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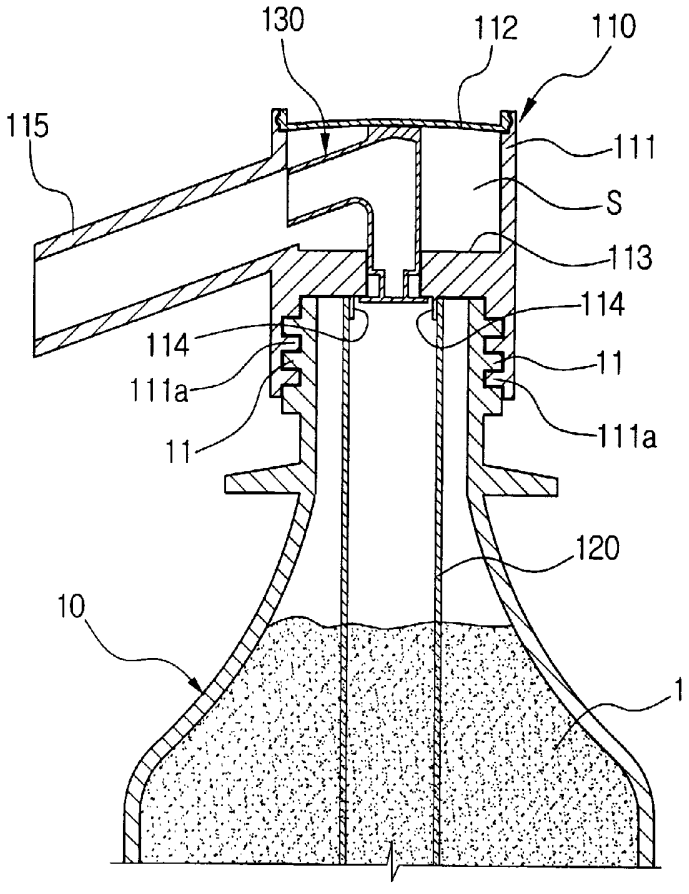
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(54) Title: BOTTLE CAP ASSEMBLY



(57) Abstract: A bottle lid assembly is disposed at a mouth of a bottle that stores a carbonated liquid therein, to allow the carbonated liquid to exit out of the bottle. Such bottle lid assembly includes a resilient layer that causes a change in internal pressure of the bottle by being compressed and deformed, a lid member having a discharge pipe formed at a side, a suction pipe supported on the lid member and inserted into the bottle and dipped in the carbonated liquid, and a valve tube that connects the suction pipe and the discharge pipe of the lid member, for opening and closing the suction pipe by being raised and lowered by the deformation of the resilient layer and thus entering and exiting with respect to a leading end of the suction pipe. The resilient layer is resiliently deformed by the compression, causing a change in the internal pressure of the bottle, so that the carbonated liquid is exit out of the bottle sequentially through the suction pipe, the valve tube and the discharge pipe with a minimum loss of carbon dioxide.

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BOTTLE CAP ASSEMBLY

TECHNICAL FIELD

The present invention relates to a bottle cap, and more particularly, it relates to a bottle cap assembly of a bottle of carbonated liquid mounted on a mouth of the bottle, which permits dispensing of a certain amount of carbonated liquid by causing pressure change in the bottle.

BACKGROUND ART

The carbon dioxide dissolved in the carbonated drink is a colorless, odorless, nonvolatile gas, and when this weak acidic gas is added to the drink, it gives the particular effervescency to the carbonated liquid (drink). The carbon dioxide moves to the upper part of the interior of the bottle until it reaches the same pressure as that in the air layer at the upper part of the interior of the bottle. Accordingly, the internal pressure of the bottle is maintained in the state of equilibrium.

As one opens the cap of the bottle, drinks the soft drink inside the bottle and then closes it, the carbon dioxide at the upper part of the inside of the bottle escapes to the atmosphere. Accordingly, the carbon dioxide of the soft drink moves to the upper part of the bottle to maintain the state of the equilibrium. As more and more of the carbon dioxide moves upward, less dense the carbon dioxide becomes in the drink, and the loss of effervescency occurs.

Korean Patent No. 127603 (Patent Publication No. 1997-9635, Patent Application No. 1995-2033) discloses a "bottle cap of carbonated soft drink" as a solution the above-described problems. According to the KP No. 127603, internal pressure change in the bottle by the pressing on a resilient layer (flexible portion) at an upper portion of an outer surface of the bottle cap causes dispensing of a certain amount of carbonated drink, which regulates the release of the carbon dioxide gas. In this way, the density of the carbon dioxide gas is maintained at a certain extent.

In dispensing the carbonated drink according to the KP No. 127603, the carbonated drink is first charged in the internal space of the outer surface of the bottle cap, and then dispensed.

Accordingly, the carbonated drink in the internal space of the outer surface of the bottle cap forms a whirling current and moves, and the interruption phenomenon occurred by the whirling current causes gust of carbonated drink and subsequently, considerable amount of foams. In this process, the carbon dioxide gas of the carbonated drink is released to the atmosphere. Further, some of the foams that were charged in the internal space of the outer surface of the bottle cap during the dispensing of the carbonated drink are turned into the liquid, exit out of the discharge port, and then gravitate down along the outer wall of the bottle, causing hygienic problem. As a result, the bottle cap is hardly developed as a product.

DISCLOSURE OF INVENTION

The present invention has been made to overcome the above-mentioned problems of the prior art, and accordingly, it is an object of the present invention to provide a bottle cap assembly of a carbonated liquid bottle, providing convenience of easy dispensing of the carbonated liquid from the bottle by simple and easy manipulation, and also contributing to the high effervescency and quality of the soft drink by controlling the loss of carbonate dioxide gas during dispensations of the soft drink through the shortened soft drink dispensing passage and thus maintaining the density of the carbonated gas at the initial level.

Another object of the present invention is to provide a hygienic and economical bottle cap assembly for a carbonated liquid bottle, which basically prevents the residue of soft drink from staying at a space of the bottle cap after the dispensing of the soft drink.

Yet another object of the present invention is to provide an economical and practical bottle cap assembly, which can be selectively mounted on all types of bottles.

The above objects are accomplished by a bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle according to the present invention, including a cap member comprising, a cylindrical body comprising a resilient layer at an upper portion to be resiliently deformed by an external force exerted thereto, thereby causing an internal pressure change in the bottle, a partitioning plate provided to be in an inner circumference of the cylindrical body, for defining a space with the resilient layer, and a discharge pipe provided at the cylindrical

body, for opening fluid communication of the space with outside, the cap member removably mounted on the mouth of the bottle; a suction pipe inserted in the bottle to be dipped in the carbonated drink, and supported on the cap member; and a valve tube mounted on the cap member for connecting the suction pipe and the discharge pipe in closed fluid communication with the space, the valve tube comprising a discharge port toward the discharge pipe and a suction port and a sealing plate toward the suction pipe, whereby the valve tube ascends and descends in accordance with a resilient deformation of the resilient layer, causing the suction port to enter and exit with respect to a leading end portion of the suction pipe to open and close the suction pipe, wherein the deformation of the resilient layer causes the internal pressure change in the bottle, and subsequent dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge pipe.

The above objects are also accomplished by a bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle according to the present invention, including a cap member comprising a cylindrical body comprising a resilient layer at an upper portion to be resiliently deformed by an external force exerted thereto, thereby causing an internal pressure change in the bottle, and also an opening formed at a sidewall exposed to outside, and a partitioning plate provided to be in an inner circumference of the cylindrical body, for defining a space with the resilient layer, the partitioning plate comprising a passing hole formed in the center portion, the

cap member removably mounted on the mouth of the bottle; a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; and a valve tube connected with the suction pipe in closed fluid communication with the space, the valve tube comprising, a discharge pipe coupled to pass through the opening of the cap member, a suction port and a sealing plate formed toward the suction pipe, whereby the valve tube ascends and descends in accordance with a resilient deformation of the resilient layer, causing the suction port to enter and exit with respect to a leading end portion of the suction pipe to open and close the suction pipe, wherein the deformation of the resilient layer causes the internal pressure change in the bottle, and subsequent dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge pipe.

The valve tube is bent at a bent portion into two ends, thereby having a structure substantially in the shape of a letter 'L'.

One end of the valve tube and one end of the discharge pipe are movably and integrally connected with each other in fluid communication by a movable rib.

The space of the cap member is provided with a guide rib for movably supporting the valve tube.

The above objects are also accomplished by a bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle according to the present invention, including a cap member comprising a cylindrical body

comprising an opening formed at a sidewall and exposed to outside, a partitioning plate provided to be in an inner circumference of the cylindrical body and having a passing hole formed in the center, the cap member removably mounted on the mouth of the bottle; a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; a pressing plate movably connected in the inner circumference of the cylindrical body of the cap member to ascend and descend, forming a space with the partitioning plate; a valve tube comprising a discharge pipe having a bent portion for being passed through the opening at the sidewall of the cap member and the passing hole of the partitioning plate, the discharge pipe having a suction port and a sealing plate formed toward the suction pipe, the bent portion of the discharging pipe being connected to the lower side of the pressing plate whereby the valve tube is connected to the suction pipe; and a resilient body disposed between the partitioning plate of the cap member and the pressing plate and disposed in the proximity of the valve tube for ascending and descending the pressing plate; wherein pressing on the pressing plate causes the internal pressure change in the bottle whereby the carbonated drink is dispensed consecutively via the suction pipe, the valve tube and the discharge pipe.

The above objects are also accomplished by a bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle according to the present invention, including a cap member removably mounted on the mouth of the bottle, and having a screw hole formed at the center of a partitioning plate

provided in the inner circumference of a cylindrical body; a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; and a valve tube comprising a discharge pipe having a bent portion for being passed through the screw hole of the partitioning plate, the discharge pipe having a suction port and a sealing plate formed toward the suction pipe, the bent portion of the discharging pipe being provided with a grip for rotation and connected to the suction pipe; wherein the grip of the valve tube is rotated, causing ascending and descending movement and subsequent internal pressure change in the bottle, and dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge pipe.

The above objects are also accomplished by a bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle according to the present invention, including a cap member removably mounted on the mouth of the bottle, and having a passing hole formed at the center of a partitioning plate provided in the inner circumference of a cylindrical body; a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; a pressing plate movably connected in the inner circumference of the cylindrical body of the cap member to ascend and descend, thereby defining a space with the partitioning plate; a valve tube comprising a suction port and a sealing plate formed toward the suction pipe, and is integrally formed with the pressing plate in the manner of passing through the pressing plate to be exposed outside, the valve tube movably connected with the passing

hole of the partitioning plate to ascend and descend and to be connected with the suction pipe; and ascending and descending means disposed between the partitioning plate of the cap member and the pressing plate and also disposed in the proximity of the valve tube, thereby ascending and descending the pressing plate, wherein pressing on the pressing plate causes the internal pressure change in the bottle, and as the bottle is inclined at a predetermined angle, the soft drink is dispensed consecutively via the dispensing pipe, the valve tube and the discharge pipe.

The ascending and descending means comprises a resilient body disposed between the partitioning plate of the cap member and the pressing plate and in the proximity of the valve tube; and restricting means for selectively restricting the deformation of the resilient body, wherein the restricting means comprises first and second locking holes formed in a sidewall of the cap member, first and second hooks provided at a protrusion rib protruding from an outer circumference of the valve tube, the first hook being displaced in the first hole in accordance with the deformation of the resilient body, and the second hook being selectively locked in, thus restricted in first and second locking holes.

According to one aspect of the present invention, the restricting means comprise a cam member comprising a cam groove formed in an inner circumference of the cap member; and a cam pin disposed on the pressing plate for being cammingly moved along the cam groove in accordance with the ascending and descending of the pressing plate, thereby being locked/unlocked alternately.

According to another aspect of the present invention, the restricting means

comprises a guide rail having an uneven surface, formed on the inner circumference of the cylindrical body of the cap member and extended in a lengthwise direction; a serrated member meshed with the guide rail and connected to the pressing plate for ascending and descending; and a ratchet wheel member inserted in an end of the guide rail and to a close contact with a leading end of the serrated member by being resiliently biased by the resilient body, and ascended and descended as the ratchet wheel member is interrupted by the ascending and descending of the serrated member so as to be rotated in uni-direction periodically, thereby being alternately engaged with the guide rail.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic sectional view showing a bottle cap assembly for a carbonated liquid bottle being mounted on the bottle;

FIG. 2 is a schematic and partial perspective view of the bottle cap assembly of FIG. 1;

FIG. 3 is a schematic perspective view showing the valve tube of FIGS. 1 and 2;

FIG. 4 is a schematic sectional view showing the bottle cap assembly of FIG. 1;

FIGS. 5 and 6 are schematic sectional views showing a bottle cap assembly for a carbonated liquid bottle according to another preferred embodiment of the present invention;

FIGS. 7 and 8 are schematic sectional views showing a bottle cap assembly for a carbonated liquid bottle according to yet another preferred embodiment of the present

invention;

FIGS. 9 and 10 are, respectively, a schematic sectional view and a perspective view showing a bottle cap assembly for a carbonated liquid bottle according to yet another preferred embodiment of the present invention;

FIG. 11 is a schematic perspective view showing the main portion of FIGS. 9 and 10;

FIG. 12 is a schematic sectional view showing the bottle cap assembly according to the preferred embodiment of FIGS. 9 and 10 being in use;

FIGS. 13a and 13b are schematic sectional views showing the bottle cap assembly in use according to another preferred embodiment of the present invention;

FIG. 14 is a schematic partial perspective view of the bottle cap assembly according to yet another preferred embodiment of the present invention;

FIG. 15 is a schematic partial perspective view of the bottle cap assembly according to yet another preferred embodiment of the present invention;

FIG. 16 is a schematic partial perspective view of the bottle cap assembly according to yet another preferred embodiment of the present invention;

FIG. 17 is a schematic sectional view showing the variation of the bottle cap assembly of FIG. 16 according to the present invention;

FIG. 18 is a schematic sectional view showing another variation of the bottle cap assembly of FIG. 16 according to the present invention;

FIG. 19 is a schematic plan view showing the main portion of FIG. 18l

FIG. 20 is a schematic sectional view showing yet another variation of the bottle cap assembly of FIG. 16 according to the present invention;

FIGS. 20a through 20c are schematic perspective views showing the main portion of FIG. 20; and

FIGS. 21a and 21b are schematic perspective views for explaining the main portion of FIG. 20.

BEST MODE FOR CARRYING OUT THE INVENTION

Hereinbelow, a bottle cap assembly for a carbonated liquid bottle according to the preferred embodiments of the present invention will be described with reference to the accompanying drawings.

Referring to FIG. 1, the bottle cap assembly according to the present invention includes a cap member 110 removably mounted on a mouth of a bottle 10 that stores carbonated liquid therein, a suction pipe 120 with one upper end being supported on the cap member 110 such that the other end can be received in a carbonated drink 1 stored in the bottle 10, and a valve tube 130 mounted on the cap member 110 for entering and exiting with respect to the upper end of the suction pipe 120 thereby opening and closing the cap.

FIG. 2 is a partial perspective view of the cap member. Referring to FIGS. 1 and 2, the cap member 110 includes a cylindrical body 111 having a screw portion 111a formed on an inner circumference so as to seal the mouth of the bottle 1 – namely, a PET bottle - in cooperation with a screw portion formed on an outer circumference, and a resilient layer 112

resiliently deformable upward and downward by the external force thereby causing internal pressure change of the bottle 10.

A partitioning plate 113 is formed at the inner circumference of the cylindrical body 111 to define a space s at the lower portion of the resilient layer 112, and a supporting plate 114 is protruded from the center of the partitioning plate 113 downward to be inserted in and thus support the upper end of the suction pipe 120.

A discharge pipe 115 is formed at a side of the cylindrical body 11, for permitting the carbonated drink inside of the PET bottle 10 to be discharged out therethrough. The discharge pipe 115 is protruded from a side of the cylindrical body 11 to be in fluid communication with the space s defined between the resilient layer 112 and the partitioning plate 113.

According to the present invention, the cap member 110 is preferably formed as one body of the cylindrical body 111, the partitioning plate 113, the supporting tube 114 and the discharge pipe 115 by injection molding of synthetic resin.

As shown in FIGS. 1 and 2, the valve tube 130 has a bent portion 131 formed in the middle, bending the valve tube 130 into the shape approximately of letter 'L' such that the fluid communication of the suction pipe 120 and the discharge pipe 115 with the space is closed. The bent portion 131 is formed in the space s of the cap member 110, supported on the lower side of the resilient layer 112 of the cap member 110 to be raised or lowered.

It is preferred that the valve tube 130 is integrally formed with the resilient layer 112 by molding, and the bent portion 131 of the valve tube 130 is supported on the resilient layer

112 of the cap member 110 by the adhesives such as bond, or the like, or alternatively, by a compact screw or rivet, thereby being raised or lowered in accordance with the resilient distortion of the resilient layer 112.

A sealing plate 132 is formed at one end of the valve tube 130, i.e., at the lower end of the suction pipe 120, while a discharge port 134 is formed at the other end of the valve tube 130, i.e., at the end of the discharge pipe. The suction pipe 120 has a pair of suction ports 133 formed above the sealing plate 132, while a discharge port 134 is formed at the discharge pipe.

Accordingly, as the resilient layer 112 of the cap member 110 is distorted downward by the external force, the valve tube 130 is lowered with the bent portion 131 thereof being secured on the resilient layer 112, and the pair of suction ports 133 are inserted into the upper portion of the suction pipe 120 thereby becoming in fluid communication with the suction pipe 120.

Then with the applying of the external force being stopped, the resilient layer 112 is returned to the initial position whereupon the valve tube 130 is raised and the pair of suction ports 133 are raised out. Also, the sealing plate 132 at the lower end is positioned at the leading end of the suction pipe 120. As a result, the communication between the valve tube 130 and the suction pipe 120 is closed.

Meanwhile, according to the present invention, the amount and intensity of dispensed soft drink can be regulated by varying the size and number of the valve tube 130 and the suction port 133.

Hereinbelow, the bottle cap assembly for carbonated soft drink bottle in use according to the present invention will be described with reference to FIG. 4.

In order to dispense the soft drink stored in the PET bottle with the bottle cap assembly for the carbonated soft drink bottle according to the present invention, as shown in FIG. 4, the user presses down the resilient layer 112 of the cap member 110 with his/her finger. The resilient layer 112 is deformed downward, pressing the bent portion 131 of the valve tube 130 down. As a result, the suction ports 133 of the valve tube 130 are inserted into the upper part of the suction pipe 120, entering into the fluid communication with the interior of the upper part of the suction pipe 120. In such a situation, overpressure carbon dioxide gas charged in the upper part of the carbonated soft drink 1 of the PET bottle 10 pushes the soft drink upward. Accordingly, the soft drink is raised through the suction pipe 120, and dispensed outside through the suction ports 133 and the discharge pipe 115 of the valve tube 130. As the soft drink 1 is dispensed sequentially through the suction pipe 120 and the valve tube 130 and the discharge pipe 115, which are closed from the space s, no soft drink remains in the space s.

With the applying of the external force on the resilient layer 112 of the cap member 110 being stopped, the valve tube 130 is raised whereupon the pair of suction ports 133 are raised out of the suction pipe 120, and the sealing plate 132 at the lower end of the valve tube 130 is positioned at the leading end of the suction pipe 120. As a result, the communication between the valve tube 130 and the suction pipe 120 is closed, and the dispensing of the soft drink 1 is stopped.

Meanwhile, FIGS. 5 and 6 show the bottle cap assembly for carbonated soft drink bottle according to the another preferred embodiment of the present invention. According to another preferred embodiment, the discharge pipe 115' is pierced through a side of the cap member 110, and the rear end of the discharge pipe 115' and one end of the valve tube 130 are movably and integrally connected with each other by the intervention of a movable lib L therebetween.

As shown, the movable lib L can be formed as a telescopic type, so as to have a certain degree of freedom in motion according to the movement of the valve tube 130.

With the bottle cap assembly for carbonated drink according to the preferred embodiment of the present invention as described above, the resilient layer 112 is deformed downward thereby pressing the bent portion 131 of the valve tube 130. Here, as the movement of the discharge pipe 115' is prevented by the buffering of the movable lib L, the valve tube 130 alone is raised and lowered. Accordingly, the carbonated drink 1 is dispensed subsequently via the suction pipe 120, the valve tube 130 and the discharge pipe 115.

Next, FIGS. 7 and 8 are views for explaining the bottle cap assembly for carbonated drink bottle according to another preferred embodiment of the present invention, in which the structure of the valve tube and the neighboring portion is varied.

Referring to FIGS. 7 and 8, the bottle cap assembly for carbonated drink bottle according to this embodiment of the present invention includes a cap member 210 removably connected to the mouth of a PET bottle 10 stored a carbonated drink 1 therein, a suction pipe 120, with an upper end of which being supported on the cap member 210, inserted inside of

the PET bottle 10 and dipped in the carbonated drink 1, and a valve tube 230 disposed on the cap member 210 for entering and exiting the upper end of the suction pipe 120 thereby opening/closing the suction pipe 120.

As shown, the cap member 210 has a cylindrical body 211 having a screw portion 210a formed on the inner circumference for sealingly closing the mouth of the PET bottle 10 in cooperation with the screw portion 11 formed on the outer circumference of the mouth, and a resilient layer 211 formed on the upper portion for being resiliently deformed in a vertical direction by the external force, thereby causing internal pressure change in the PET bottle.

A partitioning plate 213 is formed on the inner circumference of the cylindrical body 211 and below the resilient layer 211 for defining a space s' therebetween, and a guiding rib 216, a pipe whose one end is open, is protruded from the center of the partitioning plate 213 upward into the space s' so as to support the valve tube 230 movable upward and downward. A supporting plate 214 is protruded from the lower side of the center portion of the partitioning plate 213 into the upper end of the suction pipe 120, thereby supporting the upper end of the suction pipe 120.

Provided on one side of the cylindrical body 211 is a discharge pipe 215 through which the carbonated drink of the bottle is discharged out. The discharge pipe 215 is protruded to enter into the fluid communication with the open portion of the guiding rib 216 and also protruded from the cylindrical body 211 to the outside.

In the cap member 210 according to this preferred embodiment - by injection molding the synthetic resin, for example - the cylindrical body 211, the resilient layer 212 and the

partitioning layer 213 are integrally formed with one another, while the guiding rib 216 and the discharge pipe 215 are integrally formed with each other.

The valve tube 230 is movably disposed on the guiding rib 216 to be raised and lowered so as to be positioned between and to connect the suction pipe 120 and the discharge pipe 215.

The upper end of the valve tube 230 can be attached to the lower side of the resilient layer 212 by adhesives such as bond, or connected to the lower side of the resilient layer 212 by small screws or rivets, so that the valve tube 230 can be raised or lowered in accordance with the deformation of the resilient layer 212.

The valve tube 230 has a sealing plate 232 formed at a lower end, a pair of suction ports 233 formed in the upper portion of the sealing plate 232, and an opening 234 formed in a side of the body of the valve tube 230 and in fluid communication with the discharge pipe 215.

The dispensing of the carbonated drink with the bottle cap assembly according to this embodiment is performed on the substantially same principle as that of the bottle cap assembly according to the previous embodiment. That is, as shown in FIG. 8, as the resilient layer 212 is deformed downward by the external force, the valve tube 230 is restricted downward, and the pair of suction ports 233 are inserted into the upper end of the suction pipe 120 to thereby enter into the fluid communication with the suction pipe 120. Accordingly, as the high pressure carbon dioxide gas at the upper portion of the carbonated drink 1 of the PET bottle 10 pushes the carbonated drink upward, the lower part of the

carbonated drink is drawn upward through the suction pipe 120, and then dispensed out through the suction ports 233 and the discharge pipe 215 of the valve tube 230. As the carbonated drink 1 is dispensed sequentially through the suction pipe 120 in closed communication with the space s, and then through the valve tube 230 and the discharge pipe 215, the residue of the carbonated drink 1 in the space s is prevented during the dispensing.

With the external force to the resilient layer 212 being ceased, the resilient layer 212 returns to the initial shape, raising the valve tube 230. Accordingly, the pair of suction ports 233 are escaped out of the suction pipe 120, and the sealing plate 232 at the lower part s positioned at the leading end of the suction pipe 120. As a result, the fluid communication between the valve tube 230 and the suction pipe 120 becomes closed, and the dispensing of the carbonated drink 1 is prevented.

FIGS. 9 through 12 are views for explaining the bottle cap assembly of carbonated drink bottle according to yet another preferred embodiment of the present invention, employing the modifications of the valve tube and the neighboring components of the previous embodiments. Throughout the description of this embodiment, the like elements will be given the same reference numerals or symbols.

Referring to FIGS. 9 through 12, the bottle cap assembly of carbonated drink bottle according to this embodiment has a structure in which the removable cap member 110A at the mouth of the PET bottle 10 is open upward for receiving the discharge pipe 115 of the valve tube 130A which is integrally formed with the open part of the PET bottle 10. According to this structure, ascending and descending of the discharge pipe 115 of the valve tube 130A

becomes easier during the deformation of the resilient layer 112 at the upper portion of the cap member 110A.

FIGS. 13a and 13b are views for explaining the bottle cap assembly of carbonated drink bottle according to yet another preferred embodiment of the present invention, employing the modification of the cap member of the previous embodiments. Throughout the description of this embodiment, the like elements will be given the same reference numerals or symbols of the previous embodiments.

Referring to FIGS. 13a and 13b, the bottle cap assembly of carbonated drink bottle according to yet another preferred embodiment of the present invention has a structure in which the cap member 110B of FIGS. 1 and 2 removably mounted on the mouth of the PET bottle 10 has an extendible/contractible side, and the general plate type lid layer 112B is mounted on the upper portion. According to this structure, since the extendible/contractible cap member 110B is resiliently deformed as the plate type lid layer 112B is pressed, there is no need to employ the resilient layer 112. Accordingly, ascending/descending of the discharge pipe 115 of the valve tube 130A becomes simpler.

FIG. 14 is a view for explaining a bottle cap assembly of carbonated drink bottle according to yet another preferred embodiment of the present invention. Throughout the description, the like elements will be given the same reference numerals or symbols as those of the previous embodiments.

Referring to FIG. 14, the bottle cap assembly of carbonated drink bottle according to this embodiment uses a pressing plate 150 instead of resilient layer 112 of FIG. 2. The

pressing plate 150 is movably fit in the inner circumference of a cylindrical body 111 of the cap member 110A to ascend and descend. That is, a part of the sidewall of the cap member 110A defines an opening exposed upward, and the discharge pipe 115 of the valve tube 130A bent in the shape approximately of letter 'L' is mounted on the opening. The circular pressing plate 150 is movably fit in the inner circumference of the cylindrical body 111 of the cap member 110A to ascend and descend, while fixedly connected to, or integrally formed with the bent portion (131 of FIG. 3) of the valve tube 130A. Further, a resilient body 160 such as a spring, a silicone or a rubber can be formed between the partitioning plate 113 of the cap member 110A and the circular pressing plate 150, surrounding the valve tube 130A.

According to the above structure, by exerting or ceasing to exert pressure on the pressure plate 150 of the cap member 110A, the resilient body 160 disposed at the lower portion is resiliently deformed or returned to initial shape, and the valve tube 130A and the discharge pipe 115 can be raised and lowered more simply. Accordingly, the carbonated drink is dispensed through the suction pipe 120, the valve tube 130A and the discharge pipe 115 sequentially due to internal pressure change.

FIG. 15 is a view for explaining the bottle cap assembly of carbonated drink bottle according to yet another preferred embodiment of the present invention, employing a modification of the cap member of the previous embodiments. Throughout the description of this embodiment, the like elements will be given the same reference numerals or symbols of those of the previous embodiments. The bottle cap assembly of carbonated drink bottle according to this embodiment has a structure in which the carbonated drink is dispensed by

the rotation of the bottle cap, which is different from the structure of the bottle cap assemblies of the previous embodiments where the carbonated drink is dispensed by the pressure.

Referring to FIG. 15, the partitioning plate 313 is provided on the inner circumference of the cylindrical body 311 of the cap member 310 that is removably mounted on the mouth of the bottle, and a screw hole 316 is formed at the center portion of the partitioning plate 313 to be passed through the partitioning plate 313. The valve tube 330 ascends and descends as it rotates in screw contact with the threads of the screw hole 316.

The valve tube 330 includes a discharge pipe 330A bent into the shape approximately of letter 'L' and passed through the screw hole 316, and a tube member 330B fixedly connected to one end of the discharge pipe 330A. The discharge pipe 330A and the tube member 330B can be integrally formed with each other, or can be formed separately and then fixed with each other.

The tube member 330B has the sealing plate 332 and the suction port 333 formed at the lower end, while a grip 330C is formed on a bent portion of the discharge pipe 330C to enable a user to grip and turn.

Therefore, according to the structure shown in FIG. 15, as the user grabs the grip 330C and turns the valve tube 330, the discharge pipe 330a and the tube member 330B are rotated and ascended and descended, causing internal pressure change of the bottle 10. As a result, the carbonated drink is dispensed through the suction pipe 120, the valve tube 330, i.e., via the tube member 330B and the discharge pipe 330A.

FIG. 16 is a view for explaining the bottle cap assembly of carbonated drink bottle

according to yet another preferred embodiment of the present invention, employing a modification of the valve tube of the previous embodiments. Throughout the description, the like elements will be given the same reference numerals of symbols as those of the previous embodiments. According to this embodiment, the bottle cap assembly of carbonated drink bottle has a structure in which the valve tube is formed as a linear type which is integrally formed with the pressing plate, and the carbonated drink is dispensed out by inclining the bottle to a predetermined angle, in addition to exerting a certain degree of pressure.

Referring to FIG. 16, according to this embodiment, instead of the resilient layer 112 of FIGS. 1 and 2, a circular pressing plate 150 is movably fit in the inner circumference of the cylindrical body 111 of the cap member 110C to ascend and descend, and the linear type valve tube 130C passing through the pressing plate 150 is integrally formed with the pressing plate 150. A resilient body 160 such as a spring or a silicone is disposed between the partitioning plate 113 and the pressing plate 150, for serving as an ascending/descending means for the pressing plate 150 and the valve tube 130C.

According to such structure, as the pressure is exerted to the pressing plate 150 of the cap member 110C, the resilient body 160 at the lower portion is resiliently deformed, causing the valve tube 130C and the discharge pipe 115' to ascend and descend, and subsequently, an internal pressure change in the bottle. At this time, as the user incline the bottle at a predetermined angle, the carbonated drink is dispensed out via the suction pipe 120, the valve tube 130C and the discharge pipe 115'.

According to this embodiment, the carbonated drink is dispensed as the bottle is

inclined when there occurs the internal pressure change in the bottle by the pressure. Also, since the carbon dioxide gas moves to the lower portion of the bottle when the PET bottle is inclined, the carbon dioxide gas can be kept for a longer period of time.

FIG. 17 is a view showing a restricting means for restricting the ascending/descending of the pressing plate 150 of FIG. 16. Referring to FIG. 17, the restricting means includes first and second locking holes 111a, 111b formed in the sidewall of the cap member 110D, and first and second hooks 137a, 137b formed on a protrusion rib 137 which is protruded from the outer circumference of the valve tube 130D. Leading end of the protrusion rib 137 is bent and resiliently deformable.

The first hook 137a is displaced from the first locking hole 111a according to the resilient deformation of the resilient body 160, while the second hook 137b is selectively locked in first and second locking holes 111a, 111b and thus restricted.

According to the present invention, the length of the first locking hole 111a is longer than that of the second locking hole 111b, and more specifically, the length of the second locking hole 111b is slightly longer than the thickness of the second hook 137b so as not to allow any undesired movement in the space, while one end is rounded for easy separation. The length of the first hook 137a is longer than that of the second hook 137b. More specifically, the first hook 137a is protruded out through the first locking hole 111a, while the second hook 137b is not protruded out through the second locking hole 111b, so as to be moved smoothly in accordance with the ascending/descending of the protrusion rib 137 and then selectively locked in first and second locking holes 111a, 111b.

According to the restricting means constructed as above, as the pressing plate 150 is pressed, the resilient body 160 is resiliently deformed, and the valve tube 130D is descended together with the protrusion rib 137 which is integrally formed with the valve tube 130D. As a result, the first hook 137a formed on the leading end of the protrusion rib 137 is displaced from the upper portion to the lower portion of the first locking hole 111a, while the second hook 137b escapes from the second locking hole 111a to be locked in the rear end of the first locking hole 111b. Accordingly, even when the pressure on the pressing plate 150 is ceased, the second hook 137b is locked in the rear end of the first locking hole 111b, preventing the resilient body 160 from recovering to the initial position.

Accordingly, since the valve tube 130D is remained at the lowered state, the user can open the cap of the bottle with one-touch, and enjoy the carbonated drink of the bottle while he/she inclines the bottle at a predetermined angle. After dispensing of a certain amount of carbonated drink, as the user presses on the first hook 137a, the leading end of the protrusion rib 137 is pushed inward, and thus the second hook 137b escapes from the rear end of the first locking hole 111b and then moves to the second locking hole 111a. As the resilient body 160 recovers to the initial position, the valve tube 130D ascends, closing the bottle cap.

FIG. 18 is a view for showing the bottle cap assembly of carbonated drink bottle of FIG. 16 modified according to another example of the present invention. This example employs another restricting means for pressing, thus alternately ascending and descending the pressing plate 150. Throughout the description, the like elements of this example will be given the same reference numerals or symbols as those of the previous embodiments.

Referring to FIG. 18, the restricting means for pressing and alternately ascending and descending the pressing plate 150 employs a driving mechanism, which is generally used to open and close a control door of electronic device by one-touch process. This another restricting means includes a cam member 410 fit in a groove formed in the inner circumference of the cylindrical body 111 of the cap member 110E and having a cam groove 412 formed therein, and a cam pin 420 cammingly moving in the cam groove 412 in a certain direction in accordance with the ascending/descending of the pressing plate 150 to be locked/unlocked alternately.

FIG. 19 is a schematic view showing the cam member 410, in which the cam pin 420 is cammingly moved in the cam groove 412 in accordance with the ascending/descending of the pressing plate 150 to be alternately locked and unlocked. As shown, the cam groove 412 is defined by first and second cam blocks 411a, 411b, there are provided slopes or steps a, b, c, d on the bottom surface so as to allow the movement of the cam pin 420 only in a uni-direction (as arrowed, for example). Accordingly, the bottoms between the steps a, b, c, d are on different levels, and movement of the cam pin 420 in the reverse direction is prevented due to the presence of the steps a, b, c, d. As the pressing plate 150 is pressed, the leading end portion of the cam pin 420 is moved along the cam groove 412 in the certain direction to be locked and restricted in the lower end portion of the cam groove 412. As a result, the resilient body 160 is prevented from recovering to the initial position, maintaining the pressing plate 150 and the valve tube 130E at the lowered state, and keeping the bottle cap open.

In such a situation, as the pressing plate 150 is pressed again, the leading end portion

of the cam pin 420 is moved in the certain direction to be unlocked from the lower end of the cam groove 412. The resilient body 160 is allowed to recover to the initial position, and the pressing plate 150 and the valve tube 130E ascend, keeping the bottle cap closed.

With the bottle cap assembly of carbonated drink bottle according to the above-mentioned preferred embodiment of the present invention, the pressing plate 150 is pressed by so-called one-touch process, to alternately open and close the bottle cap.

FIG. 20 shows another restricting means for pressing, thus alternately ascending/descending the pressing plate 150 being employed in the embodiment of FIG. 16. Throughout the description, the like elements will be given the same reference numerals or symbols as those of the previous embodiments.

Referring to FIG. 20, the another restricting means employed in this embodiment utilizes a driving mechanism which is usually used to open and unlock a – namely, a lead of a ball-point pen – by one-touch process. The restricting means includes a guide rail G having uneven surface and is formed on the inner circumference of the cylindrical body 111 of the cap member 110F, extending in the lengthwise direction. The restricting means also includes a serrated member 510 movably connected to the pressing plate 150 to ascend and descend in mesh with the guide rail G, and a ratchet wheel member 530 resiliently biased to be inserted in the end of the guide rail G to be in close contact with the leading end portion of the serrated member 510. The ratchet wheel member 530 is periodically rotated in accordance with the ascending/descending of the serrated member 510, to be selectively restricted in the end of the guide rail G, thereby ascending and descending in alternate mesh with the guide

rail G.

The serrated member 510 and the ratchet wheel member 530 are connected with each other, with the valve tube 130F and the discharge pipe 115' passed therethrough.

As shown in FIG. 20a, the guide rail G includes first and second grooves G1, G2 of different depths formed in the inner circumference of the cylindrical body 111 of the cap member 110F and alternately formed at a predetermined interval, and a stepped guiding portion g having a cylindrical shape formed on the end of the inner circumference of the cylindrical body 111 of the cap member 110F. The ratchet wheel member 530 is disposed to be positioned in the guiding portion g.

According to one aspect of the present invention, first and second grooves 212a, 212b of the guide rail 212 are recessed in the inner circumference of the cylindrical body 111 of the cap member 110F to a different depth, and more preferably, first and second grooves 212a, 212b have depths in 1:2 proportion. That is, the depth of the second groove 212b is two times greater than that of the first groove 212a, for allowing selective entering and ascending of the ratchet member 250.

As shown in FIG. 20b, the serrated member 510 includes a serrated portion 515 formed at the end of the cylindrical body 511, and slide pieces 513 protruded from the outer circumference of the cylindrical body 511 at a uniform interval. As shown, the ends of the slide pieces 513 are inclined approximately in symmetrical fashion.

As shown in FIG. 20c, the ratchet wheel member 530 includes a serrated portion 533 formed at the end of the cylindrical body 531 to be in mesh with the serrated portion 515 of

the serrated member 510, and guiding pieces 535 protruded from the outer circumference of the body 531 in a radial direction and at a uniform interval for being selectively restricted in the guide rail G in accordance with the depth of the guide rail G and ascending. Here, the reference numeral 537 denotes the inclining sides of the guiding pieces 535, which are inclined in uni-direction. According to the ascending and descending of the serrated member 510, the inclining sides 537 are restricted by the inclining surface of the slide pin 513, to periodically rotate the ratchet wheel member 530. As a result, the position of the guiding pieces 535 selectively changes, inserted in only one of first and second grooves G1, G2. This is possible by forming the guiding pieces 535 to protrude to be on the level between first and second grooves G1, G2. That is, the unlocking and ascending is only possible when the guide pieces 535 are positioned to be in the grooves, while ascending is locked, thus impossible when the guiding pieces 535 are positioned in the grooves of relatively small depth.

Meanwhile, referring to FIGS. 21a, 21b, the ratchet wheel member 530 is inserted in the space guiding portion g formed at the end of the guide rail G, with the serrated portion 533 being in mesh with the serrated portion 515 of the serrated member 51. In such a situation, due to the periodic rotation in uni-direction in accordance with the ascending and descending of the serrated member 510, there occurs a selective locking in the step at the end of the first groove G1 of the guide rail G, and accordingly, ascending is taken place as the guide pieces 535 are alternately meshed with the second groove G1 of the guide rail G.

According to the present invention, the ratchet wheel member 530, as shown, is resiliently biased to the close contact with the serrated member 510 by the resilient body 160

which is supported on the partitioning plate 113 of the cap member 110F at its one end.

According to the restricting means constructed as above, when the pressing plate 150 is pressed, as shown in FIG. 21a, the serrated member 510 descends, pushing the ratchet wheel member 530 to the space guiding portion g at the end of the guide rail G. As a result, the guiding pieces 535 escape from the guide rail G, and the inclining surface 537 of the ratchet wheel member 530 is restricted in the inclining sides of the slide pieces 513 to be periodically rotated in uni-direction. At this time, the position of the guiding pieces 535 changes to be in either the first groove G1 or the second groove G2 of the guide rail G. When the guiding pieces 535 are arranged in the second groove G2, which is deeper than the first groove G1, the guiding pieces 535 ascend along the second groove G2 of the guide rail G by the recovering force of the resilient body 160 in mesh with the serrated member 510. Accordingly, during the ascending of the ratchet wheel member 530, the serrated member 510 is pushed upward, and the valve tube 130F and the discharge pipe 115' thereof also ascend, thereby keeping the bottle cap closed.

Meanwhile, after the rotation of the ratchet wheel member 530, the guiding pieces 535 are arranged to be in the first groove G1. Since the guiding pieces 535 are relatively higher than the first groove G1, the guiding pieces 535 are restricted in the sill of the first groove G1, and thus prevented from being inserted in the first groove G1. As a result, the ratchet wheel member 530 and the serrated member 51 are un-meshed, and descending is taken place. Accordingly, the valve tube 130F and the discharge pipe 115' descend, keeping the bottle cap open.

According to the restricting means as described above, by pressing the pressing plate 150 just like pressing a button, locking/unlocking of the valve tube 130F and the discharge pipe 115' are repeated due to the cooperation of the guide rail G and the serrated member 510 of the cap member 110F, and the ratchet wheel member 530. Accordingly, the bottle cap can be open and closed with ease.

As described above, with the bottle cap assembly of carbonated drink bottle according to the present invention, since the carbonated drink is dispensed via the suction pipe, the valve tube and the discharge pipe in close communication with the space defined in the cap member, there is no residue of the carbonated drink remaining in the space. Accordingly, loss of carbon dioxide gas is minimized, while the carbonated drink dispensing path is shortened. As a result, the freshness of the carbonated drink can be maintained at an optimum degree.

Also, as the entering of the carbonated drink into the space defined in the cap member is prevented, leakage of the drink after the dispensing can be basically prevented.

Further, according to the present invention, by varying the size and number of the valve tube 130 and the suction port 133, flowrate and intensity of the dispensed carbonated drink can be adjusted.

Although the preferred embodiments of the present invention have been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiments, but various changes and modifications can be made within the spirit and scope of the present invention as defined by the appended claims.

CLAIMS:

1. A bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle, comprising:

a cap member comprising,

a cylindrical body comprising a resilient layer at an upper portion to be resiliently deformed by an external force exerted thereto, thereby causing an internal pressure change in the bottle,

a partitioning plate provided to be in an inner circumference of the cylindrical body, for defining a space with the resilient layer, and

a discharge pipe provided at the cylindrical body, for opening fluid communication of the space with outside,

the cap member removably mounted on the mouth of the bottle;

a suction pipe inserted in the bottle to be dipped in the carbonated drink, and supported on the cap member; and

a valve tube mounted on the cap member for connecting the suction pipe and the discharge pipe in closed fluid communication with the space, the valve tube comprising a discharge port toward the discharge pipe and a suction port and a sealing plate toward the suction pipe, whereby the valve tube ascends and descends in accordance with a resilient deformation of the resilient layer, causing the suction port to enter and exit with respect to a leading end portion of the suction pipe to open and close the suction pipe,

wherein the deformation of the resilient layer causes the internal pressure change in the bottle, and subsequent dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge pipe.

2. A bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle, comprising:

a cap member comprising,

a cylindrical body comprising a resilient layer at an upper portion to be resiliently deformed by an external force exerted thereto, thereby causing an internal pressure change in the bottle, and also an opening formed at a sidewall exposed to outside, and

a partitioning plate provided to be in an inner circumference of the cylindrical body, for defining a space with the resilient layer, the partitioning plate comprising a passing hole formed in the center portion,

the cap member removably mounted on the mouth of the bottle;

a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; and

a valve tube connected with the suction pipe in closed fluid communication with the space, the valve tube comprising,

a discharge pipe coupled to pass through the opening of the cap member,

a suction port and a sealing plate formed toward the suction pipe,

whereby the valve tube ascends and descends in accordance with a resilient deformation of the resilient layer, causing the suction port to enter and exit with respect to a leading end portion of the suction pipe to open and close the suction pipe,

wherein the deformation of the resilient layer causes the internal pressure change in the bottle, and subsequent dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge pipe.

3. The bottle cap assembly of either claim 1 or claim 2, wherein the valve tube is bent at a bent portion into two ends, thereby having a structure substantially in the shape of a letter 'L'.

4. The bottle cap assembly of either claim 1 or claim 2, wherein one end of the valve tube and one end of the discharge pipe are movably and integrally connected with each other in fluid communication by a movable rib.

5. The bottle cap assembly of either claim 1 or claim 2, wherein the space of the cap member is provided with a guide rib for movably supporting the valve tube.

6. The bottle cap assembly of either claim 1 or claim 2, wherein a sidewall of the cap member is extendible and contractible.

7. A bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle, comprising:

a cap member comprising,

a cylindrical body comprising an opening formed at a sidewall and exposed to outside,

a partitioning plate provided to be in an inner circumference of the cylindrical body and having a passing hole formed in the center,

the cap member removably mounted on the mouth of the bottle;

a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink;

a pressing plate movably connected in the inner circumference of the cylindrical body of the cap member to ascend and descend, forming a space with the partitioning plate;

a valve tube comprising a discharge pipe having a bent portion for being passed through the opening at the sidewall of the cap member and the passing hole of the partitioning plate, the discharge pipe having a suction port and a sealing plate formed toward the suction pipe, the bent portion of the discharging pipe being connected to the lower side of the pressing plate whereby the valve tube is connected to the suction pipe; and

a resilient body disposed between the partitioning plate of the cap member and the pressing plate and disposed in the proximity of the valve tube for ascending and descending the pressing plate; wherein pressing on the pressing plate causes the internal pressure change in the bottle whereby the carbonated drink is dispensed consecutively via the suction pipe, the valve tube and the discharge pipe.

8. A bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle, comprising:

a cap member removably mounted on the mouth of the bottle, and having a screw hole formed at the center of a partitioning plate provided in the inner circumference of a cylindrical body;

a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink; and

a valve tube comprising a discharge pipe having a bent portion for being passed through the screw hole of the partitioning plate, the discharge pipe having a suction port and a sealing plate formed toward the suction pipe, the bent portion of the discharging pipe being provided with a grip for rotation and connected to the suction pipe;

wherein the grip of the valve tube is rotated, causing ascending and descending movement and subsequent internal pressure change in the bottle, and dispensing of the carbonated drink consecutively via the dispensing pipe, the valve tube and the discharge

pipe.

9. A bottle cap assembly of a carbonated drink bottle mounted on a mouth of the carbonated drink bottle storing the carbonated drink therein, for permitting the dispensing of the carbonated drink from the bottle, comprising:

a cap member removably mounted on the mouth of the bottle, and having a passing hole formed at the center of a partitioning plate provided in the inner circumference of a cylindrical body;

a suction pipe supported on the cap member to be inserted in the bottle and dipped in the carbonated drink;

a pressing plate movably connected in the inner circumference of the cylindrical body of the cap member to ascend and descend, thereby defining a space with the partitioning plate;

a valve tube comprising a suction port and a sealing plate formed toward the suction pipe, and is integrally formed with the pressing plate in the manner of passing through the pressing plate to be exposed outside, the valve tube movably connected with the passing hole of the partitioning plate to ascend and descend and to be connected with the suction pipe; and

ascending and descending means disposed between the partitioning plate of the cap member and the pressing plate and also disposed in the proximity of the valve tube, thereby ascending and descending the pressing plate, wherein

pressing on the pressing plate causes the internal pressure change in the bottle, and as the bottle is inclined at a predetermined angle, the soft drink is dispensed consecutively via the dispensing pipe, the valve tube and the discharge pipe.

10. The bottle cap assembly of claim 9, wherein the ascending and descending means comprises a resilient body disposed between the partitioning plate of the cap member and the pressing plate and in the proximity of the valve tube.

11. The bottle cap assembly of claim 9, wherein the ascending and descending means comprises:

a resilient body disposed between the partitioning plate of the cap member and the pressing plate and in the proximity of the valve tube; and

restricting means for selectively restricting the deformation of the resilient body, wherein

the restricting means comprises,

first and second locking holes formed in a sidewall of the cap member,

first and second hooks provided at a protrusion rib protruding from an outer circumference of the valve tube, the first hook being displaced in the first hole in accordance with the deformation of the resilient body, and the second hook being selectively locked in, thus restricted in first and second locking holes.

12. The bottle cap assembly of claim 11, wherein the restricting means comprise:

a cam member comprising a cam groove formed in an inner circumference of the cap member; and

a cam pin disposed on the pressing plate for being cammingly moved along the cam groove in accordance with the ascending and descending of the pressing plate, thereby being locked/unlocked alternately.

13. The bottle cap assembly of claim 11, wherein the restricting means comprises:

a guide rail having an uneven surface, formed on the inner circumference of the cylindrical body of the cap member and extended in a lengthwise direction;

a serrated member meshed with the guide rail and connected to the pressing plate for ascending and descending; and

a ratchet wheel member inserted in an end of the guide rail and to a close contact with a leading end of the serrated member by being resiliently biased by the resilient body, and ascended and descended as the ratchet wheel member is interrupted by the ascending and descending of the serrated member so as to be rotated in uni-direction periodically, thereby being alternately engaged with the guide rail.

14. The bottle cap assembly of claim 13, wherein the guide rail has an uneven surface, comprising:

first and second grooves formed at a uniform interval in the inner circumference

of the cylindrical body of the cap member, first and second grooves having different depth, respectively; and

a guiding portion formed as a cylinder stepped with respect to the guide rail, and formed at the end of the inner circumference of the cylindrical body of the cap member, wherein the ratchet wheel member is disposed to be positioned in the guiding portion.

15. The bottle cap assembly of claim 13, wherein the serrated member comprises a cylindrical body, a serrated portion formed at the end of the body, and slide pieces protruded from the external circumference of the body in a radial direction and at a uniform interval for being meshed with the guide rail.

16. The bottle cap assembly of claim 13, wherein the ratchet wheel member comprises:

a cylindrical body;

a serrated portion formed at an end of the body for being meshed with the serrated portion of the serrated member; and

guiding pieces having inclining sides, for being interrupted by the ascending and descending of the serrated member to be rotated in uni-direction, and selectively restricted in accordance with the depth of the guide rail thereby being alternately meshed with the guide rail.

FIG. 1

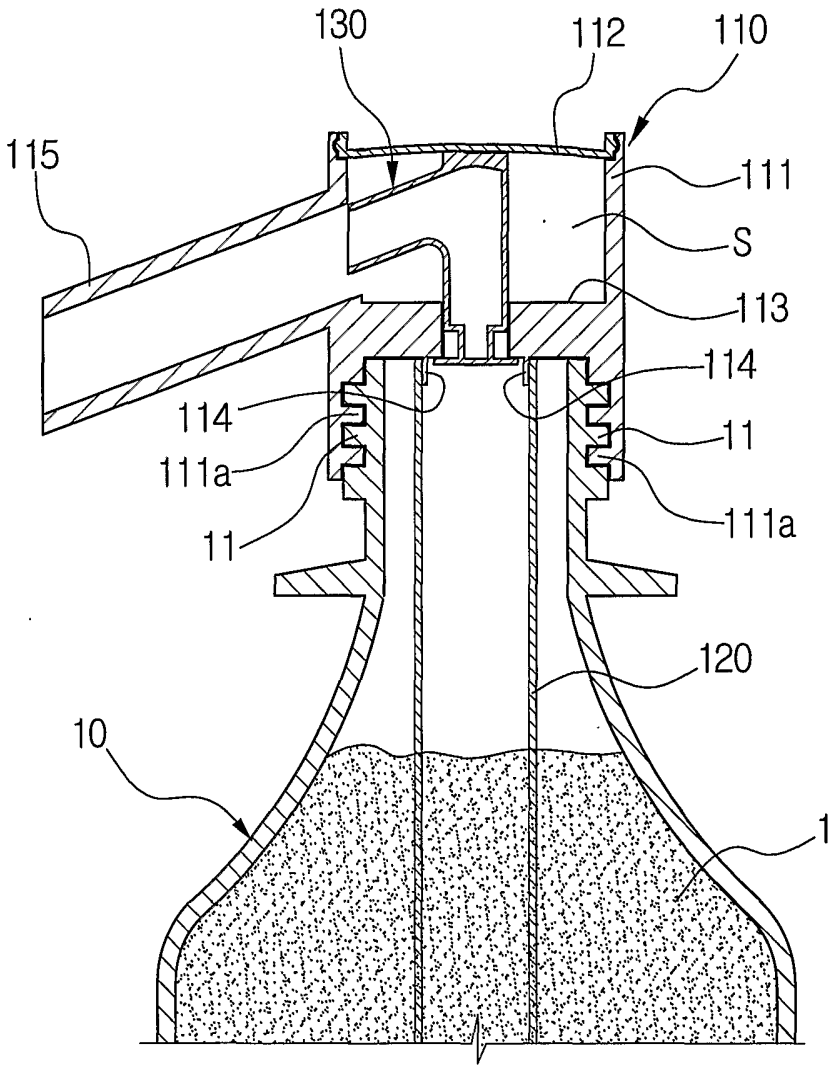


FIG.2

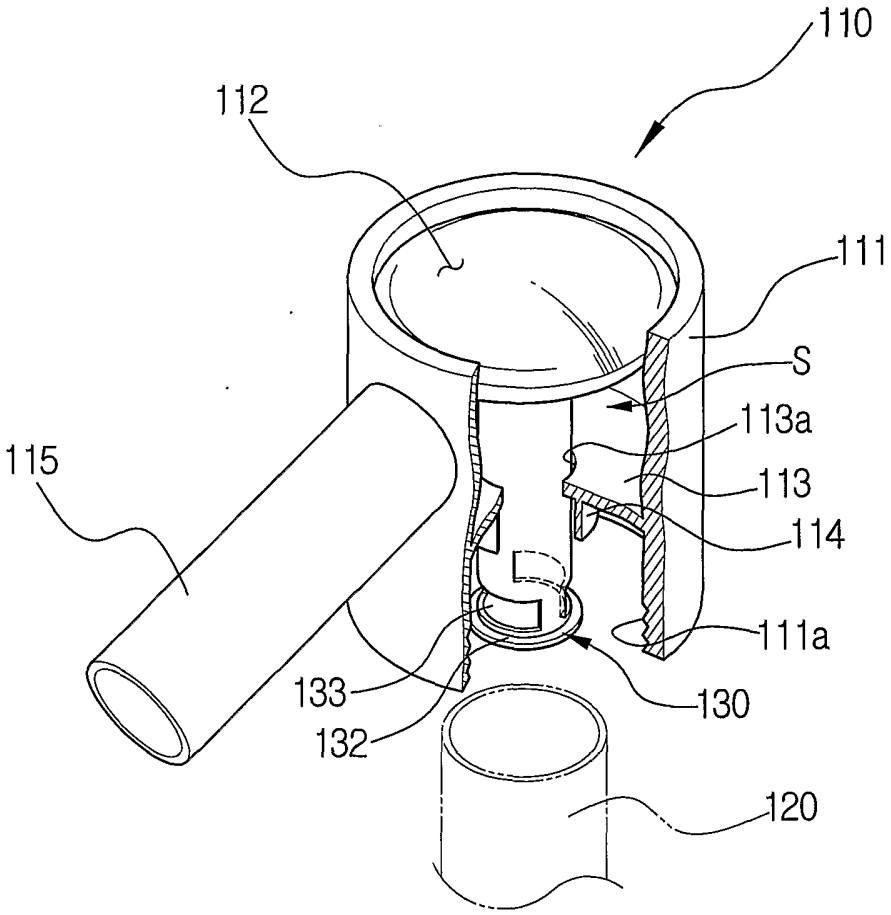

110
112
111
S
113a
115
113
114
111a
133
130
132
120

FIG.3

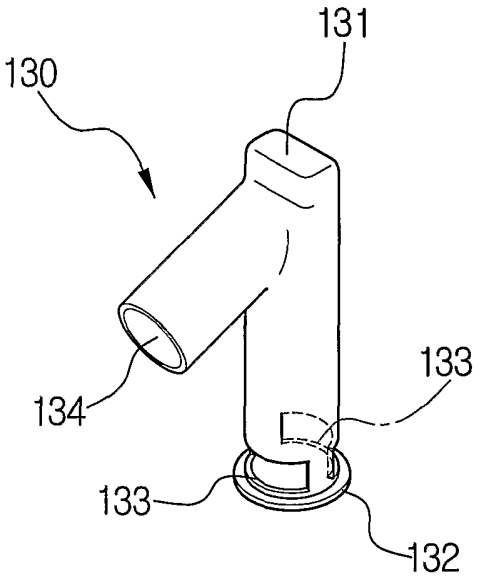

131
130
133
134
133
132

FIG.4

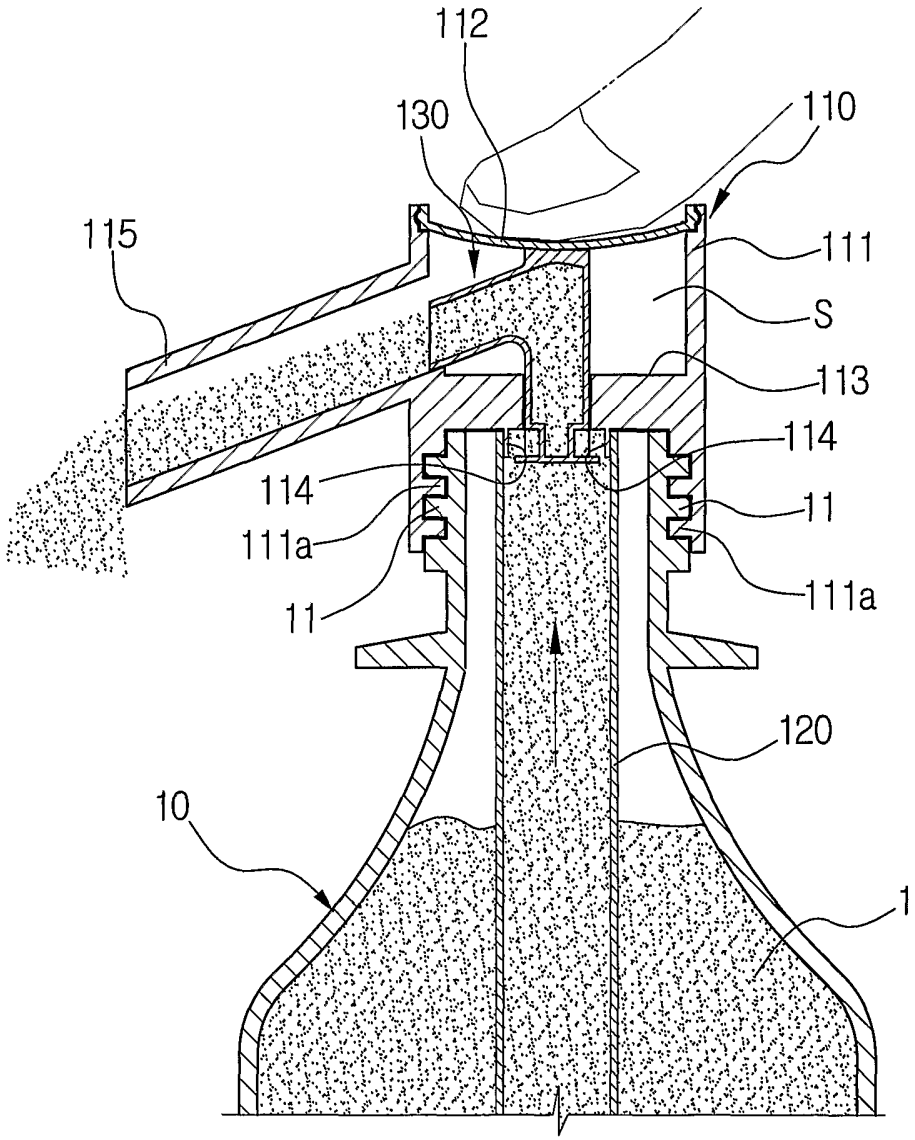


FIG.5

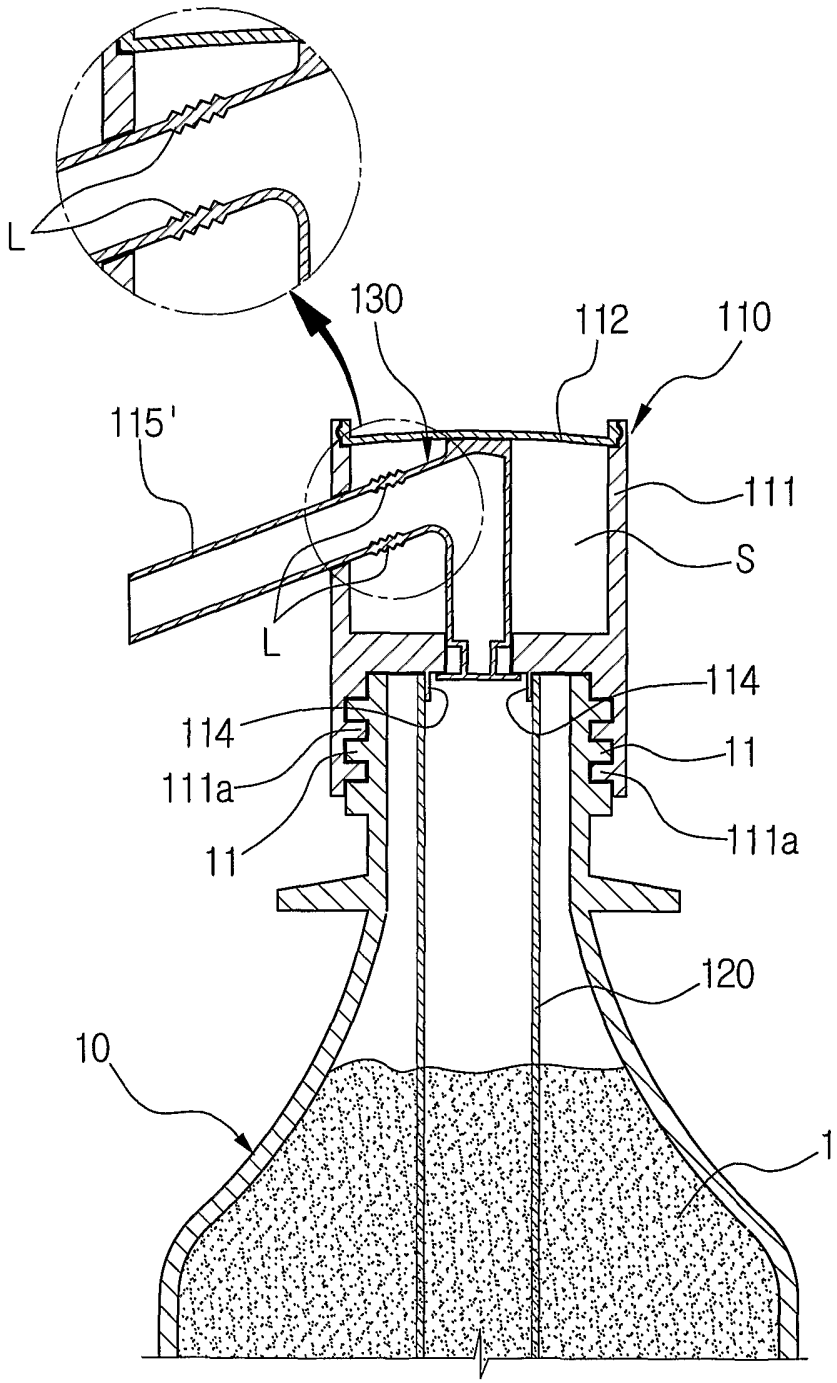


FIG.6

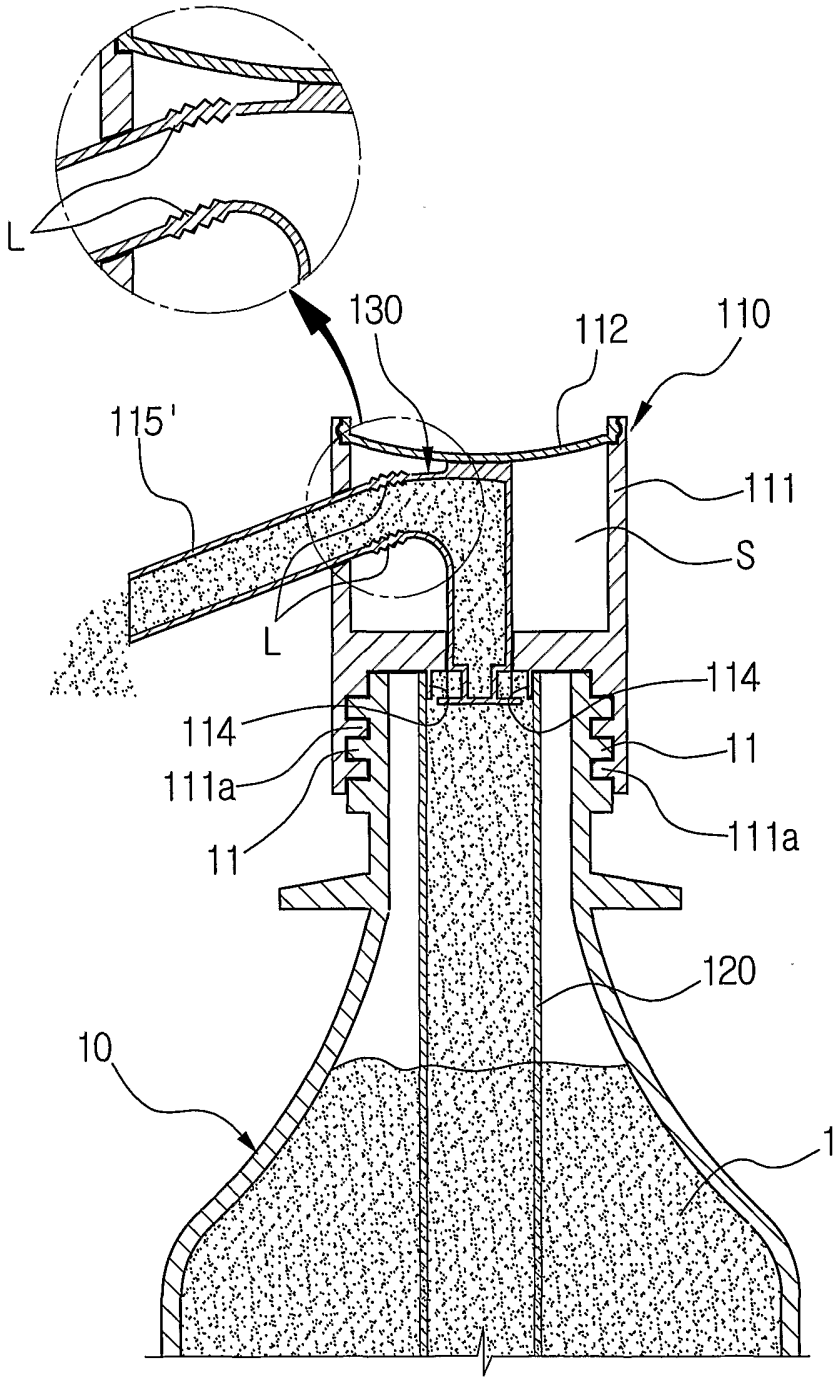


FIG.7

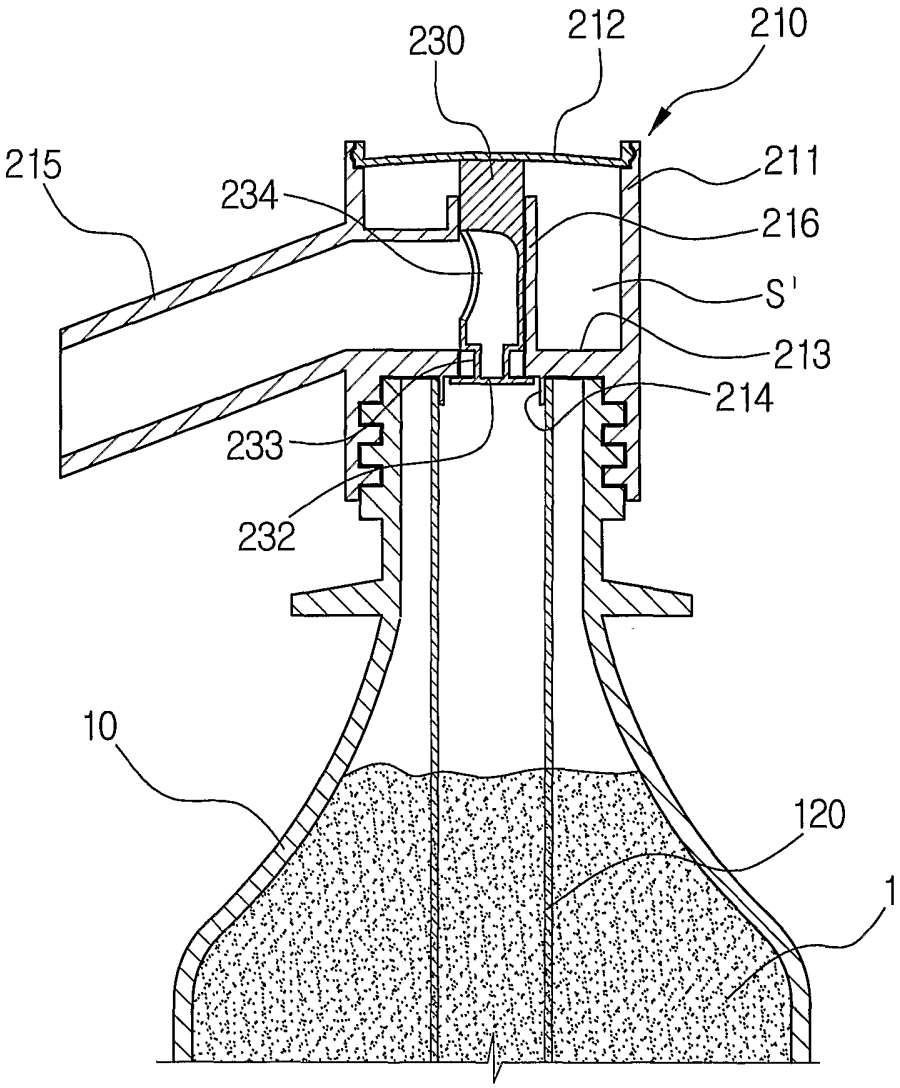


FIG.8

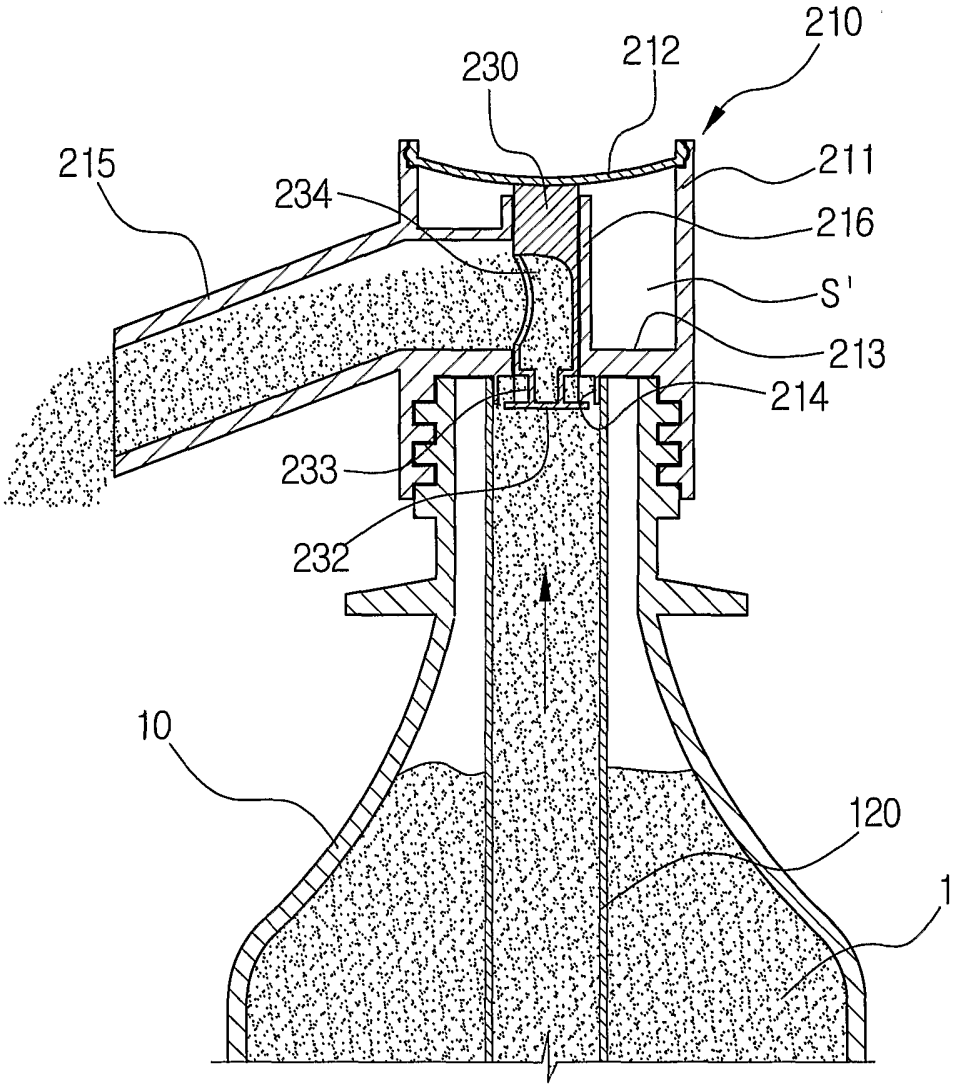


FIG.9

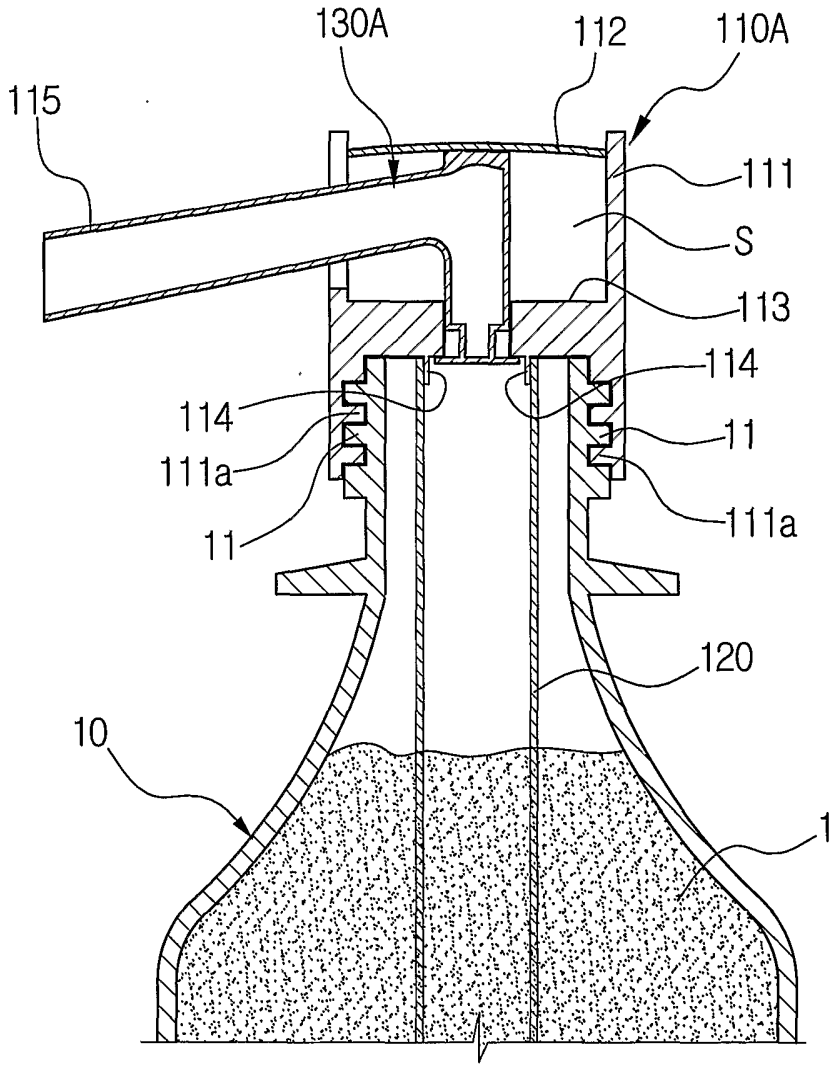


FIG.10

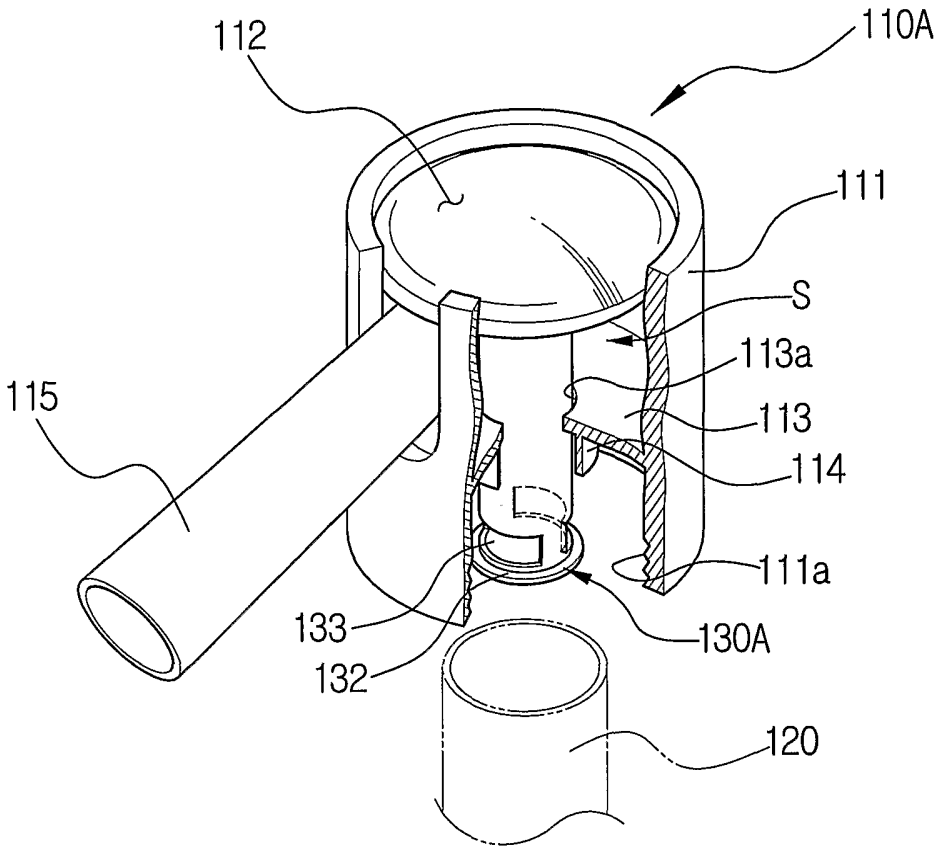

112
110A
111
S
113a
115
113
114
111a
133
130A
132
120

FIG.11

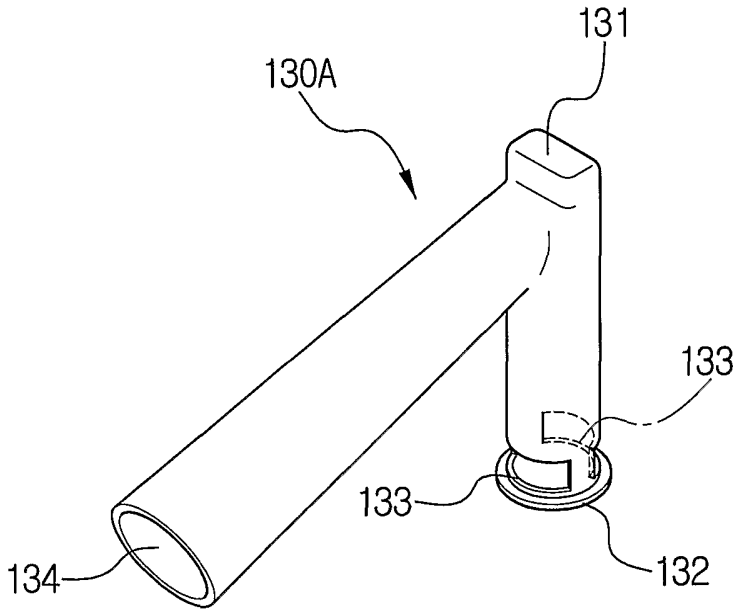

131
130A
133
133
134
132

FIG.12

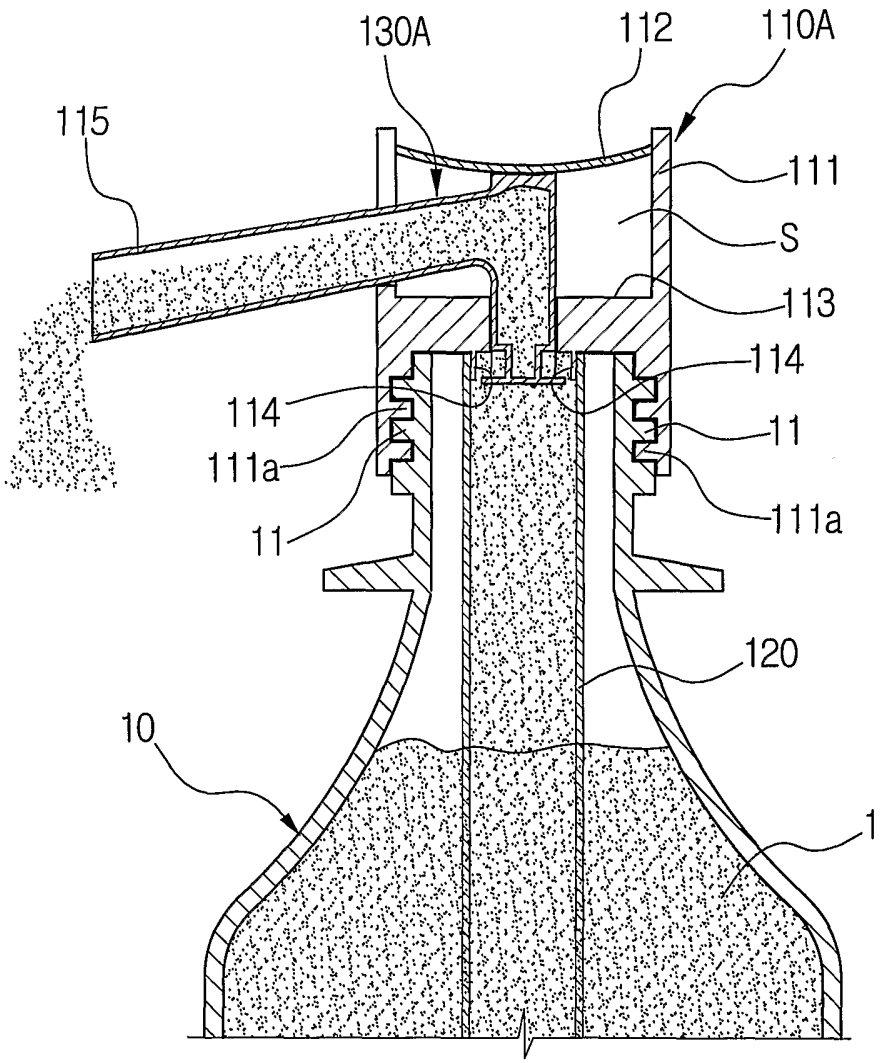


FIG.13A

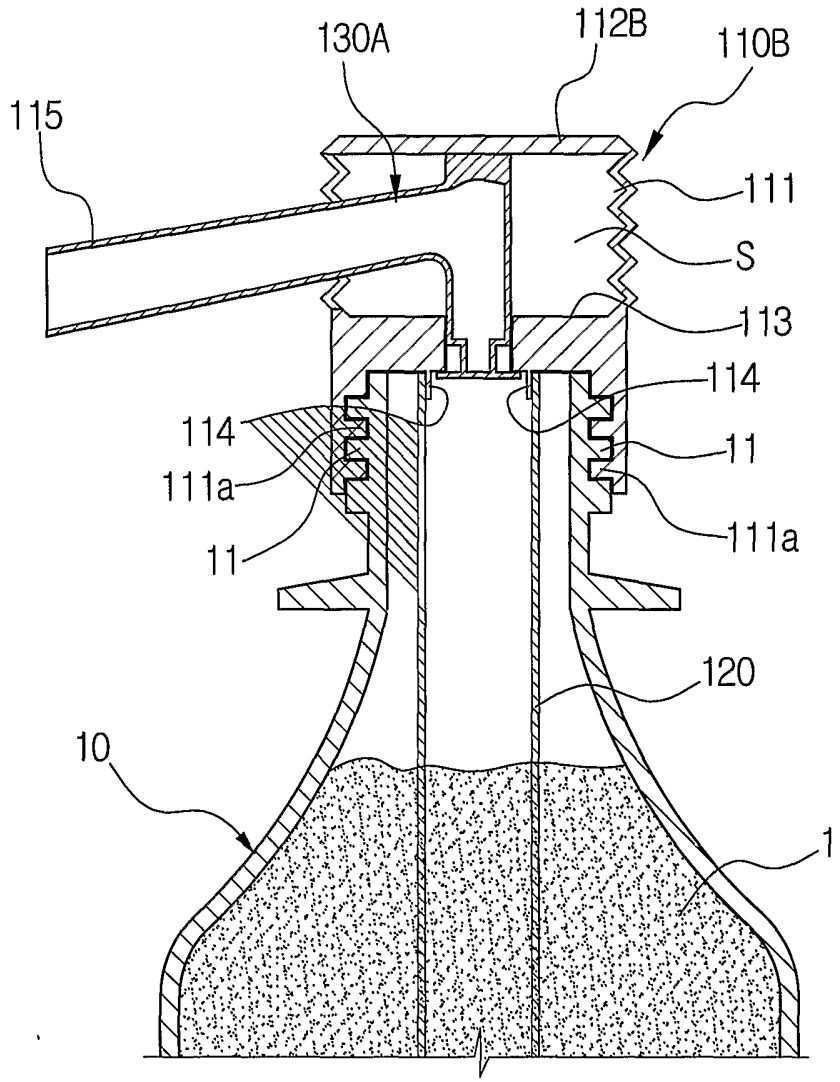


FIG.13B

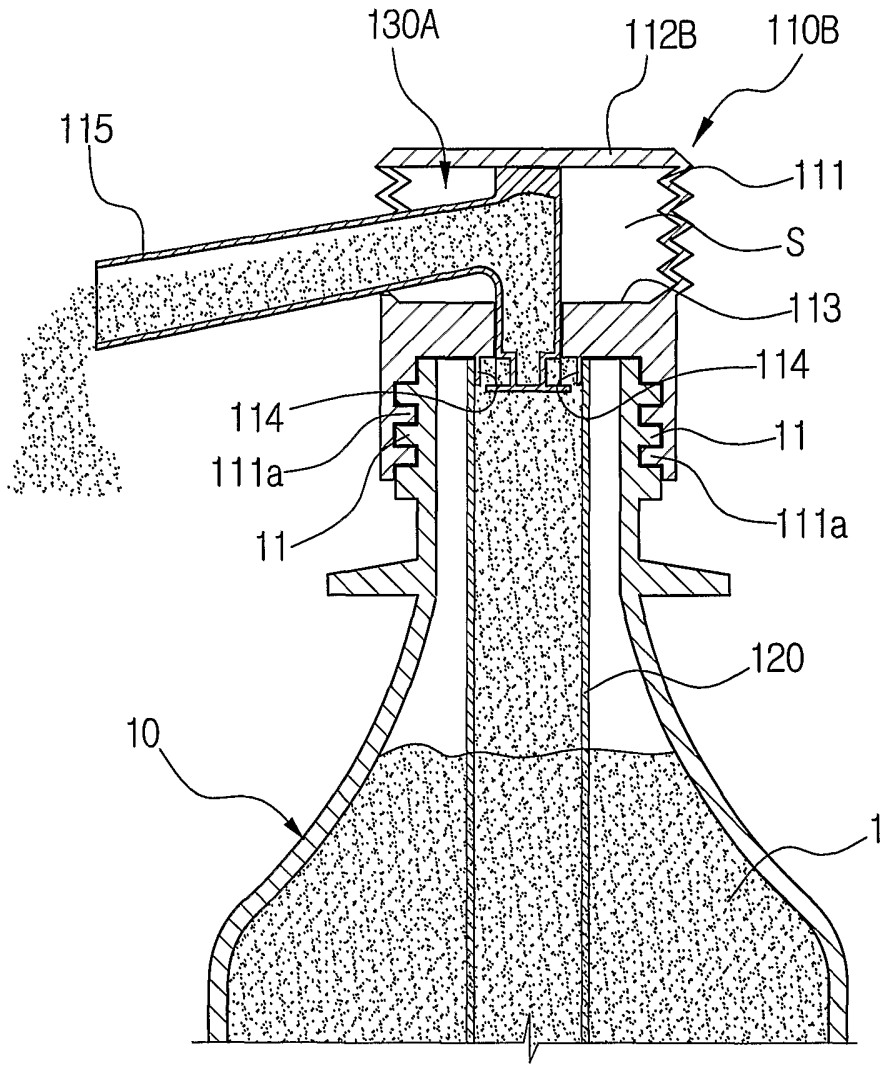


FIG. 14

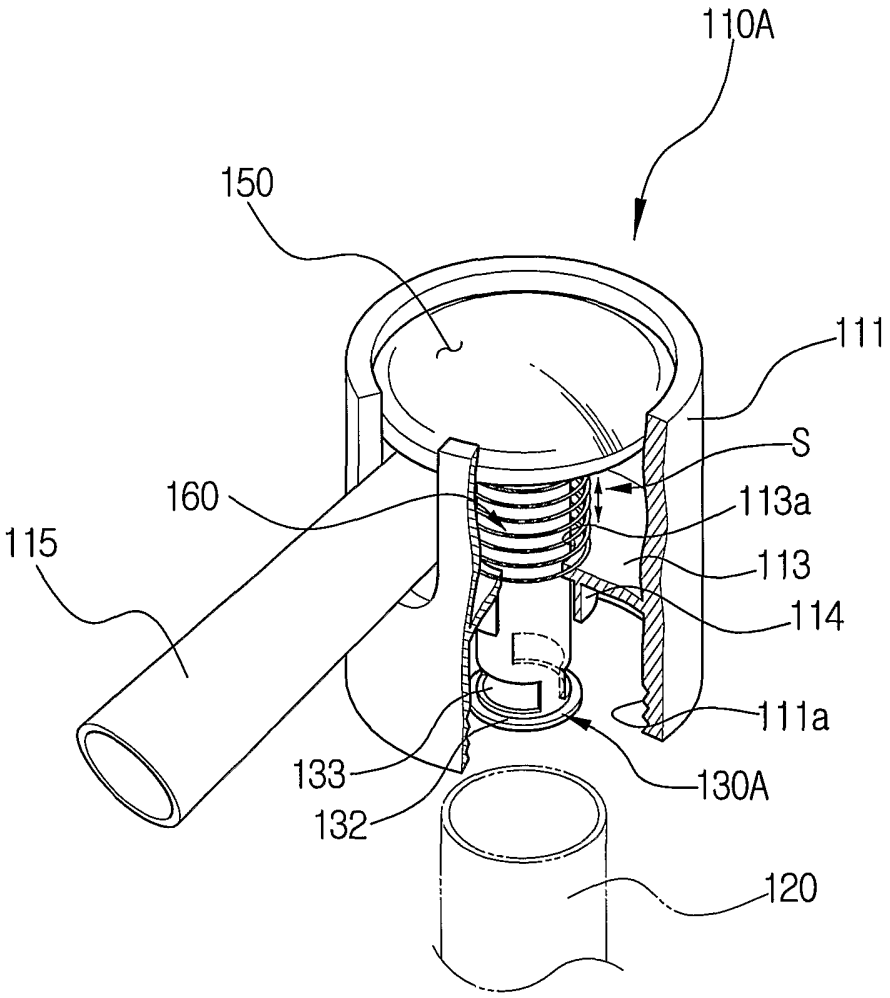


FIG.15

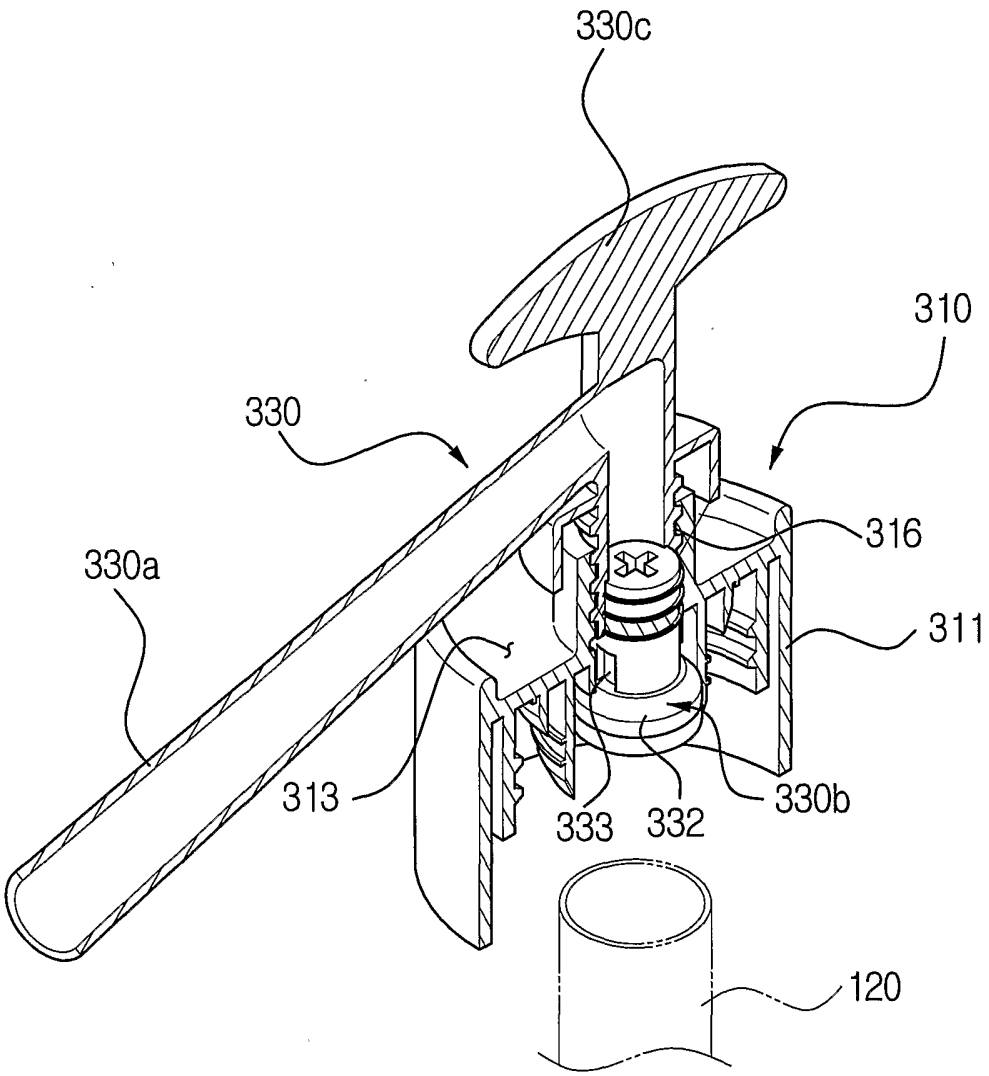


FIG.16

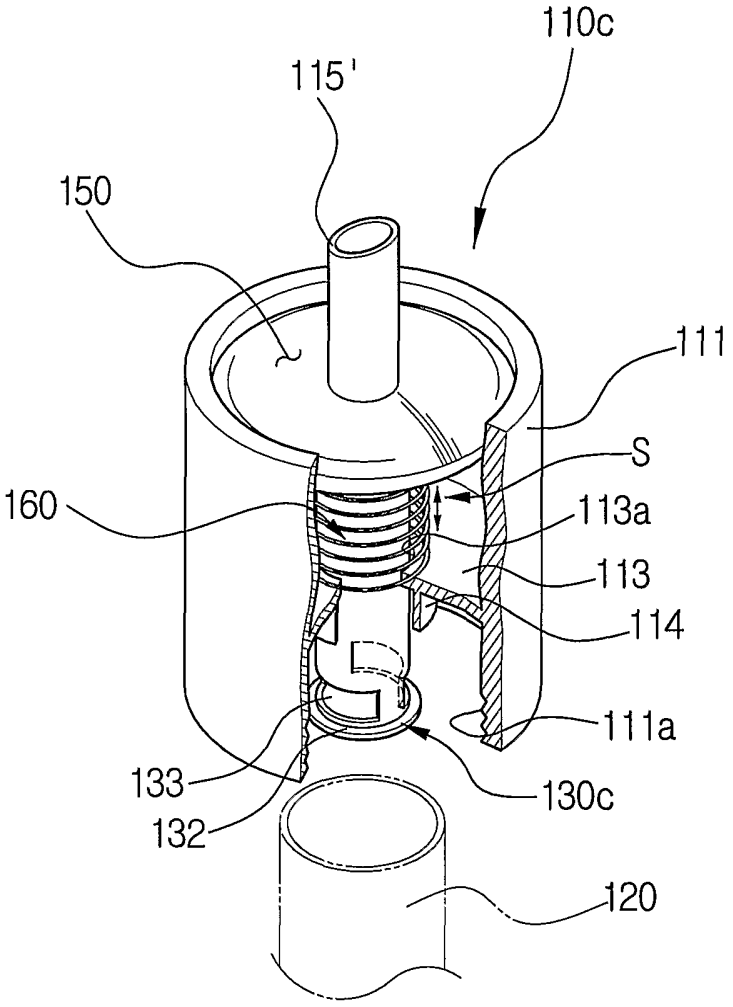


FIG.17

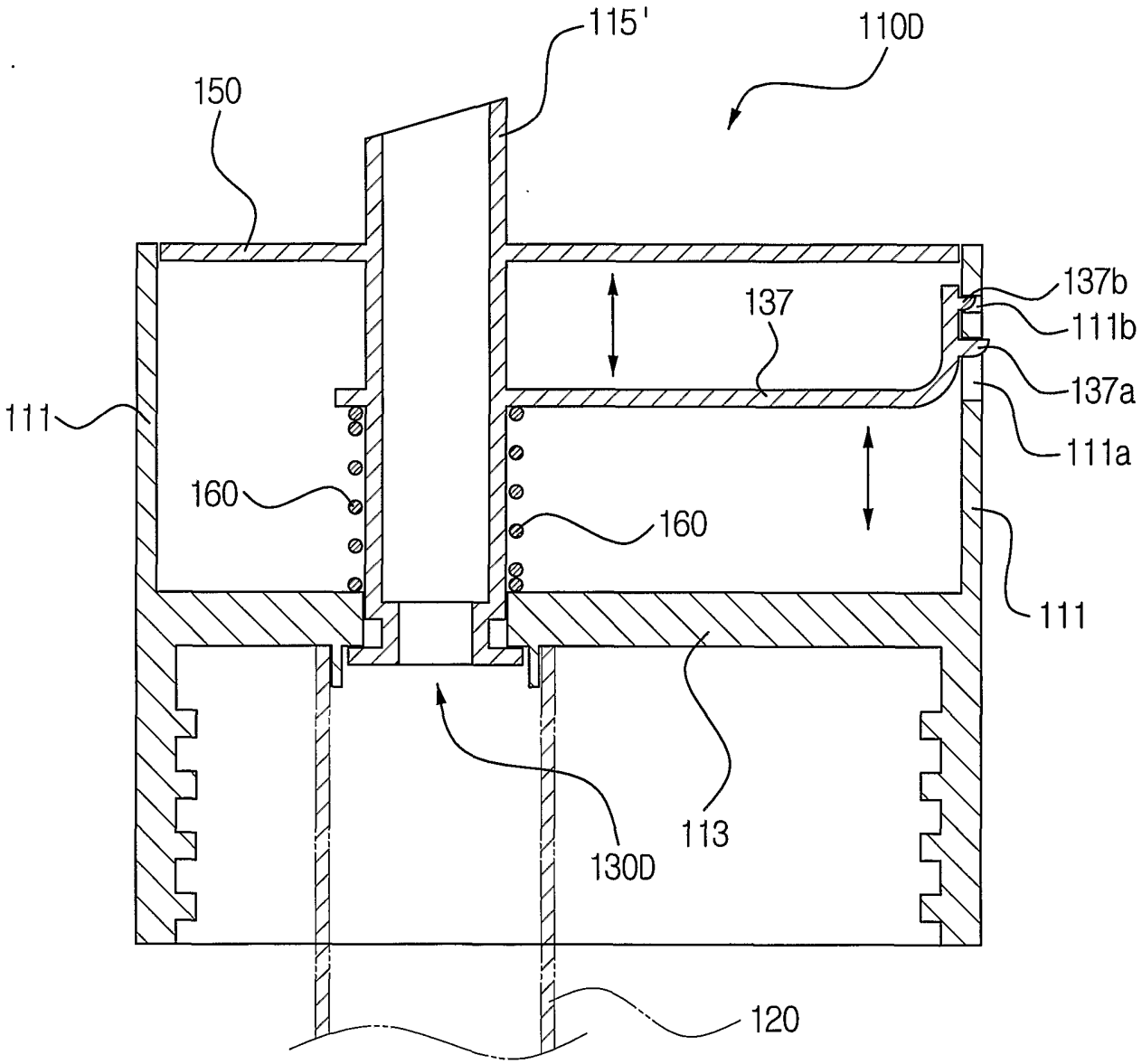

115'
110D
150
137b
137
111b
137a
111
111a
160
160
111
113
130D
120

FIG.18

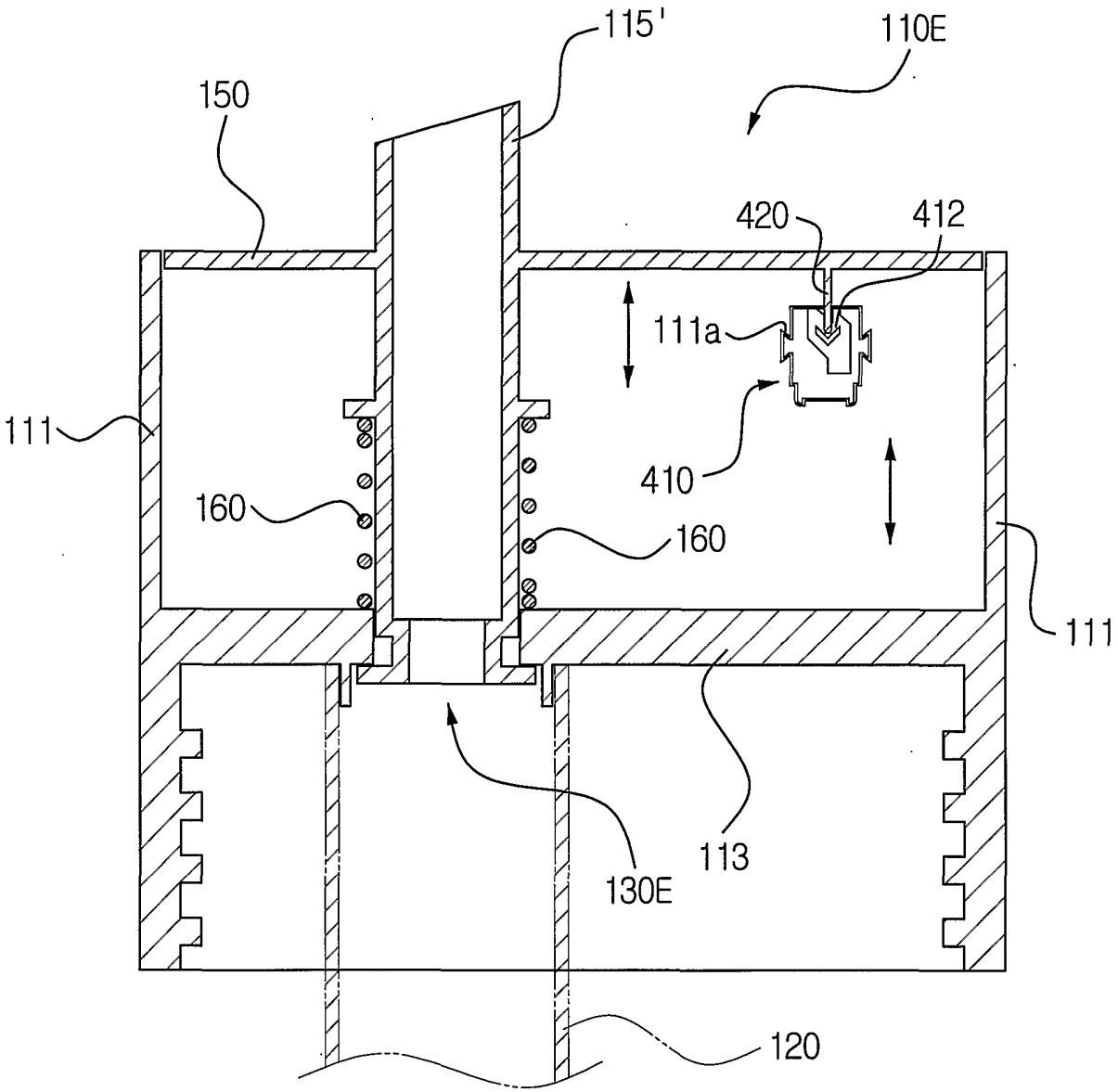


FIG.19

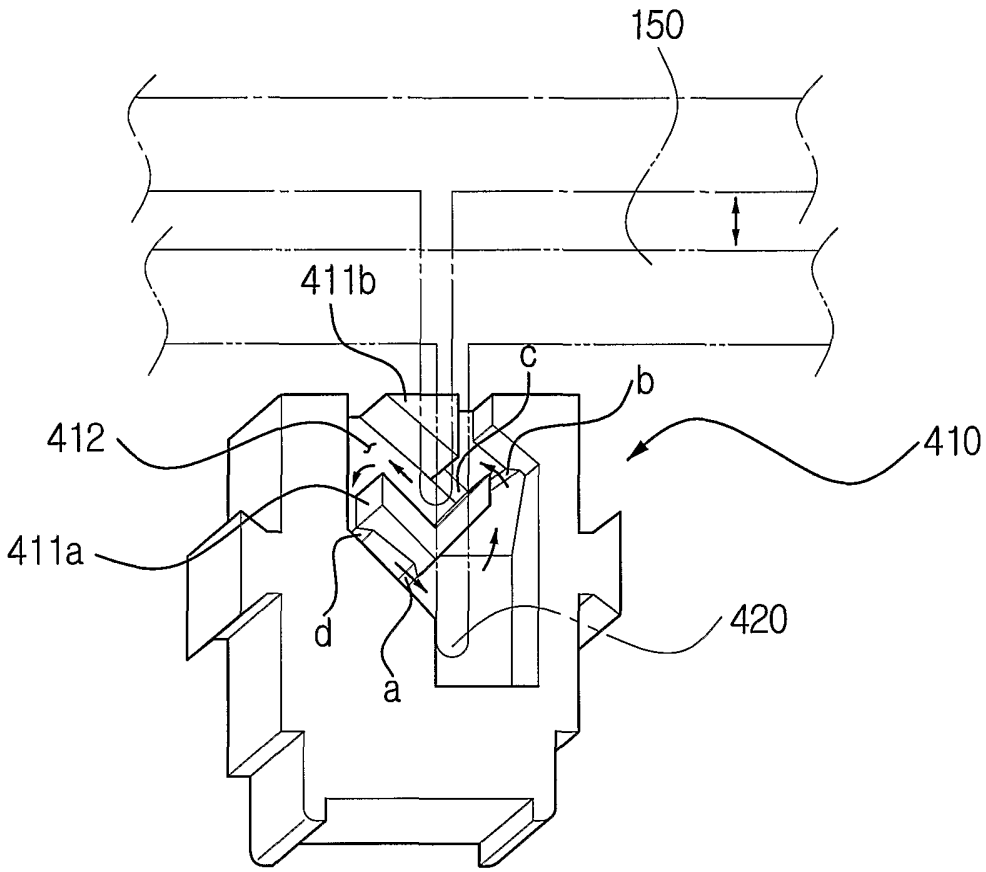


FIG.20

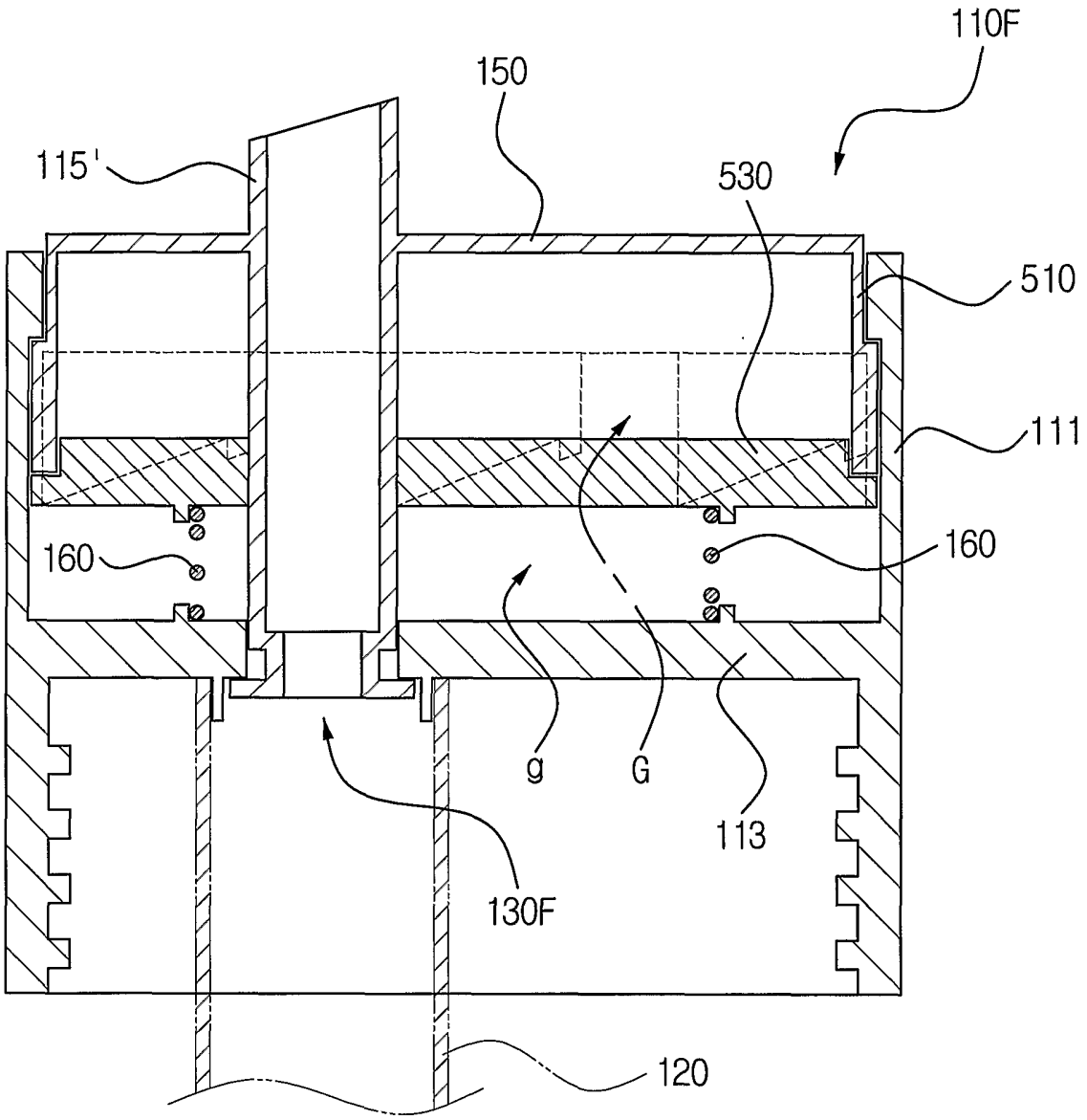


FIG.20A

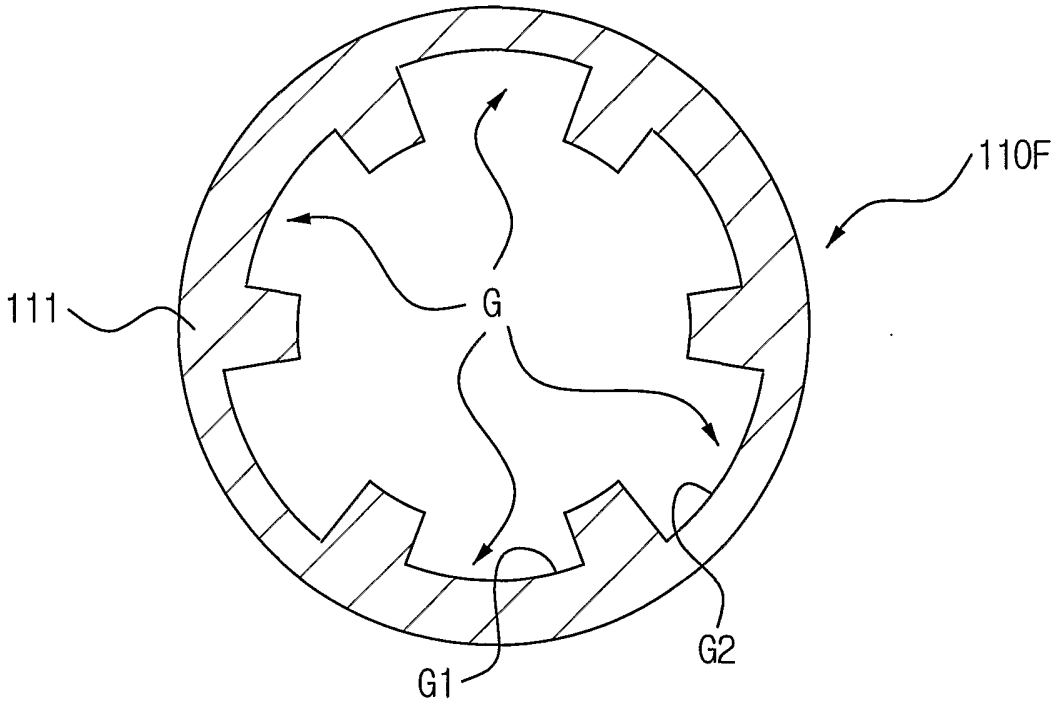


FIG.20B

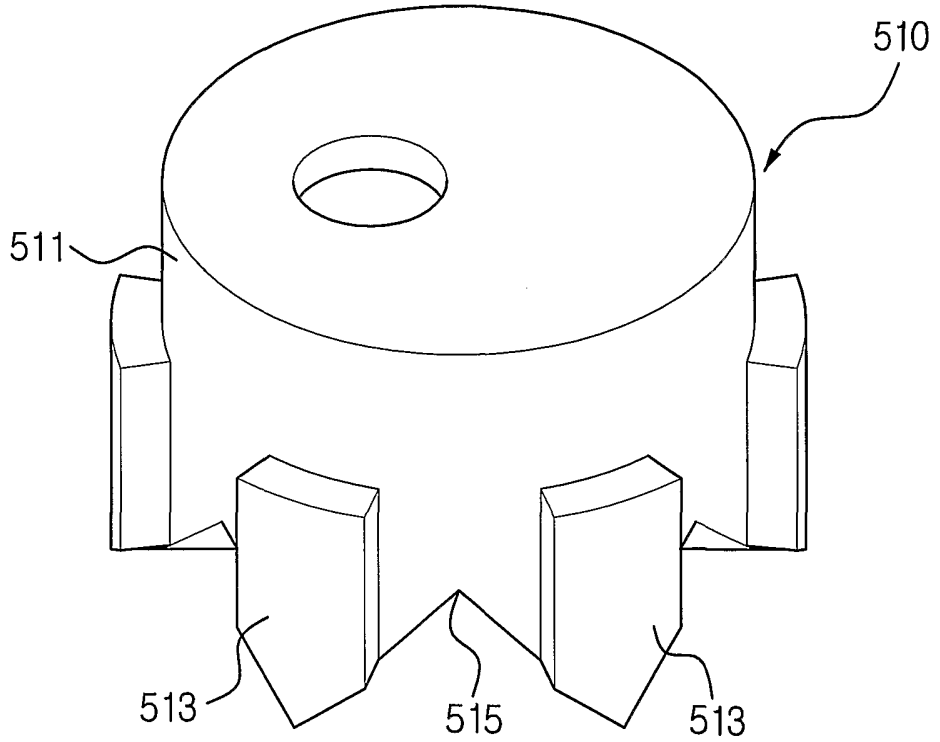


FIG.20C

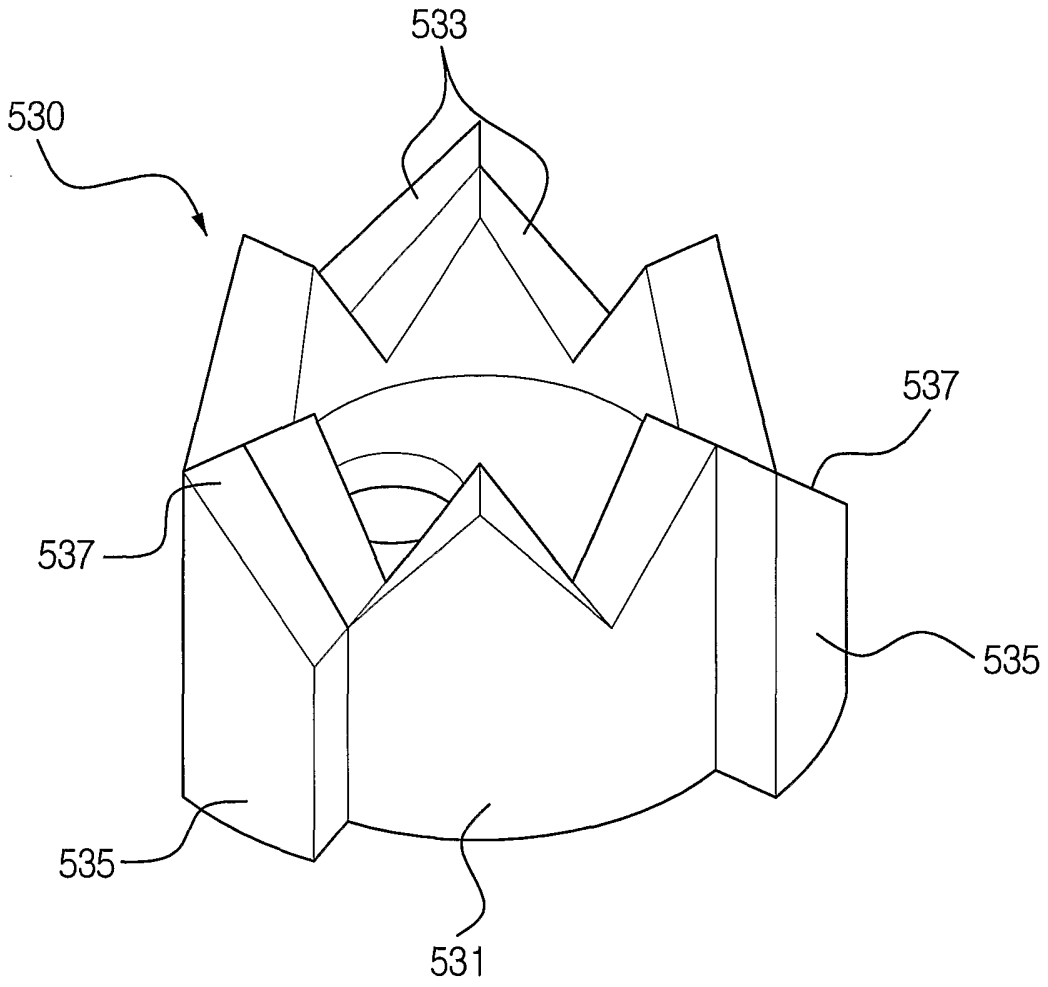


FIG.21A

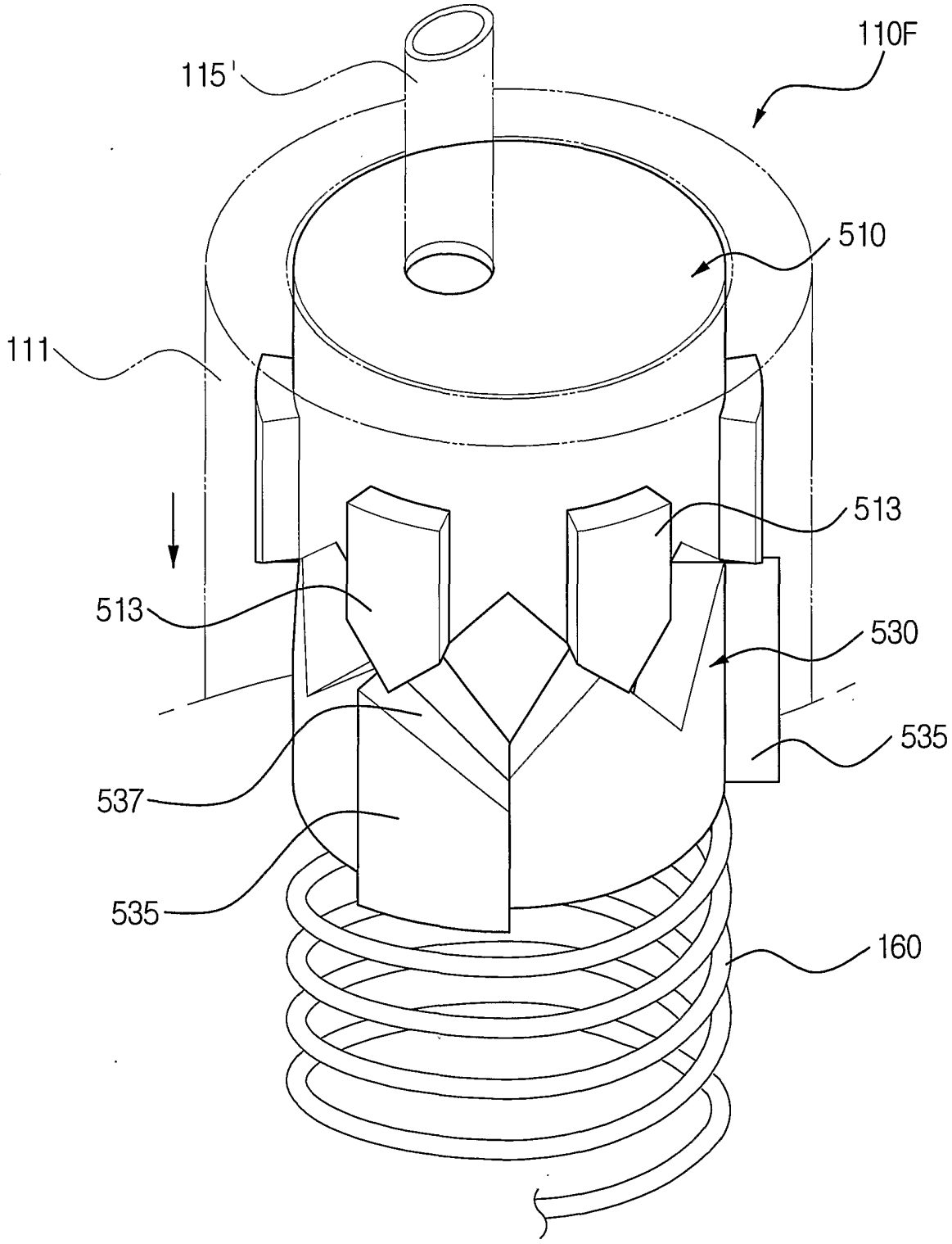
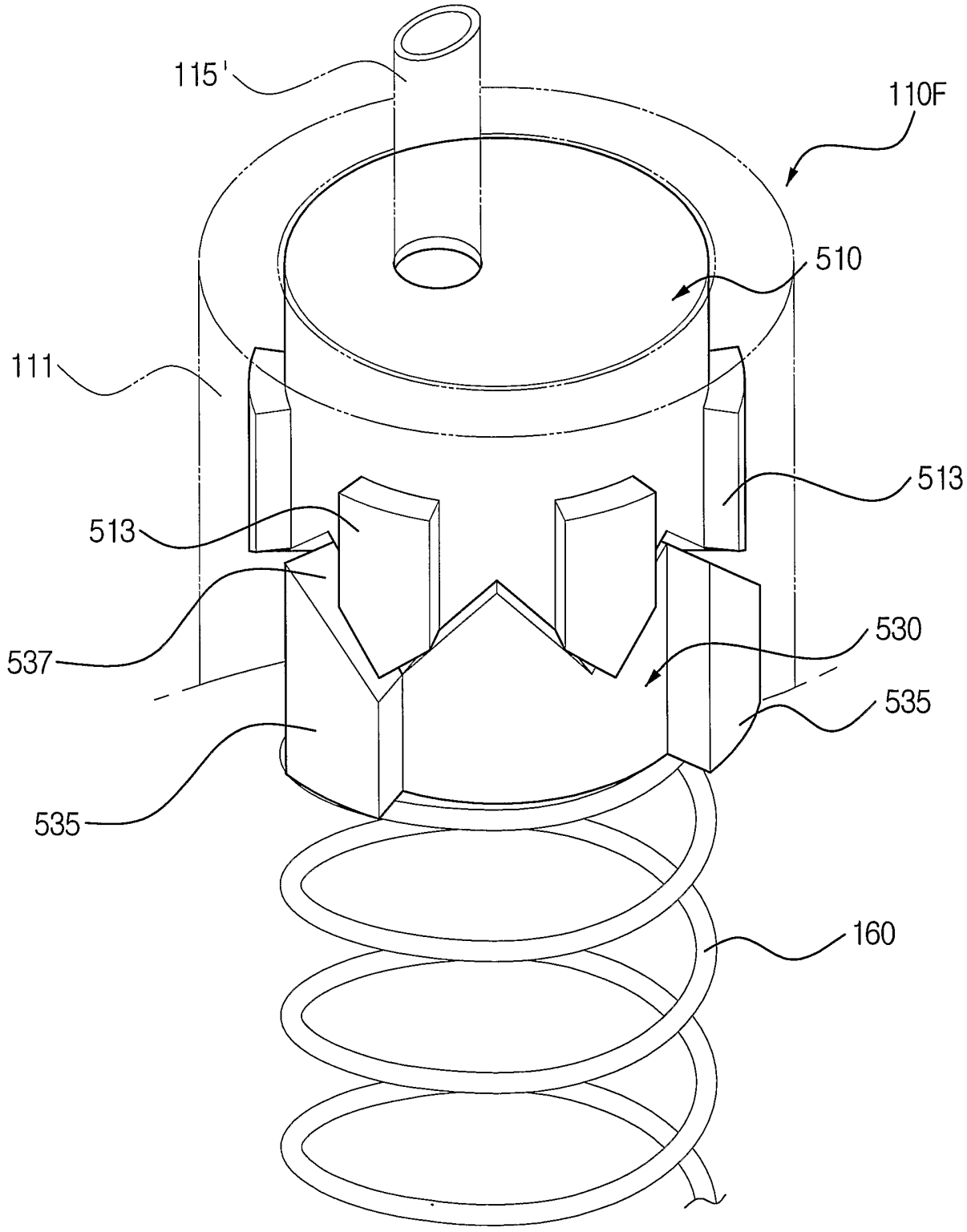


FIG.21B



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/01119

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65D 47/06

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 39/00 - B65D 55/16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KR, JP : IPC Classes as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
KIPO KIPASS system

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 99-083712 A (Kim Hyun-seok) 06 Dec. 1999 (See the abstract, Fig. 4)	1 - 3
A	JP 50- 053186 A (Totsupan Insatsu Co.,Ltd.) 12 May 1975 (See the whole document)	1, 2, 9
A	US 4978053 A (L'Oreal, Paris, France) 18 Dec. 1990 (See the Fig.2-3)	1, 2, 6
A	JP 06-029543 U (Toyo Polymer Co.,Ltd.) 19 Apr. 1994 (See the whole document)	7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 OCTOBER 2002 (11.10.2002)	14 OCTOBER 2002 (14.10.2002)

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
CHOI, Ki Hyuk
Telephone No. 82-42-481-5894

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR02/01119

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 99-083712 A	06 Dec. 1999	NONE	
JP 50- 053186 A	12 May 1975	JP 54-016276 B	21 Jun. 1979
US 4978053 A	18 Dec. 1990	EP 370842 A	30 May 1990
		FR 2639259 A	25 May 1990
		JP 2203951 A	13 Aug. 1990
JP 06-029543 U	19 Apr. 1994	NONE	