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(54) **LIQUID PRODUCT CONTAINER AND EXTENDING DRAWING UNIT OF LIQUID PRODUCT CONTAINER**

(71) Applicant: **MOTEDO CO., LTD.**, Taipei (TW)

(72) Inventor: **Han-Liang CHEN**, Taipei (TW)

(73) Assignee: **MOTEDO CO., LTD.**, Taipei (TW)

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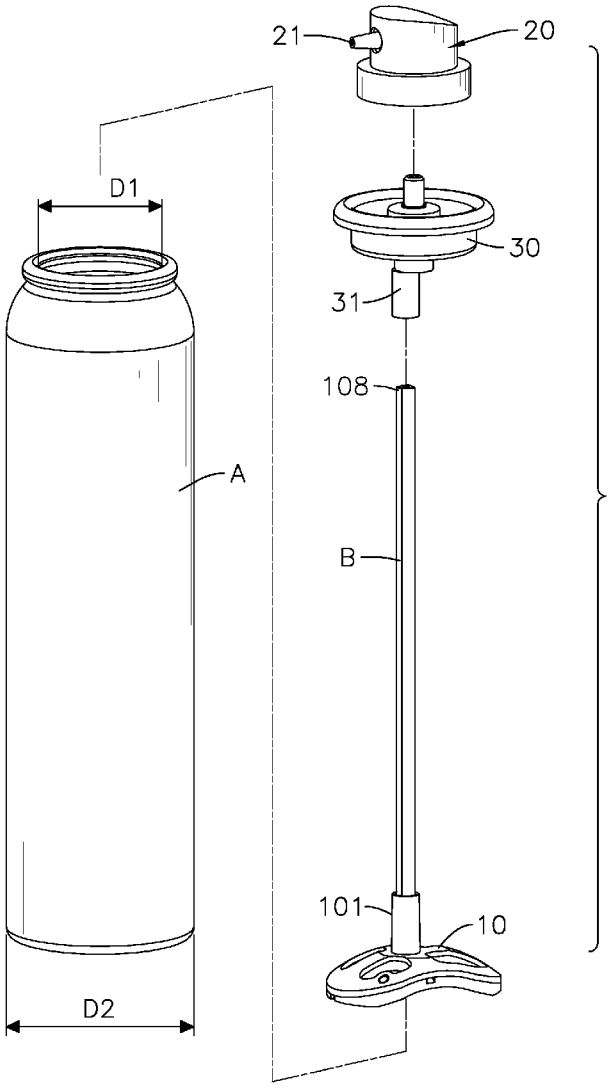
(57) **ABSTRACT**

A liquid product container has a container body, a valve, a liquid dip tube, and an extending drawing unit. The valve is sealed on the installing opening of the container body. The liquid dip tube is mounted on the valve. The extending drawing unit has a main body. The main body is mounted in the container body and extend to a bottom edge of the container body. The main body has multiple extending liquid drawing passages extending along a radial direction of the container body and respectively form multiple extending liquid drawing openings. The extending liquid drawing openings are located in the bottom edge of the container body. The main body has a connecting port segment connected to the extending liquid drawing passages and connected to the liquid dip tube, such that the liquid dip tube is connected to the extending liquid drawing openings.



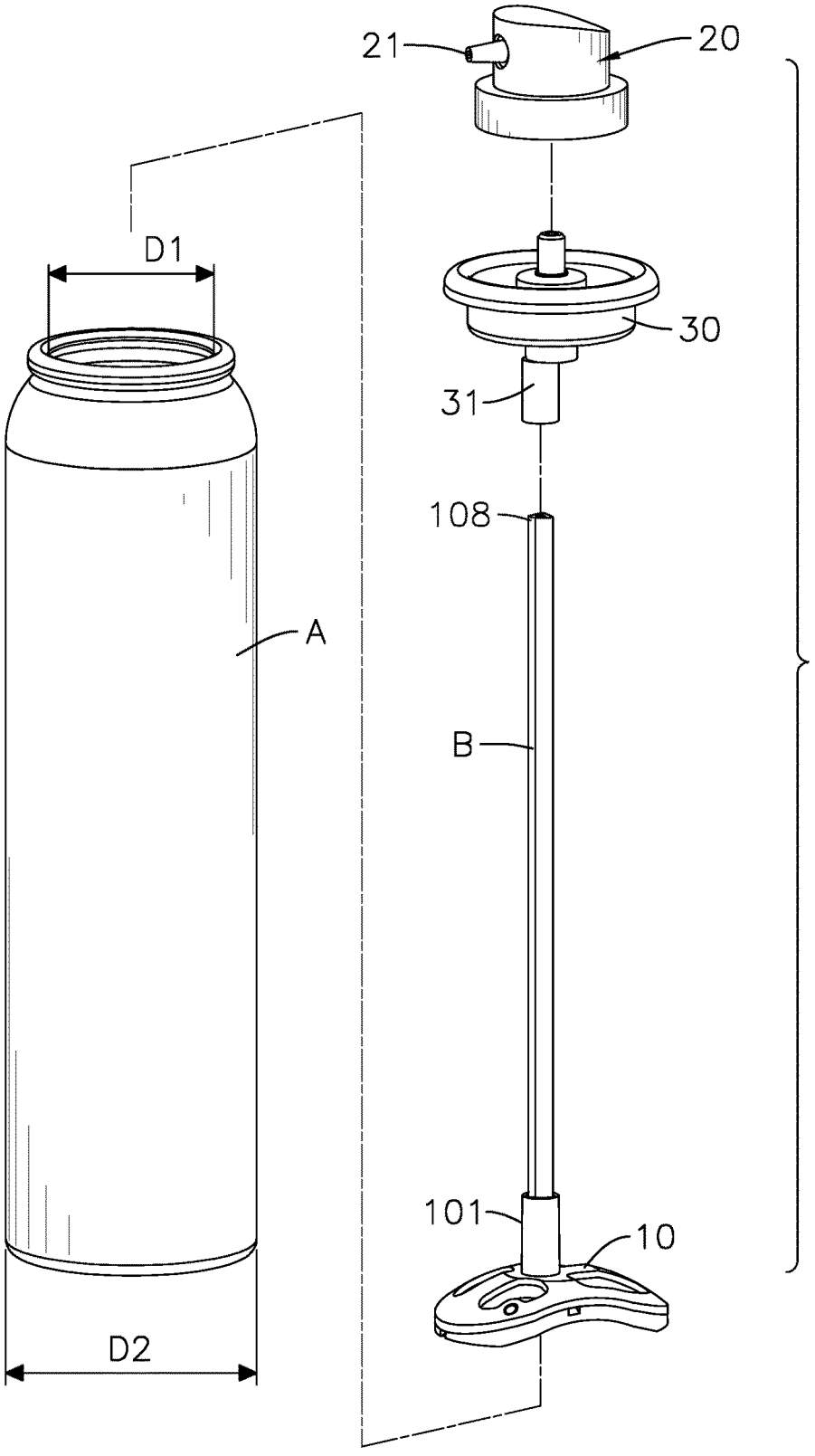


FIG. 1

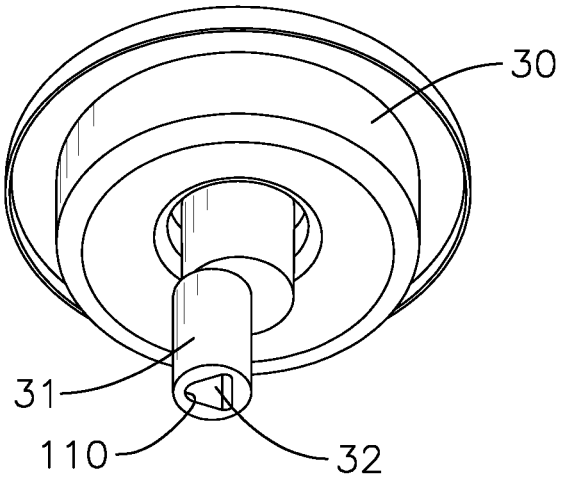


FIG. 2

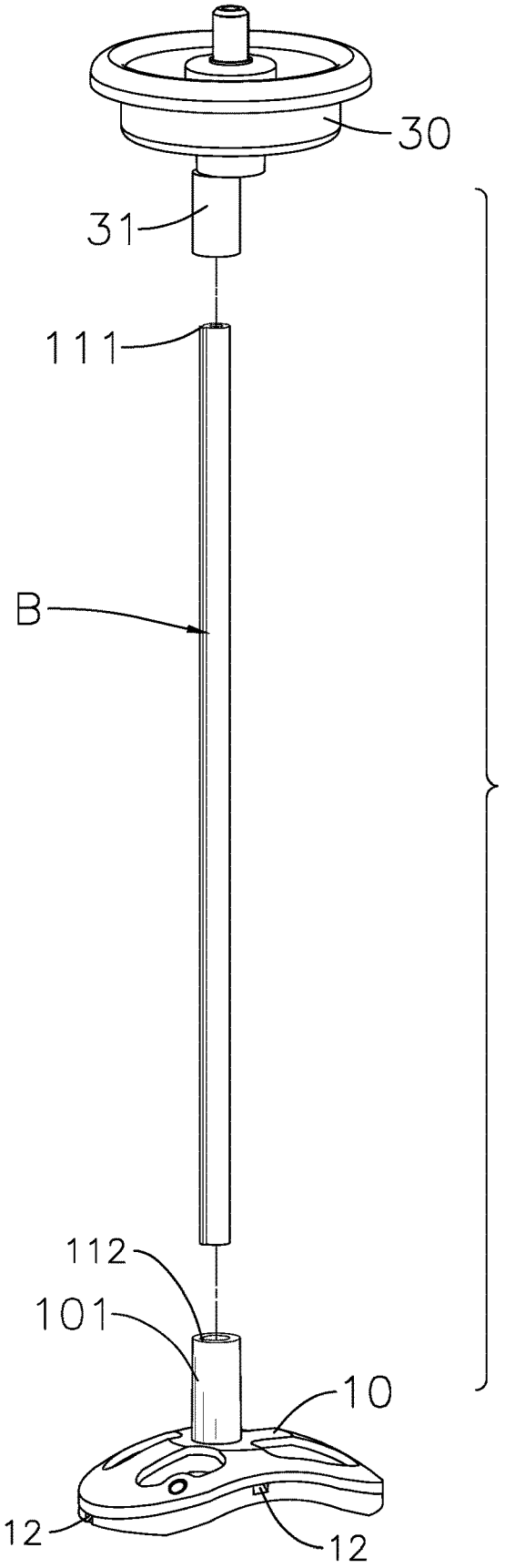


FIG. 3

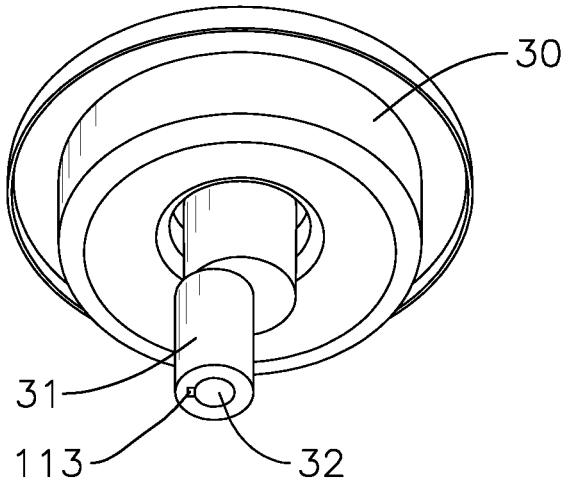


FIG.4

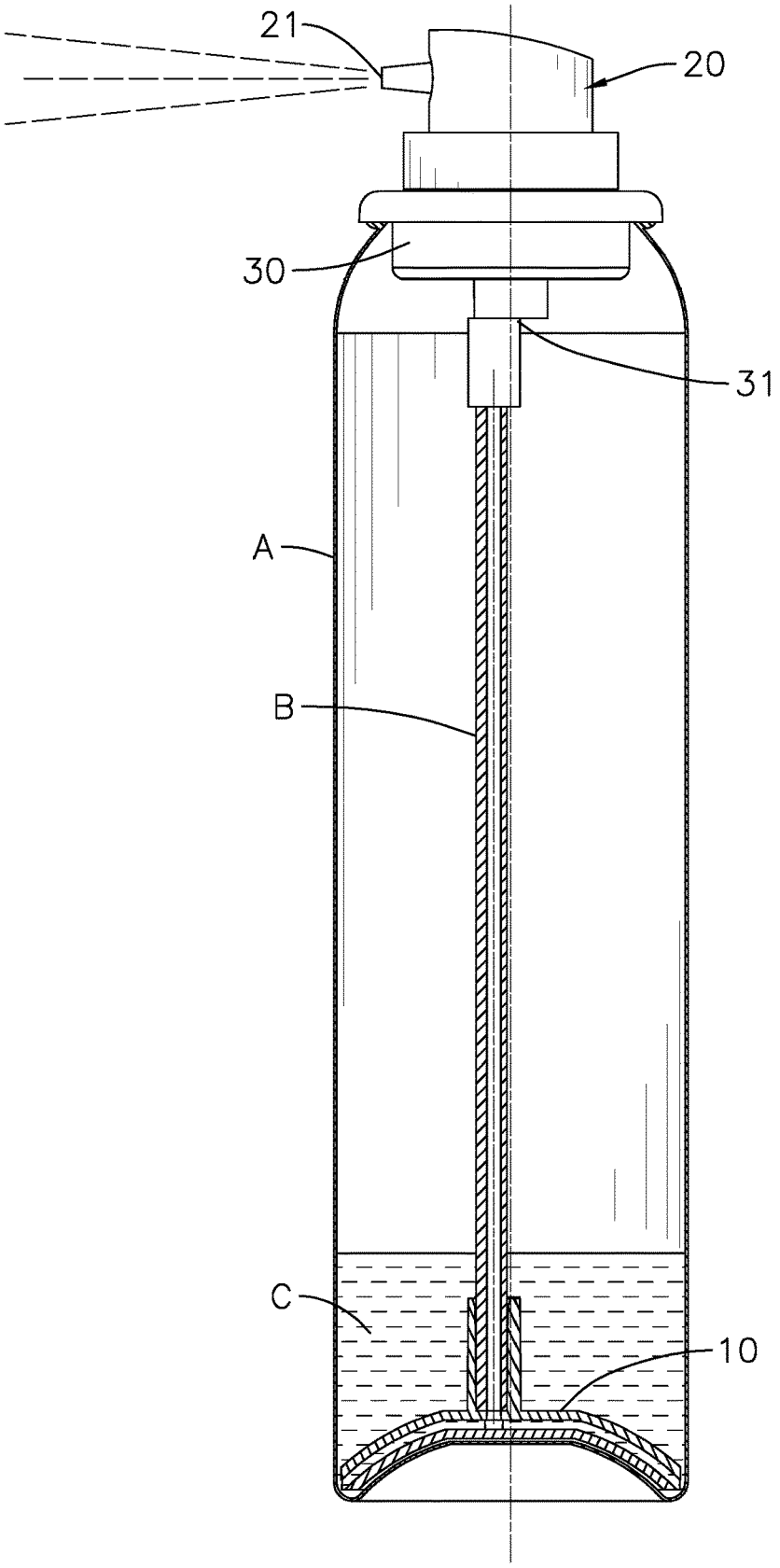


FIG. 5

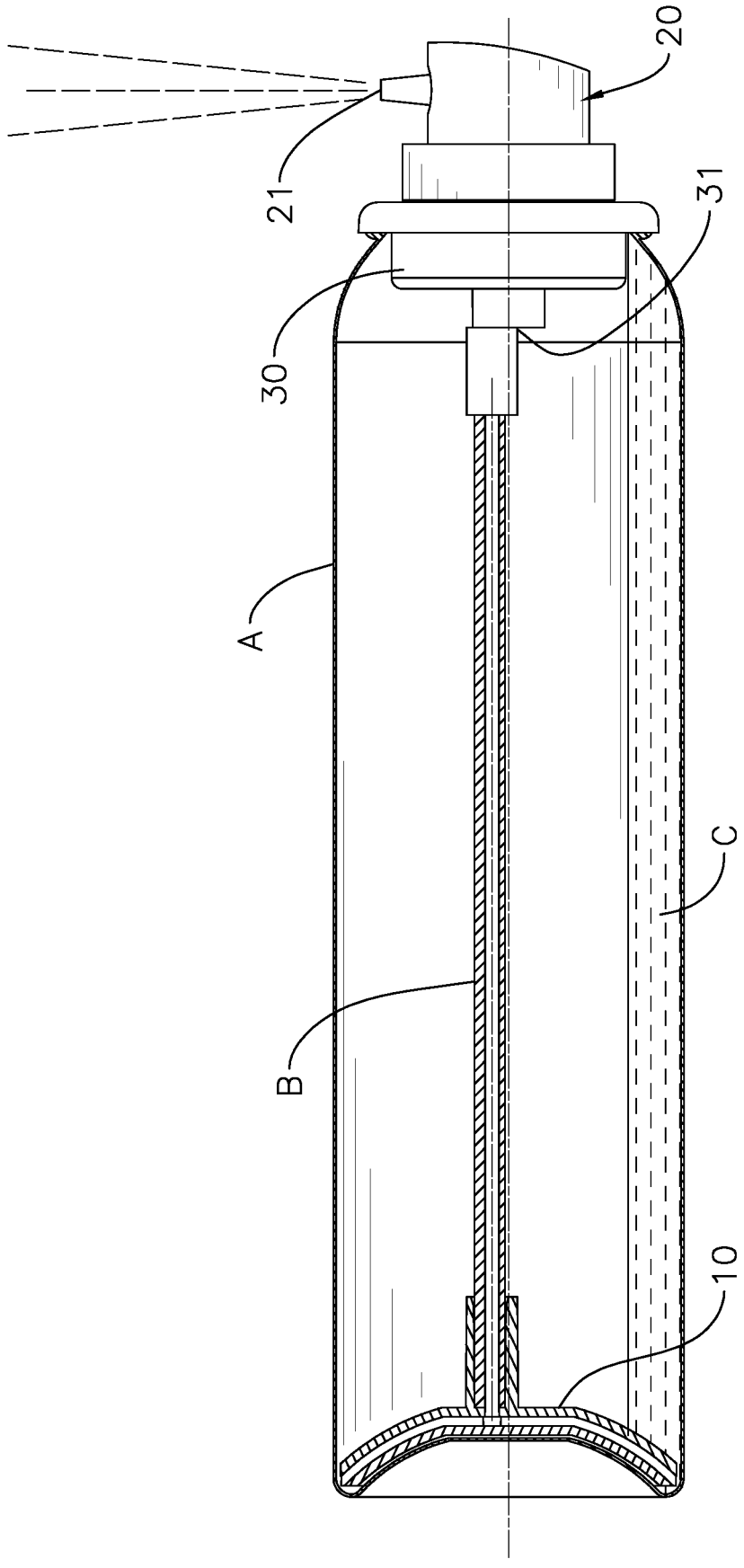


FIG.6

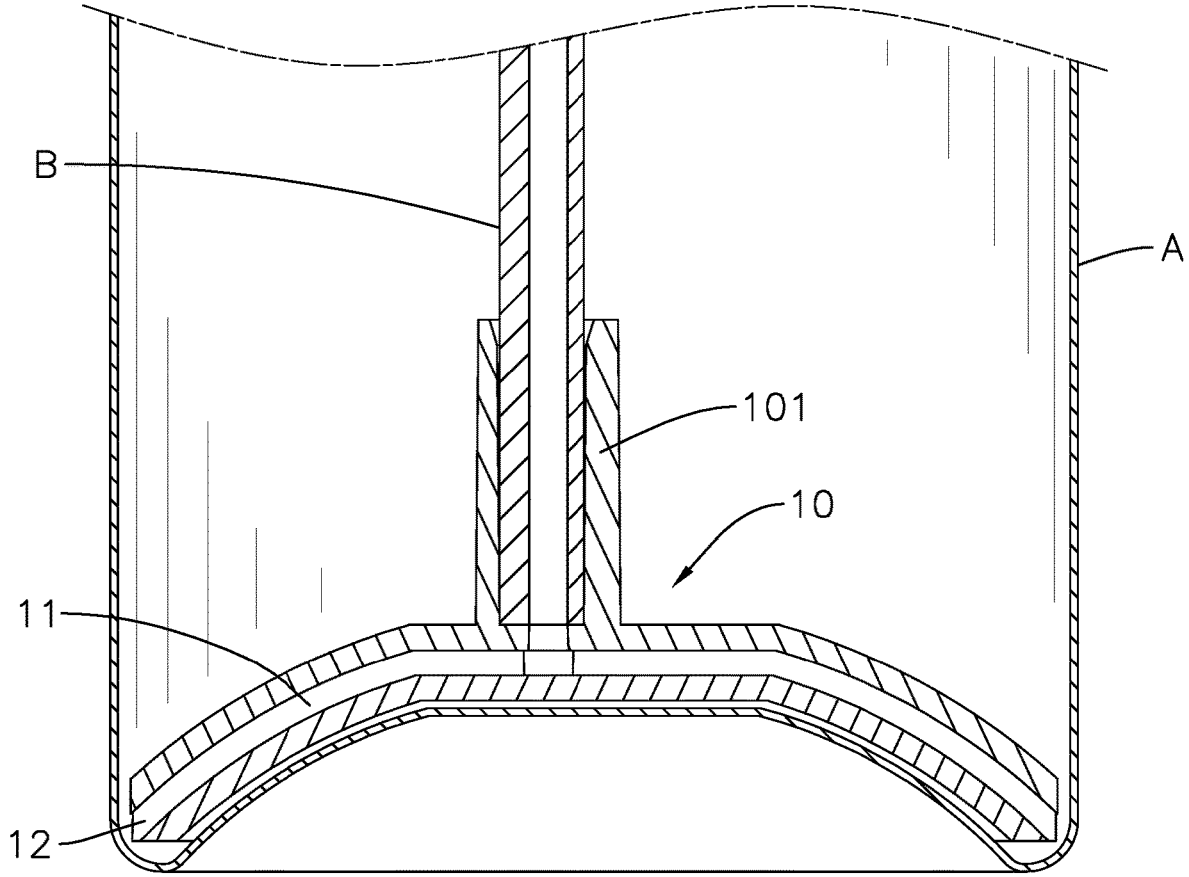


FIG. 7

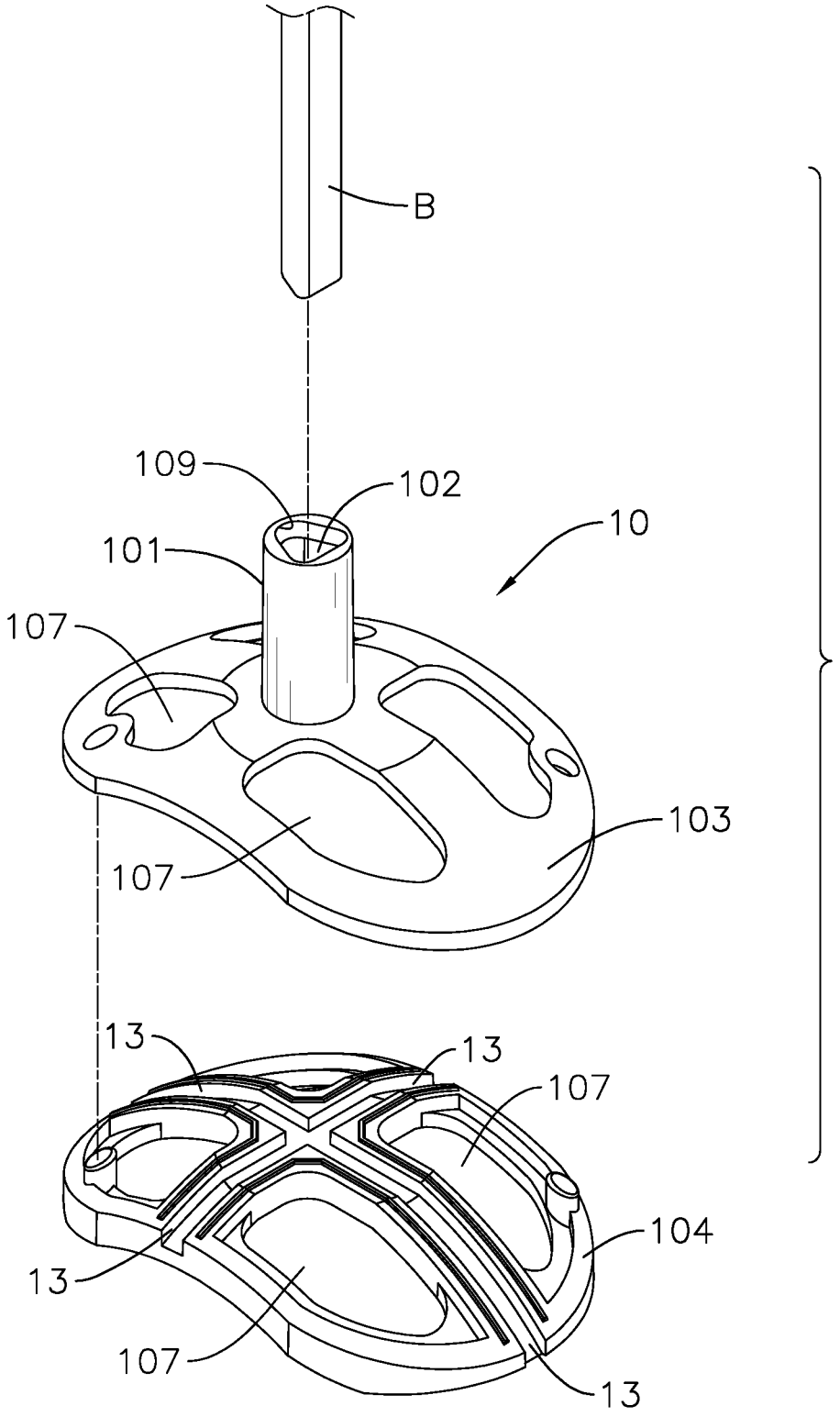


FIG. 8

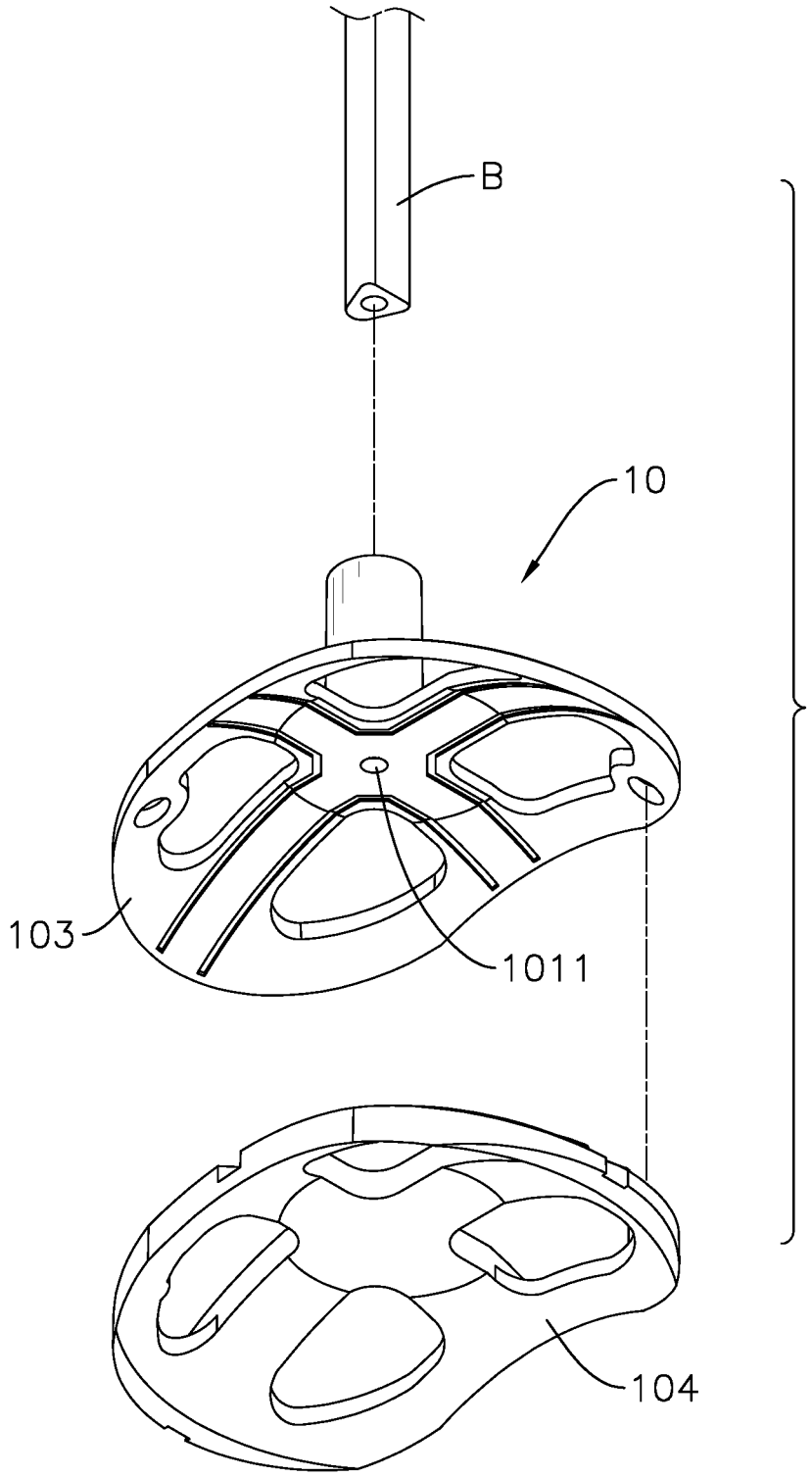


FIG. 9

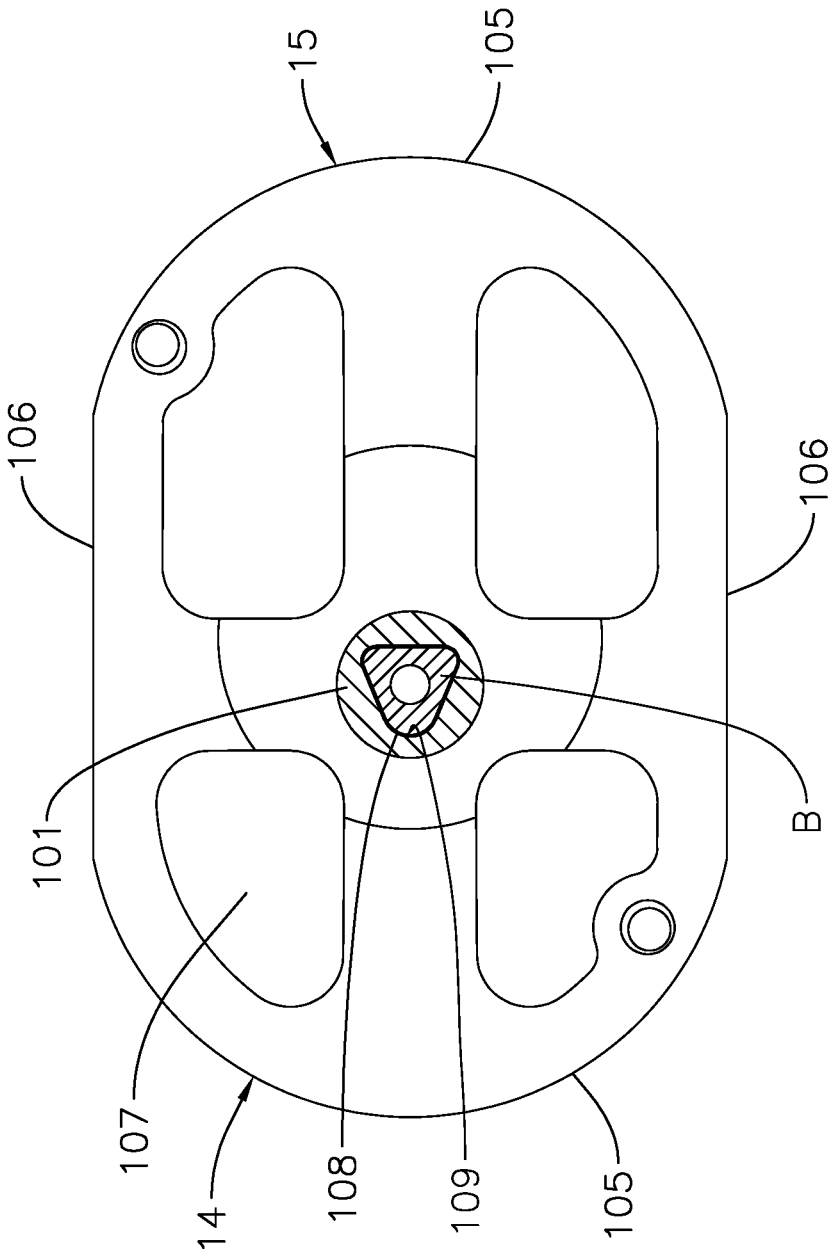


FIG. 10

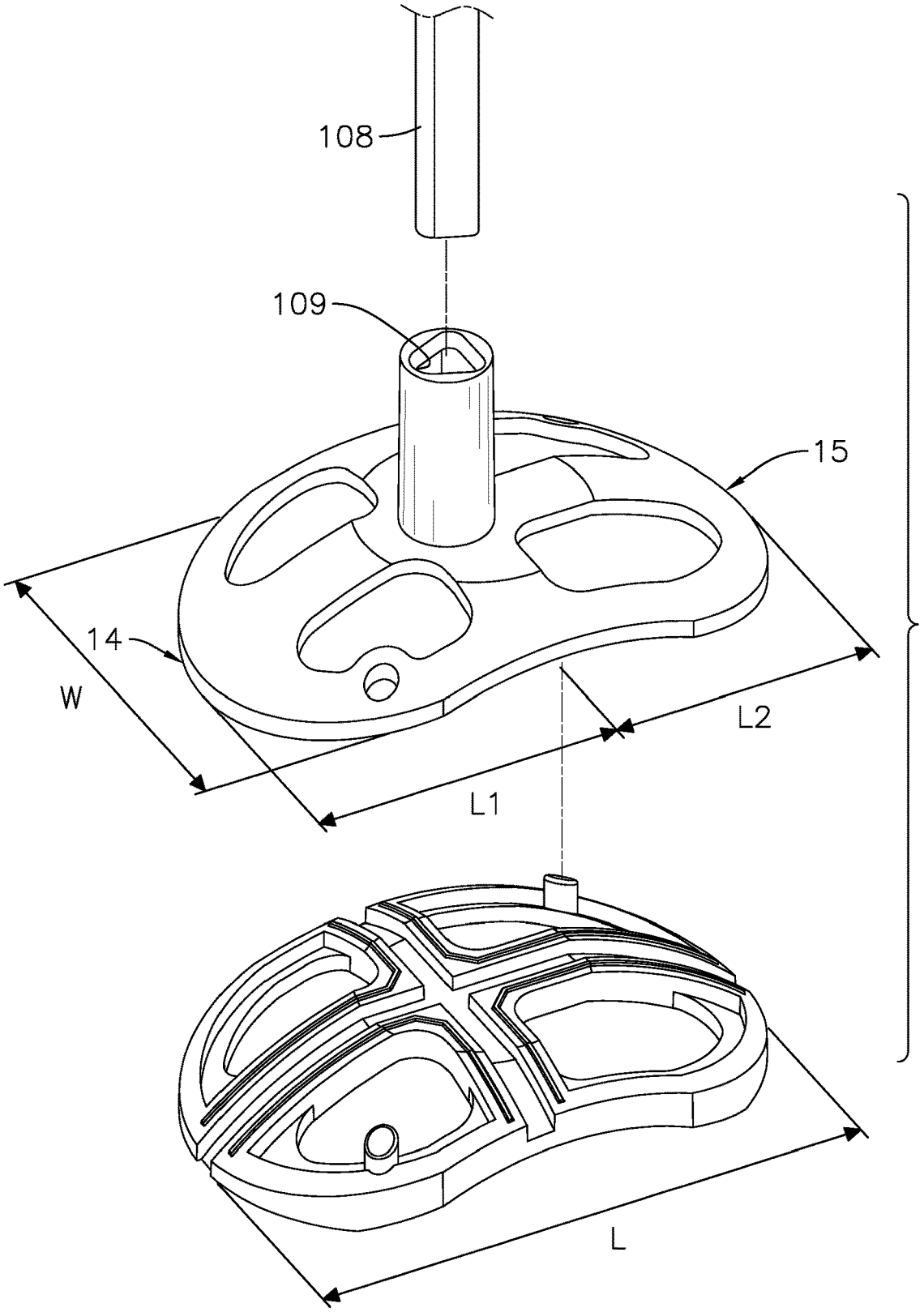


FIG. 11

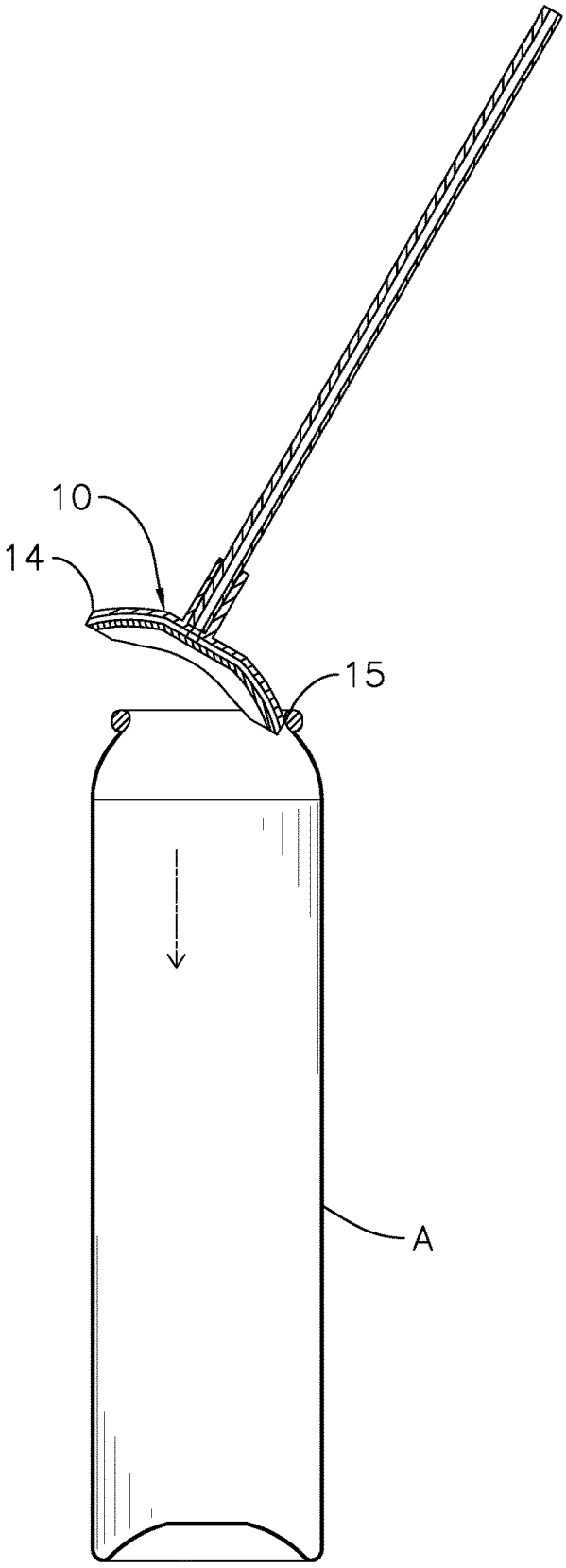


FIG. 12A

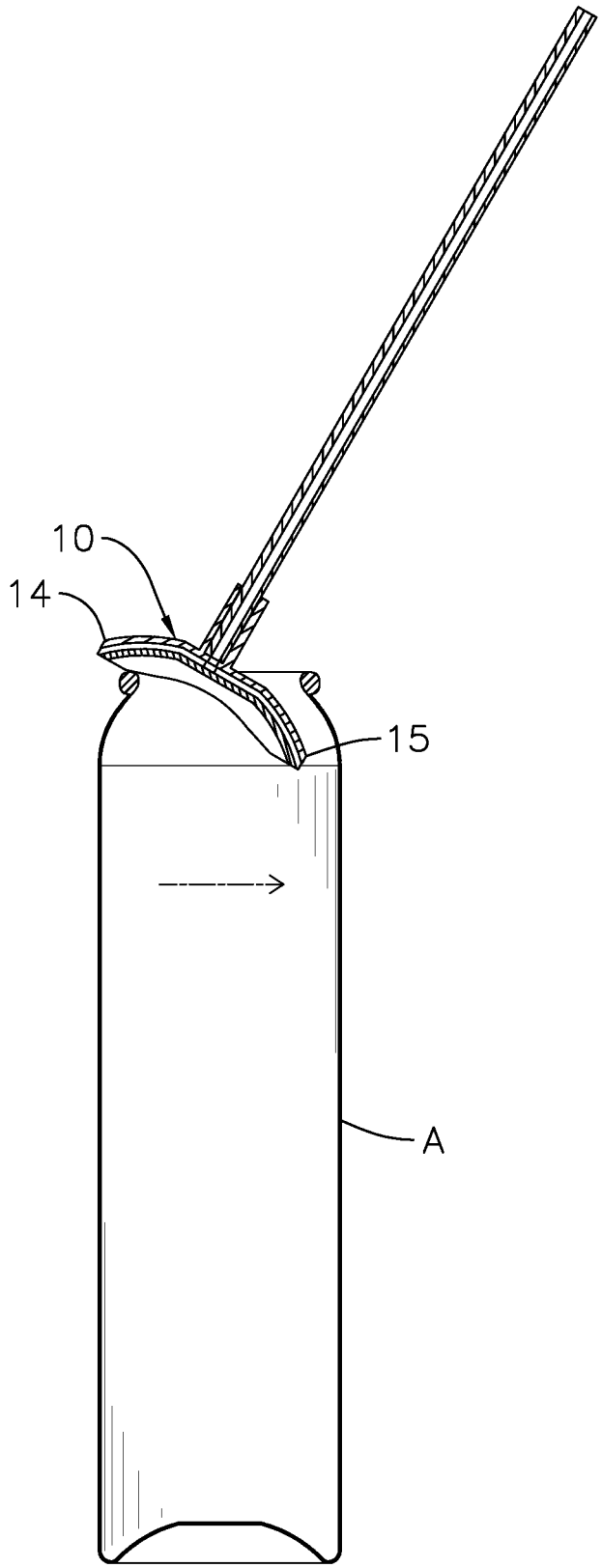


FIG. 12B

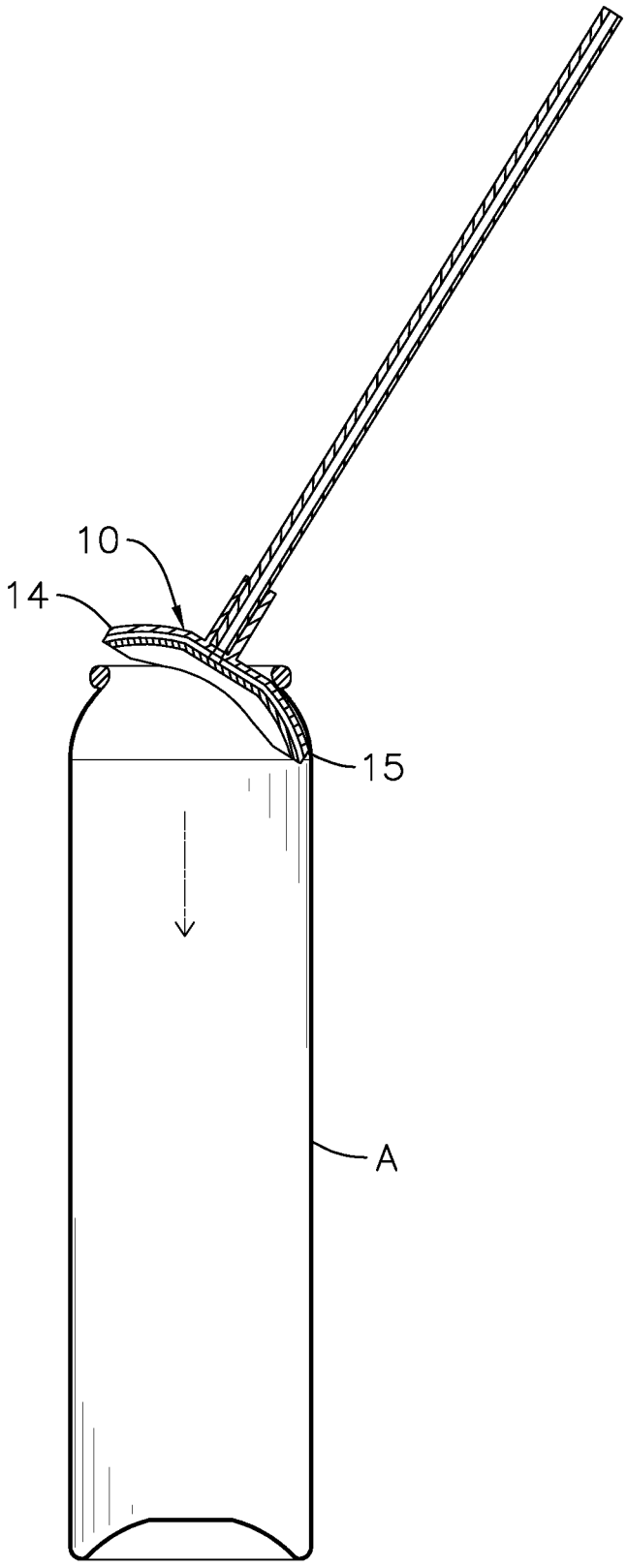


FIG. 12C

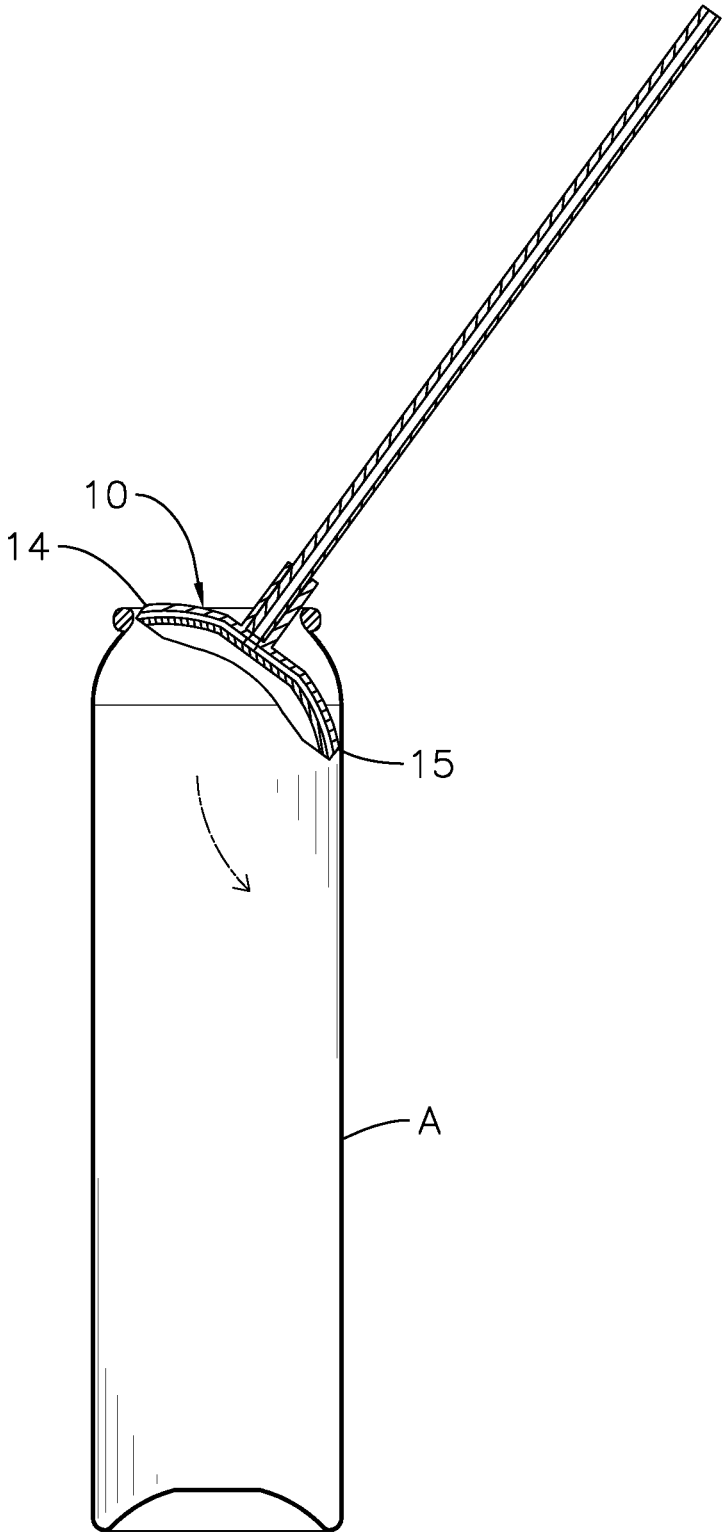


FIG. 12D

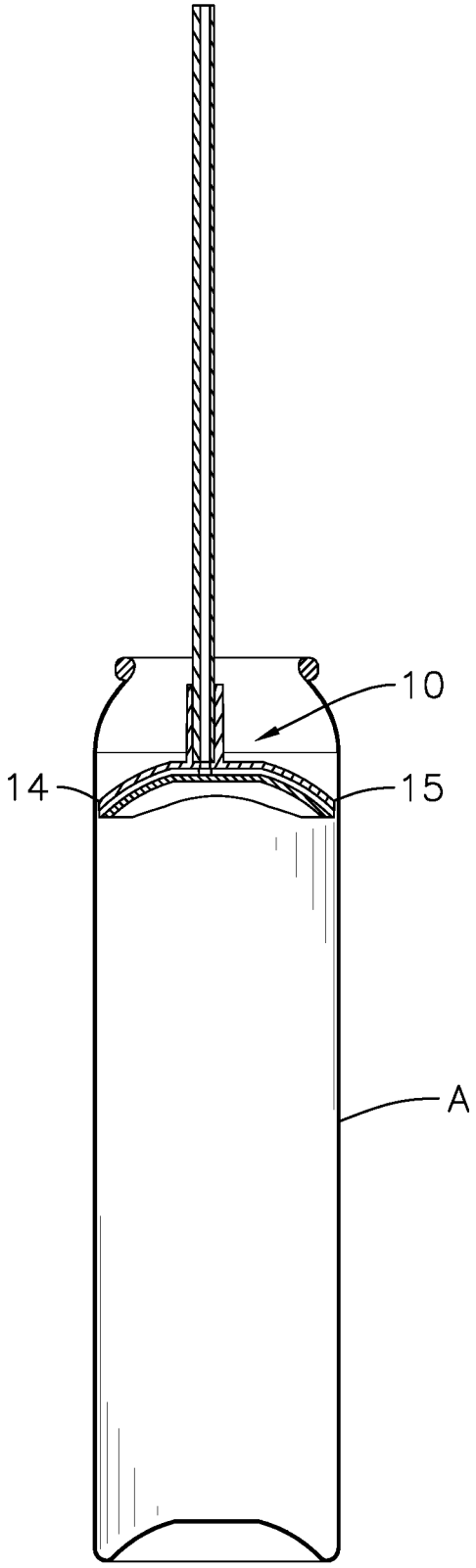


FIG. 12E

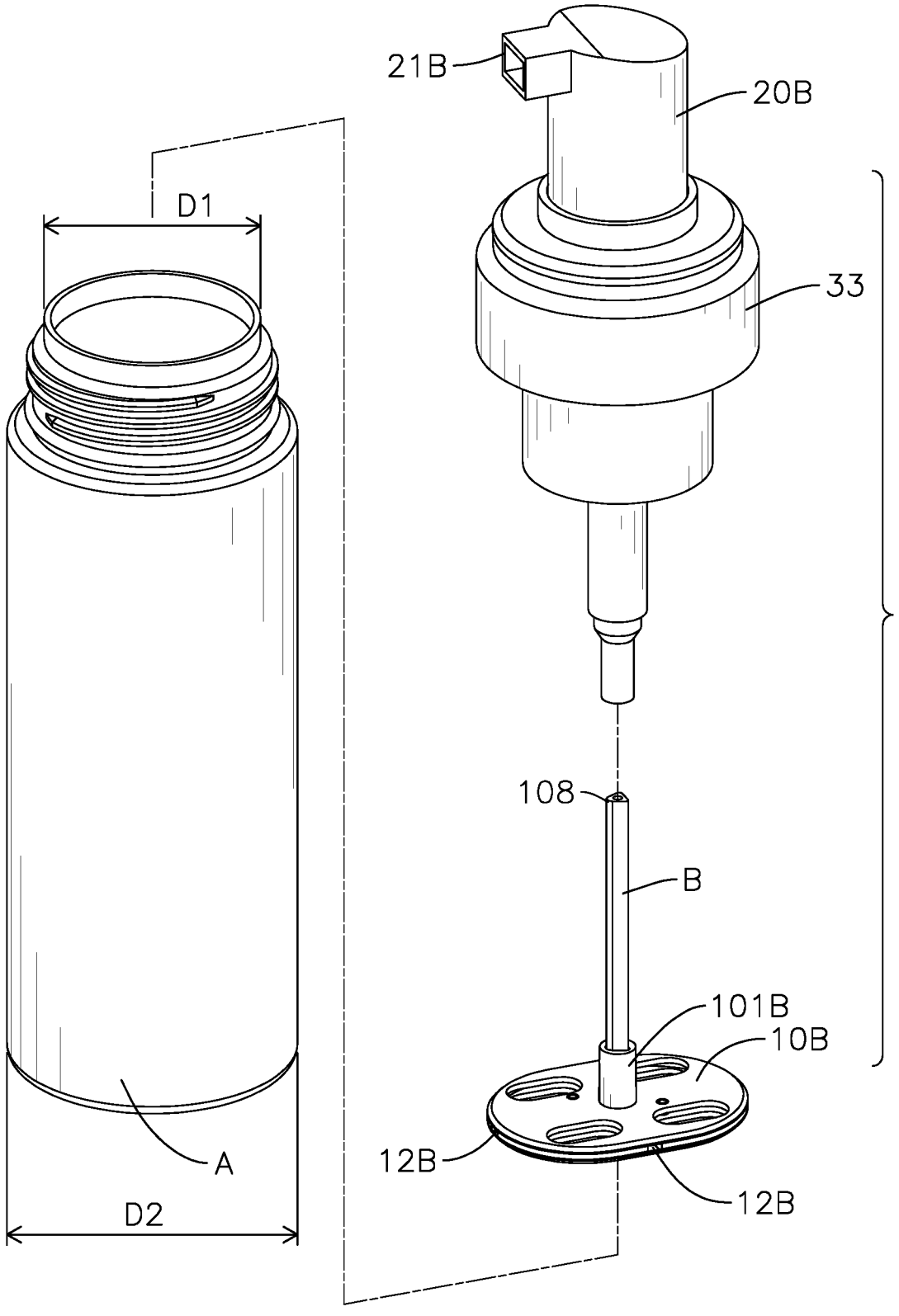


FIG. 13

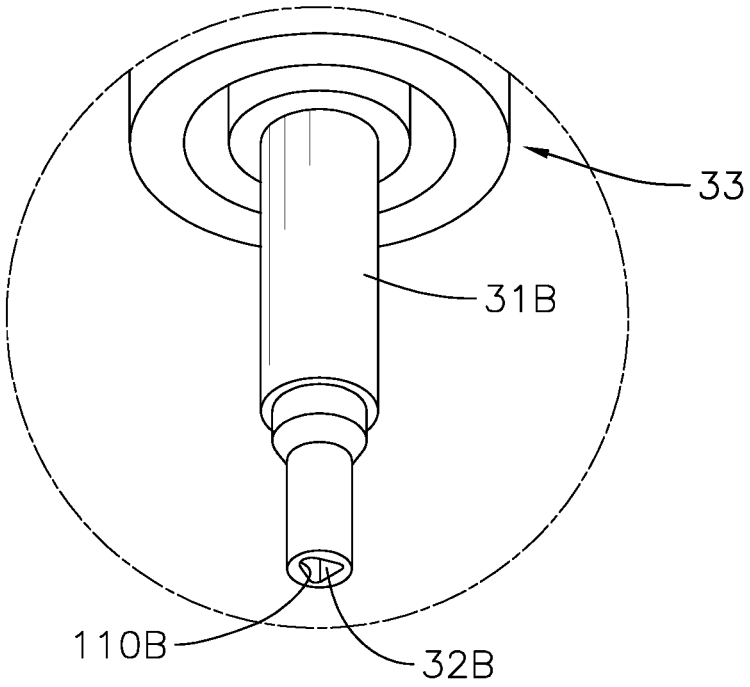


FIG. 14

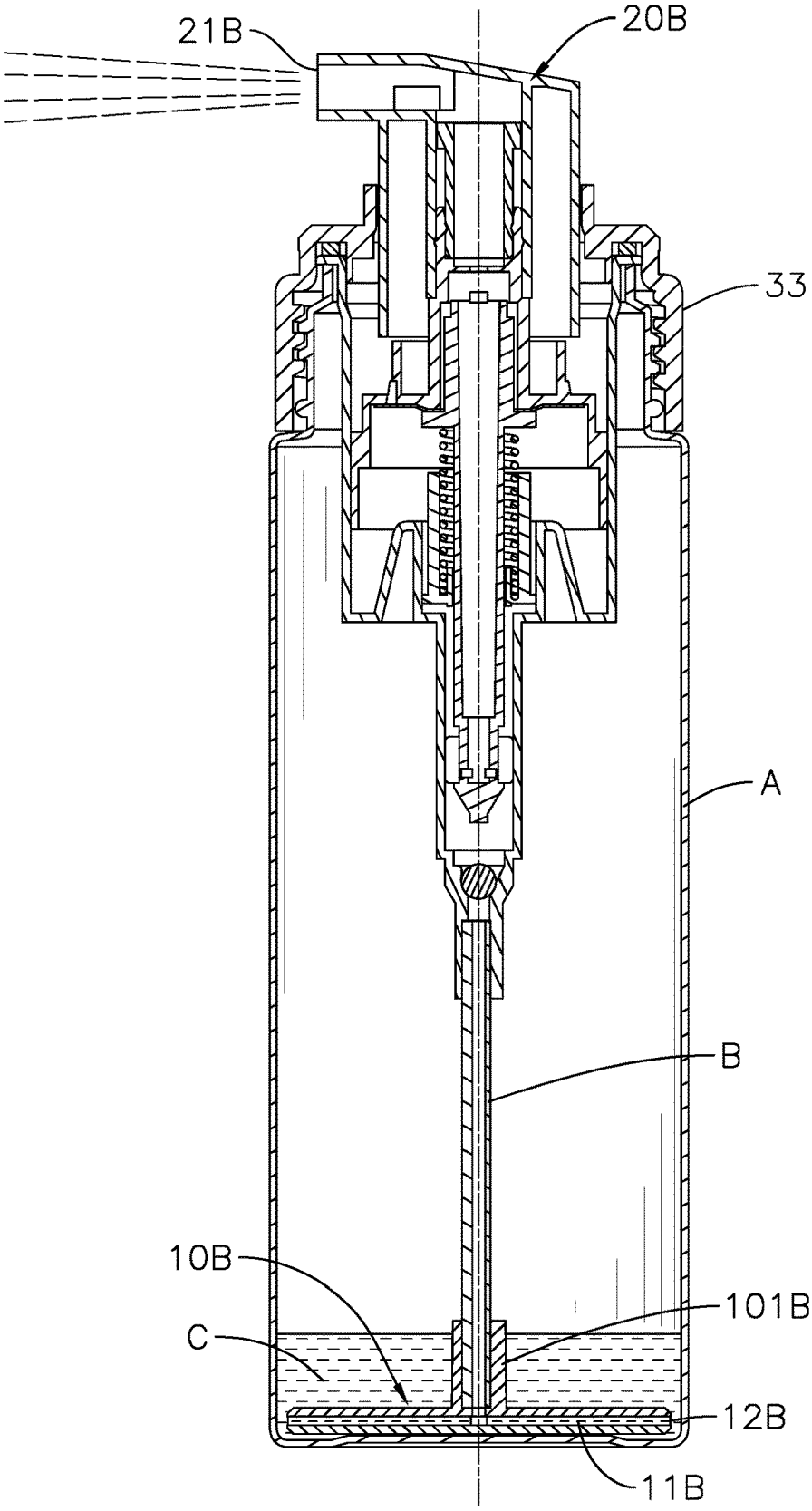


FIG. 15

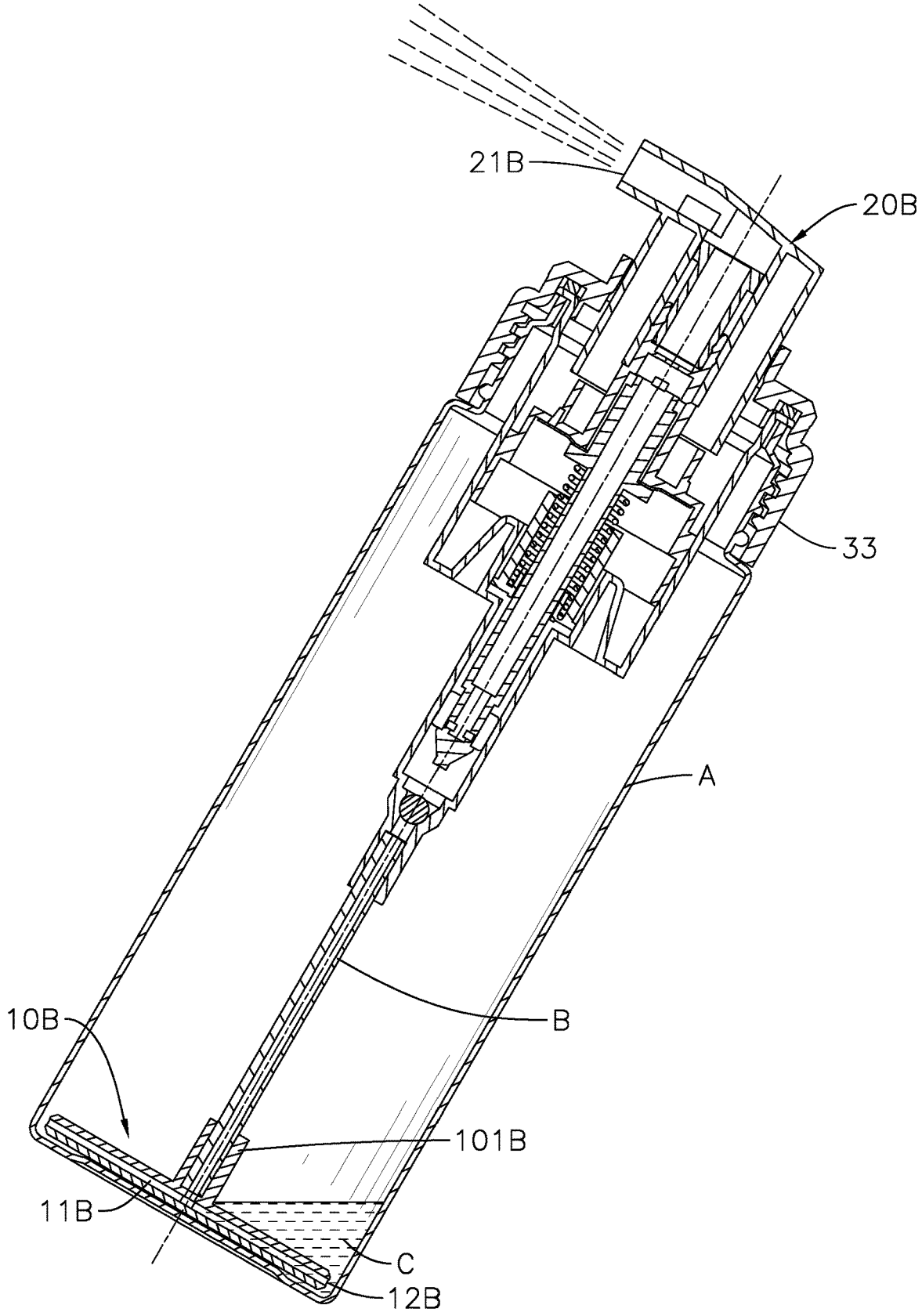


FIG. 16

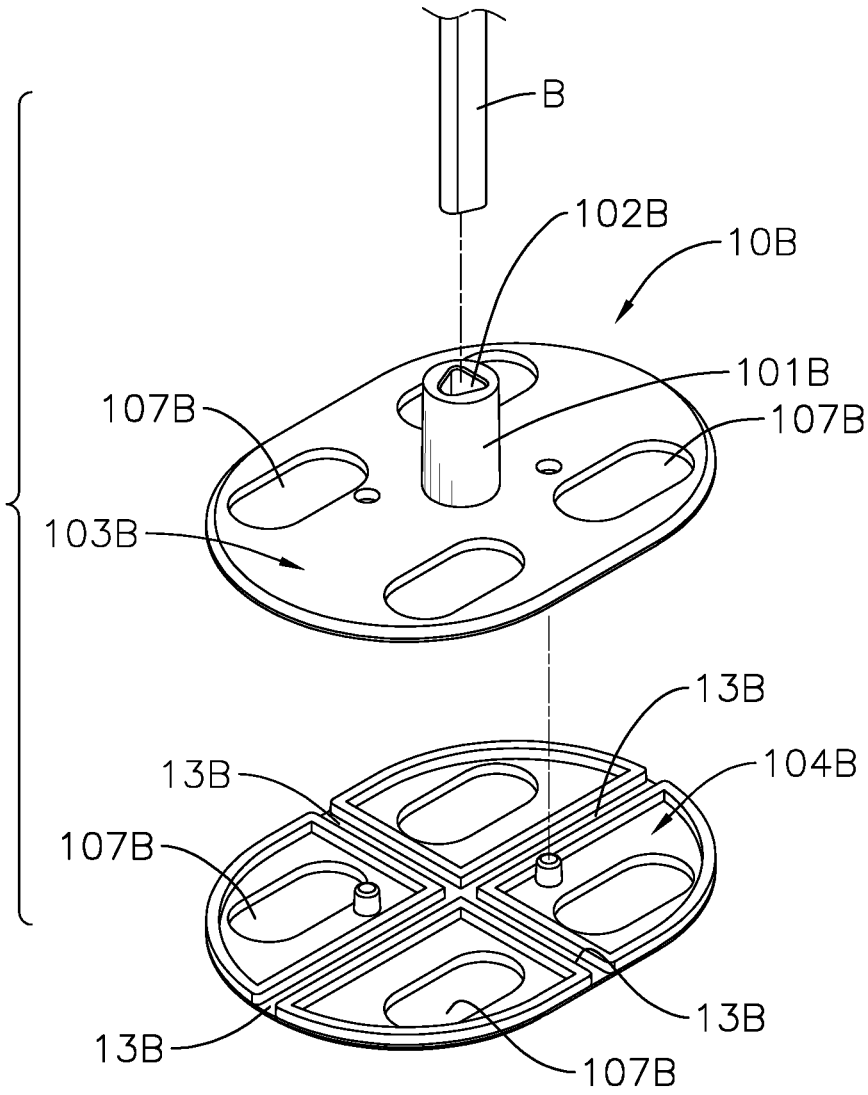


FIG. 17

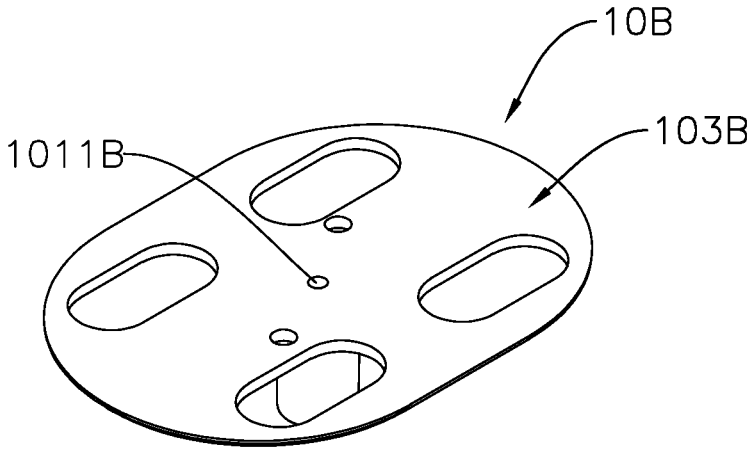


FIG. 18

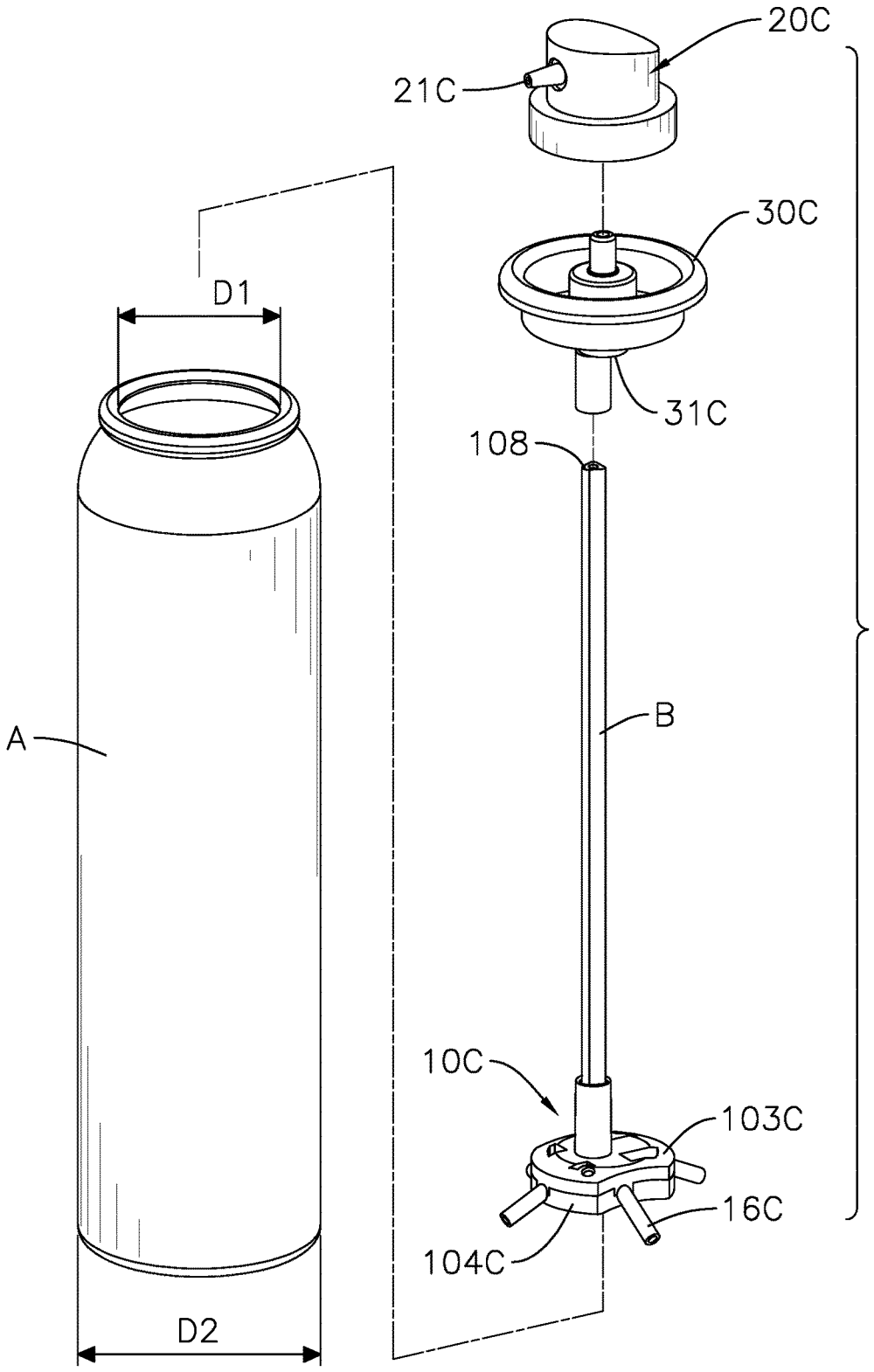


FIG. 19

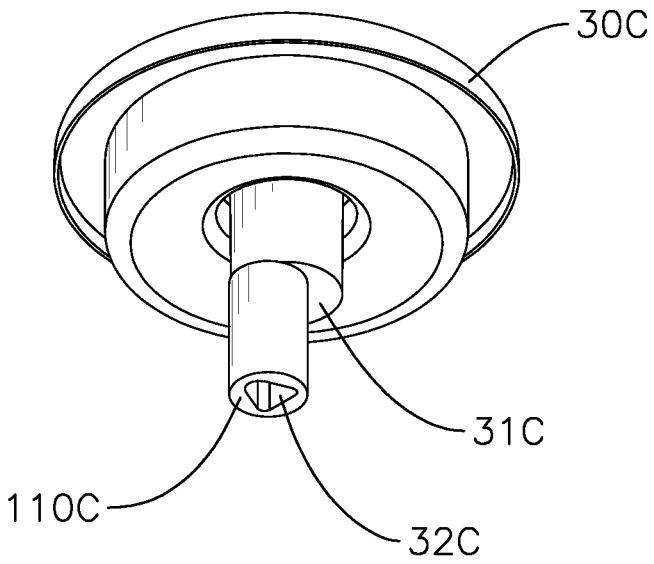


FIG. 20

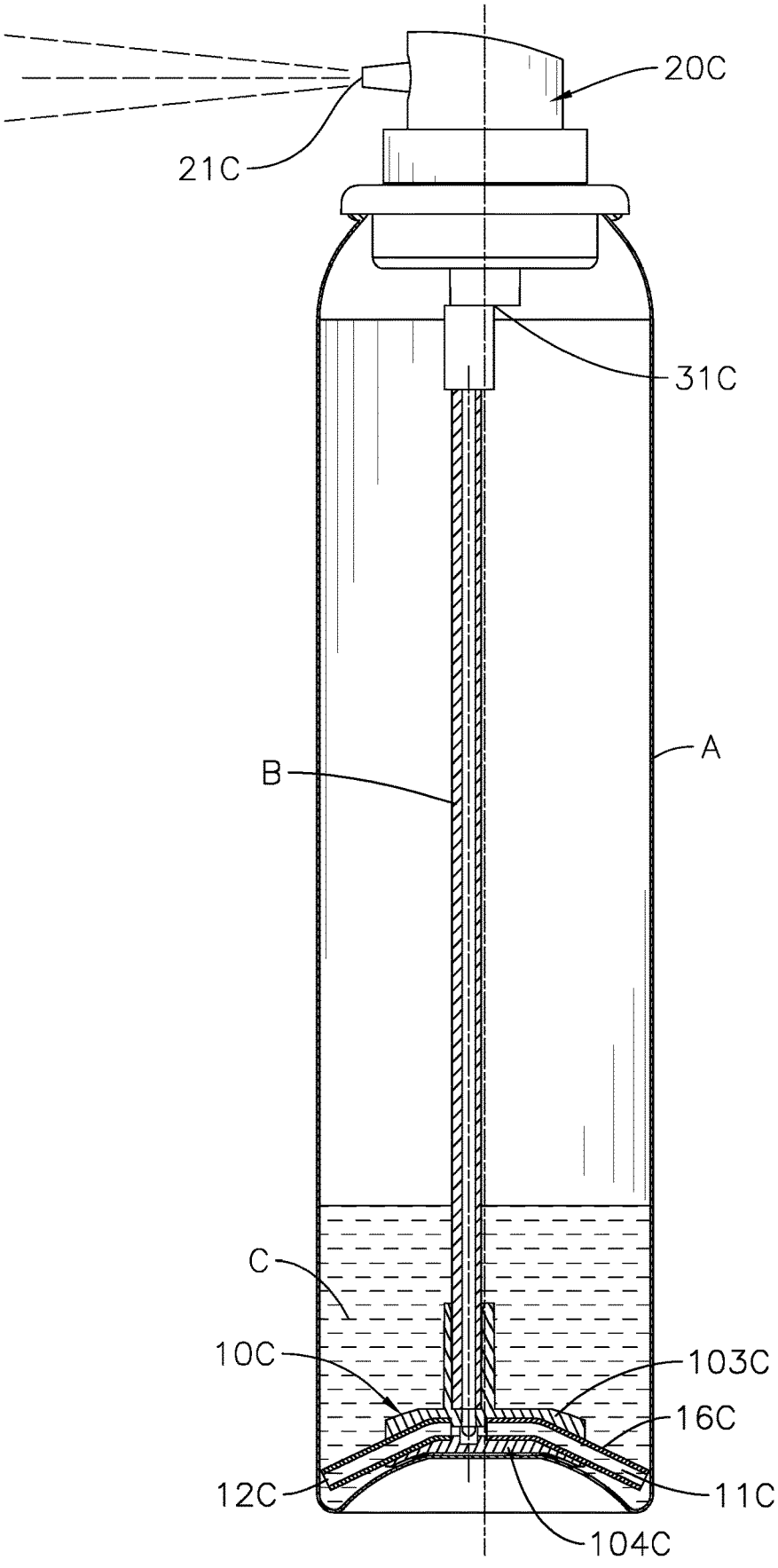


FIG. 21

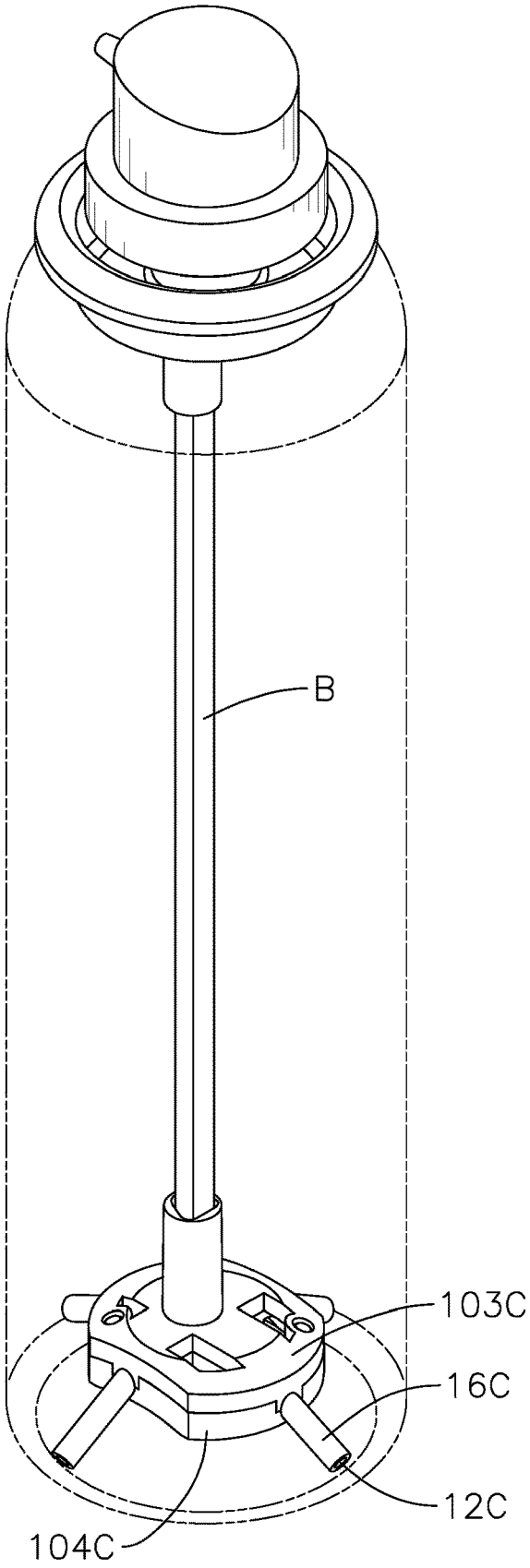


FIG. 22

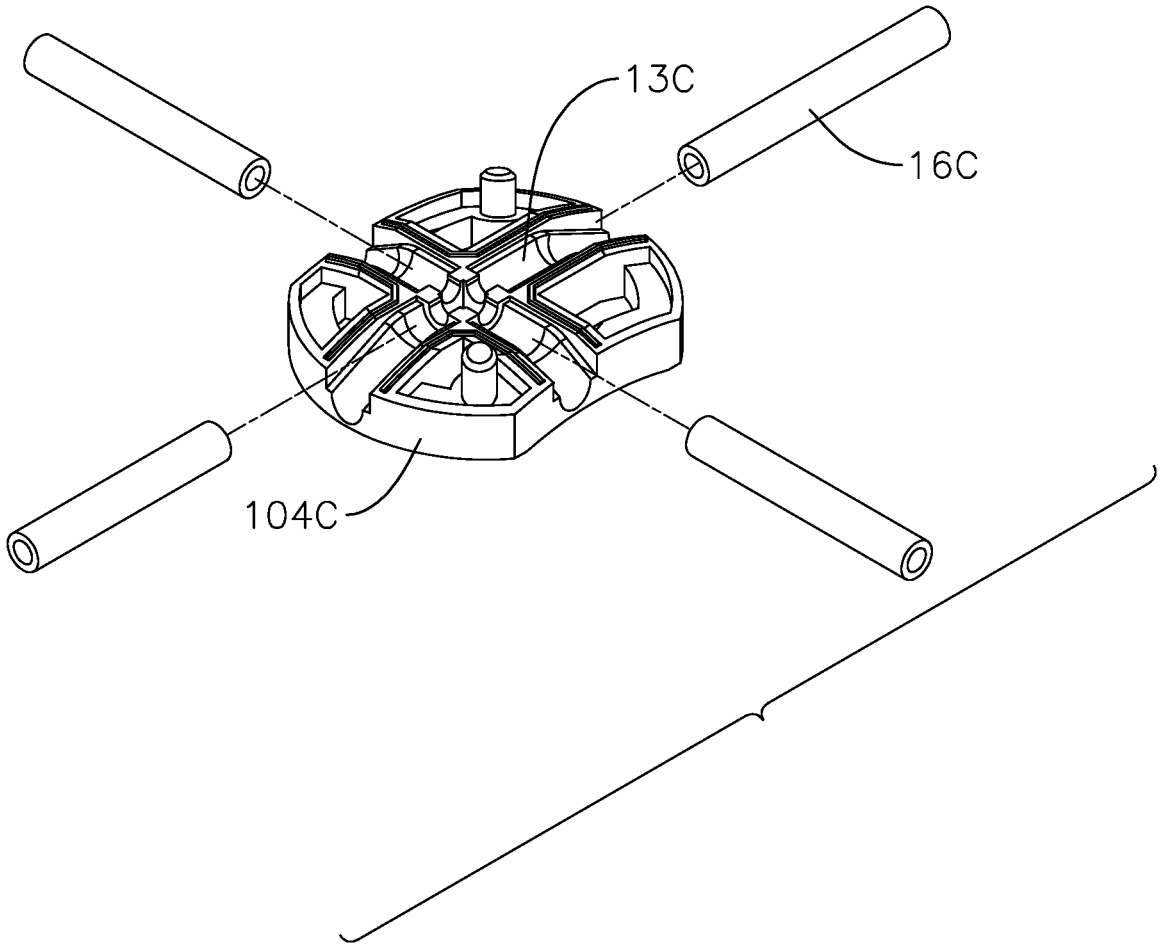


FIG. 23A

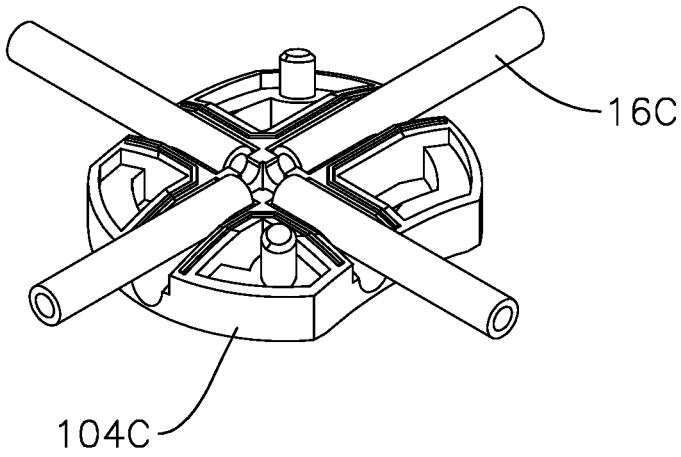


FIG. 23B

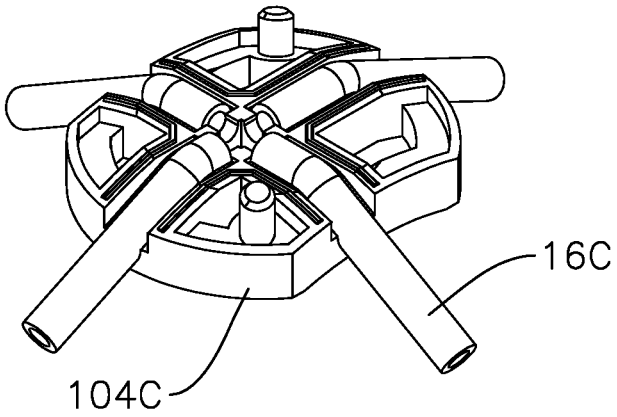


FIG. 23C

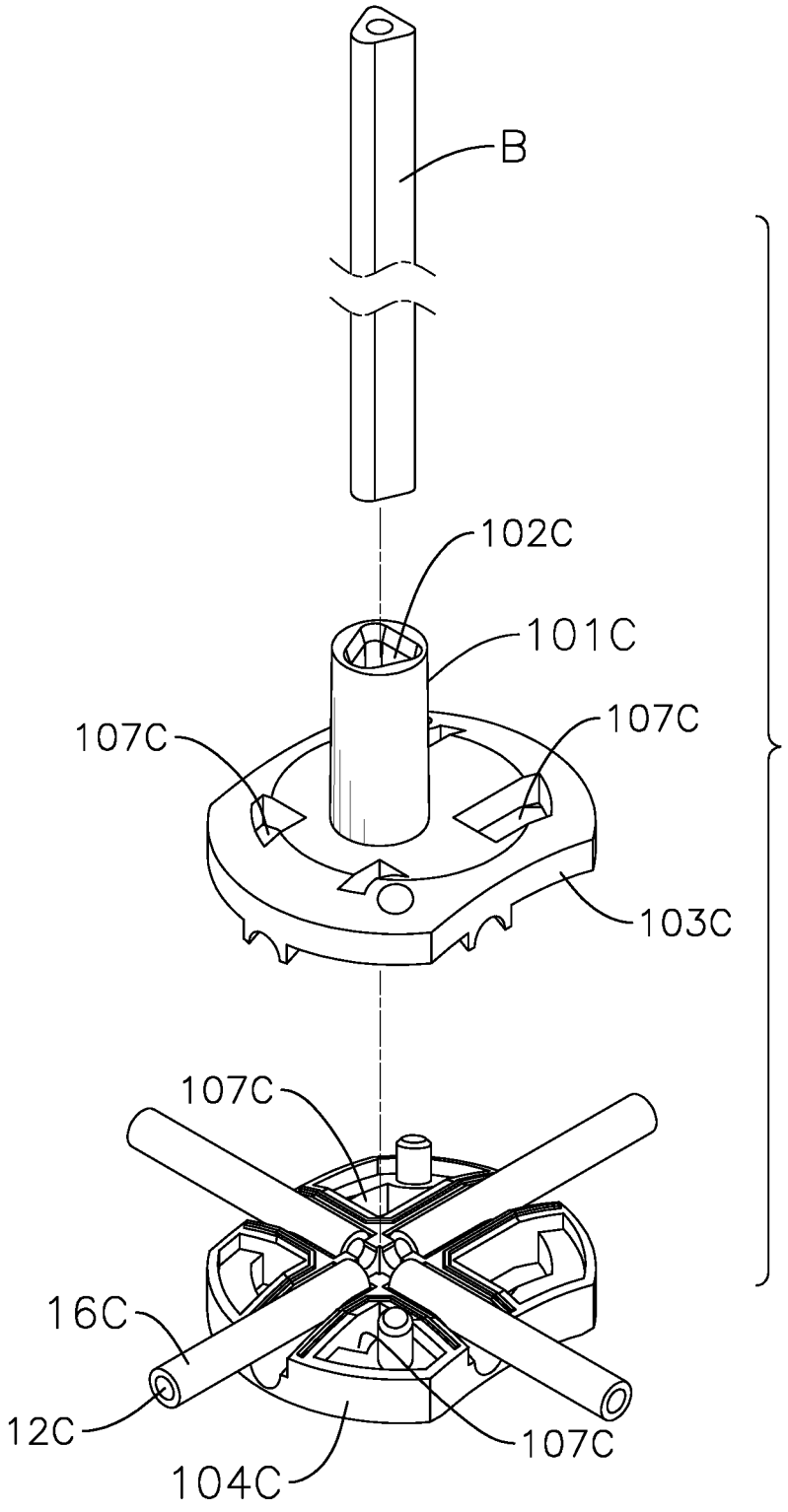


FIG. 24

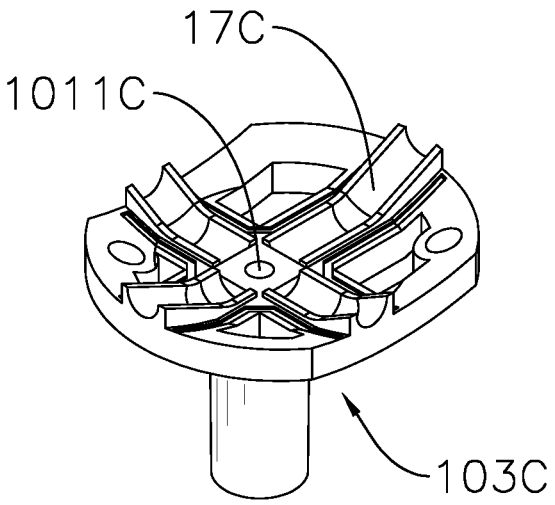


FIG. 25

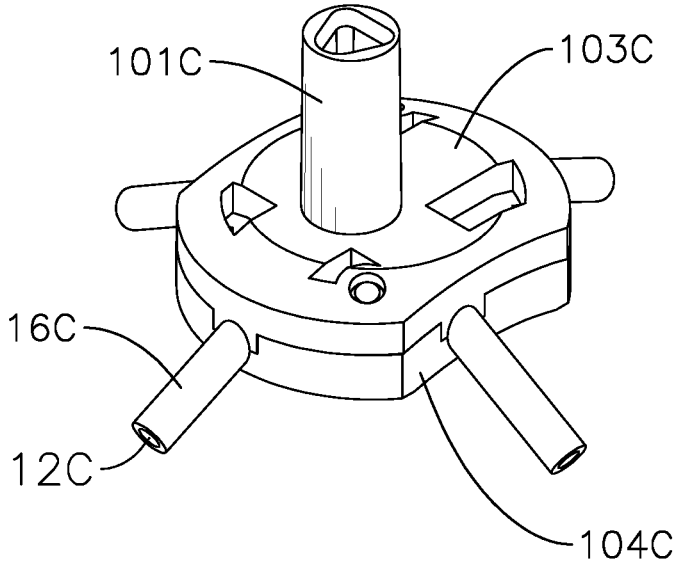


FIG. 26

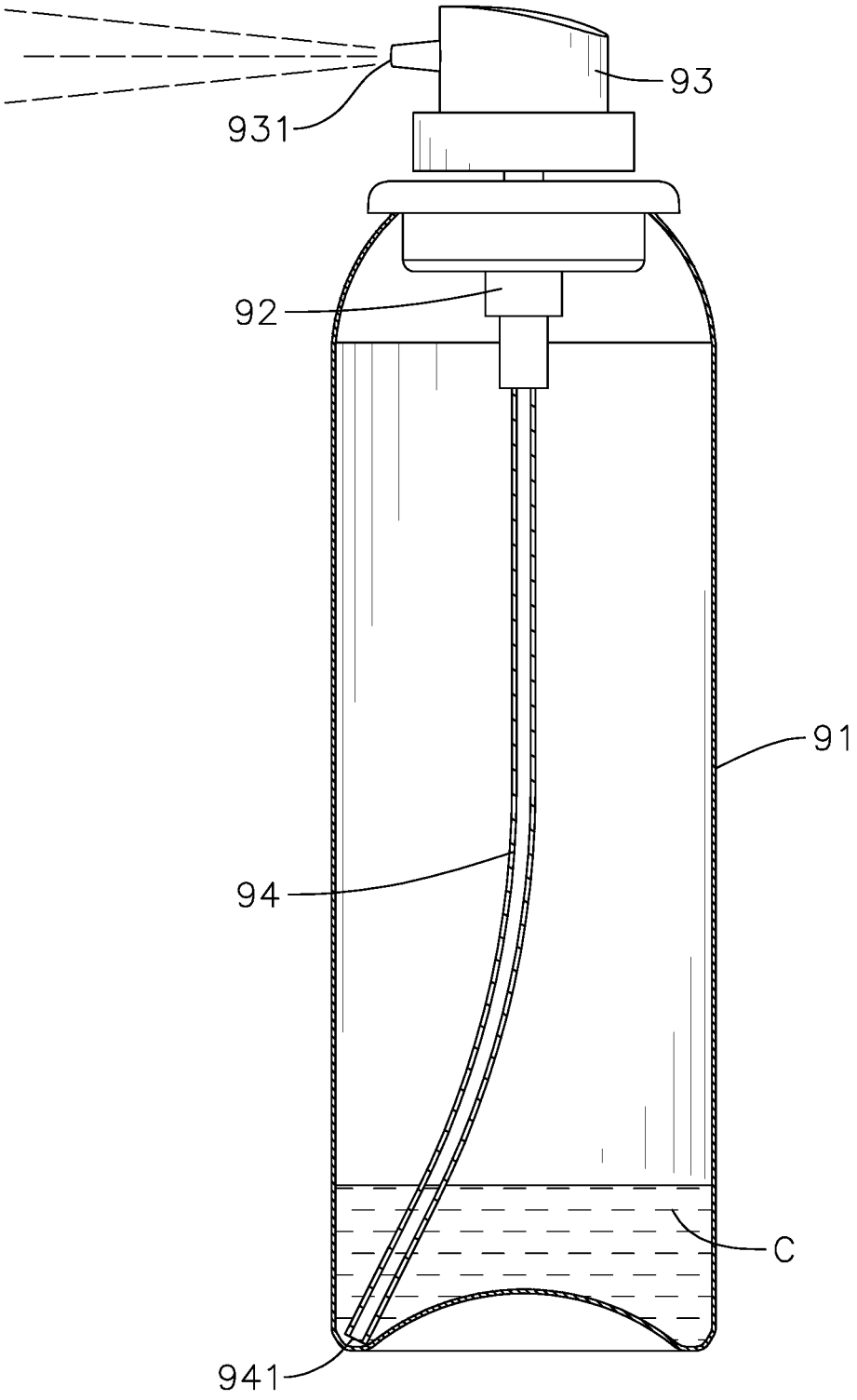


FIG. 27
PRIOR ART

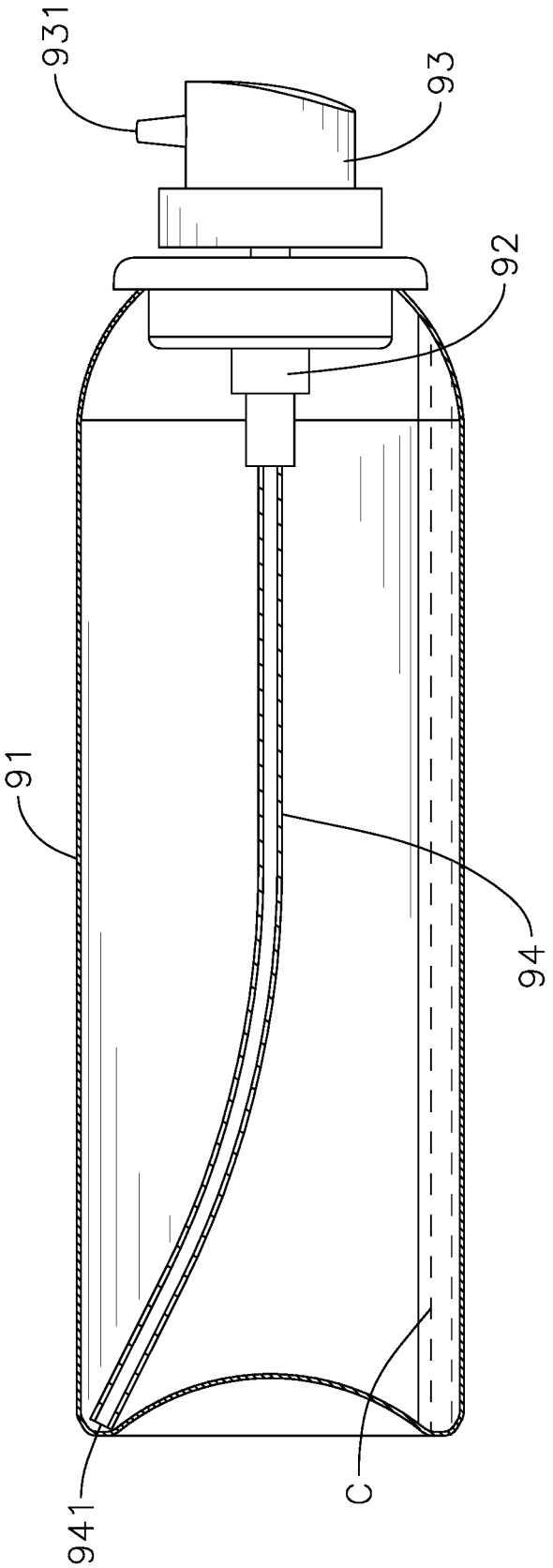


FIG. 28
PRIOR ART

LIQUID PRODUCT CONTAINER AND EXTENDING DRAWING UNIT OF LIQUID PRODUCT CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a liquid product container, especially to an extending drawing unit that is mounted on an end of a liquid dip tube to draw liquid product in every direction at a bottom edge of a container body, and especially to a liquid product container having the extending drawing unit.

2. Description of the Prior Art(s)

[0002] With reference to FIGS. **27** and **28**, a conventional liquid product container has a container body **91**, an aerosol valve **92**, an actuator **93**, and a liquid dip tube **94**. The aerosol valve **92** is mounted on a top opening of the container body **91**. The actuator **93** is mounted on a top end of the aerosol valve **92** and is located outside the container body **91**. The liquid dip tube **94** is mounted on a bottom end of the aerosol valve **92** and is located in the container body **91**. The liquid dip tube **94** extends curvedly to a bottom corner of the container body **91** so that a drawing end opening **941** can be located in the bottom corner of the container body **91** to draw liquid product C as much as possible to prevent the liquid product C remaining in the container body **91** and wasting.

[0003] Although the conventional liquid product container is capable of spraying regularly by the abovementioned configuration when the container body **91** is placed upright (with reference to FIG. **27**), since the liquid dip tube **94** extends curvedly with the drawing end opening **941** toward a same direction as a spray nozzle **931** of the actuator **93** mounted on the top of the container body **91** and the drawing end opening **941** is attached to the bottom corner of the container body **91** (with reference to FIGS. **27** and **28**), when the capacity of the liquid product C in the container body **91** is only a half or less, if the container body **91** is placed with the actuator **93** lean back or placed horizontally, the actuator **93** still cannot spray out the liquid product C even though there is remaining of the liquid product C because the drawing end opening **941** is not immerged in the liquid product C (as shown in FIG. **28**), which causes inconvenience of use and leads to residual of the liquid product C.

[0004] To overcome the shortcomings, the present invention provides a liquid product container and an extending drawing unit of the liquid product container to mitigate or obviate the aforementioned problems.

SUMMARY OF THE INVENTION

[0005] The main objective of the present invention is to provide an extending drawing unit of the liquid product container that is adapted to be mounted on an end of a liquid dip tube and has multiple extending liquid drawing openings to make the liquid dip tube capable of drawing liquid product in multiple directions from a bottom inside the liquid product container.

[0006] The liquid product container has a container body, a valve, a liquid dip tube, and an extending drawing unit. The container body is hollow and has an installing opening. The valve is sealed on the installing opening of the container body. The valve has a liquid product inlet and a liquid product outlet. The liquid product inlet is located in the container body. The liquid product outlet is located outside the container body. The liquid product inlet is selectively connected to the liquid product outlet. The extending drawing unit has a main body. The main body is adapted to be mounted in the container body and is adapted to extend to a bottom edge of the container body. The main body has multiple extending liquid drawing passages formed inside the main body. Each one of the extending liquid drawing passages extends along a respective one of radial directions of the container body. The extending liquid drawing passages respectively form multiple extending liquid drawing openings on an annular side surface of the main body. The extending liquid drawing openings are arranged annularly, are spaced apart from each other, and are adapted to be located in the bottom edge of the container body. The main body has a connecting port segment connected to the extending liquid drawing passages and adapted to be connected to the liquid dip tube, such that the liquid dip tube is connected to the extending liquid drawing openings.

[0007] The advantages of the liquid product container of the present invention are as follows. The main body is located in the container body and extends to the bottom edge of the container body. The main body forms multiple extending liquid drawing passages inside, and the extending liquid drawing passages extend along the radial direction of the container body and respectively form multiple extending liquid drawing openings which spaced apart to each other and arranged annularly on the side surface of the main body. Therefore, the extending liquid drawing openings attach to the bottom corner where the can wall and the can bottom connect to each other. Besides, the connecting port segment connect the liquid dip tube and the extending liquid drawing passages so the liquid dip tube connects the extending liquid drawing openings, and thus the liquid dip tube can be extended to the bottom corner of the container body in multiple directions. By the abovementioned configurations, even though the capacity of the liquid product in the container body is only a half or less, when the user changes the container body upright to use in a reclined state or in a horizontal state, there will be at least one extending liquid drawing opening submerged in the liquid product, such that the liquid dip tube can draw the liquid product in different directions, thereby the actuator sprays the liquid product correctly and smoothly.

[0008] Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is an exploded view of a first embodiment of an extending drawing unit in accordance with the present invention, showing the extending drawing unit mounted on a liquid dip tube and separated from a container body;

[0010] FIG. **2** is a bottom perspective view of the first embodiment of the extending drawing unit in FIG. **1**, showing an aerosol valve;

[0011] FIG. **3** is a exploded perspective view of another embodiment of the extending drawing unit in accordance with the present invention, showing the liquid dip tube, the aerosol valve, and the extending drawing unit;

[0012] FIG. **4** is a bottom perspective view of the embodiment of the extending drawing unit in FIG. **3**, showing the aerosol valve;

[0013] FIG. **5** is a side view in cross-section of the first embodiment of the extending drawing unit in FIG. **1**, showing the extending drawing unit mounted on the liquid dip tube and located in the container body;

[0014] FIG. **6** is another side view in cross-section of the first embodiment of the extending drawing unit in FIG. **1**, showing the container body placed horizontally to spray;

[0015] FIG. **7** is a partially enlarged view of the first embodiment of the extending drawing unit in FIG. **5**;

[0016] FIG. **8** is still another exploded top perspective view of the first embodiment of the extending drawing unit in FIG. **1**, showing an upper segment and a lower segment;

[0017] FIG. **9** is still another exploded bottom perspective view of the first embodiment of the extending drawing unit in FIG. **1**, showing the upper segment and the lower segment;

[0018] FIG. **10** is a top view in cross-section of the first embodiment of the extending drawing unit in FIG. **1**, showing the extending drawing unit mounted on the liquid dip tube;

[0019] FIG. **11** is still another exploded top perspective view of the first embodiment of the extending drawing unit in FIG. **1**, showing dimensions of the upper segment and the lower segment;

[0020] FIGS. **12**A to **12**E are operational views of the first embodiment of the extending drawing unit in FIG. **1**, showing steps of a main body moved into the container body;

[0021] FIG. **13** is an exploded perspective view of a second embodiment of an extending drawing unit in accordance with the present invention, showing the extending drawing unit mounted on a liquid dip tube and separated from a container body;

[0022] FIG. **14** is a bottom perspective view of the second embodiment of the extending drawing unit in FIG. **13**, showing a spray pump;

[0023] FIG. **15** is a side view in cross-section of the second embodiment of the extending drawing unit in FIG. **13**;

[0024] FIG. **16** is a side view in cross-section of the second embodiment of the extending drawing unit in FIG. **13**, showing the container body inclined;

[0025] FIG. **17** is another exploded top perspective view of the second embodiment of the extending drawing unit in FIG. **13**, showing the liquid dip tube, an upper segment, and a lower segment;

[0026] FIG. **18** is another perspective view of the second embodiment of the extending drawing unit in FIG. **13**, showing a bottom side of the upper segment;

[0027] FIG. **19** is an exploded perspective view of a third embodiment of an extending drawing unit in accordance with the present invention, showing the extending drawing unit mounted on a liquid dip tube and separated from a container body;

[0028] FIG. **20** is a bottom perspective view of the third embodiment of the extending drawing unit in FIG. **19**, showing an aerosol valve;

[0029] FIG. **21** is a side view in cross-section of the third embodiment of the extending drawing unit in FIG. **19**, showing the extending drawing unit mounted on the liquid dip tube and located in the container body;

[0030] FIG. **22** is another perspective view of the third embodiment of the extending drawing unit in FIG. **19**, showing the extending drawing unit mounted on the liquid dip tube and located in the container body;

[0031] FIGS. **23**A to **23**C are operational views of the third embodiment of the extending drawing unit in FIG. **19**, showing assembling steps of soft tubes and a lower segment;

[0032] FIG. **24** is another exploded top perspective view of the third embodiment of the extending drawing unit in FIG. **19**, showing the liquid dip tube, a upper segment, the soft tubes, and the lower segment;

[0033] FIG. **25** is still another perspective view of the third embodiment of the extending drawing unit in FIG. **19**, showing a bottom side of the lower segment;

[0034] FIG. **26** is still another perspective view of the third embodiment of the extending drawing unit in FIG. **19**, showing an assembly of the upper segment, the soft tubes, and the lower segment;

[0035] FIG. **27** is a side view in cross-section of a conventional liquid product container in accordance with the prior art, showing the liquid product container placed upright to spray; and

[0036] FIG. **28** is a side view in cross-section of the conventional liquid product container in FIG. **27**, showing the liquid product container placed horizontal to spray.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0037] With reference to FIGS. **1**, **5**, **13** and **15**, an extending drawing unit of a liquid product container in accordance with the present invention is adapted to be mounted in a container body A, and is adapted to be connected to a liquid dip tube B. The liquid product container may be a spray can with high pressure gas or a water spray bottle that disperses liquid by pressurizing the air with normal pressure.

[0038] In the liquid product container of the present invention, the container body A is filled with liquid product C and propellant. When a user presses the actuator **20**, a pressure of the propellant pushes the liquid product C to pass an aerosol valve **30** and then a spray nozzle **21** of the actuator **20** to be sprayed out. Preferably, the propellant is high pressure gas soluble in liquid product C such as environmental friendly refrigerant (HFO-1234yf) or dimethyl ether (DME). The liquid product C is formulated product content such as pepper spray or insecticide. But the configuration is not limited above, as the present invention can also be applied in a product without using high-pressure air, such as a press-type spray pump **33** for spraying alcohol sanitizer, a spray bottle for gardening, or any kind of bottle with a screwable bottle collar and a suction tube that uses uncompressed air as propulsion to spray out liquid via pressure and be also applied to any other mechanism besides the aerosol valve **30** or the press-type spray pump **33**, that has a function of spraying or drawing liquid. Moreover, the extending drawing unit may be used with accessories with suction function, such as teats on baby bottle.

[0039] In a first embodiment, the aerosol valve **30** is conventional and will not be detailed below. Two regular specifications of the aerosol valve **30** are 1 inch (large volume size) and 20 mm (small volume size).

[0040] In the first embodiment, with reference to FIGS. **1** and **5**, the container body A is a large volume size one and is made of metal. An outer diameter D**2** of the container

body A is 38 mm. The aerosol valve **30** that is used with the container body A is 25.4 mm (1 inch), and an inner diameter D**1** of an opening of the container body A is also 25.4 mm (1 inch). But the specification is not limited thereto. In the first embodiment, the aerosol valve **30** may also be 20 mm and used with the metal container body A having the outer diameter D**2** of 25 mm

[0041] In the first embodiment, with reference to FIGS. **5** to **9**, the extending drawing unit has the liquid dip tube B and a main body **10**. The main body **10** is mounted in the container body A and extends to a bottom edge defined inside the container body A. The main body **10** has multiple extending liquid drawing passages **11** formed inside the main body **10**. Each one of the extending liquid drawing passages **11** extending along a respective one of radial directions of the container body A. The extending liquid drawing passages **11** respectively form multiple extending liquid drawing openings **12** on an annular side surface of the main body **10**. The extending liquid drawing openings **12** are arranged annularly, are spaced apart from each other, and are located in the bottom edge of the container body A. The main body **10** has a connecting port segment **101** connected to the extending liquid drawing passages **11** and connected to the liquid dip tube B, such that the liquid dip tube B is connected to the extending liquid drawing openings **12**.

[0042] Specifically, in the first embodiment, with reference to FIG. **3**, the main body **10** is a board. The extending liquid drawing openings **12** are formed on an annular surface of the board. The connecting port segment **101** is located on a top side surface of the board. The annular surface of the board is connected to an edge of the side surface of the board and extends along the edge of the side surface of the board.

[0043] Further, in the first embodiment, with reference to FIGS. **7** and **8**, an amount of the extending liquid drawing passages **11** is four. The four extending liquid drawing passages **11** are arranged as a cross and respectively extend to a front side, a rear side, a left side, and a right side of the bottom edge of the container body A.

[0044] Besides, with reference to FIGS. **7**, **8**, and **9**, in the first embodiment, the main body **10** has an upper segment **103** and a lower segment **104**. The connecting port segment **101** is formed on the upper segment **103**. The lower segment **104** is assembled with the upper segment **103** and is opposite to the connecting port segment **101**. The extending liquid drawing passages **11** are formed between the upper segment **103** and the lower segment **104**. The lower segment **104** has multiple grooves **13** formed on a top surface of the lower segment **104**. The grooves **13** of the lower segment **104** are covered by a bottom surface of the upper segment **103** to form the extending liquid drawing passages **11**.

[0045] Furthermore, the upper segment **103** forms the connecting port segment **101**, and a confluence suction port **1011** is formed in an axial center of the connecting port segment **101** and is formed through a bottom surface of the upper segment **103**.

[0046] Furthermore, the extending liquid drawing passages **11** are formed between the upper segment **103** and the lower segment **104**, and the confluence suction port **1011** is located above a cross-shaped confluence of the extending liquid drawing passages **11** and is connected to the extending liquid drawing passages **11**. Specifically, the extending liquid drawing openings **12** are connected to the extending liquid drawing passages **11** and thus connected to the confluence suction port **1011**, so the extending liquid drawing openings **12** are connected to the liquid dip tube B.

[0047] Besides, with reference to FIGS. **7**, **8**, and **9**, in the first embodiment, a bottom surface of the main body **10** concaves and faces toward a bump on a bottom of the container body A. In the first embodiment, since the container body A is a large volume size can and thus has to sustain a large pressure of high pressure gas, a bottom wall of the container body A is configured concaving inward to sustain the large pressure. Therefore, making the bottom surface of the main body **10** concave allows the main body **10** to approach the bumping bottom wall of the container body A closer and to extend to a bottom corner where an annular wall and the bottom wall of the container body A.

[0048] Additionally, with reference to FIGS. **1**, **10**, and **11**, a cross-section shape of liquid dip tube B is an isosceles triangle, and one of three corners of the isosceles triangle is an arc corner **108** (R corner). The arc corner **108** (R corner) is configured for direction positioning.

[0049] With reference to FIGS. **1**, **5**, **8**, **10**, and **11**, in the extending drawing unit of the liquid product container, the cross-section shape of an inner hole **102** of the connecting port segment **101** of the main body **10** is an isosceles triangle, and the cross-section shape of the inner hole **102** of the connecting port segment **101** is the same as the cross-section shape of the liquid dip tube B. One of three corners of the isosceles triangle is an arc corner **109** (R corner). The cross-section shape of the inner hole **102** of the connecting port segment **101** is an isosceles triangle, which is configured to engage with an isosceles triangle of a bottom end of the liquid dip tube B in cross-section. The arc corner **109** (R corner) is configured for direction positioning facing a first end **14** of the main body **10**.

[0050] With reference to FIGS. **1**, **2**, **5** and **10**, in the first embodiment, the aerosol valve **30** has a valve housing **31** mounted on a bottom of the aerosol valve **30**. An inner hole **32** of a liquid product inlet on a bottom end of the valve housing **31** is an isosceles triangle in cross-section. One of three corners of the isosceles triangle is an arc corner **110** (R corner), and the arc corner **110** (R corner) and the spray nozzle **21** of the actuator **20** face toward a same direction. The inner hole **32**, which is isosceles triangle in cross-section, of the liquid product inlet is configured to engage with a top end of the liquid dip tube B, which is also an isosceles triangle in cross-section. The arc corner **110** (R corner) and the spray nozzle **21** of actuator **20** are facing toward the same direction. Specifically, the main body **10** has the first end **14** and a second end **15**, and the spray nozzle **21** of actuator **20** is facing toward the same direction of the first end **14**.

[0051] With reference to FIGS. **1**, **2**, **5**, **8**, **10**, and **11**, in the first embodiment, a shape of liquid dip tube B on a cross-section perpendicular to an axial direction, a shape of the inner hole **102** of the connecting port segment **101**, and a shape of the inner hole **32** of the liquid product inlet of valve housing **31** are of an identical isosceles triangle. The three identical isosceles triangles respectively have the arc corner **108** (R corner), the arc corner **109** (R corner), and the arc corner **110** (R corner). The arc corner **108** (R corner), the arc corner **109** (R corner), and the arc corner **110** (R corner) all face toward the first end **14** of the main body **10** and are all configured for direction positioning.

[0052] With reference to FIGS. **1**, **5**, **8**, **10** and **11**, the main body **10** has two curved side surfaces **105** located on a long

axis, two flush side surfaces **106** located on a short axis. The two curved side surfaces **105** extend curvedly, are respectively located on two opposite sides of the main body **10**, and are located adjacent to an inner wall of the bottom of the container body A. The two flush side surfaces **106** extend flatly, are respectively located on another two opposite sides of the main body **10**, and are connected to the two curved side surfaces **105**. A distance L on a long axis between the two curved side surfaces **105** is larger than an inner diameter D**1** of a can opening of the container body A. A distance W on a short axis between the two flush side surfaces **106** is smaller than the inner diameter D**1** of the can opening of the container body A. In other words, the distance W on the short axis between the two flush side surfaces **106** is shorter than the distance L on the long axis between the two curved side surfaces **105**, and the main body **10** is in a race track shape. By the distance W on the short axis between the two flush side surfaces **106** is smaller than the inner diameter D**1** of the can opening of the container body A, the main body **10** is able to enter the can opening of the container body A.

[0053] With reference to FIGS. **1**, **7**, **10**, and **11**, in the first embodiment, the inner diameter D**1** of the can opening of the container body A is 25.4 mm, an outer diameter D**2** of the container body A is 38 mm, and an inner diameter of an inner annular wall of the container body A is 37.2 mm. A distance L between the two curved side surfaces **105** is set 36.4 mm. The axial center of the connecting port segment **101** is eccentrically located in a left part near a first end **14** of the upper segment **103** instead of in a center, which means a distance L**2** between the axial center of the connecting port segment **101** and a second end **15** of the main body **10** is larger than a distance L**1** between the axial center of the connecting port segment **101** and a first end **14** of the main body **10**. Specifically, the distance L**2** between the axial center of the connecting port segment **101** and the second end **15** of the main body **10** is 20 mm, and the distance L**1** between the axial center of the connecting port segment **101** and the first end **14** of the main body **10** is 16.4 mm. Thus, setting the distance L (long axis) between the two curved side surfaces **105** to 36.4 mm (which is closest to the inner diameter 37.2 mm of the inner wall of the container body A) allows the extending liquid drawing openings **12** to extend as nearly as possible to the bottom corner of the container body A in multiple directions, so as to draw the liquid product C successfully. But the specifications and the configurations are not limited above. The axial center of the connecting port segment **101** can also be located in a right part near the second end **15** of the main body **10**, herein a distance between the first end **14** and the axial center of the connecting port segment **101** is 20 mm, and a distance between second end and the axial center of the connecting port segment **101** is 16.4 mm. Additionally, in the first embodiment, a width of the main body **10**, which is also a distance W (short axis) between the two flush side surfaces **106**, is 24 mm, but not limited thereto.

[0054] With reference to FIGS. **1**, **5**, **10**, **11**, and **12**A to **12**E, in the first embodiment, when installing the extending drawing unit into the liquid container body A, a user first tilts the main body **10** with respect to the container body A and manipulate the second end **15** into the can opening of the container body A. Then, the user tilt the main body **10** and manipulate the second end **15** that is already moved into the can opening of the container body A downward and attach to the inner wall of the container body A, so that the user can maneuver the first end **14** into the container body A and subsequently resume the upright position of main body **10** and the insertion of main body **10** is complete. The distance L on the long axis of main body **10** longer than the inner diameter of the can opening can thus be maneuvered into the container body A. Specifically, when installing the extending drawing unit into the container body A because the short axis W is set to be shorter than the inner diameter D**1** of the can opening of the container body A. Thus, the main body can easily be maneuvered into the container body A.

[0055] With reference to FIGS. **8**, **9** and **10**, in the first embodiment, the main body **10** has the through holes **107** formed through a top surface and a bottom surface of the main body **10**. The configuration of the through holes **107** allows the flow of the liquid product C, thereby avoiding the main body **10** blocking the flow of the liquid product C no matter when the main body **10** being placed in the container body A or when the liquid product container being used.

[0056] With reference to FIGS. **1**, **2**, **5**, **7**, **8** and **10**, in the first embodiment, the liquid dip tube B is polygonal in cross-section. An outer annular surface of the liquid dip tube B extends along an axial direction of the liquid dip tube B to two ends of the liquid dip tube B. In other words, an arc corner of the polygon liquid dip tube B extends along an axial direction of the liquid dip tube B to two ends of the liquid dip tube B. The connecting port segment **101** has an inner hole being polygonal in cross-section. The liquid product inlet is also polygonal in cross-section. A shape of the inner hole **102** of the connecting port segment **101** is the same as a shape of the liquid dip tube B on a cross-section perpendicular to the axial direction of the liquid dip tube B. A shape of the inner hole **32** of the liquid product inlet of the valve housing **31** is the same as the shape of the liquid dip tube B on the cross-section perpendicular to the axial direction of the liquid dip tube B. Therefore, a bottom end of the liquid dip tube B can engage with the inner hole **102** of the connecting port segment **101**, and a top end of the liquid dip tube B can engage with the inner hole **32** of the liquid product inlet of the valve housing **31**. Specifically, in the first embodiment, the liquid dip tube B is an isosceles triangular tube. The arc corner **108** (R corner) extends along an axial direction of the liquid dip tube B to two ends of the liquid dip tube B. The inner hole **102** of the connecting port segment **101** and the inner hole **32** of the liquid product inlet of the valve housing **31** are both isosceles triangular holes. When both ends of the liquid dip tube B are respectively inserted into the inner hole **102** of the connecting port segment **101** of the main body **10** and the inner hole **32** of the liquid product inlet of the valve housing **31**, the arc corner **108** (R corner) of the liquid dip tube B, the arc corner **109** (small R corner) of the inner hole **102** of the connecting port segment **101** of the main body **10** and the arc corner **110** (small R corner) of the inner hole **32** of the liquid product inlet of the valve housing **31** are all aligned toward the first end **14** of the main body **10** in consistence with the same direction as the spray nozzle **21** of the actuator **20** and are all configured for direction positioning. But the structure is not limited to the abovementioned configuration, as the liquid dip tube B can adapt another shape of tube and the arc corner (R corner) configured for direction positioning can also adapt another shape.

[0057] With reference to FIGS. **3** and **4**, the liquid dip tube B in the present invention can also be a round tube, and the liquid dip tube B has a rib **111** for direction positioning is

protruding from an outer annular surface of the round tube. The rib **111** extends along an axial direction of the liquid dip tube B to two ends of the liquid dip tube B. The shape of the inner hole **102** of the connecting port segment **101** is the same as a shape of the liquid dip tube B on a cross-section perpendicular to the axial direction of the liquid dip tube B. A bottom end of the liquid dip tube B and the connecting port segment **101** are configured to engage with each other. A shape of the inner hole **32** of the liquid product inlet of the valve housing **31** is the same as a shape of the liquid dip tube B on a cross-section perpendicular to the axle direction. A top end of the liquid dip tube B and the inner hole **32** of the liquid product inlet of the valve housing **31** are configured to engage with each other. Two ends of the rib **111** of the round tube engage with a positioning groove **112** in the inner hole **102** of the connecting port segment **101** and respectively the positioning groove **113** of the inner hole **32** of the liquid product inlet of the valve housing **31**.

[0058] With reference to FIGS. **5** and **6**, as described above, a liquid dip tube in a conventional liquid product container usually extends curvedly with a drawing end opening toward a same direction as a spray nozzle of the actuator mounted on a top of a container body of the conventional liquid product container. When capacity of liquid product C in the container body A is only a half or less, if the container body is placed with the actuator lean back or placed horizontally, the actuator cannot spray out the liquid product C even though there is remaining of the liquid product C. In the extending drawing unit of the present invention, with the multiple extending liquid drawing openings **12**, the liquid product C remaining in the bottom corner of the container body in multiple directions can be drawn out. In short, in addition to spray by holding the liquid product container upside down, the liquid product container with the extending drawing unit in the present invention can spray out the liquid product C in the container body A almost completely, thereby avoiding waste caused by too much liquid product C remaining in the container body that cannot be sprayed out, which is the advantage that the conventional liquid product container (with straight dip tube or with a distal end of a dip tube attaching a bottom corner of the container body) does not have.

[0059] With reference to FIGS. **13** to **18**, a structure and function of a second embodiment of the present invention is basically the same as the first embodiment, so the configuration and technical characteristics of the cross-section shape of the liquid dip tube B, the shape of the inner hole of the liquid product inlet of the valve housing, the shape of the inner hole of the connecting port segment, the small R corner, confluence suction port, multiple extending liquid drawing passages and multiple extending liquid drawing openings, etc. will not be detailed below.

[0060] In the second embodiment, a press-type spray pump **33** and a plastic (such as PET) container body A are applied. An outer diameter of the container body A is set to be 48 mm and an inner diameter of the can opening of the container body A is set to be 33.6 mm. Thus, the distance L on the long axis between the two curved side surfaces **105** is set to be 44 mm and the distance W on the short axis between the two flush side surfaces **106** is designed as 31.6 mm. In the second embodiment, uncompressed air is inside the container body A and a bottom wall of the container body A is flat but not bumped, so the bottom of the main body **10**B is a flat board. The axis of the connecting port segment **101**B of the main body **10**B is connected to the liquid dip tube B that is an isosceles triangle tube. The main body **10**B has multiple extending liquid drawing passages **11**B. The extending liquid drawing passages **11**B respectively form multiple extending liquid drawing openings **12**B on an annular side surface of the main body **10**B. The extending liquid drawing openings **12**B are arranged annularly and are spaced apart from each other. Thus, the second embodiment achieves the same effect as the first embodiment. In the second embodiment, the axis of the connecting port segment **101**B is located in the center of the upper segment **103**B instead of being located in the left part. But the configuration is not limited thereto, as the connecting port segment **101**B can also be located in the left part or in the right part and position toward the first end **14** or the second end **15** of the main body **10**B. Specifically, two ends of the isosceles triangular liquid dip tube B respectively connected to the inner hole **102**B of the connecting port segment **101**B and the inner hole **32**B of the liquid product inlet of the valve housing **31**B. When the actuator **20**B is pressed, the liquid product C in the container body A flows sequentially through the multiple extending liquid drawing openings **12**B, the multiple extending liquid drawing passages **111**B, the confluence suction port **1011**B and the liquid dip tube B and then into the liquid product inlet of the valve housing **31**B, and then can be sprayed out via the spray nozzle **21**B. In the second embodiment, the installation procedures of the extending drawing unit into the container body A are the same as the first embodiment and thus will not be detailed below. The press-type spray pump **33** is conventional and will not be detailed below.

[0061] The following table lists the specifications of the first embodiment and the second embodiment of the present invention.

	first embodiment	second embodiment
can opening inner diameter (D1)	25.4 mm	33.6 mm
container body outer diameter (D2)	38.0 mm	48.0 mm
container body inner diameter	37.2 mm	47.2 mm
main body long axis length (L)	36.4 mm	44 mm
Main body short axis length (W)	24.0 mm	31.6 mm
main body shape	Curved board	Flat board
Location of the connecting port segment on the upper segment	Left portion (near the first end 14)	Center
Number of the extending liquid drawing openings	Four	Four
Aerosol valve or spray pump	Aerosol valve	Spray pump (such as Press-type spray pump etc.)
Form of propellant	High-pressure air (such as environmental friendly refrigerant etc.)	Uncompressed air
Material of the container body	Metal	Plastic

[0062] With reference to FIGS. **19** to **26**, a structure and function of a third embodiment of the present invention is basically the same as the first embodiment, so the configuration and technical characteristics of the cross-section

shape of the liquid dip tube B, the shape of the inner hole of the liquid product inlet of the valve housing, the shape of the inner hole of the connecting port segment, each small R corner and confluence suction port etc. will not be detailed below. The differences between the first embodiment and the third embodiment are mainly in the structure of multiple liquid passages as instructed below. In the first embodiment, the extending liquid drawing passages **11** are formed by the grooves **13** of the lower segment **104** and the bottom surface of the upper segment **103**. But in the third embodiment, the main body **10**C comprises multiple soft tubes **16**C and the multiple extending liquid drawing passages **11**C are respectively formed in the multiple soft tubes **16**C. In the third embodiment, the connecting port segment **101**C is formed on the top of the upper segment **103**C, the bottom surface of the upper segment **103**C has multiple grooves **17**C, the cross section of multiple grooves **17**C is in semicircular shape, and a part of the soft tubes **16**C is mounted on the grooves **17**C of the upper segment **103**C. The multiple grooves **13**C are also formed on the top surface of the lower segment **104**C, and the cross section of multiple grooves **13**C is in semicircular shape, and another part of the soft tubes **16**C is mounted on the grooves **13**C of the lower segment **104**C. By this configuration, when the upper segment **103**C and the lower segment **104**C are combined, the multiple soft tubes **16**C are clamped between the upper segment **103**C and the lower segment **104**C. The multiple extending liquid drawing passages **11**C are respectively formed in the soft tubes **16**C, and the multiple liquid drawing openings **12**C are respectively formed on outer ends of the multiple soft tubes **16**C. Inner ends of the multiple soft tubes **16**C are connected to the connecting port segment **101**C. The extending liquid drawing openings **12**C on the outer ends of the soft tube **16**C protrude from the side surface of the main body **10**C. Specifically, in the third embodiment, the multiple extending liquid drawing passages **11**C are formed in the multiple soft tubes **16**C and the multiple soft tubes **16**C are clamp between the upper segment **103**C and the lower segment **104**C.

[0063] The multiple extending liquid drawing passages **11**C, through multiple soft tubes **16**C, protrude from the upper segment **103**C and the lower segment **104**C. The multiple extending liquid drawing openings **12**C are respectively formed on the end of the multiple soft tubes **16**C surrounding the main body **10**C. Specifically, the multiple extending liquid drawing openings **12**C are connected to the multiple extending liquid drawing passages **11**C and extend to the confluence suction port **1011**C; thus the multiple extending liquid drawing openings **12**C are connected to the liquid dip tube B. Specifically, the two ends of the liquid dip tube B are respectively connected to the inner hole **102**C of the connecting port segment **101**C and the inner hole **32**C of the liquid product inlet of the valve housing **31**C. When the actuator **20**C is pressed, the liquid product C in the container body A sequentially flows through the multiple extending liquid drawing openings **12**C, the multiple extending liquid drawing passages **11**C, the confluence suction port **1011**C and the liquid dip tube B and then into the inner hole **32**C of the liquid product inlet of the valve housing **31**C, and then can be sprayed out via the spray nozzle **21**C, and thus the third embodiment achieves the same effect as the first embodiment.

[0064] With reference to FIGS. **22** and **23**A to **23**C, a structure of a third embodiment of the present invention has the soft tubes **16**C, a volume of the main body **10**C can be reduced, and the length of the soft tubes **16**C of main body **10** can be adjusted according to the inner diameter of different container body A. The soft tubes **16**C can be bent and then moved into the can opening of the container body A along with the main body **10**C. Because the soft tubes **16**C with elastic potential energy are flexible to resume their functional shape for liquid suction. The soft tubes **16**C are made of, preferably, LDPE (Low-density polyethylene). An inner diameter of each of the soft tubes **16**C is, preferably, 1.3 mm, and an outer diameter of each of the soft tubes **16**C is 1.9 mm. But the material and the specification are not limited thereto. In the third embodiment, the installation procedures of the extending drawing unit into the container body A are the same as first embodiment and thus will not be detailed below. Additionally, the extending drawing unit having the soft tubes **16**C can be applied in the aerosol valve **30** and the press-type spray pump **33** etc.

[0065] The advantages of the liquid product container of the present invention are as follows. The main body **10** is located in the container body A and extends to the bottom edge of the container body A. The main body **10** forms multiple extending liquid drawing passages **11** inside, and the extending liquid drawing passages **11** extend along the radial direction of the container body A and respectively form multiple extending liquid drawing openings **12** which are spaced apart to each other and are arranged annularly on the side surface of the main body **10**. Therefore, the extending liquid drawing openings **12** are close to the bottom corner where the can wall and the can bottom connect to each other. Besides, the connecting port segment **101** connects the liquid dip tube B and the extending liquid drawing passages **11** so the liquid dip tube B connects the extending liquid drawing openings **12**, and thus the liquid dip tube B can be extended to the bottom corner of the container body A in multiple directions. By the abovementioned configurations, even though the capacity of the liquid product C in the container body A is only a half or less, when the user changes the container body A upright to use in a reclined state or in a horizontal state, there will be at least one extending liquid drawing opening **12** submerged in the liquid product C, such that the liquid dip tube B can draw the liquid product C in different directions, thereby the actuator sprays the liquid product C correctly and smoothly. Further, the present invention can use high-pressure air such as environmental friendly refrigerant (HFO-1234yf) as well as uncompressed air by being used with the aerosol valve **30** or the press-type spray pump **33** that has a function of spraying or drawing liquid. Moreover, the extending drawing unit of the present invention may also be used with accessories with suction function, such as teats on baby bottle, so the present invention can be applied in any kind of liquid product C. In short, the present invention can spray out or draw out almost all of the liquid product C in the container body A, so as to avoid waste due to excess liquid product C remaining in the container body A, which is an advantage that the liquid dip tube of the conventional liquid product container does not have.

[0066] In summary, the present invention can spray out the liquid product C in the container body A almost completely, thereby avoiding trouble and waste caused by too much liquid product C remaining in the container body A that cannot be sprayed out.

[0067] Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and features of the invention, the disclosure is illustrative only. Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. An extending drawing unit adapted to be mounted in a container body of a liquid product container and be connected to a liquid dip tube; the extending drawing unit comprising:

a main body adapted to be mounted in the container body and adapted to extend to a bottom edge of the container body; the main body having multiple extending liquid drawing passages formed inside the main body; each one of the extending liquid drawing passages extending along a respective one of radial directions of the container body; the extending liquid drawing passages respectively forming multiple extending liquid drawing openings on an annular side surface of the main body; the extending liquid drawing openings arranged annularly, spaced apart from each other, and adapted to be located in the bottom edge of the container body; the main body having

a connecting port segment connected to the extending liquid drawing passages and adapted to be connected to the liquid dip tube, such that the liquid dip tube is connected to the extending liquid drawing openings.

2. The extending drawing unit as claimed in claim **1**, wherein the liquid product container for mounting the extending drawing unit is a spray can.

3. The extending drawing unit as claimed in claim **1**, wherein the main body is a board; the extending liquid drawing openings are formed on an annular surface of the board; the connecting port segment is located on a side surface of the board; the annular surface of the board is connected to an edge of the side surface of the board and extends along the edge of the side surface of the board.

4. The extending drawing unit as claimed in claim **1**, wherein the main body has

an upper segment; the connecting port segment formed on the upper segment; and

a lower segment assembled with the upper segment and opposite to the connecting port segment; the extending liquid drawing passages formed between the upper segment and the lower segment.

5. The extending drawing unit as claimed in claim **4**, wherein the lower segment has multiple grooves formed on a top surface of the lower segment; the grooves of the lower segment are covered by a bottom surface of the upper segment to form the extending liquid drawing passages.

6. The extending drawing unit as claimed in claim **4**, wherein a confluence suction port is formed in an axial center of the connecting port segment and formed through a bottom surface of the upper segment; the confluence suction port is located above a confluence of the extending liquid drawing passages and is connected to the extending liquid drawing passages.

7. The extending drawing unit as claimed in claim **1**, wherein the main body has

two curved side surfaces extending curvedly, respectively located on two opposite sides of the main body, and adapted to be located adjacent to an inner wall of the container body; a distance between the two curved side surfaces larger than an inner diameter of a can opening of the container body; and

two flush side surfaces extending flatly, respectively located on another two opposite sides of the main body, and connected to the two curved side surfaces; a distance between the two flush side surfaces smaller than the inner diameter of the can opening of the container body.

8. The extending drawing unit as claimed in claim **1**, wherein the main body has

multiple through holes formed through a top surface and a bottom surface of the main body.

9. The extending drawing unit as claimed in claim **1**, wherein

the liquid dip tube is polygonal in cross-section; an outer annular surface of the polygonal tube extending along an axial direction of the liquid dip tube to two ends of the liquid dip tube;

a shape of an inner hole of the connecting port segment is the same as a shape of the liquid dip tube on a cross-section perpendicular to the axial direction of the liquid dip tube; and

the liquid dip tube and the connecting port segment are configured to engage with each other.

10. The extending drawing unit as claimed in claim **1**, wherein the main body has

multiple soft tubes; the extending liquid drawing passages respectively formed in the soft tubes; the extending liquid drawing openings respectively formed on outer ends of the soft tubes; inner ends of the soft tubes connected to the connecting port segment; the soft tubes protruding from the side surface of the main body such that the extending liquid drawing openings are distant from the side surface of the main body.

11. The extending drawing unit as claimed in claim **10**, wherein the main body has

an upper segment; the connecting port segment formed on the upper segment; and

a lower segment assembled with the upper segment and opposite to the connecting port segment; the soft tubes clamped between the upper segment and the lower segment.

12. The extending drawing unit as claimed in claim **11**, wherein

the upper segment has multiple grooves formed on a bottom surface of the upper segment; the soft tubes are respectively mounted in the grooves of the upper segment; a part of each of the soft tubes is located in a respect on of the grooves of the upper segment; and

the lower segment has multiple grooves formed on a top surface of the lower segment; the soft tubes are respectively mounted in the grooves of the lower segment; another part of each of the soft tubes is located in a respect on of the grooves of the lower segment.

13. A liquid product container comprising:

a container body being hollow and having an installing opening;

a valve sealed on the installing opening of the container body; the valve has a liquid product inlet and a liquid product outlet; the liquid product inlet located in the

container body; the liquid product outlet located outside the container body; the liquid product inlet selectively connected to the liquid product outlet;

a liquid dip tube; and

an extending drawing unit having a main body adapted to be mounted in the container body and adapted to extend to a bottom edge of the container body; the main body having multiple extending liquid drawing passages formed inside the main body; each one of the extending liquid drawing passages extending along a respective one of radial directions of the container body; the extending liquid drawing passages respectively forming multiple extending liquid drawing openings on an annular side surface of the main body; the extending liquid drawing openings arranged annularly, spaced apart from each other, and adapted to be located in the bottom edge of the container body; the main body having

a connecting port segment connected to the extending liquid drawing passages and adapted to be connected to the liquid dip tube, such that the liquid dip tube is connected to the extending liquid drawing openings.

14. The liquid product container as claimed in claim **13**, wherein the liquid product container is a spray can.

15. The liquid product container as claimed in claim **13**, wherein

the liquid dip tube is a polygonal tube; an outer annular surface of the polygonal tube extending along an axial direction of the liquid dip tube to two ends of the liquid dip tube;

a shape of an inner hole of the connecting port segment is the same as a shape of the liquid dip tube on a cross-section perpendicular to the axial direction of the liquid dip tube; and

the liquid dip tube and the connecting port segment are configured to engage with each other.

16. The liquid product container as claimed in claim **13**, wherein

the liquid dip tube is polygonal in cross-section; an outer annular surface of the polygonal tube extending along an axial direction of the liquid dip tube to two ends of the liquid dip tube;

a shape of an inner hole of the liquid product inlet is the same as a shape of the liquid dip tube on a cross-section perpendicular to the axial direction of the liquid dip tube; and

the liquid dip tube and the liquid product inlet are configured to engage with each other.

17. An extending drawing unit adapted to be mounted in a container body of a liquid product container and be connected to a liquid dip tube; the extending drawing unit comprising:

a liquid dip tube; and

a main body adapted to be mounted in the container body and adapted to extend to a bottom edge of the container body; the main body having multiple extending liquid drawing passages formed inside the main body; the extending liquid drawing passages extending along a radial direction of the container body and respectively forming multiple extending liquid drawing openings on a side surface of the main body; the extending liquid drawing openings arranged annularly, spaced apart from each other, and adapted to be located in the bottom edge of the container body; the main body having

a connecting port segment connected to the extending liquid drawing passages and adapted to be connected to the liquid dip tube, such that the liquid dip tube is connected to the extending liquid drawing openings.

18. The extending drawing unit as claimed in claim **17**, wherein the liquid product container for mounting the extending drawing unit is a spray can.

19. The extending drawing unit as claimed in claim **17**, wherein

the liquid dip tube is polygonal in cross-section; an outer annular surface of the polygonal tube extending along an axial direction of the liquid dip tube to two ends of the liquid dip tube;

a shape of an inner hole of the connecting port segment is the same as a shape of the liquid dip tube on a cross-section perpendicular to the axial direction of the liquid dip tube; and

the liquid dip tube and the connecting port segment are configured to engage with each other.

20. The extending drawing unit as claimed in claim **17**, wherein

the liquid dip tube has

a round tube;

a rib protruding from an outer annular surface of the round tube and extending along an axial direction of the liquid dip tube to two ends of the liquid dip tube;

a shape of an inner hole of the connecting port segment is the same as a shape of the liquid dip tube on a cross-section perpendicular to the axial direction of the liquid dip tube; and

the liquid dip tube and the connecting port segment are configured to engage with each other.

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