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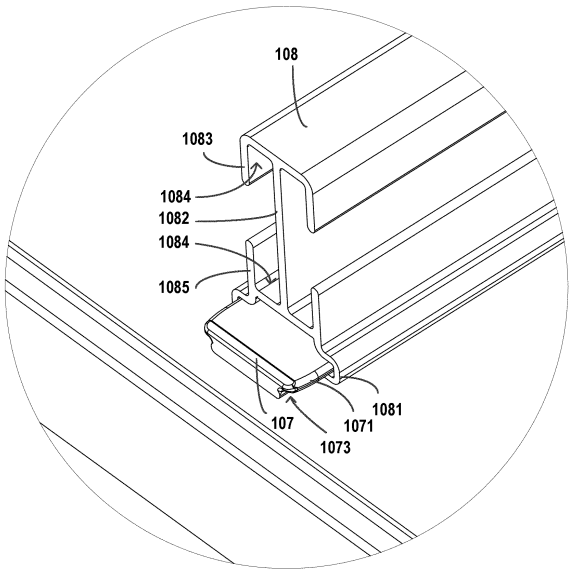
(54) **DETACHABLE ELASTIC PAD, FURNITURE, AND ASSEMBLING METHOD**

(57) The present disclosure provides a detachable elastic pad, a furniture and an assembling method. Wherein, the detachable elastic pad includes a flexible cover and a plurality of elastic modules. The top surface of the flexible cover bottom layer of the flexible cover is provided thereon with a plurality of rail beams; the plurality of elastic modules can be mounted on the flexible cover bottom layer within the receiving space and arranged in an array, each of which includes a conical spring and a spring bracket for receiving and holding the conical spring. The flexible cover is configured to be removable such that the plurality of rail beams on the top surface of the flexible cover bottom layer can be exposed to the outside, to thus allow the plurality of elastic modules to be mounted in place in the flexible cover. The detachable elastic pad provided by the present disclosure is a high-end elastic pad with higher comfort. As compared with the existing elastic pad of the same type, the detachable elastic pad according to the present disclosure further enables a user to assemble and disassemble the detachable elastic pad, and allows the user to replace specifically a partial structure of the elastic pad.



A

FIG 7A

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the furniture field, and specifically to a detachable elastic pad, a furniture comprising the same, and a method for assembling the detachable elastic pad.

BACKGROUND

[0002] Users' demands for household products are changing with the improvement of the life. In particular, demands on mattresses, sofa cushions and the like for users to sit and lie for a long time are increasingly growing and becoming diversified.

[0003] In the current household market, the mattresses are obviously divided into high-end mattresses and low-end mattresses. Low-end mattresses are typically thin in thickness to facilitate transport and storage but cannot fully satisfy the users' demands on comfort. High-end mattresses generally have complicated inner structures, exquisite craftsmanship and large thicknesses, and provide much comfort for users when they are sitting or lying thereon. Because of their complicated internal structures, the high-end mattresses cannot be disassembled, which are typically one-piece mattresses, bringing users much inconvenience in transporting and storing them. In addition, as some components of the high-end mattress have aged, users must discard the whole mattress for there is no way to carry out precise maintenance. This also leads to waste.

[0004] As a result, there arises a need for a detachable elastic pad, a furniture comprising the same, and a method for assembling the detachable elastic pad, to at least partly solve the above-mentioned problem.

SUMMARY

[0005] The main objective of the present disclosure is to provide a detachable elastic pad, a furniture comprising the same, and a method for assembling the detachable elastic pad. The detachable elastic pad provided by the present disclosure is a high-end elastic pad with higher comfort. As compared with the existing elastic pad of the same type, the detachable elastic pad according to the present disclosure can allow a user to assemble and disassemble the detachable elastic pad. The following convenience may be provided to users, including: 1. transportation and storage demands in daily life can be satisfied; 2. if a part of the structure of the detachable elastic pad is aged, users may purchase the corresponding fittings and continue to use the elastic pad by replacing the aged part; and 3. according to the needs in use, the users may select corresponding fittings to assemble personalized detachable elastic pads meeting their own needs.

[0006] In an aspect of the present disclosure, there is provided a detachable elastic pad for a user to sit or lie thereon, comprising:

a flexible cover configured to define a closed receiving space and comprising a flexible top layer, a flexible cover bottom layer arranged opposite to the flexible cover top layer, and a flexible side enclosure connected between the flexible cover bottom layer and the flexible top layer, wherein a plurality of rail beams is provided on a surface, of the flexible cover bottom layer, facing the flexible cover top layer; and

a plurality of flexible modules that can be mounted on the rail beams of the flexible cover bottom layer and arranged in an array, wherein each of the elastic modules comprises a compressible conical spring in a height direction of the detachable elastic pad, and a spring bracket for receiving and holding the conical spring,

wherein the flexible cover is configured to be detachable, to expose the plurality of the rail beams on the flexible cover bottom layer to outside, making it possible for the user to mount the plurality elastic modules on the plurality of the rail beams and slide the same along respective rail beams, to thus mount the plurality of elastic modules in place in the flexible cover.

[0007] In an implementation, each of the rail beams on left and right sides is provided with sliding channel structures respectively for engaging the elastic modules on the left and right sides thereof, such that two of the elastic modules on the two sides of the rail beam can slide independently of each other along respective slide channels.

[0008] In an implementation, each of the rail beams comprises:

a support wall extending in a vertical direction from a top of the rail beam to a bottom thereof;

a top engagement portion, the top engagement portion in a middle connected to a top of the support wall, extending respectively from left and right sides of the support wall and bent downwards, to thus form, on the top of the rail beam, two top receiving portions opening downwards;

a bottom engagement portion, the bottom engagement portion in a middle connected to a bottom of the support wall, extending respectively from left and right sides of the support wall and bent upwards, to thus form, on the bottom of the rail beam, two bottom receiving portions opening upwards;

wherein the spring bracket of each of the elastic modules on left and right sides is provided with mating

protrusions respectively configured to engage the top receiving portions and the bottom receiving portions of the rail beam, the mating protrusions respectively protruding upwards from top surfaces on two sides of the top of the spring bracket and protruding downwards from bottom surfaces on two sides of the bottom of the spring bracket.

[0009] In an implementation, each of the rail beams comprises:

a base disposed on the flexible cover bottom layer;

a pair of connection walls extending upwards respectively from left and right sides of the base; and

a pair of end walls extending towards each other from the pair of connection walls, the pair of end walls having a gap therebetween,

wherein the base, respectively with the pair of connection walls and the pair of end walls, defines a pair of receiving portions opening towards each other,

wherein the spring bracket of each of the elastic modules on left and right sides is provided with connection legs, each of the connection legs on a bottom end provided with mating protrusions extending away from each other, the mating protrusions configured to engage a pair of the receiving portions of each of the rail beams.

[0010] In an implementation, a partition wall is provided in the middle of the two connection walls of the base, and a height of the partition wall is less than a height of the connection walls.

[0011] In an implementation, the connection walls on the left and right sides of the base are arranged intermittently in an extension direction of the rail beam, and staggered from each other.

[0012] In an implementation, the flexible bottom layer is detachably provided thereon with a plurality of sets of rail beam mounting parts, and each set of the rail beam mounting parts are spaced apart from one another in an extension direction of the rail beam corresponding thereto.

[0013] In an implementation, each of the rail beam mounting parts is fixed on a top surface of the flexible bottom layer by ultrasonic welding, riveting, or adhering.

[0014] In an implementation, each of the rail beam mounting parts comprises a mounting part protrusion portion located on top thereof, the rail beam mounting part protrusion portion protrudes in a direction perpendicular to the extension direction of the rail beam and parallel to the flexible cover bottom layer, the rail beam on a bottom is provided with a mounting receiving portion corresponding to the rail beam mounting part protrusion portion, and the rail beam mounting part protrusion portion can mate with the mounting receiving portion such that the rail beam can slide relative to the rail beam mounting part along the extension direction thereof and be mounted in place.

[0015] In an implementation, each of the rail beams is directly fixed on a top surface of the flexible cover bottom layer by ultrasonic welding, riveting, or adhering.

[0016] In an implementation, each of the rail beam comprises a plurality of rail beam segments connected sequentially.

[0017] In an implementation, each of the rail beam segments is provided on a front end with a protrusion protruding forwards and provided on a rear end with a groove recessed into the rail beam segment, and the protrusion and the groove of the rail beam segments adjacent are mated with each other to connect the rail beam segments adjacent together.

[0018] In an implementation, an outer contour of each of the elastic modules is of a truncated conical shape, the detachable elastic pad further comprises an elastic balance net removably disposed in the receiving space, the elastic balance net is opened with a plurality of openings, and a size of each of the openings is consistent with an outer diameter of the elastic module at a predetermined height such that the elastic balance net can sheathe the plurality of the elastic modules respectively into the openings to associate all the elastic modules.

[0019] In an implementation, the size of each of the openings is consistent with an outer diameter on a top of the elastic module.

[0020] In an implementation, the detachable elastic pad further comprises a removable elastic cushion layer that is disposed within the receiving space and located between the flexible cover top layer and a top of the plurality of the elastic modules.

[0021] In an implementation, the elastic cushion layer and the elastic balance net are both formed from sponge, the flexible cover is a cloth cover, and the flexible cover is provided thereon with fasteners extending along a periphery of the flexible cover top layer and/or a periphery of the flexible cover bottom layer.

[0022] In an implementation, a spring in each of the elastic modules is in a pre-compressed state within the spring bracket.

[0023] In an implementation, the flexible cover is provided thereon with fasteners extending along a periphery of the flexible cover top layer and a periphery of the flexible cover bottom layer, and all of the elastic cushion layer, the flexible cover top layer, and the flexible cover side enclosure can be rolled up for storage.

[0024] In an implementation, the plurality of rail beams is formed from flexible plastic, to allow the flexible cover bottom layer integrated with the plurality of rail beams to be rolled up for storage in a plane perpendicular to the extension direction of the rail beam.

[0025] In an implementation, each of the elastic modules is configured as a truncated conical structure having a lower opening and a hollow interior, the plurality of elas-

tic modules is configured to allow the user to remove the respective elastic modules from the rail beams and sequentially sheathe and stack the respective elastic modules along a height direction of the elastic modules, and in a sheathed and stacked state, a lower elastic module in the elastic modules adjacent is inserted into an upper elastic module via a lower opening of the upper elastic module.

[0026] According to a second aspect of the present disclosure, there is provided a furniture, where the furniture comprises the detachable elastic pad according to any one of the implementations of the solution as described above.

[0027] According to a third aspect of the present disclosure, there is provided a method for assembling a detachable elastic pad according to any one of the implementations of the solution as described above, the method comprising:

obtaining a flexible cover comprising a flexible cover bottom layer;

obtaining a plurality of elastic modules;

obtaining an elastic balance net;

obtaining an elastic cushion layer, and

performing assembling in a use site following steps of:

mounting slidably the plurality of elastic modules to correct positions via rail beams disposed on the flexible cover bottom layer;

sheathing all the elastic modules into the elastic balance net;

placing the elastic cushion layer over all the elastic modules;

closing the flexible cover to seal the plurality of elastic modules, the elastic balance net, and the elastic cushion layer.

[0028] In an implementation, steps of obtaining the flexible cover comprising the flexible cover bottom layer, obtaining the plurality of elastic modules, obtaining the elastic balance net, and obtaining the elastic cushion layer can be implemented respectively at different times and different places.

[0029] In an implementation, the step of obtaining the flexible cover comprises: selecting a corresponding flexible cover according to user's needs for a color, a material and a pattern;

the step of obtaining the plurality of elastic modules comprises: selecting corresponding elastic modules according to user's needs for an elasticity and a flexibility of the detachable elastic pad;

the step of obtaining the elastic balance net comprises: selecting a corresponding elastic balance net according to an elasticity and a flexibility as required; and

the step of obtaining the elastic cushion layer comprises: selecting a corresponding elastic cushion layer according to an elasticity and a flexibility as required.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Reference may be made to the preferred implementations as shown in the drawings for better understanding on the above and other objectives, features, advantages, and functions of the present disclosure. The same reference symbols refer to the same components throughout the drawings. It is to be understood by those skilled in the art that the drawings are merely provided to illustrate preferred implementations of the present disclosure, without suggesting any limitation to the protection scope of the present disclosure, and respective components therein are not necessarily drawn to scale.

Fig. 1 is a three-dimensional view of a detachable elastic pad in an assembled state according to an implementation of the present disclosure;

Fig. 2 is an exploded, three-dimensional view of the detachable elastic pad in Fig. 1;

Fig. 3 is a schematic diagram of mounting a plurality of elastic modules in Fig. 2 on a flexible cover bottom layer;

Fig. 4 is a schematic diagram of mounting rail beams on a flexible cover bottom layer according to an implementation

Fig. 5A are multiple views of a rail beam mounting part in Fig. 4;

Figs. 5B and 5C are schematic diagrams of engaging further two rail beam mounting parts with the flexible cover bottom layer;

Fig. 6 is a schematic diagram after rail beams are mounted in place;

Fig. 7A is a local enlarged view of a Part A in Fig. 6;

Fig. 7B is a schematic diagram illustrating an end of the structure in Fig. 7A;

Fig. 8 is a schematic diagram of mounting a plurality

of elastic modules on a flexible cover bottom layer, where a pair of adjacent elastic modules located on left and right sides of a rail beam are enlarged;

Fig. 9 is a local enlarged view of a Part B in Fig. 8;

Fig. 10 is a schematic diagram when rail beams are mounted in place on the flexible cover bottom layer, according to an implementation;

Figs. 11A and 11B respectively illustrate two possible forms of an end of any one of the rail beams in Fig. 10;

Fig. 12 is a schematic diagram of mounting a plurality of elastic modules on a flexible cover bottom layer, according to the implementation, where a pair of adjacent elastic modules respectively located on left and right sides of a rail beams are enlarged;

Fig. 13 is a local enlarged view of a Part C in Fig. 12;

Fig. 14 is a schematic diagram when rail beams are mounted on a flexible cover bottom layer, according to an implementation;

Fig. 15 is a front view and a top view of a pair of rail beam segments of a rail beam;

Fig. 16 is a schematic diagram when a plurality of elastic modules is mounted on the rail beams as shown in Fig. 14;

Fig. 17 is a local enlarged view of a Part D in Fig. 16;

Figs. 18 and 19 are schematic diagrams of disassembling and storing the detachable elastic pad in Fig. 1;

Fig. 20 is a three-dimensional view of a detachable elastic pad in an assembled state according to an implementation of the present disclosure; and

Fig. 21 is an exploded, three-dimensional view of the detachable elastic pad in Fig. 20.

DETAILED DESCRIPTION OF EMBODIMENTS

[0031] Reference now will be made to the drawings to describe in detail implementations of the present disclosure. What will be described herein will only cover preferred implementations of the present disclosure, and those skilled in the art would envision other possible manners which also fall into the scope described herein, based on the preferred implementations described herein.

[0032] According to the present disclosure, there are provided a detachable elastic module for a household product, a furniture comprising the same, and a method for assembling the detachable elastic module. The elastic pad may be, for example, a mattress, a sofa cushion or other pad for a user to sit or lie thereon. Figs. 1-21 illustrate some preferred implementations according to the present disclosure.

[0033] It is worth noting that directional and positional terms as mentioned here are to be read with reference to the implementations as shown in Figs. 1-21. The directional and positional terms used here all indicate relative directions and positions among respective components, rather than absolute directions and positions.

[0034] Referring to Fig. 1, the elastic pad according to a preferred implementation of the present disclosure is of a cuboid structure, and the "longitudinal direction," the "transverse direction," and the "height direction" as will be described later will be understood with reference to the cuboid structure as shown in Fig. 1. For example, respective rail beams in various implementations of the present disclosure extend in the transverse direction and spaced apart from one another in the longitudinal direction. "Left and right sides" of a certain component refers to two sides of the component in the transverse direction.

[0035] With reference to the exploded view of the elastic pad 100 as shown in Fig. 2, the elastic pad 100 includes a flexible cover 110, a plurality of elastic modules 106, an elastic balance net 104, and an elastic cushion layer 103. The flexible cover 100 can define a closed receiving space, and includes a flexible cover top layer 102, a flexible cover bottom layer 105, and a flexible cover side enclosure 109 connected between the flexible cover bottom layer 105 and the flexible cover top layer 102. Referring to Figs. 2 and 3, the plurality of elastic modules 106 can be mounted on the flexible cover bottom layer 105 within the receiving space and arranged in an array, and are configured in a compressed state between the flexible cover top layer 102 and the flexible cover bottom layer 105.

[0036] Returning to Fig. 1, the flexible cover 110 is configured as being detachable. For example, by means of a fastener 101 extending in the extension direction of the flexible cover side enclosure 109, the flexible cover 110 is separated, to enable a user to mount the elastic modules 106, the elastic balance net 104 and the elastic cushion layer 103 within the flexible cover 110, and take/put them out of/back into the flexible cover 110.

[0037] The elastic modules 106 are slid and mounted in place via rail beams 108 on the flexible cover bottom layer 105, where each rail beam 108 extends in the transverse direction. Figs. 4-9 provide a specific implementation.

[0038] Referring to Fig. 4, each rail beam 108 is detachably mounted on the flexible cover bottom layer 105 via a set of rail beam mounting parts 107, and each set of rail beam mounting parts 107 are spaced apart from one another along the extension direction of the respective real beam 108. Each set of rail beam mounting parts 107 include three rail beam mounting parts 107 that are

respectively disposed at two ends and in the middle of the rail beam 108.

[0039] The structure of each rail beam mounting part 107 is shown in Fig. 5A. Each rail beam mounting part 107 is provided with a mounting part protrusion portion located on top thereof and protruding in a direction perpendicular to an extension direction of the rail beam 108 and parallel to the flexible cover bottom layer 105, and a recess portion 1073 recessed in the longitudinal direction is formed below the protrusion portion. In other words, each rail beam 108 includes an upper structure 1071 and a lower structure 1072, and the dimension of the upper structure 1071 in the longitudinal direction is greater than the dimension of the lower structure 1072 in the longitudinal direction such that the two longitudinal ends of the upper structure 1071 form mounting part protrusion portions relative to the lower structure 1072. The mounting part protrusion portions and the recess portions 1073 therebelow are used to cooperate with the rail beam 108.

[0040] Continuing with Fig. 5A, the bottom of the mounting part protrusion portion is provided with fixed bumps 1074 arranged in an array, where the fixed bumps 1074 are used for ultrasonically welding the mounting part protrusion portion onto the flexible cover bottom layer 105.

[0041] The rail beam 108 mounted in place along the transverse direction relative to the rail beam mounting parts 107 is shown in Figs. 6-7B. Referring to Figs. 6-7B, the bottom of the rail beam 108 is provided with a mounting receiving portion 1081 corresponding to the mounting part protrusion portion, where the mounting receiving portion 108 can slide and be mounted in place along the extension direction thereof relative to the rail beam mounting part 107. The mounting receiving portion 1081 is formed, in fact, with a hook 1086 which is hooked into the recess portion 1073 of the rail beam mounting part 107.

[0042] The body structure of the rail beam 108 (i.e., the structure for mating with the elastic module 106) is also shown in Figs. 7A and 7B. Each rail beam 108 includes a support wall 1082 extending from the top to the bottom of the rail beam 108, a top engagement portion 1083, and a bottom engagement portion 1085. The top engagement portion 1083 is connected at the top of the support wall 1082 and bent downwardly towards the left and right sides of the support wall 1082, such that two top receiving portions 1084 respectively opening downwards are formed on the top of the rail beam 108; the bottom engagement portion 1085 is connected to the bottom of the support wall 1082 and bent upwardly towards the left and right sides of the support wall 1082, such that two bottom receiving portions 1084 respectively opening upwards are formed at the bottom of the rail beam 108.

[0043] Correspondingly, referring to Figs. 8 and 9, each elastic module 106 includes a conical spring and a spring bracket 106 for receiving and holding the conical spring; the spring bracket 106 on both of the left and right sides is provided with mating protrusions 1061 that protrude upwards from the top surface of the bottom body of the spring bracket 106 while protruding downwards from the bottom surface of the bottom body of the spring bracket 106 to cause the mating protrusions 1061 to be simultaneously received by the top receiving portions 1084 and the bottom receiving portions 1084 of the rail beams 108 on the left and right sides of the elastic module 106. In other words, each rail beam 108 on both of the left and right sides is provided with structures respectively for engaging elastic modules 106 on the left and right side thereof, and the two elastic modules 106 on both sides of the rail beam 108 are slidable independently of each other on the respective slide rails.

[0044] Figs. 5B and 5C illustrate examples of other implementations in lieu of ultrasonic welding. Referring to Fig. 5B, the rail beam mounting part may be adhered onto the flexible cover bottom layer 105 via an adhesive, and may similarly include an upper structure 1071 formed with a recess portion 1073, and a lower structure 1072. Referring to Fig. 5C, the rail beam mounting part 107 is riveted onto the flexible cover bottom layer 105 via a rivet 1075, and the rail beam mounting part 107 may also be provided thereon with a mounting part protrusion portion and a recess portion.

[0045] Figs. 11A-13 show a further alternative implementation. In the implementation, the spring bracket of each elastic module 125 on both of the left and right sides is provided with mating protrusions 1251, and the mating protrusions 1251 protrudes upward from the top surface of the body of the spring bracket while protruding downwards from the bottom surface of the body of the spring bracket, to thus cause the mating protrusions 1251 to be simultaneously received by the top and bottom receiving portions 1212 (each is formed with a receiving groove 123 as shown in Figs. 11A and 11B) of the rail beams 121 on the left and right sides of the elastic module. Each rail beam 121 on the left and right sides is provided with structures respectively for engaging the elastic modules 125 on the left and right sides thereof, and causing the two elastic modules on the two sides of the rail beam 121 to slide independently of each other on the respective slide rails thereof.

[0046] However, unlike the case in the previous implementation, the rail beam in the present implementation is directly fixed onto the flexible cover bottom layer 122 by ultrasonic welding (as shown in Fig. 11A), adhesion, or riveting via a rivet 124 (as shown in Fig. 11B). In the present implementation, rail beam mounting parts are omitted.

[0047] Figs. 14-17 show a still further implementation. Referring first to Fig. 15, each rail beam includes a plurality of rail beam segments, where the respective beam segments are sequentially connected in the longitudinal direction. Each rail beam segment is provided on the front end with a forward protrusion and provided on the rear end with a forwardly recessed groove, and the protrusion and the groove of adjacent rail beam segments mate with each other to connect the adjacent rail beam segments

together. For example, for the adjacent rail beams shown in Fig. 15, the protrusion 1312a of the preceding segment of the first rail beam 1312 can extend into the forwardly recessed groove 1311a on the rear end of the second rail beam 1312.

[0048] Referring to Fig. 17, each rail beam includes: a base 131; a pair of connection walls respectively extending upwards from the left and right sides of the base 131; and a pair of end walls extending towards each other from the pair of connection walls. Each pair of end walls have a gap therebetween, where the base 131, respectively together with the pair of connection walls and the pair of end walls, defines a pair of receiving portions 1313 openings towards each other, in which each receiving portion 131 is formed with a receiving groove 1314. Correspondingly, the spring bracket of each elastic module on left and right sides is provided with: connection legs extending downwards; mating protrusions 1321 extending towards each other from the connection legs on the left and right sides of the spring bracket. The receiving grooves 1314 of the pair of receiving portions 1313 of each rail beam can respectively engage the respective mating protrusions 1321 of the elastic modules on the left and right sides of the rail beam. Preferably, a partition wall 1315 is disposed in the middle of the two connection walls of the base 131, and a height of the partition wall is less than a height of the connection walls.

[0049] Referring further to Fig. 14, the connection wall on the left side of the base 131 is disposed intermittently in the longitudinal direction, the connection wall on the right side of the base 131 is disposed intermittently in the longitudinal direction, and the connection walls on the left and right sides of the base 131 are staggered in the transverse direction.

[0050] The detachable elastic pad according to the present implementation enables a user to disassemble and store it by himself/herself. Figs. 18 and 19 are schematic diagrams of the disassembling and storage process.

[0051] Specifically, the elastic cushion layer 103, the flexible cover top layer 102, and the flexible cover side enclosure 109 can all be rolled up for storage. Still further, the rail beam or rail beam mounting part, as described above, is formed from flexible plastic, such that the flexible cover bottom layer 105 integrated with a plurality of rail beams can be rolled in a plane perpendicular to the extension direction of the rail beam for storage, and after roll-up and storage, the softer rail beam would not puncture the bottom layer of the flexible cover. It would be appreciated that the rail beam and the rail beam mounting part have a structure in a certain stable shape, respectively, which are not necessarily rigid in material, and when subjected to a certain external force, the rail beam and the rail mounting part could be deformed to a certain extent.

[0052] Referring to Fig. 18, after the flexible cover 110, the elastic cushion layer 103, the elastic modules 106, and the balance net 104 of the detachable elastic pad are separated from one another, further storage will be performed following steps of: stacking the elastic cushion layer 104 and the balance net 104, and rolling them together for storage to form a first storage roll 120a; separating the flexible cover top layer 102, the flexible cover side enclosure 109, and the flexible cover bottom layer 105 from one another (it would be appreciated that fasteners are provided between the flexible cover top layer 102 and the flexible cover side enclosure 109, and between the flexible cover side enclosure 109 and the flexible cover bottom layer 105), and stacking and then rolling the same for storage to form a second storage roll 120b.

[0053] Each elastic module 106 is configured as a truncated conical structure opened at the lower end and having a hollow interior, and the plurality of elastic modules 106 is configured to allow the user to remove each elastic module 106 from the rail beam, and sequentially sheathe and stack the elastic modules along the height direction thereof for storage to form an elastic module storage set 120c. In the sheathed and stacked state, the lower elastic module 106 in adjacent elastic modules 106 is inserted upwards in the upper elastic modules 106 via the lower opening of the upper elastic module 106.

[0054] The user can place all of the first storage roll 120a, the second storage roll 120b and the elastic module storage set 120c in a storage box 120. The storage box 120 of the corresponding size can be sold or gifted with the detachable elastic pad, to allow a user to disassemble and store the detachable elastic pad at home.

[0055] Fig. 19 provides an example of a further storage method. Referring to Fig. 19, after the flexible cover 110, the elastic cushion layer 103, the elastic modules 106, and the balance net 104 of the detachable elastic pad are separated from one other, further storage may be performed following steps of: stacking the elastic cushion layer 103, the balance net 104 and the flexible cover side enclosure 109 (it would be appreciated that fasteners are provided between the flexible cover top layer 102 and the flexible cover side enclosure 109, and between the flexible cover side enclosure 109 and the flexible cover bottom layer 105) and rolling them up for storage to form a first storage roll 120a; stacking the flexible cover top layer 102 and the flexible cover bottom layer 105, and rolling them up to form a second storage roll 120b.

[0056] Each elastic module 106 is configured as a truncated conical structure opened at the lower end and having a hollow interior, and the plurality of elastic modules 106 are configured to allow the user to remove each elastic module 106 from the rail beam, and sequentially sheathe and stack the elastic modules along the height direction thereof for storage to form an elastic module storage set 120c. In the sheathed and stacked state, the lower elastic module 106 in adjacent elastic modules 106 is inserted upwards in the upper elastic modules 106 via the lower opening of the upper elastic module 106.

[0057] The user can place all of the first storage roll 120a, the second storage roll 120b and the elastic module storage set 120c in a storage box 120.

[0058] The elastic pad in Figs. 20 and 21 is a substitution of the elastic pad 200 in Figs. 1 and 2. As can be seen from Figs. 20 and 21, the fastener 21 is disposed between the flexible cover bottom layer 205 and the flexible cover side enclosure.

[0059] Continuing with Fig. 21, the outer contour of each elastic module is configured in a truncated conical shape; the elastic pad 200 further includes an elastic balance net 204 disposed within the receiving space; the elastic balance net 204 is opened with openings 2041 corresponding to all the elastic modules; the size of the opening 2041 is consistent with the outer diameter of the elastic module at a predetermined height; the elastic balance net 204 allows all the elastic modules to be nested into the respective openings 2041, to associate all the elastic modules. Preferable, as shown in Fig. 21, the size of the opening 2041 is consistent with the outer diameter of the top of the elastic module such that the flexible cover top layer 202, the elastic cushion layer 203, and the elastic balance net 204 can fit sequentially without gaps. The elastic cushion layer 203 and the elastic balance net 204 are both formed from sponge, and the flexible cover is a cloth cover.

[0060] It is worth nothing that various details in the respective implementations, as described above, could be arranged and combined in different manners, and all the resulted technical solutions should be considered as implementations of the present disclosure. For example, in an implementation, the arrangement of the flexible cover, the elastic balance net, and the elastic cushion layer in Figs. 20 and 21 could be applied to the structures as shown in Figs. 1 and 2; in an implementation, the approach of "arranging the rail beams by means of rail beam mounting parts" could be applied to the rail beams as shown in Figs. 16 and 17.

[0061] The present disclosure further provides furniture comprising the elastic pad according to the above implementations. The furniture may be, for example, a sofa, a bed, a sofa bed or the like that allows users to sit or lie thereon.

[0062] In addition, the present disclosure provides a method for assembling the elastic pad according to the above implementations. The method is made clear with reference to the structures as shown in Figs. 1-2 and 20-21. The method includes: obtaining a flexible cover including a flexible cover bottom layer; obtaining a plurality of elastic modules; obtaining an elastic balance net; and obtaining an elastic cushion layer. The method further includes assembling in the following order: slidably mounting a plurality of elastic modules to correct positions on the flexible cover bottom layer via rail beams on the flexible cover bottom layer; sheathing all the elastic modules into the elastic balance net; placing the elastic cushion layer over all the elastic modules; closing the flexible cover to seal the plurality of elastic modules, the elastic balance net, and the elastic cushion layer within the flexible cover.

[0063] Preferably, obtaining the flexible cover including the flexible cover bottom layer, obtaining the plurality of elastic modules, obtaining the elastic balance net, and obtaining the elastic cushion layer can be implemented respectively at different times and locations. For example, if the elastic balance network of the elastic pad is aged, a user could purchase separately an elastic balance net to replace the old one, to make it possible to continue using the elastic pad. The case is the same for the elastic cushion layer, the elastic module, the flexible cover and the like.

[0064] Preferably, the step of obtaining the flexible cover includes: selecting a corresponding flexible cover according to a color, a material, and a pattern of the desired detachable elastic pad. The step of obtaining the plurality of elastic modules includes: selecting corresponding elastic modules according to an elasticity and a flexibility of the desired detachable elastic pad. The step of obtaining the elastic balance net includes: selecting a corresponding elastic balance net according to the desired elasticity and flexibility. The step of obtaining the elastic cushion layer includes: selecting a corresponding elastic cushion layer according to the desired elasticity and flexibility.

[0065] With such arrangement, users can assemble a suitable elastic pad according to their own needs. For example, if a user prefers a soft elastic pad, he/her may purchase separately the highly flexible elastic balance net, elastic cushion layer, elastic modules and the like, to assemble a soft elastic pad as desired; if a user prefers a hard elastic pad, he/her may purchase separately the less flexible elastic balance net, elastic cushion layer, elastic modules and the like, to assembly a hard elastic pad as desired; if a user desired to select a flexible cover formed of a different material (e.g., cloth, silk or the like), he/she may purchase a replacement.

[0066] The detachable elastic pad provided by the present disclosure is a high-end elastic pad with higher comfort. As compared with the existing elastic pad of the same type, the detachable elastic pad according to the present disclosure can allow a user to assemble and disassemble the detachable elastic pad. The following convenience may be provided to users, including: 1. transportation and storage demands in daily life can be satisfied; 2. if a part of the structure of the detachable elastic pad is aged, users may purchase the corresponding fittings and continue to use the elastic pad by replacing the aged part; and 3. according to the needs in use, the users may select corresponding fittings to assemble personalized detachable elastic pads meeting their own needs.

[0067] The above description on multiple embodiments of the present disclosure are provided to the ordinary skilled in the related field for the purpose of illustration, without any intention to make the present disclosure exclusive or confine the same to a single embodiment disclosed here. As aforementioned, the ordinary skilled in the art would understand that multiple replacements and variations of the present disclosure are also applicable. Therefore, although some alternative embodi-

ments are described here in detail, the ordinary skilled in the art would envision or develop easily other embodiments. The present disclosure is intended to cover all the replacements, modifications and variations of the present disclosure, and other embodiments falling into the spirits and scope described here.

Claims

1. A detachable elastic pad for a user to sit or lie thereon, comprising:

   a flexible cover configured to define a closed receiving space and comprising a flexible top layer, a flexible cover bottom layer arranged opposite to the flexible cover top layer, and a flexible side enclosure connected between the flexible cover bottom layer and the flexible top layer, wherein a plurality of rail beams is provided on a surface, of the flexible cover bottom layer, facing the flexible cover top layer; and
   a plurality of flexible modules that can be mounted on the rail beams of the flexible cover bottom layer and arranged in an array, wherein each of the elastic modules comprises a compressible conical spring in a height direction of the detachable elastic pad, and a spring bracket for receiving and holding the conical spring,
   wherein the flexible cover is configured to be detachable, to expose the plurality of the rail beams on the flexible cover bottom layer to outside, making it possible for the user to mount the plurality elastic modules on the plurality of the rail beams and slide the same along respective rail beams, to thus mount the plurality of elastic modules in place in the flexible cover.

2. The detachable elastic pad of claim 1, **characterized in that** each of the rail beams on left and right sides is provided with sliding channel structures respectively for engaging the elastic modules on the left and right sides thereof, such that two of the elastic modules on the two sides of the rail beam can slide independently of each other along respective slide channels.

3. The detachable elastic pad of claim 2, **characterized in that** each of the rail beams comprises:

   a support wall extending in a vertical direction from a top of the rail beam to a bottom thereof;
   a top engagement portion, the top engagement portion in a middle connected to a top of the support wall, extending respectively from left and right sides of the support wall and bent downwards, to thus form, on the top of the rail beam, two top receiving portions opening downwards;
   a bottom engagement portion, the bottom engagement portion in a middle connected to a bottom of the support wall, extending respectively from left and right sides of the support wall and bent upwards, to thus form, on the bottom of the rail beam, two bottom receiving portions opening upwards;
   wherein the spring bracket of each of the elastic modules on left and right sides is provided with mating protrusions respectively configured to engage the top receiving portions and the bottom receiving portions of the rail beam, the mating protrusions respectively protruding upwards from top surfaces on two sides of the top of the spring bracket and protruding downwards from bottom surfaces on two sides of the bottom of the spring bracket.

4. The detachable elastic pad of claim 2, **characterized in that** each of the rail beams comprises:

   a base disposed on the flexible cover bottom layer;
   a pair of connection walls extending upwards respectively from left and right sides of the base; and
   a pair of end walls extending towards each other from the pair of connection walls, the pair of end walls having a gap therebetween,
   wherein the base, respectively with the pair of connection walls and the pair of end walls, defines a pair of receiving portions opening towards each other,
   wherein the spring bracket of each of the elastic modules on left and right sides is provided with connection legs, each of the connection legs on a bottom end provided with mating protrusions extending away from each other, the mating protrusions configured to engage a pair of the receiving portions of each of the rail beams.

5. The detachable elastic pad of claim 4, **characterized in that** a partition wall is provided in the middle of the two connection walls of the base, and a height of the partition wall is less than a height of the connection walls.

6. The detachable elastic pad of claim 4, **characterized in that** the connection walls on the left and right sides of the base are arranged intermittently in an extension direction of the rail beam, and staggered from each other.

7. The detachable elastic pad of any one of claims 1-4, **characterized in that** the flexible bottom layer is detachably provided thereon with a plurality of sets of rail beam mounting parts, and each set of the rail

beam mounting parts are spaced apart from one another in an extension direction of the rail beam corresponding thereto.

8. The detachable elastic pad of claim 7, **characterized in that** each of the rail beam mounting parts is fixed on a top surface of the flexible bottom layer by ultrasonic welding, riveting, or adhering.

9. The detachable elastic pad of claim 7, **characterized in that** each of the rail beam mounting parts comprises a mounting part protrusion portion located on top thereof, the rail beam mounting part protrusion portion protrudes in a direction perpendicular to the extension direction of the rail beam and parallel to the flexible cover bottom layer, the rail beam on a bottom is provided with a mounting receiving portion corresponding to the rail beam mounting part protrusion portion, and the rail beam mounting part protrusion portion can mate with the mounting receiving portion such that the rail beam can slide relative to the rail beam mounting part along the extension direction thereof and be mounted in place.

10. The detachable elastic pad of any one of claims 1-4, **characterized in that** each of the rail beams is directly fixed on a top surface of the flexible cover bottom layer by ultrasonic welding, riveting, or adhering.

11. The detachable elastic pad of any one of claims 1-4, **characterized in that** each of the rail beam comprises a plurality of rail beam segments connected sequentially.

12. The detachable elastic pad of claim 11, **characterized in that** each of the rail beam segments is provided on a front end with a protrusion protruding forwards and provided on a rear end with a groove recessed into the rail beam segment, and the protrusion and the groove of the rail beam segments adjacent are mated with each other to connect the rail beam segments adj acent together.

13. The detachable elastic pad of claim 1, **characterized in that** an outer contour of each of the elastic modules is of a truncated conical shape, the detachable elastic pad further comprises an elastic balance net removably disposed in the receiving space, the elastic balance net is opened with a plurality of openings, and a size of each of the openings is consistent with an outer diameter of the elastic module at a predetermined height such that the elastic balance net can sheathe the plurality of the elastic modules respectively into the openings to associate all the elastic modules.

14. The detachable elastic pad of claim 13, **characterized in that** the size of each of the openings is consistent with an outer diameter on a top of the elastic module.

15. The detachable elastic pad of claim 13, **characterized in that** the detachable elastic pad further comprises a removable elastic cushion layer that is disposed within the receiving space and located between the flexible cover top layer and a top of the plurality of the elastic modules.

16. The detachable elastic pad of claim 15, **characterized in that** the elastic cushion layer and the elastic balance net are both formed from sponge, the flexible cover is a cloth cover, and the flexible cover is provided thereon with fasteners extending along a periphery of the flexible cover top layer and/or a periphery of the flexible cover bottom layer.

17. The detachable elastic pad of claim 1, **characterized in that** a spring in each of the elastic modules is in a pre-compressed state within the spring bracket.

18. The detachable elastic pad of claim 1, **characterized in that** the flexible cover is provided thereon with fasteners extending along a periphery of the flexible cover top layer and a periphery of the flexible cover bottom layer, and all of the elastic cushion layer, the flexible cover top layer, and the flexible cover side enclosure can be rolled up for storage.

19. The detachable elastic pad of claim 18, **characterized in that** the plurality of rail beams is formed from flexible plastic, to allow the flexible cover bottom layer integrated with the plurality of rail beams to be rolled up for storage in a plane perpendicular to the extension direction of the rail beam.

20. The detachable elastic pad of any one of claims 1 and 18-19, **characterized in that** each of the elastic modules is configured as a truncated conical structure having a lower opening and a hollow interior, the plurality of elastic modules is configured to allow the user to remove the respective elastic modules from the rail beams and sequentially sheathe and stack the respective elastic modules along a height direction of the elastic modules, and in a sheathed and stacked state, a lower elastic module in the elastic modules adjacent is inserted into an upper elastic module via a lower opening of the upper elastic module.

21. A furniture, **characterized in that** the furniture comprises the detachable elastic pad of any one of claims 1-20.

22. The furniture of claim 21, **characterized in that** the furniture is a bed, a sofa or a sofa bed.

23. A method for assembling a detachable elastic pad of any one of claims 1-20, the method comprising:

obtaining a flexible cover comprising a flexible cover bottom layer;
obtaining a plurality of elastic modules;
obtaining an elastic balance net;
obtaining an elastic cushion layer, and
performing assembling in a use site following steps of:

mounting slidably the plurality of elastic modules to correct positions via rail beams disposed on the flexible cover bottom layer;
sheathing all the elastic modules into the elastic balance net;
placing the elastic cushion layer over all the elastic modules;
closing the flexible cover to seal the plurality of elastic modules, the elastic balance net, and the elastic cushion layer.

24. The method of claim 23, **characterized in that** steps of obtaining the flexible cover comprising the flexible cover bottom layer, obtaining the plurality of elastic modules, obtaining the elastic balance net, and obtaining the elastic cushion layer can be implemented respectively at different times and different places.

25. The method of claim 23, **characterized in that**:

the step of obtaining the flexible cover comprises: selecting a corresponding flexible cover according to user's needs for a color, a material and a pattern;
the step of obtaining the plurality of elastic modules comprises: selecting corresponding elastic modules according to user's needs for an elasticity and a flexibility of the detachable elastic pad;
the step of obtaining the elastic balance net comprises: selecting a corresponding elastic balance net according to an elasticity and a flexibility as required; and
the step of obtaining the elastic cushion layer comprises: selecting a corresponding elastic cushion layer according to an elasticity and a flexibility as required.

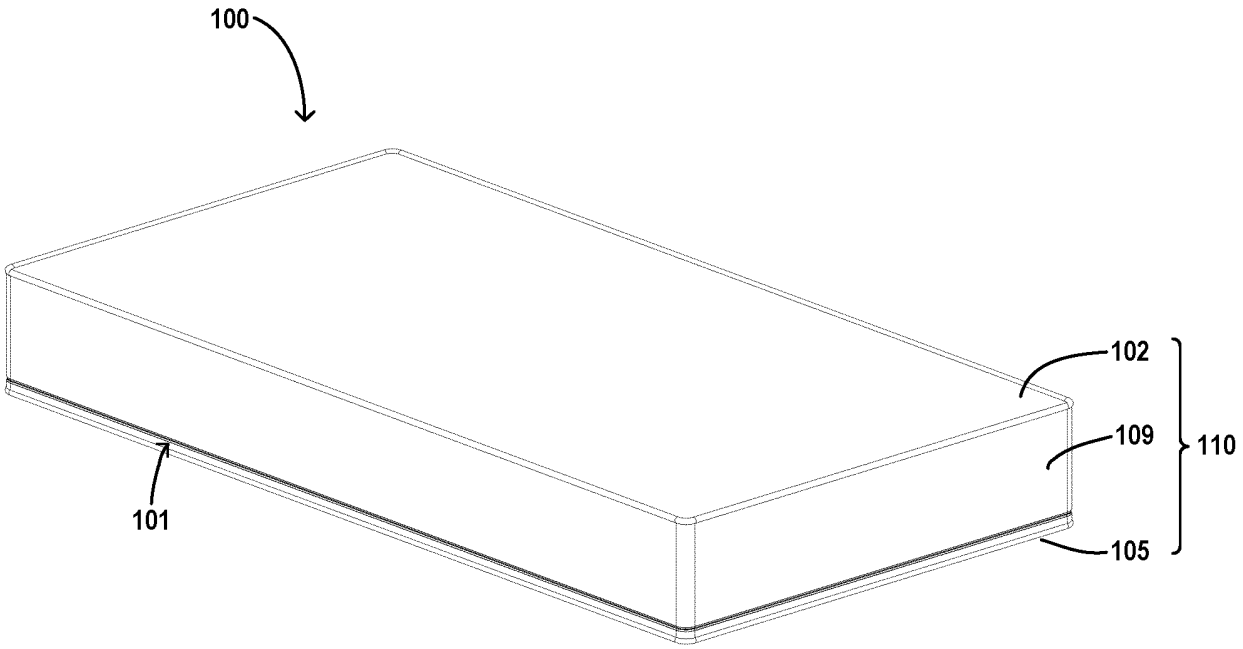


FIG 1

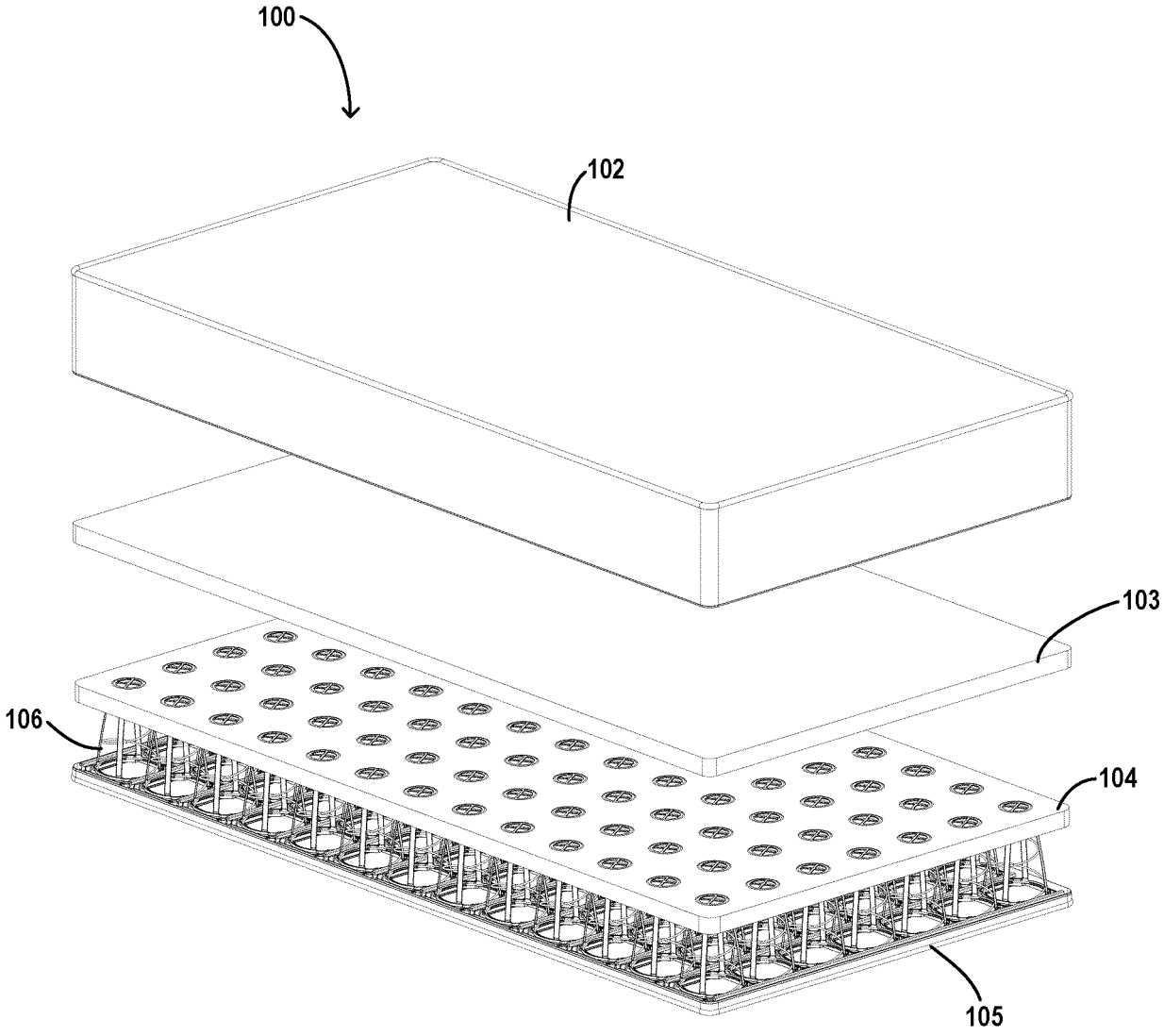


FIG 2

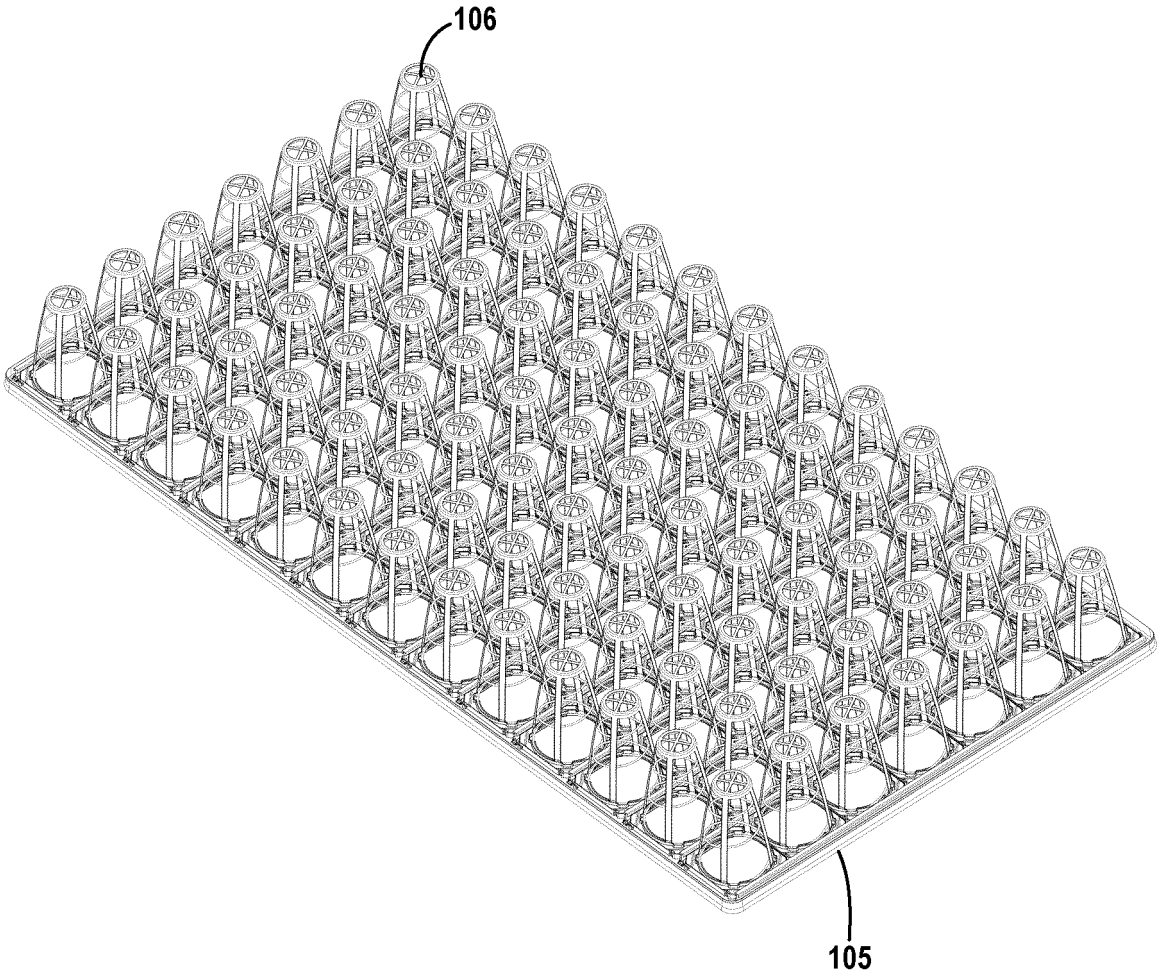


FIG 3

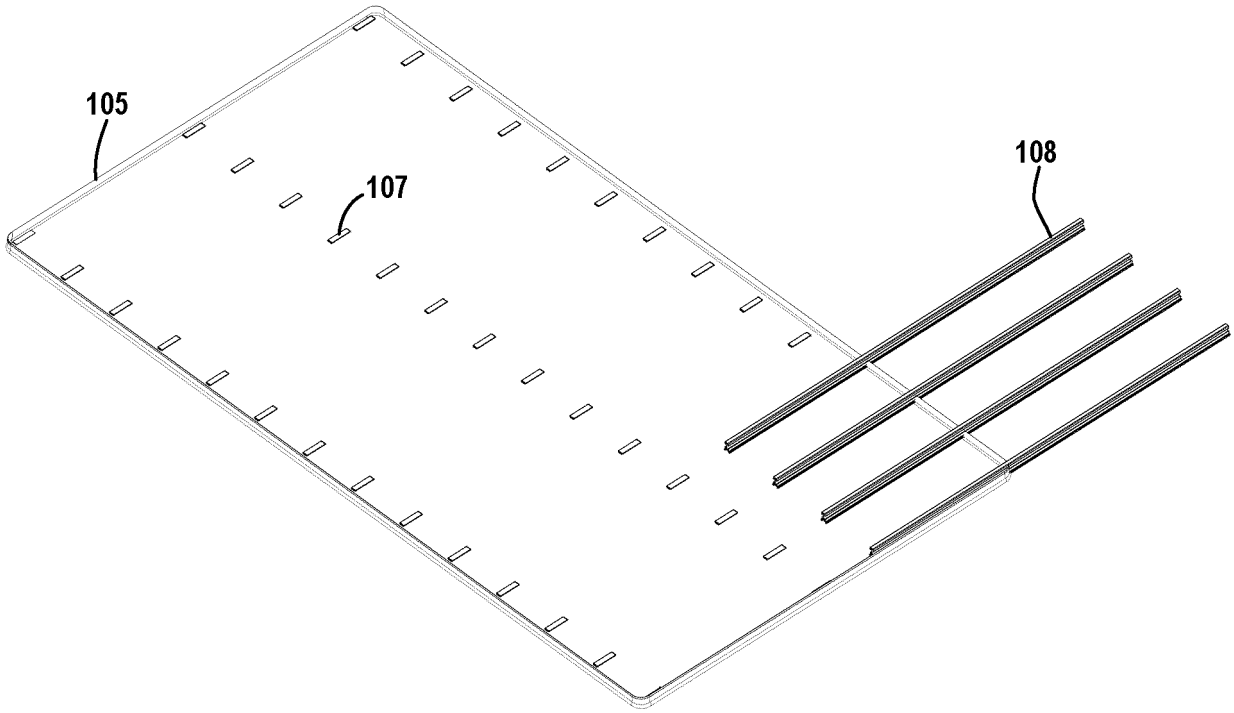


FIG 4

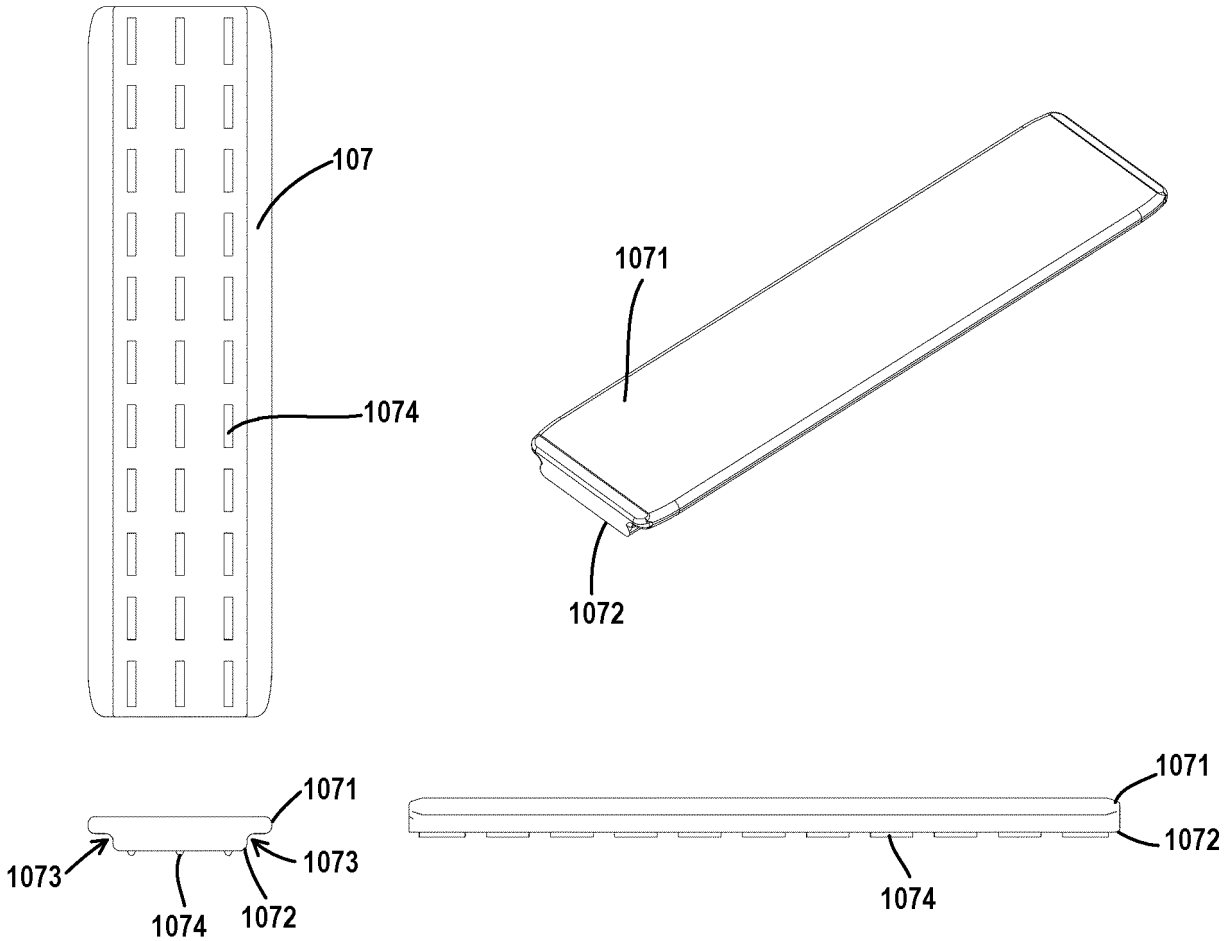


FIG 5A

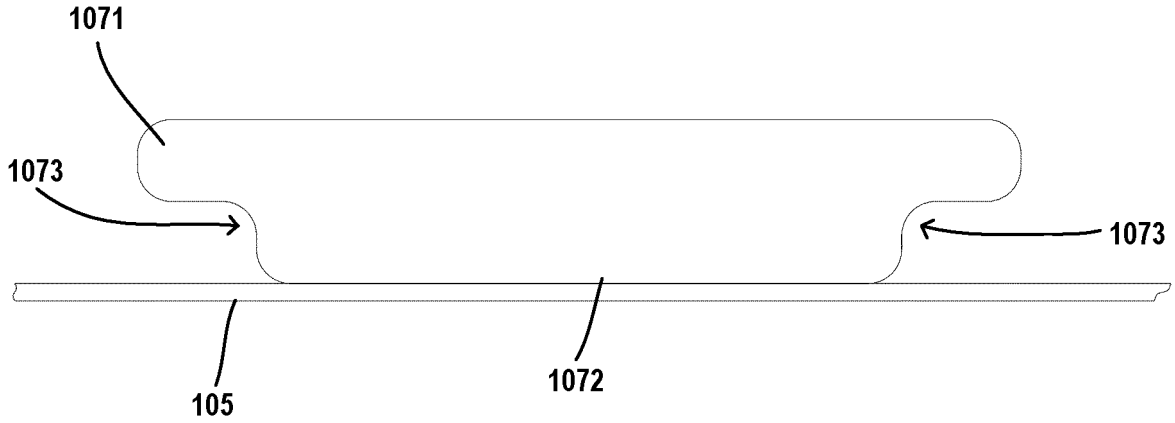


FIG 5B

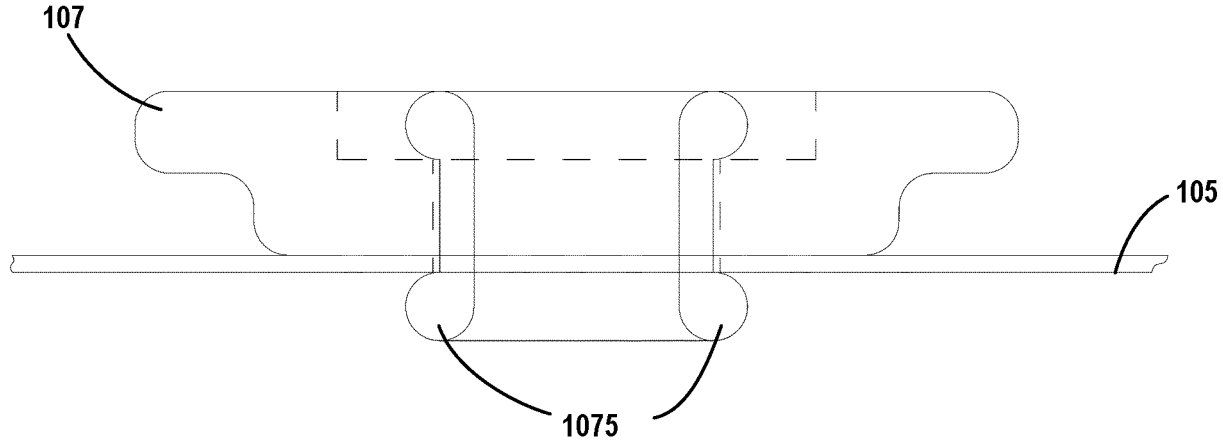


FIG 5C

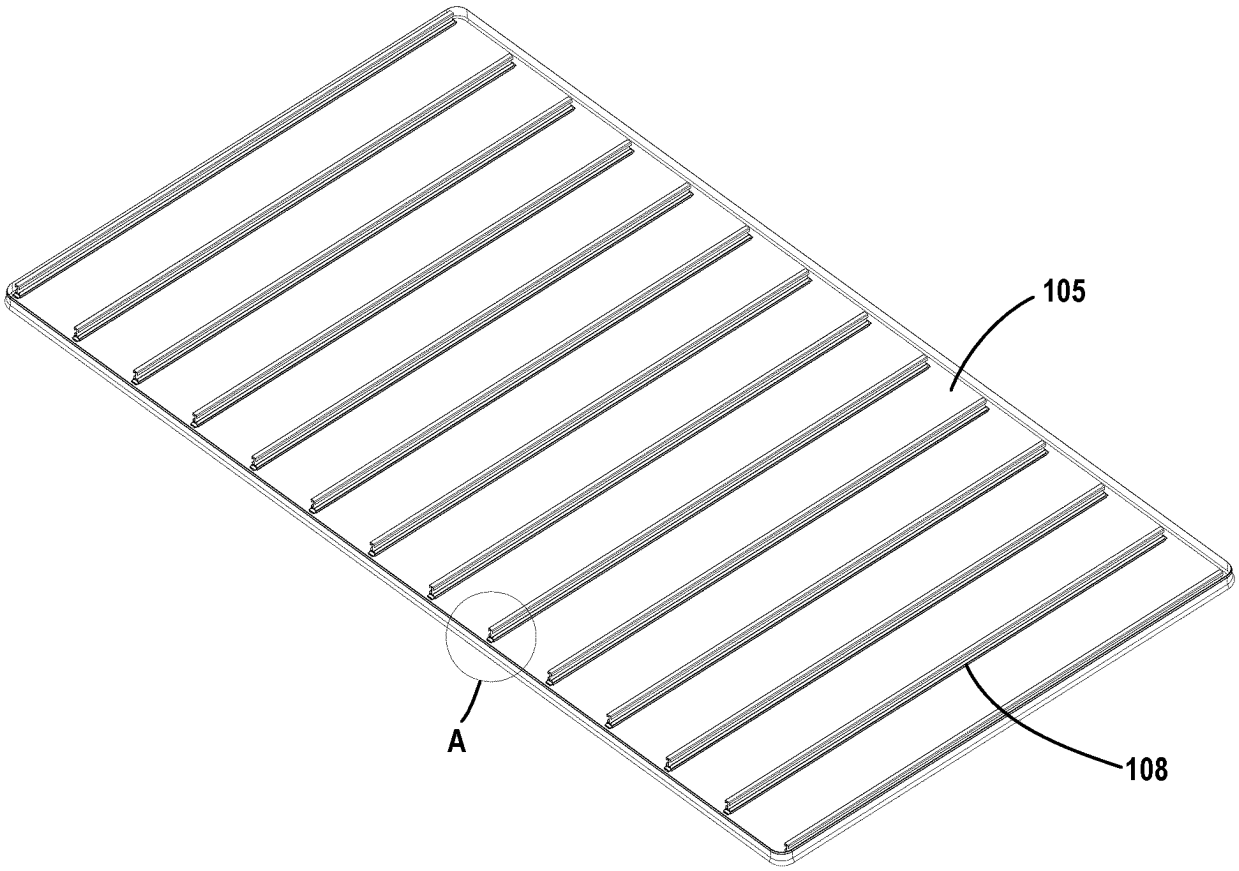
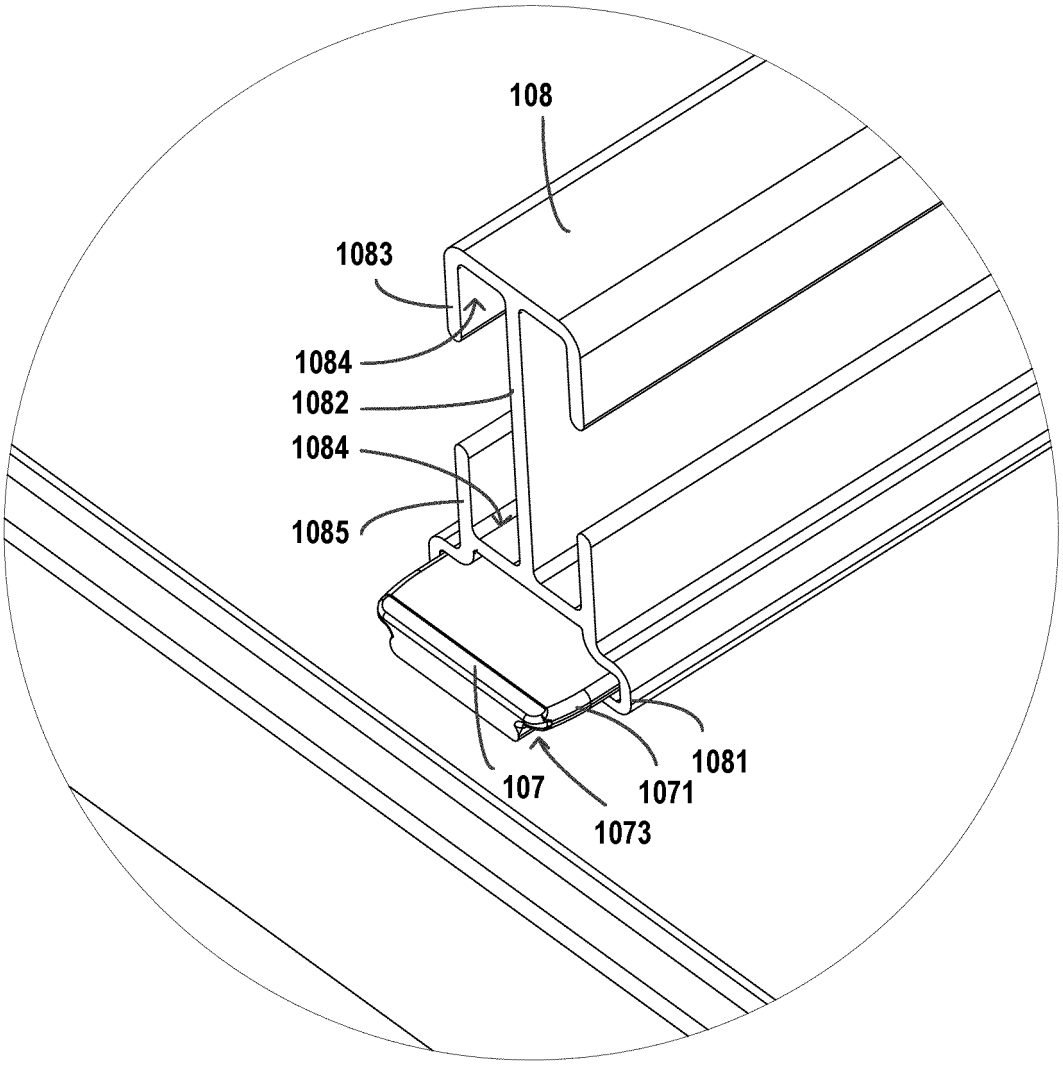


FIG 6



A

FIG 7A

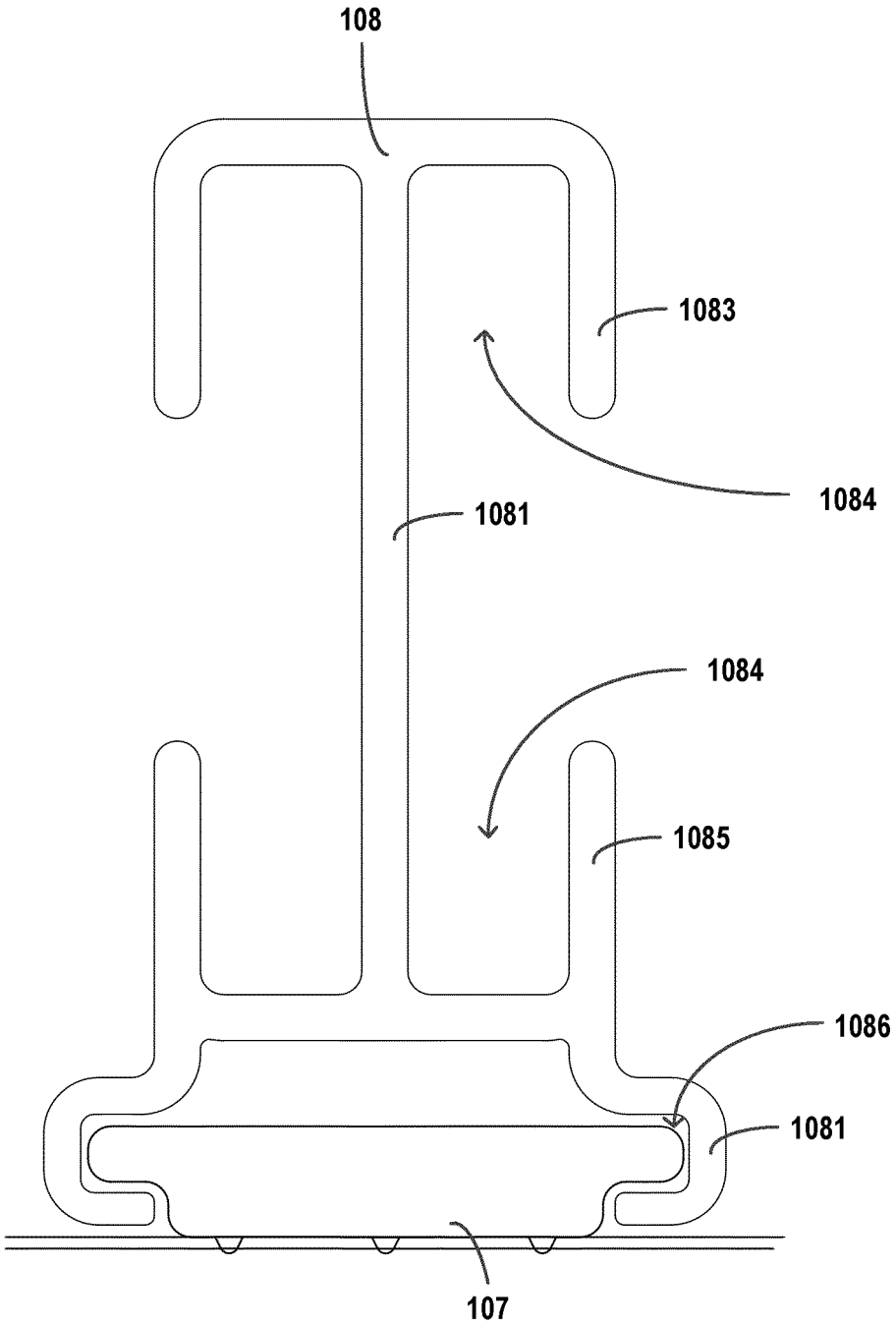


FIG 7B

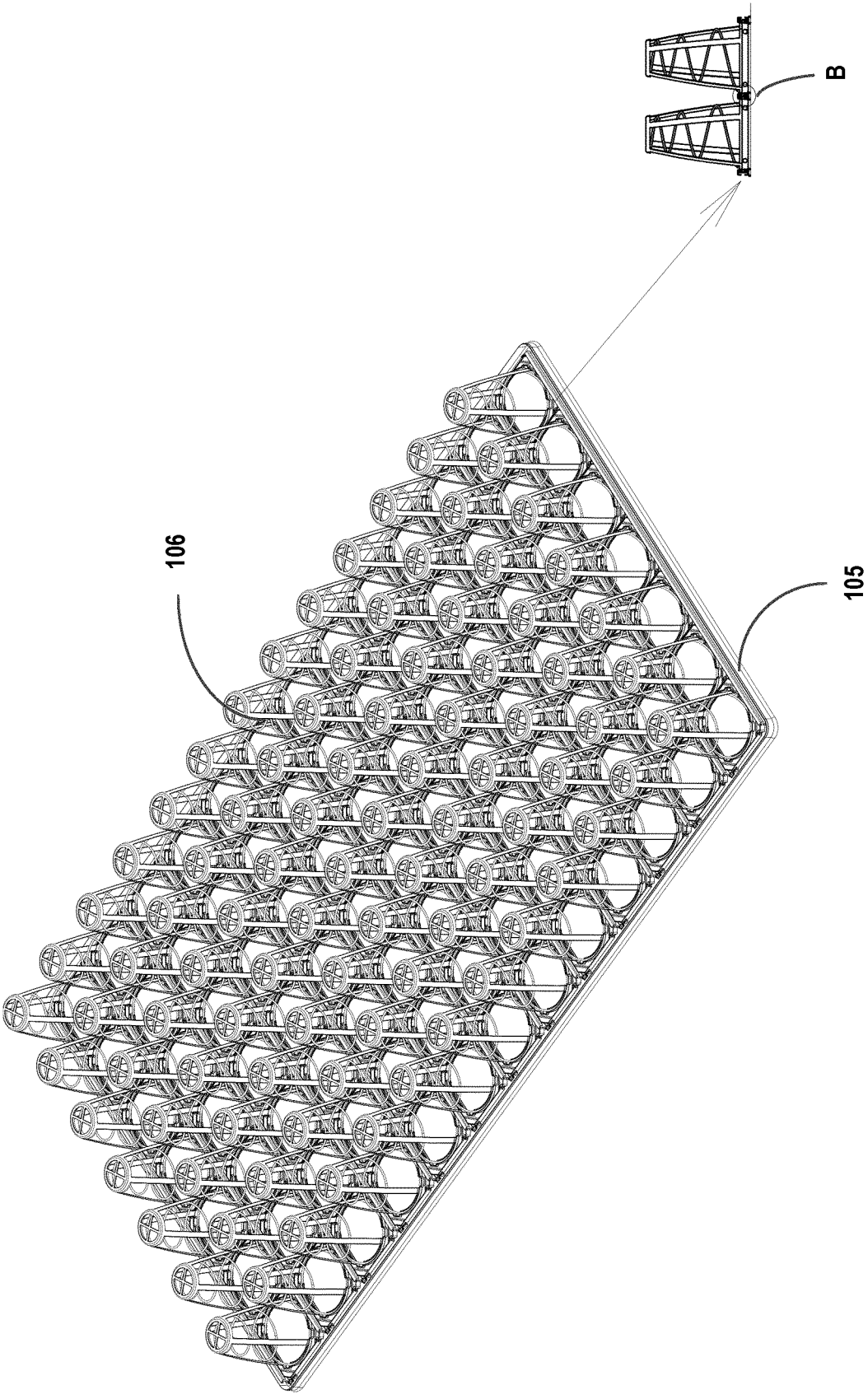
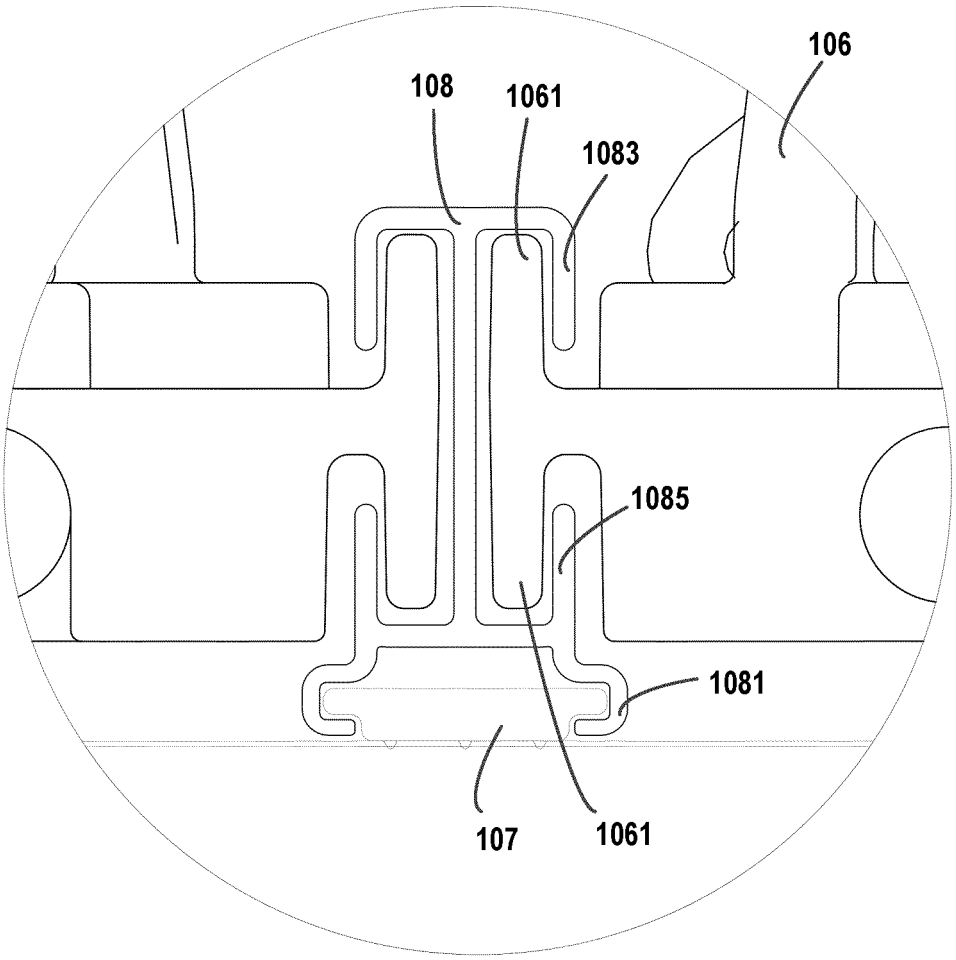


FIG 8



B

FIG 9

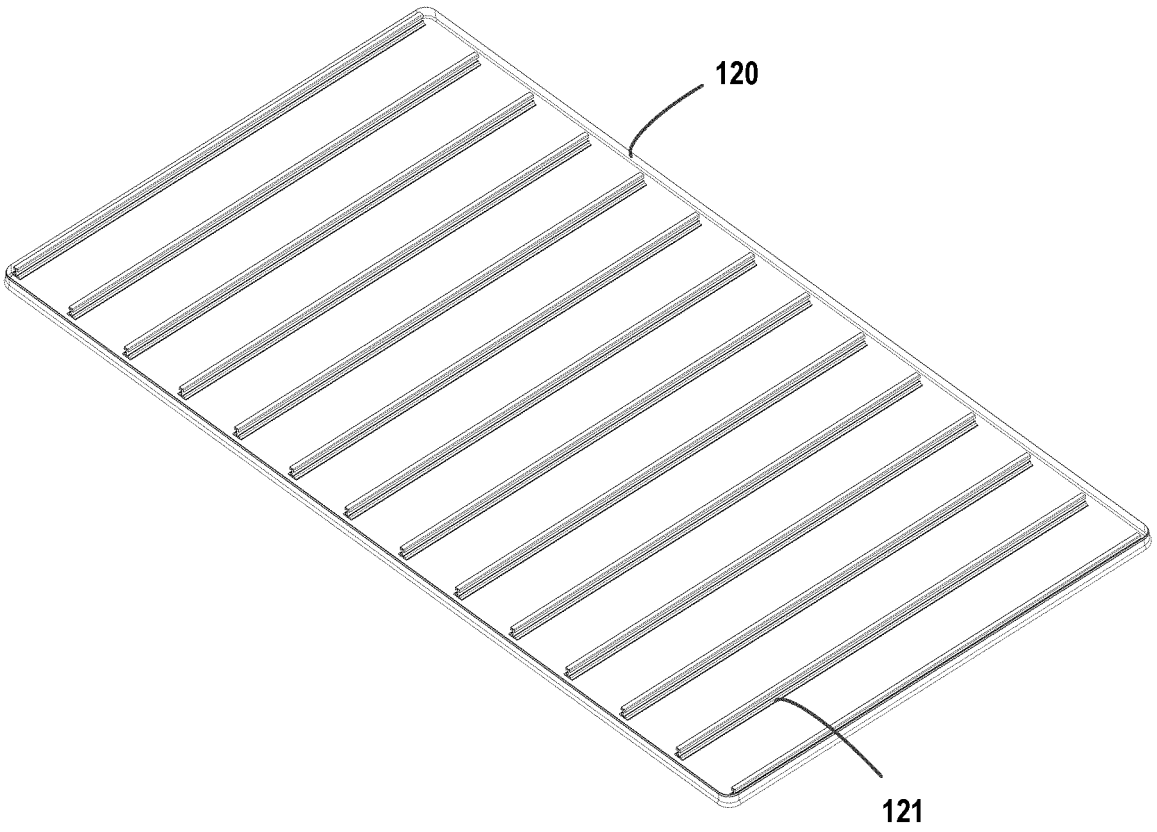


FIG 10

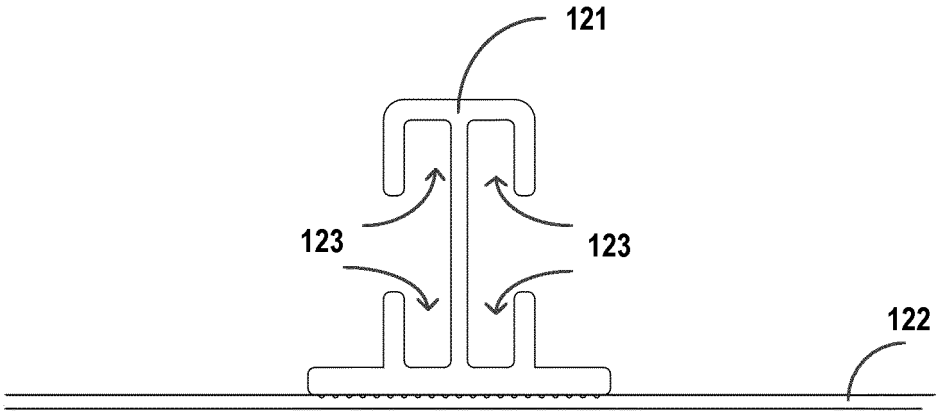


FIG 11A

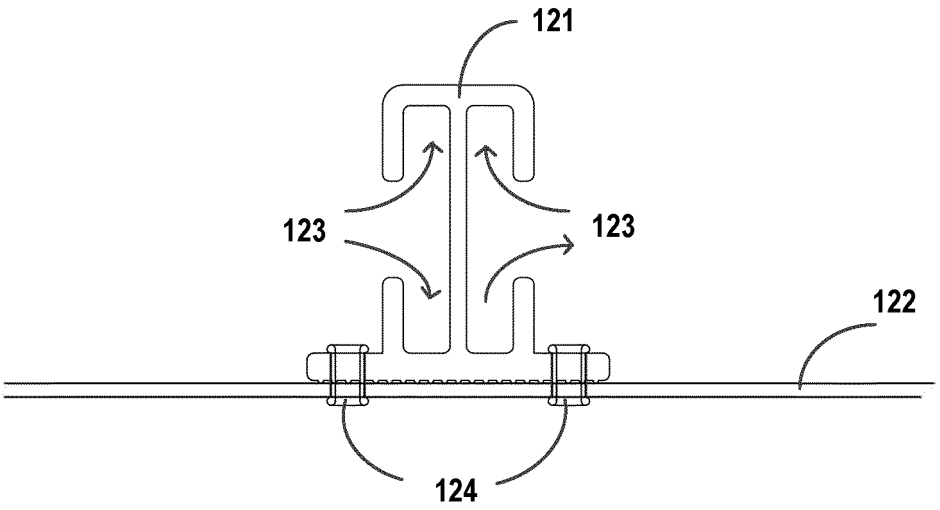


FIG 11B

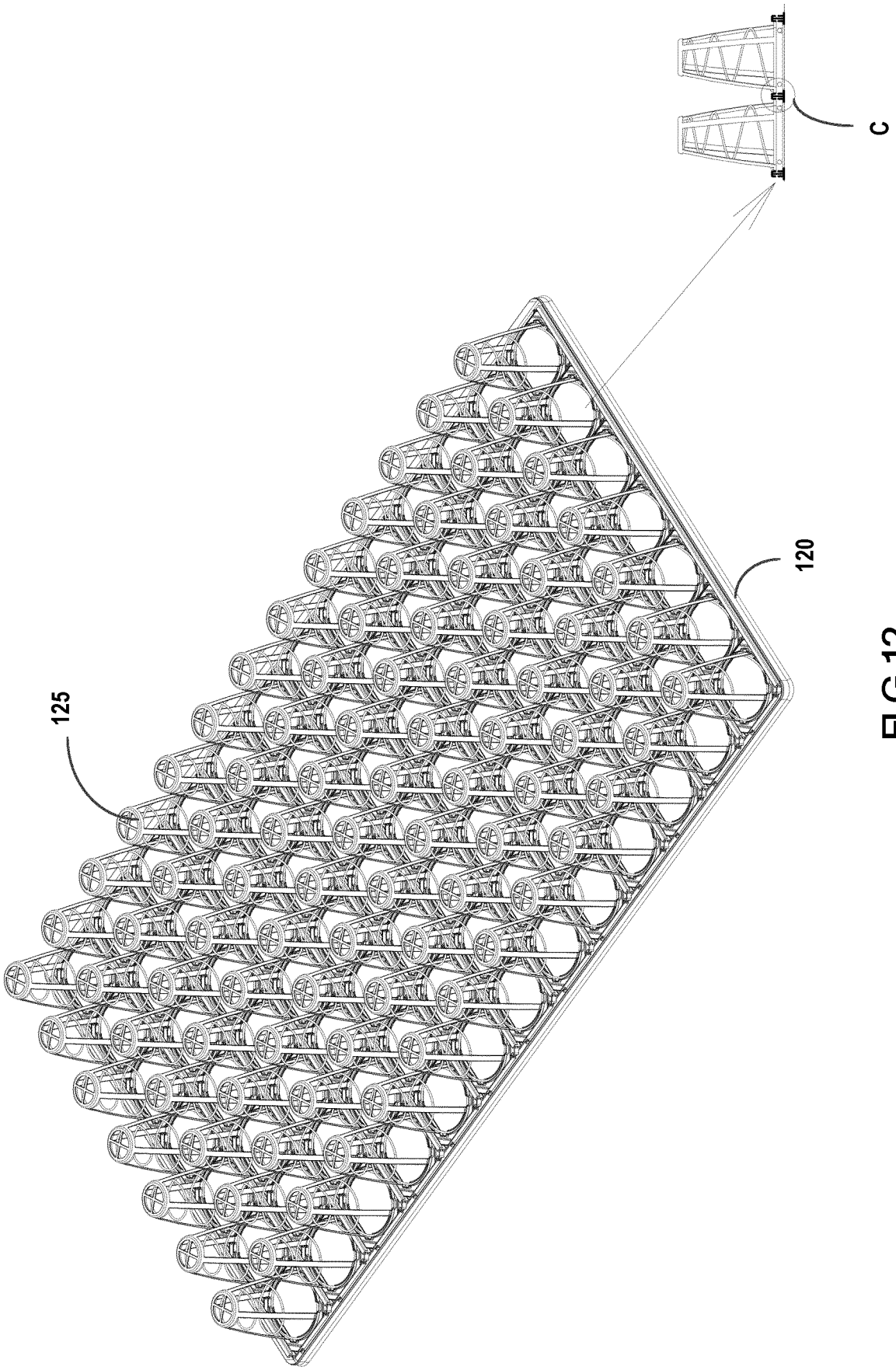


FIG 12

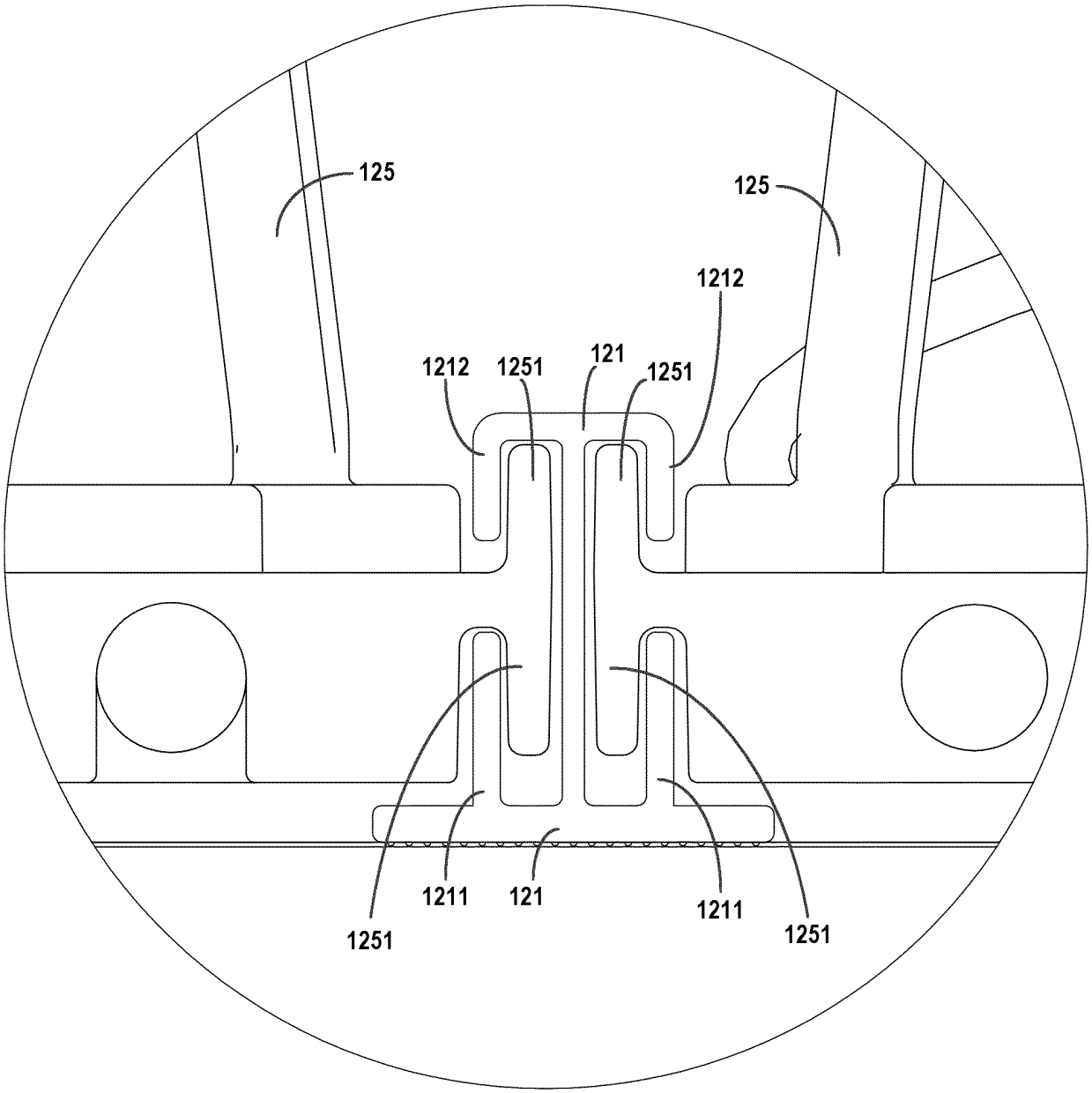


FIG 13

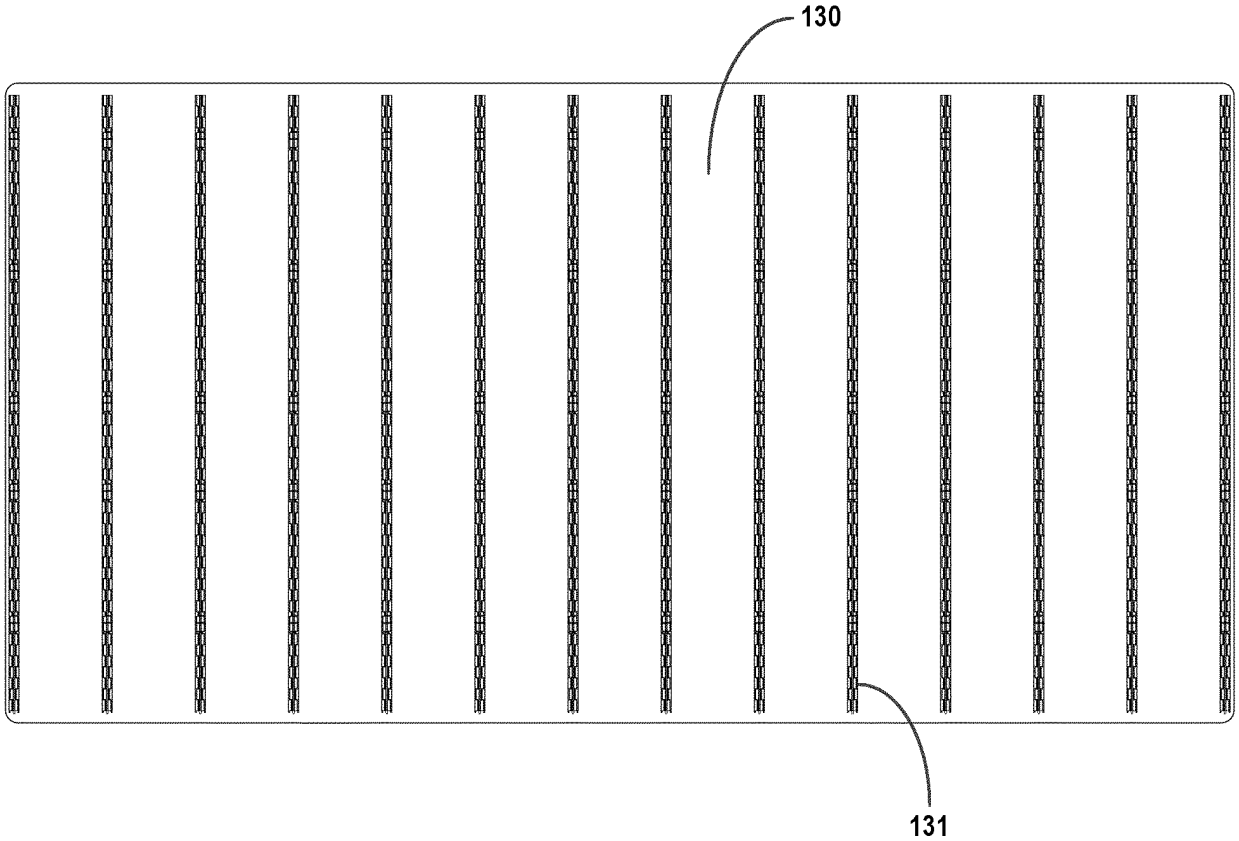


FIG 14

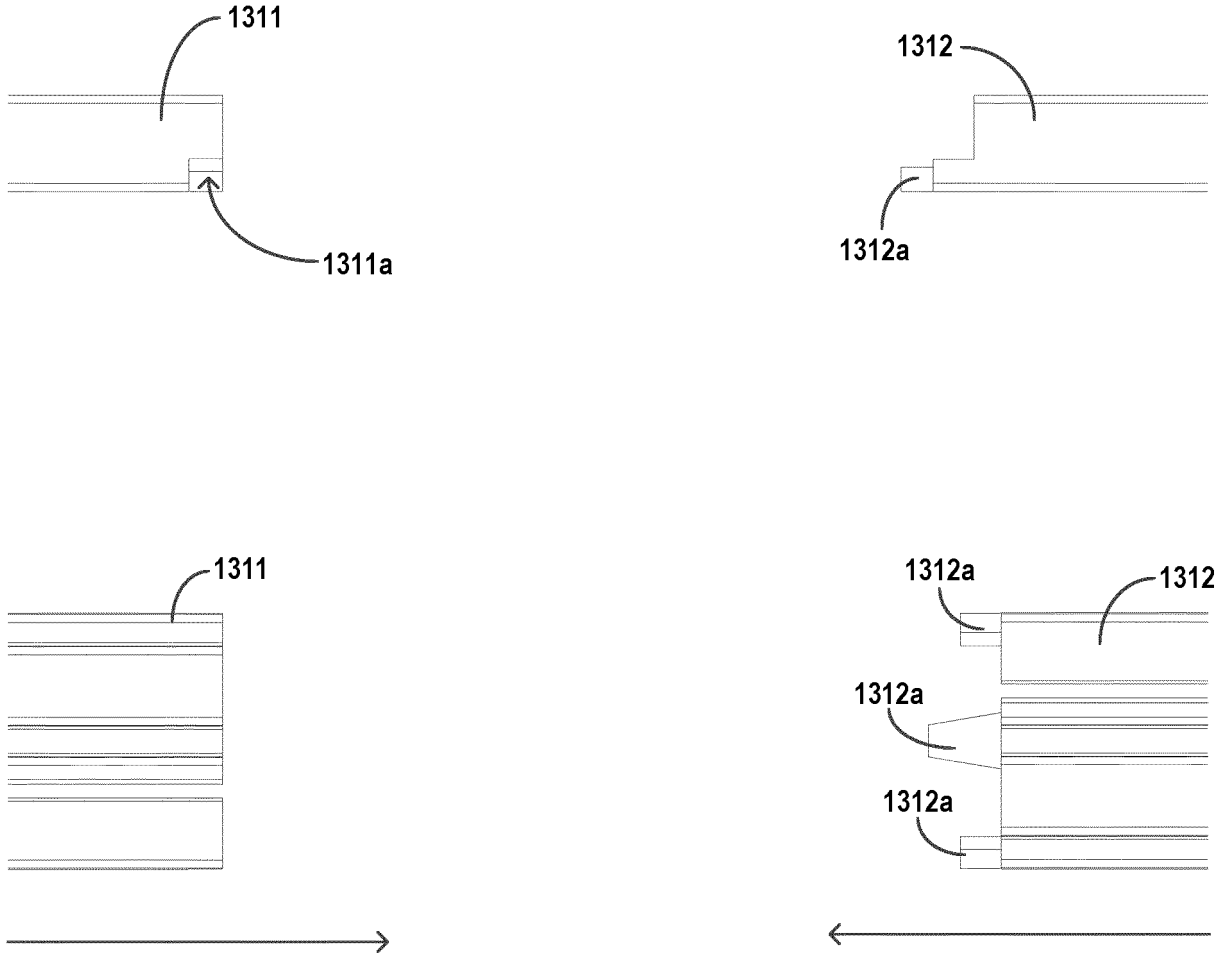


FIG 15

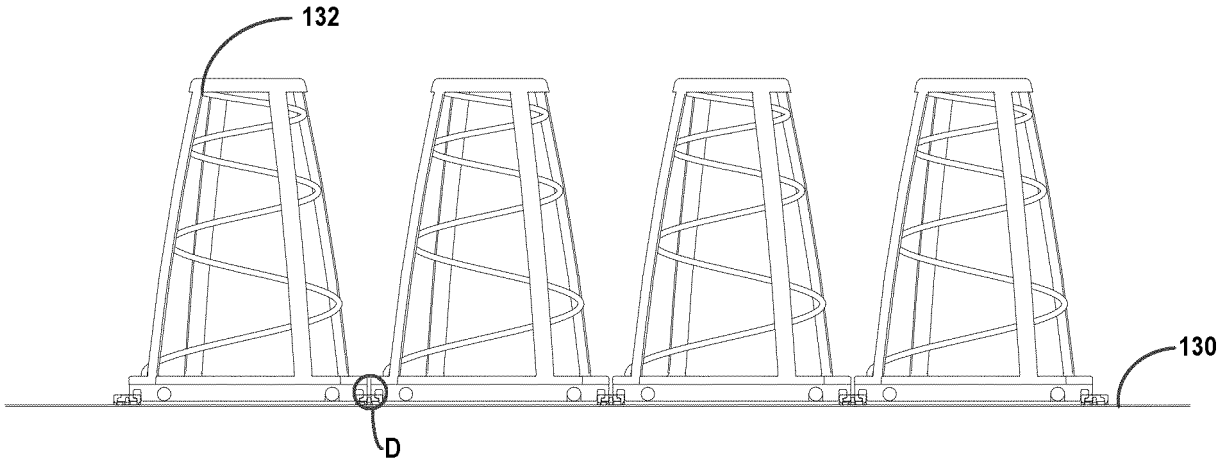
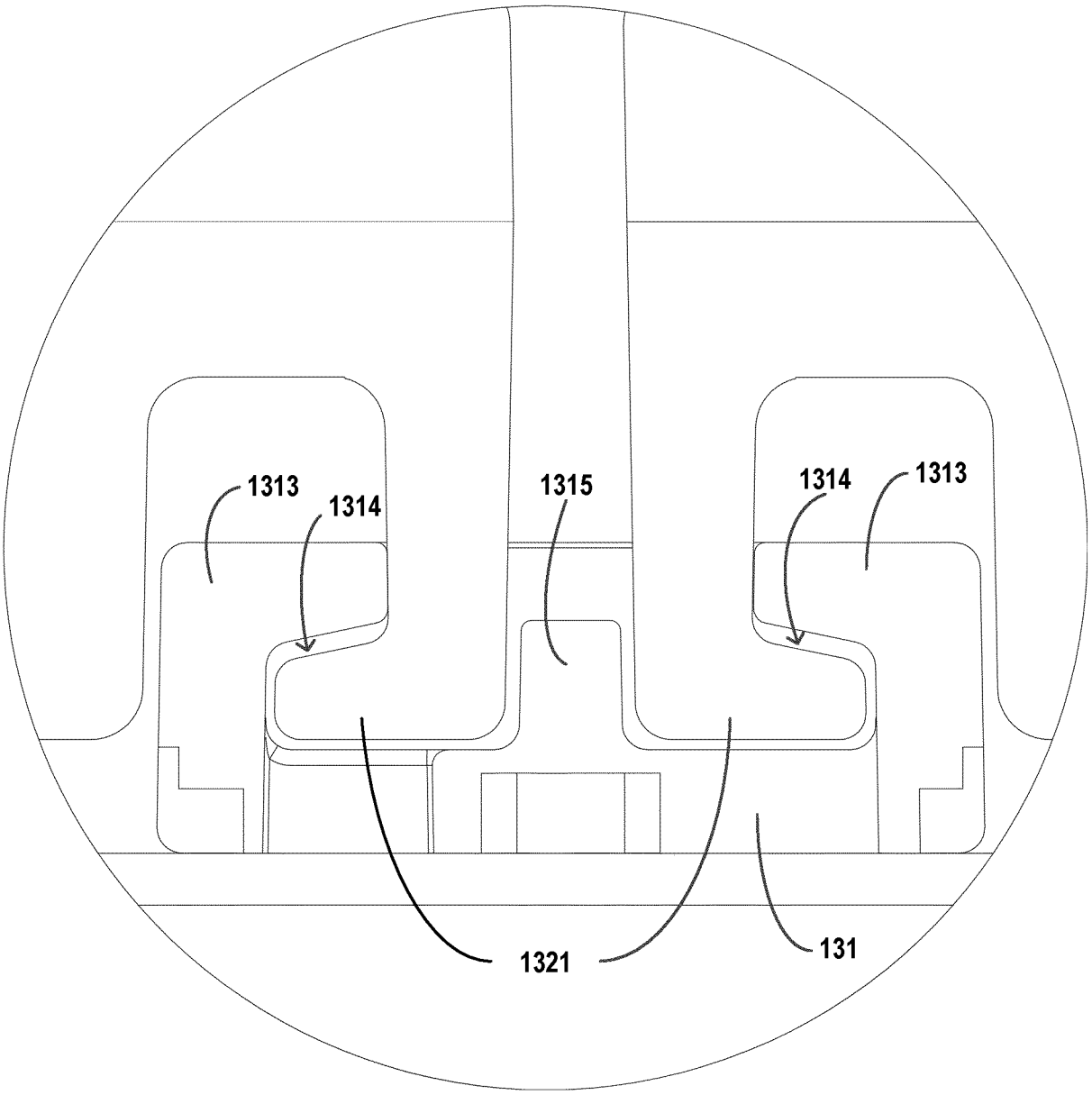


FIG 16



D

FIG 17

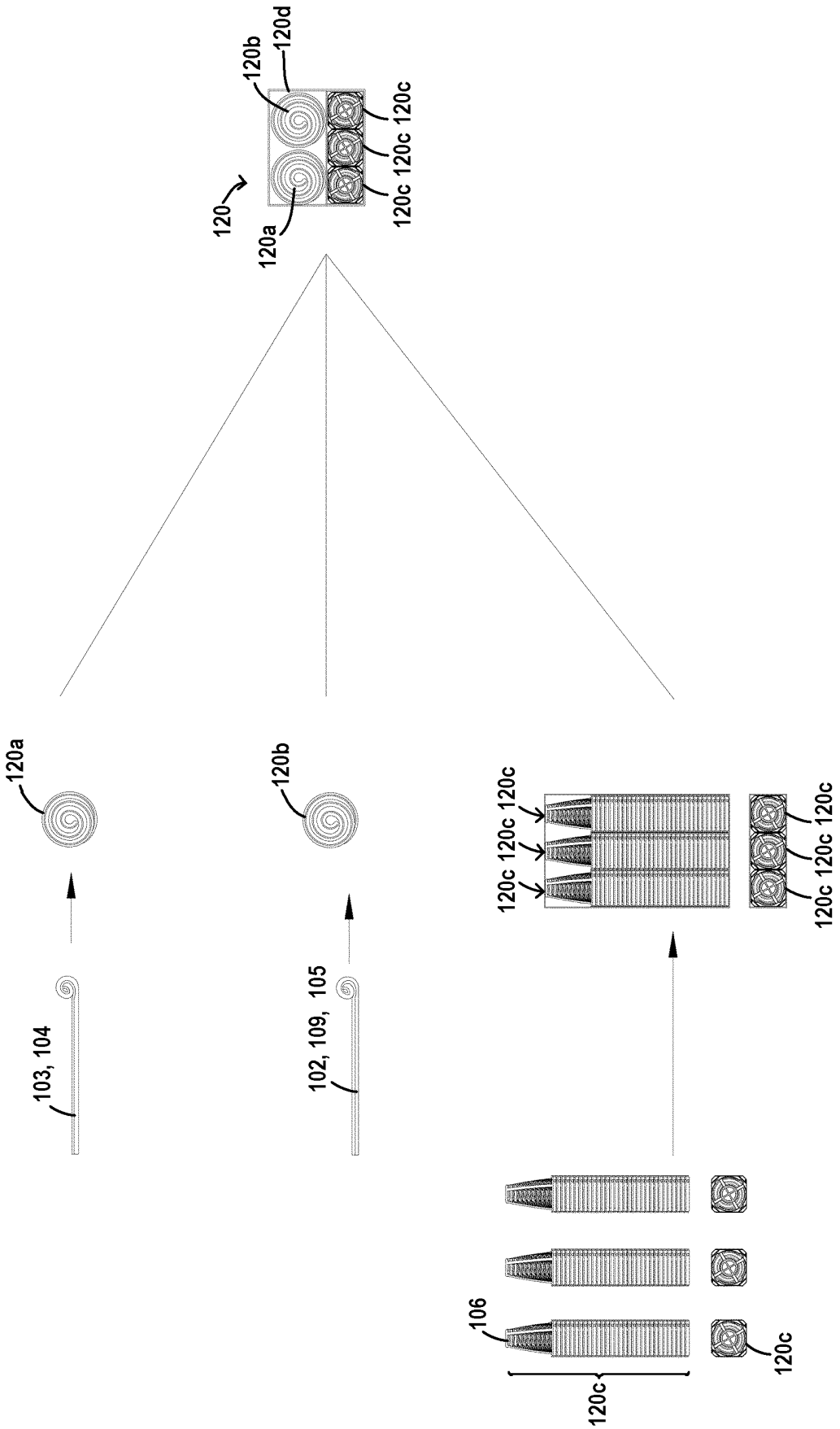

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FIG 18

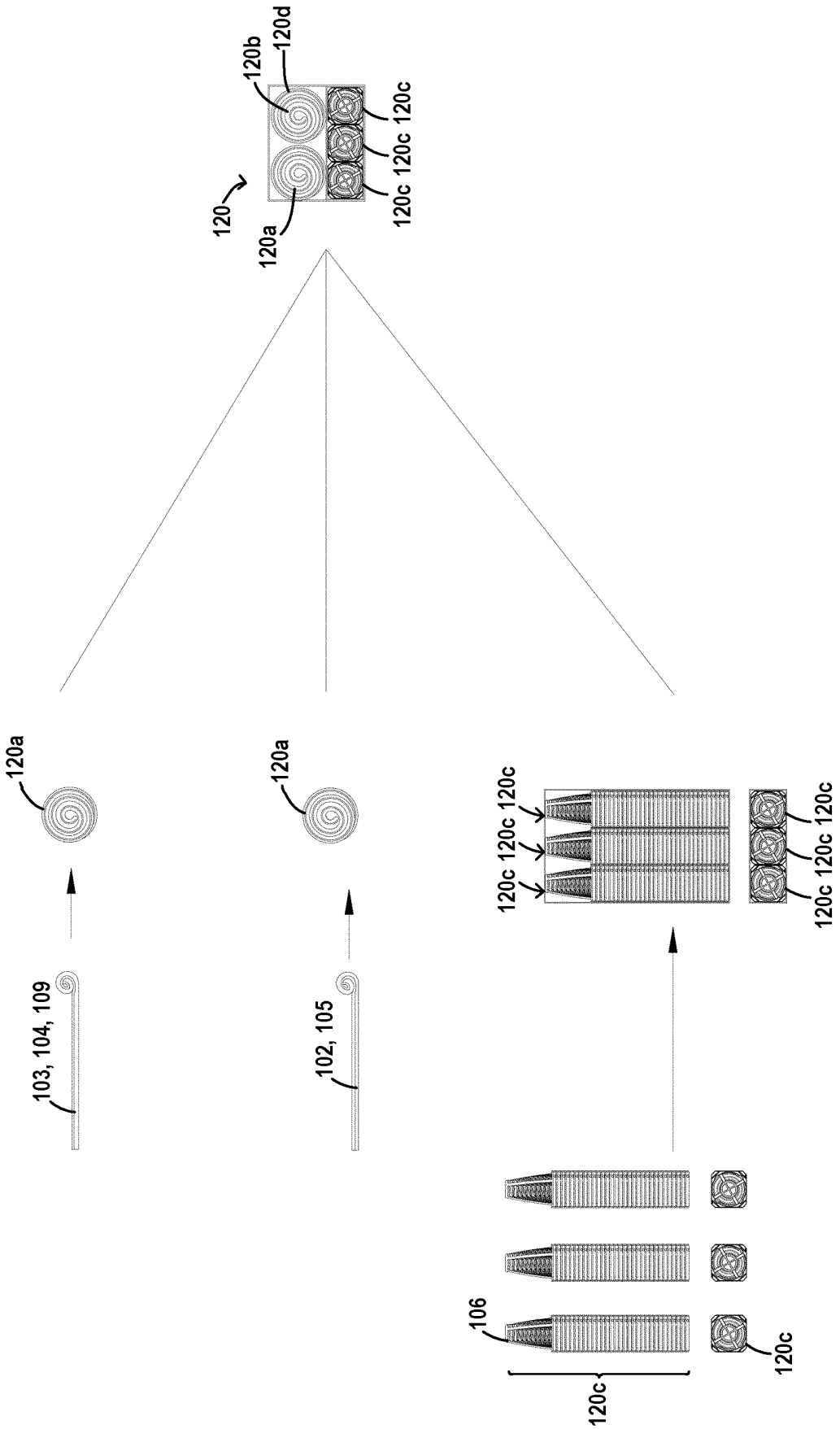
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FIG 19

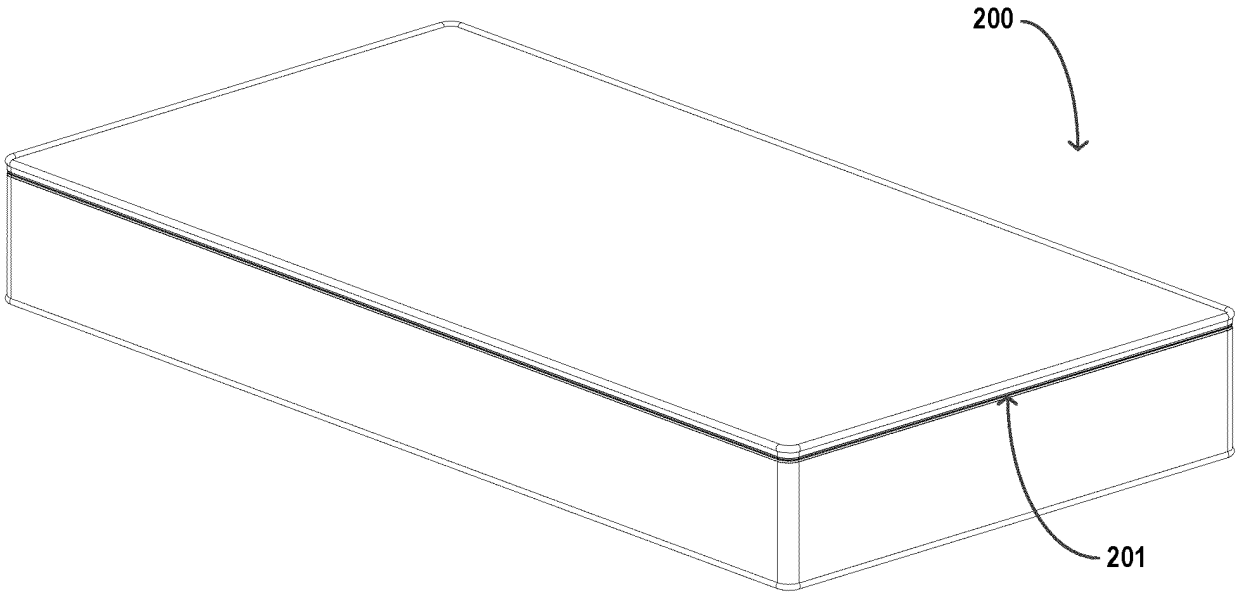

FIG 20

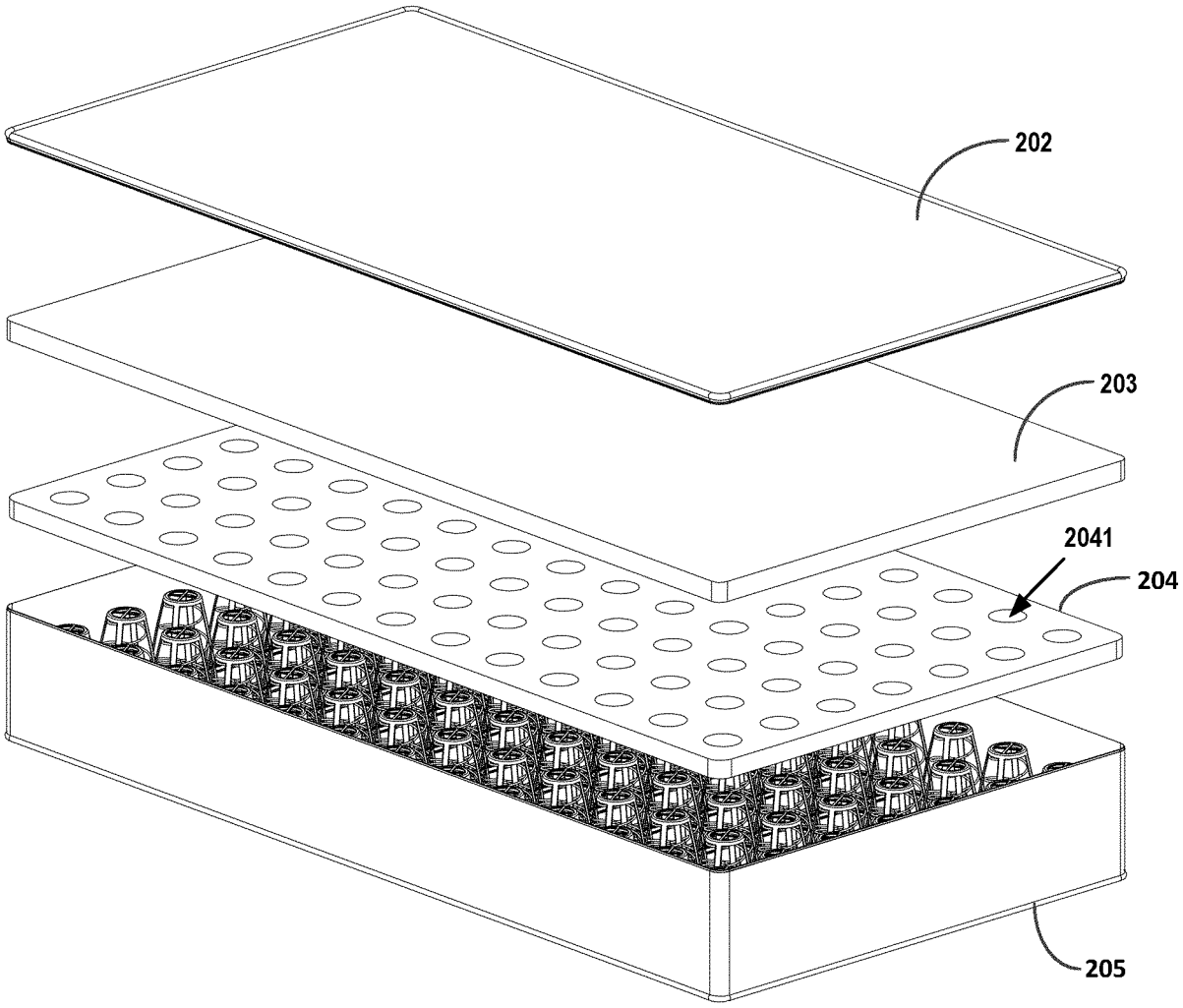

FIG 21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/104596

A. CLASSIFICATION OF SUBJECT MATTER

A47C 27/06(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)

CNABS; CNTXT; CNKI; VEN; ENTXT; WPABS: 垫, 锥, 弹簧, 拆, 更换, 组装, 组合, 轨道, 梁, 滑, spring, taper, cone, connoid, detach+, demount+, dismount+, remov+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 112674540 A (NEW TEC INTEGRATION XIAMEN CO., LTD.) 20 April 2021 (2021-04-20) description, paragraphs [0263]-[0380], and figures 1A-51C	1-25
X	CN 112674543 A (NEW TEC INTEGRATION XIAMEN CO., LTD.) 20 April 2021 (2021-04-20) description, paragraphs [0218]-[0336], and figures 1A-51C	1-25
X	CN 112674537 A (NEW TEC INTEGRATION XIAMEN CO., LTD.) 20 April 2021 (2021-04-20) description, paragraphs [0229]-[0347], and figures 1A-51C	1-25
A	KR 102037625 B1 (WON JONG MOON) 28 October 2019 (2019-10-28) entire document	1-25
A	JP H11128027 A (DREAM SOGO KENKYUSHO KK) 18 May 1999 (1999-05-18) entire document	1-25

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"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
"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
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 August 2022	**08 September 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/104596

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 112674540 A	20 April 2021	CA 3155053 A1	22 April 2021
		WO 2021073595 A1	22 April 2021
		AU 2020365168 A1	12 May 2022
CN 112674543 A	20 April 2021	WO 2021073596 A1	22 April 2021
CN 112674537 A	20 April 2021	CA 3155047 A1	22 April 2021
		WO 2021073598 A1	22 April 2021
		AU 2020366477 A1	12 May 2022
KR 102037625 B1	28 October 2019	None	
JP H11128027 A	18 May 1999	JP 3553346 B2	11 August 2004

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