elastic block such as a rubber block. Alternatively, the elastic module 5 may include a spring support 20 and a conical spring 19 disposed within the spring support 20. In the case, the elastic base pad 4 may include a foldable mounting bracket, and the spring bracket 20 is used for removably mounting the elastic module 5 to the foldable mounting bracket. In this way, a plurality of elastic modules 5 can be mounted to the foldable mounting bracket via the respective spring supports 20. Then, the balancing pad 1 is laid over the respective elastic modules 5, and a portion of each elastic module 5 enters and is located within the respective receiving hole 3. When disassembling is to be performed, the balancing pad 1 is removed, the respective elastic modules 5 are removed from the foldable mounting bracket and sequentially nested in and stacked on the corresponding ones, and the foldable mounting bracket is then folded. Therefore, the elastic module 17 is easily removed, and the disassembled elastic modules can be compressed or stacked and nested with each other, thereby significantly saving the storage and transportation space and offering convenience in cleaning.

**[0053]** Referring to Fig. 7, the elastic pad 17 further includes an outer cover 18 covering the balancing pad 1 and wrapping the balancing pad 1 and at least portion of the elastic base pad 4. For example, the elastic base pad 4 and the balancing pad 1 can be wrapped as a whole, thereby improving the appearance of the elastic pad 17. The outer cover 18 can wrap the balancing pad 1 and the at least portion of the elastic base pad 4 via a removable connection structure, for example, zippers or magic fasteners.

**[0054]** Furthermore, the present disclosure provides a furniture including the elastic pad according to any one of the embodiments as described above. The furniture can provide a significantly higher comfort.

**[0055]** The furniture includes, but is not limited to, a mattress, a sofa, a chair, a sofa bed, an upholstered bench and the like.

**[0056]** The scope of protection of the present disclosure is defined only by the appended claims. Given the teaching of the present disclosure, those skilled in the art could easily envision using alternative structures of those disclosed herein as feasible alternative embodiments, and combining the embodiments disclosed herein to form new embodiments, which should all fall into the scope defined by the appended claims.

## Claims

1. A balancing pad in use with elastic modules, the balancing pad (1) comprising a pad body (2) having a first pad surface and a second pad surface opposite to the first pad surface in a thickness direction of the pad body, the first pad surface is formed thereon with a plurality of receiving holes (3) extending towards the second pad surface in the thickness direction of the pad body, each of the plurality of receiving holes (3) being configured to receive a portion of a corresponding elastic module (5) of an elastic base pad (4) to restrict movement of the corresponding elastic module in a transverse direction of the pad body (2), the second pad surface being provided thereon with a vent structure.

2. The balancing pad in use with elastic modules according to claim 1, wherein the vent structure comprises a plurality of protrusions protruding from the second pad surface, and the plurality of protrusions are spaced apart to form therebetween vent spaces (6) that are communicated with between each other.

3. The balancing pad in use with elastic modules according to claim 2, wherein the plurality of protrusions include a plurality of first protrusions (7), wherein in an axial direction of the receiving hole (3), each of the plurality of first protrusions (7) corresponds to a corresponding receiving hole (3) of the plurality of receiving holes and forms a top wall (8) of the receiving hole (3).

4. The balancing pad in use with elastic modules according to claim 3, wherein the top wall (8) of the receiving hole (3) is formed with at least one vent hole (9) communicating with the receiving hole (3).

5. The balancing pad in use with elastic modules according to claim 4, wherein an outer surface of the top wall (8) is provided with a gel pad (10) which is formed with at least one vent opening (11) communicating with the at least one vent hole (9).

6. The balancing pad in use with elastic modules according to claim 3, wherein the plurality of protrusions comprise a plurality of second protrusions (12) arranged to space apart from each other, wherein each of the plurality of second protrusions (12) is surrounded by multiple of the first protrusions (7), and each of the plurality of first protrusions (7) is surrounded by multiple of the second protrusions (12).

7. The balancing pad in use with elastic modules according to claim 6, wherein the second protrusions (12) comprises tapered extensions (13) extending towards gaps formed among the adjacent first protrusions (7) in their surroundings, such that an outer peripheral surface of each of the second protrusions (12) comprises a mating segment (14) that matches an outer peripheral surface of a portion of the first protrusion (7) in shape.

8. The balancing pad in use with elastic modules according to claim 3, 6 or 7, wherein a gel pad (10) is disposed on an outside top surface of each of the plurality of protrusions.

9. The balancing pad in use with elastic modules according to claim 8, wherein an outer surface of the gel pad (10) is formed with a vent groove (15) which extends to an edge of the gel pad (10) and communicates with the vent space (6).

10. The balancing pad in use with elastic modules according to claim 1, wherein the pad body (2) is an elastic body.

11. The balancing pad in use with elastic modules according to claim 1, wherein an inner dimension of the receiving hole (3) is gradually increased in a direction from the bottom to the opening of the receiving hole (3).

12. The balancing pad in use with elastic modules according to claim 1, wherein the first pad surface is formed thereon with a plurality of sleeves (16) surrounding the receiving holes (3) respectively and projecting from an opening edge of the respective receiving holes, such that each of the receiving holes (3) comprises an inner space of a corresponding sleeve (16).

13. An elastic pad (17) comprising:

    an elastic base pad (4) comprising a plurality of elastic modules (5); and
    the balancing pad (1) according to any one of claims 1-12;
    wherein the balancing pad (1) is laid over the elastic base pad (4), and a portion of each of the plurality of elastic modules (5) is received and located within a corresponding one of the plurality of receiving holes (3), wherein the plurality of receiving holes (3) can restrict movements of the plurality of elastic module (5) in a transverse direction.

14. The elastic pad according to claim 13, wherein each of the plurality of elastic modules (5) is in a truncated conical shape and is fit within the corresponding receiving hole (3) which has a matched shape.

15. The elastic pad according to claim 13 or 14, wherein the elastic pad further comprises an outer cover (18) covering the balancing pad (1) and wrapping the bal-

ancing pad (1) and at least a portion of the elastic base pad (4).

**16.** A furniture, comprising the elastic pad (17) according to any one of claims 13-15.

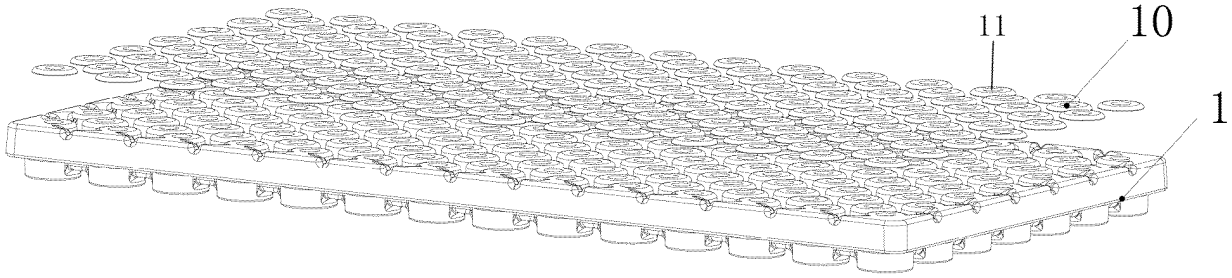


Fig. 1

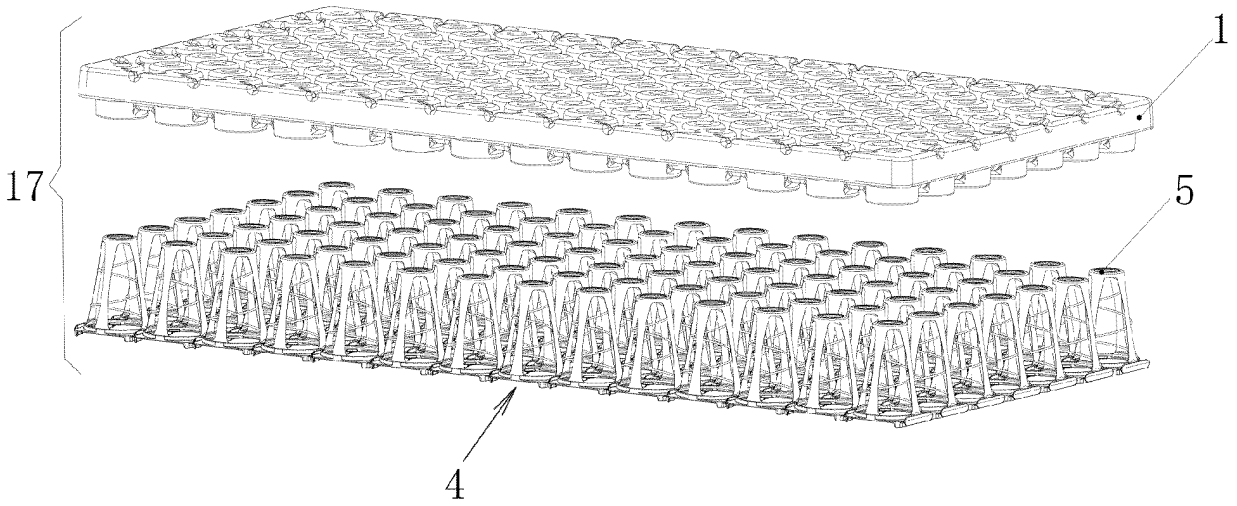


Fig. 2

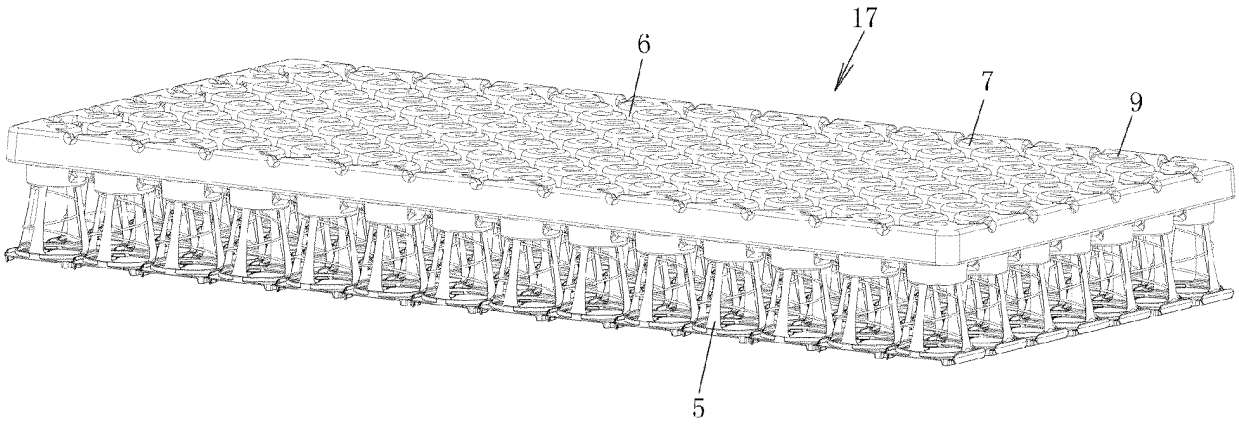


Fig. 3

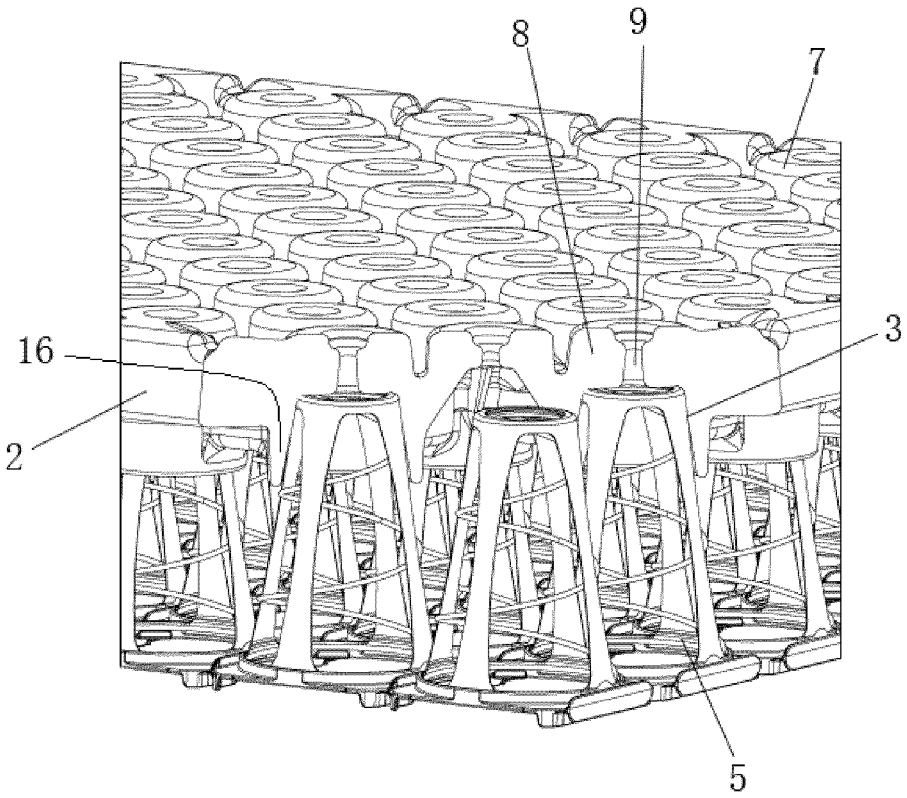


Fig. 4

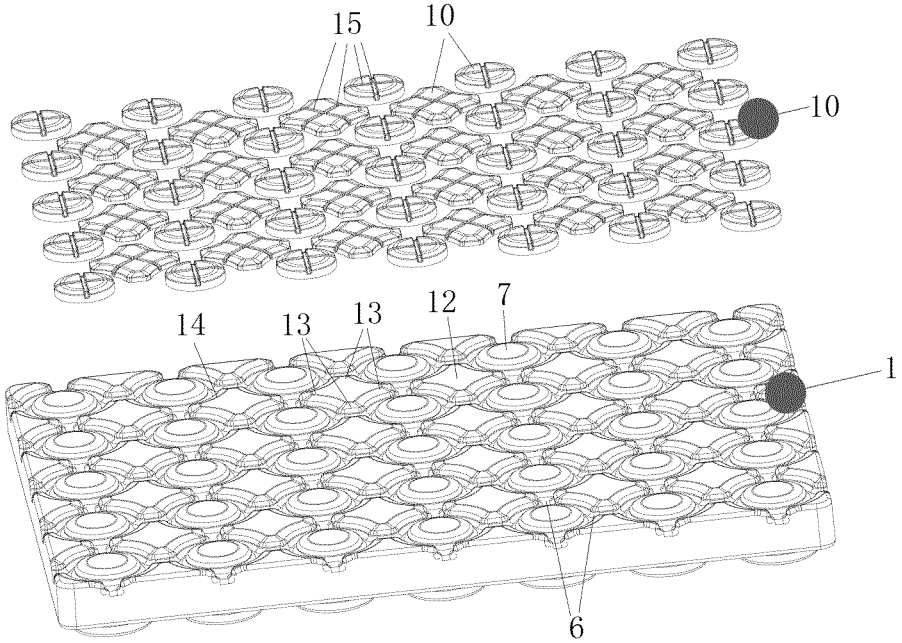


Fig. 5

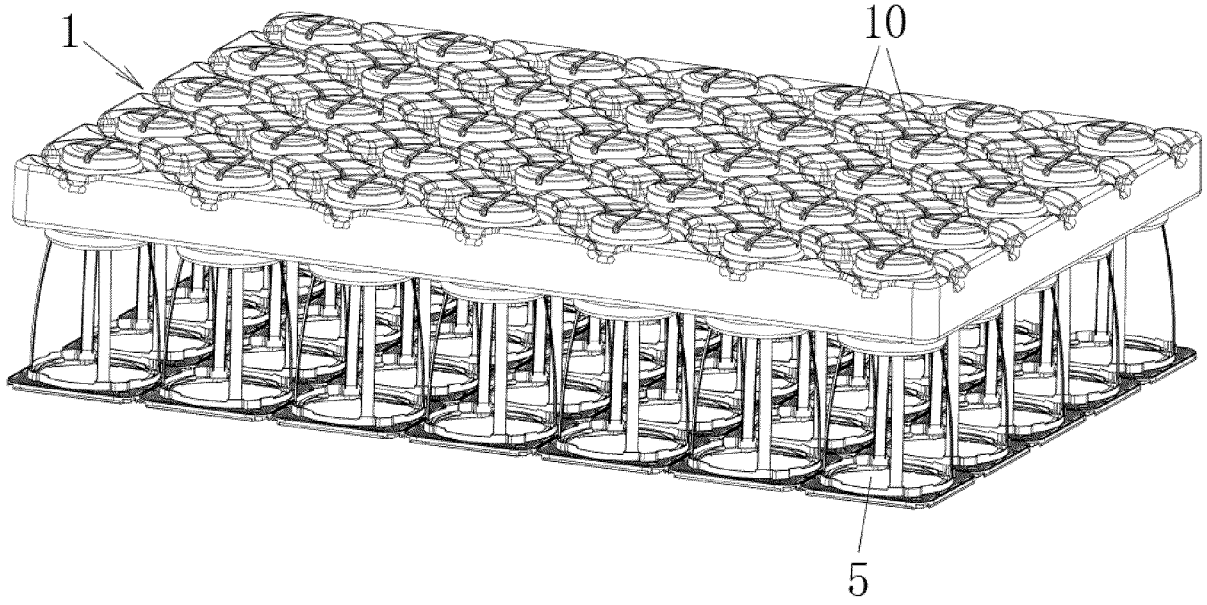


Fig. 6

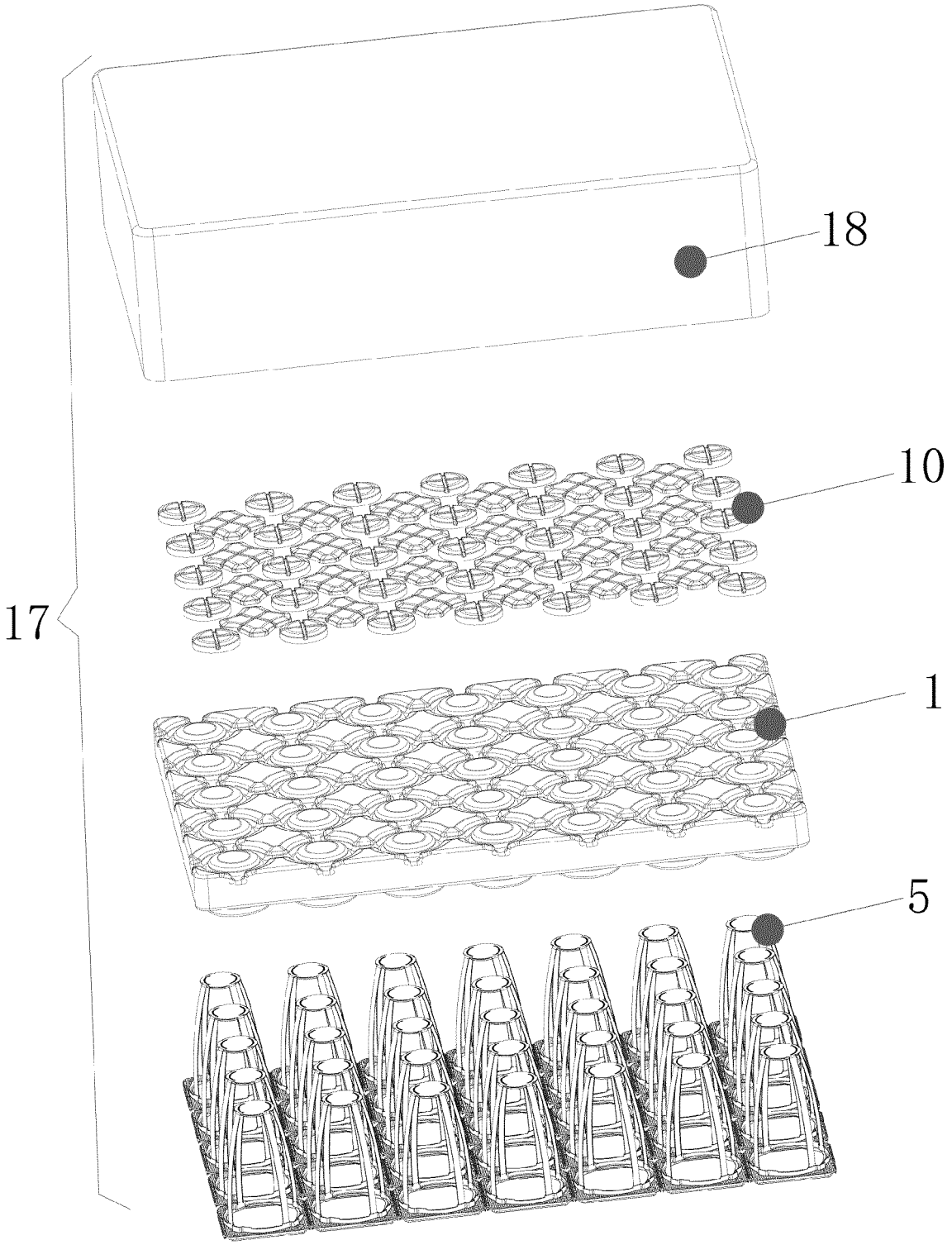


Fig. 7

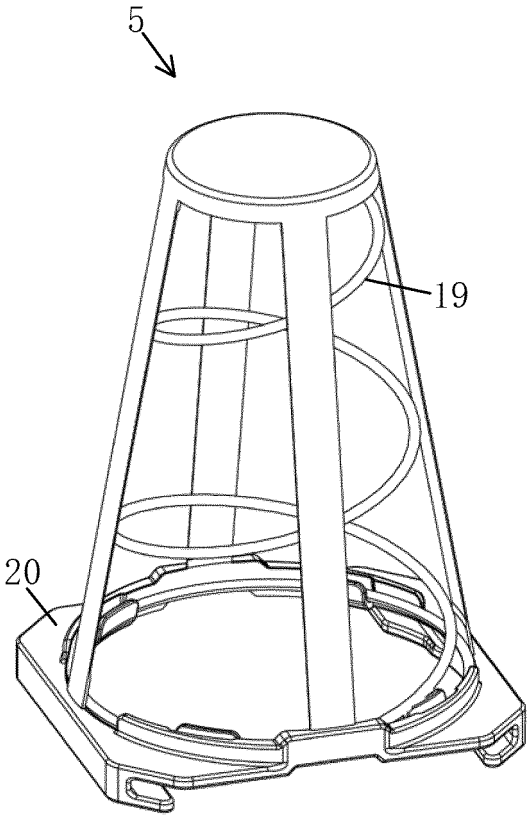


Fig. 8

## INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2022/110293**

**A. CLASSIFICATION OF SUBJECT MATTER**

A47C 27/05(2006.01)i; A47C 27/22(2006.01)i

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)

A47C

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)

WPI, EPODOC, CNPAT, CNKI: 出气, 容纳, 弹簧, 透气, 弹性, 床垫, 通气, 容置, 排气, vent+, exhaust+, air+, accommodat+, spring, elastic+, mattress

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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| Y | CN 1233444 A (CHEN LI'EN) 03 November 1999 (1999-11-03)<br>description, page 2, paragraphs 2 and 3, and figures 1-6 | 1-16 |
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☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **09 October 2022** | **02 November 2022** |
| Name and mailing address of the ISA/CN<br>**China National Intellectual Property Administration (ISA/CN)**<br>**No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** | Authorized officer |
| Facsimile No. **(86-10)62019451** | Telephone No. |

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/110293

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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**Information on patent family members**

International application No.
**PCT/CN2022/110293**

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Form PCT/ISA/210 (patent family annex) (January 2015)