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(54) **PRESSURIZED-FLUID CONTROL MECHANISM AND PRESSURIZED-FLUID SUPPLY DEVICE**

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(57) **ABSTRACT**

A pressurized-fluid control mechanism for controlling the ejection of a compressed carbonic gas C charged into a gas container vessel (**3**), and a Pressurized-Fluid Supply device that makes use of the pressurized-fluid control mechanism, are disclosed. The pressurized-fluid control mechanism is mounted on the gas container vessel filled with the compressed carbonic gas C to control the ejection of the compressed carbonic gas C charged into the gas container vessel. The pressurized-fluid control mechanism includes a sealing plate (**13**) that stops up an opening (**4**) of the gas container vessel, and an acute pointed member (**17**) provided towards its extreme end. A sealing part (**19**) progressively reduced in its diameter is formed at an extreme end of the acute pointed member. The pressurized-fluid control mechanism also includes a coil spring (**23**) that biases the acute pointed member. The acute pointed member (**17**), used in this pressurized-fluid control mechanism, is arranged within the gas container vessel and adapted to be moved back and forth in the gas container vessel to open/close an ejection opening (**18**) formed in the sealing plate. The acute pointed member is biased by the coil spring to fit a sealing part into the ejection opening to close the opening.

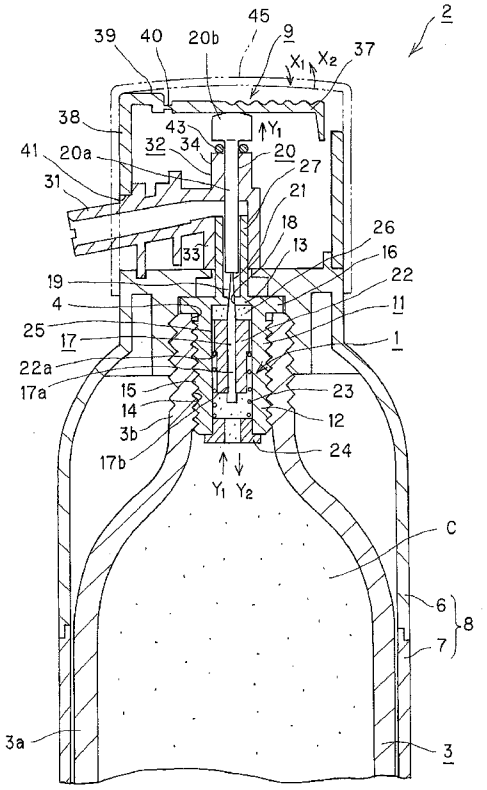

FIG.1

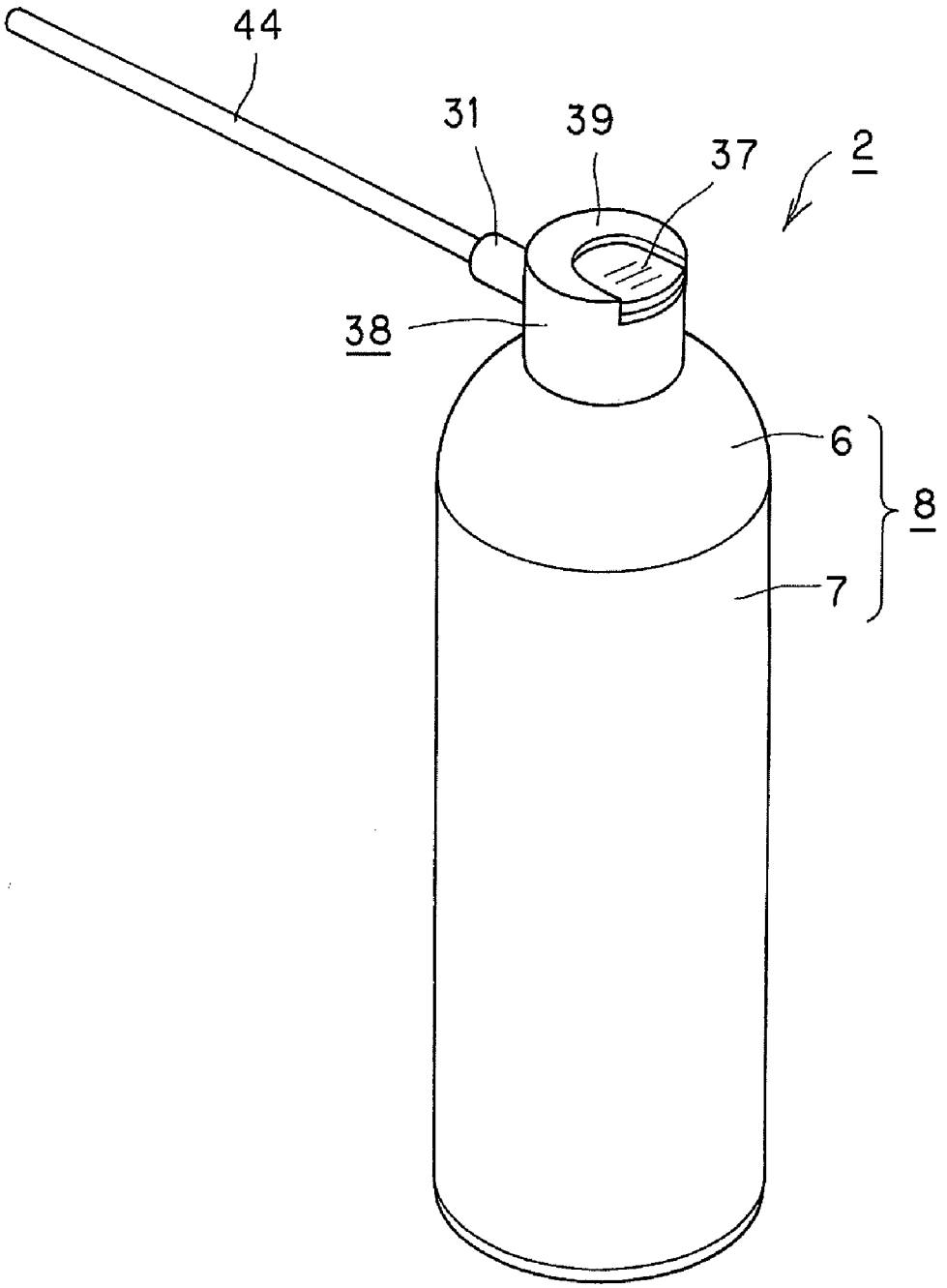

FIG.2

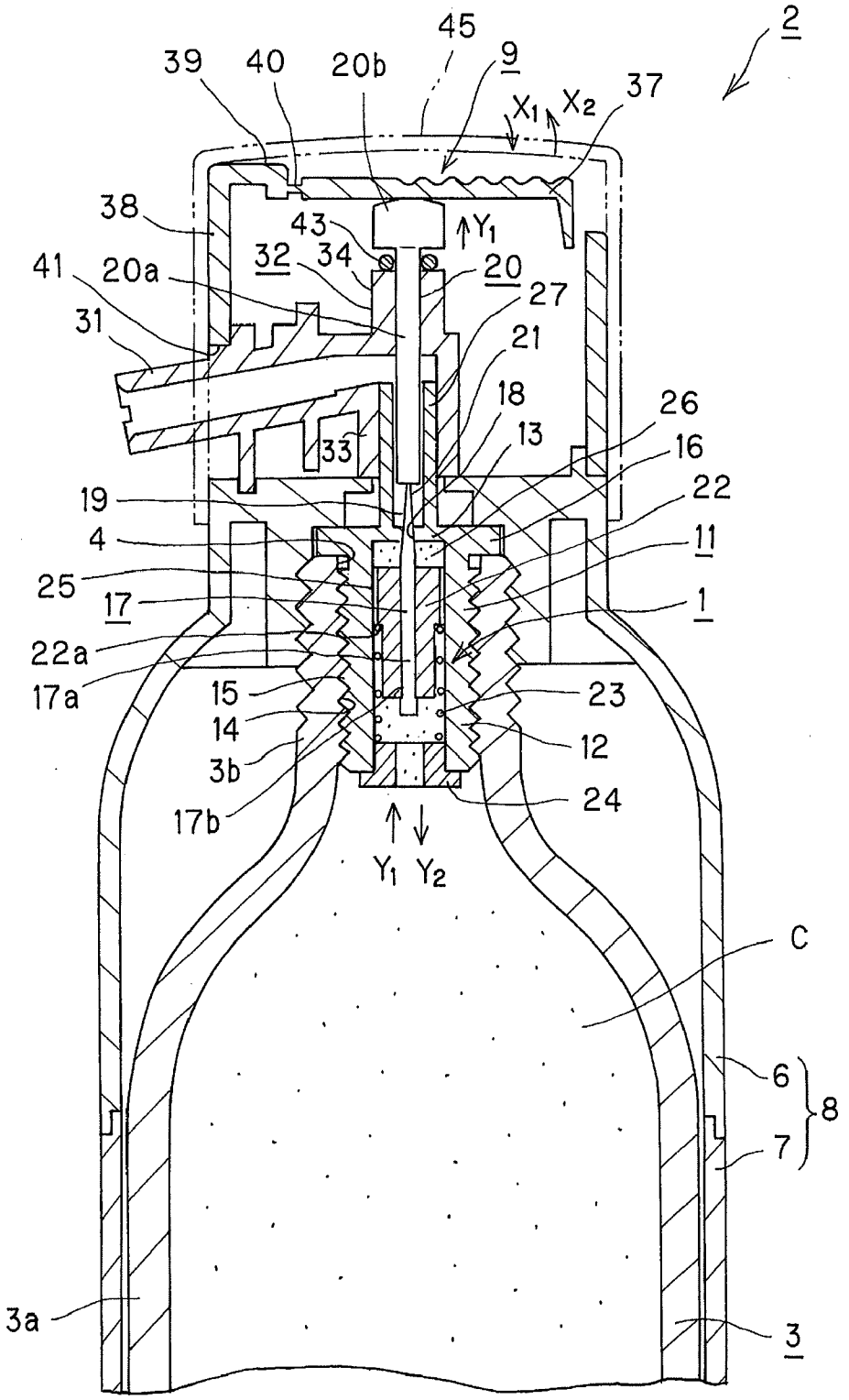
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FIG.3

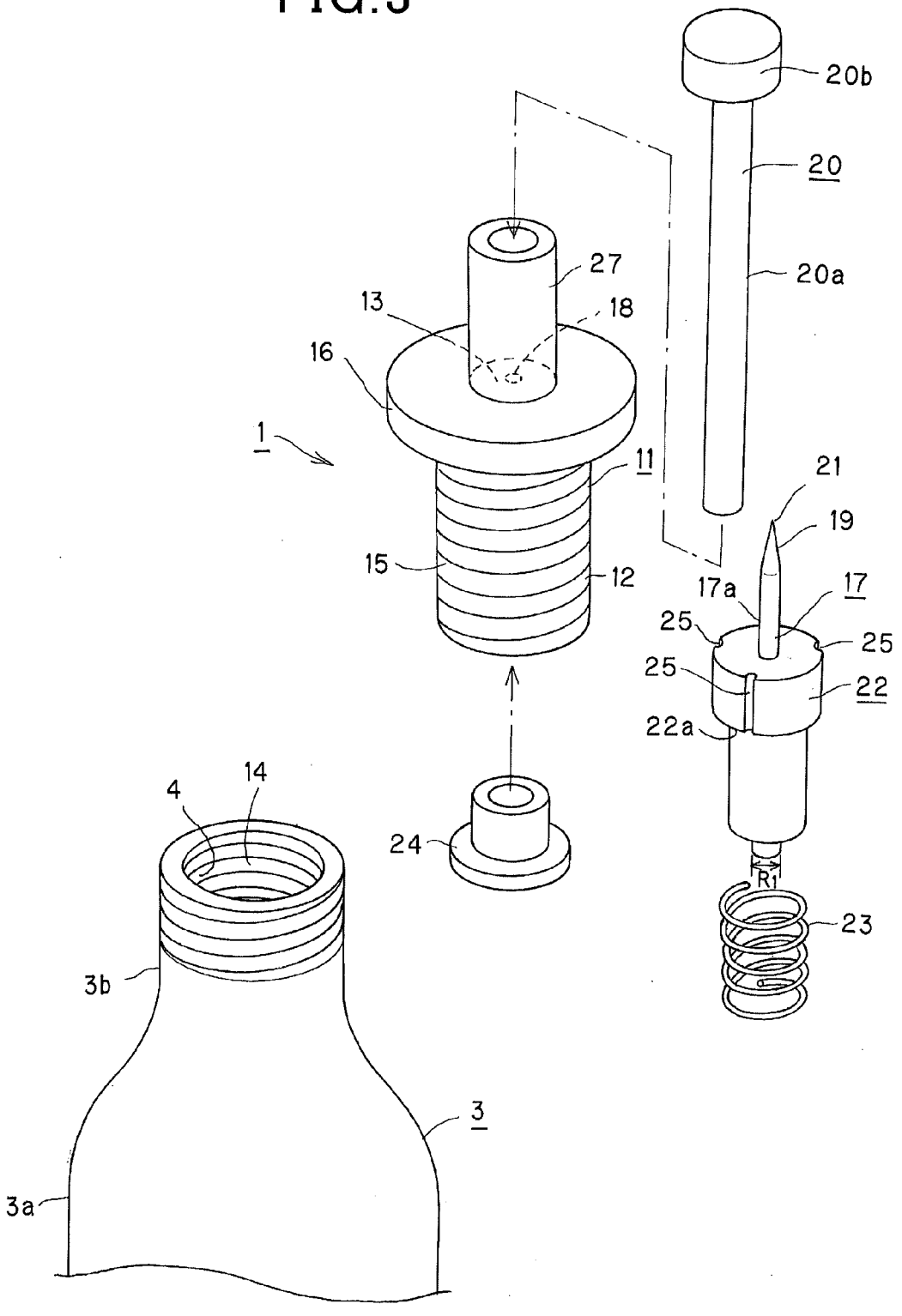
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FIG.4

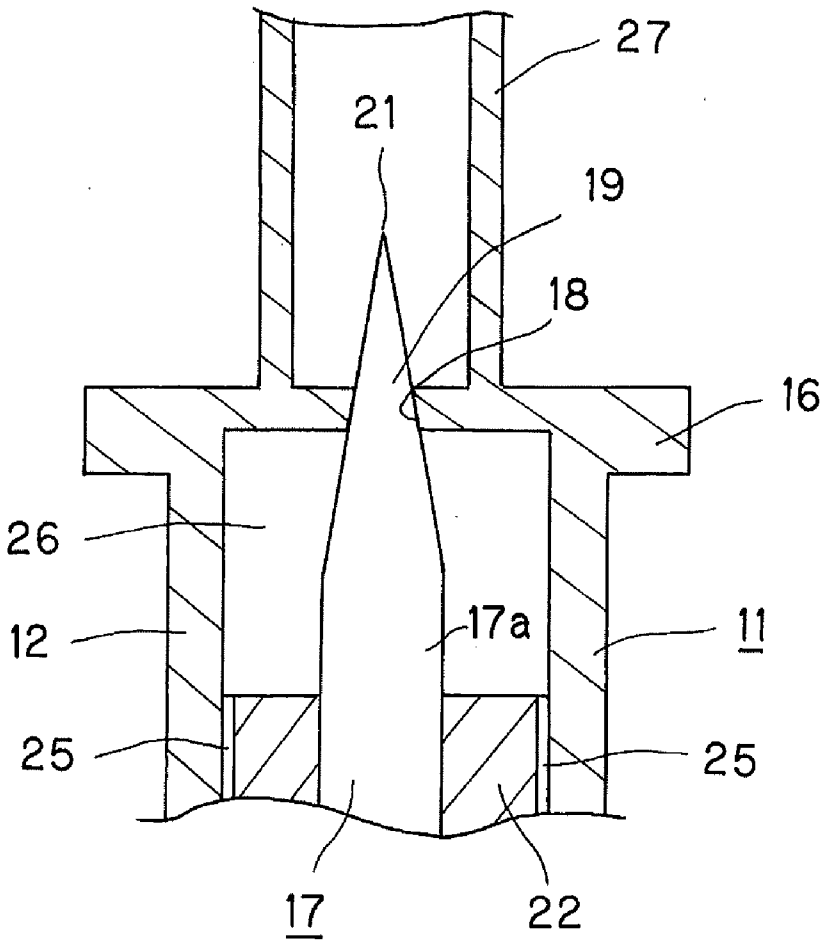
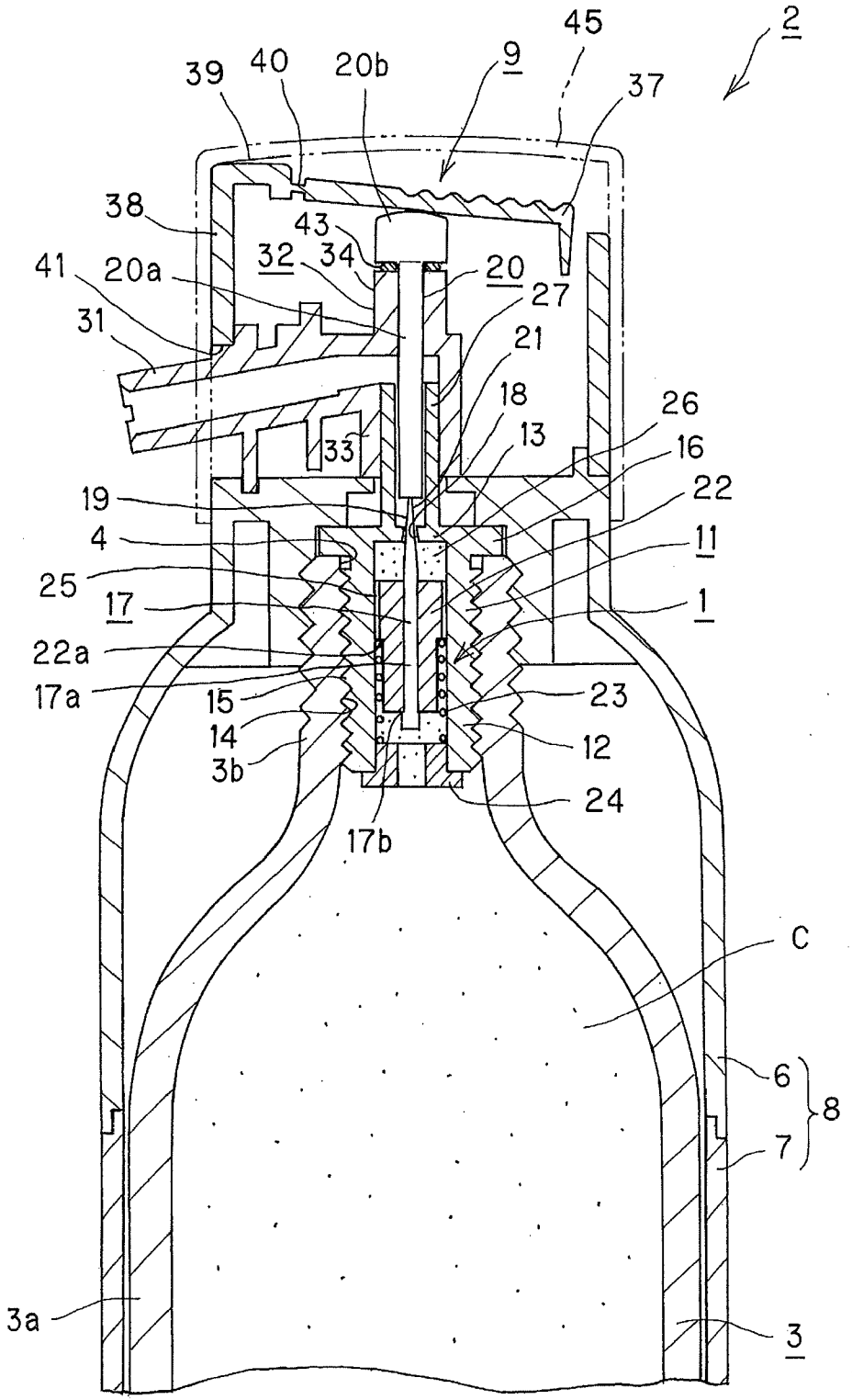


FIG.5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3a
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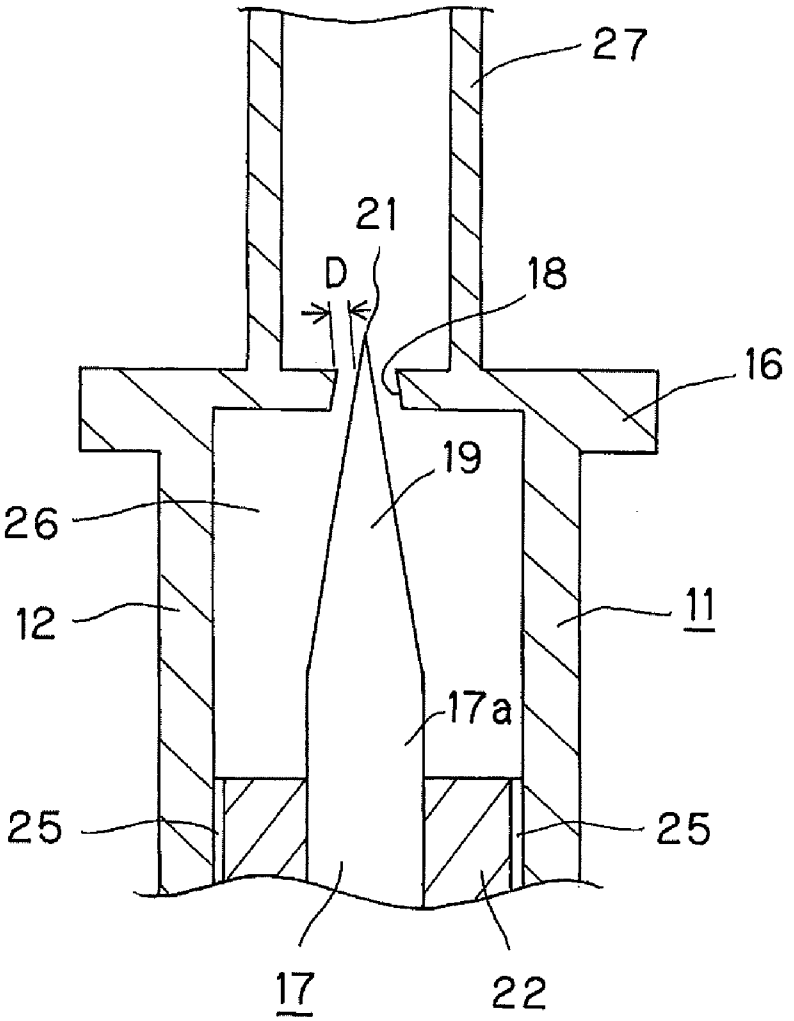
FIG.6



PRESSURIZED-FLUID CONTROL MECHANISM AND PRESSURIZED-FLUID SUPPLY DEVICE

TECHNICAL FIELD

[0001] This invention relates to a pressurized-fluid control mechanism for controlling the ejection of a pressurized fluid, such as a high pressure gas, charged into a container vessel, and to a Pressurized-Fluid Supply device that makes use of this pressurized-fluid control mechanism.

BACKGROUND ART

[0002] A gas spraying device has so far been used for removing dust and dirt affixed to a device such as a feed mechanism for an elongated magnetic tape or sheet, or a semiconductor manufacturing device. The gas spraying device of this sort is adapted for ejecting a high pressure gas, a pressurized gas charged into a container vessel, via an ejection opening. The high pressure gas, charged into the container vessel, is ejected by actuating a valve device fitted on the container vessel.

[0003] There is disclosed in Japanese Laid-Open Patent Publication 2003-146393 a Pressurized-Fluid Supply device in which a pressurized gas is ejected from a container vessel filled with the pressurized gas as the pressurized fluid. In the device described in this Publication, a needle is pierced through a sealing plate that closes an opening of a gas container, thereby forming a gas ejection opening. The gas container is a container vessel filled with the pressurized fluid, The gas ejection opening is opened or closed by the needle that has formed it in order to control the gas ejection.

[0004] In the Pressurized-Fluid Supply device, disclosed in the above Patent Publication, the opening/closure of the gas ejection opening formed in the sealing plate is controlled by the needle provided outside the container vessel filled with the pressurized gas. It is thus possible to control the gas ejection by a simplified structure.

[0005] However, in the Pressurized-Fluid Supply device, configured as described above, the structure that controls the movement of the needle, in turn controlling the opening/closure of the gas ejection opening, is complicated in structure.

[0006] On the other hand, in a Pressurized-Fluid Supply device, used for removing dust and dirt, such as a gas spraying device, there is a demand that the device is reduced in size so that it may be held by hand and moved about for use.

[0007] In a small-sized Pressurized-Fluid Supply device, it is desired that ejection control may be attained without requiring a large operating force in order to realize ejection control of a pressurized fluid with high operability.

DISCLOSURE OF THE INVENTION

[0008] It is an object of the present invention to provide a pressurized-fluid control mechanism which may be reduced in size and in which ejection of a pressurized fluid, such as a pressurized gas, charged in a container vessel, may be controlled extremely readily with high operability with the use of a simpler mechanism, and a Pressurized-Fluid Supply device making use of this pressurized-fluid control mechanism.

[0009] It is another object of the present invention to provide a pressurized-fluid control mechanism in which ejection of a pressurized fluid may be controlled with high operability, and a Pressurized-Fluid Supply device making use of this pressurized-fluid control mechanism.

[0010] The present invention provides a pressurized-fluid control mechanism mounted on a pressurized fluid container filled with a pressurized fluid to control ejection of a pressurized fluid charged into the pressurized fluid container. The pressurized-fluid control mechanism of the present invention includes an acute pointed member including a sealing part at its distal end. The sealing member is reduced in diameter from a proximal end towards the distal end. The pressurized-fluid control mechanism of the present invention also includes a biasing member for biasing the acute pointed member. The acute pointed member is arranged in the inside of the pressurized fluid container and moved back and forth in the inside of the pressurized fluid container to open or close an ejection opening for the pressurized fluid provided in the pressurized fluid container. The acute pointed member is biased by the biasing member so that the sealing part is fitted into the ejection opening to close the ejection hole.

[0011] The acute pointed member is supported by a movable member movable by being guided by a movement guide provided on the pressurized fluid container. There is formed a passageway for a pressurized fluid between the movable member and the movement guide. There is formed a spacing between a sealing plate and the movable member when a sealing part of the acute pointed member is fitted in the ejection opening to stop the ejection opening. The pressurized fluid charged in the pressurized fluid container flows into this spacing.

[0012] When the sealing part is fitted in the ejection opening to stop the ejection opening, the distal end of the sealing part is protruded via the ejection opening to outside of the pressurized fluid container. The protruded portion of the distal end of the sealing part may be thrust and thereby moved to open the ejection opening.

[0013] The ejection opening is provided in a sealing plate that closes an opening of the pressurized fluid container. Preferably, the sealing plate is formed of synthetic resin, and the acute pointed member is formed of metal.

[0014] The present invention also provides a Pressurized-Fluid Supply device including a pressurized fluid container filled with a pressurized fluid, and a pressurized-fluid control mechanism mounted on the pressurized fluid container. The pressurized-fluid control mechanism opens or closes an ejection opening for the pressurized fluid provided in the pressurized fluid container to control the ejection of the pressurized fluid charged in the pressurized fluid container. The pressurized-fluid control mechanism includes an acute pointed member provided with a sealing part at its distal end, and a biasing member for biasing the acute pointed member. The sealing part is progressively reduced in diameter from a proximal end towards the distal end. The acute pointed member is supported by a movable member moved by being guided by a movement guide provided on the side the pressurized fluid container. There is formed a passageway for the pressurized fluid between the movable member and a movement guide. There is formed a spacing into which flows the pressurized fluid charged in the pressurized fluid container when the sealing part of the acute pointed member is fitted in the ejection opening to stop the ejection opening.

[0015] When the sealing part of the acute pointed member is fitted in the ejection opening to close it, the distal end of the

sealing part is protruded via the ejection opening. This protruded portion may be thrust and thereby moved to open the ejection opening.

[0016] The Pressurized-Fluid Supply device according to the present invention includes an opening/closure actuating mechanism that thrusts the acute pointed member against the bias of the biasing member to open the ejection opening.

[0017] In the pressurized-fluid control mechanism and in the Pressurized-Fluid Supply device that makes use of this pressurized-fluid control mechanism, the small-sized ejection opening formed in the sealing plate may be controlled to be opened or closed by the acute pointed member arranged in the pressurized fluid container filled with the pressurized fluid. Hence, the ejection of the pressurized fluid, such as a pressurized gas, charged into the container vessel, may be controlled with ease by a simpler mechanism. In addition, the control mechanism and the supply device itself may be reduced in size.

[0018] In particular, in the pressurized-fluid control mechanism and in the Pressurized-Fluid Supply device that makes use of this pressurized-fluid control mechanism, according to the present invention, the ejection opening is closed just by the acute pointed member arranged in the pressurized fluid container. Hence, the total pressure applied to the member that closes the ejection opening may be made small, so that the ejection opening may be opened or closed with ease with a light force. It is thus possible to construct a Pressurized-Fluid Supply device of high operability.

[0019] Other advantages of the present invention will become more apparent from the following description which is made in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. **1** is a perspective view showing the appearance of a Pressurized-Fluid Supply device that makes use of a pressurized-fluid control mechanism according to the present invention.

[0021] FIG. **2** is a cross-sectional view of the Pressurized-Fluid Supply device showing the state in which the gas ejection opening has been closed by the acute pointed member.

[0022] FIG. **3** is an exploded perspective view showing the pressurized-fluid control mechanism according to the present invention.

[0023] FIG. **4** is a cross-sectional view showing the state in which the gas ejection opening has been closed by the sealing part of the acute pointed member.

[0024] FIG. **5** is a cross-sectional view of the pressurized-fluid control mechanism showing the state in which the gas ejection opening has been opened.

[0025] FIG. **6** is a cross-sectional view showing the state in which the acute pointed member is moved to open the gas ejection opening.

BEST MODE FOR CARRYING OUT THE INVENTION

[0026] Preferred embodiments of a pressurized-fluid control mechanism and a Pressurized-Fluid Supply device that uses this pressurized-fluid control mechanism, according to the present invention, will now be described in detail.

[0027] A preferred embodiment of a pressurized-fluid control mechanism that controls ejection of a pressurized carbonic gas from a pressurized fluid container filled with the compressed carbonic gas as a pressurized fluid will now be described. A preferred embodiment of a Pressurized-Fluid Supply device that uses this pressurized-fluid control mechanism will also be described. In the following description, a compressed carbonic gas is referred to simply as a carbonic gas.

[0028] A pressurized-fluid control mechanism **1** according to the present invention is applied to a Pressurized-Fluid Supply device **2** shown in FIGS. **1** and **2**. The Pressurized-Fluid Supply device **2** includes a gas container vessel **3** in which the carbonic gas as pressurized gas has been charged, or is adapted to be charged. This gas container vessel **3** has a mechanical strength sufficient to be filled with a compressed liquefied carbonic gas, and is formed from metal, such as iron, to the shape of a bottomed cylinder.

[0029] Referring to FIG. **2**, the gas container vessel **3** includes a vessel main **3***a* whose upper end is formed as a tubular reduced-diameter portion **3***b*, as shown in FIG. **2**. This reduced-diameter portion **3***b* is prepared by reducing-molding an upper end of the vessel main **3***a* so as to have an end opening **4**. The pressurized-fluid control mechanism **1** is arranged so as to be accommodated within this reduced-diameter portion **3***b*.

[0030] The gas container vessel **3**, within which the pressurized-fluid control mechanism **1** is mounted, is housed within a vessel container **8** combined from an upper half **6** and a lower half **7**. This vessel container **8** is molded from synthetic resin to a cylindrical shape to conform to the gas container vessel **3** held within the vessel container. The gas container vessel **3** is retained by the upper and lower halves **6**, **7** so as not to be moved or displaced within the vessel container **8**.

[0031] An opening/closure actuating mechanism **9**, used for opening or closing the pressurized-fluid control mechanism **1**, is provided on the side the upper half **6** of the vessel container **8**, as will be described subsequently in detail.

[0032] The pressurized-fluid control mechanism **1**, controlling the ejection of carbonic gas C, charged into the gas container vessel **3**, includes a valve box **11**, mounted so as to be engaged in the reduced-diameter portion **3***b* of the gas container vessel **3**, as shown in FIGS. **2** and **3**. The valve box **11** includes a tubular valve box main **12**, engaged in the reduced-diameter portion **3***b*, and a sealing plate **13**. This sealing plate **13**, mounted as one with an upper end of the valve box main **12**, closes the end opening **4** of the reduced-diameter portion **3***b*.

[0033] An outer peripheral surface of the valve box main **12** has a threaded portion **15** engaged with a mating threaded portion **14** formed on the inner peripheral surface of the reduced-diameter portion **3***b*. The valve box **11** is mounted on the reduced-diameter portion **3***b* by screwing the threaded portion **15** provided on the valve box main **12** to the mating threaded portion **14** of the reduced-diameter portion **3***b*, as shown in FIG. **2**.

[0034] The valve box **11** is formed of a synthetic resin, such as a polyacetal resin. The crest and the root of the threaded portion **15** provided on the valve box **11** formed of the synthetic resin are set so as to be slightly larger than those of the mating threaded portion **14** of the reduced-diameter portion **3***b*. By so doing, the threaded portion **15** is screwed to the mating threaded portion **14** of metal as the threaded portion **15** becomes deformed by engagement with the metal threads. As a result, the outer peripheral surface of the valve box main **12** is hermetically sealed against the inner peripheral surface

of the reduced-diameter portion **3***b* to inhibit gas leakage from the outer peripheral surface of the valve box main **12**.

[0035] The sealing plate **13** is formed as one with the valve box main **12** so as to close an upper end opening of the tubular valve box main **12** as shown in FIGS. **2** and **3**. The sealing plate **13** is formed as a disc and is formed on its outer periphery with a flange **16** of a diameter larger than the outer diameter of the valve box main **12**, as shown in FIG. **3**. When the valve box main **12** is fitted on the reduced-diameter portion **3***b*, the flange**16** abuts against an upper end face of the reduced-diameter portion **3***b* to regulate the mounting position of the valve box **11** with respect to the gas container vessel **3**.

[0036] The sealing plate **13** has a gas ejection opening **18** at its center position for ejecting the carbonic gas C filled in the gas container vessel **3** to outside of the vessel. This gas ejection opening **18** has its opening/closure controlled by an acute pointed member **17** moved back and forth within the valve box main **12** located within the reduced-diameter portion **3***b* of the valve box **11**.

[0037] The acute pointed member **17**, controlling the opening/closure of the gas ejection opening **18**, is formed as a linear member of a smaller diameter. This acute pointed member **17** includes a sealing part **19** at the foremost part of a proximal side shank part **17***a*, as shown in FIGS. **2** and **3**. This sealing part **19** fits in the gas ejection opening **18** to hermetically seal the gas ejection opening **18**, and is tapered from the shank part **17***a* towards its foremost portion. That is, the sealing part **19** is tapered towards the foremost acute end via a conically inclined terminal portion.

[0038] The gas ejection opening **18**, in which the sealing part **19** is fitted, has is inner peripheral surface tapered in keeping with the profile of the sealing part **19**, as shown in FIG. **4**. The gas ejection opening **18** is formed by thrusting the acute pointed member **17** of metal through the sealing plate **13** of synthetic resin. Preferably, the gas ejection opening **18** is formed by the acute pointed member **17** used later for closing the gas ejection opening **18**. By forming the gas ejection opening **18** by the acute pointed member **17** in this manner, the shape of the gas ejection opening **18** may be made coincident with that of the acute pointed member **17**, thereby improving the hermetic sealing property by the acute pointed member **17**.

[0039] The sealing part **19**, fitted in and closing the gas ejection opening **18**, is tapered and, when it has closed the gas ejection opening **18**, its distal end is protruded by a preset length from the sealing plate **13**, as shown in FIG. **2**. That is, the sealing part **19** has a tapered terminal portion of such a length that, when a mid part of the conically inclined surface progressively increasing in diameter from its distal end towards its proximal end is fitted in and retained by the gas ejection opening **18**, as the sealing part is inserted into the gas ejection opening **18**, the foremost part of the sealing part **19** is protruded by a preset amount from the sealing plate **13**.

[0040] The portion of the sealing part **19** protruded from the sealing plate **13** is used as a thrust part **21** acted on by an opening/closure actuating member **20** that causes fore-and-aft movement of the acute pointed member **17** relative to the gas ejection opening **18**, as later explained.

[0041] The acute pointed member **17** is housed within the valve box main **12** operating as a movement guide means. The acute pointed member **17** is carried by a movable member **22** guided in its movement direction by the valve box main **12**. The acute pointed member is movably arranged within the valve box main **12** for movement in unison with the movable member **22** in a back-and-forth direction relative to the gas ejection opening **18** as indicated by arrows Y_1 and Y_2. The movable member **22** is thus of a size such that it can be moved within the valve box main **12**.

[0042] The acute pointed member **17** is mounted on the movable member **22**, as the shank **17***a* on its proximal side is introduced into and carried by the cylindrically-shaped movable member **22** and as the sealing part **19** on its distal side is protruded from the movable member **22**. A retention step **17***b* is formed at the proximal end of the shank **17***b* of the acute pointed member **17**. The acute pointed member **17** is mounted on the movable member **22** with the retention step **17***b* abutting against the proximal end face of the movable member **22** in order to regulate the amount of protrusion of the sealing part **19** from the distal end face of the movable member **22**.

[0043] The movable member **22**, carrying the acute pointed member **17**, is arranged within the valve box main **12**, as the sealing part **19** at the distal end side of the acute pointed member **17** is inserted into the gas ejection opening **18**, as shown in FIG. **2**. The movable member **22**, arranged within the valve box main **12**, is biased for movement in the direction indicated by arrow Y_1 in FIG. **2** by a coil spring **23** which is an elastic member arranged between the movable member **22** and the valve box main **12**. That is, the movable member **22** is biased for movement in a direction in which the sealing part **19** at the distal side end of the acute pointed member **17** carried by the movable member **22** will be protruded and introduced into the gas ejection opening **18**.

[0044] Meanwhile, the coil spring **23** is retained by a retention step **22***a* and a spring support member **24**, as shown in FIG. **2**. The retention step is formed at a mid portion of the movable member **22**, and the spring support member is fitted to the proximal end of the valve box main **12**. The coil spring biases the movable member **22** in a direction of projecting the sealing part **19** out of the gas ejection opening **18**.

[0045] In the pressurized-fluid control mechanism **1** according to the present invention, the gas ejection opening **18** bored in the sealing plate **13** is stopped just by the sealing part **19** of the acute pointed member **17** arranged within the gas container vessel **3**. That is, in the present embodiment, when the acute pointed member **17** is fitted in the gas ejection opening **18** to stop this gas ejection opening, the movable member **22** is located halfway in the valve box main **12**, with the movable member thus being held in a floated state within the valve box main **12**.

[0046] In the outer peripheral surface of the movable member **22**, there are formed a plurality of flutes **25** that provide passageways for the pressurized fluid between the outer peripheral surface of the movable member and the inner peripheral surface of the valve box main **12**, as shown in FIG. **3**. These flutes **25** are continuously formed from the proximal end towards the distal end of the movable member **22**. By these flutes **25**, the carbonic gas C, filled in the gas container vessel **3**, is charged via the flutes **25** into a spacing **26** delimited between the distal end face of the movable member **22** and the sealing plate **13** to equalize the pressure in the vessel main **3***a* of the gas container vessel **3** with that in the spacing **26**. As a result, the force acting in the direction of introducing the acute pointed member **17** into the gas ejection opening **18** is just the biasing force of the coil spring **23** plus the force of the carbonic gas, as the pressurized fluid, acting on the acute pointed member **17**. The force of the pressurized fluid on the acute pointed member **17** is the force acting on a surface

corresponding to the cross-sectional area of the acute pointed member **17**, and may thus be made sufficiently small in comparison with the pressure of the pressurized fluid filled in the gas container vessel **3**.

[0047] In the present embodiment, the gas ejection opening **18** bored in the sealing plate **13** has a diameter on the order of 0.3 mm to 1 mm, while the acute pointed member **17**, carrying the tapered sealing part **19**, is so formed that its shank part **17***a* has a diameter R_1 on the order of 1.3 mm to 0.8 mm. The pressure of the liquefied carbonic gas, charged into the gas container vessel **3**, is ca. 70 atm. The force applied from the pressurized carbonic gas to the acute pointed member **17** is on the order of 400 gf to 600 gf.

[0048] If the acute pointed member **17** is thrust in the direction of arrow Y_1 in FIG. **2** with a force of insertion just sufficient to keep the gas ejection opening **18** in its closed state, the gas ejection opening **18** may be kept hermetically sealed to inhibit gas leakage. If, in the present embodiment, the acute pointed member **17** is thrust by a thrust force on the order of 1 kgf to 2 kgf in a direction indicated by arrow Y_1 in FIG. **2**, it is possible to prevent the carbonic gas from flowing out to keep the gas ejection opening **18** closed. In the present embodiment, the coil spring **23** having the biasing force on the order of 1 kgf to 1.5 kgf is sufficient as the biasing member that biases the acute pointed member **17** in the direction of closing the gas ejection opening **18**.

[0049] Since the force acting on the acute pointed member **17** may thus be decreased, a smaller force that causes movement of the acute pointed member **17** from its state of closing the gas ejection opening **18** in the direction of opening the gas ejection opening **18** suffices. Since the force that produces movement of the acute pointed member **17** may safely be reduced, the mechanism of controlling the ejection of the gas as the pressurized fluid charged into the gas container vessel **3** may be simpler in structure. In addition, since a smaller force suffices, it is possible to construct an ejection control mechanism with optimum operability. A tubular actuation member insertion unit **27** is also formed as one with the valve box **11** for encircling the gas ejection opening **18**. The distal end of the sealing part **19**, formed as one with the acute pointed member **17**, projected from the gas ejection opening **18**, is disposed within the tubular actuation member insertion unit **27**. This tubular actuation member insertion unit **27** performs the role of protecting the sealing part **19** protruded via the gas ejection opening **18**. In addition, the opening/closure actuating member **20**, composing the opening/closure actuating mechanism **9** operating for opening/closing the gas ejection opening **18**, is introduced into this tubular actuation member insertion unit **27** so as to perform a back-and-forth movement therein.

[0050] A nozzle unit **32**, including a nozzle member **31** that ejects the carbonic gas via the gas ejection opening **18**, is mounted on the distal end of the tubular actuation member insertion unit **27**. The proximal end of the nozzle unit **32** includes a tubular fitting portion **33** in which the tubular actuation member insertion unit **27** has a fit. The upper end of the nozzle unit **32** includes an insertion guide portion **34**. The fitting portion **33** and the insertion guide portion **34** are coaxial relative to each other. The nozzle member **31** is adapted to be projected sideways from a mid part of the nozzle unit **32** on top of the fitting portion **33**.

[0051] The nozzle unit **32** is mounted on the valve box **11** as the fitting portion **33** is fitted over the tubular actuation member insertion unit **27**. The nozzle unit **32** is mounted at this time in position over the tubular actuation member insertion unit **27**, so that the proximal end of the nozzle **31** is disposed in the vicinity of the actuation member insertion unit **27**, as shown in FIGS. **2** and **3**. The nozzle member **31** is now in fluid communication with the actuation member insertion unit **27**.

[0052] The nozzle unit **32**, constructed as described above, is mounted on the valve box **11** with the fitting portion **33** fitted on the actuation member insertion unit **27**. The nozzle unit **32** is mounted at this time in position with the proximal end of the fitting portion **33** fitted on the tubular actuation member insertion unit **27**. The nozzle member **31** thus is in fluid communication with the actuation member insertion unit **27**.

[0053] The opening/closure actuating mechanism **9**, adapted for opening/closing the gas ejection opening **18**, includes the opening/closure actuating member **20** and an opening/closing lever **37**, as shown in FIG. **2**. The opening/closure actuating member **20** is introduced via the insertion guide portion **34** of the nozzle unit **32** into the actuation member insertion unit **27**, and the opening/closing lever **37** serves for thrusting and thereby actuating the opening/closure actuating member **20**. The opening/closure actuating member **20** is formed by a shank-like member, and includes a shank part **20***a* and a thrusting head part **20***b*. The shank part **20***a* is introduced into the actuation member insertion unit **27** via the insertion guide portion **34**, and the thrusting head part **20***b* is formed at the terminal end of the shank part **20***a*. Referring to FIG. **2**, the opening/closure actuating member **20** is introduced into the actuation member insertion unit **27** so that the proximal end of the shank part **20***a* abuts against the thrust part **21** at the distal end of the sealing part **19**. The opening/closure actuating member **20** is biased by the coil spring **23** in the same direction as the acute pointed member **17**, indicated by arrow Y_1 in FIG. **2**, as the shank part **20***a* is introduced into the actuation member insertion unit **27**. The coil spring **23** biases the acute pointed member **17**, as previously mentioned.

[0054] The foremost part of the insertion guide portion **34**, into which the opening/closure actuating member **20** has been inserted and which is in fluid communication with the actuation member insertion unit **27**, is sealed by a sealing member **43** to prevent gas leakage.

[0055] The opening/closing lever **37**, thrusting the opening/closure actuating member **20**, is formed as one with an upper plate **39** of a cap **38** mounted on an upper side of the upper half **6** of the vessel container **8**. This cap **38** is molded from a synthetic resin, and is mounted on the upper half **6** so as to overlie the opening/closure actuating member **20**. The opening/closure actuating member is mounted by having its shank part **20***a* introduced from the insertion guide portion **34** of the nozzle unit **32** into the inside of the actuation member insertion unit **27**. The opening/closing lever **37** is provided for facing the head part **20***b* of the opening/closure actuating member **20** of the upper plate **39**. The opening/closing lever **37** is formed as by partially cutting the upper plate **39** in the form of a letter U, and is adapted to be rotationally displaced along the direction of arrow X_1 or arrow X_2 in FIG. **2**, with a connecting portion to the upper plate **39** as a hinge **40**. The opening/closing lever **37** is formed so that, when the cap **38** is mounted on the upper half **6**, a mid part of the opening/closing lever abuts on the thrusting head part **20***b* of the opening/closure actuating member **20**. The opening/closing lever **37** is also formed so that its mid part abuts at all times on the thrusting head part **20***b* with a small thrusting force. That is, the opening/closing lever **37** is formed so that, when the cap

38 is mounted on the upper half 6, a biasing force will be generated for acting in a direction indicated by arrow X_1 in FIG. 2. Hence, the opening/closing lever 37 is contacted with the opening/closure actuating member 20 in a state in which the opening/closing lever is acted on by the biasing force of the coil spring 23 adapted for thrusting and biasing the acute pointed member 17.

[0056] Meanwhile, when the cap 38 is mounted on the upper half 6, the distal end of the nozzle member 31 is projected laterally of the cap 38 via a cut-out 41 formed in a lateral surface of the cap 38. An ejection nozzle 44 is mounted on the distal end of the nozzle 31 as necessary.

[0057] In the pressurized-fluid control mechanism 1, described above, when the opening/closing lever 37 is turned in the direction indicated by arrow X_1 in FIG. 2, the opening/closure actuating member 20 is moved in a direction indicated by arrow Y_2 in FIG. 2. By this opening/closure actuating member 20, the acute pointed member 17 is thrust in the direction indicated by arrow Y_2 in FIG. 2 against the bias of the coil spring 23. The acute pointed member 17 is thus moved towards a more inner area in the gas container vessel 3. When the acute pointed member 17 is moved in the direction indicated by arrow Y_2 in FIG. 2, there is produced a gap D between the tapered sealing part 19 and the tapered gas ejection opening 18, as shown in FIGS. 5 and 6. The carbonic gas C, charged into the container vessel 3, is ejected into the nozzle unit 32 via the gap D and the actuation member insertion unit 27. The carbonic gas C, thus ejected into the nozzle unit 32, is ejected outwards via the nozzle member 31.

[0058] In the present embodiment, the gas ejection opening 18 may be kept in an opened state to allow sustained ejection of the carbonic gas C if the opening/closing lever 37 is kept in a state it has been turned in the direction indicated by arrow X_1, the opening/closure actuating member 20 has been moved in the direction indicated by arrow Y_2 in FIG. 2 and the acute pointed member 17 has been moved in the direction indicated by arrow Y_2 in FIG. 5.

[0059] When the opening/closing lever 37 is released from the thrust state in which it is turned as described above, the opening/closure actuating member 20 is released from its thrust state. The acute pointed member 17 is then moved in the direction of the arrow Y_1 of FIG. 2, under the bias of the coil spring 23. Hence, the sealing part 19 is intruded into the gas ejection opening 18, with the thickened part of the sealing part 19 fitting into and stopping the gas ejection opening 18 to halt the ejection of the carbonic gas C.

[0060] A protective cap 45 is mounted on the cap 38 of the opening/closure actuating mechanism 9 to cover the cap to prevent inadvertent thrusting of the opening/closing lever 37.

[0061] In the pressurized-fluid control mechanism 1 of the present embodiment, the gas ejection opening 18 is stopped by the acute pointed member 17 except if the opening/closure actuating member 20 is thrust. It is thus possible to positively prevent outflow of the carbonic gas charged into the gas container vessel 3. By applying this pressurized-fluid control mechanism 1 to the Pressurized-Fluid Supply device 2, it is possible to realize a device free from gas leakage.

[0062] In addition, in the pressurized-fluid control mechanism 1 of the present embodiment, there is no necessity of exerting a large biasing force to the acute pointed member 17 that closes the gas ejection opening 18, as described above. Hence, the opening/closure operation for the gas ejection opening 18 is facilitated, so that it is possible to simplify the mechanism of opening/closing the gas ejection opening 18 to contribute to reducing the size of the Pressurized-Fluid Supply device 2 employing the pressurized-fluid control mechanism 1.

[0063] In the above embodiment, the acute pointed member 17 that opens/closes the gas ejection opening 18 is carried by the movable member 22 and moved within the valve box main 12 operating as a movement guide unit. The acute pointed member 17 may, however, be supported for movement within the valve box main 12, in which case the movable member 22 may not be used. For example, the proximal end of the acute pointed member 17 may directly be supported by one end of the coil spring 23.

[0064] In the above embodiment, the Pressurized-Fluid Supply device is filled with the carbonic gas as a pressurized fluid. The present invention is, however, not limited to the above mentioned embodiment and may be applied to a Pressurized-Fluid Supply device filled with another pressurized fluid.

1. A pressurized-fluid control mechanism mounted on a pressurized fluid container filled with a pressurized fluid to control ejection of a pressurized fluid charged into said pressurized fluid container; comprising:

an acute pointed member including a sealing part at a distal end thereof; said sealing member being reduced in diameter from a proximal end thereof towards said distal end; and

a biasing member for biasing said acute pointed member;

said acute pointed member being arranged in the inside of said pressurized fluid container and being moved back and forth in the inside of said pressurized fluid container to open or close an ejection opening for said pressurized fluid provided in said pressurized fluid container; said acute pointed member being biased by said biasing member so that said sealing part is fitted into said ejection opening to close said ejection hole.

2. The pressurized-fluid control mechanism according to claim 1, wherein

said acute pointed member is supported by a movable member movable by being guided by a movement guide provided on said pressurized fluid container;

there being formed a passageway for said pressurized fluid between said movable member and said movement guide;

there being formed a spacing between a sealing plate and said movable member when said sealing part of said acute pointed member is fitted in said ejection opening to stop said ejection opening; said pressurized fluid charged into said pressurized fluid container flowing into said spacing.

3. The pressurized-fluid control mechanism according to claim 1, wherein

the distal end of said sealing part is protruded via said ejection opening to outside of said pressurized fluid container when said sealing part is fitted in said ejection opening to stop said ejection opening.

4. The pressurized-fluid control mechanism according to claim 1, wherein

said acute pointed member is arranged so that the distal end of said sealing part is protruded from said ejection opening; the portion of said acute pointed member protruded from said ejection opening operating as a thrust part.

5. The pressurized-fluid control mechanism according to claim 1, wherein

said ejection opening is provided in a sealing plate that closes an opening of said pressurized fluid container.

6. The pressurized-fluid control mechanism according to claim **5**, wherein

said sealing plate is formed of synthetic resin; and wherein

said acute pointed member is formed of metal.

7. A Pressurized-Fluid Supply device comprising:

a pressurized fluid container filled with a pressurized fluid; and

a pressurized-fluid control mechanism mounted on said pressurized fluid container; said pressurized-fluid control mechanism opening or closing an ejection opening for said pressurized fluid provided in said pressurized fluid container to control the ejection of the pressurized fluid charged in said pressurized fluid container;

said pressurized-fluid control mechanism including

an acute pointed member including a sealing part at a distal end thereof; said sealing part being reduced in diameter from a proximal end thereof towards said distal end; and

a biasing member for biasing said acute pointed member;

said acute pointed member being arranged in the inside of said pressurized fluid container and being moved back and forth in the inside of said pressurized fluid container to open or close an ejection opening for said pressurized fluid provided in said pressurized fluid container; said acute pointed member being biased by said biasing member so that said sealing part is fitted into said ejection opening to close said ejection hole.

8. The Pressurized-Fluid Supply device according to claim **7**, wherein

said acute pointed member is supported by a movable member movable by being guided by a movement guide provided on said pressurized fluid container;

there being formed a passageway for the pressurized fluid between said movable member and said movement guide;

there being formed a spacing between a sealing plate and said movable member when said sealing part of said acute pointed member is fitted in said ejection opening to stop said ejection opening; said pressurized fluid charged in said pressurized fluid container flowing into said spacing.

9. The Pressurized-Fluid Supply device according to claim **7**, wherein

the distal end of said sealing part is protruded via said ejection opening to outside of said pressurized fluid container when said sealing part is fitted in said ejection opening to stop said ejection opening.

10. The Pressurized-Fluid Supply device according to claim **7**, wherein

said acute pointed member is arranged so that the distal end of said sealing part is protruded from said ejection opening; the portion of said acute pointed member protruded from said ejection opening operating as a thrust part.

11. The Pressurized-Fluid Supply device according to claim **7**, wherein

said ejection opening is provided in a sealing plate that closes an opening of said pressurized fluid container.

12. The Pressurized-Fluid Supply device according to claim **11**, wherein

said sealing plate is formed of synthetic resin; and wherein said acute pointed member is formed of metal.

13. The Pressurized-Fluid Supply device according to claim **7**, further comprising:

an opening/closure actuating mechanism that thrusts said acute pointed member against the biasing force of said biasing member to open or close said ejection opening.

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