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(54) POOL WITH THERMAL INSULATION

(57) The present disclosure provides a thermally insulated non-inflatable pool, including: a liner, having a water storage cavity; a frame, surrounding a perimeter of the liner; a connection member, fixing the liner to the frame; and a thermal insulation structure, at least a part of which is arranged between the liner and the frame. At least a part of the thermal insulation structure is attached to an outer surface of the liner; and/or, at least a part of the thermal insulation structure is attached to an inner surface of the frame. The present disclosure may reduce heat loss in the water storage cavity of the thermally insulated non-inflatable pool and prolong heat preservation time for water in the water storage cavity.

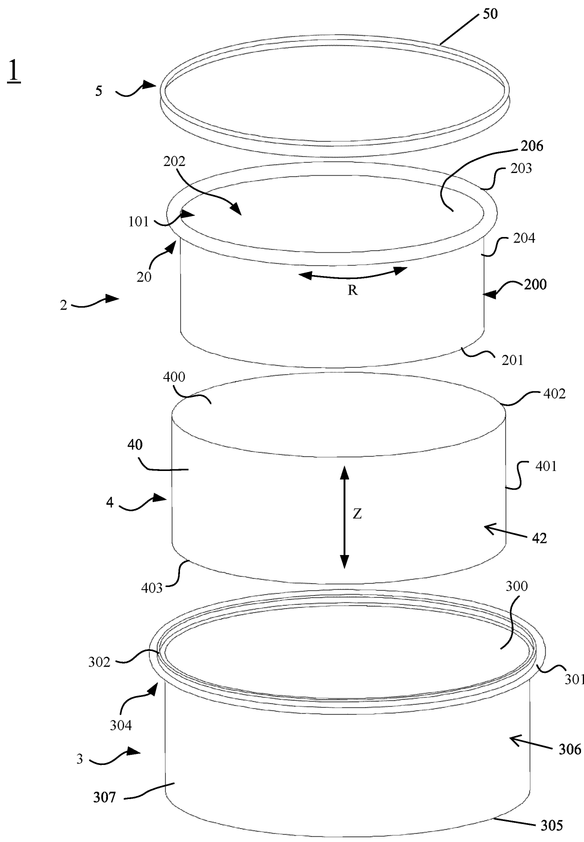

FIG. 2

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Description

FIELD AND BACKGROUND

Field

[0001] The present application relates to the technical field of above-ground pools, and particularly relates to a hard-body pool with thermal insulation.

Background

[0002] Above-ground pools are leisure and entertainment products used in outdoor open spaces, for example, it can be installed in a home's courtyard, garden or other open spaces for multiple adults and children to play together. These kinds of pools are widely popular with people due to convenient installation and a good use effect. In some usage scenarios, in order to improve the comfort of the pool during use, users need to inject hot water to a water storage cavity of the pool or heat cold water in the water storage cavity to a temperature suitable for human body by using heating equipment, so as to make it convenient for the users to use. However, during use, the heat inside the water storage cavity will dissipate over time, especially in cold seasons or cold regions, the heat dissipates faster. Therefore, it becomes increasingly important to insulate the heat of the water in the water storage cavity of the pool.

SUMMARY

[0003] Example embodiments may address at least the above problems and/or disadvantages and other disadvantages not described above. Also, example embodiments are not required to overcome the disadvantages described above, and may not overcome any of the problems described above.

[0004] The following summary is exemplary and explanatory only and is not necessarily restrictive of the claimed invention. The summary is intended to present general aspects of the present embodiments in order to provide a basic understanding of at least some salient features. This summary is not an extensive overview of all possible embodiments. It is not intended to identify key or critical elements of the present application or to delineate the scope of all embodiments. The following summary merely presents some concepts of the embodiments in a general form as a prelude to the more detailed description provided below.

[0005] Further, it should be noted that in various embodiments, description is made with reference to figures, in which like reference numerals refer to similar or identical items in the drawings. However, certain embodiments may be practiced without one or more of these specifically identified details, or in combination with other known methods and configurations. In the following summary and detailed description, numerous details are set forth, such as specific configurations, dimensions and processes, etc., in order to provide a thorough understanding of the present invention. In other instances, well-known processes and conventional hardware have not been described in particular detail in order to not unnecessarily obscure the present embodiments. Reference throughout this specification to "one embodiment," "an embodiment" or the like means that a particular feature, structure, configuration, or characteristic described in connection with the embodiment is included in at least one embodiment of the invention. Thus, the appearances of the phrase "in one embodiment," "an embodiment," or the like in various places throughout this specification are not necessarily referring to the same embodiment of the invention. Furthermore, the particular features, structures, configurations, or characteristics may be combined in any suitable manner in one or more embodiments.

[0006] An objective of the present disclosure is to solve the problem of heat loss of water in the existing pools. The present disclosure provides a thermally insulated non-inflatable pool, which is capable of insulating the heat of the pool, so as to reduce the heat loss of the water in a water storage cavity of the pool.

[0007] In order to solve the above technical problems, an embodiment of the present disclosure provides a thermally insulated non-inflatable pool. The thermally insulated non-inflatable pool includes: a liner, having a water storage cavity; a frame, surrounding a perimeter of the liner; a connection member, fixing the liner to the frame; and a thermal insulation structure, at least a part of which is arranged between the liner and the frame, where at least a part of the thermal insulation structure is attached to one or more of an outer surface of the liner, and inner surface of the frame.

[0008] In an exemplary embodiment, the thermal insulation structure comprises a cylinder defined by a wall and presenting upper and lower ends. An inner side surface of the cylinder approximates the outer surface of the liner, and an outer side surface of the cylinder approximates the inner surface of the frame.

[0009] Preferably, the upper end of the cylinder is provided with an opening, while the lower end of the cylinder may be provided with an opening. In an exemplary embodiment, both the upper and lower ends are provided with openings.

[0010] In an exemplary embodiment, the inner side surface of the cylinder is adhered to the outer surface of the liner, and/or, the outer side surface of the cylinder is adhered to the inner surface of the frame.

[0011] In an exemplary embodiment, the wall of the cylinder presents a wall thickness which gradually increases from with a preconfigured thickness gradient from top to bottom, therefore from the upper end to the lower end, in a depth direction of the thermally insulated non-inflatable pool. In various aspects, the thickness gradient may increase in one or more of a linear, exponential, or stepwise manner.

[0012] In an exemplary embodiment, the thickness gradient is preconfigured so that when the water storage cavity is filled with water, and the liner is compressed by the water, the water storage cavity assumes a relatively uniform inner diameter.

[0013] In an exemplary embodiment, the thermal insulation structure includes a plurality of thermal insulation units between the liner and the frame; and the plurality of thermal insulation units are spliced to each other, or the plurality of thermal insulation units are arranged at intervals, or some of the plurality of thermal insulation units are spliced to each other and other thermal insulation units are arranged at intervals.

[0014] In an exemplary embodiment, the thermal insulation structure includes a plurality of thermal insulation units, the thermal insulation units being arranged in one or more of the following configurations: the plurality of thermal insulation units are spliced to each other, the plurality of thermal insulation units are arranged at intervals, the plurality of thermal insulation units are arranged in a plurality of overlapping layers; and some of the plurality of thermal insulation units are spliced to each other and other thermal insulation units are arranged at intervals.

[0015] In an exemplary embodiment, the thermal insulation structure further includes a bottom sheet arranged under a bottom wall of the liner.

[0016] In an exemplary embodiment, the bottom sheet is adhered to the lower surface of the bottom wall of the liner.

[0017] In an exemplary embodiment, a material of the thermal insulation structure includes one or more of pearl cotton, expandable expanded polyethylene (EPE), expanded polystyrene (EPS), fiberglass batting, elastomeric foam, polyurethane (PU) foam, sponge, and silk wadding..

[0018] In an exemplary embodiment, a top region of the frame is provided with a first extension portion extending outward with respect to the water storage cavity, and the first extension portion is provided with a first protrusion; a top region of the liner is provided with a second extension portion extending outward with respect to the water storage cavity, and the second extension portion is coupled to the first extension portion and covers the first protrusion to form a second protrusion; and the connection member clamps the second protrusion together with the first protrusion.

[0019] In an exemplary embodiment, a material of the liner comprises any of flexible polyvinyl chloride (PVC), polyurethane (PU), a PVC mesh material, and a PU mesh material.

[0020] In an exemplary embodiment, the frame is constructed from one or more of: a structurally supportive plastic, polyethylene (PE), polypropylene (PP), and polystyrene (PS).

[0021] The thermally insulated non-inflatable pool proposed by the present application adds a thermal insulation structure between the liner and the frame, and optionally underneath the liner, which effectively prevents the heat dissipation in the water storage cavity of the pool, prolongs the heat preservation time of the water in the water storage cavity, and reduces the heat loss in the water storage cavity, thereby providing users with a better experience during the use. The pool having the thermal insulation structure is easy to use, has low costs and a simple manufacturing process, and is applicable to pools in various application environments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The above and/or other aspects will become apparent and more readily appreciated from the following description of example embodiments, taken in conjunction with the accompanying drawings, in which:

FIG. 1 shows a perspective view of a thermally insulated non-inflatable pool according to an embodiment of the present application;
FIG. 2 is a schematic exploded view of a structure of the thermally insulated non-inflatable pool shown in FIG. 1;
FIG. 3 is a cross-sectional view of the thermally insulated non-inflatable pool shown in FIG. 1 in a water-filled state;
FIG. 4 is a partial enlarged view of a region A in FIG. 3;
FIG. 5 is a partial cross-sectional view of the thermally insulated non-inflatable pool shown in FIG. 1 in a non-water-filled state;
FIG. 6 is a partial enlarged view of a region B in FIG. 3;
FIG. 7 shows a cross-sectional view of a thermally insulated non-inflatable pool according to another embodiment of the present application;
FIG. 8 is a partial enlarged view of a region C in FIG. 7;
FIG. 9 shows a first schematic diagram of attachment of a thermal insulation structure to a liner, where the thermal insulation structure includes a cylinder;
FIG. 10 shows a second schematic diagram of attachment of a thermal insulation structure to a liner, where the thermal insulation structure includes a plurality of thermal insulation units spliced with each other;
FIG. 11 shows a third schematic diagram of attachment of a thermal insulation structure to a liner, where the thermal insulation structure includes a plurality of thermal insulation units arranged at intervals in both the horizontal and vertical directions;
FIG. 12 shows a fourth schematic diagram of attachment of a thermal insulation structure to a liner, where the thermal insulation structure includes a plurality of thermal insulation units arranged at intervals in the horizontal direction;
FIG. 13 shows a fifth schematic diagram of attachment of a thermal insulation structure to a liner,

where the thermal insulation structure includes a plurality of thermal insulation units spliced with each other and a plurality of thermal insulation units arranged at intervals; and

FIG. 14 shows a sixth schematic diagram of attachment of a thermal insulation structure to a liner, where the thermal insulation structure includes a plurality of thermal insulation units of different shapes.

DETAILED DESCRIPTION

[0023] Implementations of the present disclosure are illustrated below by way of specific embodiments, and those skilled in the art would have readily understood other advantages and effects of the present disclosure from the content disclosed in the description. Although the description of the present disclosure will be introduced in conjunction with preferred embodiments, it does not mean that features of the present disclosure are limited to the implementations. On the contrary, an objective of introducing the present disclosure in conjunction with the implementations is to encompass other options or modifications that may be extended on the basis of the claims of the present disclosure. The following description contains numerous specific details in order to provide deep understanding of the present disclosure. The present disclosure may also be implemented without these details. In addition, in order to avoid confusing or obscuring key points of the present disclosure, some specific details will be omitted in the description. It should be noted that the embodiments and the features thereof in the present disclosure can be combined with each other without conflicts.

[0024] It should be noted that in the description, like reference signs and letters denote like items in the following drawings. Therefore, once an item is defined in one of the drawings, it is not necessary to further define and explain the item in the subsequent drawings.

[0025] In the description of the present embodiments, it should be noted that the orientation or position relationships indicated by the terms such as "upper", "lower", "inner" and "bottom" are based on the orientation or position relationships shown in the drawings or the orientation or position relationships in which a product of the present disclosure is customarily placed during use, and are only intended to facilitate description of the present disclosure and simplify the description, rather than indicating or implying that the apparatus or element indicated must have a specific orientation or be configured and operated in the specific orientation, and therefore cannot be construed as limiting the present disclosure.

[0026] The terms "first", "second", etc. are only intended to distinguish the description, and should not be construed as indicating or implying the relative importance.

[0027] In the description of the embodiments, it should also be noted that the terms "arrange", "connected", and "connection" should be understood in a broad sense, unless otherwise explicitly specified and limited. For example, the connection can be a secured connection, a detachable connection, or an integral connection; or may be a mechanical connection or an electrical connection; and can be directly connected, or indirectly connected by means of an intermediate medium, or communication between interiors of two elements. For those of ordinary skill in the art, the specific meaning of the terms mentioned above in the embodiments should be understood in specific cases.

[0028] In order to make objectives, technical solutions and advantages of the present disclosure clearer, the implementations of the present disclosure will be further described in detail below with reference to the drawings.

[0029] FIGS. 1 and 2 show a schematic structure of a thermally insulated non-inflatable pool according to an embodiment of the present application, where FIG. 2 is a schematic exploded view of a structure of the thermally insulated non-inflatable pool. As shown in FIGS. 1 and 2, in this embodiment, the thermally insulated non-inflatable pool 1 may be a circular or approximately circular pool. However, those skilled in the art will understand that this embodiment only takes the circular thermally insulated non-inflatable pool 1 as an example for illustration. In other embodiments, the thermally insulated non-inflatable pool 1 may be designed to various cross-sectional shapes, such as an oval, a square, a rectangle, and other polygonal sections.

[0030] As shown in FIGS. 1 and 2, the thermally insulated non-inflatable pool 1 includes a liner 2 and a frame 3. For example, the liner 2 may be constructed from a flexible material with the ability to stretch and deform. In various exemplary embodiments, the liner 2 may be constructed from one or more of PVC (Polyvinyl chloride), PU (polyurethane), a PVC mesh material, and a PU mesh material. In one implementation, the frame 3 provides structural support for the liner 2. In various exemplary embodiments, the frame 3 may be constructed from a structurally supportive plastic, such as PE (Polyethylene), PP (polypropylene), PS (Polystyrene), etc.

[0031] In the embodiments illustrated in FIGS. 1 and 2, the liner 2 includes a cylindrical side wall 200 and a circular bottom wall 201. The cylindrical side wall 200 and the circular bottom wall 201 define a water storage cavity 202 with a top opening (i.e., a pool opening 101 of the thermally insulated non-inflatable pool). That is, the water storage cavity 202 approximates the shape of a cylinder, and a top region thereof is provided with an opening, and a bottom region thereof is closed, so as to receive water in the water storage cavity 202 and thus provide users with water-based entertainment and play. The side wall 200 of the liner 2 includes an outer surface 204 and an inner surface 206, the latter facing the water storage cavity 202. The side wall 200 of the liner 2 comprises a top region 20 surrounding the top opening of the water storage cavity.

[0032] The frame 3 is counter shaped to the liner 2: in the illustrated embodiments, the frame 3 is configured to surround a perimeter of the liner 2, so that the liner 2 may be arranged inside the frame 3. In detail, the frame 3, in various aspects, comprises a closed side wall 306, having an inner surface 300 and an outer surface 307, and a top region 304 surrounding a top opening of the frame 3. The frame 3 comprises a bottom side 305, opposite to the top region 304; the frame 3 may be provided with a bottom wall, not shown in the present embodiments, arranged at the bottom side 305 of the frame 3, under the bottom wall 201 of the liner 2. The side wall 306 of the frame 3 defines a space inside which the liner 2 is housed. The outer surface 204 of the side wall 200 of the liner 2 is disposed to approximate the frame 3: in particular, the outer surface 204 of the side wall 200 of the liner 2 faces the inner surface 300 of the frame 3.).

[0033] FIGS. 3 and 4 illustrate an embodiment where the liner 2 and the frame 3 are fixedly connected through a connection member 5. More particularly, the top region 304 of the frame 3 is provided with a first extension portion 301 extending outwardly towards the outside of the water storage cavity 202 (as shown by an M direction in FIG. 4), and the first extension portion 301 is provided with a first protrusion 302 protruding upward (as shown by a Z direction in FIG. 4). For example, a longitudinal cross-section of the first protrusion 302 may be formed in the shape of a rectangle, and the first protrusion 302 protrudes upwardly away from a plane E (shown in FIG. 3) where the pool opening 101 is located in a depth direction of the thermally insulated non-inflatable pool. The first extension portion 301 may be formed in the shape of a ring, and it is configured to surround the top region 304 of the frame 3 (i.e. 360°) along a circumferential direction (shown by an R direction in FIG. 2). The top region 20 (as shown in FIG.4) of the liner 2 is provided with a second extension portion 203 extending towards the outside of the water storage cavity 202. The second extension portion 203 of the liner 2 is configured to be attached to the first extension portion 301 of the frame 3 and to cover the first protrusion 302, so that the first protrusion 302 and a part of the second extension portion 203 covering the first protrusion 302 jointly form a second protrusion 303. Therefore, the second extension portion 203 is provided with a second protrusion 303 protruding upward (as shown by a Z direction in FIG. 4), following the same shape of the first protrusion 302. More particularly, the second protrusion 303 includes the first protrusion 302 and the part of the second extension portion 203 that covers the first protrusion 302. Put another way, the second extension portion 203 may be formed in a shape substantially the same as the first protrusion 302 so that the second extension portion 203 may be arranged on the first extension portion 301 to facilitate covering the first protrusion 302 and thereby forming the second protrusion 303. Accordingly, the second extension portion 203 is also configured in the shape of a ring, and it may surround the top of the liner 2 along a circumferential direction (i.e. 360°).

[0034] In the illustrated embodiment, the connection member 5 is exemplified in a form of a fixing clamp ring 50. A bottom region of the fixing clamp ring 50 is provided with a recess 500 in the depth direction of the thermally insulated non-inflatable pool (shown by a Z direction in FIG. 4). Upon assembly, the second protrusion 303 is embedded within the recess 500, and the fixing clamp ring 50 thereby clamps and affixes the second protrusion 303, and the first protrusion 302 placed immediately underneath the second protrusion 303, so that the liner 2 and the frame 3 are fixedly connected through the fixing clamp ring 50.

[0035] To recap, in this embodiment, the second protrusion 303 formed by the second extension portion 203 of the liner 2 and the first protrusion 302 of the frame 3 is clamped by the fixing clamp ring 50, so as to realize the fixed connection between the liner 2 and the frame 3, and accordingly, the liner 2 is supported by the frame 3.

[0036] Those skilled in the art will understand that the connection member 5 may also be arranged in other forms, such as a hidden buckle, a clip, a hook or other connection methods known in the art.

[0037] With continued reference to FIGS. 3 and 4, there is a gap 420 between the outer surface 204 of the liner 2 and the inner surface 300 of the frame 3, so as to form a chamber 100 therebetween. The chamber 100 is used to receive a thermal insulation structure 4. The thermal insulation structure 4 may provide thermal insulation of the water in the water storage cavity 202, thereby reducing heat loss from the water storage cavity 202. In this embodiment, the thermal insulation structure 4 includes a cylinder 40, as shown in FIGS. 2 and 3, having an upper end 402 and a lower end 403. Preferably, the upper end 402 of the cylinder 40 is provided with an opening, while the lower end 403 of the cylinder 40 may be provided with opening. In particular, the cylinder 40, as shown in one of the preferred embodiments shown in FIGS. 5 and 6, has a cylindrical structure with openings at both the upper end 402 and lower end 403.

[0038] In a radial direction of the thermally insulated non-inflatable pool 1 (shown by a U direction in FIG. 4), the cylinder 40 of the thermal insulation structure 4 includes an inner side surface 400 and an outer side surface 401, where the inner side surface 400 faces the liner 2 and the outer side surface 401 faces the frame 3.

[0039] The cylinder 40 is configured to be attached to both the outer surface 204 of the liner 2 (that is, the outer surface 204 of the side wall 200) and the inner surface 300 of the frame 3. That is, the inner side surface 400 of the cylinder 40 of the thermal insulation structure 4 is attached to the outer surface 204 of the liner 2, and the outer side surface 401 of the cylinder 40 of the thermal insulation structure 4 is attached to the inner surface 300 of the frame 3. To put it another way, the frame 3 approximates and slightly presses against the cylinder 40 in the radial direction (shown by the U direction in FIG. 4), so that the cylinder 40 of the thermal insulation structure 4 is closely approximated to the frame 3, thereby closing voids so as to realize improved thermal insulation of the water in the water storage cavity 202. In other words, after the water storage cavity 202 is filled with water, the liner 2 and the frame 3 jointly sandwich the cylinder 40 of the thermal insulation structure 4 in the radial direction, so that the liner 2, the cylinder 40 and the frame 3 are closely approximated, thereby ensuring a thermal insulation effect on the water in the water storage cavity 202.

[0040] The thermal insulation structure 4 comprises a wall 42 defining the cylinder 40. Referring to FIGS. 4 and 5, in one implementation, the wall 42 of the thermal insulation structure (i.e., the cylinder 40) presents a thickness (wall thickness), between the liner 2 and the frame 3, configured to gradually increase from top to bottom (therefore from the upper end 402 to the lower end 403) in the depth direction of the thermally insulated non-inflatable pool 1 (as shown by a V direction in FIG. 5), forming a thickness gradient of the thermal insulation structure 4. That is, as shown in FIG. 5, the cylinder 40 has the smallest wall thickness H1 at the upper end 402. From top to bottom, the wall thickness of the cylinder 40 gradually increases approaching the bottom wall 201 of the liner 2 until reaching a position where the lower end 403 the cylinder 40 is flush with a bottom surface of the bottom wall 201 of the liner 2, and at this point, the cylinder 40 of the thermal insulation structure 4 has the largest wall thickness H2. The thickness gradient may increase linearly from top to bottom, or may increase nonlinearly, for example exponentially from top to bottom, or with any other desired gradient. Further, in certain embodiments, the variations in thickness may not increase monotonically from top to bottom so as to induce desired patterns into the liner when the thermally insulated non-inflatable pool is in a filled state.

[0041] Since the liner 2 expands under water pressure when the water storage cavity 202 assumes a filled state, the cylinder 40 of the thermal insulation structure 4 proximate the liner may also undergo elastic deformation due to the pressure. As the pressure gradually increases from top to bottom in the depth direction of the pool, the pressure applied to the thermal insulation structure 4 gradually increases from top to bottom, and thus the degree of deformation thereof gradually increases. By providing a thickness gradient and accordingly increasing the wall thickness of the thermal insulation structure 4 from top to bottom, deformation of the thermally insulated non-inflatable pool may be reduced. Accordingly, a predetermined thickness gradient of the thermal insulation structure may be provided so that after the thermally insulated non-inflatable pool is filled with water, it has a relatively uniform inner diameter (as shown in FIG. 3, wherein vertical dimensions of side walls 200 of the liner 2 assume an essentially parallel configuration).

[0042] Referring to FIGS. 4 and 6, the cylinder 40 completely covers the outer surface 204 of the liner 2. Specifically, the upper end 402 of the cylinder 40 of the thermal insulation structure 4 in the depth direction of the thermally insulated non-inflatable pool (shown by the Z direction in FIG. 4) is flush with the top of the frame 3 and is covered by the second extension portion 203 of the top of the liner 2. The lower end 403 of the cylinder 40 in the depth direction of the thermally insulated non-inflatable pool is flush with both the bottom wall 201 of the liner 2 and the bottom side 305 of the frame 3, so as to cover as much area of the water storage cavity 202 as possible, thereby achieving an improved thermal insulation effect.

[0043] The cylinder 40 of the thermal insulation structure 4 is made of a material with thermal insulation properties, such as pearl cotton (expandable expanded polyethylene (EPE)), expanded polystyrene (EPS), fiberglass batting, elastomeric foams, polyurethane (PU) foam, sponge-like material, silk wadding, etc. Those skilled in the art will understand that in other embodiments, the cylinder 40 of the thermal insulation structure 4 may also be made of other materials with thermal insulation effects, such as a foam material, a three-dimensional fabric, etc.

[0044] Those skilled in the art will understand that in alternate embodiments, the cylinder 40 may be attached to one or both of the liner 2 and the frame 3. In exemplary implementations, the inner side surface 400 of the cylinder 40 may be attached to the outer surface 204 of the liner 2, and there may be a gap between the outer side surface 401 of the cylinder 40 and the inner surface 300 of the frame 3; alternatively, the outer side surface 401 of the cylinder 40 may be attached to the inner surface 300 of the frame 3, and there is a gap between the inner side surface 400 of the cylinder 40 and the outer surface 204 of the liner 2.

[0045] In some additional embodiments, the inner side surface 400 of the cylinder 40 may be adhered to the outer surface 204 of the liner 2, and the outer side surface 401 of the cylinder 40 is adhered to the inner surface 300 of the frame 3. That is, the liner 2, the thermal insulation structure 4 (the cylinder 40) and the frame 3 may be fixedly connected using an adhesive sheet or a hook and loop fastener. In alternative implementations, the cylinder 40 of the thermal insulation structure 4 may be attached to only one of the liner 2 and the frame 3. In other words, the cylinder 40 may be attached to only the outer surface 204 of the liner 2 through its inner side surface 400, or the cylinder may be attached to only the inner surface 300 of the frame 3 through its outer side surface 401, both of which may realize the thermal insulation effect on the water in the water storage cavity 202. Those skilled in the art will understand that the cylinder 40 may also be attached and connected to the liner 2 and the frame 3 by using other methods, such as welding, and other connection methods known to those skilled in the art.

[0046] FIG. 7 shows a cross-sectional view of a thermally insulated non-inflatable pool according to another embodiment of the present application. FIG. 8 shows a partial enlarged view of a region C in FIG. 7. In this embodiment, the thermal insulation structure 4 includes the cylinder 40 described in the foregoing embodiments, and further a bottom sheet 41. The bottom sheet 41 is preferably in the shape of a circle and is placed at the lower end 403 of the cylinder 40. In this configuration, the lower end 403 of the cylinder 40 may result closed by the bottom sheet 41. The bottom sheet 41 may be attached to the lower end 403 of the cylinder 40 or may simply arranged near the lower end 403.

[0047] In the illustrated embodiment, the bottom sheet 41 is arranged under the bottom wall 201 of the liner 2, and is attached to a lower surface 205 of the bottom wall 201 of the liner 2. Compared with the thermal insulation structure 4 (i.e., the cylinder 40) covering only the side wall 200 of the liner 2 in the foregoing embodiments (as shown in FIG. 3), the bottom sheet 41 is added in the present embodiment, so as to cover the bottom wall 201 of the liner 2 using the bottom sheet 41, thereby realizing the all-round coverage of the water storage cavity 202 except for the pool opening 101. In this way, a better thermal insulation effect is achieved by reducing the heat loss in the water storage cavity 202 through the bottom wall 201.

[0048] In this embodiment, the cylinder 40 of the thermal insulation structure 4 is configured to be connected to the bottom sheet 41, and the bottom sheet 41 configured to completely cover the lower surface 205 of the bottom wall 201 of the liner 2. Those skilled in the art will understand that it is also possible to not connect the cylinder 40 of the thermal insulation structure and the bottom sheet 41, that is, the two are regarded as two independent elements proximate one another. The cylinder 40 is arranged in the chamber 100 formed by the liner 2 and the frame 3, and the bottom sheet 41 is arranged below the bottom wall 201 of the liner 2.

[0049] FIGS. 9 to 14, FIG. 9 illustrate embodiments showing schematic diagrams of attachment of the cylinder 40 to the liner 2, and FIGS. 10 to 14 illustrate schematic diagrams of attachment of a plurality of thermal insulation units 410 to the liner 2. Those skilled in the art will understand that in some other embodiments, the cylinder of the thermal insulation structure 4 may also be replaced by the plurality of thermal insulation units 410 (such as a plurality of pieces of sheet thermal insulation material), and they may be all attached to the outer surface 204 of the liner 2 or the inner surface 300 of the frame 3. Alternatively, some of the plurality of thermal insulation units 410 may be attached to the outer surface 204 of the liner 2 and other thermal insulation units are attached to the inner surface 300 of the frame 3, so as to surround the water storage cavity 202 in a circumferential direction (shown by the R direction in FIG. 1) to achieve the thermal insulation effect on the water storage cavity 202. In various embodiments, the thermal insulation structure 4 may also include multiple layers of insulting materials, wherein some of such layers may be attached to the outer surface of the liner 2 and other of such layers may be attached to the inner surface of the frame 3. In such embodiments, each of the respective layers may comprise the same or different insulating materials. In a particular multiplayer implementation, an outer layer of the thermal insulation structure 4 may be attached to the inner surface 300 of the frame 3, and/or an inner layer of the thermal insulation structure 4 may be attached to an outer surface 204 of the liner 2. In implementations where individual layers of the multilayer thermal insulation structure 4 comprise different materials, an inner insulating layer could comprise a more deformable material allowing the pool liner to assume a straighter orientation upon filling, while an outer insulating layer may be firmer to maintain structural integrity of the insulation without interspersed voids.

[0050] The plurality of thermal insulation units 410 mentioned above may be of one material, or may be of any combination of various materials with thermal insulation properties. For example, in an embodiment, 10 thermal insulation units 410 are attached to the outer surface 204 of the liner 2, and all the 10 thermal insulation units 410 may be made of pearl cotton; or, 5 of the 10 thermal insulation units 410 may be made of pearl cotton and the other 5 may be made of sponge (or sponge-like material); or, 3 of the 10 thermal insulation units 410 are made of pearl cotton, 3 are made of sponge (or sponge-like material), 4 are made of silk wadding, or any combination of any number of thermal insulation units 410 made of any thermal insulation material.

[0051] Further, as shown in FIG. 10, the plurality of thermal insulation units 410 mentioned above may be spliced to each other to form a shape the same as the cylinder 40 in the foregoing embodiments, thereby circumferentially surrounding the water storage cavity 202. Alternatively, the plurality of thermal insulation units 410 may be arranged at intervals (as shown in FIGS. 11 and 12) to at least partially surround the water storage cavity 202 in the circumferential direction. Alternatively, several of the plurality of thermal insulation units 410 are spliced to each other, and several other thermal insulation units are arranged at intervals (as shown in FIGS. 13 and 14), which may also at least partially surround the water storage cavity 202 to achieve the thermal insulation effect on the water in water storage cavity 202. Further, as mentioned previously, the thermal insulation units 410 may comprise a layered configuration, wherein at plurality of thermal insulation units 410 overlap one another.

[0052] The plurality of thermal insulation units 410 shown in FIGS. 10 to 13 are each in the shape of a rectangle, but those skilled in the art will understand that in other embodiments, the plurality of thermal insulation units 410 may be arranged as a circle, an oval, a polygon or other irregular shapes, or may be arranged as a combination of various shapes, such as the combination of a circle and a quadrilateral as shown in FIG. 14. That is, the size and shape of the plurality of thermal insulation units 410 may be selected according to actual needs, which is not limited by the present application.

[0053] Identical to the cylinder 40, the bottom sheet 41 may also be arranged as an integrally formed circle as a whole, or as a plurality of independent thermal insulation units. The plurality of thermal insulation units may be spliced to each other, or arranged at intervals, or several of the plurality of thermal insulation units are spliced to each other, and several other thermal insulation units are arranged at intervals. For details, reference may be made to the arrangement of the plurality of thermal insulation units shown in FIGS. 10 to 14. The present application does not limit the specific arrangement of the bottom sheet 41, as long as the bottom sheet 41 is provided such that it may be at least partially attached to the bottom wall 201 of the liner 2. As such, it is possible to realize thermal insulation of the water in the water storage cavity 202 at the bottom of the water storage cavity 202, thereby reducing heat loss and providing users with a better use experience.

[0054] Although the present disclosure has been illustrated and described with reference to some preferred implementations of the present disclosure, those of ordinary skill in the art should understand that the above contents are further detailed descriptions for the present disclosure with reference to specific implementations, and it cannot be assumed that the specific implementations of the present disclosure are limited to these descriptions. Those skilled in the art can make various changes in form and details, including several simple deduction or substitutions, without departing from the scope of the present disclosure.

Claims

1. A thermally insulated non-inflatable pool, comprising:

a liner (2), having a water storage cavity (202);
a frame (3), surrounding a perimeter of the liner (2);
a connection member (5), fixing the liner (2) to the frame (3); and
a thermal insulation structure (4), at least a part of which is arranged between the liner (2) and the frame (3),
wherein at least a part of the thermal insulation structure (4) is attached to one or more of:

an outer surface (204) of the liner (2); and
inner surface (300) of the frame (3).

2. The thermally insulated non-inflatable pool of claim 1, wherein the thermal insulation structure (4) comprises a cylinder (40) defined by a wall (42) and presenting an upper end (402) and a lower end (403); an inner side surface (400) of the cylinder (40) approximating the outer surface (204) of the liner (2), and an outer side surface (401) of the cylinder (40) approximating the inner surface (300) of the frame (3).

3. The thermally insulated non-inflatable pool of claim 2, wherein the upper end (402) and the lower end (403) of the cylinder (40) are provided with openings.

4. The thermally insulated non-inflatable pool of claim 2, wherein the inner side surface (400) of the cylinder (40) is adhered to the outer surface (204) of the liner, and/or the outer side surface (401) of the cylinder (40) is adhered to the inner surface (300) of the frame (3).

5. The thermally insulated non-inflatable pool of claim 2, wherein the wall (42) of the cylinder (40) presents a wall thickness which gradually increases with a preconfigured thickness gradient from the upper end (402) to the lower end (403), in a depth direction (V) of the thermally insulated non-inflatable pool.

6. The thermally insulated non-inflatable pool of claim 5, wherein the thickness gradient is preconfigured so that when the water storage cavity (202) is filled with water, and the liner (2) is compressed by the water, the water storage cavity (202) assumes a relatively uniform inner diameter.

7. The thermally insulated non-inflatable pool of claim 5, wherein the thickness gradient increases in one or more of a linear, exponential, or stepwise manner.

8. The thermally insulated non-inflatable pool of claim 1, wherein:
the thermal insulation structure (4) comprises a plurality of thermal insulation units (410) arranged between the liner (2) and the frame (3), the thermal insulation units (410) being arranged in one or more of the following configurations:

the plurality of thermal insulation units (410) are spliced to each other;
the plurality of thermal insulation units (410) are arranged at intervals;
the plurality of thermal insulation units (410) are arranged in a plurality of overlapping layers; and
some of the plurality of thermal insulation units (410) are spliced to each other and other thermal insulation units (410) are arranged at intervals.

9. The thermally insulated non-inflatable pool of claim 2, wherein the thermal insulation structure (4) further comprises a bottom sheet (41) arranged under a bottom wall (201) of the liner (2).

10. The thermally insulated non-inflatable pool of claim 9, wherein the bottom sheet (41) is adhered to the lower surface (205) of the bottom wall (201) of the liner (2).

11. The thermally insulated non-inflatable pool of claim 2, wherein a material of the thermal insulation structure (4) comprises one or more of pearl cotton, expandable expanded polyethylene (EPE), expanded polystyrene (EPS), fiberglass batting, elastomeric foam, polyurethane (PU) foam, sponge, and silk wadding.

12. The thermally insulated non-inflatable pool of claim 1, wherein:

a top region (304) of the frame (3) is provided with a first extension portion (301) extending outward with respect to the water storage cavity (202), and the first extension portion (301) is provided with a first protrusion (302);
a top region (20) of the liner (2) is provided with a second extension portion (203) extending outward with respect to the water storage cavity (202), and the second extension portion (203) is coupled to the first extension portion (301) and covers the first protrusion (302) to form a second protrusion (303); and
the connection member (5) clamps the second protrusion (303) together with the first protrusion (302).

13. The thermally insulated non-inflatable pool of claim 1, wherein a material of the liner comprises one or more of flexible polyvinyl chloride (PVC), polyurethane (PU), a PVC mesh material, and a PU mesh material.

14. The thermally insulated non-inflatable pool of claim 1, wherein the frame (3) is constructed from one or more of: a structurally supportive plastic, polyethylene (PE), polypropylene (PP), and polystyrene (PS).

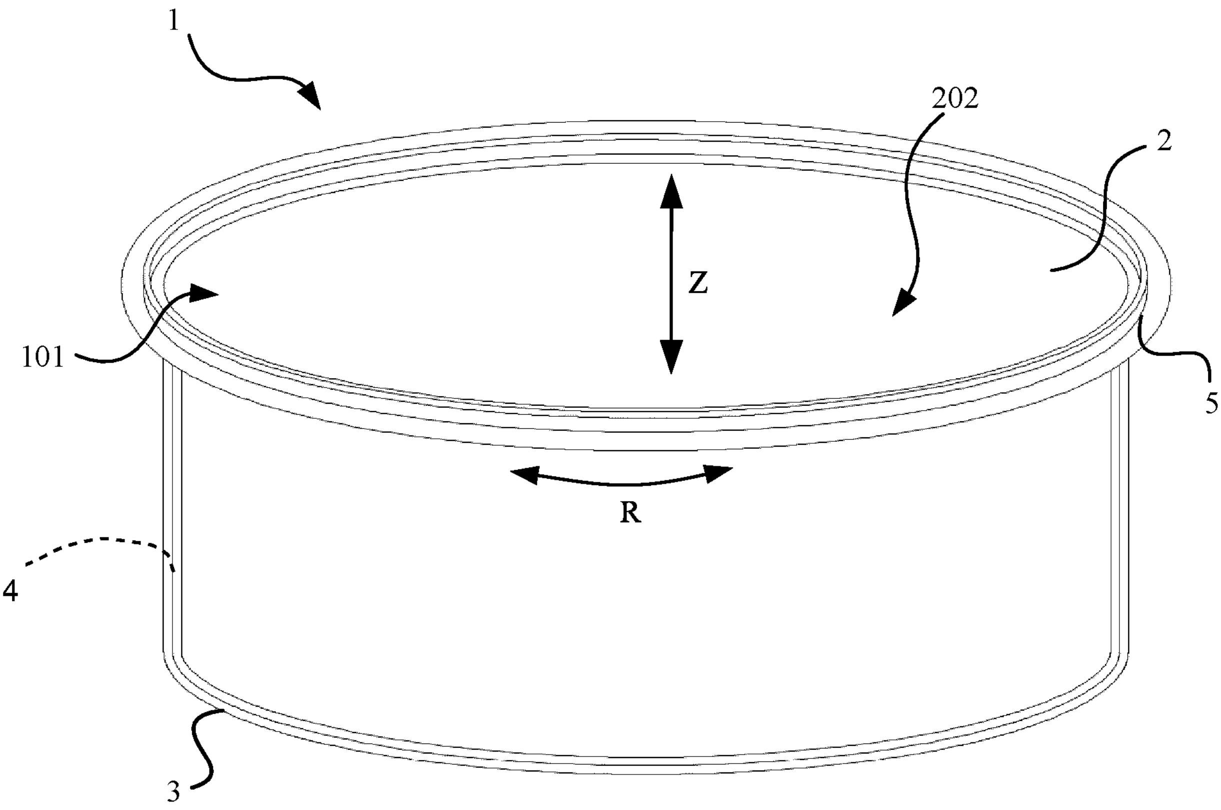

FIG. 1

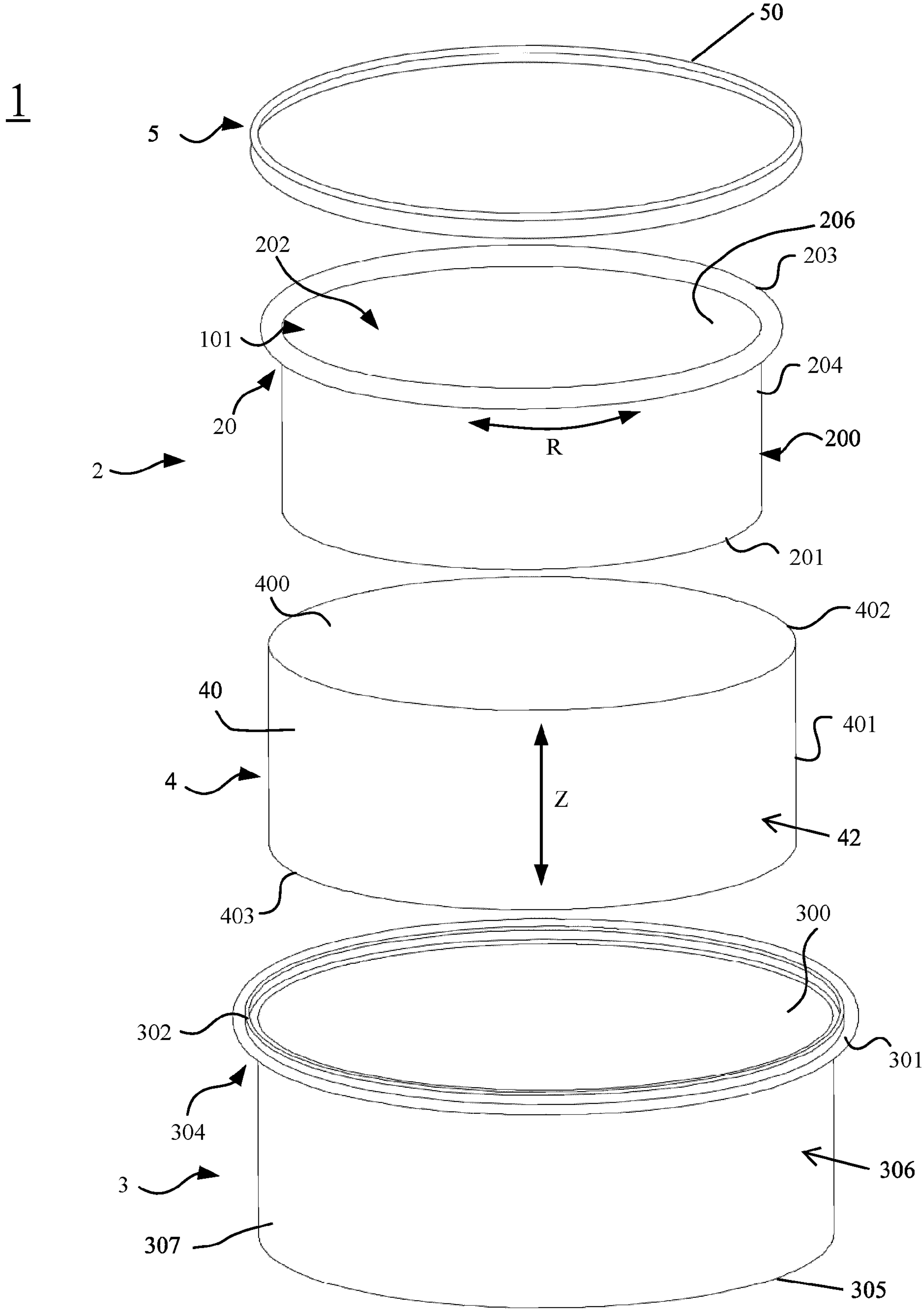
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FIG. 2

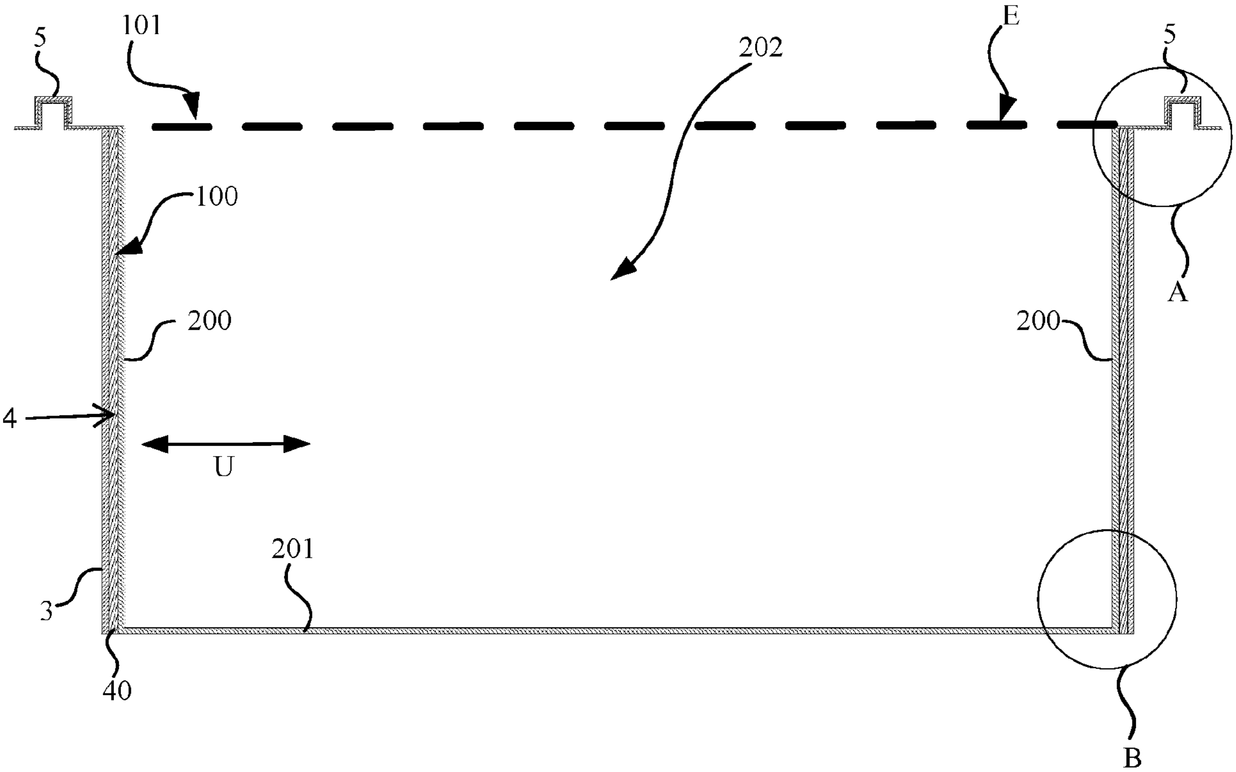
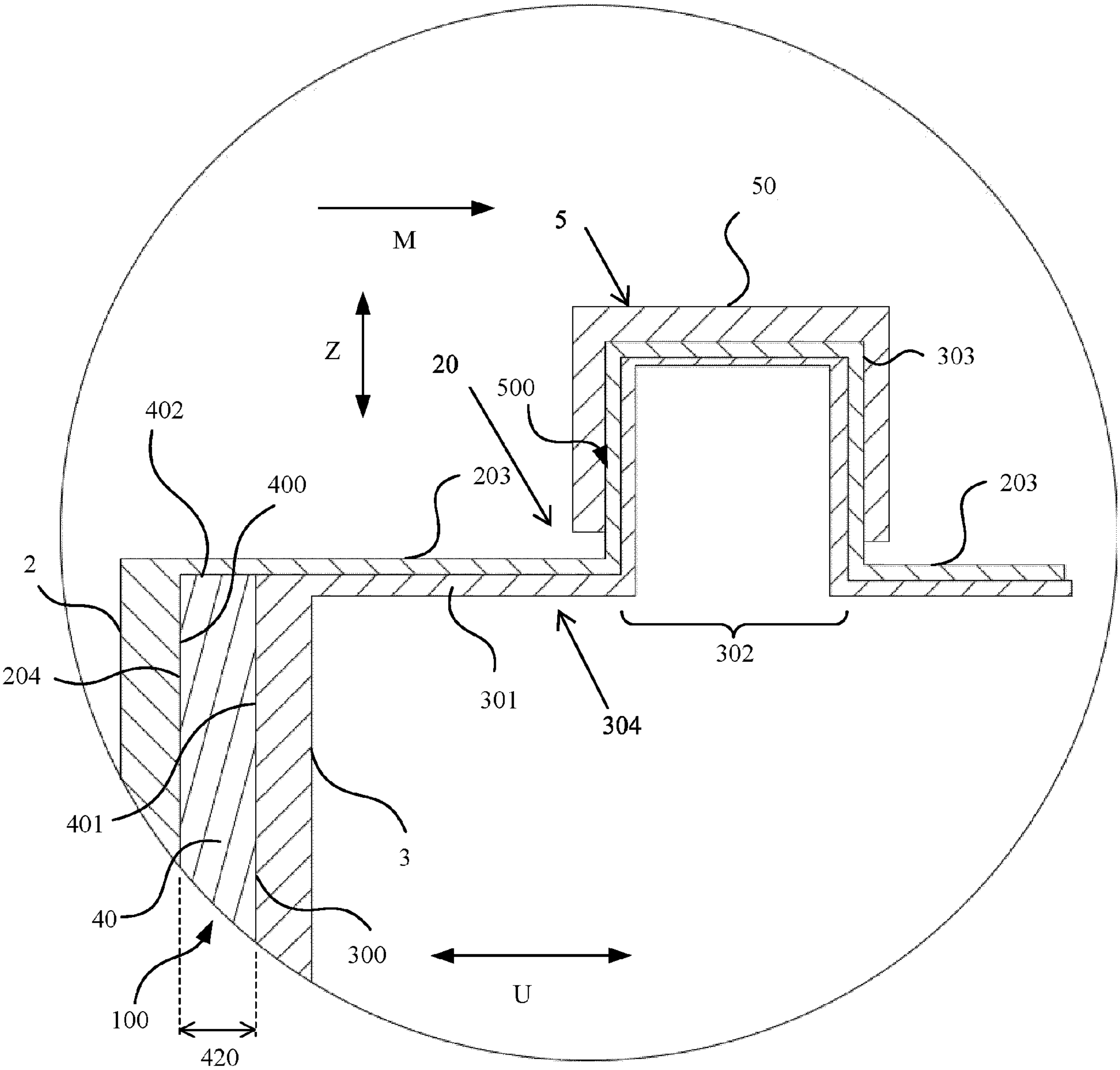


FIG. 3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500
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301
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401
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100
420

FIG. 4

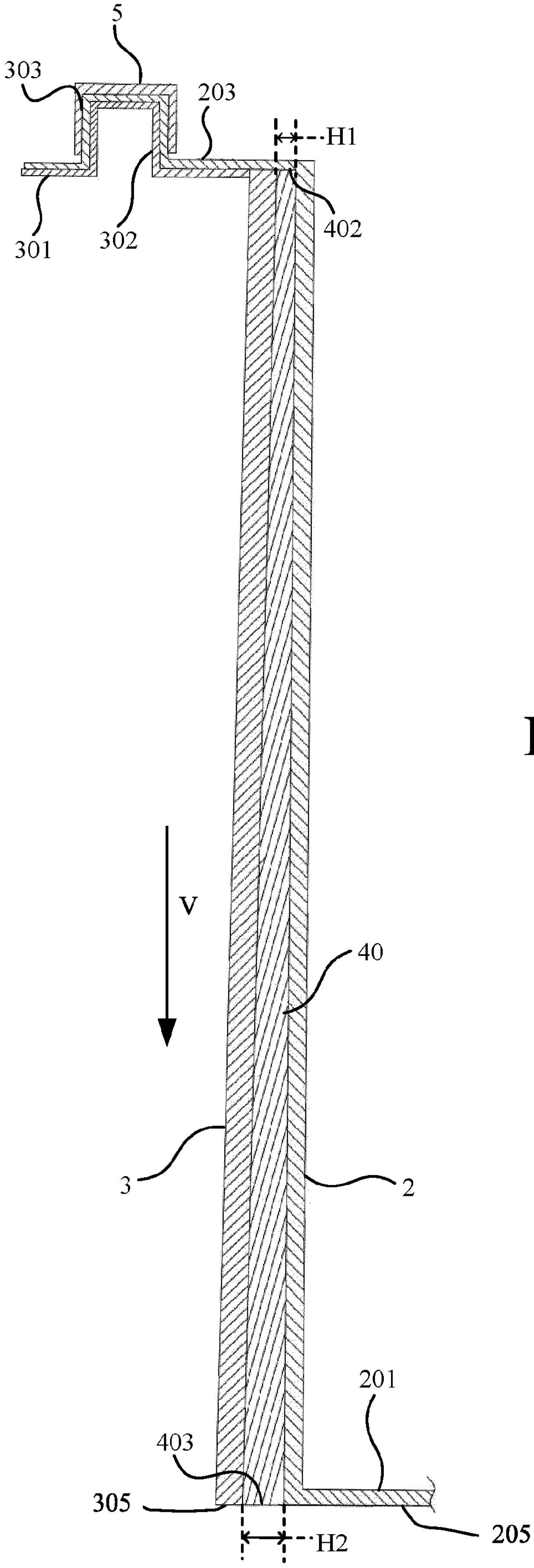

FIG. 5

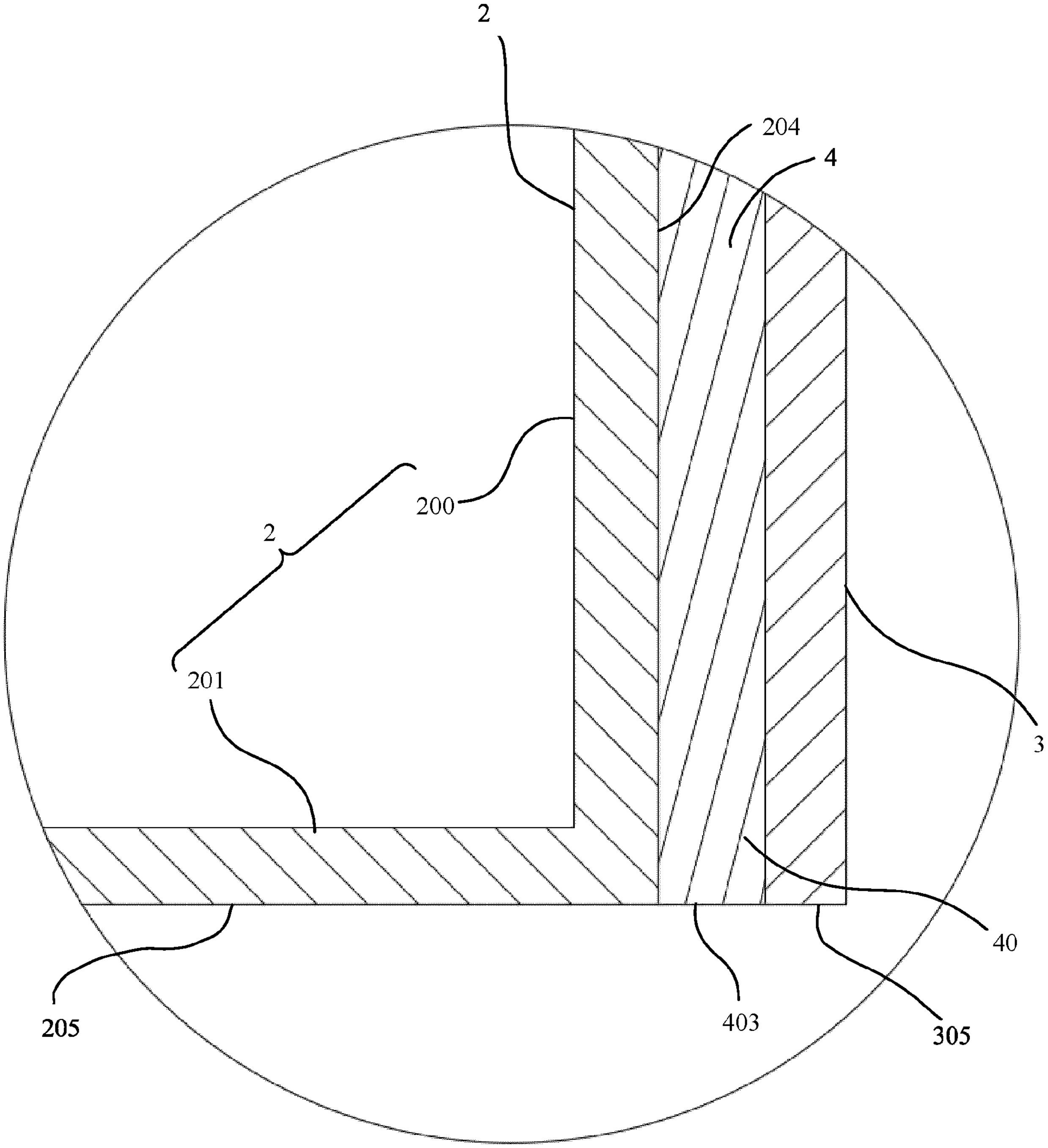

FIG. 6

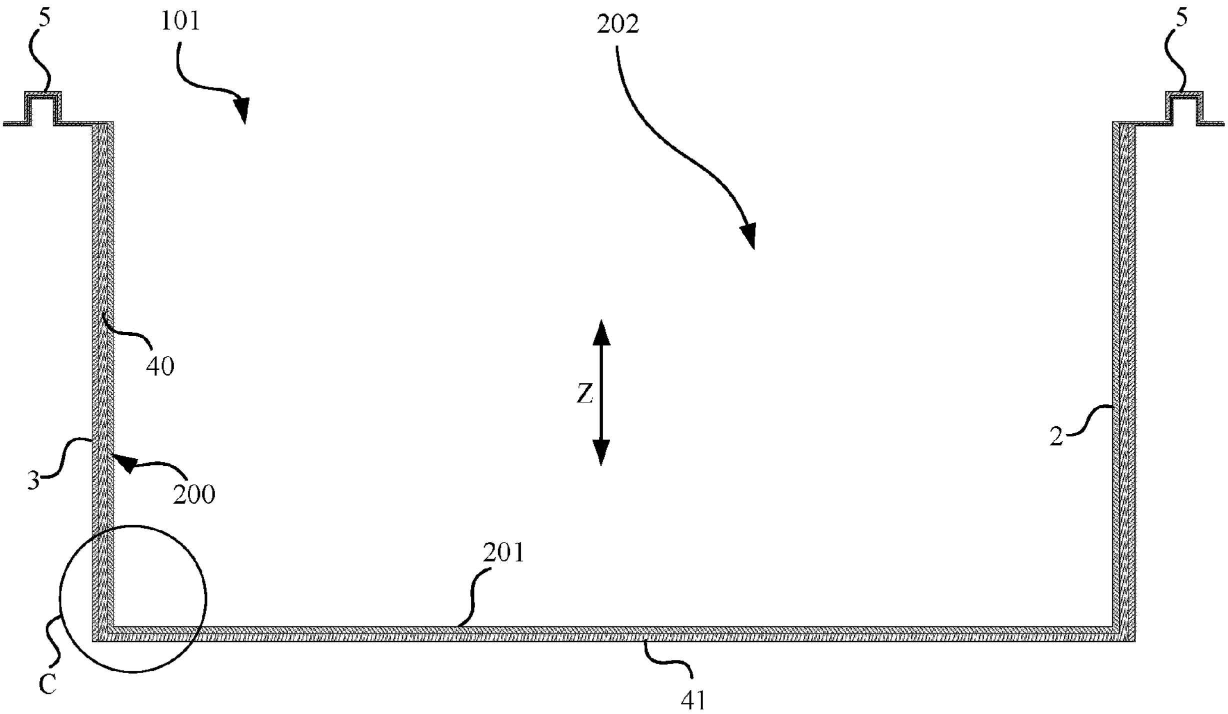

FIG. 7

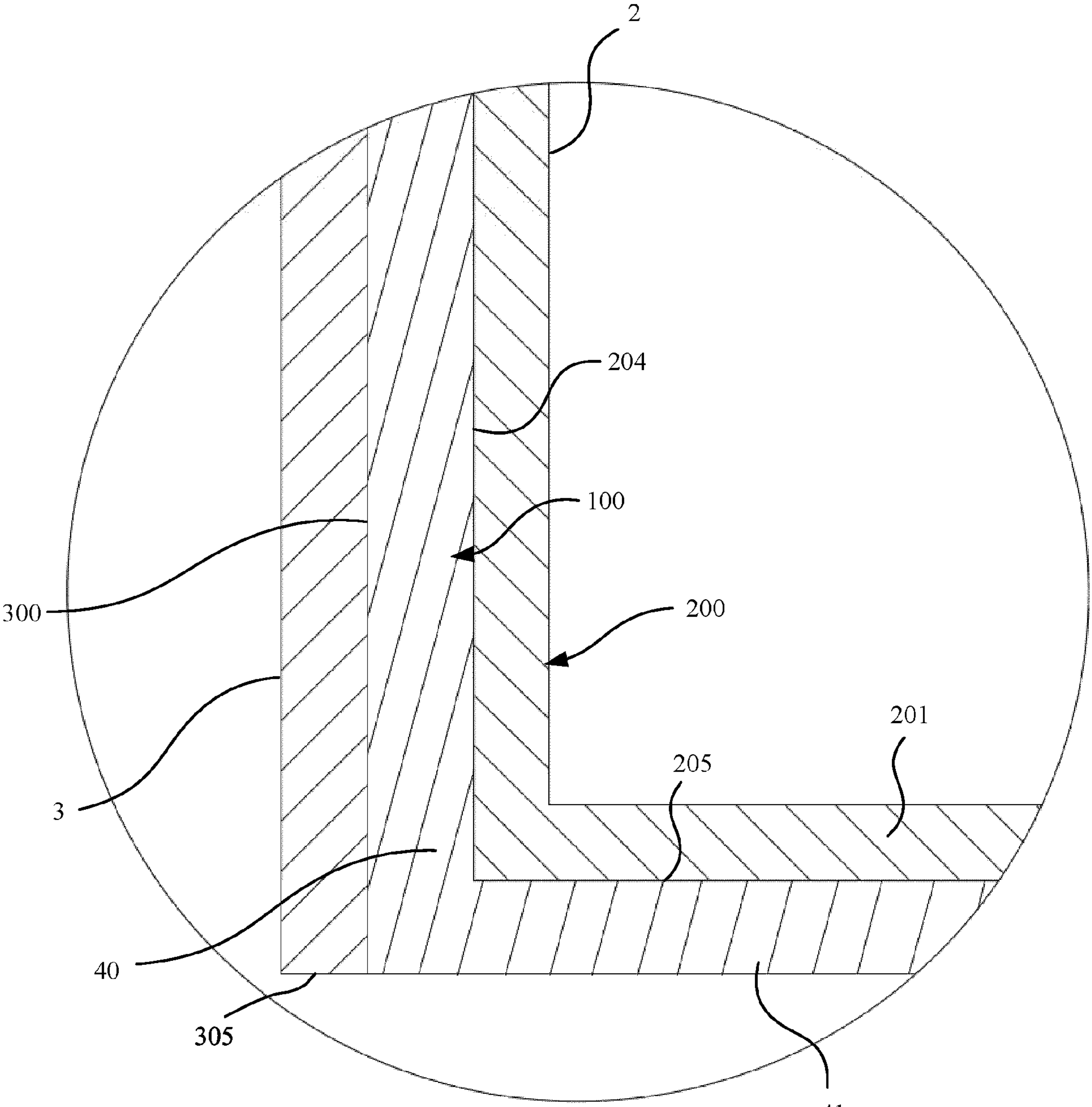

FIG. 8

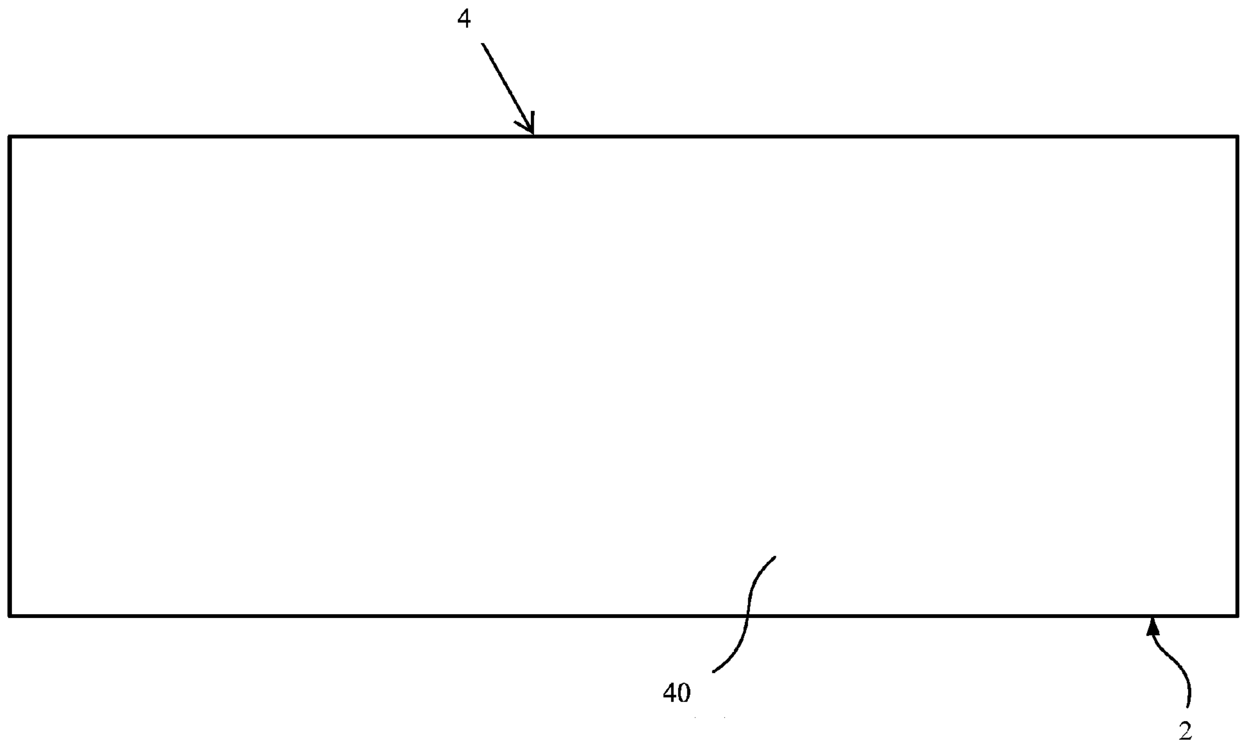

FIG. 9

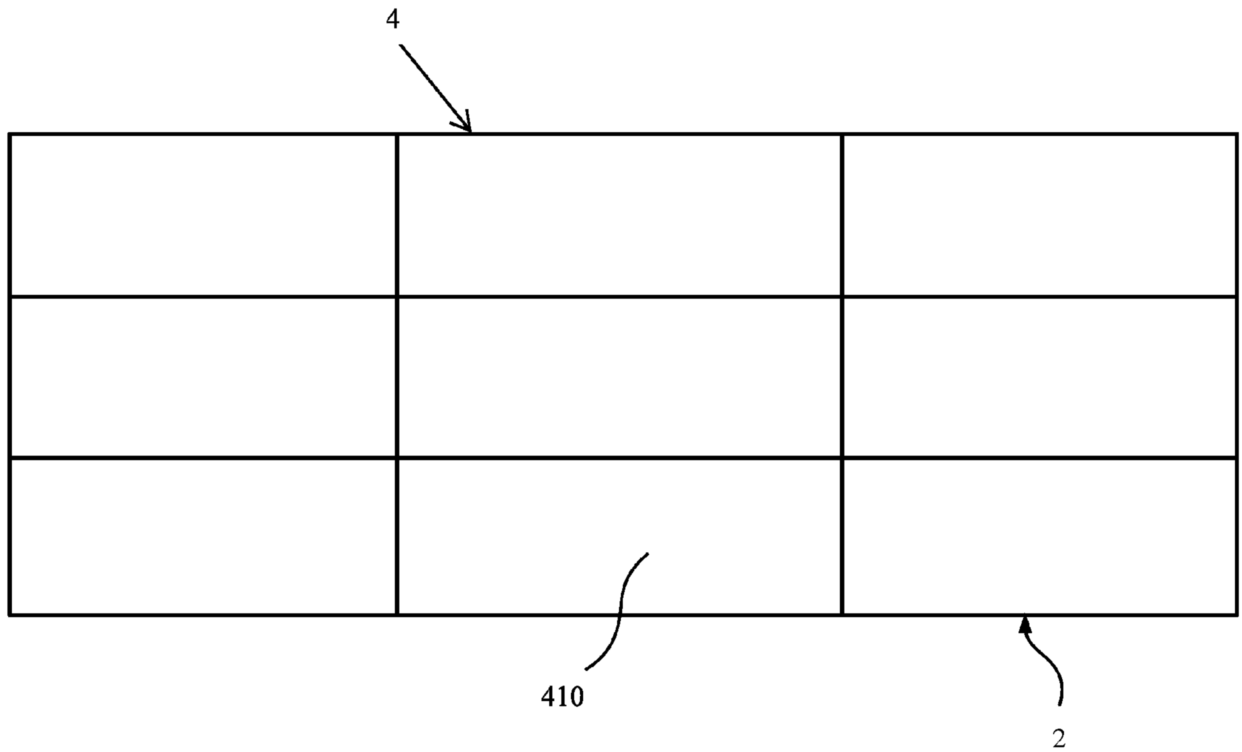

FIG. 10

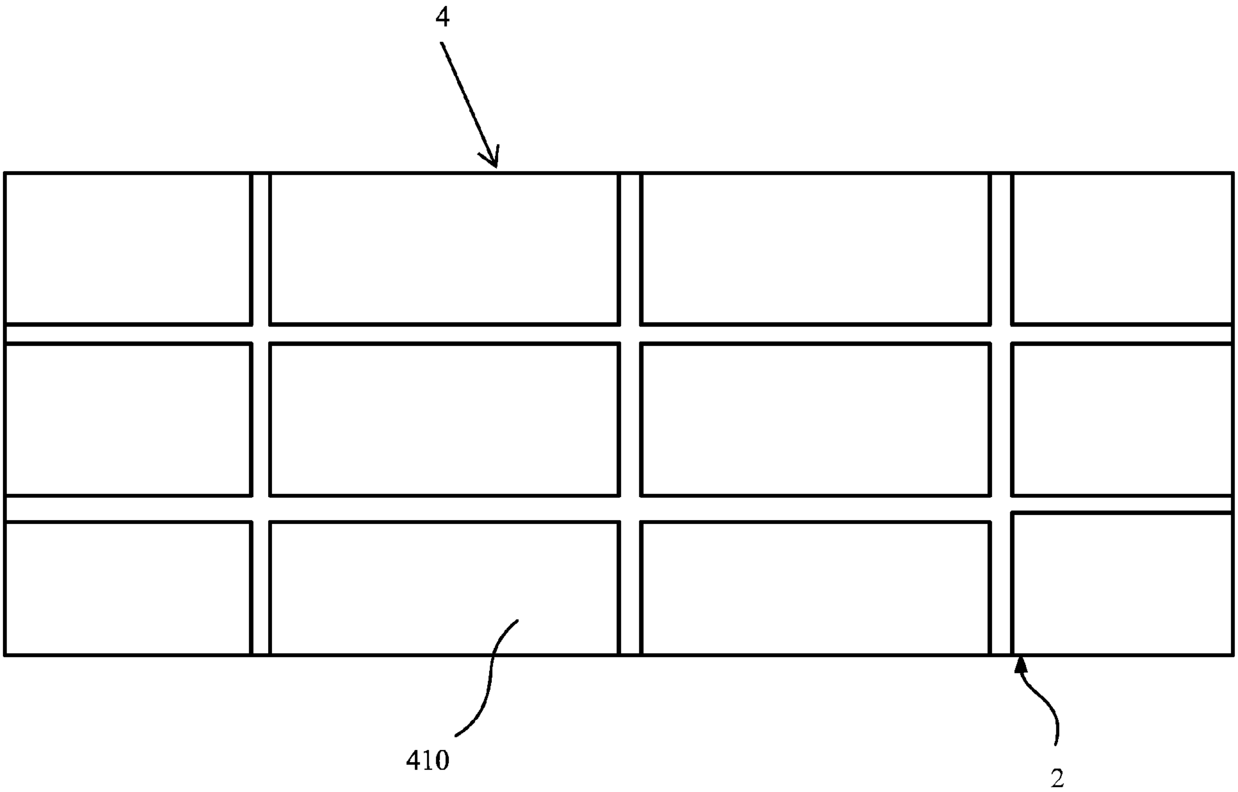

FIG. 11

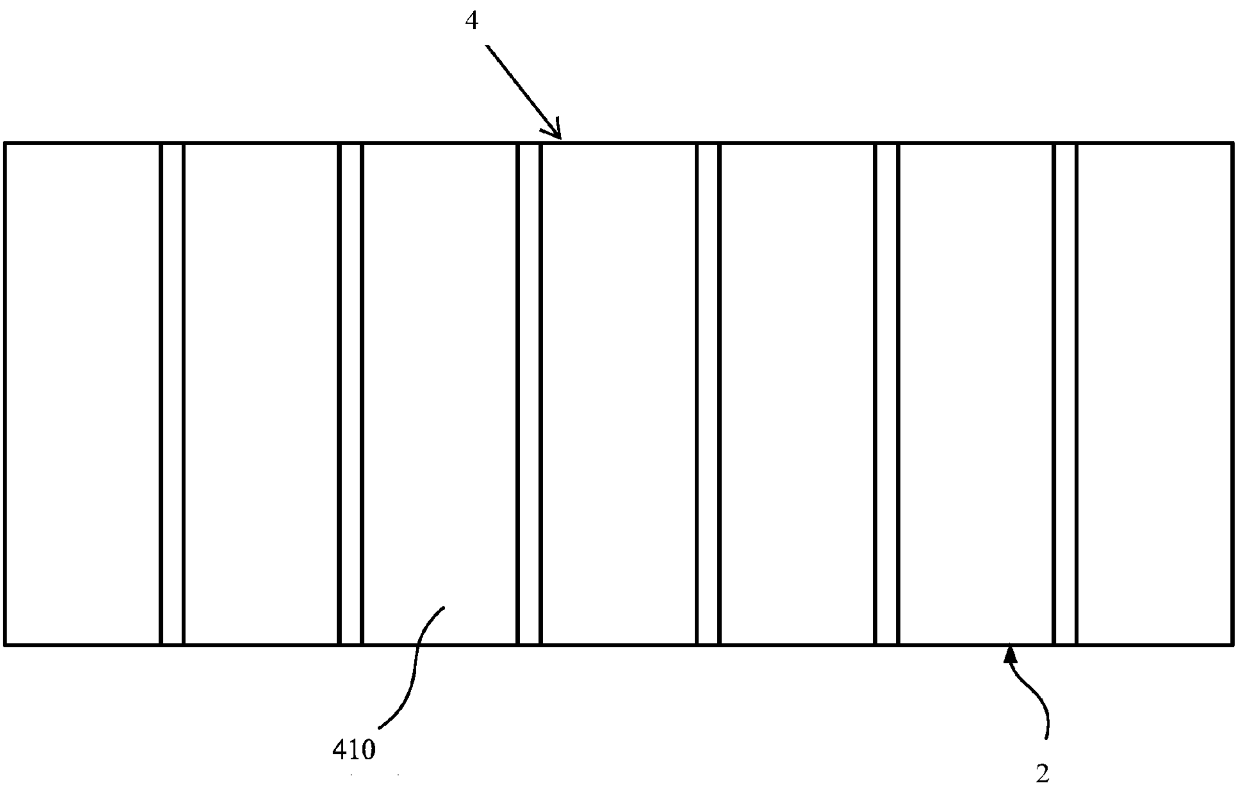

FIG. 12

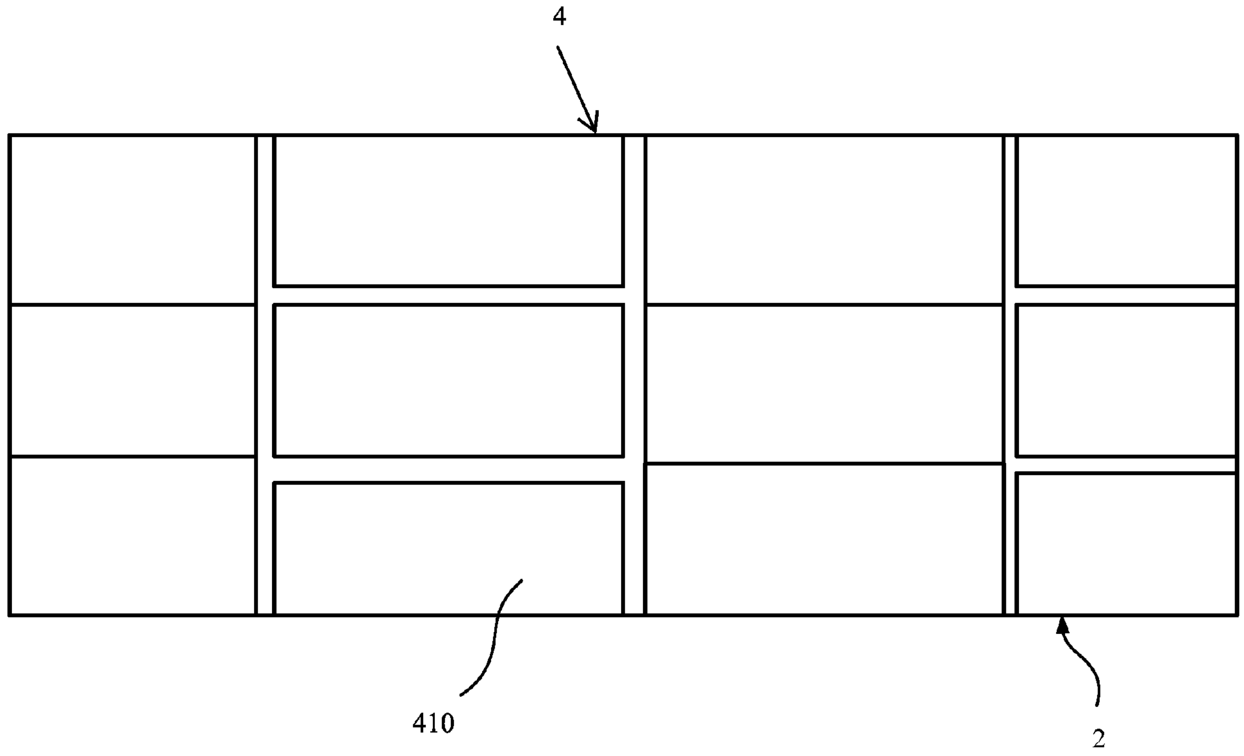

FIG. 13

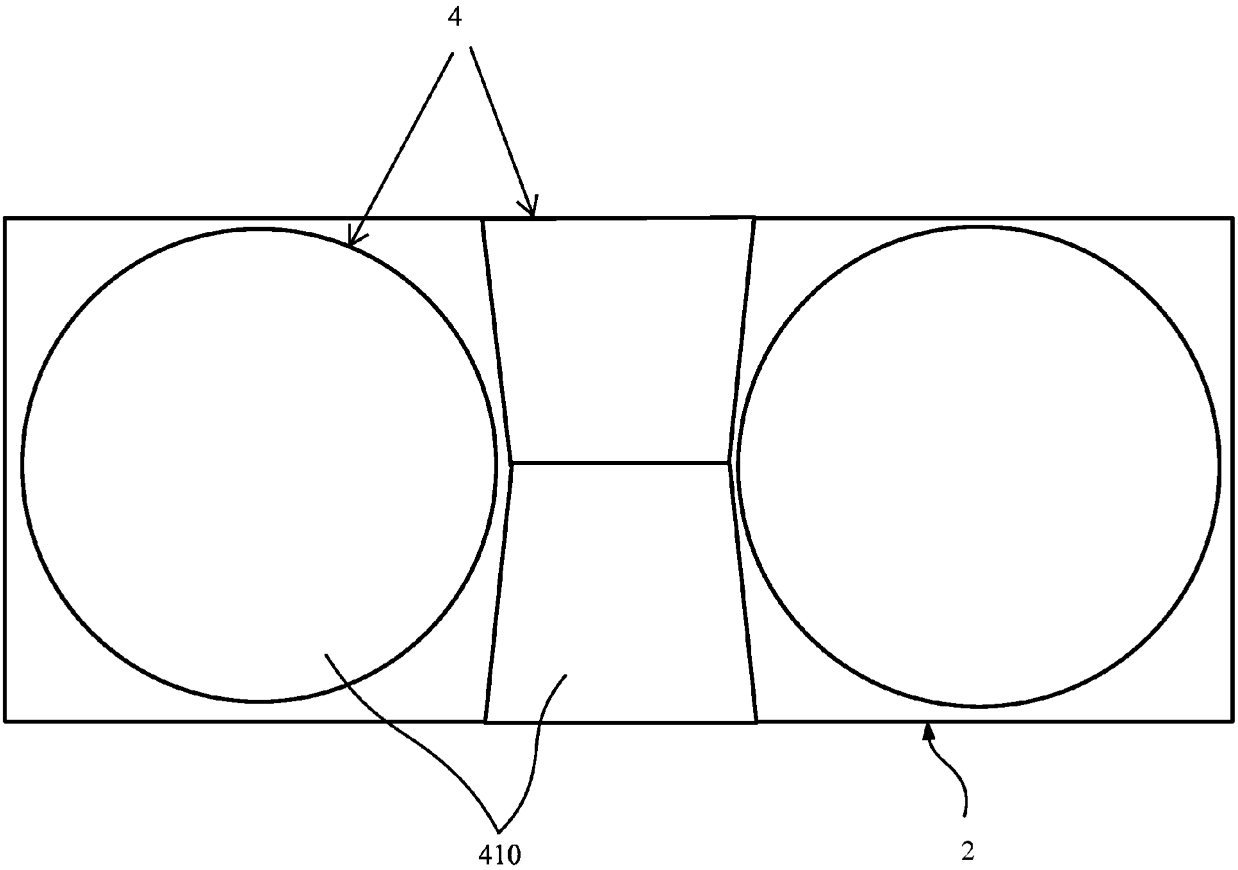

FIG. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 25 15 0654

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 5 652 972 A (CHARTRAND PAUL-EMILE [CA]) 5 August 1997 (1997-08-05) * column 2, line 66 - column 4, line 49; figures 1,4,6 *	1,8,13,14 12	INV. E04H4/00
X A	US 2016/376800 A1 (ZHANG ZHONGXIU [CN] ET AL) 29 December 2016 (2016-12-29) * paragraph [0013]; figures 1,2 * * paragraph [0030] - paragraph [0026] *	1-3,5-9,11,13,14 12	
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X A	US 5 548 852 A (ROWE LEE R [US]) 27 August 1996 (1996-08-27) * column 3, line 4 - column 4, line 62; figures 1,4 *	1,8,13,14 12	

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E04H
A61H

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	29 April 2025	Valenta, Ivar

CATEGORY OF CITED DOCUMENTS

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