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(71) Applicant: **Greatview Beijing Trading Co., Ltd.**
Beijing 100015 (CN)

(72) Inventors:
• **LIU, Jun**
Beijing 100015 (CN)
• **HONG, Gang**
Beijing 100015 (CN)

(74) Representative: **Weal, Emily Teresa et al**
Keltie LLP
No.1 London Bridge
London SE1 9BA (GB)

(54) **PACKAGING CONTAINER MOLDING BLANK AND PACKAGING CONTAINER**

(57) A packaging container. The packaging container is partially or completely formed by a laminated packaging material. A plurality of reinforcing ribs is formed on the surface or inside of the material of the packaging container to protect stability of the structure, so that the packaging container has higher performance when carrying liquid food, and the service time of the container can be prolonged. A base layer of the packaging material is isolated from the external environment by means of a waterproof material, so that the possibility that the base layer is damaged or moldy due to excessive environmental humidity is required, and the performance and quality of the packaging container itself are improved.

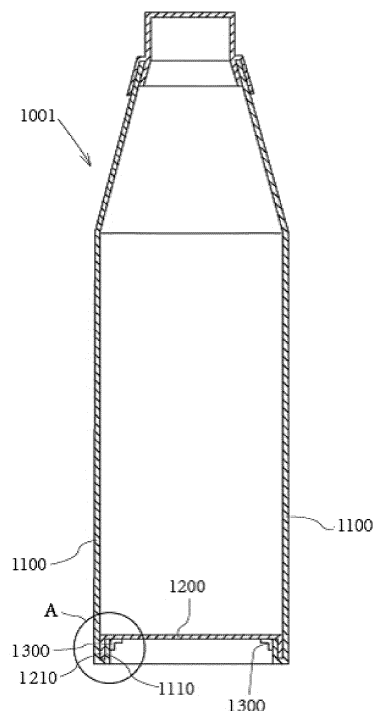


Fig.1-1

Description

[0001] The present application claims priority to the following Chinese patent applications:

1. Chinese patent application No. 201420283322.7, filed on May 29, 2014 and entitled "PACKAGING CONTAINER";
2. Chinese patent application No. 201420282931.0, filed on May 29, 2014 and entitled "BLANK FOR FORMING PACKAGING CONTAINER";
3. Chinese patent application No. 201420246292.2, filed on May 14, 2014 and entitled "PACKAGING CONTAINER AND BLANK FOR MAKING THE SAME";
4. Chinese patent application No. 201420245867.9, filed on May 14, 2014 and entitled "PACKAGING CONTAINER AND BLANK FOR MAKING THE SAME";
5. Chinese patent application No. 201420222389.X, filed on April 30, 2014 and entitled "PACKAGING CONTAINER AND BLANK FOR MAKING THE SAME".

Field of the Invention

[0002] The present invention relates to a blank for forming a packaging container and a packaging container.

Background of the Invention

[0003] An existing packaging container structure is disclosed in, for example, a patent document having a publication number WO2008/086808A1. A paper bottle structure is disclosed in Fig. 2 of the patent document. After the bottom 3 and the bottle body 2, both formed by a laminated composite material, of the paper bottle structure are sealed, the upper end of a skirt 17 formed by the bottle body 2 will be exposed to the external environment. Since the packaging material forming such a bottle body structure is a laminated material, and particularly, most of laminated materials of this kind may include a paper base layer, the end of the skirt, when exposed to the external environment, will be broken, cracked, mildewed, etc., due to the damp condition and the like of the external environment, thus causing an influence on the performance of the packaging container and a certain influence on food safety.

[0004] The above packaging container comprises a cylindrical bottle body at a lower end and a truncated cone-shaped bottle neck at an upper end, with the bottle body and the bottle neck both formed by a rectangular sheet-shaped packaging material, in which the bottle neck part in a tapering shape is achieved by forming folds of the packaging material. In this application, the folds of the neck part are folded in one direction, and after folding, the portions on both sides of the creases on the external

surface of the bottle neck may be uneven in height. As shown in the accompanying drawings of the reference document, the specific structures illustrated in the reference document are shown, in which the folding lines 10 are turned to one sides of the creases 9. Although the portion represented by 11 in one drawing is made close to the folding line 9 as much as possible and even kept adjacent and overlapped with the folding line 9 to keep relatively consistent concave-convex forms on both sides of the crease 12 on the external surface of the bottle neck in the drawing, actually, this is a relatively ideal situation, and can only be achieved through a relatively complex process, and its shape is not easy to maintain. For this reason, from the appearance of the bottle body of such a structure, obvious steps are present at the crease positions of the finished product with one sides higher and the other sides lower. In addition, since patterns generally are printed on the surface of the packaging material of such a packaging container in advance, the obvious steps will affect the expression of the content of the patterns. Moreover, as an additional screw bottle cap will be attached to the bottle opening portion of the bottle neck, a twisting force will be applied in the circumferential direction of the bottle body when a consumer screws off the bottle cap to take the content left in the container, and it will firstly cause breakage of bonding of the portion represented by 11 in the drawing, thus breaking the ideal appearance presentation state of the bottle neck.

[0005] In consideration of such factors as cost, environmental protection and the like, laminated sheets are extensively used at present in the filling industry to form ultimate packaging containers, for example, widely-known brick packages and pillow packages, as well as bottle-shaped packaging containers, in which the basic operating process is forming the ultimate packaging container structures by means of folding and sealing sheet packaging materials; additionally, during forming, folded portions are substantially limited to edges, corners and the like meaningless to forming shapes, and it follows the principle of as few folded portions as possible. Generally speaking, due to the own physical characteristics of the packaging materials, some relatively small packaging containers among packaging containers formed by this kind of relatively thin laminated sheets are relatively easy to maintain in form after contents are filled therein; however, when the packaging capacity is increased, articles such as a liquid food and the like filled in the packaging containers will press the inner walls of the containers, and the weight of the liquid food will cause uneven squeezing onto the inner walls of the containers, thus affecting the shapes of the package bodies and even leading to deformation and even breakage of the packaging containers.

[0006] The above packaging containers of the bottle-shaped structure are formed by folding laminated materials, i.e., folding and sealing blanks formed with folding lines by pressing in advance to form the main body parts of bottles. For the bottles formed in such a forming man-

ner, portions formed by folding and tiering the packaging materials in the bottle neck parts thereof will cause a large surface undulation degree of the bottle bodies and thus ugly appearances, and the gaps between the folded portions are adverse to sterilization. Further, as bottle caps will be attached to the tops of the bottle bodies, in many cases, these gaps cannot be sterilized thoroughly and thus are prone to become places for bacterial colonies breeding, thereby resulting in reduction of the quality guarantee period of packaged foods. Or, these gaps or dead corners will add difficulty of sterilization, leading to a more complex sterilization and disinfection process.

Summary of the Invention

[0007] One technical problem to be solved by the present invention is to provide a packaging container structure having better performance and environmental suitability.

[0008] The technical problem to be solved may be solved by the following technical solution.

[0009] A packaging container is formed in part or in whole by a laminated composite material having a paper base layer. A section or surface of at least part of the laminated composite material is bonded with a surface of an adjoining packaging material in the formed packaging container, in which a paper substrate of the paper base layer of the laminated composite material is isolated from an external environment by a waterproof material at the bonded position.

[0010] As further improvement of this technical solution, the section or surface is covered with a waterproof strip that forms the waterproof material for isolating the paper substrate from the external environment.

[0011] Also as further improvement of this technical solution, the section of the laminated composite material is an oblique section that fits the surface of the adjoining packaging material. An outermost laminated material layer of the laminated composite material forms the waterproof material isolating the paper substrate from the external environment.

[0012] As still further improvement of this technical solution, the waterproof strip is heat-sealed to cover the section of the laminated composite material.

[0013] As one preferred embodiment of the present invention, the waterproof strip is a PE strip. The PE strip used as the waterproof strip is easily available and good in effect.

[0014] Alternatively, the waterproof strip is a laminated material.

[0015] Also as one preferred embodiment of the present invention, the packaging container is bottle-shaped with the bonded position at a bottle bottom part of the bottle-shaped packaging container.

[0016] Yet as one preferred embodiment of the present invention, the packaging container is bottle-shaped with the bonded position at the bottle bottom part of the bottle-shaped packaging container. The waterproof strip covers

a joint of two adjoining packaging materials forming the bottle bottom and a bottle body along a circular ring-shaped path.

[0017] As the bottle bottom serves as a bearing part of the packaging container during storage and transportation, if the paper base is exposed here, the surrounding ventilation condition will be worse, leading to easier gathering of damp; therefore, a better effect may be achieved by isolating the paper base from the environment.

[0018] Still as one preferred embodiment of the present invention, the packaging container is bottle-shaped, in which the oblique section is formed at ends of edgefolds of the packaging material forming the bottle body of the bottle-shaped packaging container, and fitted and bonded with a lower surface of the packaging material forming the bottle bottom of the bottle-shaped packaging container.

[0019] Also as one preferred embodiment of the present invention, the oblique section has an oblique angle of 45 degrees.

[0020] As another further improvement of the present invention, the oblique section faces the outside of the bottle body.

[0021] For the packaging container structure formed according to the above technical solution, the structure at the bonded position of the packaging materials is treated, or covered, etc., such that the paper base layer exposed outside the packaging container is avoided from excessive contact or reaction with the external environment, thus allowing the decrease of the probability of the paper base layer being damaged or mildewed in the cases of over-high environment humidity and the like to affect the appearance of the whole packaging container or decrease the physical properties of the packaging container. Thus, the performance of the packaging container is further improved.

[0022] Further, another technical problem to be solved by the present invention is to provide a packaging container having even surface positions on both sides of creases without more subsequent treatment and having a container structure relatively easy to maintain.

[0023] The technical problem to be solved may be solved by the following technical solution.

[0024] A packaging container comprises a cylindrical bottle body and a truncated cone-shaped bottle neck both formed by folding a sheet laminated material. The bottle body and the bottle neck are formed by an integrated rectangular sheet laminated material consisting of a first portion and a second portion both in a rectangular shape. The first portion and the second portion connected with each other form the cylindrical bottle body and the truncated cone-shaped bottle neck, respectively. A series of folded layers, which are formed by folding part of a substrate of the sheet laminated material of the second portion and tiered at one side of the bottle neck, and project from a surface of a bottle neck body, are spaced apart in a circumferential direction of the bottle neck, and a series of corresponding creases are formed on a surface

of the other side of the bottle neck. Folded areas of the folded layers are gradually wider from a lower portion to an upper portion of the truncated cone-shaped bottle neck to keep a tapering opening of the bottle neck. The packaging container is characterized in that each folded layer projecting from the surface of the bottle neck body has at least two end ridges located at both ends of the corresponding crease, respectively.

[0025] As further improvement of this technical solution, the folded layers are located at an inside end of the packaging container.

[0026] Also as further improvement of this technical solution, the folded layers are located at an outside end of the packaging container.

[0027] As one preferred embodiment of the present invention, in a same horizontal plane, each corresponding crease has a distance away from one end ridge greater than a distance away from the other end ridge. In this case, it is conducive to keeping the form of the packaging container when a screw cap attached to the packaging container is screwed off.

[0028] Also as one preferred embodiment of the present invention, in a same horizontal plane, each corresponding crease has an identical distance away from the two end ridges.

[0029] As another preferred embodiment of the present invention, the laminated material comprises at least a paper base layer and an aluminum foil layer, thereby facilitating preservation of beverages, such as milk, juice and the like.

[0030] As another further improvement of the present invention, the folded layers are integrally heat-sealed with the laminated material of the bottle neck body by means of induction heating.

[0031] For the packaging container made according to the above technical solution, the bottle-shaped packaging container is made by using the laminated sheet. Particularly, a composite paper material is sealed and folded to form an ultimate bottle-shaped structure, thereby allowing effective solving of the problems of high cost, difficult decomposition and the like of a plastic packaging container, providing such advantages as low cost, high environmental protection and the like, and also being conducive to keeping form control of the container. More particularly, when such packaging containers are applied to a dedicated filling machine, it may lead to great increases in filling speed and throughput in unit time. Moreover, the defects of complex control, many control links, not easy maintaining of the bottle body form and the like of a similar packaging container process in the prior art may be avoided.

[0032] Another technical problem to be solved by the present invention is to provide a blank for making the above packaging container. The blank is partitioned from a sheet in a roll. Each partitioned blank unit comprises a first rectangular portion and a second rectangular portion connected to each other and sharing a rectangular edge. The first rectangular portion is used for forming the cy-

lindrical bottle body of the packaging container, and the second rectangular portion is used for forming the bottle neck of the packaging container and provided with a plurality of groups of indentations convenient for tiering the folded layers. Each group of indentations includes a first indentation line, a second indentation line, a third indentation line and a fourth indentation line arranged in order, wherein one ends of the four indentation lines converge at one point on the shared rectangular edge, while the other ends of the four indentation lines are scattered on another rectangular edge of the second rectangular portion opposite to the shared rectangular edge.

[0033] As further improvement of this technical solution, a first region is formed between the first and second indentation lines, while a second region is formed between the second and third indentation lines, and a third region is formed between the third and fourth indentation lines. The first region and the third region are located symmetrically.

[0034] As another further improvement of this technical solution, with a line passing through the convergence point and perpendicular to the shared rectangular edge as a reference line, in a same horizontal plane, a distance between the first indentation line and the reference line is twice a distance between the second indentation line and the reference line, and a distance between the fourth indentation line and the reference line is twice a distance between the third indentation line and the reference line.

[0035] As one preferred embodiment of this technical solution of the blank, with a line passing through the convergence point and perpendicular to the shared rectangular edge as a reference line, in a same horizontal plane, a distance between the first indentation line and the reference line is twice a distance between the second indentation line and the reference line, and a distance between the fourth indentation line and the reference line is twice a distance between the third indentation line and the reference line. Further, the distance between the first indentation line and the reference line is smaller than the distance between the fourth indentation line and the reference line.

[0036] In addition, the blank may be a laminated composite material having composite layers including at least one paper base layer and one aluminum foil layer.

[0037] As another further improvement of this technical solution, the first rectangular portion is provided with at least one observation hole that is hermetically connected with a transparent sheet.

[0038] As another further improvement of this technical solution, the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

[0039] When the blank provided in the above technical solution is used for making the packaging container, the forming efficiency and forming quality of the packaging container may be greatly improved. Moreover, the production process of the blank is simple, and low in cost.

[0040] Another technical problem to be solved by the

present invention is to provide a packaging container having a package body shape easy to maintain.

[0041] The technical problem to be solved may be solved by the following technical solution.

[0042] A packaging container is used for storing a liquid food, wherein a container wall defining a major storage space of the packaging container is formed in part by a sheet laminated material having a paper base as a major portion. A plurality of groups of stiffeners formed by folding and tiering the laminated material are provided on the container wall, and project from the container wall.

[0043] As further improvement of this technical solution, the stiffeners are transversely arranged on a surface of the container wall.

[0044] Alternatively, the stiffeners are vertically arranged on the surface of the container wall.

[0045] Alternatively, the stiffeners are slantwise arranged on the surface of the container wall.

[0046] Also as further improvement of this technical solution, the stiffeners project from an inner side surface of the container wall.

[0047] Alternatively, the stiffeners project from an outer side surface of the container wall.

[0048] As one preferred embodiment of the present invention, the packaging container is bottle-shaped. A bottle body of the bottle-shaped packaging container is formed by the laminated material.

[0049] Also as one preferred embodiment of the present invention, the packaging container is bottle-shaped, wherein a bottle body and a bottle neck of the bottle-shaped packaging container are both formed by the laminated material, and the stiffeners are provided on the surfaces of both the bottle body and the bottle neck.

[0050] Still as further improvement of this technical solution, relative to creases formed at folded positions, the tiered stiffeners are folded along one sides of the creases.

[0051] Similarly, relative to the creases formed at the folded positions, the tiered stiffeners may also be folded along both sides of the creases.

[0052] Specifically, relative to the tiered stiffeners, the creases are center-aligned or deflected to one side.

[0053] As another preferred embodiment of the present invention, the packaging container is shaped into a hexagonally prismatic package body or a brick package structure.

[0054] In addition, the laminated composite material may be inductively heated and then tiered and sealed to form the stiffeners.

[0055] For the packaging container structure formed according to the above technical solution, the stiffeners in various forms are formed on the surface of or inside the material forming the packaging container by means of folding, attaching, embedding and the like to protect the stability of the package body structure, thus allowing higher physical properties for the packaging body when holding a liquid food and being conducive to prolonging the service time of the container body, with avoidance of

defects of breakage, collapse, package body deformation and the like of the packaging container during transportation and even production. As a result, the quality of the package body is greatly improved.

[0056] Another technical problem to be solved by the present invention is to provide a blank for producing the above package body in order to facilitate the production of the above special package body.

[0057] The technical problem to be solved may be solved by the following technical solution.

[0058] A blank for making the above packaging container is provided, in which a plurality of groups of indentation lines convenient for forming the stiffener structures by tiering after folding are pressed against a surface of a laminated composite material in advance.

[0059] Specifically, each group of indentation lines includes two or four indentation lines.

[0060] More specifically, at least one observation hole is formed in the laminated composite material in advance, and a transparent sheet is hermetically connected to each observation hole.

[0061] More specifically, the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

[0062] The packaging container blank formed according to the above technical solution may permit fast and convenient formation of a corresponding package body, thereby meeting the large-scale production requirements of modern food processing.

[0063] Further another technical problem to be solved by the present invention is to provide a packaging container having a package body shape easy to maintain.

[0064] The technical problem to be solved may be solved by the following technical solution.

[0065] A packaging container has a main body formed by a sheet laminated material. A strip-shaped or meshed stiffener structure is provided on a sidewall of the packaging container formed by the sheet laminated material.

[0066] As further improvement of this technical solution, the stiffener structure is provided on an inner wall or outer wall surface of the sidewall.

[0067] As another further improvement of this technical solution, the stiffener structure is embedded inside the laminated material.

[0068] Also as another further improvement of this technical solution, the stiffeners are formed by folding and then tiering part of a same piece of laminated composite material forming the sidewall of the packaging container.

[0069] Still as another further improvement of this technical solution, the stiffeners are formed by a same packaging material or a different packaging material adhered to a surface of the laminated composite material forming the sidewall of the packaging container.

[0070] Yet as further improvement of this technical solution, a plurality of strip-shaped stiffeners of the stiffener structure are uniformly arranged along a periphery of the

packaging container.

[0071] Similarly, the strip-shaped stiffeners of the stiffener structure may be arranged slantwise, vertically or horizontally with respect to a trend of a bottom of the packaging container.

[0072] Specifically, the stiffener structure may be provided on the sidewall corresponding to a major containing space of the packaging container.

[0073] As one preferred embodiment of this technical solution, the stiffener structure is provided from a one-second or one-third position of a lower portion of the corresponding sidewall to a bottom of the sidewall.

[0074] Also as one preferred embodiment of this technical solution, gaps between adjacent stiffeners among a plurality of strip-shaped stiffeners arranged horizontally taper from an upper part to a lower part of the packaging container.

[0075] Yet as another further improvement of this technical solution, relative to creases formed at folded positions, the tiered stiffeners are folded along one sides of the creases.

[0076] As one another preferred embodiment of the present technical solution, relative to creases formed at folded positions, the tiered stiffeners are folded along both sides of the creases. For example, relative to the tiered stiffeners, the creases are center-aligned or deflected to one side. As another example, the creases are closer to the front sides of the corresponding stiffeners in a clockwise direction in a view from top to bottom.

[0077] As one preferred embodiment of the present invention, the packaging container is bottle-shaped. A bottle body and a bottle neck of the bottle-shaped packaging container are formed by the laminated composite material.

[0078] Further, the bottle body and the bottle neck of the bottle-shaped packaging container are formed by the same piece of laminated composite material.

[0079] Still further, the stiffener structure is provided at both the bottle body and the bottle neck.

[0080] Alternatively, the stiffener structure is provided only at the bottle body.

[0081] Also as one preferred embodiment of the present invention, the packaging container is shaped into a hexagonally prismatic package body or a brick package structure.

[0082] Yet as one preferred embodiment of the present invention, the stiffeners are horizontally provided on a circumferential external facade of the packaging container.

[0083] Also as one preferred embodiment of the present invention, the laminated composite material is inductively heated and then tiered and sealed to form the stiffeners.

[0084] For the packaging container structure formed according to the above technical solution, the stiffeners in various forms are formed on the surface of or inside the material forming the packaging container by means of folding, attaching, embedding and the like to protect

the stability of the package body structure, thus allowing higher physical properties for the packaging body when holding a liquid food and being conducive to prolonging the service time of the container body, with avoidance of defects of breakage, collapse, package body deformation and the like of the packaging container during transportation and even production. As a result, the quality of the package body is greatly improved.

[0085] Another technical problem to be solved by the present invention is to provide a blank for producing the above package body in order to facilitate the production of the above special package body.

[0086] The technical problem to be solved may be solved by the following technical solution.

[0087] A blank for making the above packaging container is provided. A plurality of groups of indentation lines convenient for forming the stiffener structures by tiering after folding are pressed against a surface of a laminated composite material in advance.

[0088] Specifically, each group of indentation lines includes two or four indentation lines.

[0089] As further improvement of this technical solution, the blank comprises a first rectangular portion and a second rectangular portion connected to each other.

The first rectangular portion forms a bottle neck of a bottle-shaped packaging container, and the second rectangular portion forms a bottle body of the bottle-shaped packaging container. One single group of indentation lines provided in the first rectangular portion are arranged radially, and one single group of indentation lines provided in the second rectangular portion are arranged in parallel. The corresponding groups of indentation lines in the first rectangular portion and the second rectangular portion intersect at a rectangular edge shared by the first rectangular portion and the second rectangular portion, and the shared rectangular edge eventually forms a dividing line of the bottle neck and the bottle body of the bottle-shaped packaging container.

[0090] As further improvement of this technical solution, at least one observation hole is formed in the second rectangular portion in advance, and a transparent sheet is hermetically connected to each observation hole.

[0091] As further improvement of this technical solution, the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

[0092] Yet another technical problem to be solved by the present invention is to provide another blank for making a packaging container, and the specific technical solution is that band-shaped or meshed stiffeners are embedded between composite layers of a laminated composite material in advance during compounding.

[0093] Still another technical problem to be solved by the present invention is to provide another blank for making a packaging container, and the specific technical solution is that band-shaped stiffeners are adhered to the surface of the laminated composite material in advance.

[0094] The packaging container blanks formed accord-

ing to the above technical solutions may permit fast and convenient formation of corresponding package bodies, thereby meeting the large-scale production requirements of modern food processing.

[0095] Still another technical problem to be solved by the present invention is to provide a blank for forming a packaging container that is more conducive to disinfection and sterilization. The technical problem to be solved may be solved by the following technical solution.

[0096] A blank for forming packaging container is used for forming a bottle body part and a bottle neck part of a bottle-shaped container. Specifically, the blank is a sheet comprising a segment of rectangular material of a lower portion and a segment of serrated strip-shaped material of an upper portion. One rectangular edge of the rectangular material overlaps a bottom edge of the serrated strip-shaped material such that the rectangular material and the serrated strip-shaped material are connected and formed in whole by different portions of a same sheet through die cutting. The rectangular material is used for forming the bottle body part of the bottle-shaped container, and the serrated strip-shaped material is used for forming the bottle neck part of the bottle-shaped container. The serrated strip-shaped material is provided with a group of serrations open outwards.

[0097] As further improvement of this technical solution, indentation lines convenient for folding the blank to keep splicing and sealing of the adjacent serrations are provided in a surface of the blank at inner side ends of serration edges of the serrations. The addition of the indentation lines along the edges of the serrations allows easier formation in the subsequent bonding and sealing process and easy guarantee on the forming quality.

[0098] Also as further improvement of this technical solution, each serration is isosceles trapezoid-shaped.

[0099] As another further improvement of this technical solution, 6-8 serrations are uniformly formed on the serrated strip-shaped material. More specifically, a better effect may be achieved when 8 serrations are uniformly formed on the serrated strip-shaped material.

[0100] As one preferred embodiment of the present invention, a height of each serration is approximately one half of a rectangle height (i.e., in an axial direction in a roll form) of the rectangular material.

[0101] Also as one preferred embodiment of the present invention, an overall length of the serrated strip-shaped material is 3-4 times the height of each serration. Specifically, it is more preferred that the overall length of the serrated strip-shaped material is π times the height of each serration. In this case, the overall shape of the eventually formed bottle is elongated (especially in the bottle neck part), and such a structure causes a relatively gentle tapering trend of the bottle neck part, which is conducive to keep natural transition of the bottle body structure and fine appearance of the surface.

[0102] Still as one preferred embodiment of the present invention, the serration edges of the serrations are covered with a waterproof material strip. The covering wa-

terproof strip is conducive to protecting the section of the blank packaging material, and also convenient for bonding and sealing during forming.

[0103] In addition, the blank comprises at least a paper base layer, an aluminum foil layer, and a waterproof layer. The composite material not only is capable of satisfying the characteristics of thermal insulation, protection from light and moisture protection, but also has the advantage of low cost.

[0104] Additionally, an ink printed layer may be further provided on the surface of the blank, which is conducive to the expression of patterns on the surface of the bottle body, thus allowing a decrease in package printing cost.

[0105] Specifically, at least one observation hole is formed in the blank in advance, and a transparent sheet is hermetically connected to each observation hole.

[0106] More specifically, the transparent sheet is bonded to the surface of the blank, or between the aluminum foil layer and the waterproof layer of the blank.

[0107] For the blank for forming packaging container formed according to the above technical solution, in-advance die-cutting and pressing of the sheet blank, and particularly, handling of the serrated part folded and bonded may permit avoidance of sterilization dead corners at the packaging material folds of a bottle neck part when a laminated composite material is used for forming a bottle-shaped packaging container, thus causing simplification of a subsequent sterilization process and reduction of food safety risks resulting from sterilization risks and production costs. Moreover, when the blank is used for making the bottle-shaped packaging container, compared to making with a packaging material in a complete roll, the occupied area and space of the filling machinery can be effectively reduced.

Brief Description of the Drawings

[0108] The specific implementations of the present invention will be described in detail below in conjunction with the accompanying drawings.

Fig. 1-1 is a structural schematic view of an embodiment 1-1 of the present invention;

Fig. 1-2 is an enlarged view of a part A in Fig. 1-1;

Fig. 1-3 is a structural schematic view of an embodiment 1-2 of the present invention;

Fig. 1-4 is an enlarged view of a part B in Fig. 1-3;

Fig. 1-5 is a structural schematic view of an embodiment 1-3 of the present invention;

Fig. 1-6 is an enlarged schematic view of a part C in Fig. 1-5;

Fig. 1-7 is a schematic view of a partial structure in Fig. 1-6;

Fig. 2-1 is a structural schematic view of a packaging container in the prior art;

Fig. 2-2 is a structural schematic view of a blank for making the packaging container of the present invention;

Fig. 2-3 is a structural schematic view of an embodiment 2-1 of a packaging container of the present invention;

Fig. 2-4 is a schematic cross sectional structure of a neck part of the packaging container of the embodiment 2-1;

Fig. 2-5 is a schematic cross sectional structure of a neck part of an embodiment 2-2 of a packaging container of the present invention;

Fig. 2-6 is a structural schematic view of a blank for making the packaging container of an embodiment 2-3 of the present invention;

Fig. 2-7 is a structural schematic view of the embodiment 2-3 of a packaging container of the present invention;

Fig. 3-1 is a schematic view of an external structure of a packaging container provided by embodiments 3-1, 3-2 and 3-3 of the present invention;

Fig. 3-2 is a schematic structure of a cross section of a bottle body part in the embodiment 3-1 (with the related section line omitted);

Fig. 3-3 is schematic expansion of a blank in the embodiment 3-1;

Fig. 3-4 is a schematic structure of a cross section of a bottle body part in the embodiment 3-2 (with the related section line omitted);

Fig. 3-5 is schematic expansion of one part of a blank in the embodiment 3-2;

Fig. 3-6 is a schematic structure of a cross section of a bottle body part in the embodiment 3-3 (with the related section line omitted);

Fig. 3-7 is a schematic view of an external structure of a packaging container provided by an embodiment 3-4;

Fig. 3-8 is a schematic structure of a cross section of a bottle body part in the embodiment 3-4 (with the related section line omitted);

Fig. 3-9 is a schematic view of an external structure of a packaging container provided by an embodiment 3-5;

Fig. 3-10 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 3-5 (with the related section line omitted);

Fig. 3-11 is schematic expansion of a blank forming the bottle body part in the embodiment 3-5.

Fig. 3-12 is a schematic view of an external structure of a packaging container provided by an embodiment 3-6;

Fig. 3-13 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 3-6 (with the related section line omitted);

Fig. 3-14 is a schematic view of an external structure of a packaging container provided by an embodiment 3-7;

Fig. 3-15 is a structural schematic view of a packaging container provided by an embodiment 3-8;

Fig. 3-16 is a structural schematic view of a packaging container provided by an embodiment 3-9;

Fig. 3-17 is a structural schematic view of a packaging container provided by an embodiment 3-10;

Fig. 3-18 is a structural schematic view of a packaging container provided by an embodiment 3-11;

Fig. 3-19 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 3-11 (with the related section line omitted);

Fig. 3-20 is a structural schematic view of a packaging container provided by an embodiment 3-12;

Fig. 3-21 is a structural schematic view of a packaging container provided by an embodiment 3-13;

Fig. 4-1 a schematic view of an external structure of a packaging container provided by embodiments 4-1, 4-2 and 4-3 of the present invention;

Fig. 4-2 is a schematic structure of a cross section of a bottle body part in the embodiment 4-1 (with the related section line omitted);

Fig. 4-3 is schematic expansion of a blank in the embodiment 4-1;

Fig. 4-4 is a schematic structure of a cross section of a bottle body part in the embodiment 4-2 (with the related section line omitted);

Fig. 4-5 is schematic expansion of one part of a blank in the embodiment 4-2;

Fig. 4-6 is a schematic structure of a cross section of a bottle body part in the embodiment 4-3 (with the related section line omitted);

Fig. 4-7 is a schematic view of an external structure of a packaging container provided by an embodiment 4-4;

Fig. 4-8 is a schematic structure of a cross section of a bottle body part in the embodiment 4-4 (with the related section line omitted);

Fig. 4-9 is a schematic view of an external structure of a packaging container provided by an embodiment 4-5;

Fig. 4-10 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 4-5 (with the related section line omitted);

Fig. 4-11 is schematic expansion of a blank forming the bottle body part in the embodiment 4-5.

Fig. 4-12 is a schematic view of an external structure of a packaging container provided by an embodiment 4-6;

Fig. 4-13 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 4-6 (with the related section line omitted);

Fig. 4-14 is a schematic view of an external structure of a packaging container provided by an embodiment 4-7;

Fig. 4-15 is a structural schematic view of a packaging container provided by an embodiment 4-8;

Fig. 4-16 is a structural schematic view of a packaging container provided by an embodiment 4-9;

Fig. 4-17 is a structural schematic view of a packaging container provided by an embodiment 4-10;

Fig. 4-18 is a structural schematic view of a packaging container provided by an embodiment 4-11;

Fig. 4-19 is a schematic partial structure of a longitudinal section of a bottle body part in the embodiment 4-11 (with the related section line omitted);
 Fig. 4-20 is a structural schematic view of a packaging container provided by an embodiment 4-12;
 Fig. 4-21 is a structural schematic view of a packaging container provided by an embodiment 4-13;
 Fig. 5-1 is a structural schematic view of an embodiment 5-1 of the present invention.
 Fig. 6-1 is a structural schematic view of a packaging container with one observation hole provided by an embodiment;
 Fig. 6-2 is a structural schematic view of a packaging container with four observation hole arranged in a straight line provided by an embodiment;
 Fig. 7-1 is a structural schematic view of a blank with one observation hole arranged in a straight line provided by an embodiment;
 Fig. 7-2 is a structural schematic view of a blank with four observation hole arranged in a straight line provided by an embodiment.

[0109] In the figures, what reference numerals refer to will be shown as follows:

1001, 1002, 1003-Packaging container;
 1100, 1200, 1410, 1420, 1600, 1700-Packaging material;
 1110, 1210, 1610, 1710-Edgefold;
 1111, 1411, 1421, 1640-End;
 1300, 1500-Strip;
 1720-Bottom surface;
 1631, 1632, 1633-Material layer;
 1620, 1621, 1622, 1623-Section;
 2100-Bottle body; 2000-Neck part; 2310-Crease;
 2320, 2330, 2331, 2340, 2341, 2350-Indentation;
 2400-Dividing line; 2500-Blank; 2510, 2520-Edge;
 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3910, 3920-Packaging container;
 3010, 3013, 3014, 3020, 3023, 3033, 3040, 3050, 3060, 3070, 3090-Stiffener;
 3011, 3021, 3031, 3041, 3051, 3061, 3071, 3081-Bottle body;
 3012, 3022, 3032, 3042, 3052, 3082-Bottle neck;
 3100, 3300-Blank;
 3101, 3102, 3400, 3500, 3600, 3700, 3900-Packaging material;
 3901, 3902-Laminated material;
 3103, 3203, 3303, 3403, 3503, 3803-Dividing line;
 3110, 3111, 3210, 3310, 3810, 3912, 3923-Crease;
 3911, 3921, 3922-External facade;
 3120, 3121, 3123, 3130, 3131, 3132, 3133, 3134, 3140, 3141, 3143, 3150, 3153, 3220, 3230, 3231, 3240, 3241, 3250, 3320, 3330-Fold lines;
 4001, 4002, 4003, 4004, 4005, 4006, 4007, 4008, 4009, 4910, 4920-Packaging container;
 4010, 4013, 4014, 4020, 4023, 4033, 4040, 4050,

4060, 4070, 4090-Stiffener;
 4011, 4021, 4031, 4041, 4051, 4061, 4071, 4081-Bottle body;
 4012, 4022, 4032, 4042, 4052, 4082-Bottle neck;
 4100, 4300-Blank;
 4101, 4102, 4400, 4500, 4600, 4700, 4900-Packaging material;
 4901, 4902-Laminated material;
 4103, 4203, 4303, 4403, 4503, 4803-Dividing line;
 4110, 4111, 4210, 4310, 4810, 4912, 4923-Crease;
 4911, 4921, 4922-External facade;
 4120, 4121, 4123, 4130, 4131, 4132, 4133, 4134, 4140, 4141, 4143, 4150, 4153, 4220, 4230, 4231, 4240, 4241, 4250, 4320, 4330-Fold line;
 5100-Serration; 5110, 5120-Serration edge; 5210, 5220-Indentation line; 5300-Rectangle; 5400-Dividing line;
 6001, 6003, 7001, 7004-observation hole; 6002, 6004, 7002, 7003-Transparent sheet.

Detailed Description of the Embodiments

Embodiment 1-1:

[0110] A packaging container structure is shown in Fig. 1-1 and Fig. 1-2. The packaging container 1001 of a bottle-shaped structure is mainly formed by a laminated composite material, in which a packaging material 1100 forms a bottle body part, while a packaging material 1200 forms a bottle bottom part. The bottle body and the bottle bottom are formed by mutual blending, tiering and sealing of the packaging materials. As shown in Fig. 1-2, an inward and upward edgefold 1110 is formed at the bottom of the packaging material 1100, while a downward edgefold 1210 is formed on the packaging material 1200, and the edgefold 1210 is just inserted in a gap between the edgefold 1110 and the body of the packaging material 1100. A circular ring-shaped tiered and sealed portion is formed at the bottom of the packaging container of the bottle-shaped structure by means of sealing and pressing, in which the edgefold 1110 located at the lower portion of the bottle bottom substantially forms a skirt having an upper end 1111 against the bottom surface of the packaging material 1200. If no any handling is performed on the exposed end 1111, corrosion, mildewing and the like may occur from the end 1111 in the cases of damp and the like because various layers of laminated materials forming the packaging material 1100 include a paper base layer. For this reason, the gap position between the end 1111 and the bottom of the packaging material 1200 is covered with an annular strip 1300 to adapt to the structure of the bottle body. As shown by the section in the figure, one edge of the strip 1300 is fitted on the surface of the edgefold 1110, while the other edge of the strip 1300 is fitted on the bottom surface of the packaging material 1200 forming the bottle bottom part. After this handling, even though the packaging container is placed

in a damp environment, no damage will be caused to the bottom structure of the packaging container 1001 for isolation of the external humid air from the end 1111 of the edgefold 1110, thereby being conducive to improving the performance of the whole packaging container and prolonging the storage time of food when stored in the packaging container. Certainly, the strip 1300 must have a waterproof and damp-proof function in material performance, and may be a strip formed either by a single material, for example, PE, or by a composite laminated material.

Embodiment 1-2:

[0111] A packaging container structure is shown in Fig. 1-3 and Fig. 1-4. The packaging container 1002 of a pillow-shaped structure is formed by a laminated material, in which upper and lower ends of packaging materials 1410 and 1420 are sealed, respectively. At the sealed positions, ends 411 and 1421 of the packaging materials 1410 and 1420 are exposed outside. In order to prevent the cases of package body breakage and the like caused by damage to paper base portions in the packaging materials 1410 and 1420 because of damp and other factors, the edges of the upper part and the lower part of the package body, i.e., the end parts, are covered with waterproof strips 1500 respectively to cover the sections of the ends 1411 and 1421, thus allowing an improvement in the adaptability of the whole packaging container to the environment and an increase in the storage life of a content.

Embodiment 1-3:

[0112] A packaging container structure is shown in Fig. 1-5 to Fig. 1-7. Similar to the embodiment 1-1, the packaging container 1003 of the bottle-shaped structure has a bottle body formed by a packaging material 1600 and a bottle bottom formed by a packaging material 1700. Hermetical connection is achieved at the joint of the bottle body and the bottle bottom by means of tiering and sealing of edgefolds 1710 and 1610.

[0113] Specifically, as shown in Fig. 1-6 and Fig. 1-7, inclined cutting is carried out on the end 1640 of the edgefold 1610 to enable the end 1640 to have an oblique section structure. That is, the angle α in the figures (an included angle between the section and vertical line H of the surface of the edgefold) is an acute angle. The acute angle is 30-60 degrees, and preferably 45 degrees.

[0114] In this embodiment, the packaging material 1600 is formed by compounding and laminating material layers 1631, 1632 and 1633, in which the middle material layer 1632 is a paper substrate. After inclined cutting of the end of the edgefold 1610, the section 1620 of the end is formed into an oblique section. The sections 1621, 1622 and 1623 of the material layers 1631, 1632 and 1633 are all oblique sections. After the section 1620 is bonded with the bottom surface 1720 of the packaging

material 1700 of the bottle bottom, as the outermost material layer 1633 of the packaging material forming the edgefold 1610 of the packaging material 1600 generally is waterproof, the section 1623 bonded with the bottom surface 1720 spontaneously prevents the material layer 1632 of the paper substrate from contacting the external environment in the case that the section is the oblique section; thus, the requirements of the bottle body on the environment are actually reduced, and the performance of the packaging container is improved.

[0115] In the above embodiments, protection of the paper base portion in the packaging material that may be exposed to the external environment is achieved in different ways, thus preventing the case that the paper base may be affected by the environment first due to its own characteristics to cause quality defect of the package body and pollution to food. Certainly, part of the embodiments may also be varied. For example, the ends of the packaging material in the embodiment 1-2 may also be combined with the oblique sections in the embodiment 1-3, and then the oblique sections on both sides are sealed and bonded; therefore, the additional covering waterproof strip therein can be removed.

[0116] In addition, for the exposed parts, the parts obviously responding to the environment, for example, the bottom of the container and the like, may be mainly covered. For instance, similar to the embodiment 1-1, when the packaging container is stored, a space of poor ventilation is formed between the packaging material of the bottle bottom and the bottom, and this portion will bear greater pressure than the lateral exposed portions of the bottle body due to ventilation, and is more likely to be mildewed or damaged first in unit time. Moreover, the lower part of the packaging container will bear greater pressure than other parts.

Embodiment 2-1

[0117] A packaging container and a blank for making the same are shown in Fig. 2-2 to Fig. 2-4. A rectangular blank 2500 as shown in Fig. 2-2 eventually forms a main body part of a packaging container (in a bottle-like shape) as shown in Fig. 2-3. The blank 2500 is divided by a crease 2400 into upper and lower portions (two rectangles). The whole blank is formed into a cylindrical structure by means of tiering and heat sealing of edges 2510 and 2520 on both sides, in which the portion under the dividing line 2400 (which may also be present in the form of the crease) eventually forms the bottle body part of the packaging container, while the portion above the dividing line 2400 may eventually form the bottle neck part of the packaging container. The bottle neck part is truncated cone-shaped. As the raw material (blank) of the bottle neck part is rectangular before folding, the blank is folded and bonded along indentations 2320, 2330, 2340 and 2350 pressed against it in advance in Fig. 2-2 to form a truncated cone-shaped structure having a tapering opening.

[0118] Specifically, a plurality of groups of indentation lines are provided at intervals on the raw material of the rectangular bottle neck part. Each group of indentation lines is folded along the indentations 2320, 2330, 2340 and 2350 to form a crease 2310, and the lower ends of the indentations 2320, 2330, 2340 and 2350 for each group of indentation lines converge at one point, while the upper ends of them are scattered, wherein along the same transverse position in Fig. 2-2, a region defined between the indentations 2320 and 2330 and a region defined between the indentations 2350 and 2340 are distributed symmetrically, and the two regions are spliced together to equal a region between the indentations 2330 and 2350 in size. That is, after folding along the above indentations 2320, 2330, 2340 and 2350, the actual situation that folds extend and are symmetrically arranged on both sides of each crease in Fig. 2-4 may be eventually achieved, rather than the situation that each crease is turned to one side in the reference document. In this embodiment, after the packaging container is formed, the folds face inside of the bottle body. Since the folds are symmetrically arranged at both ends of each crease 2310, the packaging materials on both sides of each joint may be kept as high as each other, thus being conducive to expression of the content of patterns printed in advance on the surfaces of the packaging materials.

[0119] In the process of folding the folded portion along each crease, an Ω -shaped intermediate form may be possibly formed at each folded position according to the technical characteristics. After the packaging material at the entire folded positions is folded and compacted (including the steps of bonding, sealing and the like), two lines formed by the indentations 2320 and 2350 fit and overlap each other and form the crease 2310; the indentations 2330 and 2340 are located on both sides of the crease 2310, respectively, and arranged symmetrically. A plurality of tiered packaging materials project from the inner side of the bottle body and are arranged uniformly along the neck part, which actually also function as stiffeners and are helpful for keeping the shape of the bottle body under pressure after the packaging materials are formed. For example, after a screw bottle cap is attached to the opening of the neck part, a twisting force may be applied to the bottle body when an end consumer needs to twist the bottle cap to open the package for eating food; in this case, if the hand of the consumer holding the bottle body is just put on the bottle neck part, the bottle body may be prevented from damage in use and the shape of the bottle body may be well maintained due to protection of a plurality of folds tiered in the circumferential direction of the bottle neck to the bottle neck. In other words, when the tiered packaging materials of the neck part are located on both sides of the creases separately, it is conducive not only to joining and keeping a smooth surface of the packaging materials at the joints, but also to keeping the shape of the bottle body when twisting the bottle body.

[0120] Apparently, in the reference document described in the background of the present invention in Fig.

2-1, the tiered packaging materials at the bottle neck part are turned to one sides of creases 12, the portion (the position that the numeral 11 refers to in the figure) specially folded for the purpose of keeping a relatively smooth surface at both ends of each joint will be stressed first when the bottle cap is twisted in the process of opening the bottle, and other tiered portions are stressed only after the portion and the bonded portion at numeral 9 in Fig. 2-1 are damaged; therefore, this portion will bear greater stress and is prone to bonding disconnection when the bottle cap is twisted in the process of opening the bottle, thus causing damage to the surface structure of the bottle body. Differently, when the tiered portions in the present invention are subjected to twisting stress, the stressed tiered area is already changed into a line and a plane (being the plane in whole, and the line in section) from a point and a line (being the line in whole, and the point in section) in the reference document, thereby allowing better firmness.

[0121] The blank 2500 may be partitioned from a laminated material in a roll. The laminated material may be a laminated material having an inner film formed by at least a paper base layer, an aluminum foil layer, a PE or OPP layer and the like. The performance of the laminated material should facilitate storage of a liquid food or a beverage contained in the packaging container.

Embodiment 2-2

[0122] As shown in Fig. 2-5, compared with the embodiment 2-1, the folds of the neck part in this embodiment are located outside the bottle body, and in this case, the creases 2310 are formed on the internal surface of the bottle body. When the folds are formed outside the bottle body, it is easier and easier to control in the folding steps of the folds and the subsequent handling step in contrast with the embodiment 2-1.

[0123] Moreover, when the folds are located outside the bottle body, the three-dimensional structure thereof appears novel and unique, and a better effect may be achieved after the three-dimensional structure is combined with the patterns on the surface of the packaging material.

Embodiment 2-3

[0124] A schematic structure (for the sake of convenient illustration, the related section lines are all omitted) of a section of a neck part of a packaging container and a blank for making the same are shown in Fig. 2-6 and Fig. 2-7. Compared with the embodiment 2-1, indentations 2331 and 2341 herein differ from the corresponding indentations 2330 and 2340 in the embodiment 2-1 in position, as reflected in the tiered packaging materials at both ends of the ultimate crease 2310: the tiered packaging materials are symmetrical along the crease 2310 in the embodiment 2-1, whereas in this embodiment, with respect to the position of the crease 2310, the tiered pack-

aging material at the end close to the indentation 2341 is wider than the tiered packaging material at the end close to the indentation 2331. With reference to a direction from top to bottom of the bottle body in Fig. 2-7, when the screw bottle cap is twisted counterclockwise, the bottle body of the packaging container is subjected to a clockwise twisting force, specifically in the section position in Fig. 2-7. At each crease 2310, the twisting force on the tiered packaging material at the side close to the indentation 2341 is slightly greater than that on the tiered packaging material at the side close to the indentation 2331. In this way, the difference of widths on the two sides will counteract in part the damage of such a disadvantage to the bonded position of the packaging container, allowing maximum maintaining of the shape of the packaging container. Certainly, a specific proportional relation of the widths on the two sides may also flexibly take into account the specific damage to the bonded portion caused by stress on the tiered positions in the twisting process. It is more favorable when determining which side each crease is deflected to.

[0125] Certainly, with respect to each horizontal plane, the sum of the distance between the indentations 32 and 2331 and the distance between the indentations 2341 and 2350 is equal to the distance between the indentations 2331 and 2341 such that the tiered packaging materials are relatively flat without undesirable humps and folds.

Embodiment 3-1:

[0126] A packaging container structure as shown in Fig. 3-1 to Fig. 3-3 is bottle-shaped, and has a main body formed by a rectangular blank 3100 through the steps of crimping, folding, sealing and the like. The blank 3100 comprises a sheet packaging material 3101 of an upper portion and a sheet packaging material 3102 of a lower portion, with the packaging material 3102 of the upper portion forming the part of the bottle neck 3012 of the packaging container and the packaging material 3101 of the lower portion forming the part of the bottle body 3011, which are divided by a dividing line 3103.

[0127] In the vertical direction, a plurality of groups of fold lines 3120, 3132, 3121 and 3134 are pressed against the blank 3100 in advance, in which the fold lines 3120 and 3132 are located at the part of the bottle body 3011, and two lines of each group are parallel to each other; the fold lines 3121 and 3122 are located at the part of the bottle neck 3012, and two lines of each group have their lower ends close to each other and upper ends gradually diverging from each other, wherein the fold line 3121 is connected to the fold line 3120, while the fold line 3132 is connected to the fold line 3134, with connection points in the dividing line 3103. After folding along the above fold lines, creases 3110 and 3111 (the two connected) as shown in Fig. 3-1 are formed on the external facade of the packaging container 3001; as shown in Fig. 3-2, the folded portions are tiered at one side of the internal

surface of the bottle body, thereby forming stiffeners 3010. Groups of stiffeners 3010 arranged vertically on the internal surface of the bottle body eventually form protective strips enabling easier maintaining of the shape and better performance of the packaging container.

[0128] Specifically, the blank 3100 is a laminated material that may include at least a paper material layer, an aluminum foil layer and a plastic material layer. Further, a printed layer may be provided on the surface of the blank 3100.

Embodiment 3-2:

[0129] According to the schematic structures of the packaging containers as shown in Fig. 3-1, Fig. 3-4 and Fig. 3-5, different from the embodiment 3-1, the stiffeners 3014 formed on the internal surface of the bottle body by tiering after folding are folded in a different way. Specifically, in the embodiment 3-1, the stiffeners 3010 are tiered towards one side along the creases 3110; in this embodiment, the stiffeners 3013 are tiered towards both sides along the creases 3110, and such a folding manner is advantageous for keeping the surface of the packaging materials (i.e., the surface of the container) at the folded positions as smooth as possible, thereby being conducive to expression of patterns on the surface of the packaging materials. In order to achieve the effect of such a tiering manner, as shown in Fig. 5, the fold lines provided on the blank 3100 (for the sake of convenient correspondence, the same numeral as in the embodiment 3-1 is used herein) are adjusted: at the bottle body and bottle neck parts, each group of folding positions is provided with four fold lines, i.e., the fold lines 3120, 3130, 3140 and 3150 respectively provided on the bottle body and parallel to each other, and the fold lines 3123, 3133, 3143 and 3153 connected to the above four fold lines and provided on the bottle neck, in which, after folding, the fold lines 3120 and 3150 fit each other, and so do the fold lines 3123 and 3153; the distance between the fold lines 3130 and 3140 is twice the distance between the fold lines 3120 and 3130, and the distance between the fold lines 3140 and 3150 is equal to the distance between the fold lines 3120 and 3130. Similarly, the distance relations of the fold lines 3123, 3133, 3143 and 3153 are similar to the above distance relations. Such relations may allow even projecting stiffeners 3014 after folding.

Embodiment 3-3:

[0130] According to the schematic structures of the packaging containers as shown in Fig. 3-1 and Fig. 3-6, different from the embodiment 3-2, the relation of the stiffeners 3013 formed on the internal surface of the bottle body by tiering after folding and the creases 3110 is specifically reflected in that the creases 3110 are located at middle positions of the stiffeners 3014 in the embodiment 3-2, and in the embodiment 3-3, the creases 3110 are deflected towards one sides of the creases 3131. This

change may allow appropriate adjustment of the positions of the stiffeners 3013 relative to the creases 3110 according to different forces on both sides of the creases 3110 because a twisting force applied to the bottle body when a threaded opening in the top of the bottle body is twisted open may be possibly decomposed to the tiered positions.

[0131] Specifically, it may be achieved by adjusting the distance relation of every two fold lines pressed against the blank in advance, which will not be described in detail herein.

Embodiment 3-4:

[0132] According to the schematic structure of a packaging container as shown in Fig. 3-7 and Fig. 3-8, different from the embodiment 3-2, the stiffeners 3020 formed on the surface of the bottle body by tiering after folding are located on the outer side surface of the packaging container. Specifically, the bottle body 3002 is divided into the bottle neck 3022 of the upper part and the bottle body 3021 of the lower part, the two of which are divided by a dividing line 3203. The packaging materials are folded to form the stiffeners 3023 on the bottle neck part and the stiffeners 3020 on the bottle body part, in two groups on each part and vertically arranged around the surface of the bottle body. As shown in Fig. 3-8, the indentation lines 3220 and 3250 pressed against the blank in advance fit each other with an inwards open crease 3210 formed at the joint thereof, and indentation lines 3230 and 3240 face outwards and are located at both ends of the crease 3210, respectively. The stiffeners 3020 are arranged to project from the external surface of the bottle body. In this embodiment, the stiffeners 3020 and 3023 located outside the bottle body may serve as the stiffeners for keeping the performance of the packaging container, and may also act as surface anti-skid ridges.

Embodiment 3-5:

[0133] According to the schematic structure of a packaging container as shown in Fig. 3-9 to Fig. 3-11, the main body part of the bottle-shaped packaging container 3003 is formed by a sheet packaging material, and comprises the bottle neck 3032 of the upper part and the bottle body 3031 of the lower part. A plurality of transverse stiffeners 3033 formed by folding the packaging material are provided apart in the circumferential direction of the bottle body 3031. The stiffeners 3033 projecting from the surface of the blank 3300 are located at the side of the interior of the bottle body, while a group of creases 3310 is formed on the external surface of the bottle body. As shown in Fig. 3-10 and Fig. 3-11, a plurality of groups of fold lines 3320 and 3330 spaced apart and arranged in parallel uniformly are provided on the blank 3300, and the structure of the stiffeners 3033 as shown in Fig. 3-10 is formed by folding to protect the bottle body and reduce damage to the bottle body.

Embodiment 3-6

[0134] According to the schematic structure of a packaging container as shown in Fig. 3-12 to Fig. 3-13, the main body part of the bottle-shaped packaging container 3004 is formed by a sheet packaging material, and comprises the bottle neck 3042 of the upper part and the bottle body 3041 of the lower part. A plurality of projecting stiffeners 3040 are provided apart on the surface in the circumferential direction of the bottle body 3041, attached to the packaging material 3400 forming the bottle body 3041 in a strip form and arranged uniformly on the surface thereof by way of bonding, and may be made from a similar or same material as the packaging material 3400 of the packaging container, or plastic materials such as PE and the like.

Embodiment 3-7:

[0135] According to the schematic structure of a packaging container as shown in Fig. 3-14, the bottle neck 3052 and the bottle body 3051 of the bottle-shaped packaging container 3005 are divided by a dividing line 3503. A plurality of strip-shaped stiffeners 3050 transversely arranged along the outer edge of the bottle body are provided on the surface of the packaging material 3500 forming the bottle body 3051, in which the density of the stiffeners 3050 is gradually reduced from the bottom to the top of the bottle body 3051. Such an arrangement has the advantages that the difference of stress on the upper and lower parts of the bottle body full of a liquid food (large lower part, and tapering upper part) is satisfied, and the material is also saved. Certainly, the strip-shaped stiffeners 3050 additionally attached herein may also be implemented in the form of folding and tiering the packaging material 3500 in the embodiment 3-5, but the tiered stiffeners are also required to be arranged in the pattern of being more at the lower part than at the upper part.

Embodiment 3-8:

[0136] According to the schematic structure of a packaging container as shown in Fig. 3-15, a group of strips attached to the exterior of the bottle body is disposed on the lower part of the bottle body 3061 of the bottle-shaped package 3006 (from the 1/3 to 1/2 position of the lower part of the bottle body to the bottle bottom) as stiffeners 3060.

[0137] The arrangement of this group of strips also follows the principle of being more at the lower part than at the upper part. In this embodiment, the group of strips is provided for the current situation that the lower portion of the packaging container filled with a liquid food is more prone to breakage than the upper portion thereof under the condition of the same packaging material, and allows not only reinforcing of the packaging container and a decrease of the breakage probability, but also reduction of material loss of added articles and a decrease of costs.

Embodiment 3-9:

[0138] According to the schematic structure of a packaging container as shown in Fig. 3-16, compared with the embodiment 3-8, the strip-shaped stiffeners 3070 disposed at the lower part of the bottle body 3071 of the packaging container 3007 are arranged vertically and uniformly spaced apart from each other. The stiffeners are arranged from the 1/3 to 1/2 position of the lower part of the bottle body 3071 to the bottle bottom part.

Embodiment 3-10:

[0139] According to the schematic structure of a packaging container as shown in Fig. 3-17, the main body of the bottle-shaped packaging container 3008 is composed of the bottle neck 3082 of the upper part and the bottle body 3081 of the lower part, the two of which are divided by a dividing line 3803, and the bottle neck 3082 and the bottle body 3081 are formed by packaging materials, respectively. Different from the embodiment 3-5, the packaging material forming the bottle body is folded to form inclined creases 3810 on the surface of the bottle body 3081, which differ from the vertical creases in the embodiment 3-5. In this embodiment, the stiffeners formed by folding the packaging material at the other sides of the creases 3810 are located on the inner side surface of the bottle body 3081. As the stiffeners are also correspondingly arranged slantwise, the disadvantage of added sealing difficulty due to two stiffeners needing to be tiered may be overcome reasonably at the joints of the packaging materials in the vertical direction of the bottle body (the joints herein are where the packaging material blanks forming the cylindrical structure of the bottle body are connected, not the creases 3810). Furthermore, the directions and angles of inclination of the creases 3810 and the corresponding stiffeners may also be set flexibly after comprehensively considering issues, such as the direction and magnitude of a rotating force exerted on the bottle body when the bottle cap is opened, and the like. Moreover, the stiffeners may also be provided along the positions of the joints 3810 in a way similar to the way of attaching to the surface of the packaging material in the embodiment 3-9.

Embodiment 3-11:

[0140] According to the schematic structure of a packaging container as shown in Fig. 3-18 and Fig. 3-19, the main body of the bottle-shaped packaging container 3009 is composed of the bottle neck 92 of the upper part and the bottle body 91 of the lower part, the two of which are divided by a dividing line 3903, in which groups of strip-shaped stiffeners 3090 arranged in parallel are embedded inside the packaging material 3900 forming the bottle body part. As shown in Fig. 3-19, when the laminated materials 3901 and 3902 are compounded, the strip-shaped stiffeners 3090 are compounded inside the

packaging material 3900 such that the ultimately formed packaging material 3900 has a relatively smooth surface, and may also have obviously improved physical properties such as strength, toughness and the like, thereby being conducive to the improvement of the quality of the ultimately formed packaging container.

[0141] Certainly, a meshed reinforcement structure, for example, meshed wires, may be embedded between the layers of laminated materials forming the packaging material in advance to take the place of the strip-shaped stiffeners therein.

Embodiment 3-12:

[0142] According to the schematic structure of a packaging container as shown in Fig. 3-20, the packaging container 3910 in a hexagonal prism (octahedron) shape has six ridge surfaces (i.e., the external facades 3911 in the figure). Groups of parallel creases 3912 are provided on the sidewalls of the package body that are formed by the external facades 3911, and formed by folding a packaging material forming the sidewalls with the tiered portions located at the inside end of the package body. The specific structure is as shown in the embodiment 3-5, in which the tiered portions form the transverse stiffener structure that is helpful for improvement of the performance of the sidewalls of the container when filled with a liquid food.

Embodiment 3-13:

[0143] According to the schematic structure of a packaging container as shown in Fig. 3-21, the packaging container 3920 is cuboid-shaped (i.e., a brick package structure of general meaning). Also, a plurality of groups of creases 3923 arranged transversely and uniformly are provided on the external facades 3921 and 3922 on the four sides of the packaging container 3920, and the stiffener structure helpful for maintaining the shape of the package body is formed at the other sides of the creases 3923.

[0144] According to the above various packaging container structures provided by the present invention, the stiffener structure is formed on the bottle body in multiple ways, thereby powerfully overcoming the defect of easy deformation and even damage to the package bodies of the packaging containers formed by adding the laminated materials, for example, the paper substrate, after the package bodies are filled with a liquid food. The provision of the stiffeners causes an obvious improvement in the performance, such as the overall strength of the package bodies, the toughness of the packaging materials, and the like, under the circumstance of a finite increase of the costs, and particularly an apparent improvement in the great surface performance of the package bodies.

Embodiment 4-1:

[0145] A packaging container structure as shown in Fig. 4-1 to Fig. 4-3 is bottle-shaped, and has a main body formed by a rectangular blank 4100 through the steps of crimping, folding, sealing and the like. The blank 4100 comprises a sheet packaging material 4101 of an upper portion and a sheet packaging material 4102 of a lower portion, with the packaging material 4102 of the upper portion forming the part of the bottle neck 4012 of the packaging container and the packaging material 4101 of the lower portion forming the part of the bottle body 4011, which are divided by a dividing line 4103.

[0146] In the vertical direction, a plurality of groups of fold lines 4120, 4132, 4121 and 4134 are pressed against the blank 4100 in advance, in which the fold lines 4120 and 4132 are located at the part of the bottle body 4011, and two lines of each group are parallel to each other; the fold lines 4121 and 4122 are located at the part of the bottle neck 4012, and two lines of each group have their lower ends close to each other and upper ends gradually diverging from each other, wherein the fold line 4121 is connected to the fold line 4120, while the fold line 4132 is connected to the fold line 4134, with connection points in the dividing line 4103. After folding along the above fold lines, creases 4110 and 4111 (the two connected) as shown in Fig. 4-1 are formed on the external facade of the packaging container 4001; as shown in Fig. 4-2, the folded portions are tiered at one side of the internal surface of the bottle body, thereby forming stiffeners 4010. Groups of stiffeners 4010 arranged vertically on the internal surface of the bottle body eventually form protective strips enabling easier maintaining of the shape and better performance of the packaging container.

[0147] Specifically, the blank 4100 is a laminated material that may include at least a paper material layer, an aluminum foil layer and a plastic material layer. Further, a printed layer may be provided on the surface of the blank 4100.

Embodiment 4-2:

[0148] According to the schematic structures of the packaging containers as shown in Fig. 4-1, Fig. 4-4 and Fig. 4-5, different from the embodiment 4-1, the stiffeners 4014 formed on the internal surface of the bottle body by tiering after folding are folded in a different way. Specifically, in the embodiment 4-1, the stiffeners 4010 are tiered towards one side along the creases 4110; in this embodiment, the stiffeners 4013 are tiered towards both sides along the creases 4110, and such a folding manner is advantageous for keeping the surface of the packaging materials (i.e., the surface of the container) at the folded positions as smooth as possible, thereby being conducive to expression of patterns on the surface of the packaging materials. In order to achieve the effect of such a tiering manner, as shown in Fig. 4-5, the fold lines provided on the blank 4100 (for the sake of convenient cor-

respondence, the same numeral as in the embodiment 4-1 is used herein) are adjusted: at the bottle body and bottle neck parts, each group of folding positions is provided with four fold lines, i.e., the fold lines 4120, 4130, 4140 and 4150 respectively provided on the bottle body and parallel to each other, and the fold lines 4123, 4133, 4143 and 4153 connected to the above four fold lines and provided on the bottle neck, in which, after folding, the fold lines 4120 and 4150 fit each other, and so do the fold lines 4123 and 4153; the distance between the fold lines 4130 and 4140 is twice the distance between the fold lines 4120 and 4130, and the distance between the fold lines 4140 and 4150 is equal to the distance between the fold lines 4120 and 4130. Similarly, the distance relations of the fold lines 4123, 4133, 4143 and 4153 are similar to the above distance relations. Such relations may allow even projecting stiffeners 4014 after folding.

Embodiment 4-3:

[0149] According to the schematic structures of the packaging containers as shown in Fig. 4-1 and Fig. 4-6, different from the embodiment 4-2, the relation of the stiffeners 4013 formed on the internal surface of the bottle body by tiering after folding and the creases 4110 is specifically reflected in that the creases 4110 are located at middle positions of the stiffeners 4014 in the embodiment 4-2, and in the embodiment 4-3, the creases 4110 are deflected towards one sides of the creases 4131. This change may allow appropriate adjustment of the positions of the stiffeners 4013 relative to the creases 4110 according to different forces on both sides of the creases 4110 because a twisting force applied to the bottle body when a threaded opening in the top of the bottle body is twisted open may be possibly decomposed to the tiered positions.

[0150] Specifically, it may be achieved by adjusting the distance relation of every two fold lines pressed against the blank in advance, which will not be described in detail herein.

Embodiment 4-4:

[0151] According to the schematic structure of a packaging container as shown in Fig. 4-7 and Fig. 4-8, different from the embodiment 4-2, the stiffeners 4020 formed on the surface of the bottle body by tiering after folding are located on the outer side surface of the packaging container. Specifically, the bottle body 4002 is divided into the bottle neck 4022 of the upper part and the bottle body 4021 of the lower part, the two of which are divided by a dividing line 4203. The packaging materials are folded to form the stiffeners 4023 on the bottle neck part and the stiffeners 4020 on the bottle body part, in two groups on each part and vertically arranged around the surface of the bottle body. As shown in Fig. 4-8, the indentation lines 4220 and 4250 pressed against the blank in advance fit each other with an inwards open crease 4210

formed at the joint thereof, and indentation lines 4230 and 4240 face outwards and are located at both ends of the crease 4210, respectively. The stiffeners 4020 are arranged to project from the external surface of the bottle body. In this embodiment, the stiffeners 4020 and 4023 located outside the bottle body may serve as the stiffeners for keeping the performance of the packaging container, and may also act as surface anti-skid ridges.

Embodiment 4-5:

[0152] According to the schematic structure of a packaging container as shown in Fig. 4-9 to Fig. 4-11, the main body part of the bottle-shaped packaging container 4003 is formed by a sheet packaging material, and comprises the bottle neck 4032 of the upper part and the bottle body 4031 of the lower part. A plurality of transverse stiffeners 4033 formed by folding the packaging material are provided apart in the circumferential direction of the bottle body 4031. The stiffeners 4033 projecting from the surface of the blank 4300 are located at the side of the interior of the bottle body, while a group of creases 4310 is formed on the external surface of the bottle body. As shown in Fig. 4-10 and Fig. 4-11, a plurality of groups of fold lines 4320 and 4330 spaced apart and arranged in parallel uniformly are provided on the blank 4300, and the structure of the stiffeners 4033 as shown in Fig. 4-10 is formed by folding to protect the bottle body and reduce damage to the bottle body.

Embodiment 4-6

[0153] According to the schematic structure of a packaging container as shown in Fig. 4-12 to Fig. 4-13, the main body part of the bottle-shaped packaging container 4004 is formed by a sheet packaging material, and comprises the bottle neck 4042 of the upper part and the bottle body 4041 of the lower part. A plurality of projecting stiffeners 4040 are provided apart on the surface in the circumferential direction of the bottle body 4041, attached to the packaging material 4400 forming the bottle body 4041 in a strip form and arranged uniformly on the surface thereof by way of bonding, and may be made from a similar or same material as the packaging material 4400 of the packaging container, or plastic materials such as PE and the like.

Embodiment 4-7:

[0154] According to the schematic structure of a packaging container as shown in Fig. 4-14, the bottle neck 4052 and the bottle body 4051 of the bottle-shaped packaging container 4005 are divided by a dividing line 4503. A plurality of strip-shaped stiffeners 4050 transversely arranged along the outer edge of the bottle body are provided on the surface of the packaging material 4500 forming the bottle body 4051, in which the density of the stiffeners 4050 is gradually reduced from the bottom to the

top of the bottle body 4051. Such an arrangement has the advantages that the difference of stress on the upper and lower parts of the bottle body full of a liquid food (large lower part, and tapering upper part) is satisfied, and the material is also saved. Certainly, the strip-shaped stiffeners 4050 additionally attached herein may also be implemented in the form of folding and tiering the packaging material 4500 in the embodiment 4-5, but the tiered stiffeners are also required to be arranged in the pattern of being more at the lower part than at the upper part.

Embodiment 4-8:

[0155] According to the schematic structure of a packaging container as shown in Fig. 4-15, a group of strips attached to the exterior of the bottle body is disposed on the lower part of the bottle body 4061 of the bottle-shaped package 4006 (from the 1/3 to 1/2 position of the lower part of the bottle body to the bottle bottom) as stiffeners 4060.

[0156] The arrangement of this group of strips also follows the principle of being more at the lower part than at the upper part. In this embodiment, the group of strips is provided for the current situation that the lower portion of the packaging container filled with a liquid food is more prone to breakage than the upper portion thereof under the condition of the same packaging material, and allows not only reinforcing of the packaging container and a decrease of the breakage probability, but also reduction of material loss of added articles and a decrease of costs.

Embodiment 4-9:

[0157] According to the schematic structure of a packaging container as shown in Fig. 4-16, compared with the embodiment 4-8, the strip-shaped stiffeners 4070 disposed at the lower part of the bottle body 4071 of the packaging container 4007 are arranged vertically and uniformly spaced apart from each other. The stiffeners are arranged from the 1/3 to 1/2 position of the lower part of the bottle body 4071 to the bottle bottom part.

Embodiment 4-10:

[0158] According to the schematic structure of a packaging container as shown in Fig. 4-17, the main body of the bottle-shaped packaging container 4008 is composed of the bottle neck 4082 of the upper part and the bottle body 4081 of the lower part, the two of which are divided by a dividing line 4803, and the bottle neck 4082 and the bottle body 4081 are formed by packaging materials, respectively. Different from the embodiment 4-5, the packaging material forming the bottle body is folded to form inclined creases 4810 on the surface of the bottle body 4081, which differ from the vertical creases in the embodiment 4-5. In this embodiment, the stiffeners formed by folding the packaging material at the other sides of the creases 4810 are located on the inner side

surface of the bottle body 4081. As the stiffeners are also correspondingly arranged slantwise, the disadvantage of added sealing difficulty due to two stiffeners needing to be tiered may be overcome reasonably at the joints of the packaging materials in the vertical direction of the bottle body (the joints herein are where the packaging material blanks forming the cylindrical structure of the bottle body are connected, not the creases 4810). Furthermore, the directions and angles of inclination of the creases 4810 and the corresponding stiffeners may also be set flexibly after comprehensively considering issues, such as the direction and magnitude of a rotating force exerted on the bottle body when the bottle cap is opened, and the like.

[0159] Moreover, the stiffeners may also be provided along the positions of the joints 4810 in a way similar to the way of attaching to the surface of the packaging material in the embodiment 4-9.

Embodiment 4-11:

[0160] According to the schematic structure of a packaging container as shown in Fig. 4-18 and Fig. 4-19, the main body of the bottle-shaped packaging container 4009 is composed of the bottle neck 4092 of the upper part and the bottle body 4091 of the lower part, the two of which are divided by a dividing line 4903, in which groups of strip-shaped stiffeners 4090 arranged in parallel are embedded inside the packaging material 4900 forming the bottle body part. As shown in Fig. 4-19, when the laminated materials 4901 and 4902 are compounded, the strip-shaped stiffeners 4090 are compounded inside the packaging material 4900 such that the ultimately formed packaging material 4900 has a relatively smooth surface, and may also have obviously improved physical properties such as strength, toughness and the like, thereby being conducive to the improvement of the quality of the ultimately formed packaging container.

[0161] Certainly, a meshed reinforcement structure, for example, meshed wires, may be embedded between the layers of laminated materials forming the packaging material in advance to take the place of the strip-shaped stiffeners therein.

Embodiment 4-12:

[0162] According to the schematic structure of a packaging container as shown in Fig. 4-20, the packaging container 4910 in a hexagonal prism (octahedron) shape has six ridge surfaces (i.e., the external facades 4911 in the figure). Groups of parallel creases 4912 are provided on the sidewalls of the package body that are formed by the external facades 4911, and formed by folding a packaging material forming the sidewalls with the tiered portions located at the inside end of the package body. The specific structure is as shown in the embodiment 4-5, in which the tiered portions form the transverse stiffener structure that is helpful for improvement of the perform-

ance of the sidewalls of the container when filled with a liquid food.

Embodiment 4-13:

[0163] According to the schematic structure of a packaging container as shown in Fig. 4-21, the packaging container 4920 is cuboid-shaped (i.e., a brick package structure of general meaning). Also, a plurality of groups of creases 4923 arranged transversely and uniformly are provided on the external facades 4921 and 4922 on the four sides of the packaging container 4920, and the stiffener structure helpful for maintaining the shape of the package body is formed at the other sides of the creases 4923.

[0164] According to the above various packaging container structures provided by the present invention, the stiffener structure is formed on the bottle body in multiple ways, thereby powerfully overcoming the defect of easy deformation and even damage to the package bodies of the packaging containers formed by adding the laminated materials, for example, the paper substrate, after the package bodies are filled with a liquid food. The provision of the stiffeners causes an obvious improvement in the performance, such as the overall strength of the package bodies, the toughness of the packaging materials, and the like, under the circumstance of a finite increase of the costs, and particularly an apparent improvement in the great surface performance of the package bodies.

Embodiment 5-1:

[0165] A blank for forming packaging container as shown in Fig. 5-1 is a sheet laminated material divided into upper and lower portions, with the upper portion being a row of serrations and the lower portion being a rectangular sheet, the two of which are divided (connected) by a dividing line 5400, wherein the upper portion ultimately forms a truncated cone-shaped bottle neck part of a bottle-shaped packaging container, while the lower portion ultimately forms a cylindrical bottle body part of the bottle-shaped packaging container. Specifically, each serration 5100 comprises two serration edges 5110 and 5120 forming the contour thereof and each having a shape die-cut in advance; accordingly, indentation lines 5210 and 5220 are pressed against the blank surface on the inner side of the serration edges 5110 and 5120 in advance; after folding along the indentation lines 5210 and 5220, a "bleed" (in line with the concept of bleed in the printing field) having a certain width is formed at the serration edges 5110 and 5120 of each serration 5100 to facilitate bonding and sealing of the adjacent serration edges, thereby forming a truncated cone-shaped bottle neck structure.

[0166] Specifically, after bonding forming, the indentation line 5220 of one serration 5100 fits the indentation line 5210 of one adjacent serration to guarantee the serration edge 5120 corresponding to the indentation line

5220 fits the serration edge 5110 corresponding to the indentation line 5210, in which the indentation line 5210 of the leftmost serration will eventually fit the indentation line 5220 of the rightmost serration in the figure, thereby achieving splicing of the truncated cone in the circumferential direction.

[0167] Accordingly, the leftmost edge and the rightmost edge of the sheet corresponding to the rectangle 5300 will be tiered and sealed with each other to achieve the circumferential sealing and splicing of the ultimately formed cylindrical bottle body.

[0168] The serration 5100 herein is in whole of an isosceles trapezoid structure and elongated to cause a relatively gentle change of the diameters of the truncated cone-shaped bottle neck as much as possible. It is appropriate to provide 6-8 serrations, preferably 8 serrations. The height of each serration 5100 (i.e., the distance between the upper and lower edges of the isosceles trapezoid) is approximately one half of the height of the rectangle 5300 in the figure. The height of each serration 5100 is approximately 3-4 times the width of the rectangle 5300 in the figure. Particularly, according to experiments, the forming effect, the force-bearing performance and the like are best when the diameter of the formed bottle shape is identical to the height of the truncated cone-shaped part; in this case, the width (i.e., the perimeter of the formed bottle body) of the rectangle 5300 is just π times the height of each serration.

[0169] In addition, for the sake of facilitating subsequent forming and meeting function requirements, the serration edges 5110 and 5120 of the serrations 5100 may be covered with a waterproof material, for example, a PE strip.

[0170] Specifically, the blank herein is a laminated composite material having a paper base layer, an aluminum foil layer, and a waterproof layer. Certainly, an ink printed layer or a coating forming patterns may also be provided on the surface of the blank.

[0171] The above blank for forming packaging container provided by the present invention allows simplification of the forming process and relatively reduced undulation of the surface of the formed packaging container at the tiered positions by changing the folded portions in the prior art into the serrated sheet structure. Furthermore, the disadvantages that the semi-finished packaging container cannot be sterilized favorably due to a relatively high occurrence probability of sterilization dead corners during container folding and then breakage of the container and rising of food safety risks may be caused, etc., may also be avoided.

[0172] According to the above packaging containers provided by the present application, in order to facilitate observation of the condition of an article held in the container, at least one observation hole may be formed in the body of the packaging container. The observation hole is a through hole and hermetically connected with a transparent sheet by means of which the condition of the article held in the container can be observed.

[0173] As shown in Fig. 6-1, for example but not limited to, the packaging container is the bottle-shaped container, and the observation hole 6001 is formed in the bottle body, and may be an elongated hole extending vertically in the bottle body, or a plurality of small holes 6003 arranged from top to bottom along a specified line as shown in Fig. 6-1 may also be provided as observation holes; the corresponding transparent sheets 6002 and 6004 may be bonded to the surface of the composite laminated material forming the packaging container, and certainly may also be bonded between two lamination layers forming the composite laminated material. That is, the transparent sheet is bonded between two lamination layers of the laminated packaging material, and the inner cavity of the packaging container and the paper base layer are located on the two sides of the transparent sheet, respectively, thereby avoiding the paper base layer from being soaked in a liquid substance in the container to cause leakage.

[0174] In addition, the above packaging containers are formed by the blanks provided by the present application. The observation holes may be formed in advance in various blanks (composite laminated materials) provided by the present invention, and the transparent sheet is hermetically connected to each observation hole. The transparent sheet may be bonded to the surface of each blank, or between two lamination layers of each composite laminated material forming the blank. As shown in Fig. 7-1, for example but not limited to, an elongated observation hole 7001 is formed in a rectangular portion of the blank, and of course four small holes 7004 extending along a straight line in a rectangular portion of the blank as shown in Fig. 7-2 may also be provided as observation holes. Number, diameter and arrangement of the formed small holes can be determined based on the actual use situation.

Claims

1. A packaging container formed in part or in whole by a laminated composite material having a paper base layer, with a section or surface of at least part of the laminated composite material bonded with a surface of an adjoining packaging material in the formed packaging container, **characterized in that** a paper substrate of the paper base layer of the laminated composite material is isolated from an external environment by a waterproof material at the bonded position.
2. The packaging container according to claim 1 **characterized in that:**

the section or surface is covered with a waterproof strip that forms the waterproof material for isolating the paper substrate from the external environment.

3. The packaging container according to claim 1 **characterized in that:**

the section of the laminated composite material is an oblique section that fits the surface of the adjoining packaging material, and an outermost laminated material layer of the laminated composite material forms the waterproof material isolating the paper substrate from the external environment.

4. The packaging container according to claim 2 **characterized in that:**

the waterproof strip is heat-sealed to cover the section of the laminated composite material.

5. The packaging container according to claim 2 or 4 **characterized in that:**

the waterproof strip is a PE strip.

6. The packaging container according to claim 2 or 4 **characterized in that:**

the waterproof strip is a laminated material.

7. The packaging container according to any one of claims 1-4 **characterized by** being bottle-shaped with the bonded position at a bottle bottom part of the bottle-shaped packaging container.

8. The packaging container according to claim 2 **characterized by** being bottle-shaped with the bonded position at the bottle bottom part of the bottle-shaped packaging container and the waterproof strip covering a joint of two adjoining packaging materials forming the bottle bottom and a bottle body along a circular ring-shaped path.

9. The packaging container according to claim 3 **characterized by** being bottle-shaped with the oblique section formed at ends of edgefolds of the packaging material forming the bottle body of the bottle-shaped packaging container, and fitted and bonded with a lower surface of the packaging material forming the bottle bottom of the bottle-shaped packaging container.

10. The packaging material according to claim 3 or 9 **characterized in that:**

the oblique section has an oblique angle of 45 degrees.

11. The packaging material according to claim 9 **characterized in that:**

the oblique section faces outside of the bottle body.

12. A packaging container comprising a cylindrical bottle body and a truncated cone-shaped bottle neck both formed by folding a sheet laminated material, the bottle body and the bottle neck being formed by an integrated rectangular sheet laminated material consisting of a first portion and a second portion both in a rectangular shape, the first portion and the second portion connected with each other forming the cylindrical bottle body and the truncated cone-shaped bottle neck, respectively, with a series of folded layers spaced apart in a circumferential direction of the bottle neck that are formed by folding part of a substrate of the sheet laminated material of the second portion and tiered at one side of the bottle neck, and project from a surface of a bottle neck body, and a series of corresponding creases formed on a surface of the other side of the bottle neck, and folded areas of the folded layers being gradually wider from a lower portion to an upper portion of the truncated cone-shaped bottle neck to keep a tapering opening of the bottle neck, **characterized in that:**

each folded layer projecting from the surface of the bottle neck body has at least two end ridges located at both ends of the corresponding crease, respectively.

13. The packaging container according to claim 12 **characterized in that:**

the folded layers are located at an inside end of the packaging container.

14. The packaging container according to claim 13 **characterized in that:**

the folded layers are located at an outside end of the packaging container.

15. The packaging container according to claim 12, 13 or 14 **characterized in that:**

in a same horizontal plane, each corresponding crease has a distance away from one end ridge greater than a distance away from the other end ridge.

16. The packaging container according to claim 12, 13 or 14 **characterized in that:**

in a same horizontal plane, each corresponding crease has an identical distance away from the two end ridges.

17. The packaging container according to claim 12, 13

or 14 **characterized in that:**

the laminated material comprises at least a paper base layer and an aluminum foil layer.

18. The packaging container according to claim 17 **characterized in that:**

the folded layers are integrally heat-sealed with the laminated material of the bottle neck body by means of induction heating.

19. A blank for making the packaging container, partitioned from a sheet in a roll with each partitioned blank unit comprising a first rectangular portion and a second rectangular portion connected to each other and sharing a rectangular edge, the first rectangular portion used for forming the cylindrical bottle body of the packaging container, and the second rectangular portion used for forming the bottle neck of the packaging container and provided with a plurality of groups of indentations convenient for tiering the folded layers, and each group of indentations including a first indentation line, a second indentation line, a third indentation line and a fourth indentation line arranged in order, wherein one ends of the four indentation lines converge at one point on the shared rectangular edge, while the other ends of the four indentation lines are scattered on another rectangular edge of the second rectangular portion opposite to the shared rectangular edge.

20. The blank according to claim 19 **characterized in that:**

a first region is formed between the first and second indentation lines, while a second region is formed between the second and third indentation lines, and a third region is formed between the third and fourth indentation lines, with the first region and the third region located symmetrically.

21. The blank according to claim 20 **characterized in that:**

with a line passing through the convergence point and perpendicular to the shared rectangular edge as a reference line, in a same horizontal plane, a distance between the first indentation line and the reference line is twice a distance between the second indentation line and the reference line, and a distance between the fourth indentation line and the reference line is twice a distance between the third indentation line and the reference line.

22. The blank according to claim 19 **characterized in**

that:

with a line passing through the convergence point and perpendicular to the shared rectangular edge as a reference line, in a same horizontal plane, a distance between the first indentation line and the reference line is twice a distance between the second indentation line and the reference line, and a distance between the fourth indentation line and the reference line is twice a distance between the third indentation line and the reference line.

23. The blank according to claim 22 **characterized in that:**

the distance between the first indentation line and the reference line is smaller than the distance between the fourth indentation line and the reference line.

24. The blank according to claim 19 **characterized by** being a laminated composite material having composite layers including at least one paper base layer and one aluminum foil layer.

25. The blank according to any one of claims 19-24 **characterized in that,** the first rectangular portion is provided with at least one observation hole that is hermetically connected with a transparent sheet.

26. The blank according to claim 25 **characterized in that:**

the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

27. A packaging container used for storing a liquid food, wherein a container wall defining a major storage space of the packaging container is formed at least in part by a sheet laminated material having a paper base as a major portion, **characterized in that** a plurality of groups of stiffeners formed by folding and tiering the laminated material are provided on the container wall, and project from the container wall.

28. The packaging container according to claim 27 **characterized in that:**

the stiffeners are transversely arranged on a surface of the container wall.

29. The packaging container according to claim 27 **characterized in that:**

- the stiffeners are vertically arranged on the surface of the container wall.
30. The packaging container according to claim 27 **characterized in that:** 5
- the stiffeners are slantwise arranged on the surface of the container wall.
31. The packaging container according to any one of claims 27-30 **characterized in that:** 10
- the stiffeners project from an inner side surface of the container wall.
32. The packaging container according to any one of claims 27-30 **characterized in that:** 15
- the stiffeners project from an outer side surface of the container wall. 20
33. The packaging container according to claim 27 **characterized by** being bottle-shaped, wherein a bottle body of the bottle-shaped packaging container is formed by the laminated material. 25
34. The packaging container according to claim 27 **characterized by** being bottle-shaped, wherein a bottle body and a bottle neck of the bottle-shaped packaging container are both formed by the laminated material, and the stiffeners are provided on the surfaces of both the bottle body and the bottle neck. 30
35. The packaging container according to claim 27 **characterized in that:** 35
- relative to creases formed at folded positions, the tiered stiffeners are folded along one sides of the creases.
36. The packaging container according to claim 27 **characterized in that:** 40
- relative to creases formed at folded positions, the tiered stiffeners are folded along both sides of the creases. 45
37. The packaging container according to claim 36 **characterized in that:** 50
- relative to the tiered stiffeners, the creases are center-aligned or deflected to one side.
38. The packaging container according to claim 27 **characterized by** being shaped into a hexagonally prismatic package body or a brick package structure. 55
39. The packaging container according to claim 27 **characterized in that:**
- the laminated composite material is inductively heated and then tiered and sealed to form the stiffeners.
40. A blank for making the packaging container of claim 27 **characterized in that:**
- a plurality of groups of indentation lines convenient for forming the stiffener structures by tiering after folding are pressed against a surface of a laminated composite material in advance.
41. The blank according to claim 40 **characterized in that:**
- each group of indentation lines includes two or four indentation lines.
42. The blank according to claim 40 or 41 **characterized in that** at least one observation hole is formed in the laminated composite material in advance, and a transparent sheet is hermetically connected to each observation hole.
43. The blank according to claim 42 **characterized in that** the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.
44. A packaging container having a main body formed by a sheet laminated material **characterized in that:**
- a strip-shaped or meshed stiffener structure is provided on a sidewall of the packaging container formed by the sheet laminated material.
45. The packaging container according to claim 44 **characterized in that:**
- the stiffener structure is provided on an inner wall surface or outer wall surface of the sidewall.
46. The packaging container according to claim 44 **characterized in that:**
- the stiffener structure is embedded inside the laminated material.
47. The packaging container according to claim 45 **characterized in that:**
- the stiffeners are formed by folding and then tiering part of a same piece of laminated composite material forming the sidewall of the packaging container.

48. The packaging container according to claim 45 **characterized in that:**

the stiffeners are formed by a same packaging material or a different packaging material adhered to a surface of the laminated composite material forming the sidewall of the packaging container.

49. The packaging container according to claim 44 **characterized in that:**

a plurality of strip-shaped stiffeners of the stiffener structure are uniformly arranged along a periphery of the packaging container.

50. The packaging container according to claim 44 **characterized in that:**

the strip-shaped stiffeners of the stiffener structure are arranged slantwise, vertically or horizontally with respect to a trend of a bottom of the packaging container.

51. The packaging container according to claim 44 **characterized in that:**

the stiffener structure is provided on the sidewall corresponding to a major containing space of the packaging container.

52. The packaging container according to claim 44 or 51 **characterized in that:**

the stiffener structure is provided from a one-second or one-third position of a lower portion of the corresponding sidewall to a bottom of the sidewall.

53. The packaging container according to claim 50 **characterized in that:**

gaps between adjacent stiffeners among a plurality of strip-shaped stiffeners arranged horizontally taper from an upper part to a lower part of the packaging container.

54. The packaging container according to claim 52 **characterized in that:**

gaps between adjacent stiffeners among a plurality of strip-shaped stiffeners arranged horizontally taper from an upper part to a lower part of the packaging container.

55. The packaging container according to claim 47 **characterized in that:**

relative to creases formed at folded positions, the tiered stiffeners are folded along one sides of the creases.

56. The packaging container according to claim 47 **characterized in that:**

relative to creases formed at folded positions, the tiered stiffeners are folded along both sides of the creases.

57. The packaging container according to claim 56 **characterized in that:**

relative to the tiered stiffeners, the creases are center-aligned or deflected to one side.

58. The packaging container according to claim 57 **characterized in that:**

the creases are closer to front sides of the corresponding stiffeners in a clockwise direction in a view from top to bottom.

59. The packaging container according to claim 44 **characterized by** being bottle-shaped, wherein a bottle body and a bottle neck of the bottle-shaped packaging container are formed by the laminated composite material.

60. The packaging container according to claim 59 **characterized in that:**

the bottle body and the bottle neck of the bottle-shaped packaging container are formed by a same piece of laminated composite material.

61. The packaging container according to claim 59 or 60 **characterized in that:**

the stiffener structure is provided at both the bottle body and the bottle neck.

62. The packaging container according to claim 59 or 60 **characterized in that:**

the stiffener structure is provided only at the bottle body.

63. The packaging container according to claim 44 **characterized by** being shaped into a hexagonally prismatic package body or a brick package structure.

64. The packaging container according to claim 49 or 63 **characterized in that:**

the stiffeners are horizontally formed on a circumferential external facade of the packaging

container.

65. The packaging container according to claim 47 **characterized in that:**

the laminated composite material is inductively heated and then tiered and sealed to form the stiffeners.

66. A blank for making the packaging container of claim 44 **characterized in that:**

a plurality of groups of indentation lines convenient for forming the stiffener structures by tiering after folding are pressed against a surface of a laminated composite material in advance.

67. The blank according to claim 66 **characterized in that:**

each group of indentation lines includes two or four indentation lines.

68. The blank according to claim 67 **characterized by** comprising a first rectangular portion and a second rectangular portion connected to each other, the first rectangular portion forming a bottle neck of a bottle-shaped packaging container, and the second rectangular portion forming a bottle body of the bottle-shaped packaging container; one single group of indentation lines provided in the first rectangular portion being arranged radially, one single group of indentation lines provided in the second rectangular portion being arranged in parallel, the corresponding groups of indentation lines in the first rectangular portion and the second rectangular portion intersecting at a rectangular edge shared by the first rectangular portion and the second rectangular portion, and the shared rectangular edge eventually forming a dividing line of the bottle neck and the bottle body of the bottle-shaped packaging container.

69. The blank according to claim 68 **characterized in that** at least one observation hole is formed in the second rectangular portion in advance, and a transparent sheet is hermetically connected to each observation hole.

70. The blank according to claim 69 **characterized in that** the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

71. A blank for making the packaging container of claim 44 **characterized in that:**

band-shaped or meshed stiffeners are embed-

ded between composite layers of a laminated composite material.

72. The blank according to claim 71 **characterized in that** at least one observation hole is formed in the laminated composite material in advance, and a transparent sheet is hermetically connected to each observation hole.

73. The blank according to claim 72 **characterized in that** the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

74. A blank for making the packaging container of claim 44 **characterized in that:**

band-shaped stiffeners are adhered to a surface of the laminated composite material.

75. The blank according to claim 74 **characterized in that** at least one observation hole is formed in the laminated composite material in advance, and a transparent sheet is hermetically connected to each observation hole.

76. The blank according to claim 75 **characterized in that** the transparent sheet is bonded to a surface of the laminated composite material, or between two lamination layers of the laminated composite material.

77. A blank for forming packaging container, used for forming a bottle body part and a bottle neck part of a bottle-shaped container, **characterized by** being a sheet comprising a segment of rectangular material of a lower portion and a segment of serrated strip-shaped material of an upper portion, one rectangular edge of the rectangular material overlapping a bottom edge of the serrated strip-shaped material such that the rectangular material and the serrated strip-shaped material are connected and formed in whole by different portions of a same sheet through die cutting, the rectangular material being used for forming the bottle body part of the bottle-shaped container, the serrated strip-shaped material being used for forming the bottle neck part of the bottle-shaped container, and the serrated strip-shaped material being provided with a group of serrations open outwards.

78. The blank for forming packaging container according to claim 77 **characterized in that:**

indentation lines convenient for folding the blank to keep splicing and sealing of the adjacent serrations are provided in a surface of the blank at inner side ends of serration edges of the serra-

- tions.
79. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- each serration is isosceles trapezoid-shaped.
80. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- 6-8 serrations are uniformly formed on the serrated strip-shaped material.
81. The blank for forming packaging container according to claim 80 **characterized in that:**
- 8 serrations are uniformly formed on the serrated strip-shaped material.
82. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- a height of each serration is approximately one half of a rectangle height of the rectangular material.
83. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- an overall length of the serrated strip-shaped material is 3-4 times the height of each serration.
84. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- an overall length of the serrated strip-shaped material is π times the height of each serration.
85. The blank for forming packaging container according to claim 77 or 78 **characterized in that:**
- the serration edges of the serrations are covered with a waterproof material strip.
86. The blank for forming packaging container according to claim 77 or 78 **characterized by** comprising at least a paper base layer, an aluminum foil layer, and a waterproof layer.
87. The blank for forming packaging container according to claim 86 **characterized in that:**
- an ink printed layer is further provided on the surface of the blank.
88. The blank for forming packaging container according to claim 86 **characterized in that** at least one observation hole is formed in the blank in advance, and
- a transparent sheet is hermetically connected to each observation hole.
89. The blank according to claim 88 **characterized in that** the transparent sheet is bonded to the surface of the blank, or between the aluminum foil layer and the waterproof layer of the blank.
90. A packaging container formed in part or in whole by a laminated composite material including a paper base layer, **characterized in that** at least one observation hole is formed in the laminated composite material, and a transparent sheet is hermetically connected to each observation hole.
91. The packaging container according to claim 90 **characterized in that** the transparent sheet is bonded to a surface of the laminated composite material, and the surface is an inner surface of the packaging container.
92. The packaging container according to claim 90 **characterized in that** the transparent sheet is bonded between two lamination layers of the laminated packaging material, and an inner cavity of the packaging container and the paper base layer are located on two sides of the transparent sheet, respectively.
93. The packaging container according to any one of claims 90-92 **characterized in that** a section or surface of at least part of the laminated composite material of the packaging container is bonded with a surface of an adjoining packaging material, and a paper substrate of the paper base layer of the laminated composite material is isolated from an external environment by a waterproof material at the bonded position.
94. The packaging container according to claim 93 **characterized in that:**
- the section or surface is covered with a waterproof strip that forms the waterproof material for isolating the paper substrate from the external environment.
95. The packaging container according to claim 93 **characterized in that:**
- the section of the laminated composite material is an oblique section that fits the surface of the adjoining packaging material, and an outermost laminated material layer of the laminated composite material forms the waterproof material isolating the paper substrate from the external environment.
96. The packaging container according to claim 94 **char-**

acterized in that:

the waterproof strip is heat-sealed to cover the section of the laminated composite material.

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97. The packaging container according to claim 94 **characterized in that:**

the waterproof strip is a PE strip.

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98. The packaging container according to claim 94 **characterized in that:**

the waterproof strip is a laminated material.

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99. The packaging container according to any one of claims 90-92 **characterized by** being bottle-shaped with the bonded position at a bottle bottom part of the bottle-shaped packaging container, and each observation hole located in a bottle body of the bottle-shaped packaging container.

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100. The packaging container according to claim 94 **characterized by** being bottle-shaped with the bonded position at the bottle bottom part of the bottle-shaped packaging container, the waterproof strip covering a joint of two adjoining packaging materials forming the bottle bottom and the bottle body along a circular ring-shaped path, and each observation hole located in the bottle body of the bottle-shaped packaging container.

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101. The packaging container according to claim 95 **characterized by** being bottle-shaped with the oblique section formed at ends of edgefolds of the packaging material forming the bottle body of the bottle-shaped packaging container, and fitted and bonded with a lower surface of the packaging material forming the bottle bottom of the bottle-shaped packaging container.

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102. The packaging container according to claim 95 **characterized in that:**

the oblique section has an oblique angle of 45 degrees.

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103. The packaging container according to claim 101 **characterized in that:**

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the oblique section faces outside of the bottle body.

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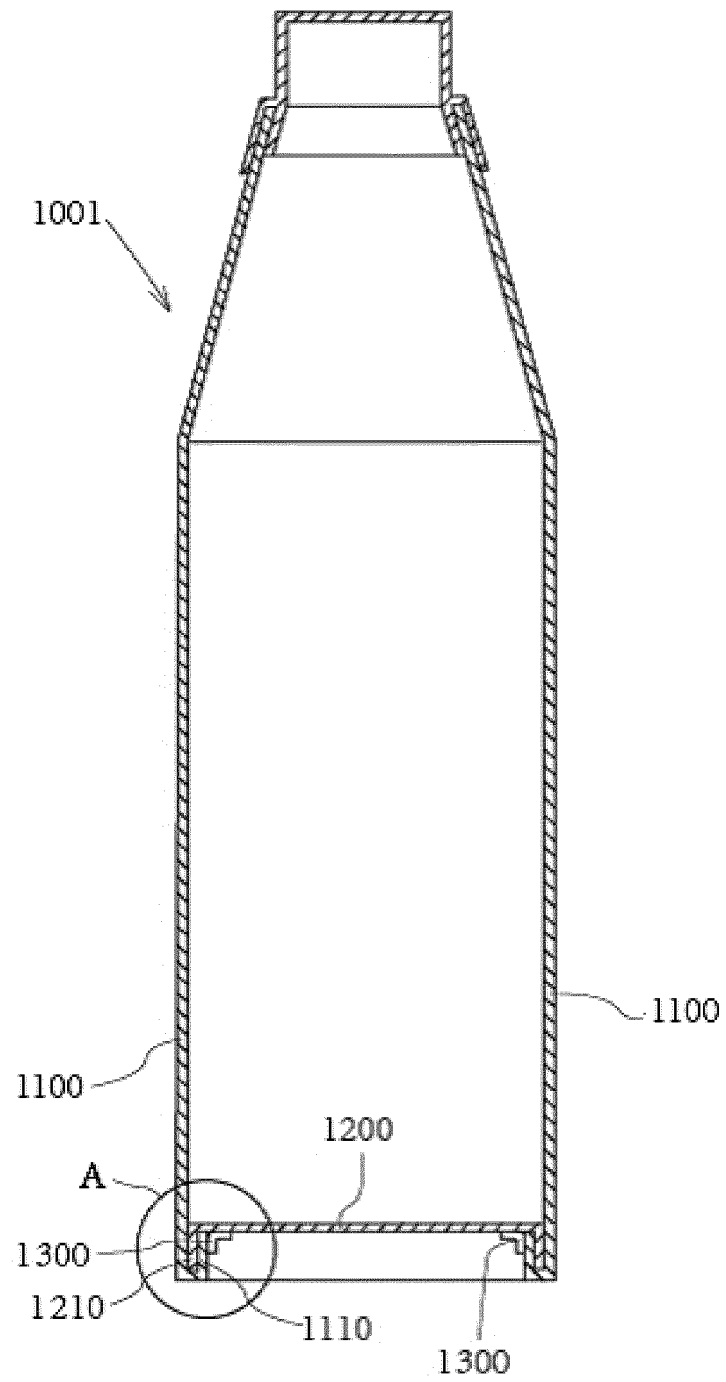


Fig.1-1

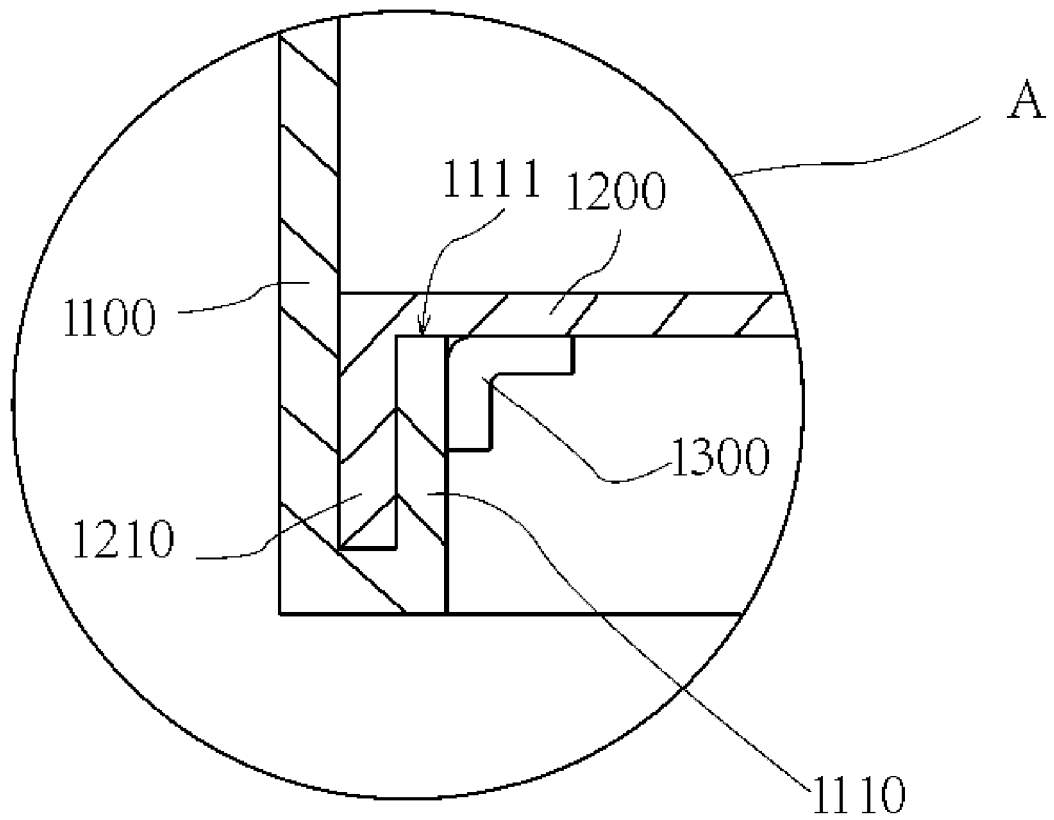


Fig.1-2

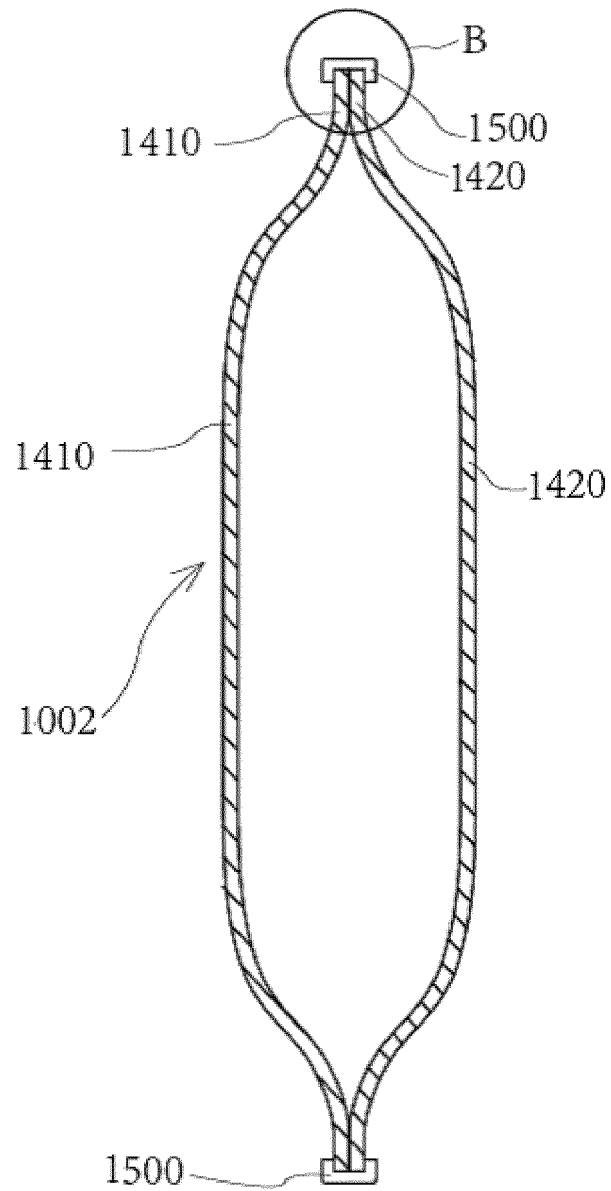


Fig.1-3

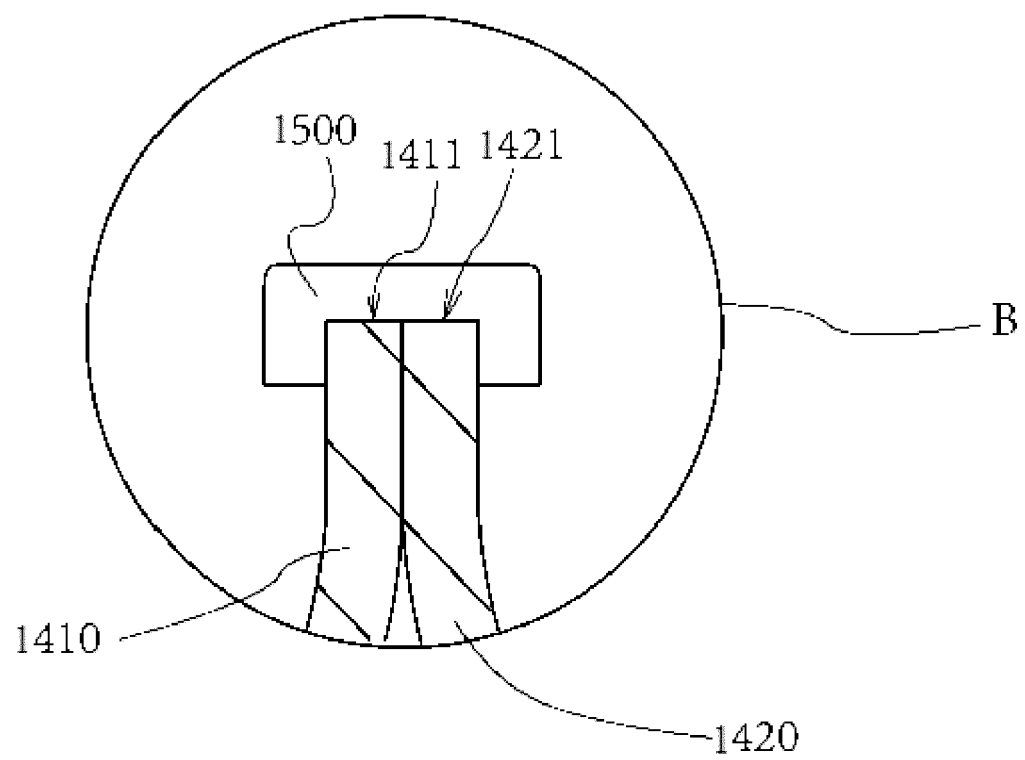


Fig.1-4

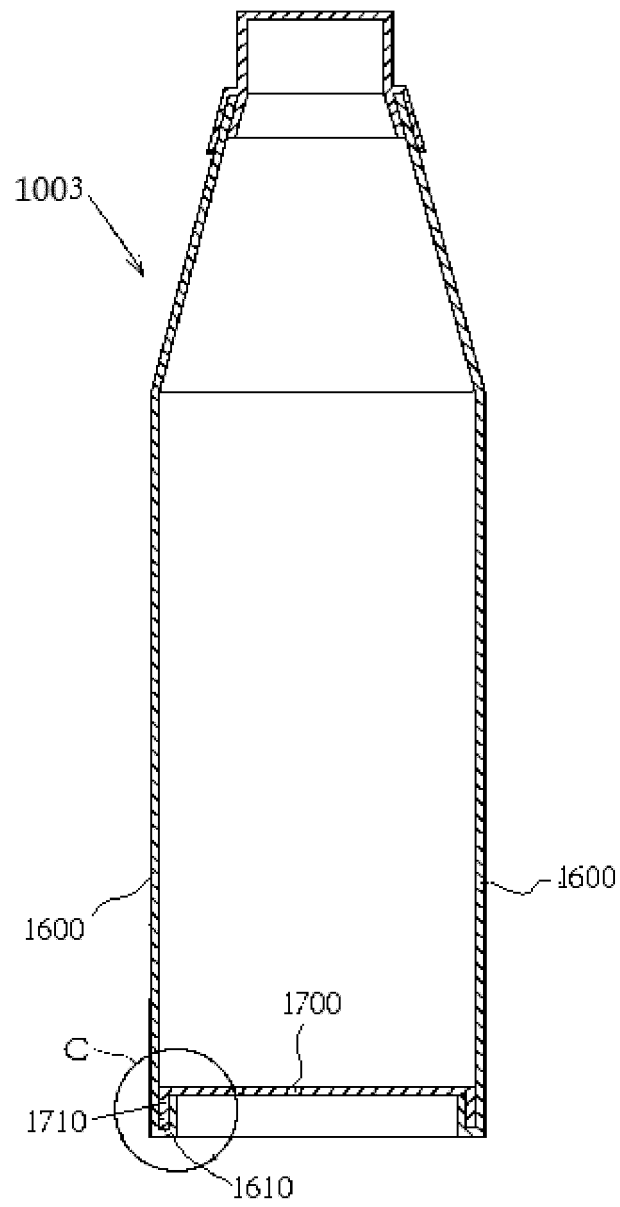


Fig.1-5

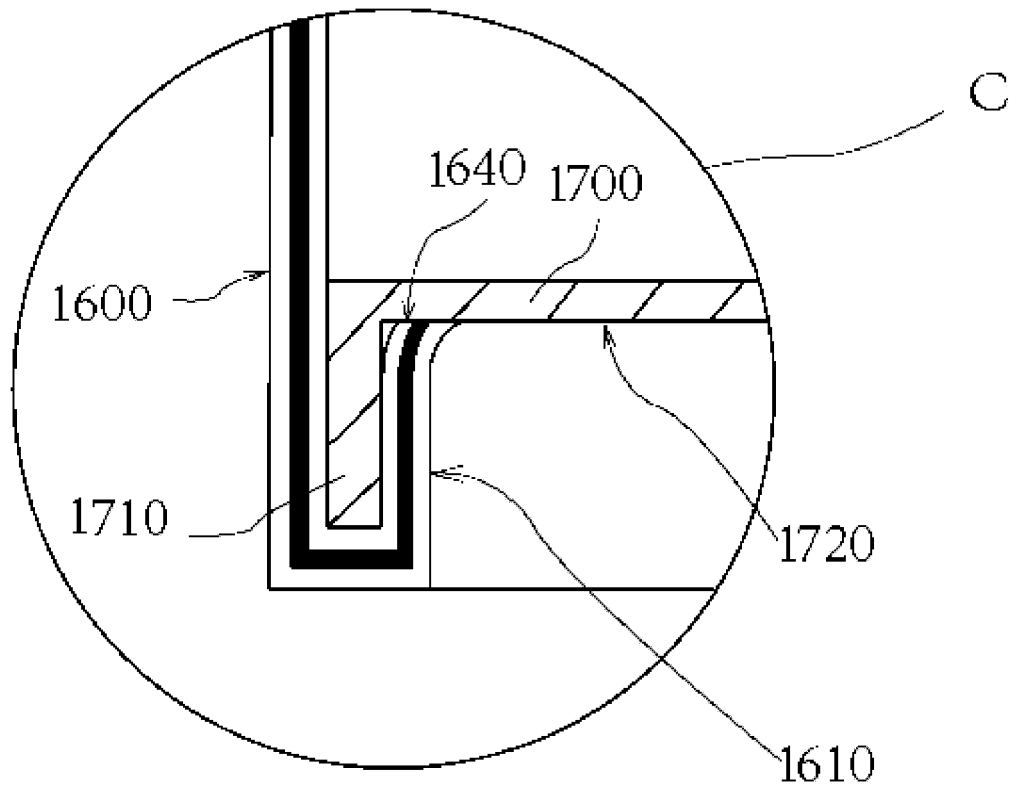


Fig.1-6

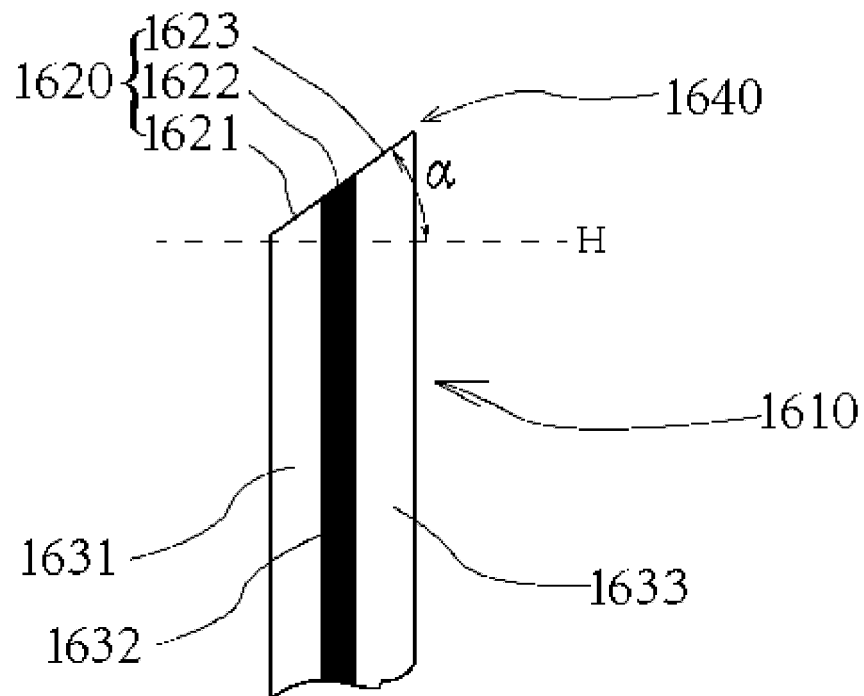


Fig.1-7

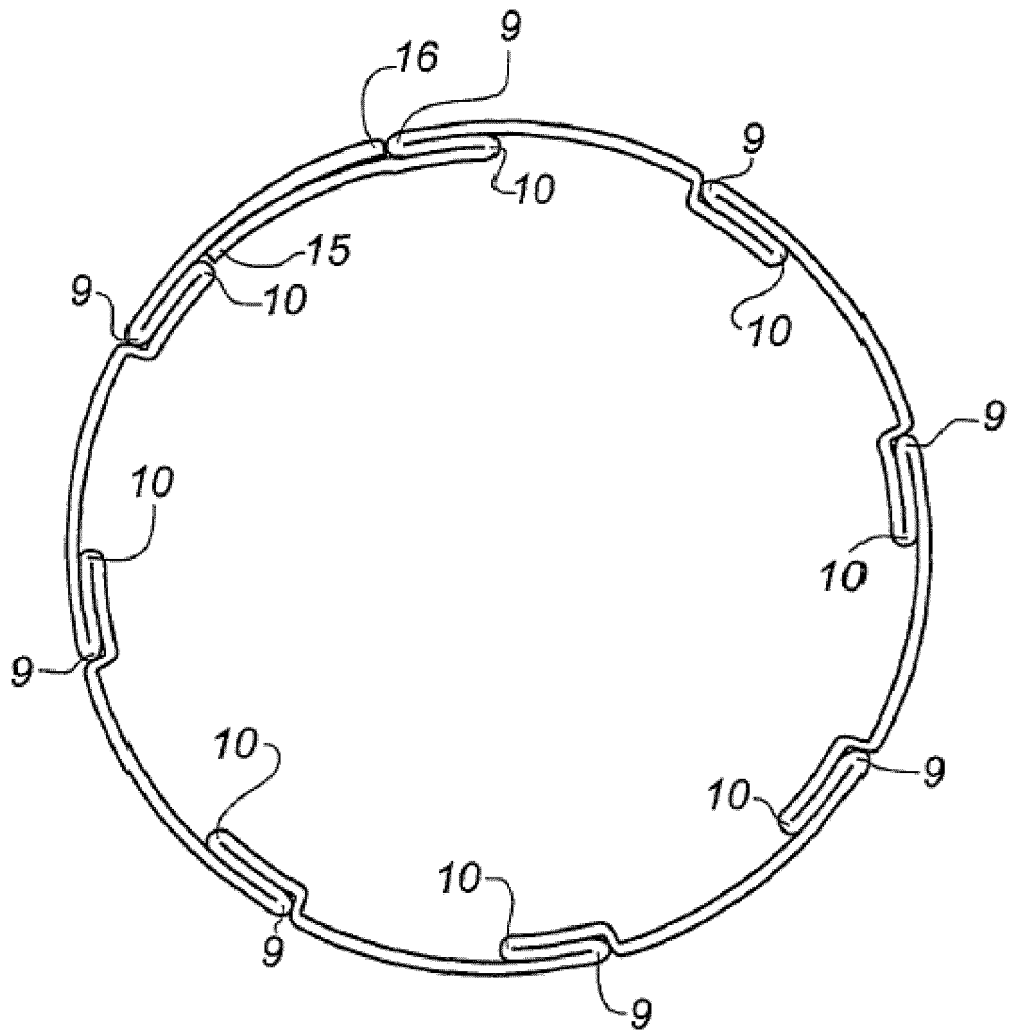


Fig.2-1

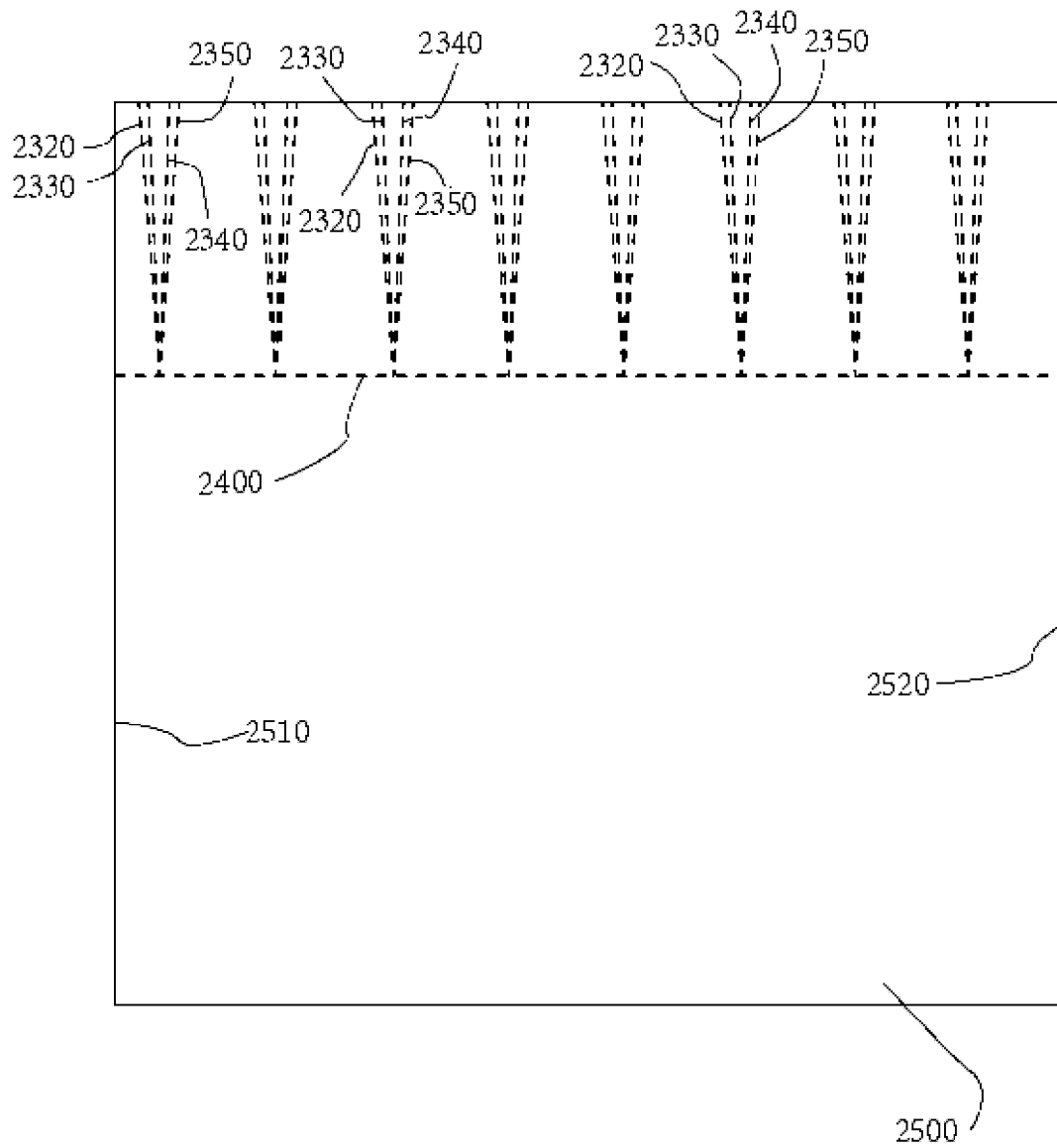


Fig.2-2

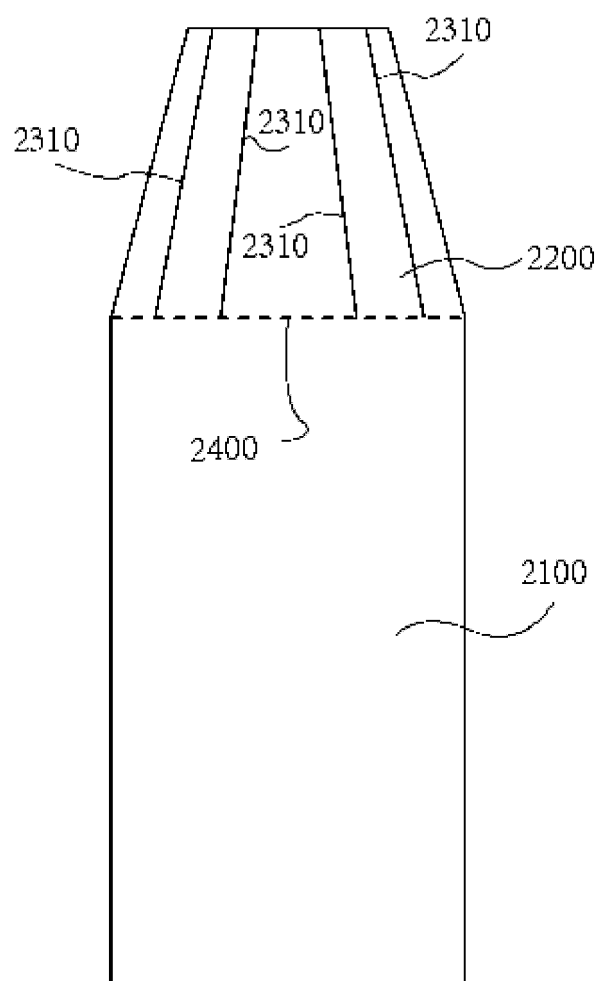


Fig.2-3

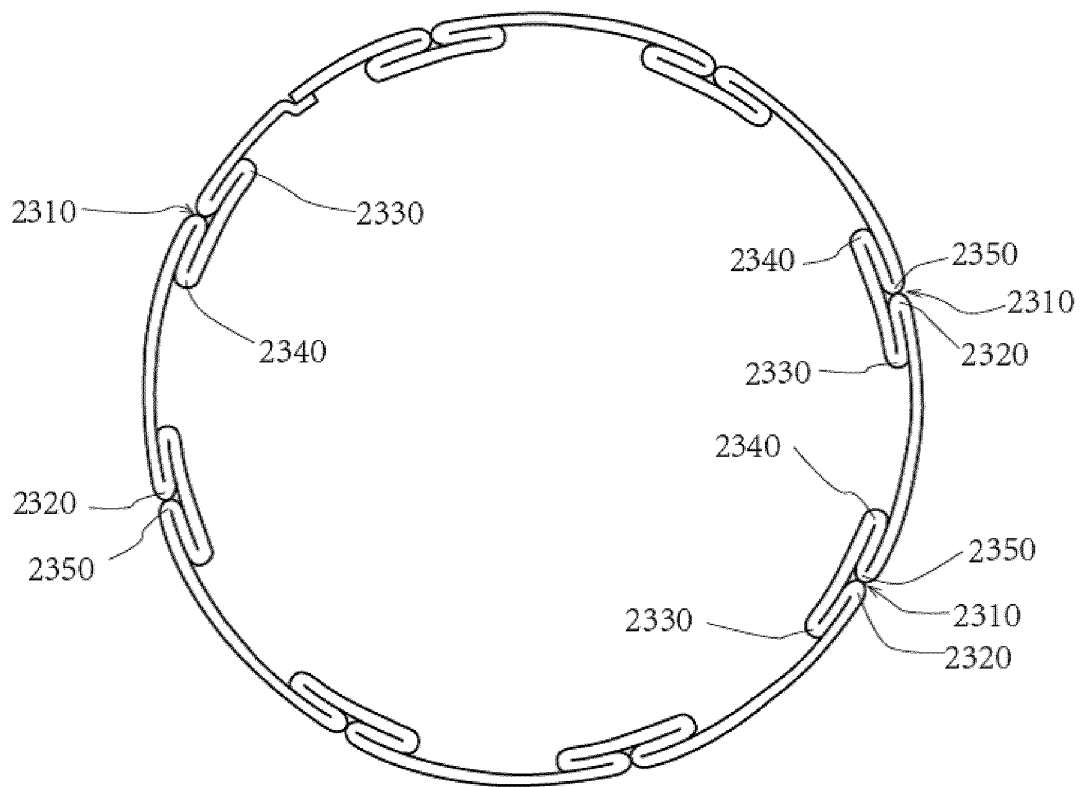


Fig.2-4

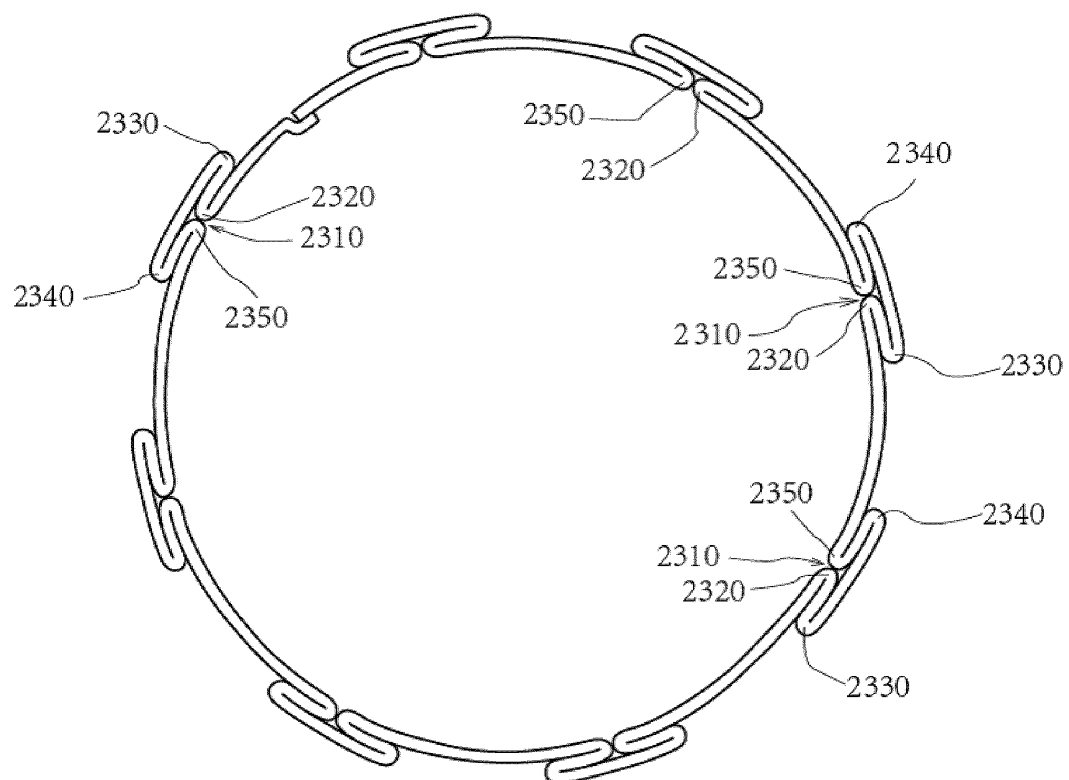


Fig.2-5

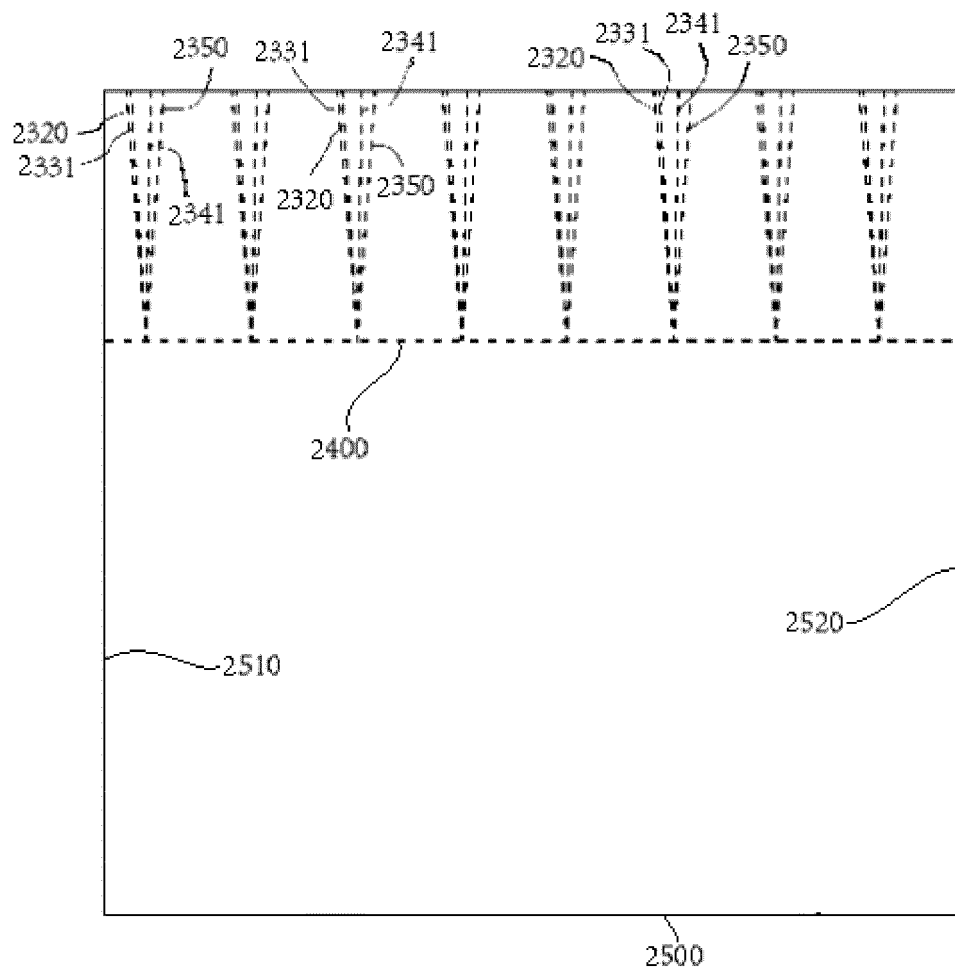


Fig.2-6

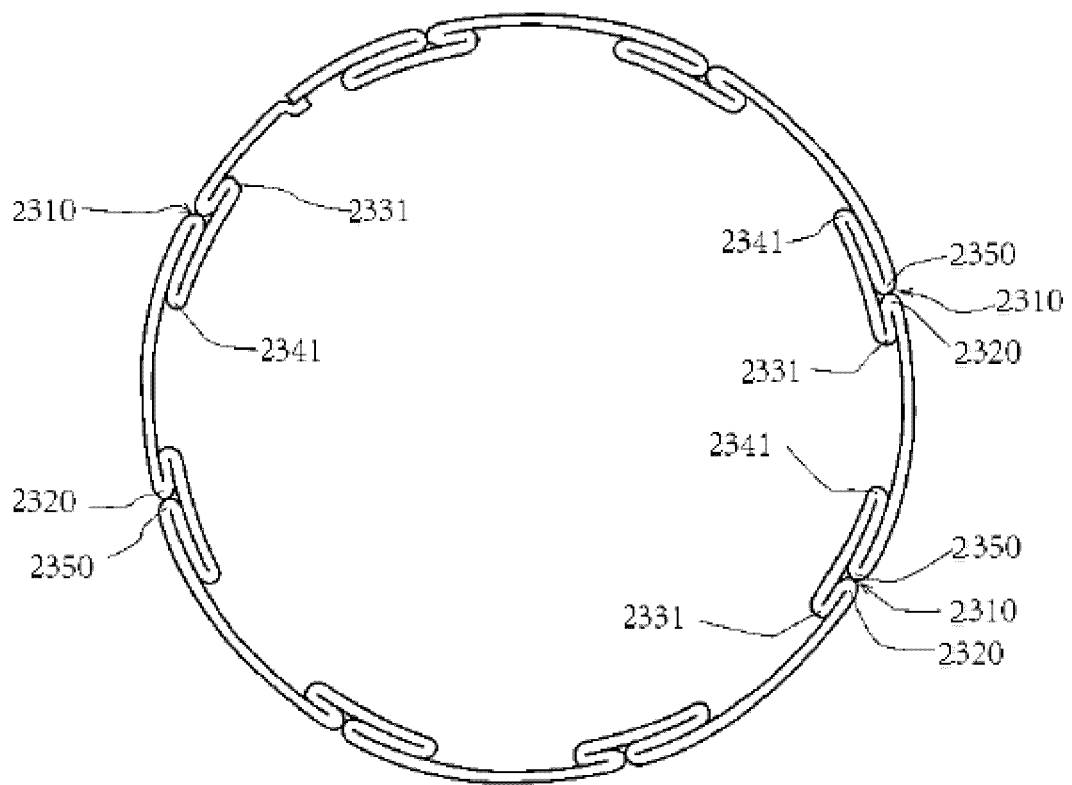


Fig.2-7

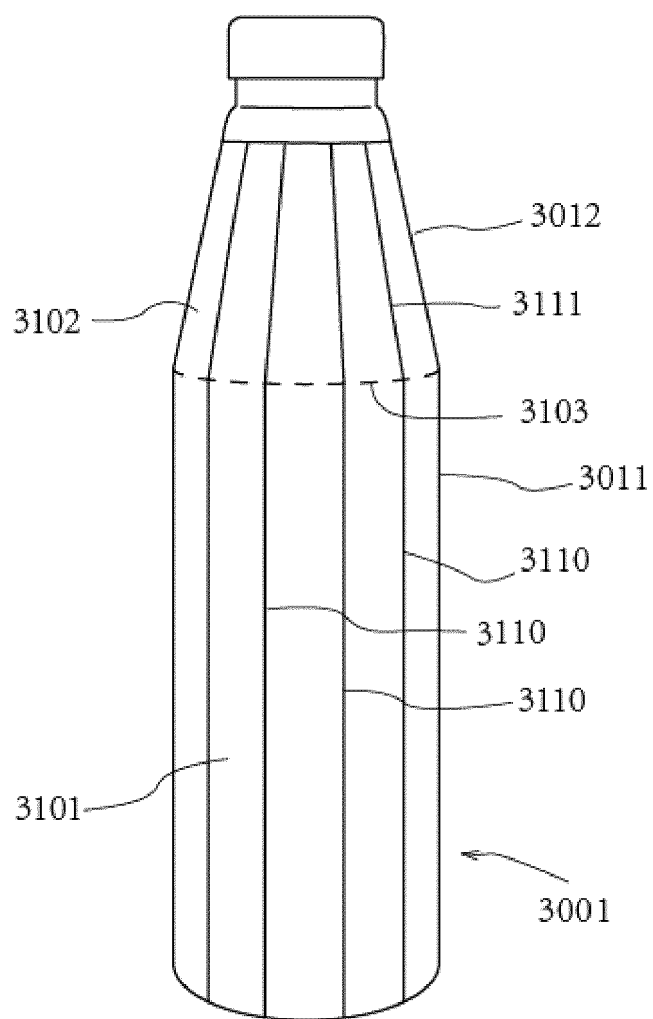


Fig.3-1

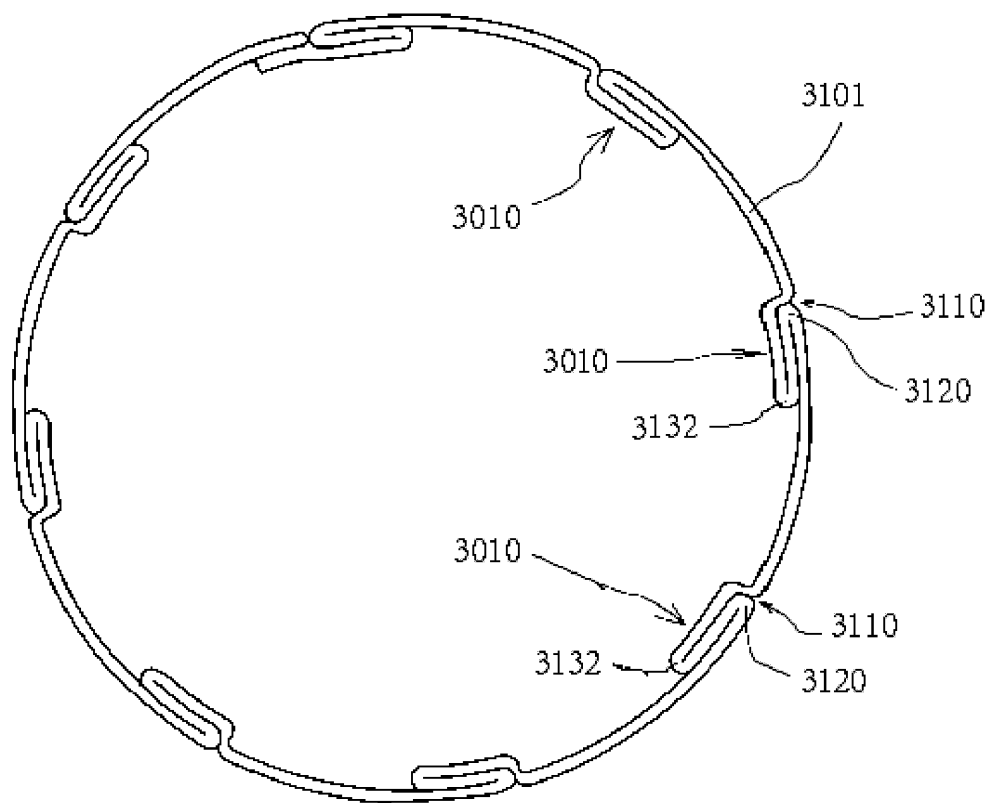


Fig.3-2

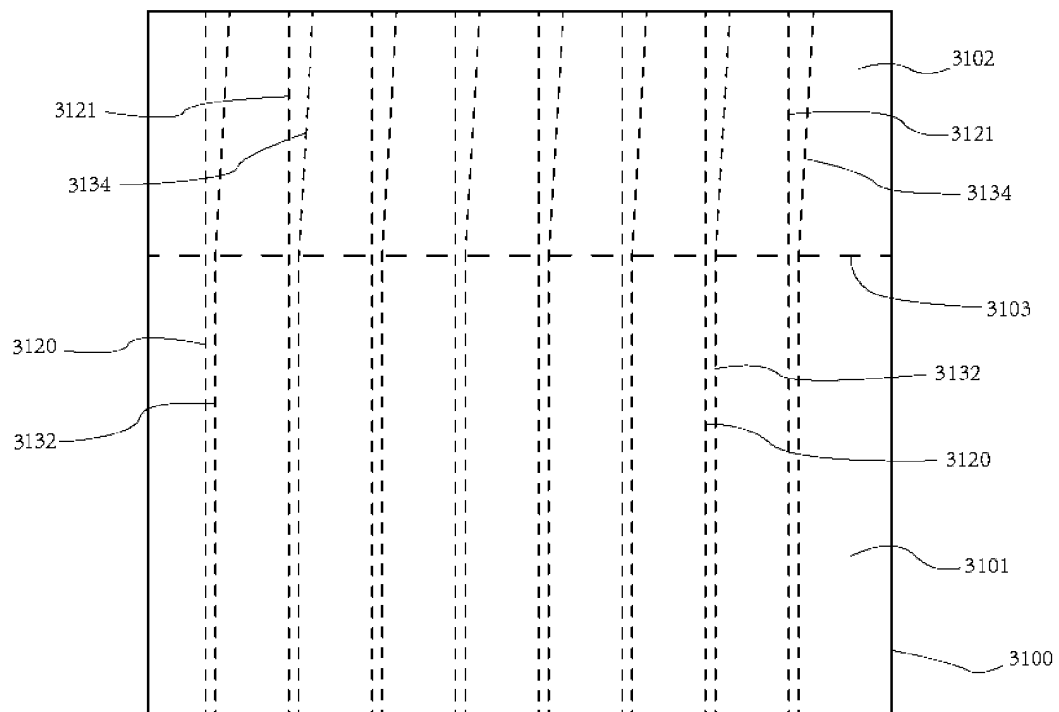


Fig.3-3

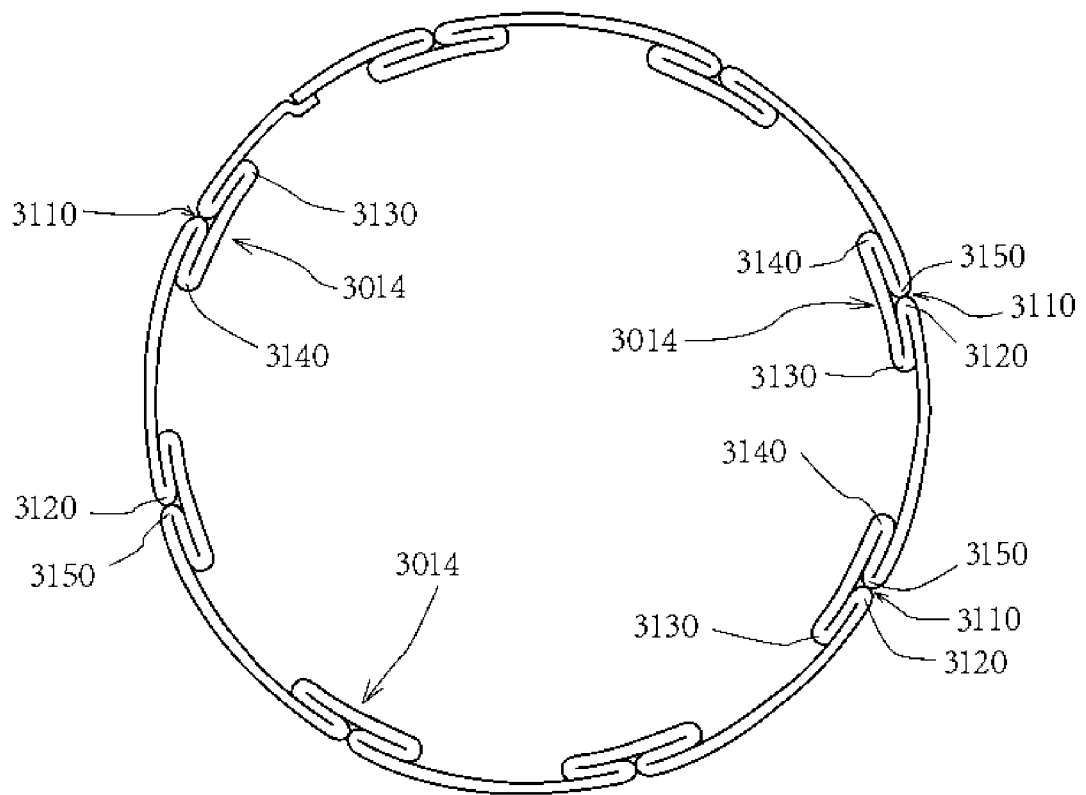


Fig.3-4

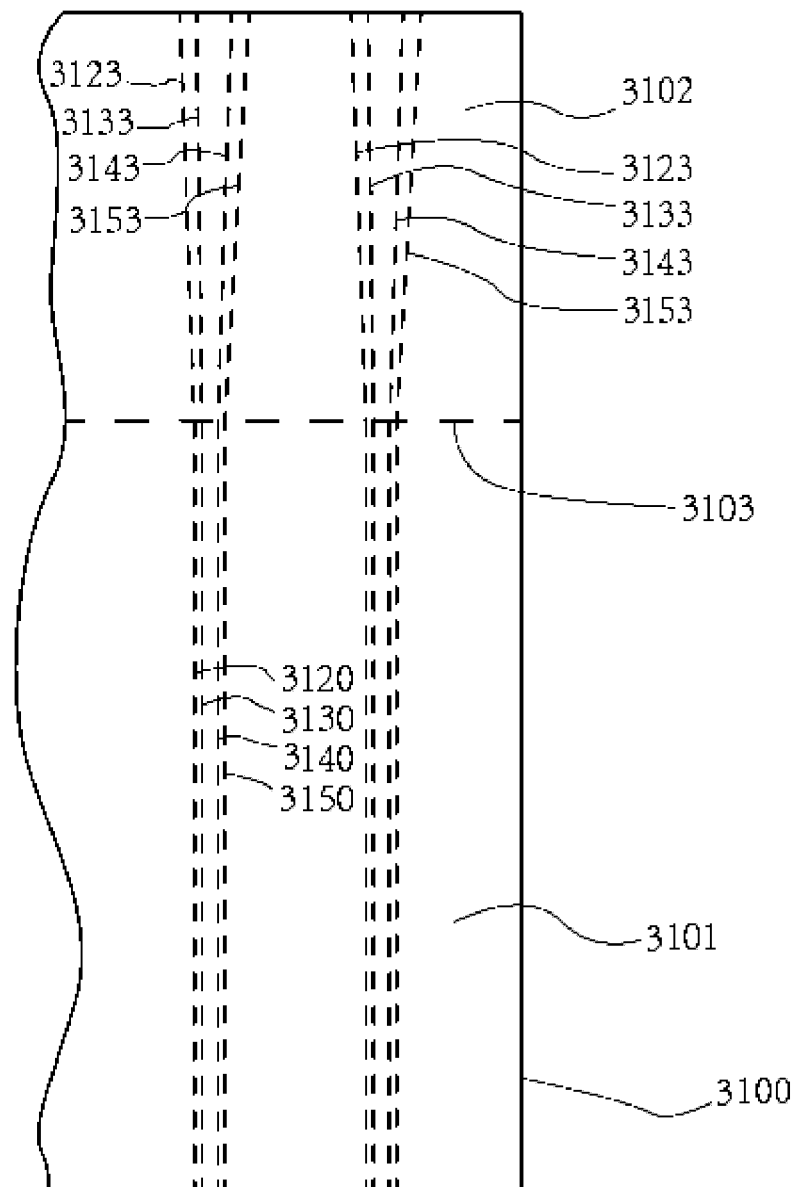


Fig.3-5

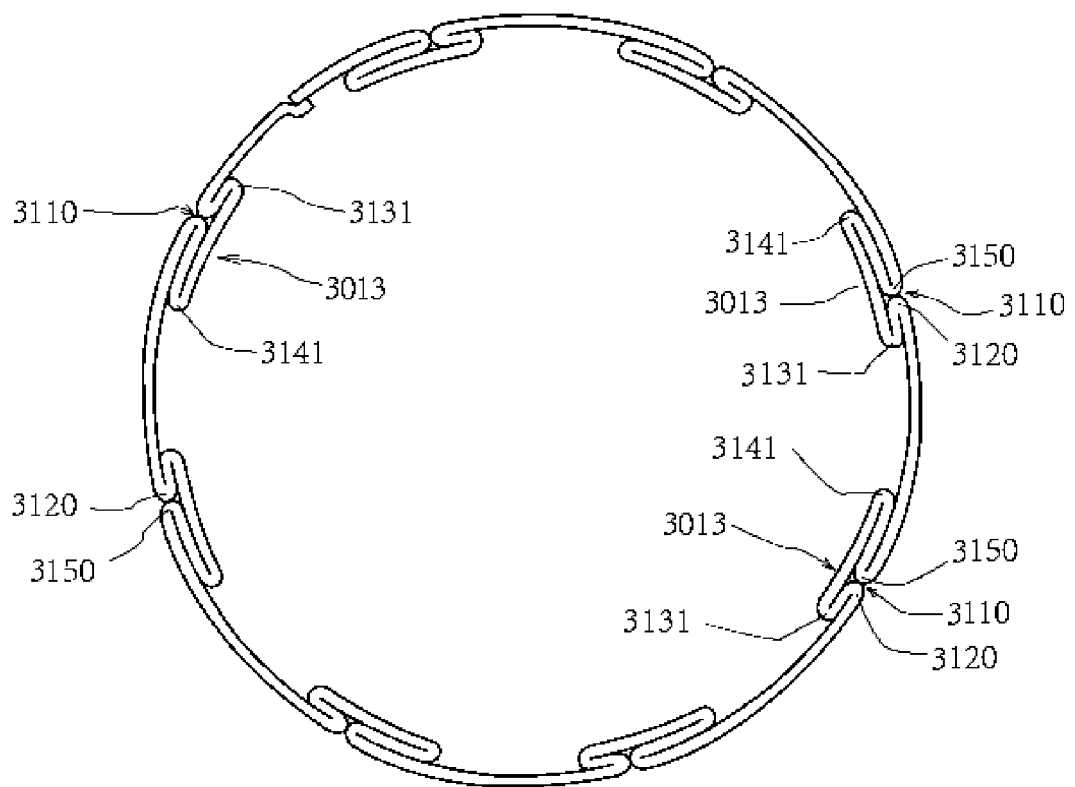


Fig.3-6

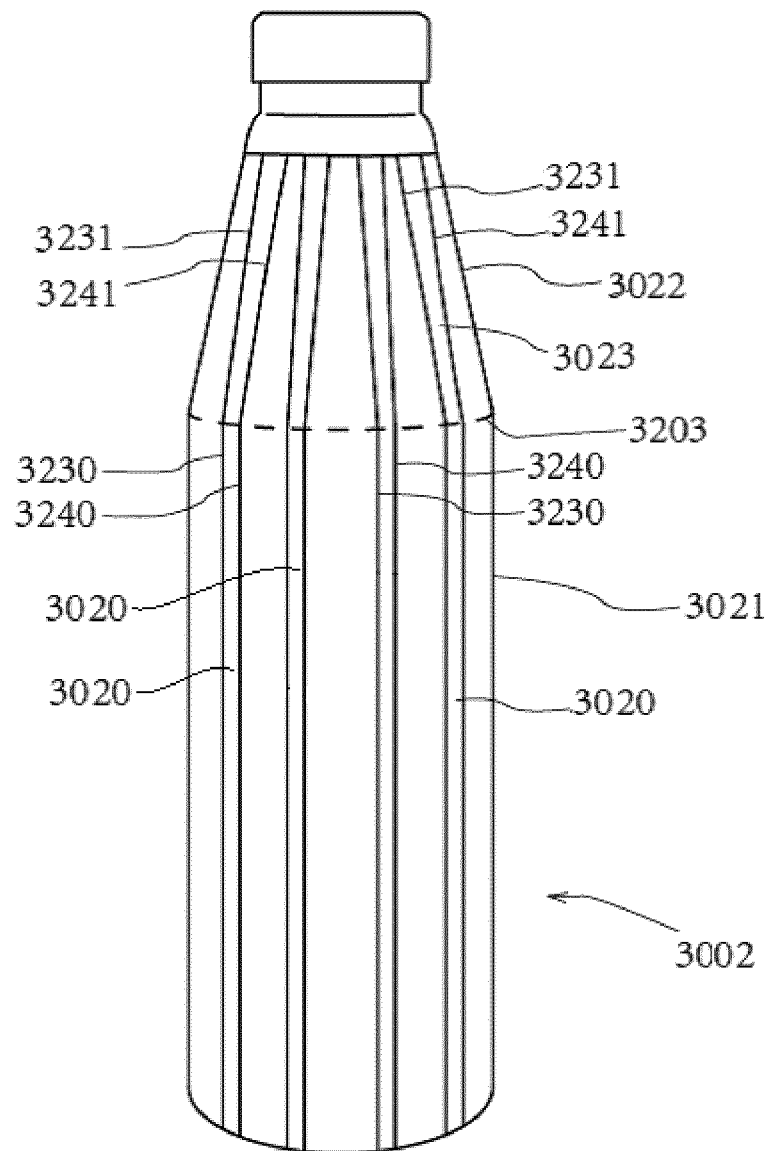


Fig.3-7

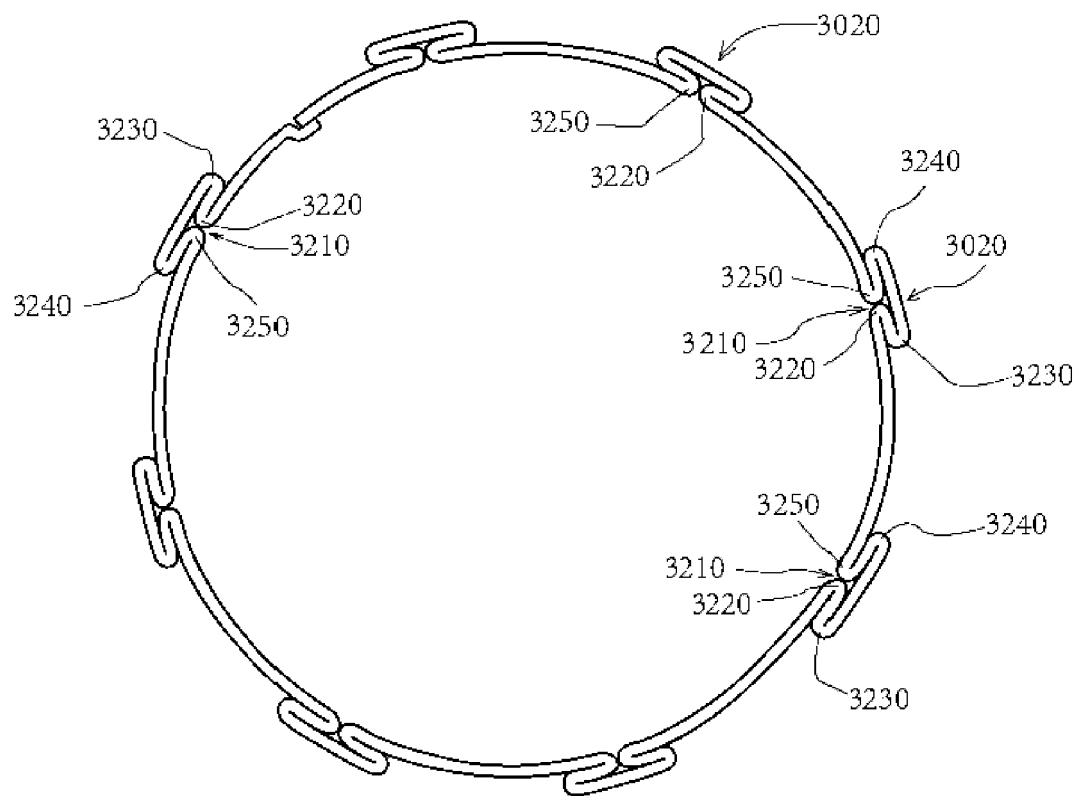


Fig.3-8

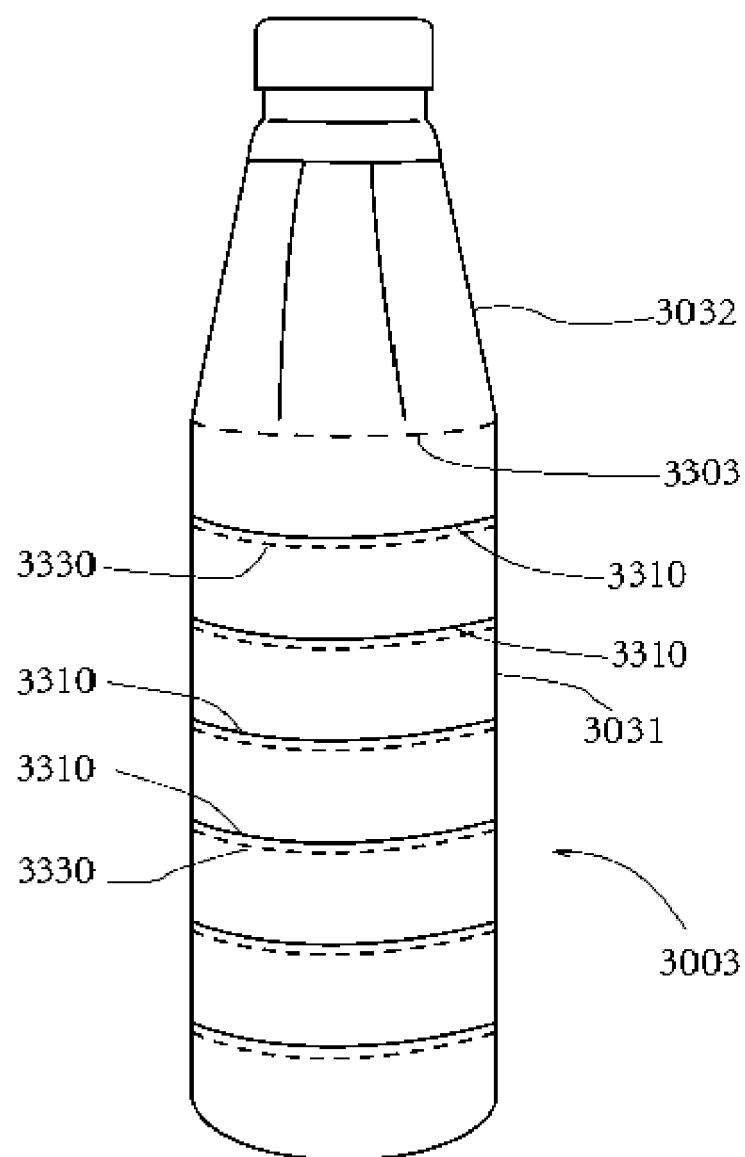


Fig.3-9

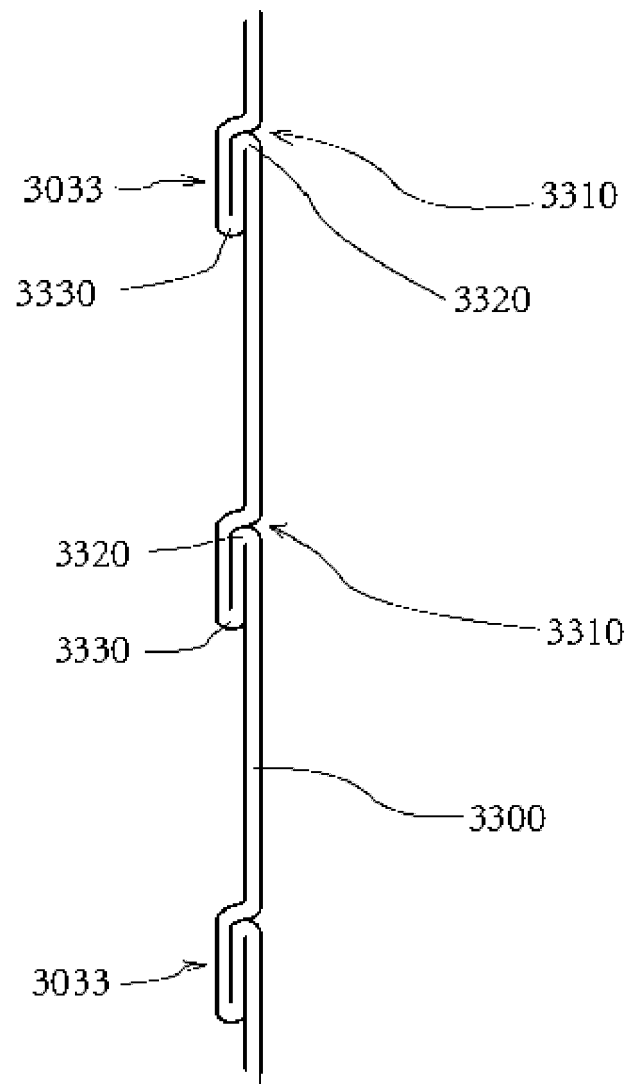


Fig.3-10

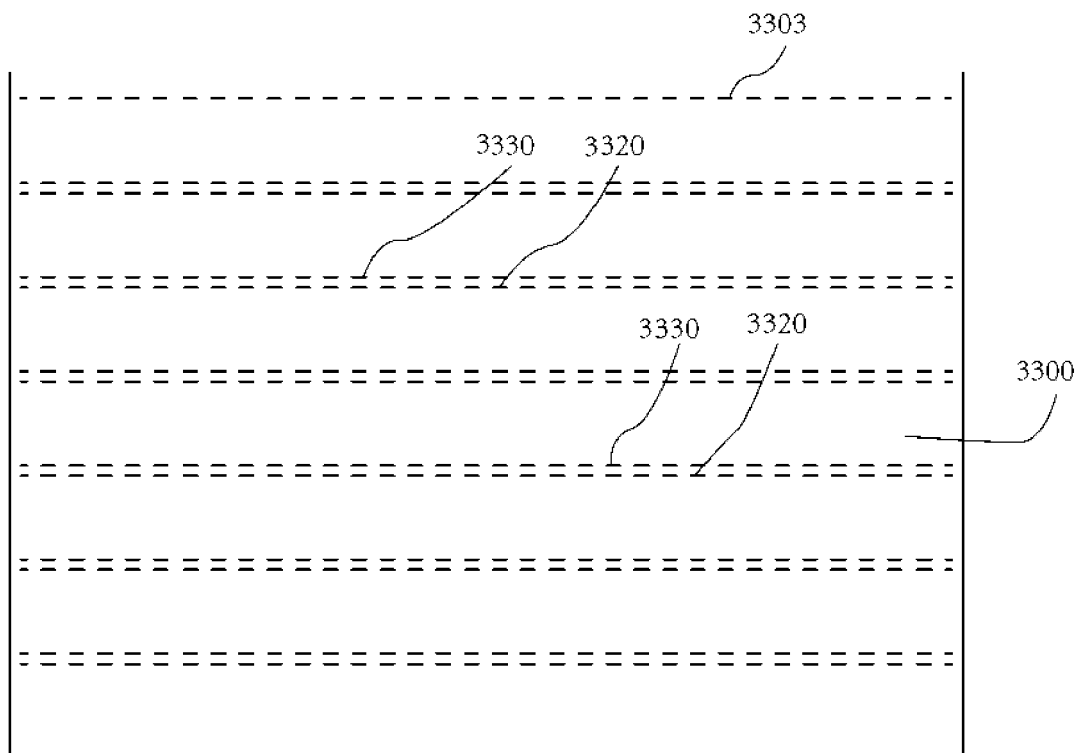


Fig.3-11

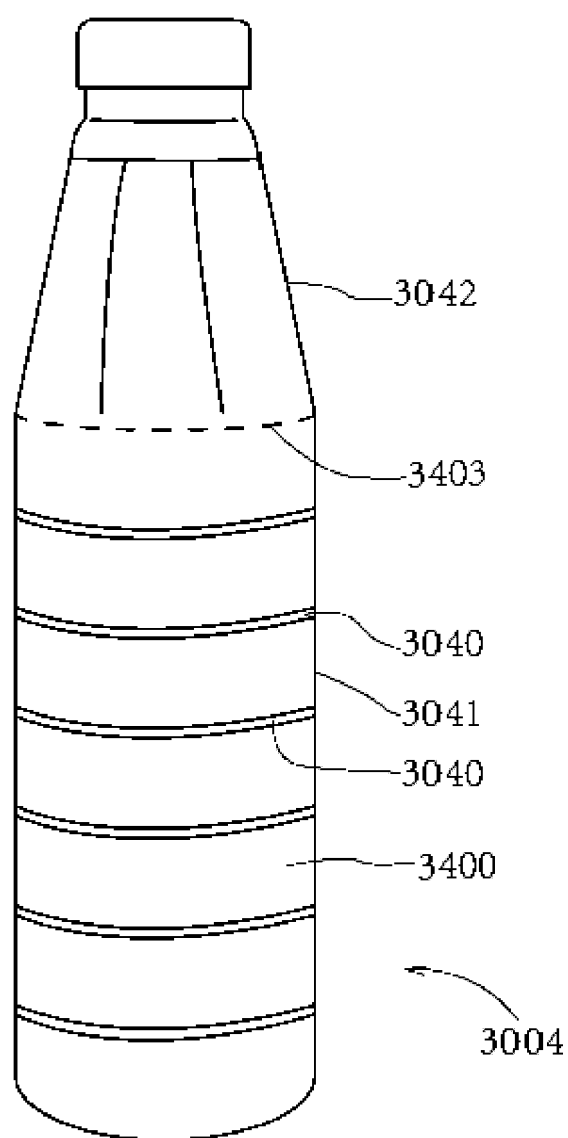


Fig.3-12

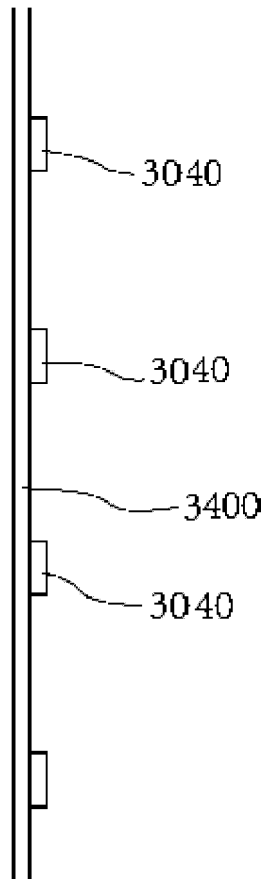


Fig.3-13

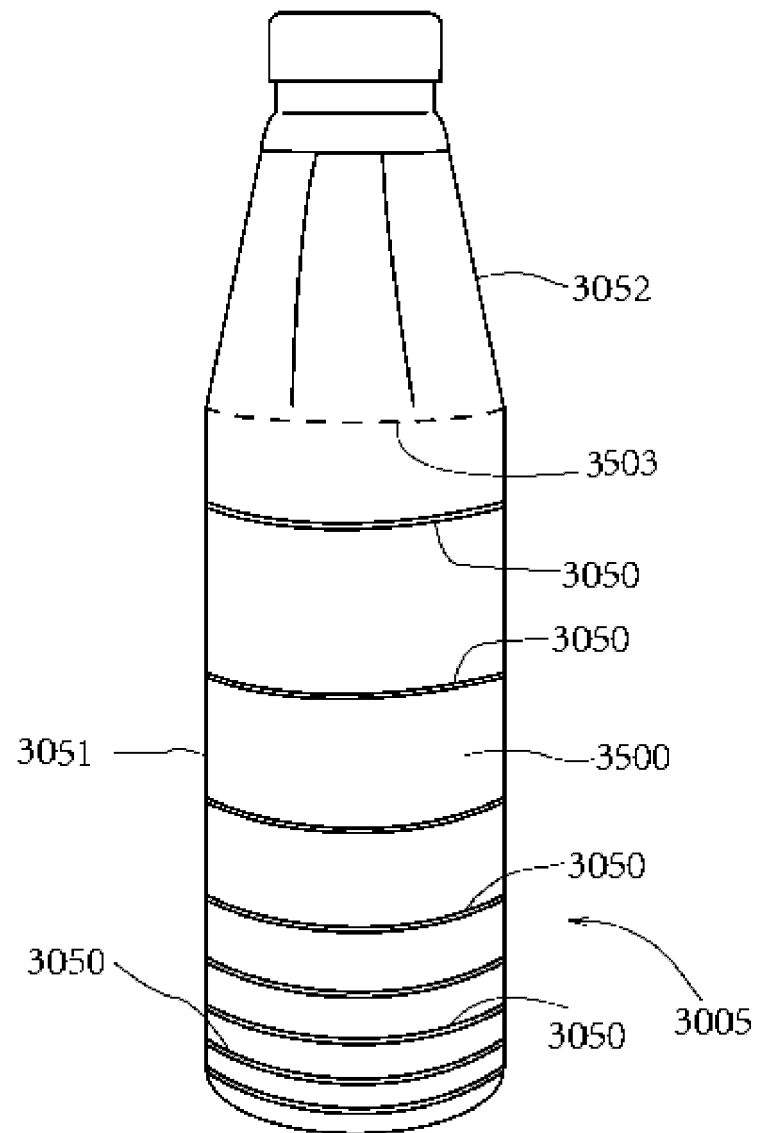


Fig.3-14

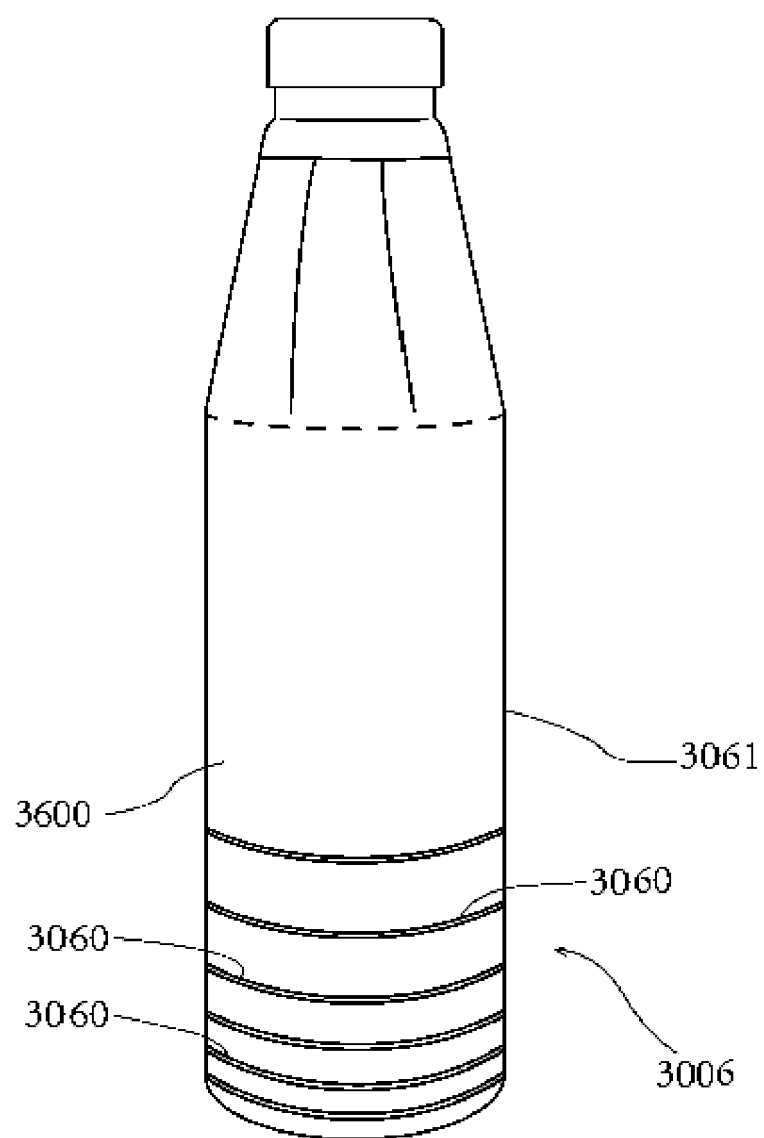


Fig.3-15

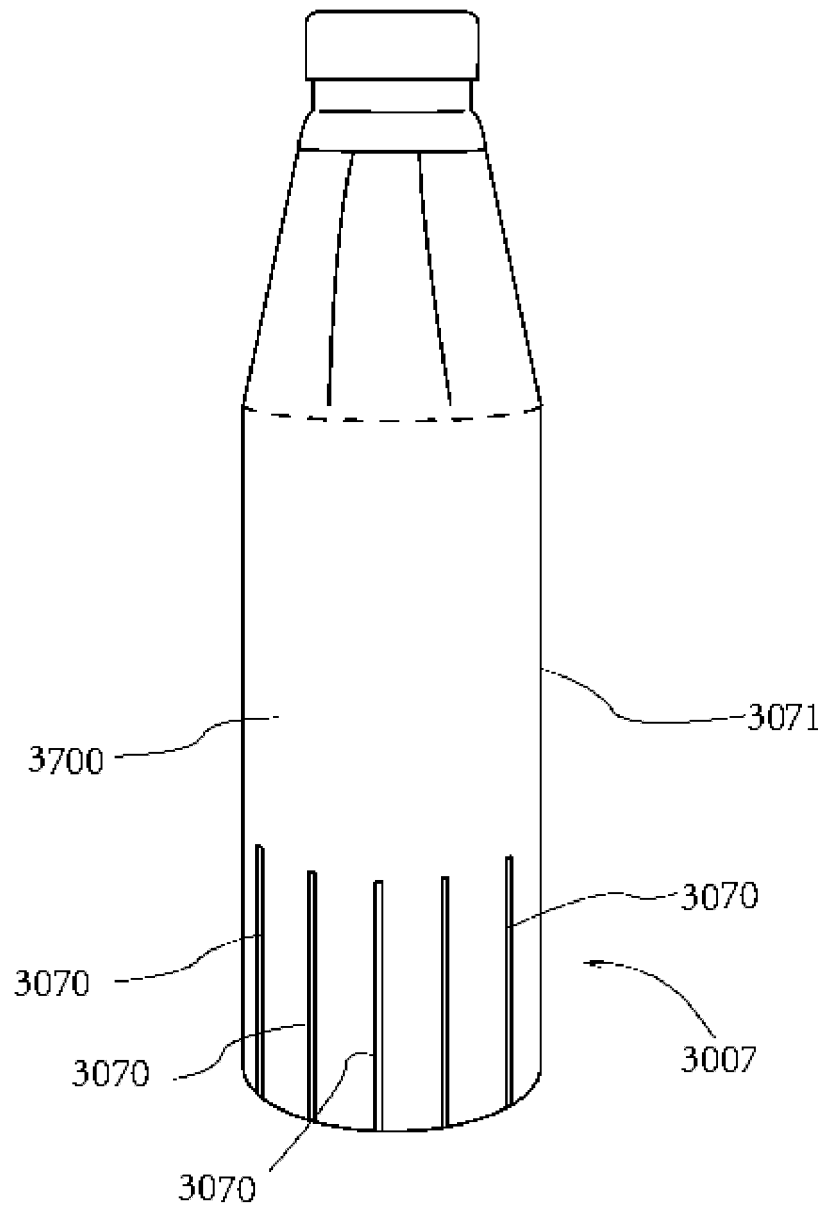


Fig.3-16

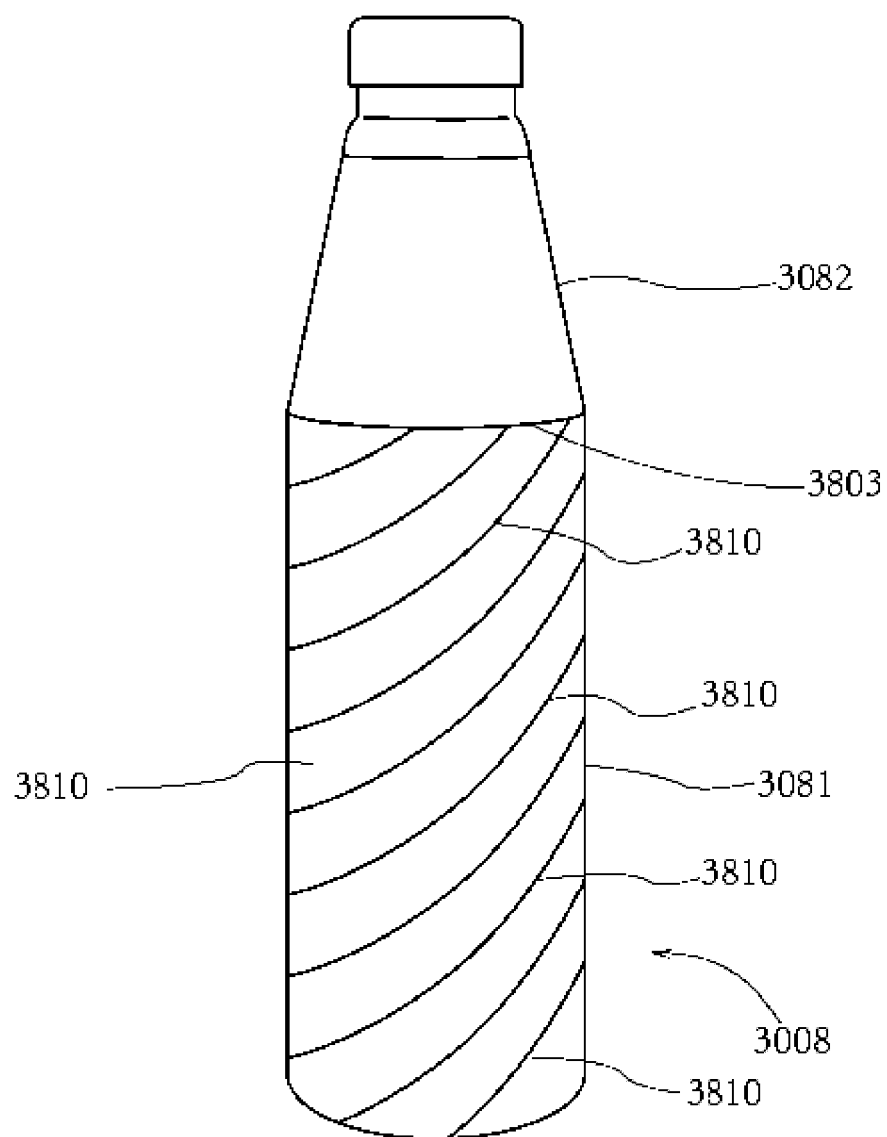


Fig.3-17

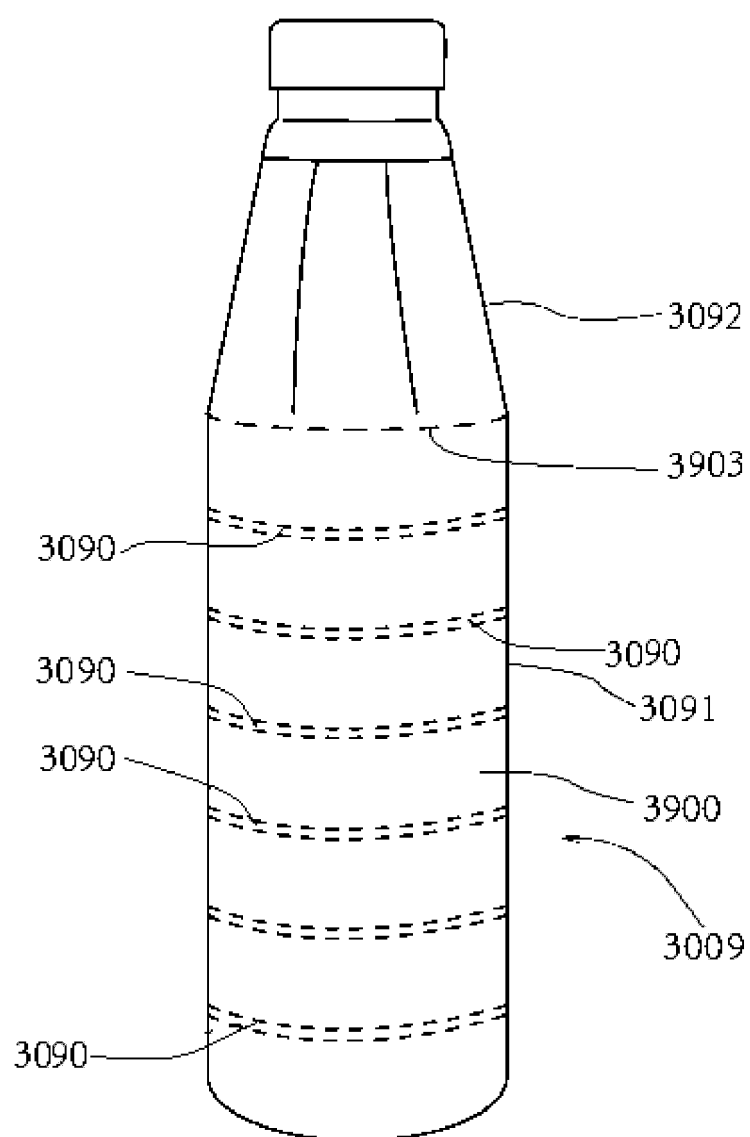


Fig.3-18

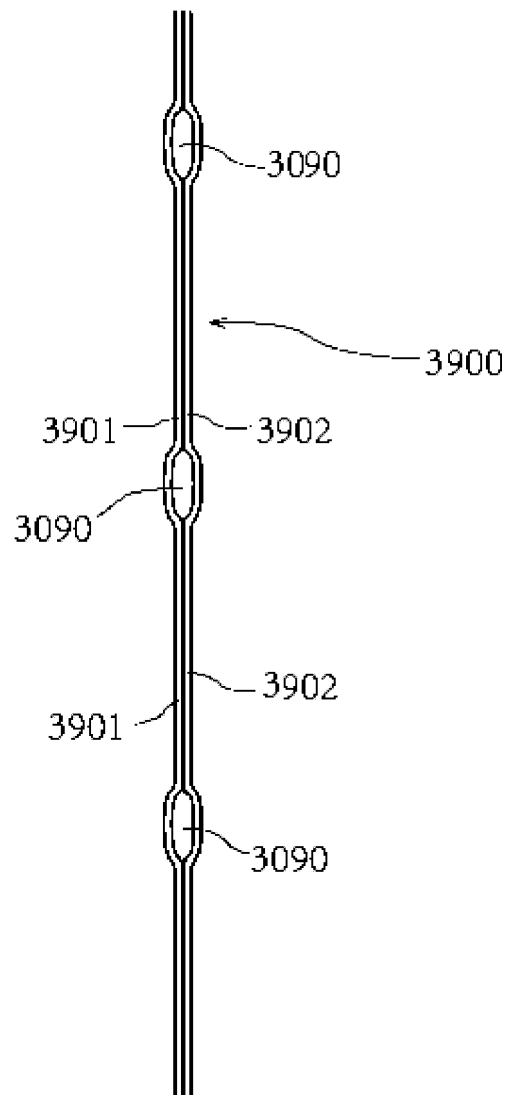


Fig.3-19

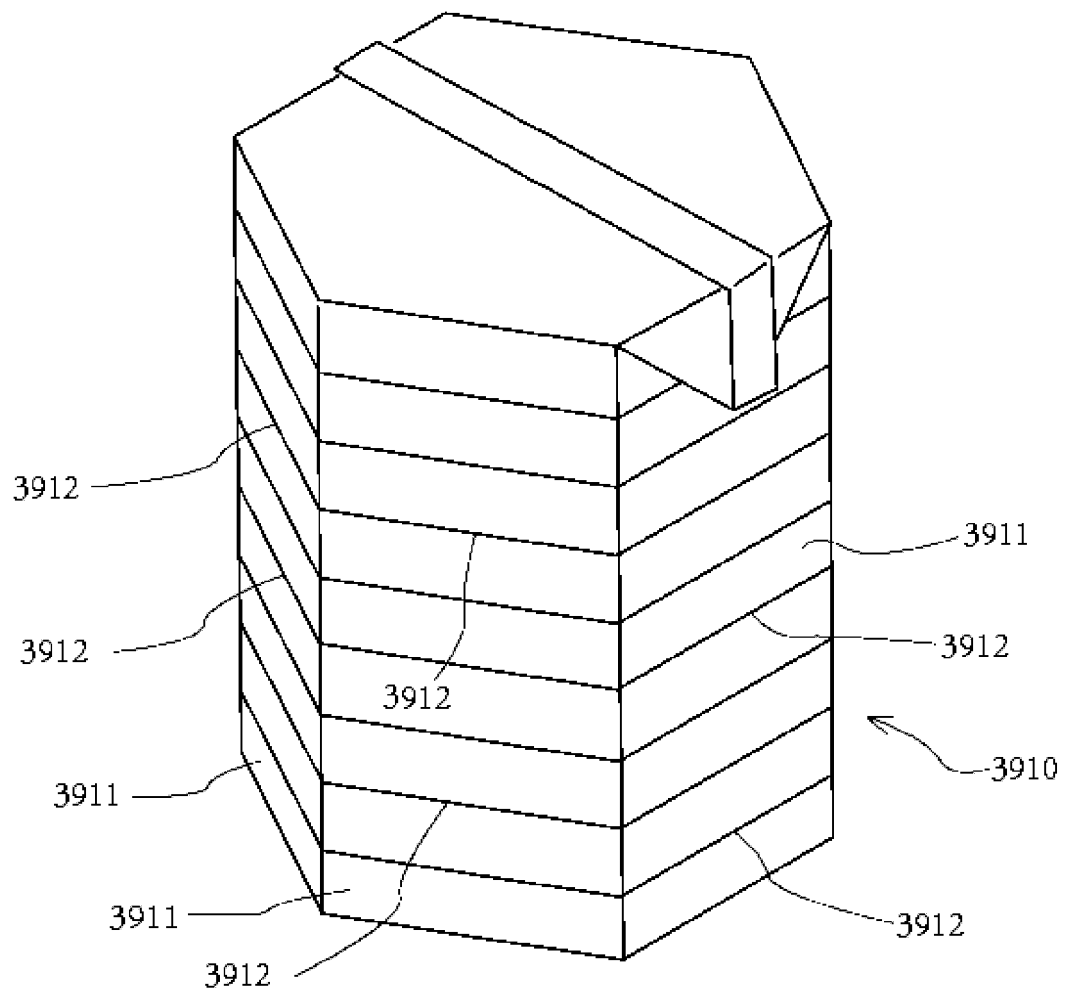


Fig.3-20

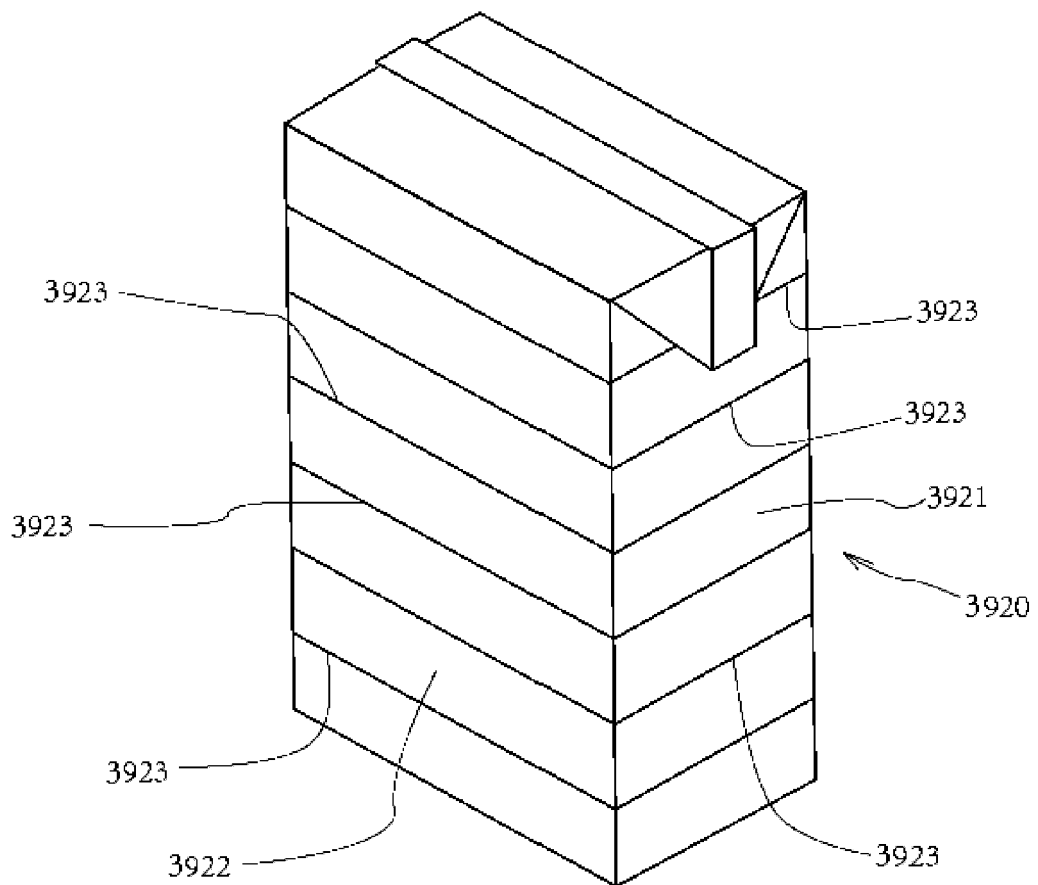


Fig.3-21

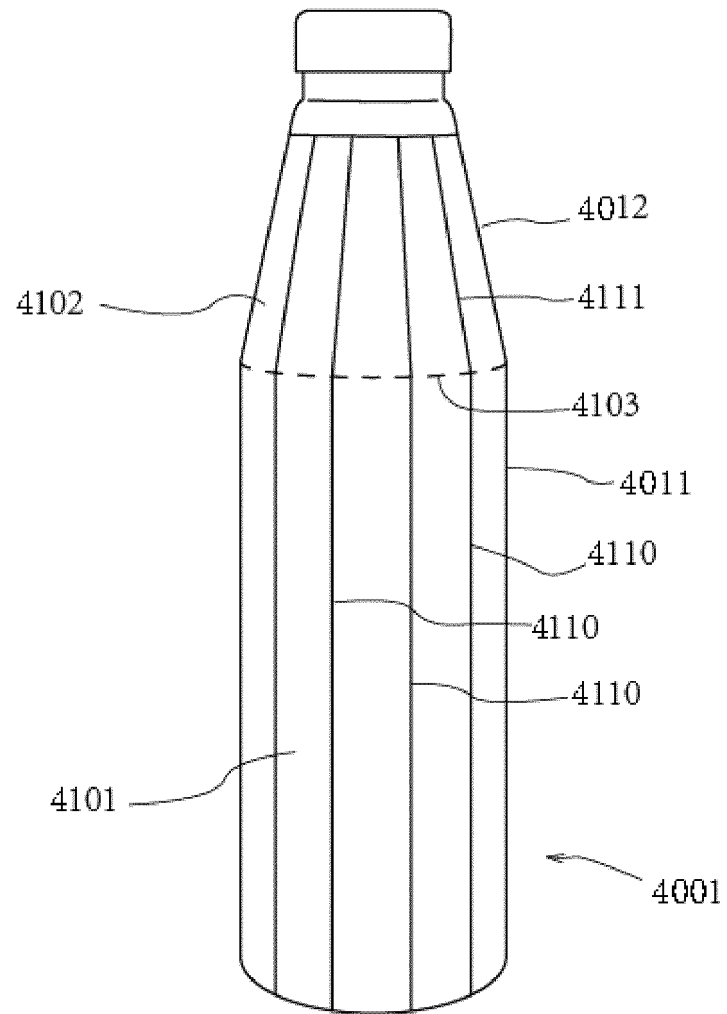


Fig.4-1

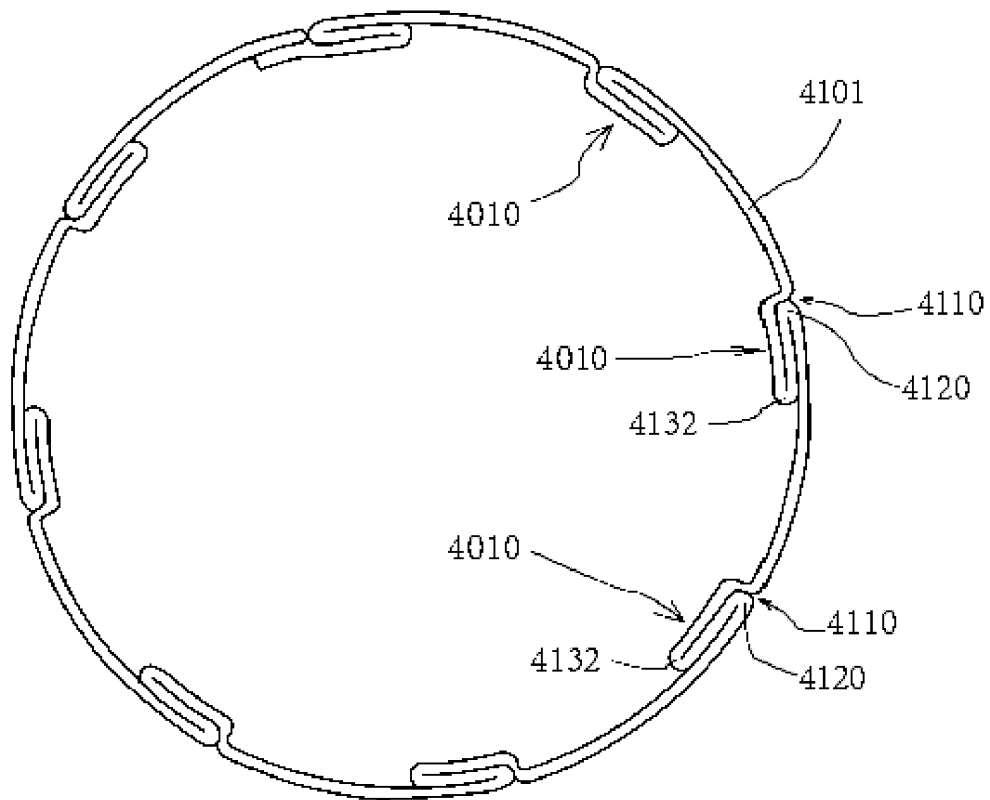


Fig.4-2

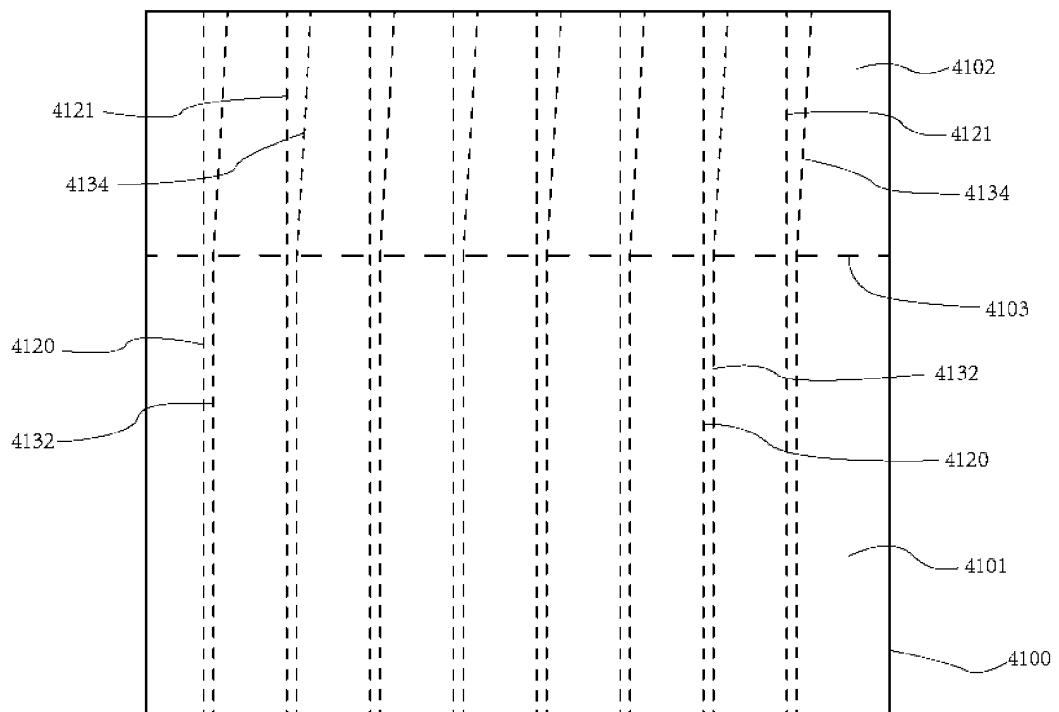


Fig.4-3

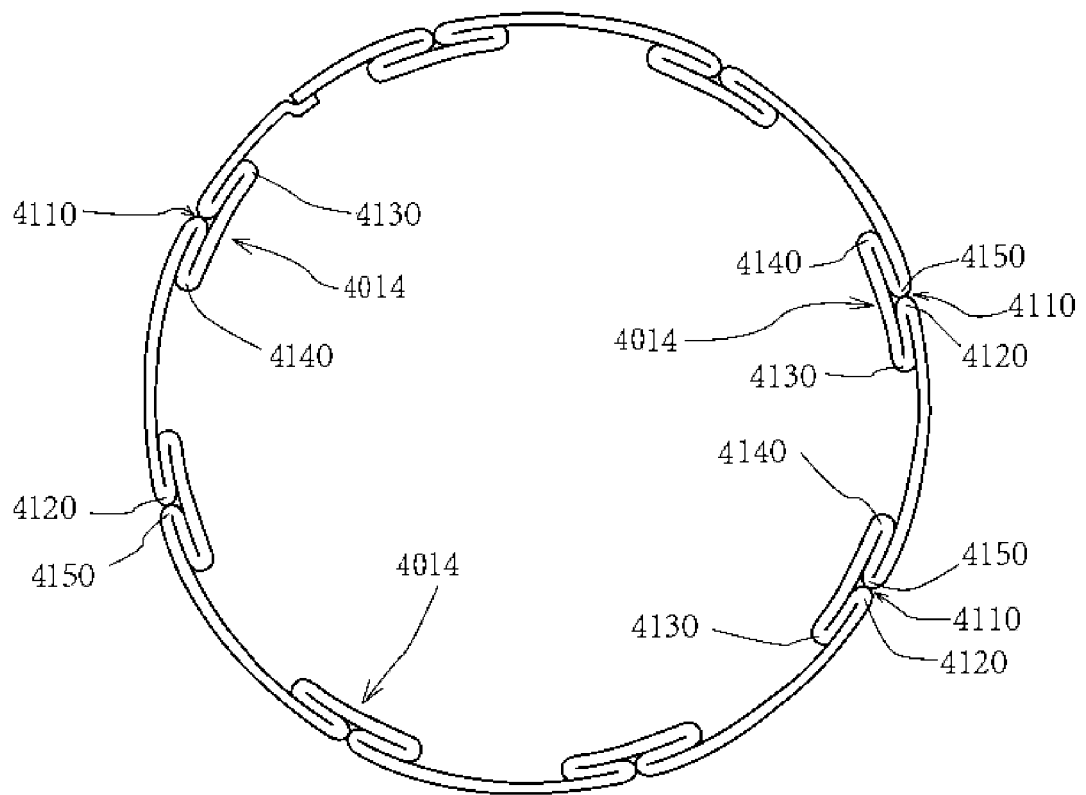


Fig.4-4

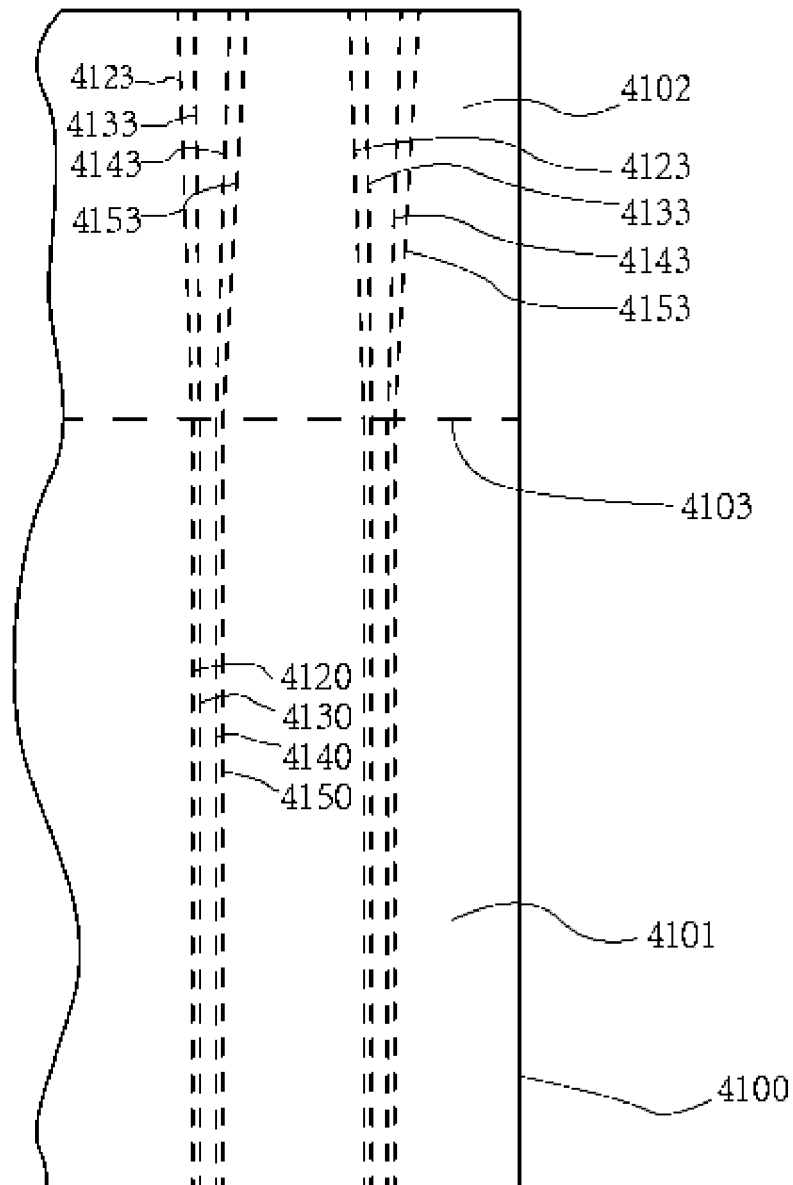


Fig.4-5

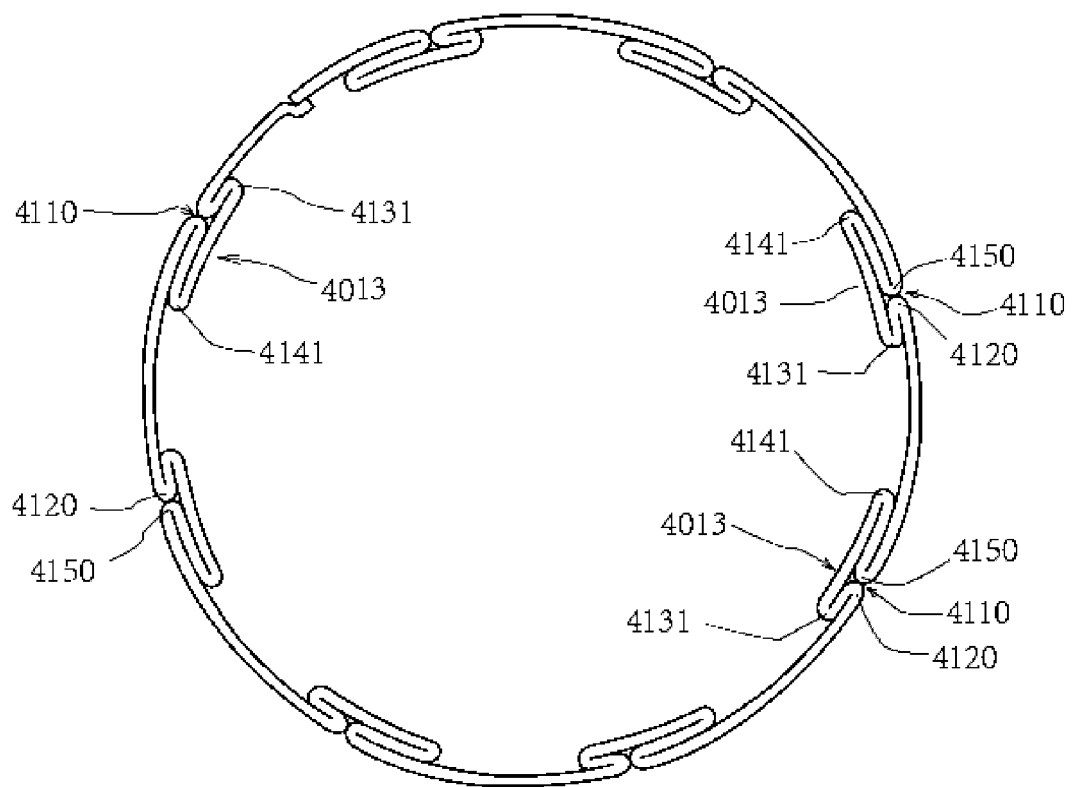


Fig.4-6

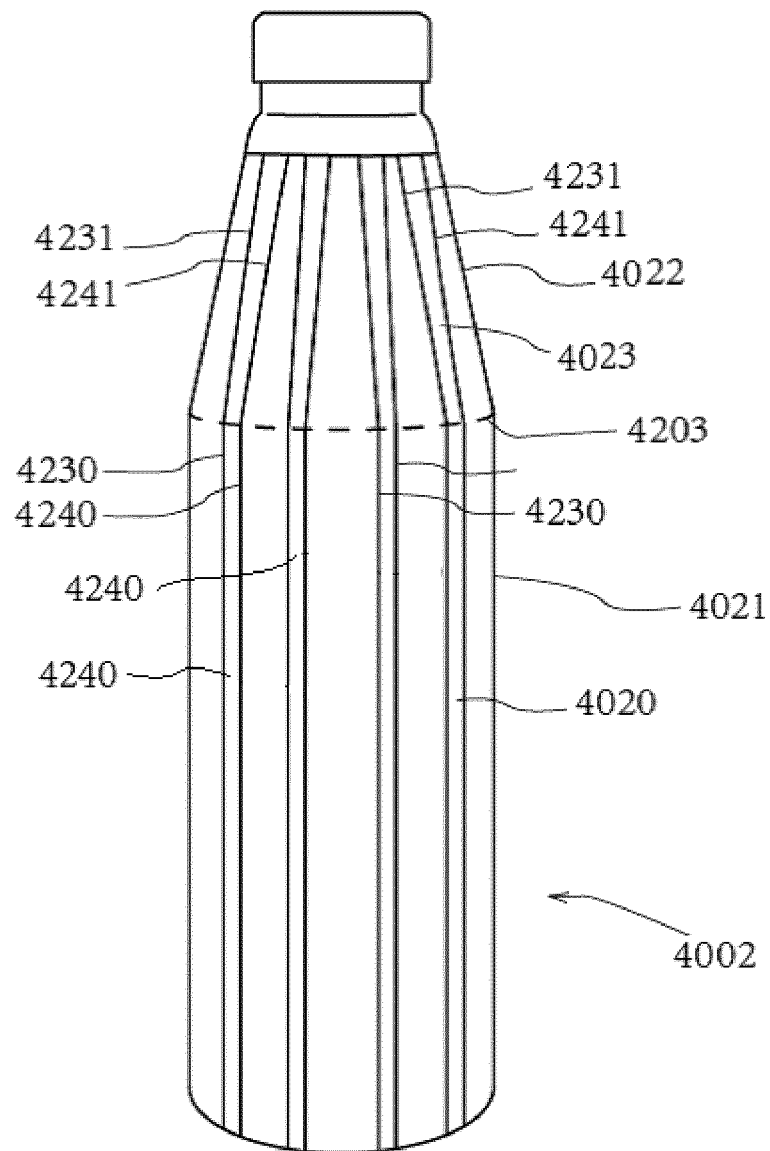


Fig.4-7

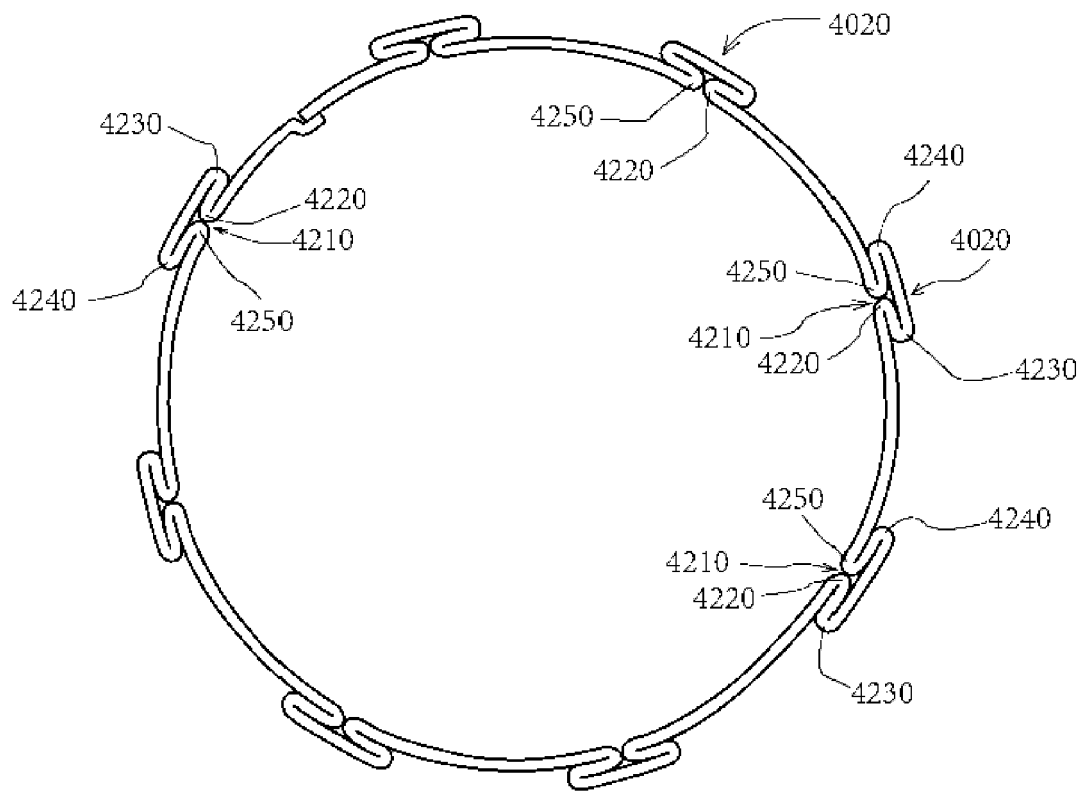


Fig.4-8

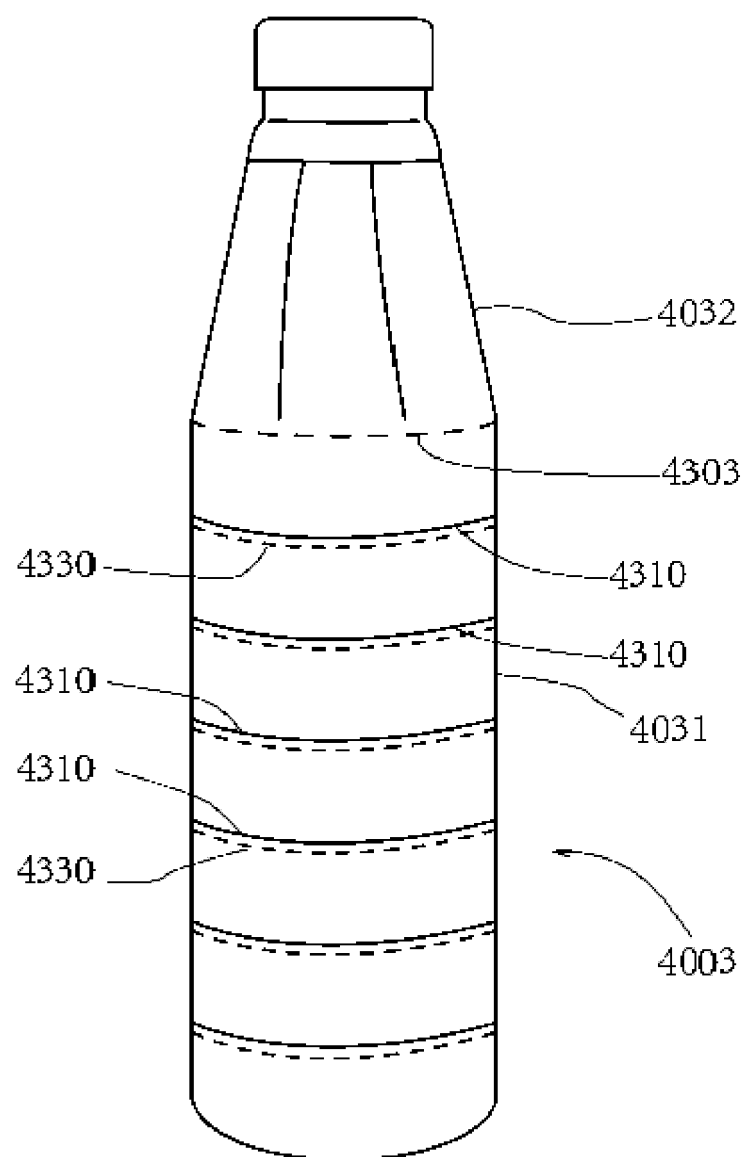


Fig.4-9

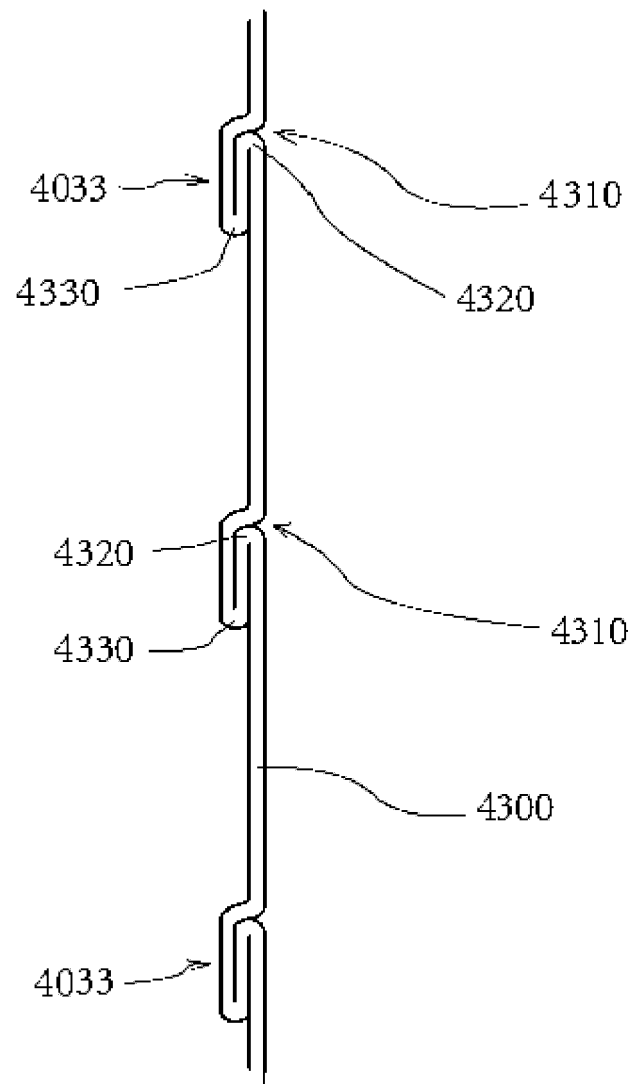


Fig.4-10

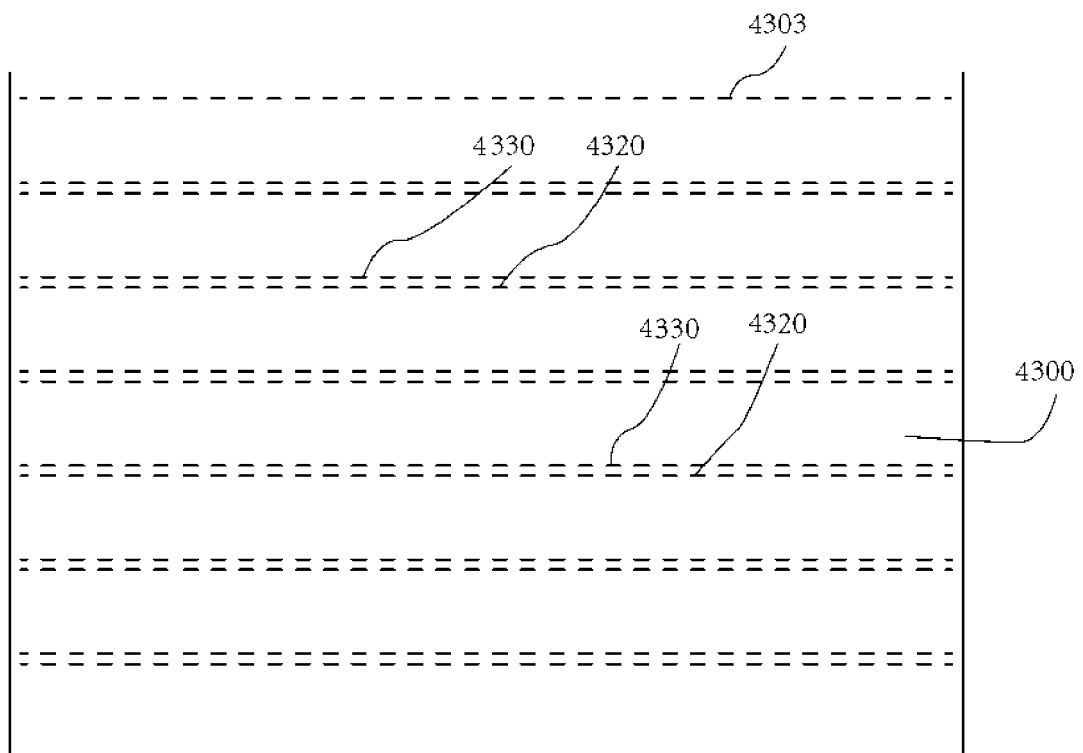


Fig.4-11

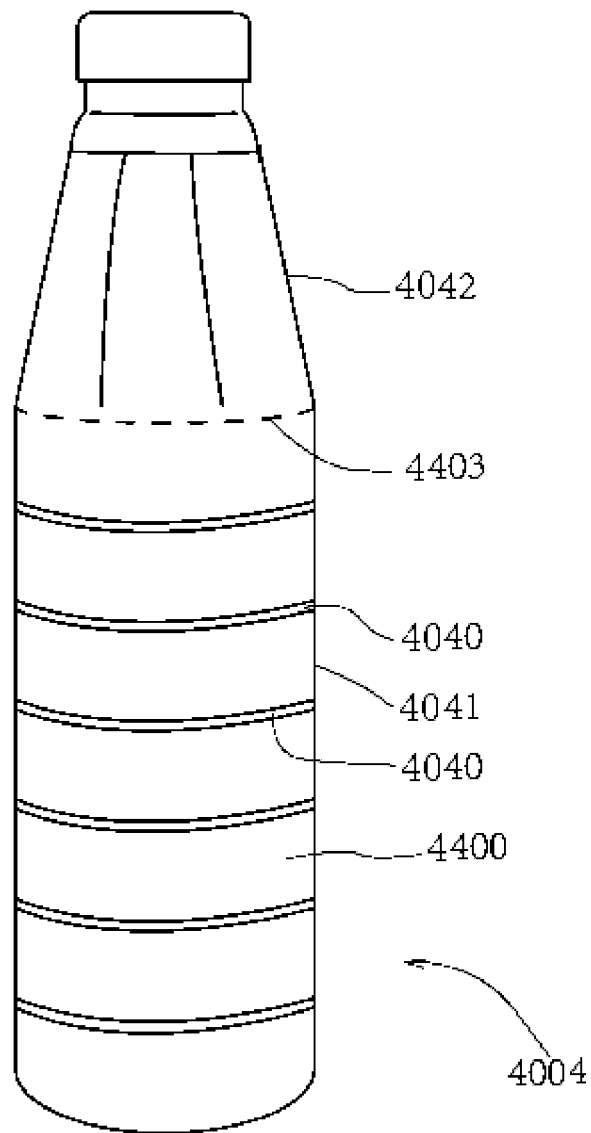


Fig.4-12

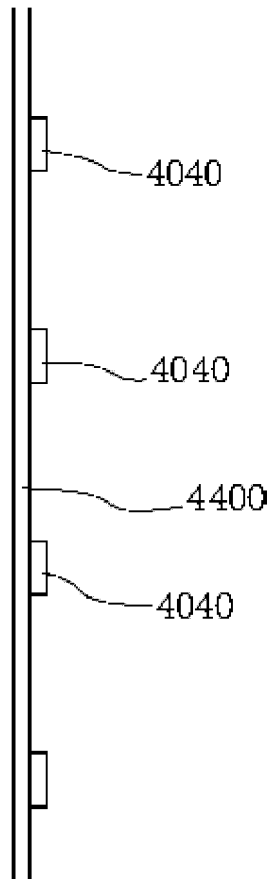


Fig.4-13

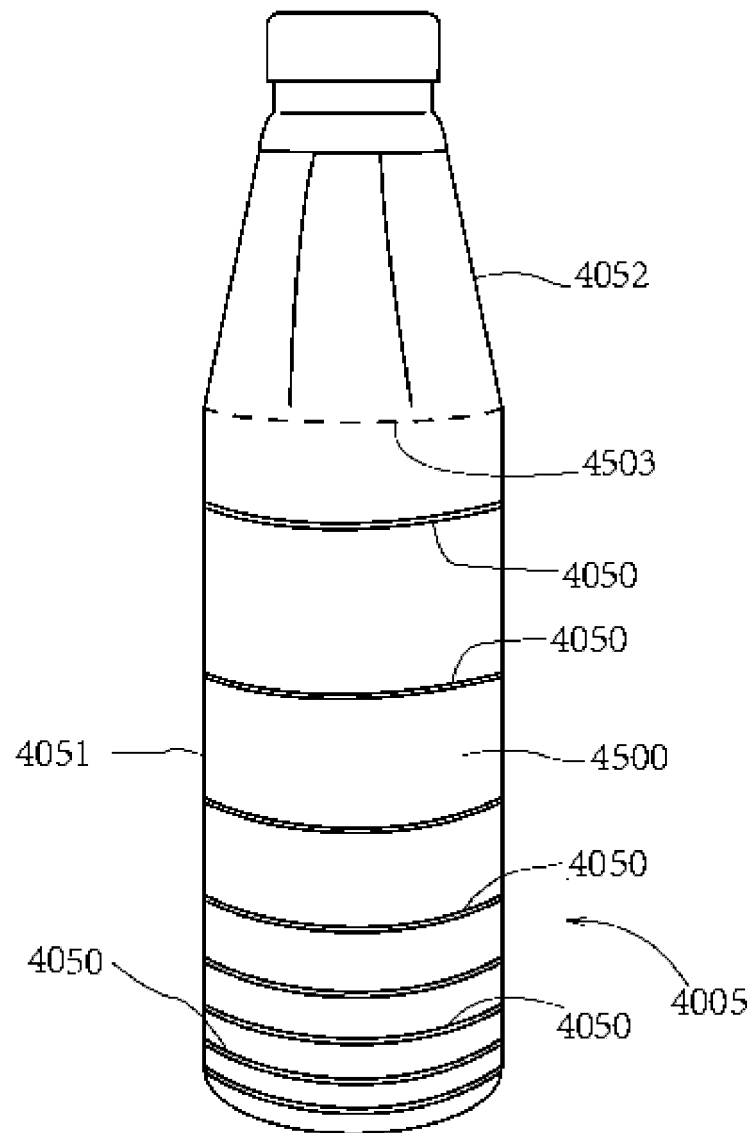


Fig.4-14

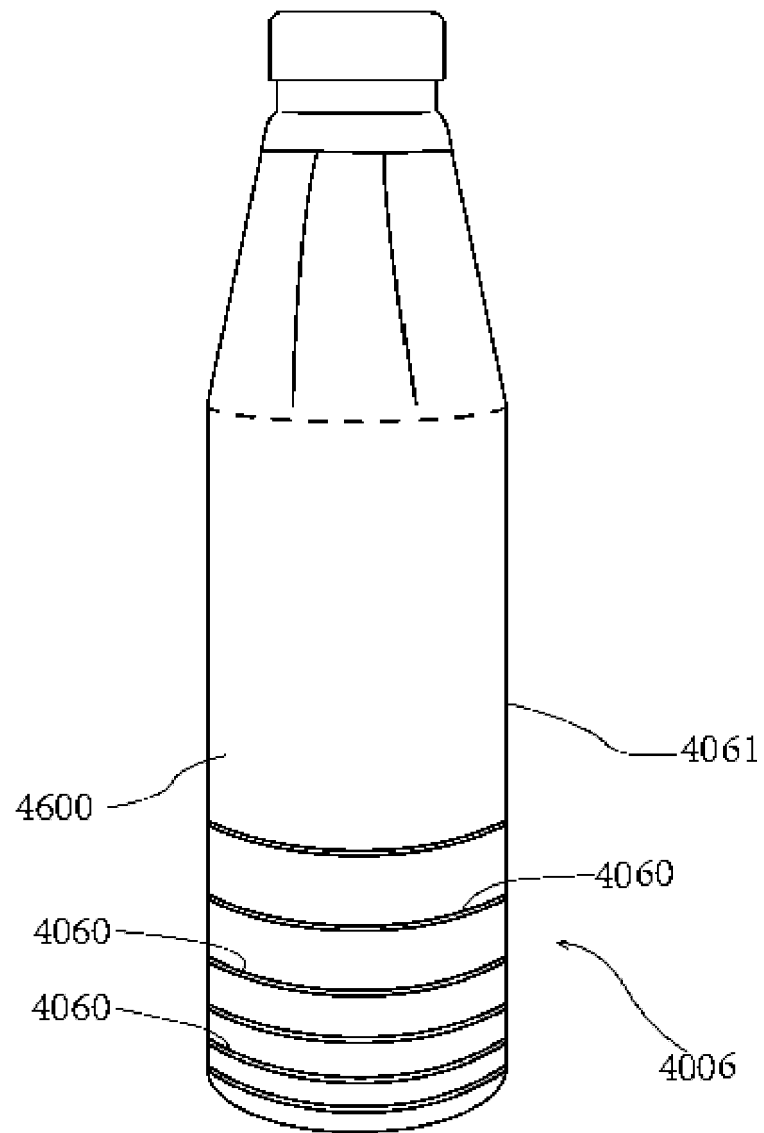


Fig.4-15

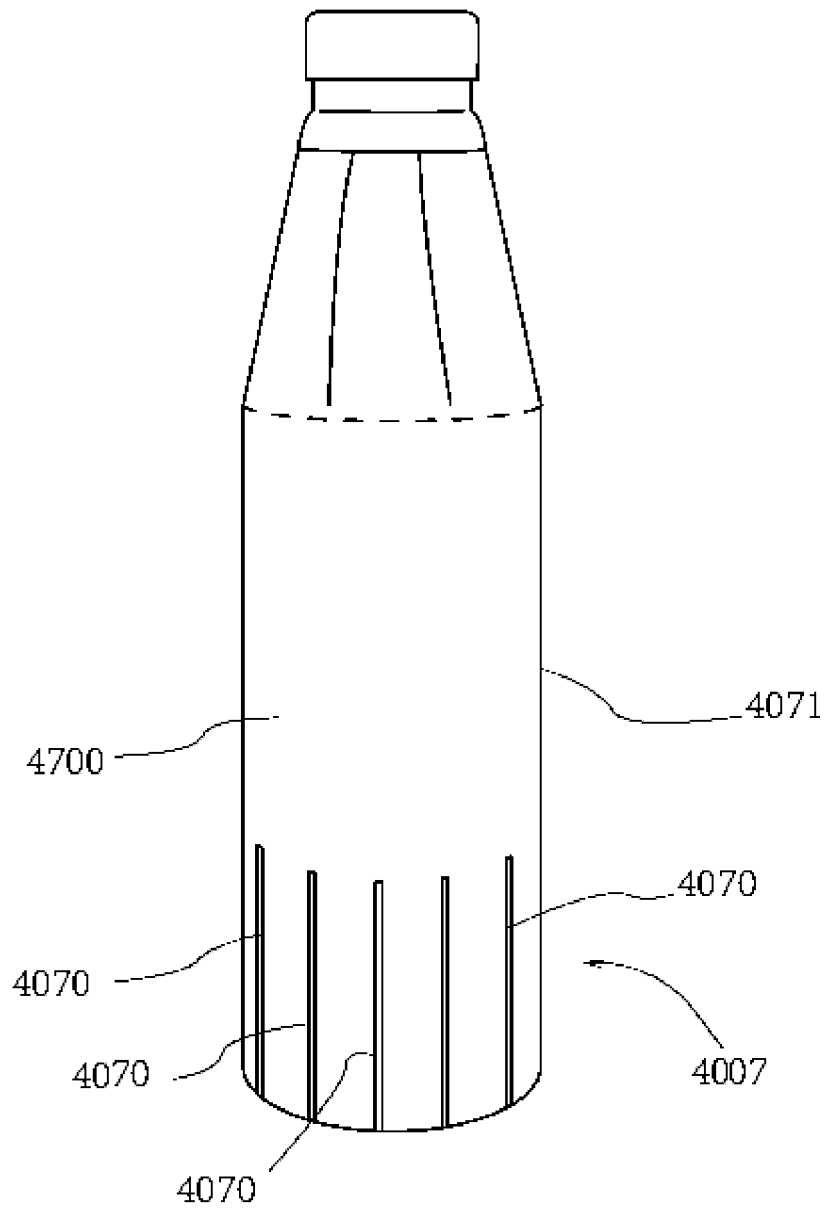


Fig.4-16

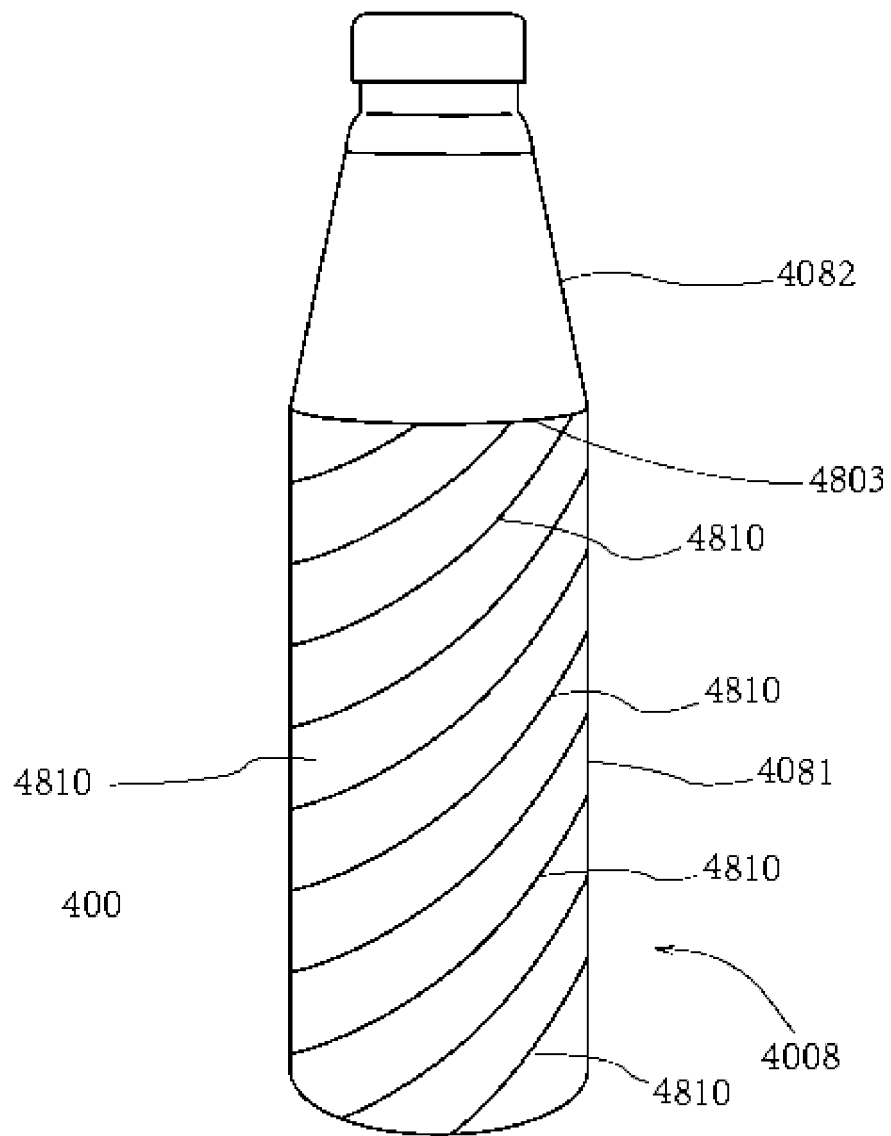


Fig.4-17

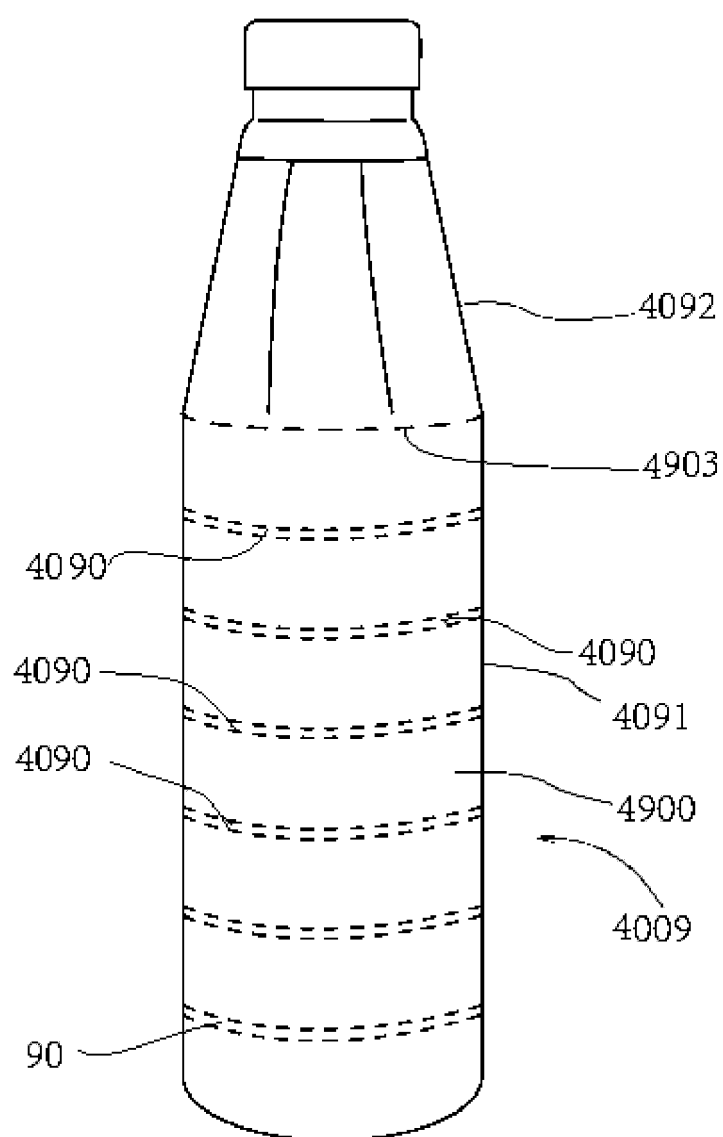


Fig.4-18

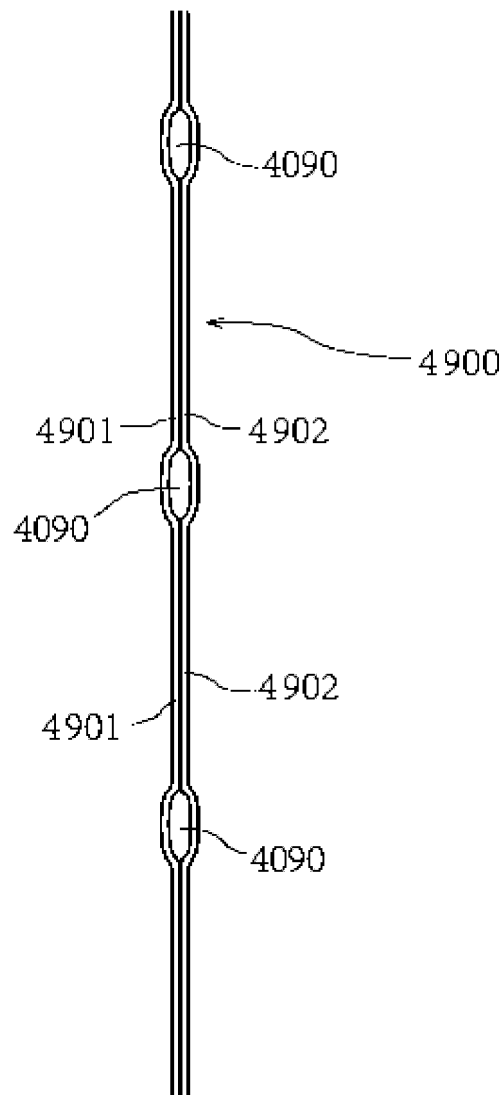


Fig.4-19

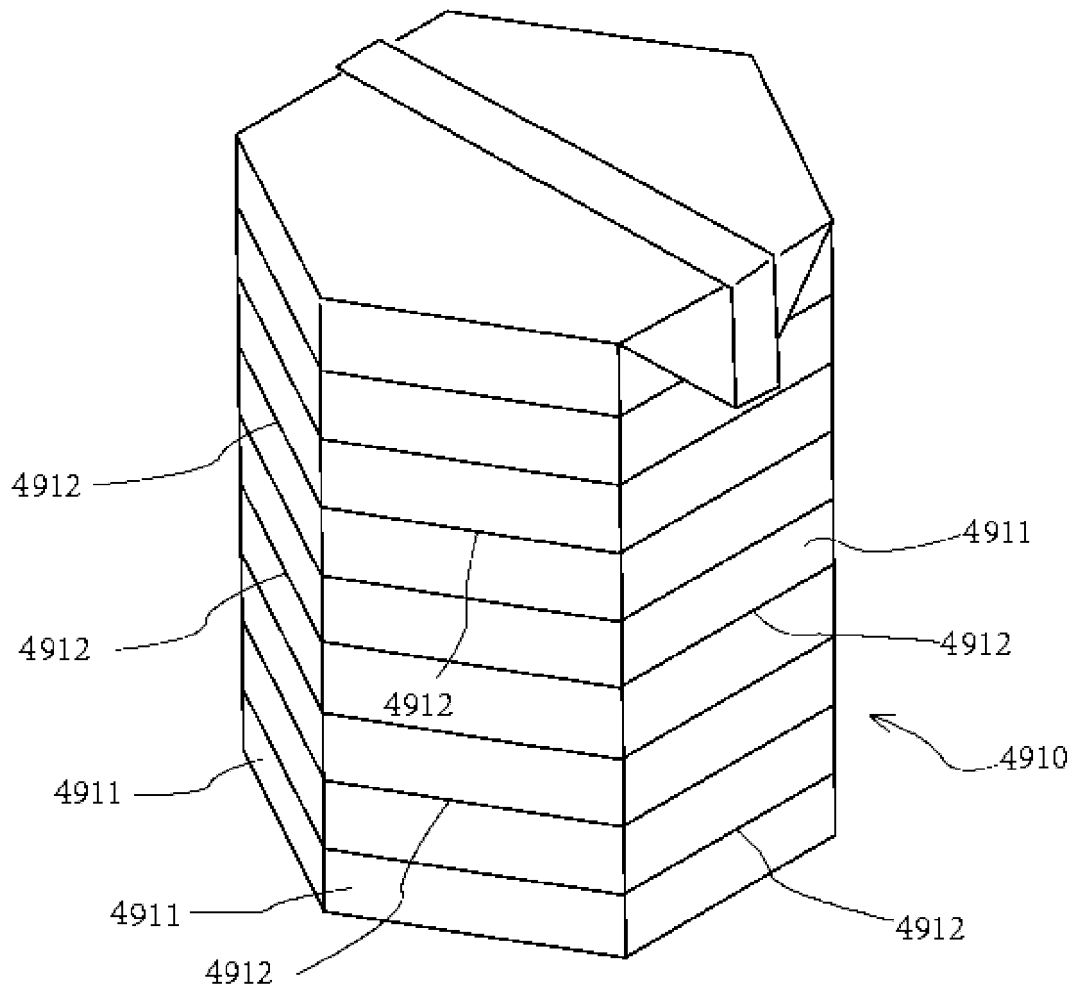


Fig.4-20

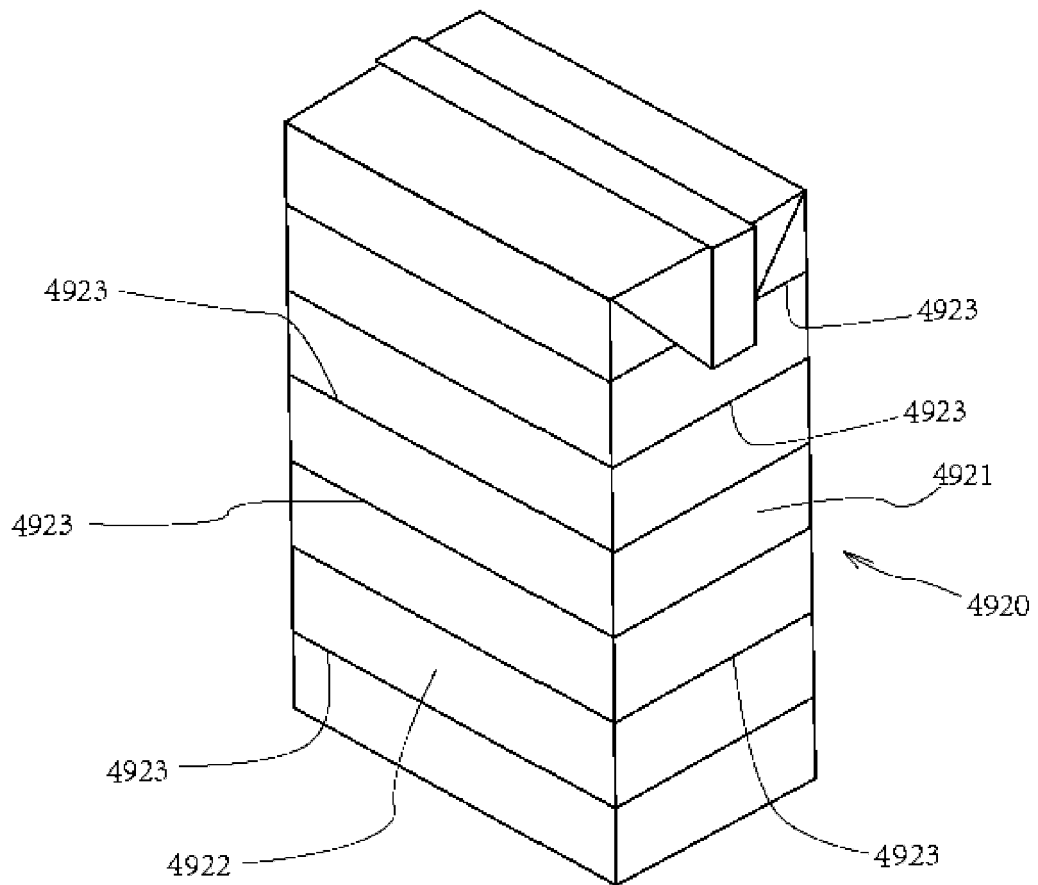


Fig.4-21

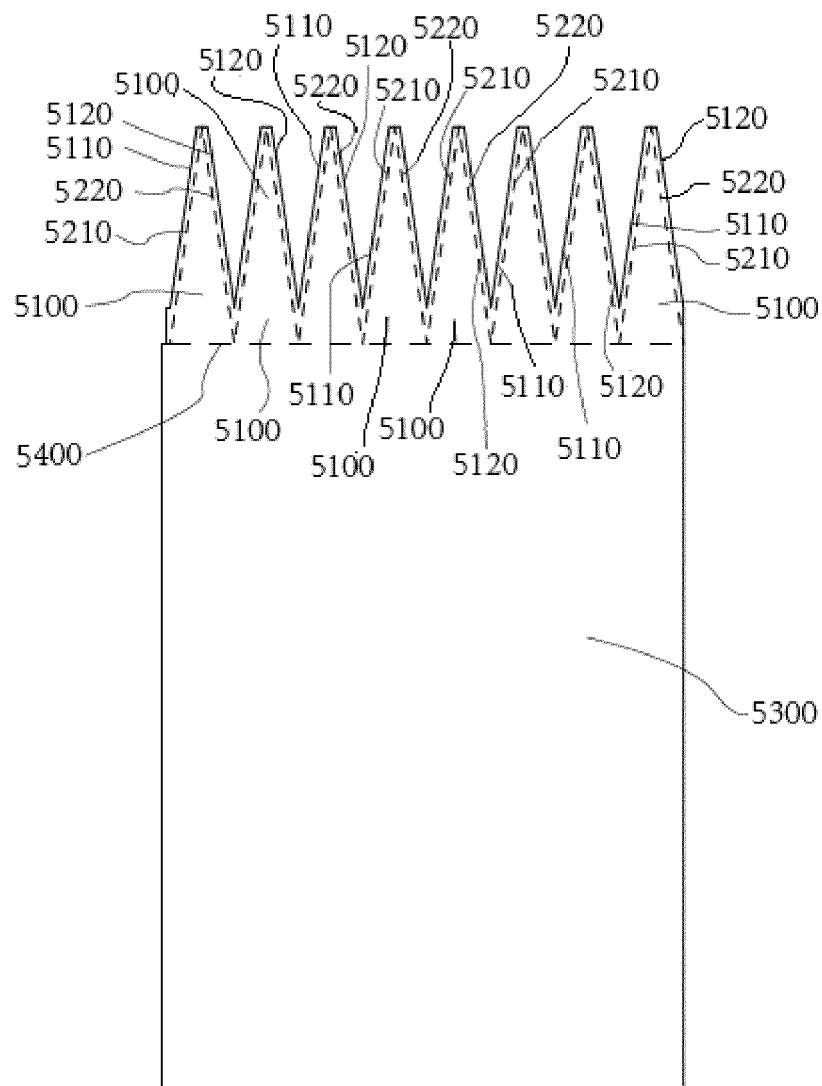


Fig.5-1

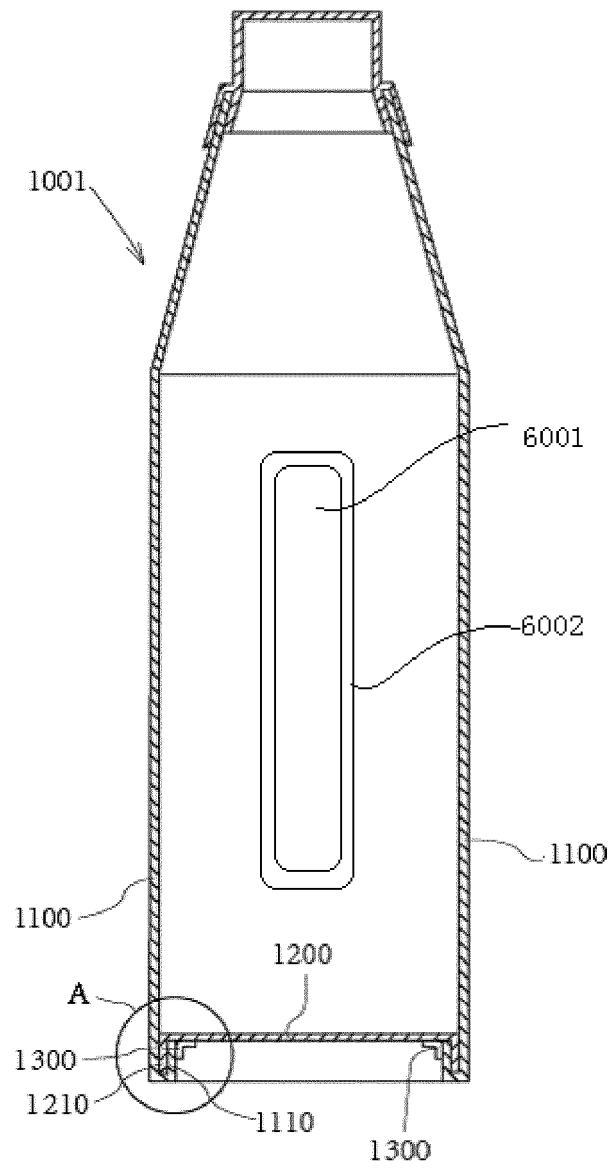


Fig.6-1

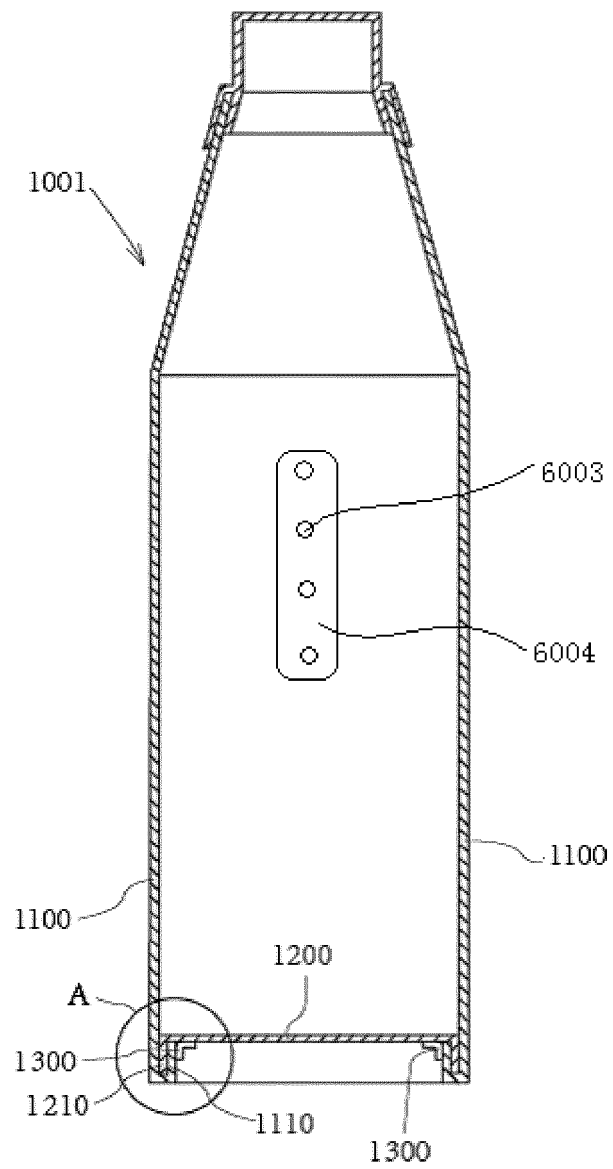


Fig.6-2

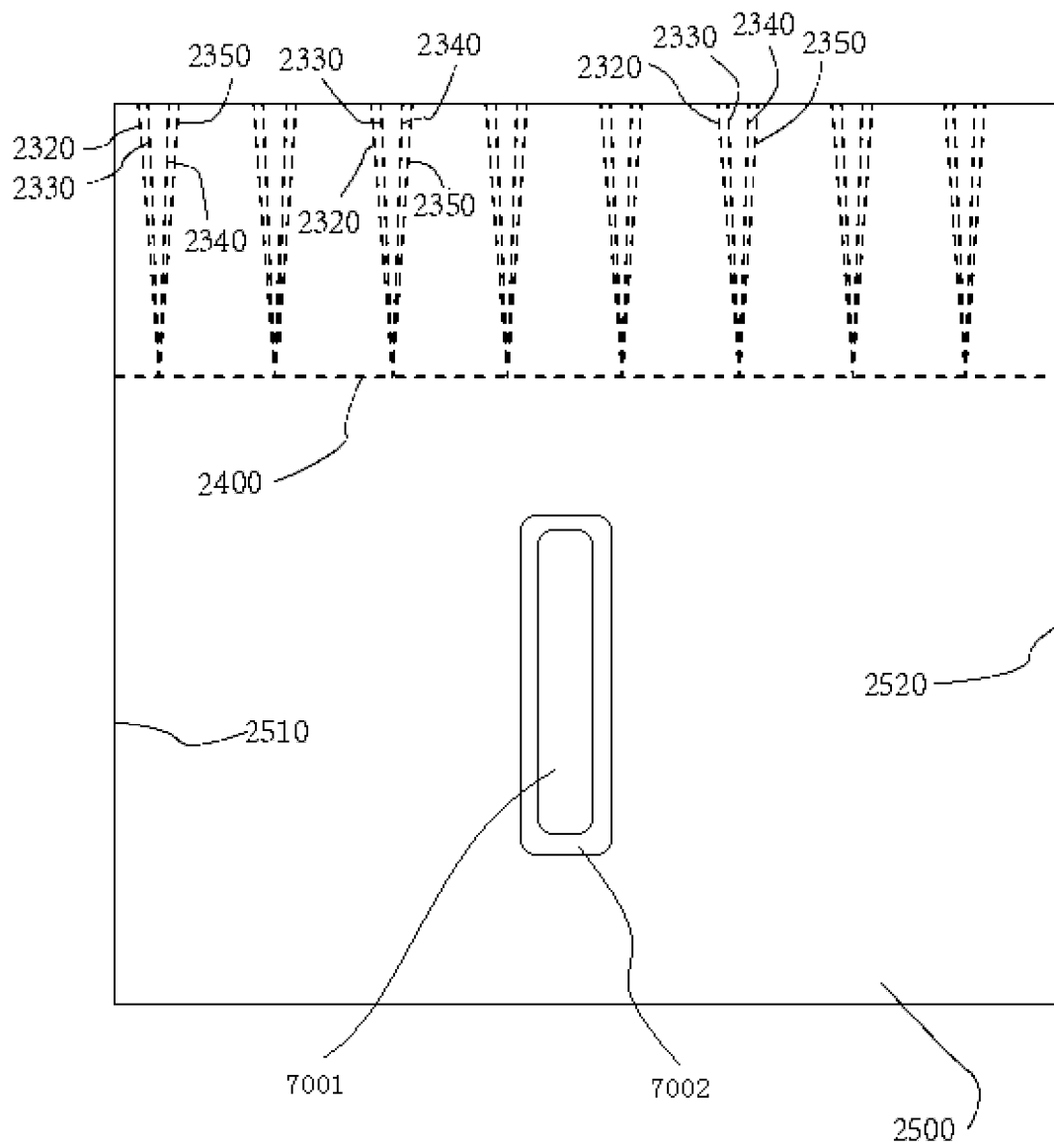


Fig.7-1

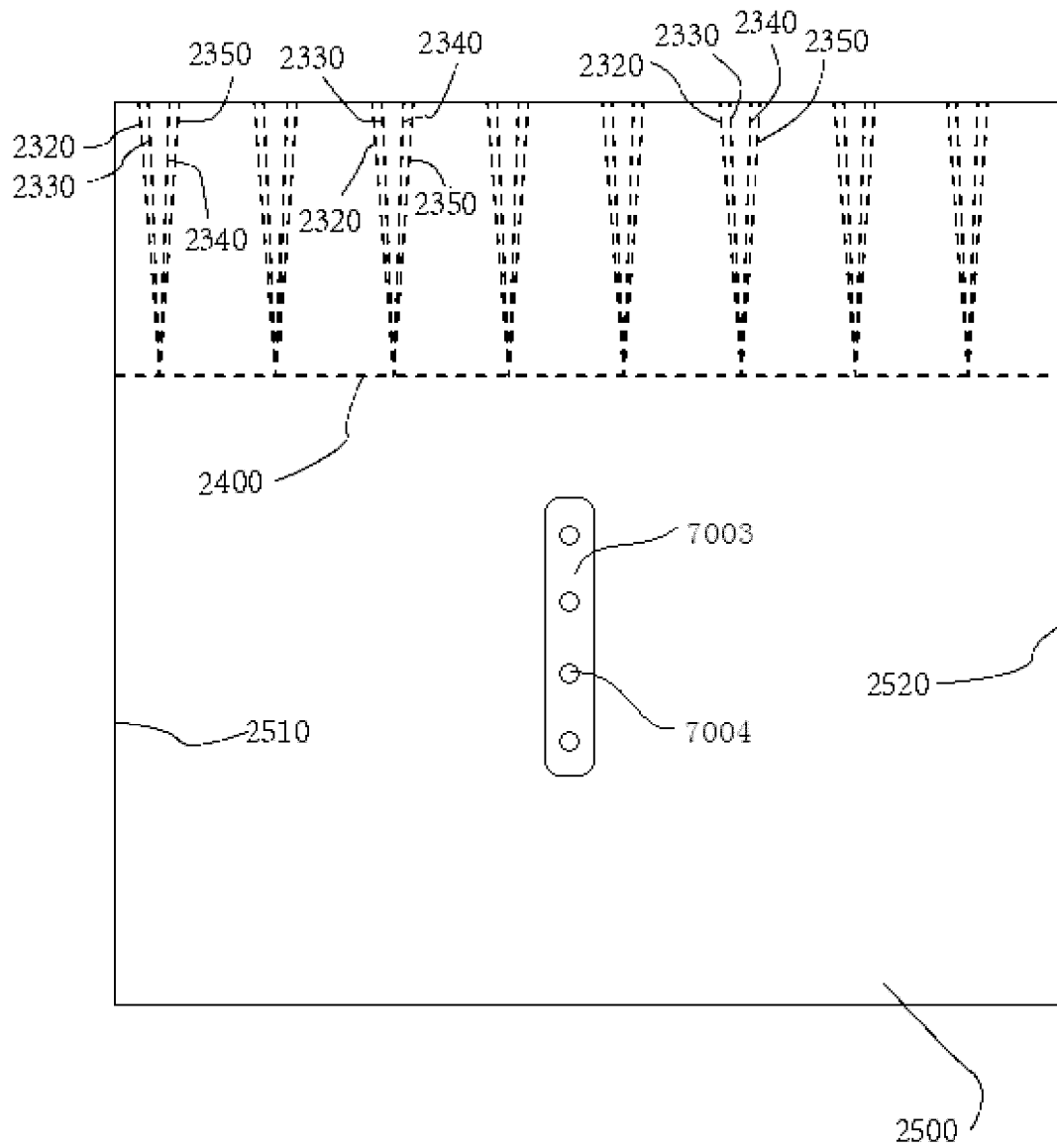


Fig.7-2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/077846

A. CLASSIFICATION OF SUBJECT MATTER

B65D 8/06 (2006.01) i; B65D 1/02 (2006.01) i; B65D 65/22 (2006.01) i; B65D 8/04 (2006.01) i; B65D 8/08 (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)

B65D

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)

container, laminated material, waterproof, damp-proof, strip, band, scarf, chamfer angle, fold, overlap, crimple, crease, indentation,
pressure mark, press mark, rib, strengthen, reinforce, stiffener, buried, inbuilt, built-in, embedded, adhere, stick, bond, sawtooth, serrate,
observing aperture, peep hole, viewing port, sightglass, sighting slit, sight window, eye split, prothole, FENMEI BEIJING, LIU Jun,

HONG Gang

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 11157526 A (TOPPAN PRINTING CO LTD) 15 June 1999 (15.06.1999) description, paragraphs [0013] to [0030] and figures 1, 4 and 7	1, 2, 4-8
X	CN 201597812 U (SU, Jie) 06 October 2010 (06.10.2010) description, paragraphs [0011] to [0013] and figures 1 to 3	1, 2, 4-8
A	JP 2002337840 A (JUJO CENTRAL CO LTD) 27 November 2002 (27.11.2002) description, paragraphs [0008] to [0023] and figure 2	1-11
A	GB 479059 A (HERBERT LYON CARPENTER) 31 January 1938 (31.01.1938) the whole document	1-11

☒ 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

08 July 2015

Date of mailing of the international search report

22 July 2015

Name and mailing address of the ISA
State Intellectual Property Office of the P. R. China
No. 6, Xitucheng Road, Jimenqiao
Haidian District, Beijing 100088, China
Facsimile No. (86-10) 62019451

Authorized officer

CAO, Chuanlu

Telephone No. (86-10) 62085324

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/077846

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2323078 A (WILLIAM PELZER et al.) 29 June 1943 (29.06.1943) description, pages 1 to 3 and figures 1 to 7	12-18, 27-34, 36-41
Y	US 2323078 A (WILLIAM PELZER et al.) 29 June 1943 (29.06.1943) description, pages 1 to 3 and figures 1 to 7	19, 20, 24-26, 42, 43, 72, 73, 75, 76, 90-94, 96-100
Y	WO 2008086808 A1 (MICON DEV APS et al.) 24 July 2008 (24.07.2008) description, pages 1 to 5 and figures 1 to 5	19, 20, 24-26, 42, 43, 72, 73, 75, 76
A	GB 412789 A (ROLAND KEENE REED) 05 July 1934 (05.07.1934) the whole document	12-26
X	WO 2008086808 A1 (MICON DEV APS et al.) 24 July 2008 (24.07.2008) description, pages 1 to 5 and figures 1 to 5	27-41
X	JP 2003276722 A (DAINIPPON PRINTING CO LTD) 02 October 2003 (02.10.2003) description, paragraphs [0007] to [0036] and figures 1 to 4	44, 45, 47, 49-54, 59-65
X	JP 2003089159 A (TOPPAN PRINTING CO LTD) 25 March 2003 (25.03.2003) description, paragraphs [0006] to [0015] and figures 1 to 4	44-46, 48-54, 59-65, 71, 74
X	CN 101143626 A (WANG, Weiming) 19 March 2008 (19.03.2008) description, pages 2 and 3 and figures 1 to 3	44, 45, 49-54, 59-65
A	CN 101143626 A (WANG, Weiming) 19 March 2008 (19.03.2008) description, pages 2 and 3 and figures 1 to 3	55-58, 66-70, 72, 73, 75, 76
A	US 2323078 A (WILLIAM PELZER et al.) 29 June 1943 (29.06.1943) the whole document	77-89, 95, 101-103
A	WO 2008086808 A1 (MICON DEV APS et al.) 24 July 2008 (24.07.2008) the whole document	77-89, 95, 101-103
Y	JP 11157526 A (TOPPAN PRINTING CO LTD) 15 June 1999 (15.06.1999) description, paragraphs [0013] to [0030] and figures 1, 4 and 7	93, 94, 96, 97, 99, 100
A	CN 202541941 U (LV, Yanrong) 21 November 2012 (21.11.2012) description, pages 1 and 2 and figure 1	25, 26, 42, 43, 72, 73, 75, 76, 90-94, 96-100

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/077846

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- [1] The first invention: claims 1-11;
- [2] The second invention: claims 12-26;
- [3] The third invention: claims 27-76;
- [4] The fourth invention: claims 77-89;
- [5] The fifth invention: claims 90-103.
- [6] There is not a technical relationship among the five inventions which do not involve one or more of the same or corresponding special technical features, therefore the application lacks unity of invention in the sense of Rule 13.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

- Remark on protest**
- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
 - ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
 - ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)

INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International application No.
 PCT/CN2015/077846

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
JP 11157526 A	15 June 1999	JPH 11157526 A	15 June 1999
		JP 3666217 B2	29 June 2005
CN 201597812 U	06 October 2010	None	
JP 2002337840 A	27 November 2002	None	
GB 479059 A	31 January 1938	None	
US 2323078 A	29 June 1943	None	
WO 2008086808 A1	24 July 2008	US 2010108746 A1	06 May 2010
		EP 2117938 A1	18 November 2009
		DK 200700073 A	19 July 2008
		DK 176664 B1	09 February 2009
GB 412789 A	05 July 1934	None	
JP 2003276722 A	02 October 2003	None	
JP 2003089159 A	25 March 2003	None	
CN 101143626 A	19 March 2008	None	
CN 202541941 U	21 November 2012	None	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201420283322 [0001]
- CN 201420282931 [0001]
- CN 201420246292 [0001]
- CN 201420245867 [0001]
- CN 201420222389X [0001]
- WO 2008086808 A1 [0003]