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(54) **HEATING PULL-OUT PREVENTING BOTTLE CAP, AND FIXING STRUCTURE FOR INNER
MAIN BODY OF BOTTLE CAP AND BOTTLE NECK**

(57) A heating pull-out preventing bottle cap, and a fixing structure for an inner main body of the bottle cap and a bottle neck. The fixing structure comprises a bottle body, the inner main body (1), an inner plug (2) and a fixing sleeve (3), wherein an outer wall of the bottle neck is provided with a first boss (71) extending in a circumferential direction and first rotation stopping recesses (74) arranged above the first boss at intervals in the circumferential direction; and the fixing sleeve is sleeved inside a mounting section (11) of the inner main body and a slot is formed between the fixing sleeve and an inner plug main body (21), an inner wall of the upper portion of the fixing sleeve is provided with first rotation stopping protrusions (33), and the lower portion of the fixing sleeve is provided with a plurality of clamping claws (31) capable of being opened and closed in the circumferential direction. The fixing structure uses an expansion structure design of the clamping claws, which can be extended and retracted on the fixing sleeve, and the bottle neck, such that an inverted buckle is formed inside the bottle, and the inner plug and the inner main body are thus firmly integrated with the bottle, that is to say, the bottle cap cannot be pulled out from the bottle neck without damage even if the bottle cap is heated and becomes softened, and therefore the bottle cap is disposable, achieving the aim of destroying the bottle cap.

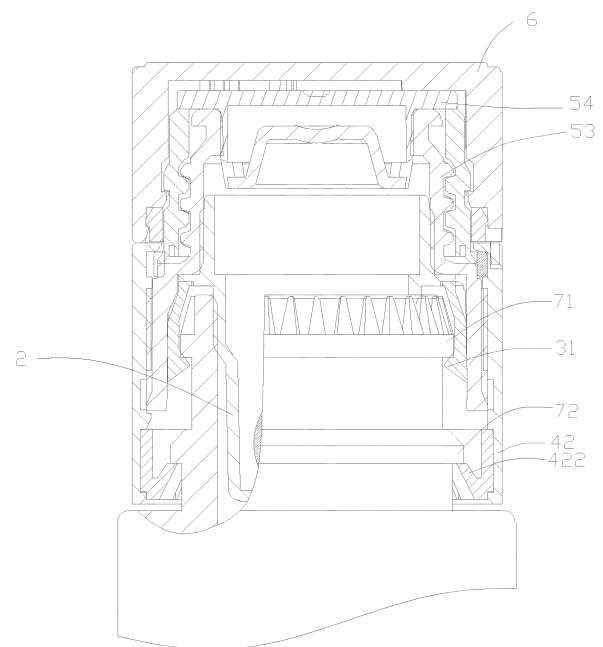


FIG.16

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Description

TECHNICAL FIELD

[0001] This disclosure relates to a technical field of packaging technology, and in particular to a bottle cap resistant to heat-induced removal and the fixed structure of its inner body and bottle neck.

BACKGROUND

[0002] Bottles typically consist of a bottle body and a bottle cap resistant to heat-induced removal. Generally, the wine is first filled into the bottle body, and then the bottle cap resistant to heat-induced removal is sealed on the neck of the bottle body. Existing bottle cap resistant to heat-induced removal typically include a fixed component fixed to the bottle neck, a twist-off movable component, and an anti-counterfeiting structure positioned between the fixed component and the movable component. When opened for use, the anti-counterfeiting structure is irreparably damaged, achieving anti-counterfeiting by destroying the bottle cap. However, since the fixed component is usually secured to the bottle neck through snap fasteners and anti-rotation ribs, both made of plastic, heating the fixed component with a hairdryer or hot water can easily cause the snap fasteners and anti-rotation ribs to fail, allowing the fixed component to be easily removed. This enables counterfeiters to reuse bottles and bottle caps for fraudulent purposes, thereby compromising the anti-counterfeiting effectiveness.

SUMMARY

[0003] According to various embodiments of the present application, a fixed structure of a bottle cap's inner body and bottle neck is provided, ensuring that the bottle cap cannot be removed without damage when heated, the fixed structure comprising:

a bottle body, the bottle body including a bottle neck;

an inner body, the inner body including a spout section and a mounting section;

characterized in that the outer wall of the bottle neck is provided with a first protruding ridge(or protrusion) extending along the circumferential direction and a first anti-rotation recess or first anti-rotation protrusion arranged at circumferential intervals above the first protruding ridge;

further comprising a fixing sleeve, the fixing sleeve being sleeved inside the mounting section and forming a slot with the inner body, an upper inner wall of the fixing sleeve being provided with a first anti-rotation protrusion or first anti-rotation recess mating with the first anti-rotation recess or first anti-rotation

protrusion, the fixing sleeve's lower part being provided with multiple retractable claws arranged along the circumferential direction; the bottle neck is inserted into the slot, the first anti-rotation protrusion engages the first anti-rotation recess, and the claws engage with the first protruding ridge under urging from the mounting section.

[0004] The fixed structure of the bottle cap resistant to heat-induced removal of the present disclosure employs an expansion-designed fixing sleeve, featuring collapsible claws on the fixing sleeve that engage with a first convex platform on the bottle neck, creating an inverted buckle inside the cap. This securely integrates the fixing sleeve with the inner body to the bottle neck. Even when heated to softening, the cap cannot separate from the bottle neck. Such a design ensures that the cap can only be removed by damaging it, ensuring single-use functionality and achieving anti-counterfeiting purposes. Because the cap cannot be reused, it significantly enhances anti-counterfeiting effectiveness.

[0005] In one embodiment, the fixed sleeve and the inner plug are separable structures. The fixed sleeve is made of hard plastic material. Between the fixed sleeve and the mounting segment, there are anti-rotation structures to prevent relative rotational movement and axial limiting structures to prevent relative axial movement.

[0006] In one embodiment, the anti-rotation structure includes a second anti-rotation protrusion or second anti-rotation recess located on the outer wall of the fixed sleeve, and a third anti-rotation recess or third anti-rotation protrusion on the inner wall of the mounting segment, which complements the second anti-rotation protrusion or second anti-rotation recess.

[0007] In one embodiment, the inner diameter and outer diameter of the upper part of the fixed sleeve gradually decrease from bottom to top. The second anti-rotation protrusion or second anti-rotation recess is located on the outer wall of the upper part of the fixed sleeve, and the radial height of the second anti-rotation protrusion or second anti-rotation recess increases gradually from bottom to top.

[0008] In one embodiment, the inner wall of the mounting segment is provided with several circumferentially spaced limiting grooves. After the inner body slides downward relative to the fixed sleeve into position, the lower outer edge of at least one claw engages with at least one limiting groove to form the axial limiting structure.

[0009] In one embodiment, the width of the limiting groove along the circumferential direction is greater than the width of the claw.

[0010] In one embodiment, the inner side surface of the claw is provided with protrusions.

[0011] In one embodiment, the fixed sleeve is made of hard plastic material.

[0012] In one embodiment, the outer side surfaces of multiple claws are located on a conical surface.

[0013] In one embodiment, the lower part of the fixed sleeve is provided with several longitudinally spaced slots along the circumference, extending through to the lower end face of the fixed sleeve, to form the claws.

[0014] The bottle cap resistant to heat-induced removal provided by the present disclosure includes: The anti-heating pull-off bottle cap provided by the present disclosure comprises:

[0015] An inner body, a cylindrical structure extending along the axial direction, including an upper spout segment and a lower mounting segment.

[0016] An inner plug, also a cylindrical structure extending along the axial direction, positioned inside the inner body. The upper end of the inner plug is inserted into the spout segment, forming a sealing fit with the inner wall of the spout segment. The lower end of the inner plug is inserted into the bottle neck, forming a sealing fit with the inner wall of the bottle neck.

[0017] An outer body, a cylindrical structure extending along the axial direction, externally mounted on the mounting segment.

[0018] A fixing sleeve, made of hard plastic material, located between the mounting segment and the inner plug. The fixing sleeve forms a slot for the bottle neck to be inserted, and its upper inner wall is provided with several first concave or convex portions to cooperate with several first convex or concave portions on the bottle neck. The lower part of the fixing sleeve is equipped with multiple circumferentially arranged, collapsible claws, which can contract inward under the action of the lower end of the inner body, thereby tightly engaging with the first convex platform on the bottle neck.

[0019] In one embodiment, the fixing sleeve and the inner plug are separable structures.

[0020] In one embodiment, there is a first anti-rotation structure between the fixing sleeve and the mounting segment to prevent relative rotational movement.

[0021] In one embodiment, the first anti-rotation structure includes a second convex or concave portion on the outer wall of the fixing sleeve and a third concave or convex portion on the inner wall of the mounting segment, with the third concave or convex portion cooperating with the second convex or concave portion.

[0022] In one embodiment, the inner diameter and outer diameter of the upper part of the fixing sleeve gradually decrease from bottom to top, and the second convex or concave portion is located on the outer wall of the upper part of the fixing sleeve, with the radial height of the second convex or concave portion gradually increasing from bottom to top.

[0023] In one embodiment, there is a first axial limit structure between the fixing sleeve and the mounting segment to prevent relative axial movement.

[0024] In one embodiment, several limiting grooves are provided on the inner wall of the mounting segment at circumferential intervals, and the lower outer edge of at least one claw fits into at least one limiting groove to form the first axial limit structure, where the width of the limiting

grooves is greater than the width of the claws.

[0025] In one embodiment, the inner plug includes an inner plug body and a flange. The inner plug body is a cylindrical structure extending along the axial direction, and the flange extends radially outward from the outer wall of the inner plug body and forms a sealing fit with the upper open end of the fixing sleeve.

[0026] In one embodiment, the lower end of the flange is provided with a sealing portion that matches the upper open end of the fixing sleeve.

[0027] In one embodiment, there are anti-pull latches on the inner wall of the outer body, which cooperate with second convex platforms on the outer wall of the bottle neck, located below the first convex platform.

[0028] In one embodiment, the outer body includes a main body and an anti-pull piece. The anti-pull piece is made of hard plastic material and includes a ring-shaped main body and the anti-pull latches. The main body is nested inside the lower end of the outer body, and the anti-pull latches extend upward from the lower end of the main body at an inward and upward angle.

[0029] In one embodiment, the anti-pull piece also includes at least two positioning parts, which are located on the inner wall of the main body and arranged at circumferential intervals.

[0030] In one embodiment, there is an installation groove on the inner bottom wall of the outer body, and the main body of the anti-pull piece is fitted into the installation groove.

[0031] In one embodiment, the bottle cap further includes a top cover assembly, which comprises an outer cover and an inner cover. The inner cover includes a cylindrical body with lower and upper open ends and a top portion connected to the upper open end of the cylindrical body, where the cylindrical body is made of hard plastic material and the top portion is made of soft plastic material.

[0032] Details of one or more embodiments of the present disclosure are set forth in the accompanying drawings and description. Further features, objectives, and advantages of the present disclosure will become apparent from the specification, drawings, and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033]

Fig. 1 is a sectional view of an embodiment of the present disclosure showing an anti-heating pull-off bottle cap.

Fig. 2 is an enlarged partial view at position A in Figure 1.

Fig. 3 is a top view of the internal body of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 4 is a sectional view along line A-A of Fig. 3.

Fig. 5 is a sectional view along line B-B of Fig. 3.

Fig. 6 is a sectional view of the internal plug of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 7 is a top view of the fixing sleeve of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 8 is a sectional view along line A-A of Fig. 7.

Fig. 9 is a sectional view of the main body of the outer main body of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 10 is a sectional view of the anti-pulling member of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 11 is a sectional view of the outer cover of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 12 is a sectional view of the barrel of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 13 is a sectional view of the top of the anti-heating pull-off bottle cap shown in Fig. 1.

Fig. 14 is a front view of the bottle neck.

Fig. 15 is an enlarged partial view at position B in Fig. 14.

Fig. 16 is an assembly diagram showing the assembly of the anti-heating pull-off bottle cap with the bottle neck as shown in Fig. 1.

[0034] Reference numbers are listed as follows:

1. Inner Body; 11. Mounting Section; 111. Third anti-rotation protrusion; 112. Limiting groove; 12 Spout Section; 121. External thread; 13. Step portion; 14. Stopper; 15. Connecting rib; 16. Spout channel; 17. First protrusion; 2 Inner Plug; 21. Inner plug body; 211. Upper section of inner plug; 212. Lower section of inner plug; 213. Spout hole; 22. Flange section; 221. Seal section; 3. Fixing Sleeve; 31. Claw; 311. Inner side; 312. Outer side; 313. End face; 314. Protrusion; 32. Groove; 33. First anti-rotation protrusion; 36. Second anti-rotation groove; 37. Slot; 4. Outer Body; 41. Outer body main body; 411. First snap; 412. Installation groove; 413. Second protrusion; 414. Protruding edge; 42. Anti-pulling member; 421. Main body part; 422. Anti-pulling snap; 423. Positioning part; 5. Inner Lid; 51. Inner thread; 52. Groove; 53. Cylinder; 54. Top; 55. Seal ring; 6. Outer Lid; 61. Snap protrusion; 7. Bottle Neck; 71. First raised platform; 72. Second raised platform; 74. First anti-rotation groove; 76. Bottle mouth; 8. Sealing Bead; 91. First anti-counterfeiting ring; 92. Second anti-counterfeiting ring

DETAILED DESCRIPTION

[0035] In order to make the objectives, features, and advantages of the present disclosure clearer and more understandable, a clear and complete description of specific embodiments of the present disclosure is provided below in conjunction with the accompanying drawings. It is evident that the specific details of the following description are merely exemplary embodiments of the present disclosure, and the present disclosure can be implemented in many other embodiments different from those described herein. Based on the embodiments of the present disclosure, all other embodiments obtained by those skilled in the art without exercising inventive labor, are within the scope of protection of the present disclosure.

[0036] In this document, when a component is referred to as "fixed to" another component, it may be directly on the other component or may also exist as an intermediate component. When a component is considered "connected to" another component, it may be directly linked to the other component or may also exist as an intermediate component simultaneously. The terms "front," "rear," "top," "bottom," and similar directional terms are defined based on the positions of components in the drawings and their relative positions to each other, solely for clarity and convenience in describing the technical solution. It should be understood that the use of these directional terms should not limit the scope of protection sought in this application.

[0037] Unless otherwise defined, all technical and scientific terms used in this document have the same meaning as understood by those skilled in the art pertaining to the technical field of the present disclosure. The terms used in the specification of the present disclosure are intended solely for describing specific embodiments and are not intended to limit the scope of the disclosure.

[0038] As shown in Figure 1, the example anti-heating pull-out bottle cap mainly consists of a fixing assembly used to secure it to the bottle neck 7, an upper cover assembly placed on the fixing assembly, and an anti-counterfeiting structure positioned between the fixing assembly and the upper cover assembly. The fixing assembly includes an inner body 1, a fixing sleeve 3, an inner plug 2, a sealing bead 8, and an outer body 4.

[0039] Combining Figures 1, 3-5, the main body 1 is overall cylindrical in shape, comprising a pouring spout segment 12 and a mounting segment 11 connected from top to bottom. The outer peripheral surface of the pouring spout segment 12 is equipped with external threads 121 for connection with the upper cover assembly. A stopper section 14 is centrally located within the pouring spout segment 12, with a gap between the stopper section 14 and the inner wall of the pouring spout segment 12. The stopper section 14 is connected to the pouring spout segment 12 via several connecting ribs 15. Several pouring channels 16 are formed between the stopper section 14, pouring spout segment 12, and the connecting ribs

15. The mounting segment 11 is designed to cooperate with the fixing sleeve 3 to securely fix the entire fixing assembly onto the bottle neck 7 in a non-detachable manner.

[0040] As an example, the inner diameter of the mounting segment 11 is greater than that of the pouring spout segment 12, with a step portion 13 provided between the mounting segment 11 and the pouring spout segment 12.

[0041] Referring to Figures 1 and 6, the inner plug 2 comprises an inner plug body 21 and a flanged portion 22. The inner plug body 21 is cylindrical and includes an upper inner plug segment 211 and a lower inner plug segment 212 connected from top to bottom. The upper inner plug segment 211 inserts into the pouring spout segment 12 and seals tightly against the inner wall of the pouring spout segment 12. The lower inner plug segment 212 can be inserted into the bottle neck 7 and seals tightly against the inner wall of the bottle neck 7. The bottom of the lower inner plug segment 212 is equipped with a pouring hole 213 for the liquid to flow through. To facilitate insertion into the bottle neck 7, the lower end of the lower inner plug segment 212 is tapered. In this embodiment, the inner diameter of the upper inner plug segment 211 is greater than that of the lower inner plug segment 212, creating a step between them. The flanged portion 22 extends radially outward from the outer wall of the inner plug body 21 and seals with the upper opening of the fixing sleeve 3. A sealing bead 8 is installed inside the inner plug 2.

[0042] As shown in Figures 1, 2, 7, and 8, the fixing sleeve 3 is cylindrical in structure and is sleeved onto the mounting segment 11. Between the inner wall of the fixing sleeve 3 and the outer wall of the lower inner plug segment 212, there is a slot 37 for inserting the bottle neck 7. The upper inner wall of the fixing sleeve 3 is provided with a first anti-rotation protrusion 33 (or first anti-rotation recess) that cooperates with a first anti-rotation recess 74 (or first anti-rotation protrusion) on the bottle neck 7. The lower part of the fixing sleeve 3 is equipped with multiple engageable claws 31 arranged along the circumference.

[0043] Before sealing, the claws 31 are in an open state, allowing the bottle neck 7 to be inserted into the slot 37 between the inner plug body 21 and the fixing sleeve 3. During sealing, the inner body 1 moves downward relative to the fixing sleeve 3, and the lower end of the inner body 1 slides along the outer surface 312 of the claws 31, causing the claws 31 to contract and engage with the first protrusion 71. With this structure, the fixing sleeve 3 prevents relative rotational movement between itself and the bottle neck 7 through the cooperation of the first anti-rotation recess 74 and the first anti-rotation protrusion 33, and prevents relative axial movement between the fixing sleeve 3 and the bottle neck 7 through the cooperation of the claws 31 and the first protrusion 71. This design enhances anti-removal functionality and improves the stability of the bottle cap during installation.

[0044] As an example, the fixed sleeve 3 and the inner

plug 2 are of a split-type structure, with the fixed sleeve 3 made of hard plastic material. Between the fixed sleeve 3 and the mounting segment 11, there are anti-rotation structures to prevent relative rotational movement and axial limit structures to prevent relative axial movement. Because the fixed sleeve 3 is made of hard plastic material (such as ABS plastic), when heating the bottle cap with a hair dryer or hot water, the fixed sleeve 3 is not easily deformed. This prevents the fixed sleeve 3 from being pulled out from the bottleneck 7 using heating means alone, ensuring that the bottle cap can only be removed by destroying it. This design enables the bottle cap to be used only once, achieving the purpose of destruction, thereby preventing the cap from being re-used and enhancing the anti-counterfeiting effect. As an alternative solution, the fixed sleeve 3 and the inner plug 2 can be designed as a monolithic structure.

[0045] In one embodiment, the outer wall of the fixed sleeve 3 is provided with several second anti-rotation concave portions 36 (or second anti-rotation convex portions), while the inner wall of the mounting segment 11 is equipped with third anti-rotation convex portions 111 (or third anti-rotation concave portions) that cooperate with the second anti-rotation concave portions 36 (or convex portions). The interaction between the second anti-rotation concave portions 36 and the third anti-rotation convex portions 111 prevents relative rotational movement between the fixed sleeve 3 and the inner main body 1. This structure further enhances the stability and anti-pull-out performance of the bottle cap.

[0046] In one embodiment, as shown in Figures 4 and 5, the inner wall of installation section 11 is equipped with several circumferentially spaced limiting grooves 112. After crimping, at least one lower outer edge of claw 31 engages into at least one of the limiting grooves 112, thereby preventing relative axial movement between fixed sleeve 3 and inner body 1. This design allows claw 31 to simultaneously serve as an axial limit, which simplifies the structure. For example, there are four circumferentially spaced limiting grooves 112 arranged along the inner wall of installation section 11. The limiting grooves 112 extend longitudinally along the circumferential direction as strip shapes, with a length greater than that of claw 31 along the circumferential direction. This configuration ensures that there is no directional requirement during the assembly of fixed sleeve 3, facilitating the assembly process. Such a design simplifies the installation procedure and enhances production efficiency.

[0047] In one embodiment, the lower end of flanging section 22 is equipped with a sealing portion 221 that matches the upper opening of fixed sleeve 3. After crimping, the sealing portion 221 is inserted into the upper opening of fixed sleeve 3. This design ensures a good seal of the bottle cap when closed, preserving the freshness of the beverage inside the bottle.

[0048] In one embodiment, the lower part of fixed sleeve 3 is equipped with several slots 32 arranged at intervals along the circumference and extending axially

to the lower end face of fixed sleeve 3, thereby forming the claws 31. As an example, the longitudinal cross-section of claws 31 resembles a nearly right-angled triangle, comprising inner surface 311, outer surface 312, and end face 313. The outer surfaces 312 of multiple claws 31 are located on the same conical surface, while the inner surface 311 runs parallel to the axial direction of fixed sleeve 3, and the end face 313 is perpendicular to the axial direction of fixed sleeve 3. This structure of claws 31 enhances anti-pull performance, ensuring a safer and more reliable bottle cap.

[0049] In one embodiment, as shown in Figure 8, the inner and outer diameters of the upper part of fixed sleeve 3 gradually decrease from bottom to top. The radial height of the first anti-rotation convex portion 33 decreases gradually from bottom to top, while the radial height of the second anti-rotation concave portion 36 increases gradually from bottom to top. The upper part of fixed sleeve 3 is structured in this manner to accommodate the structure of the bottle neck on one hand, and to leave space for the third anti-rotation convex portion 111 on the inner body 1 on the other hand.

[0050] In one embodiment, protrusions 314 are provided on the inner surface 311 of the claw 31 to increase the bonding strength between the claw 31 and the first convex platform 71. This design enhances the secure attachment of the claw 31 to the first convex platform 71, thereby further improving anti-pull performance.

[0051] In conjunction with Figures 1, 9, and 10, the outer body 4 is cylindrical in shape and is fitted onto the mounting section 11 of the inner body 1. Between the outer body 4 and the mounting section 11, there are anti-rotation structures to prevent relative rotational movement and axial limiting structures to prevent relative axial movement. The outer body 4 serves both decorative purposes and secures the mounting section 11 of the inner body 1, preventing deformation during heating of the mounting section 11, which could otherwise cause the claws 31 to open and compromise the fixation structure.

[0052] In one embodiment, the inner wall of the outer body 4 is equipped with a first latch 411, which engages with the lower end face of the inner body 1 to prevent axial upward movement of the outer body 4 relative to the inner body 1. This design enhances the stability of the connection between the outer body 4 and the inner body 1, further improving anti-pull performance.

[0053] In one embodiment, the inner wall of the outer body 4 is provided with anti-pull tabs 422, which cooperate with the second protrusion 72 on the outer peripheral surface of the bottleneck 7 to prevent relative movement of the outer body 4 with respect to the bottleneck 7, thereby further increasing the bonding strength between the fixing component and the bottleneck 7.

[0054] In one embodiment, the outer body 4 comprises an outer body main body 41 and an anti-pull member 42 disposed on the inner wall at the lower end of the outer body main body 41. A plurality of anti-pull tabs 422 arranged along the circumferential direction are provided

on the anti-pull member 42, which is made of hard plastic material. This design achieves the following technical effects:

1. Improved safety of the bottle cap: By the mutual cooperation of the anti-pull tabs 422 of the inner and outer bodies 4 with the second protrusion 72, the bonding strength between the bottle cap and the bottleneck 7 is enhanced, further improving the anti-pull performance.

2. Superior anti-counterfeiting performance: By using a unique anti-pull design, the bottle cap requires destruction of its original structure during disassembly, making it impossible to reuse the bottle cap and achieving anti-counterfeiting purposes. The material of the anti-pull member 42 is hard plastic, which makes it difficult for the anti-pull member 42 to deform when heated with a hairdryer or hot water, thereby preventing the outer body 4 from being pulled out from the bottleneck 7 using heating means, achieving the purpose of destroying the cap, making the cap for one-time use only, and ensuring that the cap cannot be reused, with good anti-counterfeiting effect.

3. Easy assembly: The modular structure of the outer body 4 simplifies the assembly process of the bottle cap. First, the fixing sleeve 3 is installed into the inner body 1, and then the anti-pull member 42 is installed, thereby improving production efficiency.

4. Structural stability: Anti-rotation structures are provided between the inner and outer bodies 4 to ensure that the bottle cap does not loosen due to rotation during use.

[0055] In one embodiment, the anti-pull member 42 comprises an annular main body portion 421, and the anti-pull tabs 422 extend upwardly inward from the lower end of the main body portion 421 at an inward slant, forming an inverted structure. The anti-pull tabs 422 are not easily detached from the second protrusion 72.

[0056] In one embodiment, the anti-pull member 42 further includes at least two positioning parts 423 arranged at intervals along the circumferential direction on the inner wall of the main body portion 421. These at least two positioning parts 423 cooperate with the outer peripheral surface of steps on the bottleneck 7. During assembly of the bottle cap, the positioning parts 423 ensure concentricity with the outer peripheral surface of the second protrusion 72, preventing misalignment of the bottle cap.

[0057] In one embodiment, the lower end inner wall of the outer body 4 is provided with a mounting groove 412, and the main body portion 421 is engaged in the mounting groove 412.

[0058] In one embodiment, the inner diameter of the

main body portion 421 is smaller than the outer diameter of the lower end of the fixing sleeve 3, thus allowing the main body portion 421 to serve as a limiting stop to prevent the fixing sleeve 3 from slipping off.

[0059] Preferably, there is a prevention structure between the outer body 4 and the inner body 1 to prevent them from rotating relative to each other. For example, the prevention structure includes several second protrusions 413 on the inner wall of the outer body 4 and several first protrusions 17 on the outer surface of the inner body 1, with each second protrusion 413 fitting between adjacent pairs of first protrusions 17. The inner wall of the outer body 4 above several second protrusions 413 has inwardly extending ridges 414 that cooperate with the second protrusions 413 to prevent axial downward movement of the outer body 4 relative to the inner body 1.

[0060] As shown in Figures 1 and 11-13, the upper cover assembly includes an outer cover 6 and an inner cover 5 fixedly embedded within the outer cover 6. The inner wall of the inner cover 5 is provided with internal threads 51 that cooperate with external threads 121 on the inner body 1. The outer wall of the inner cover 5 is equipped with a groove 52, while the inner wall of the outer cover 6 is equipped with a protrusion 61 that engages with the groove 52, securely connecting the inner cover 5 and the outer cover 6. Alternatively, the positions of the protrusion 61 and the groove 52 can be swapped, meaning the protrusion 61 is placed on the inner cover 5 and the groove 52 is located on the outer cover 6.

[0061] In one embodiment, the inner cover 5 comprises a cylindrical body 53 with a lower end opening and an upper end opening, and a top portion 54 connected to the upper end opening of the cylindrical body 53. The cylindrical body 53 is made of rigid plastic material, while the top portion 54 is made of soft plastic material. This design utilizes rigid plastic for the portion of the inner cover 5 where the groove 52 is located, and soft plastic for the portion that interfaces with the end face of the liquid outlet section. This configuration enhances the sealing performance of the inner cover 5 while increasing its connection strength with the outer cover 6.

[0062] When the upper cover assembly is heated using a hair dryer or hot water, the portion of the inner cover 5 with the groove 52 is less prone to deformation, preventing the outer cover 6 from being pulled out from the inner cover 5 by heating means alone. Only deformation of the outer cover 6 would separate the protrusion 61 from the groove 52, ensuring that the bottle cap can only be removed by damaging it, thereby achieving a one-time use of the cap and preventing its reuse, enhancing anti-counterfeiting measures effectively.

[0063] As an example, the upper end surface of the cylindrical body 53 tightly adheres to the lower surface of the top portion 54, thereby preventing leakage between the upper end surface of the cylindrical body 53 and the lower surface of the top portion 54. The connection between the cylindrical body 53 and the outer cover 6 is achieved through the engagement of protrusion 61 on

the outer cover 6 into the groove 52. This engagement ensures that the lower surface of the top portion 54 adheres closely to the upper end surface of the cylindrical body 53.

[0064] As an alternative, in one embodiment, the upper end of the cylindrical body 53 and the top portion 54 are integrally molded using a two-shot injection molding process. This integration allows the cylindrical body 53 and the top portion 54 to form a single part, facilitating assembly.

[0065] In one embodiment, the cylindrical body 53 is made of ABS plastic, while the top portion 54 is made of PE (polyethylene) plastic.

[0066] In one embodiment, the lower surface of the top 54 has a downward-extending sealing ring 55, which is made of soft plastic. This sealing ring 55 is designed to come into close contact with a dispensing port when the bottle cap is fully tightened, providing effective sealing to prevent liquid leakage.

[0067] In this embodiment, the anti-counterfeiting structure comprises a first anti-counterfeiting ring 91 on the outer cap 6 and a second anti-counterfeiting ring 92 on the outer body 4. The first anti-counterfeiting ring 91 has downward-extending first anti-counterfeiting teeth (not shown in the figure), and the second anti-counterfeiting ring 92 has upward-extending second anti-counterfeiting teeth (not shown in the figure). When opened for use, rotating the outer cap 6 causes the first anti-counterfeiting teeth to rotate. The first and/or second anti-counterfeiting teeth are designed to break upon rotation, and cannot be repaired once broken or twisted, thereby achieving anti-counterfeiting purposes.

[0068] In another embodiment of the present disclosure, a bottle body is provided for use with the above-mentioned anti-heating extraction bottle cap, as shown in Figure 14. The bottle body includes a bottle body (not shown in the figure) and a bottle neck 7 set on the bottle body, which has a bottle mouth 76. The outer wall of the bottle neck 7 is equipped with first protrusions 71 and second protrusions 72 arranged at intervals from top to bottom. Above the first protrusion 71 on the outer wall of the bottle neck 7, there are several first locking recesses 74 arranged at intervals along the circumferential direction. Preferably, the first locking recesses 74 are wider at the top and narrower at the bottom to facilitate smooth insertion and automatic alignment of the first locking protrusion 33 into the first locking recess 74 during sealing.

[0069] Figure 16 shows the assembly diagram of the anti-heating extraction bottle cap with bottle neck 7, referring to Figures 1 and 16. Before sealing, the lower end of installation section 11 of inner body 1 is positioned above claw 31, which remains in an open state. At this point, bottle neck 7 can be inserted into slot 37 between inner plug body 21 and fixing sleeve 3. The first locking protrusion 33 on fixing sleeve 3 inserts into the first locking recess 74 on the outer wall of bottle neck 7. During sealing, downward pressure is applied to the anti-heating

extraction bottle cap. Inner body 1 moves downward relative to fixing sleeve 3, and the lower end of inner body 1 slides along the outer side 312 of claw 31, causing claw 31 to contract and grip the first protrusion 71 of bottle neck 7. Simultaneously, anti-pull buckle 422 locks onto the second protrusion 72, thus securely fixing the anti-heating extraction bottle cap onto bottle neck 7.

[0070] The anti-heating extraction bottle cap of the present disclosure utilizes a fixed assembly with retractable claws 31 on fixing sleeve 3 and first protrusions 71 on bottle neck 7 through an expansion structure design, creating an inverted buckle inside the bottle to firmly integrate inner plug 2 and inner body 1 with the bottle. Even when heated and softened, they cannot be separated. Additionally, anti-pull buckle 422 on outer body 4 engages with second protrusion 72 on bottle neck 7, further enhancing the bonding strength between the fixed assembly and bottle neck 7. Only deformation of outer body 4 due to heating can separate anti-pull buckle 422 and second protrusion 72, ensuring that the cap can only be removed by destroying it, making the cap for one-time use only and achieving the purpose of cap destruction, preventing recycling and ensuring good anti-counterfeiting effects. This design meets market demands for cap security, anti-counterfeiting performance, and user convenience, offering high practical value and broad application prospects.

[0071] Assembly method of the anti-heating extraction bottle cap in this embodiment is as follows:

Step 1: Secure the inner body 1 onto the first fixture and tighten the inner cap 5 onto the inner body 1. Specifically, fit the installation section 11 of inner body 1 onto the first support of the first fixture, with the first protrusion 17 of inner body 1 inserted into the locking groove on the first support to prevent rotation. Then, tighten the inner cap 5 onto the pouring spout section 12 of inner body 1 to form the first intermediate assembly.

Step 2: Fit the outer body main body 41, assembled with the second anti-counterfeiting ring 92, onto the first intermediate assembly. Specifically, slide the outer body main body 41 from top to bottom over the inner body 1 of the first intermediate assembly until the first latch 411 on the outer body main body 41 hooks onto the lower end surface of inner body 1, forming the second intermediate assembly.

Step 3: Install the outer cap 6, assembled with the first anti-counterfeiting ring 91, onto the inner cap 5. Specifically, slide the outer cap 6 from top to bottom over the inner cap 5 until the protrusion 61 on the outer cap 6 snaps into the groove 52 on the inner cap 5, forming the third intermediate assembly.

Step 4: Place the inner plug 2, equipped with glass beads, into the second fixture and press it into the

inner body 1. Specifically, the second fixture includes a second column and a second support part connected to the upper end of the second column. Insert the lower section 212 of the inner plug into the hole of the second support part. Slide the third intermediate assembly down over the inner plug 2 until the lower end of the outer body 4 contacts the limiting step on the second fixture.

Step 5: Insert the anti-pull component 42 into the mounting groove 412 of the outer body main body 41. Specifically, fix the anti-pull component 42 onto the third fixture and slide the third intermediate assembly down over the anti-pull component 42 until it locks into the mounting groove 412, thereby completing the assembly of the anti-pull bottle cap.

[0072] The above-described embodiments only express several implementation methods of the present disclosure, which are detailed and specific in description. However, this should not be construed as limiting the scope of the patent for the present disclosure. It should be noted that ordinary skilled artisans in this field can make various modifications and improvements within the conceptual framework of the disclosure, all of which fall within the scope of protection of the present disclosure.

Claims

1. A fixed structure of an inner body and a bottle neck for preventing heating removal of a bottle cap, comprising:

a bottle body, the bottle body including a bottle neck;
an inner body, the inner body including a spout section and a mounting section;

characterized in that the outer wall of the bottle neck is provided with a first protruding ridge(or protrusion) extending along the circumferential direction and a first anti-rotation recess or first anti-rotation protrusion arranged at circumferential intervals above the first protruding ridge; further comprising a fixing sleeve, the fixing sleeve being sleeved inside the mounting section and forming a slot with the inner body, an upper inner wall of the fixing sleeve being provided with a first anti-rotation protrusion or first anti-rotation recess mating with the first anti-rotation recess or first anti-rotation protrusion, the fixing sleeve's lower part being provided with multiple retractable claws arranged along the circumferential direction; the bottle neck is inserted into the slot, the first anti-rotation protrusion engages the first anti-rotation recess, and the claws engage with the first protruding ridge under urging from the mounting section.

2. The fixed structure according to claim 1, **characterized in that** there is provided between the fixing sleeve and the installation section an anti-rotation structure preventing relative rotational movement between the two, and an axial limiting structure preventing relative axial movement between the two. 5
3. The fixed structure according to claim 2, **characterized in that** the anti-rotation structure comprises a second anti-rotation convex or concave portion located on the outer wall of the fixing sleeve, and a third anti-rotation concave or convex portion on the inner wall of the installation section, corresponding to the second anti-rotation convex or concave portion. 10
4. The fixed structure according to claim 3, **characterized in that** the inner diameter and outer diameter of the upper part of the fixing sleeve gradually decrease from bottom to top, the second anti-rotation convex or concave portion is located on the outer wall of the upper part of the fixing sleeve, and the radial height of the second anti-rotation convex or concave portion increases gradually from bottom to top. 20
5. The fixed structure according to claim 2, **characterized in that** the inner wall of the installation section is provided with several spaced-apart limiting grooves arranged along the circumferential direction; after the inner body slides downward relative to the fixing sleeve into position, the lower outer edge of at least one claw engages into at least one of the limiting grooves to form the axial limiting structure. 25 30
6. The fixed structure according to claim 5, **characterized in that** along the circumferential direction, the width of the limiting grooves is greater than the width of the claws. 35
7. The fixed structure according to claim 1, **characterized in that** the fixing sleeve is made of hard plastic material. 40
8. The fixed structure according to claim 1, **characterized in that** the inner side of the claw is provided with protrusions. 45
9. The fixed structure according to claim 1, **characterized in that** the outer side surfaces of multiple claws are located on a conical surface. 50
10. The fixed structure according to claim 1, **characterized in that** the lower part of the fixing sleeve is provided with several slots arranged at intervals along the circumference and extending axially through to the lower end face of the fixing sleeve, thereby forming the claws. 55
11. A bottle cap resistant to heat-induced removal, **char-**

acterized by comprising

a fixed structure as described in any one of claims 1-10; and
 an outer body, which is cylindrical in structure, fitted onto the mounting section of the inner body, and wherein between the outer body and the mounting section, there are anti-rotation structures to prevent relative rotational movement, and axial limit structures to prevent relative axial movement.

12. The bottle cap resistant to heat-induced removal according to claim 11, **characterized in that** the inner wall of the outer body is provided with anti-pull latches, which cooperate with a second protrusion on the outer wall of the bottle neck, wherein the second protrusion is located below the first protrusion.
13. The bottle cap resistant to heat-induced removal according to claim 12, **characterized in that** the outer body comprises a main body and an anti-pull component, wherein the anti-pull component is made of hard plastic material and includes a ring-shaped main body part and the anti-pull latch. The main body part is sleeved inside the lower end of the outer body main body, and the anti-pull latch extends upward inwardly from the lower end of the main body part at an upward slant.
14. The heat-resistant pull-out bottle cap according to claim 13, **characterized in that** the anti-pull component further comprises at least two positioning parts, these positioning parts are located on the inner wall of the main body part and are spaced apart in the circumferential direction.
15. The heat-resistant pull-out bottle cap according to claim 13, **characterized in that** the inner wall of the lower end of the outer body is provided with mounting grooves, and the main body part of the anti-pull component is engaged in the mounting grooves.

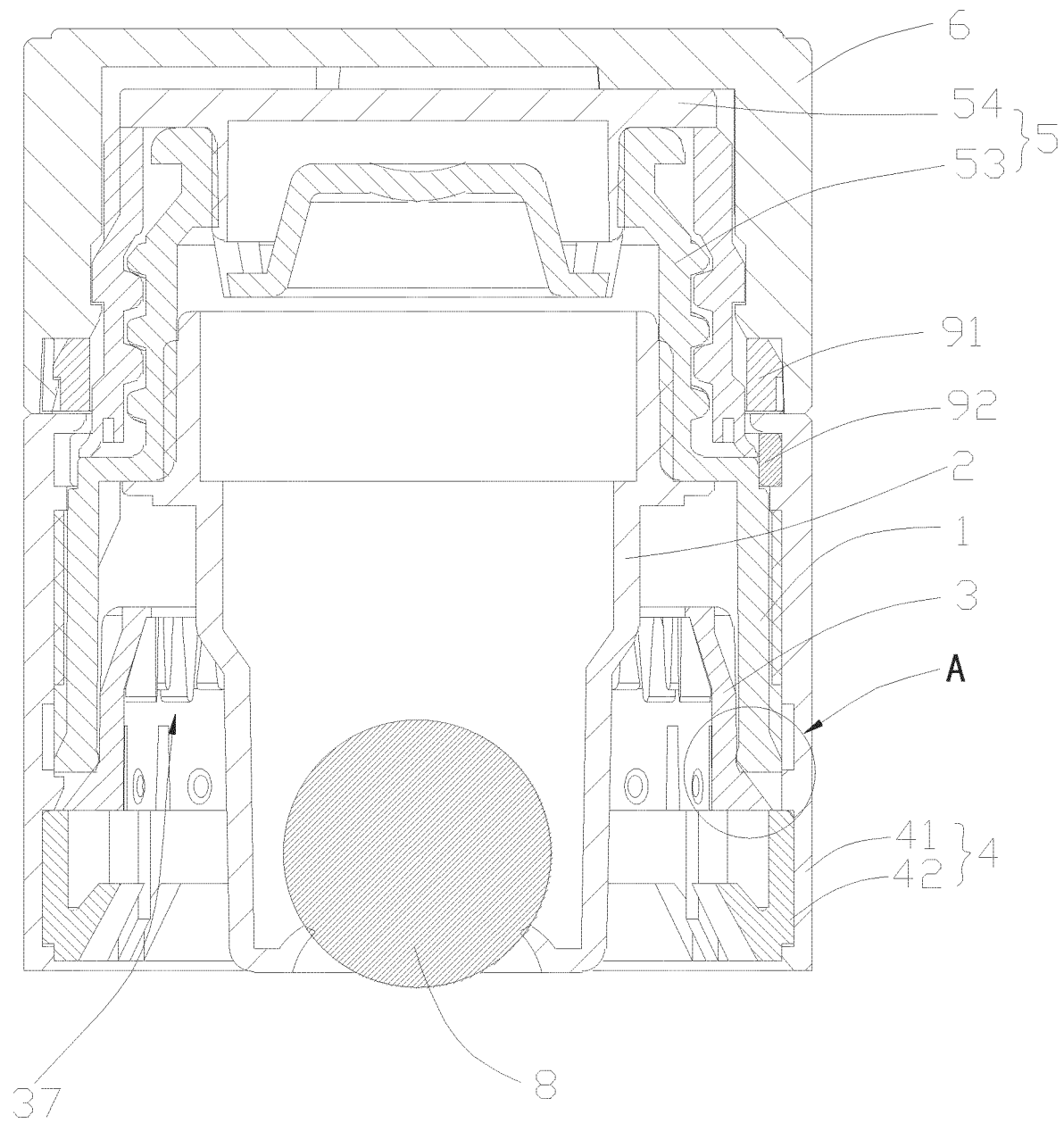


FIG.1

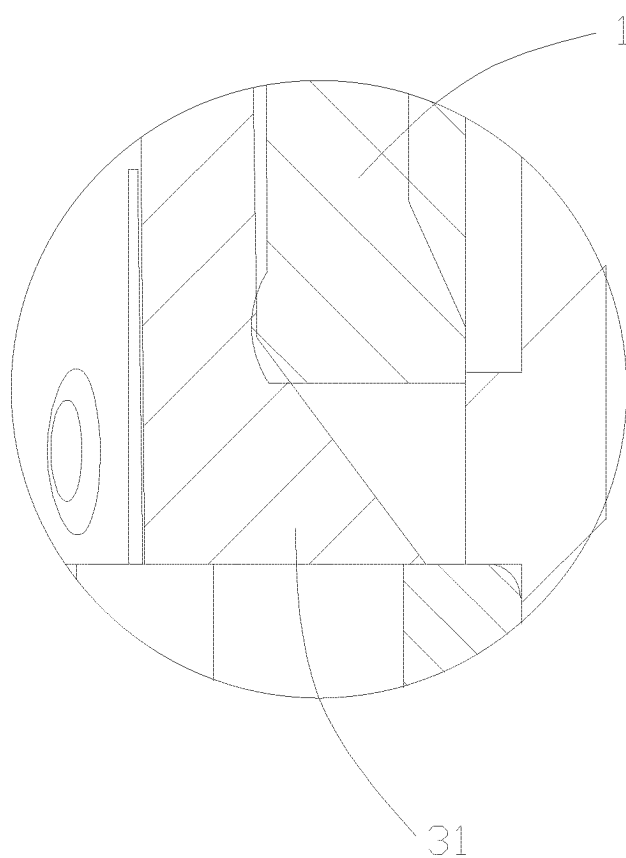


FIG.2

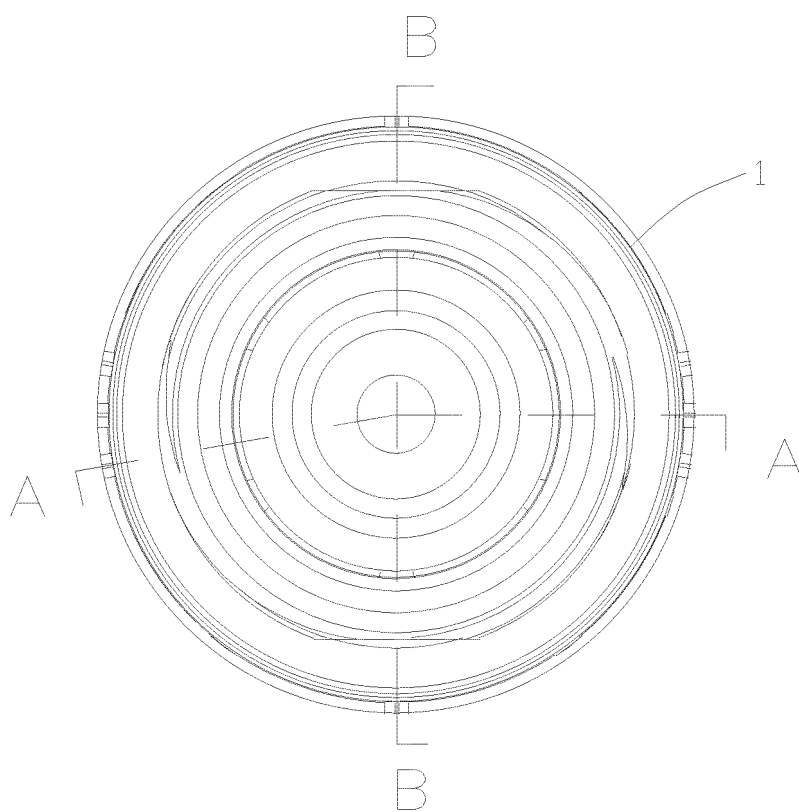


FIG.3

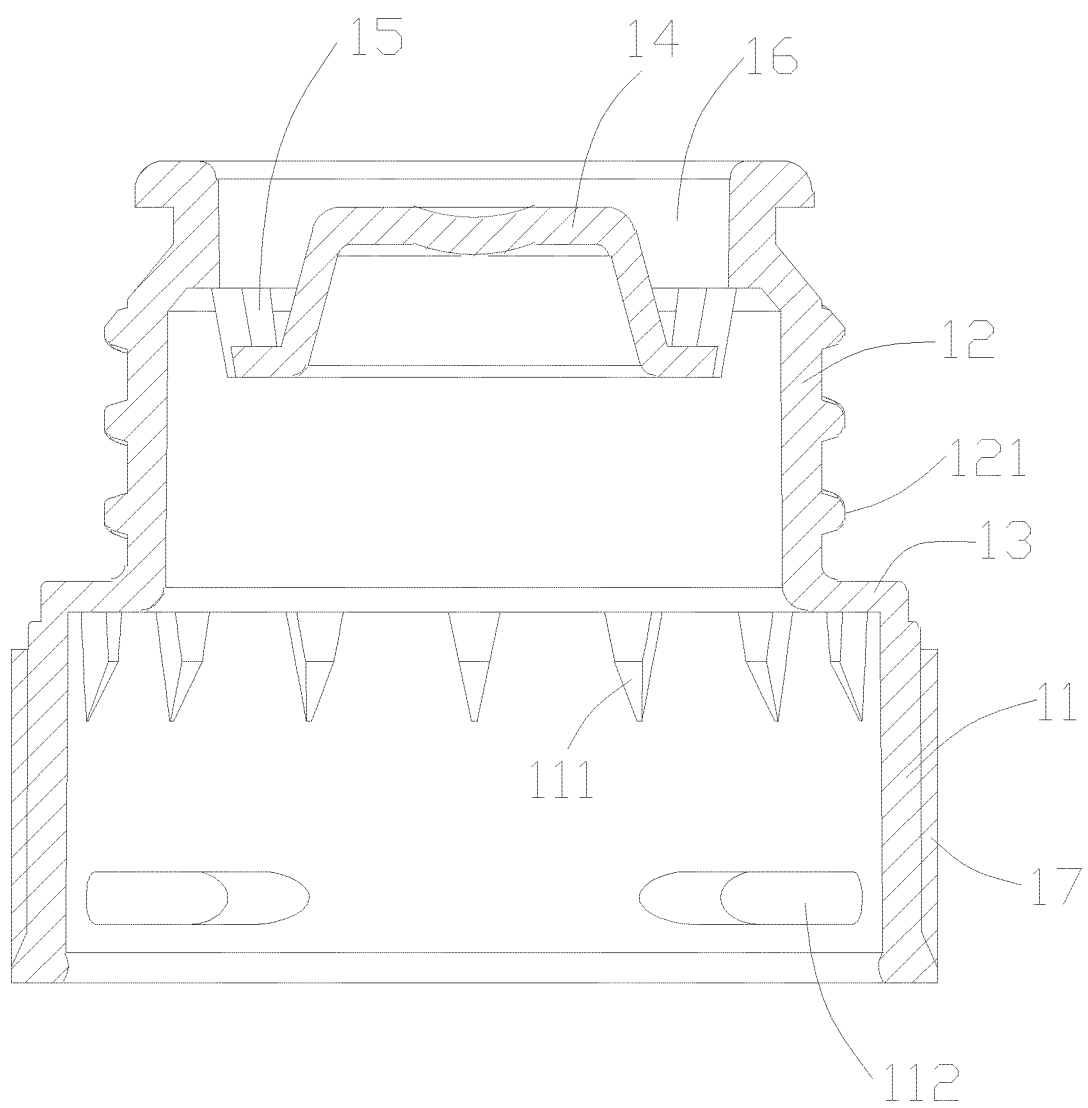


FIG.4

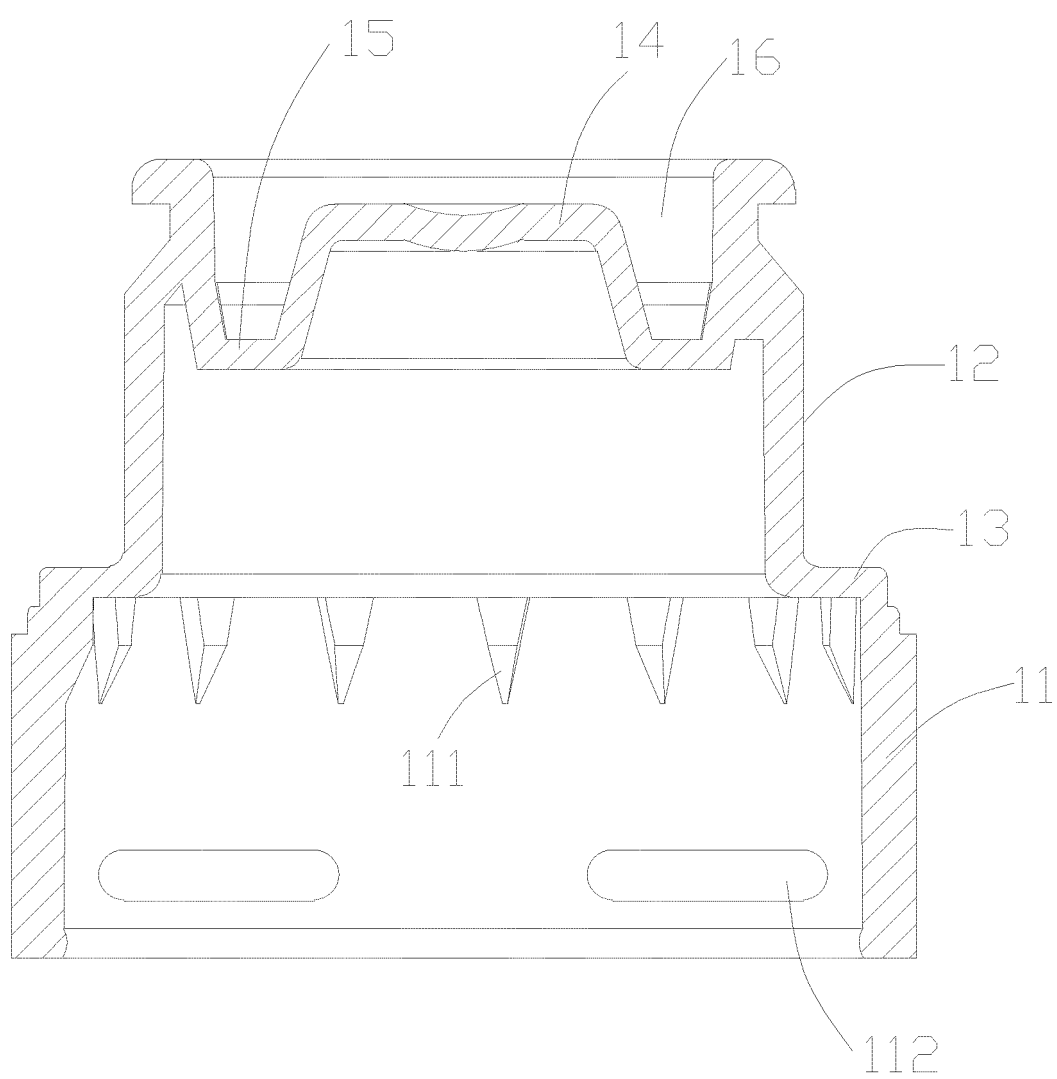


FIG.5

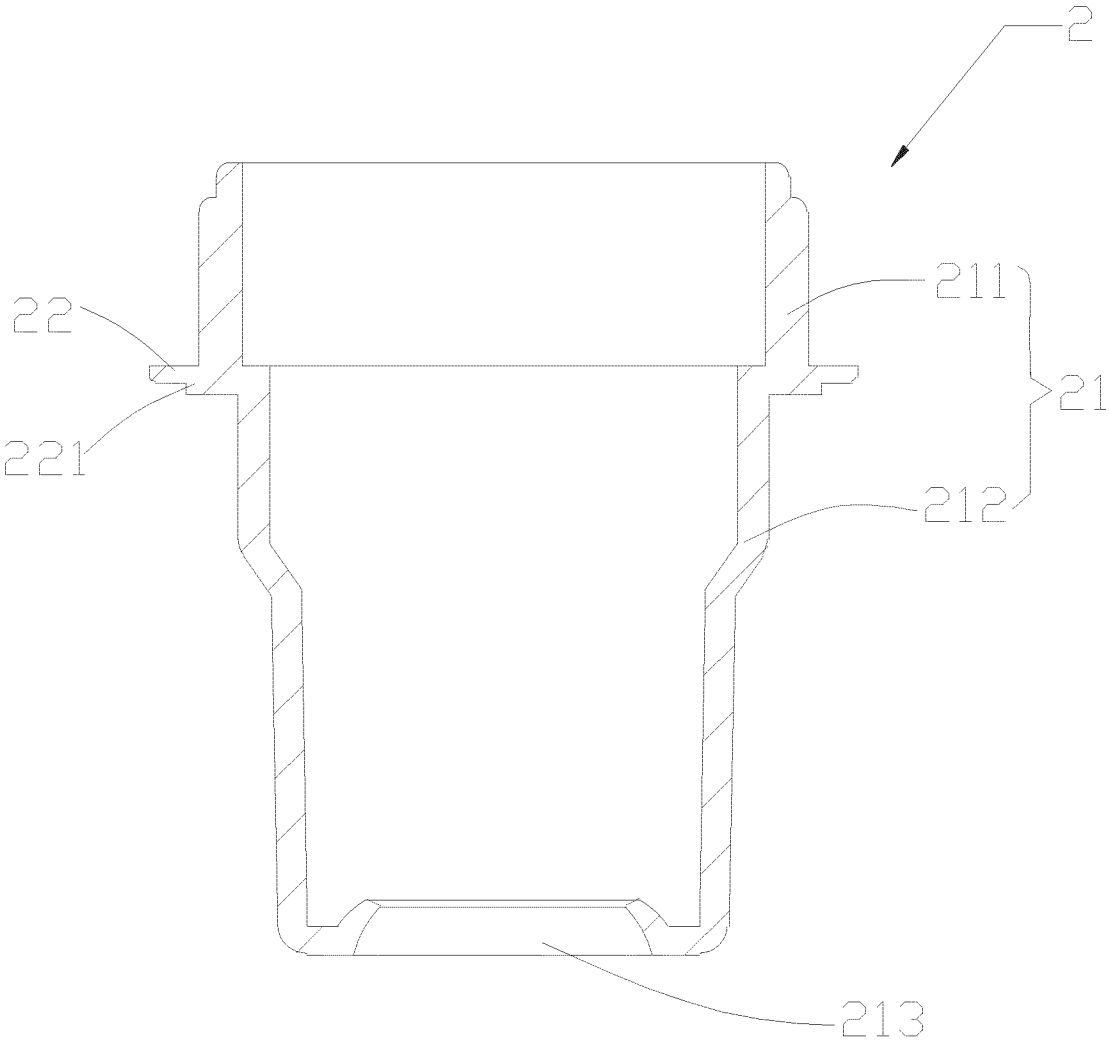


FIG.6

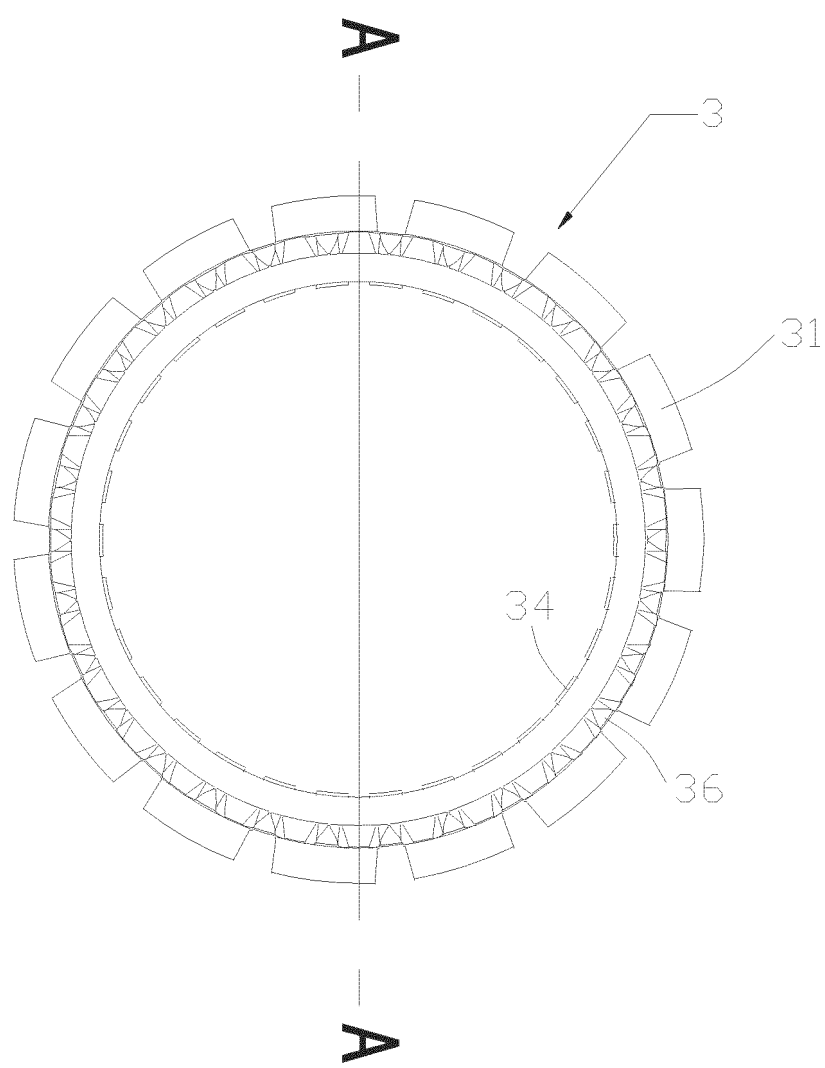


FIG.7

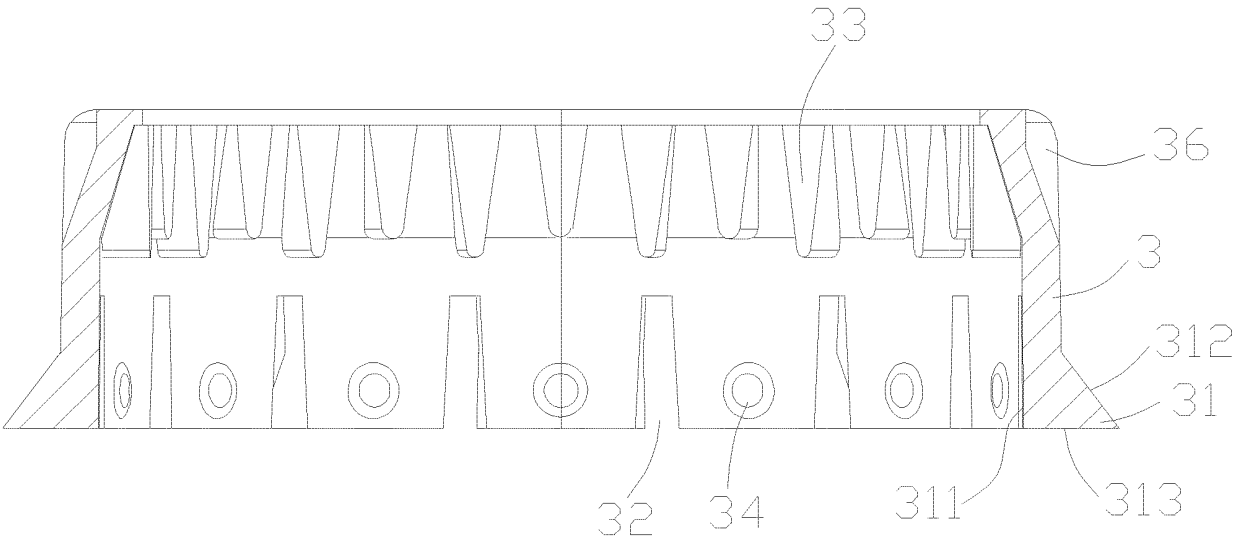


FIG.8

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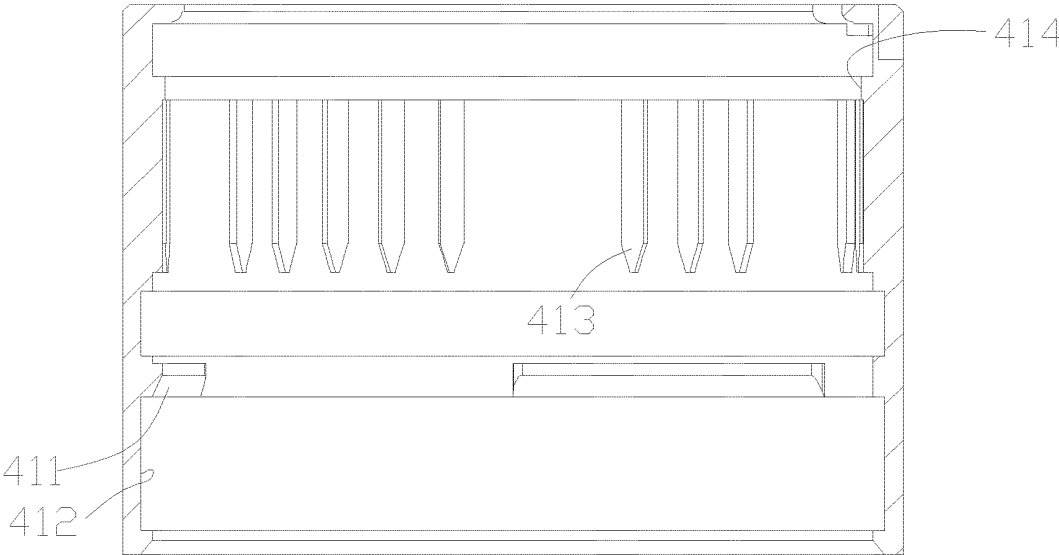


FIG.9

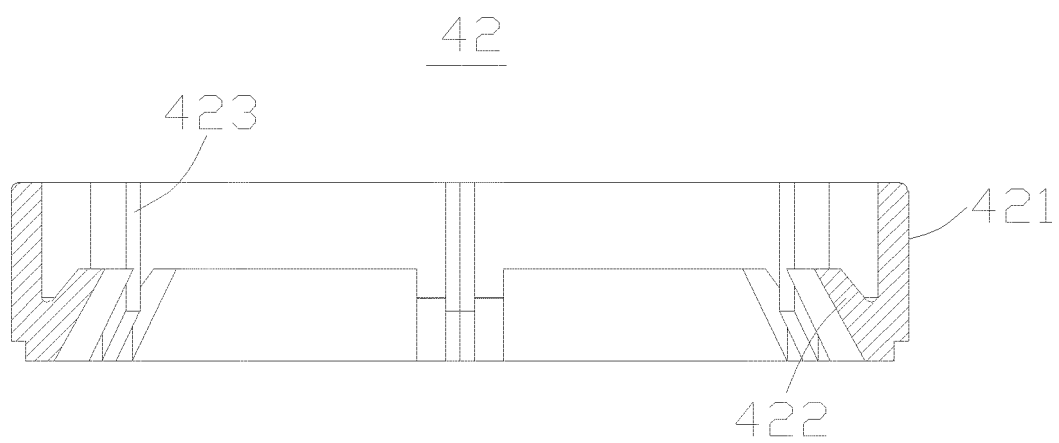


FIG.10

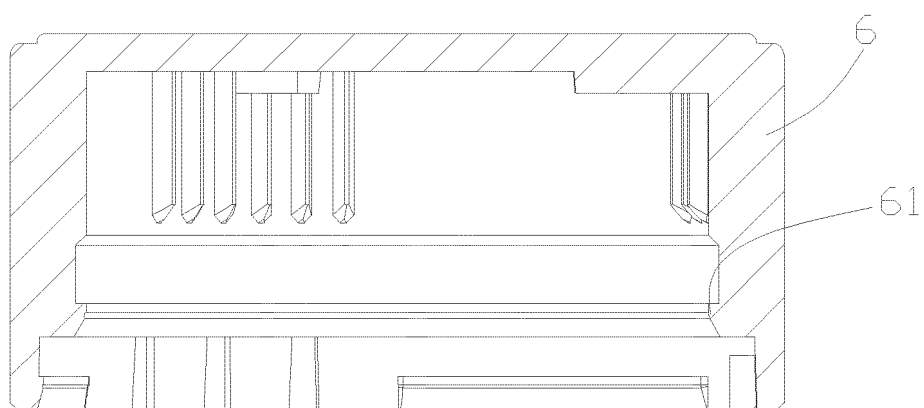


FIG.11

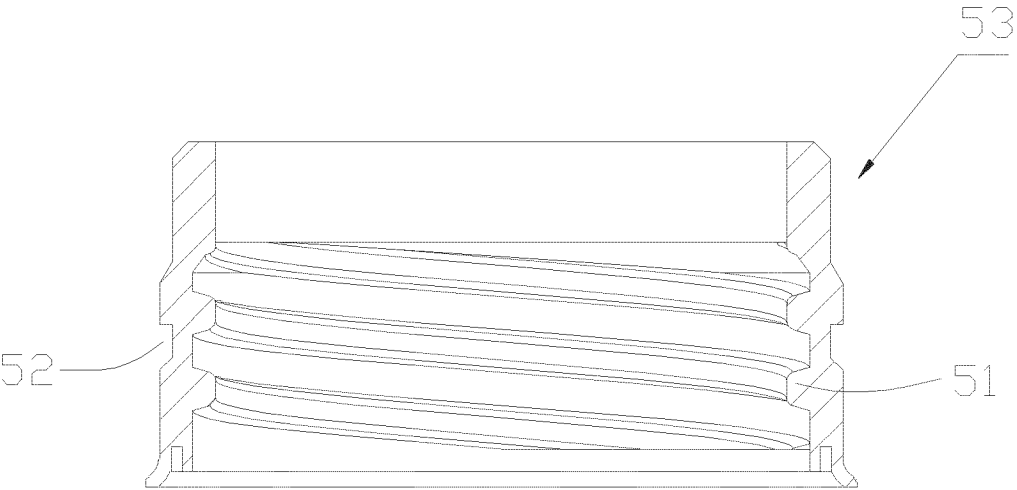


FIG.12

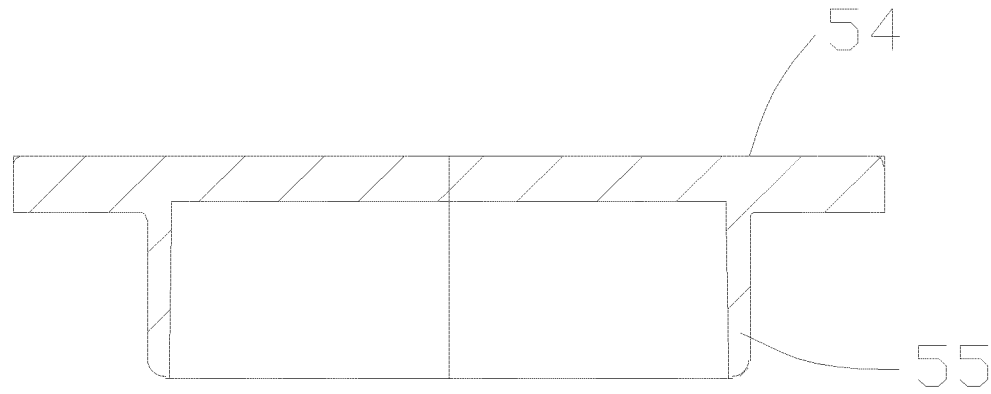


FIG.13

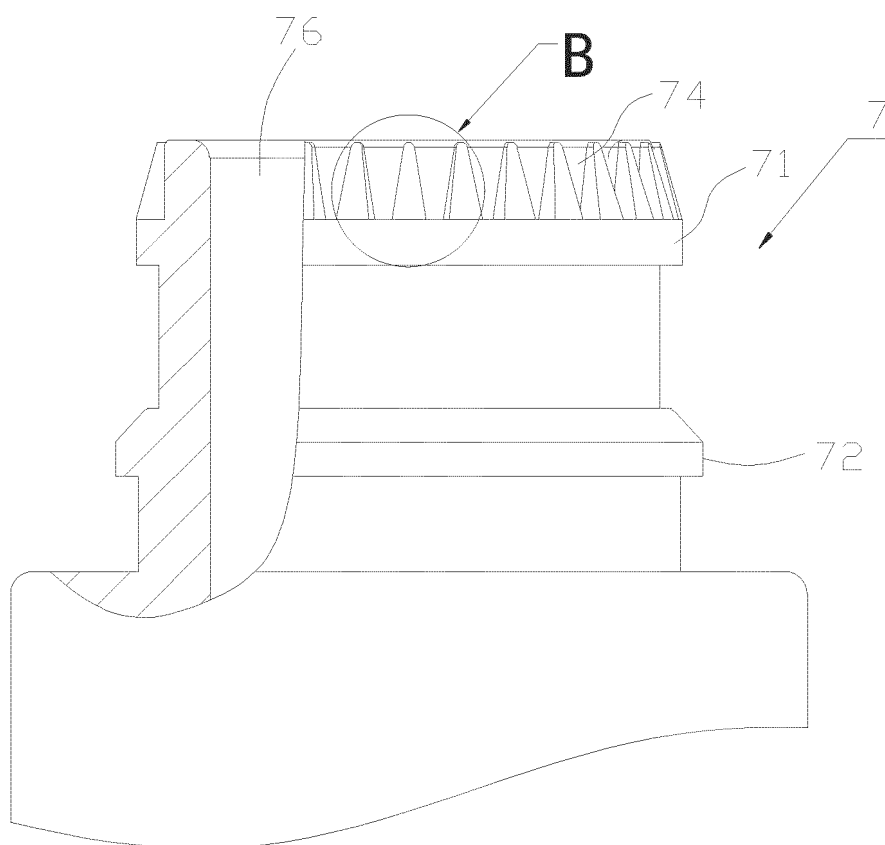


FIG.14

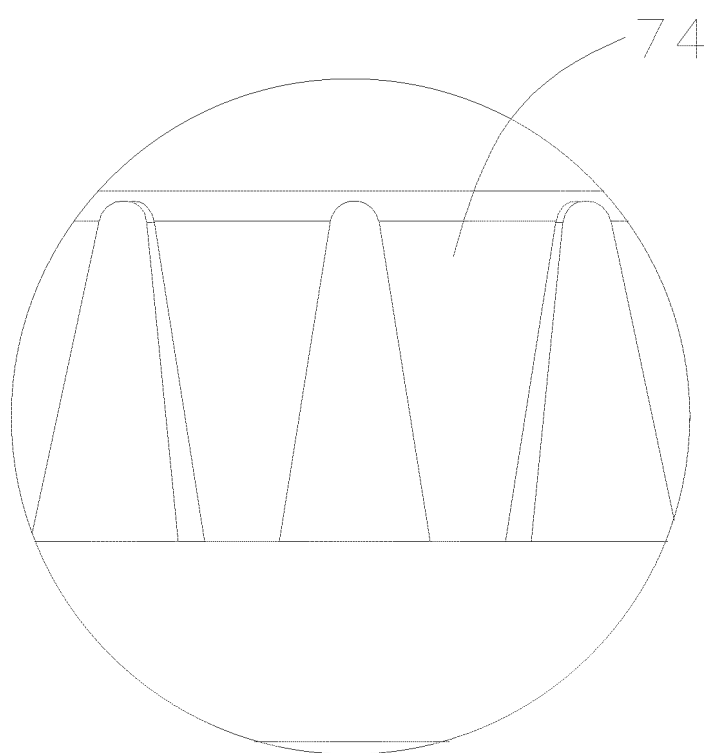


FIG.15

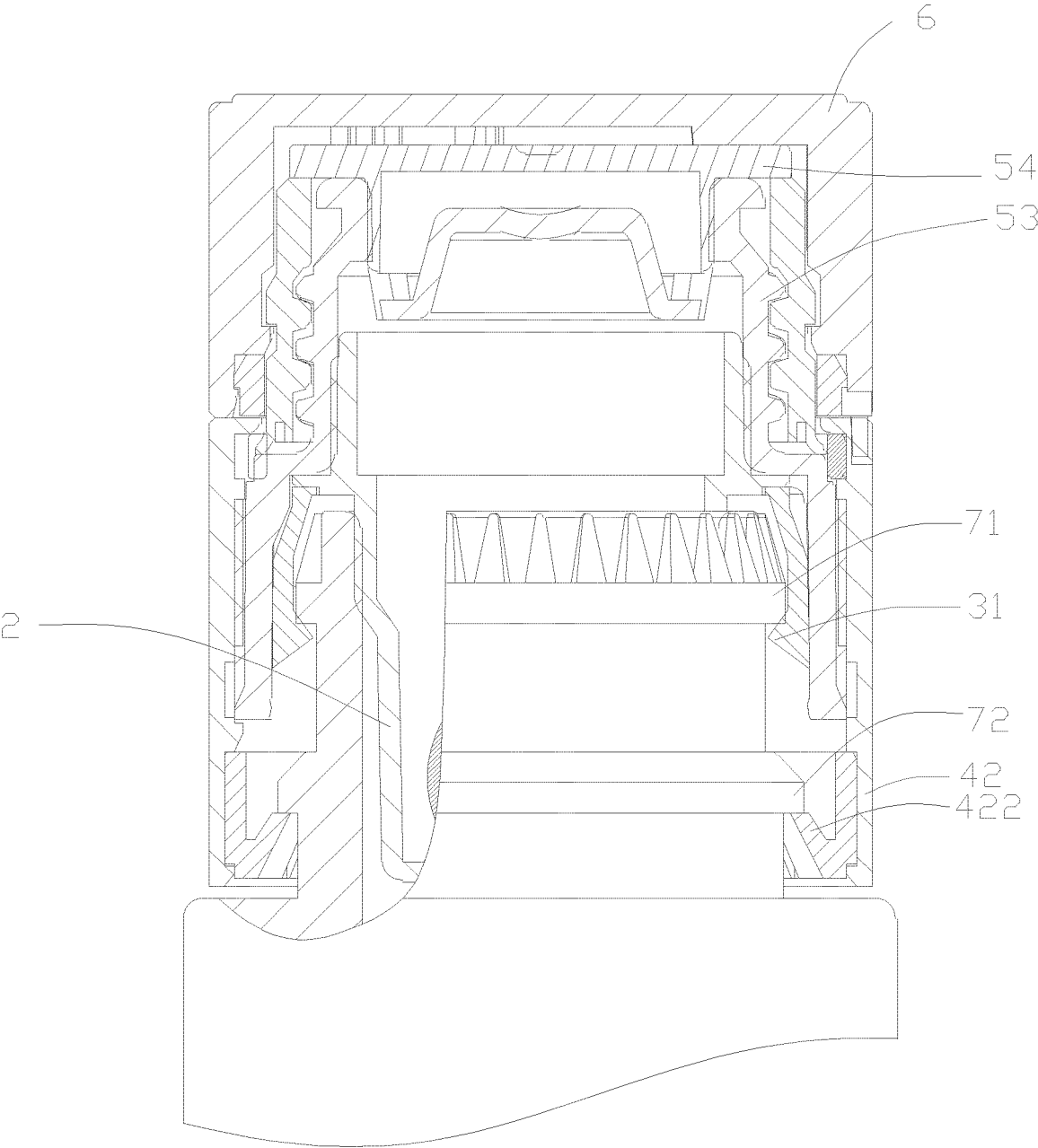


FIG.16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/081586

A. CLASSIFICATION OF SUBJECT MATTER

B65D1/02(2006.01)i; B65D41/28(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)

IPC: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)

CNTXT, WPABSC, ENTXTC, ENTXT, VEN, CJFD, CNKI: 防伪, 加热, 篡改, 盖, 卡, tamper, false, heat+, cover?, lid?, cap?, clamp+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220448372 U (CHINESE-FOREIGN VENTURE DRAGON AND LION CAP CO., LTD.) 06 February 2024 (2024-02-06) claims 1-15	1-15
A	CN 218432690 U (CHINESE-FOREIGN VENTURE DRAGON AND LION CAP CO., LTD.) 03 February 2023 (2023-02-03) description, paragraphs 3-44, and figures 1-14	1-15
A	CN 218432689 U (CHINESE-FOREIGN VENTURE DRAGON AND LION CAP CO., LTD.) 03 February 2023 (2023-02-03) entire document	1-15
A	US 2004020943 A1 (YOSHINO KOGYOSHO CO., LTD.) 05 February 2004 (2004-02-05) entire document	1-15

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

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

Date of the actual completion of the international search 31 May 2024	Date of mailing of the international search report 16 June 2024
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/ CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2024/081586

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