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GB 930372
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(54) **Improved Bottle Opener**

(57) A bottle opener comprises a cylindrical body 1 suitable for encasing a gas cartridge 8 having a gas outlet port 9, a needle member 5 provided at one end of the cylindrical body, a cylindrical member 10 screwed on the other end of the cylindrical body, a gas cartridge needle disposed so as to face the gas outlet port 9 of a gas cartridge, a gas flow path 15 communicating the gas cartridge needle with the needle member, a valve operated by a piston 17 for opening and closing the gas flow path, the valve being biased into the closed position, means 25—27 for actuating the valve, the actuating means being biased in a closing direction, means 30 to seal between the gas cartridge and the cylindrical member and between the gas cartridge and the gas cartridge needle, and a safety valve communicating with the gas flow path downstream of the valve.

FIG.2

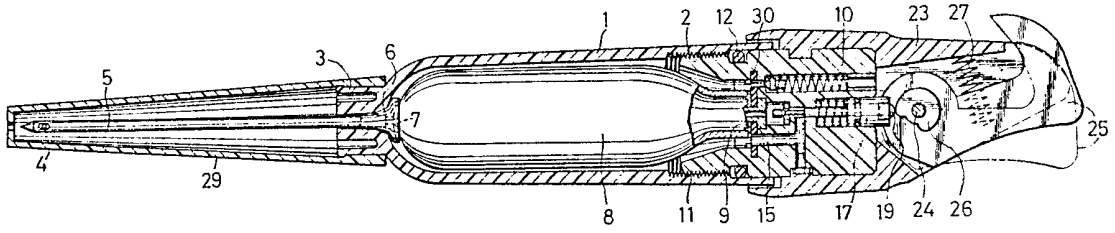

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FIG.1

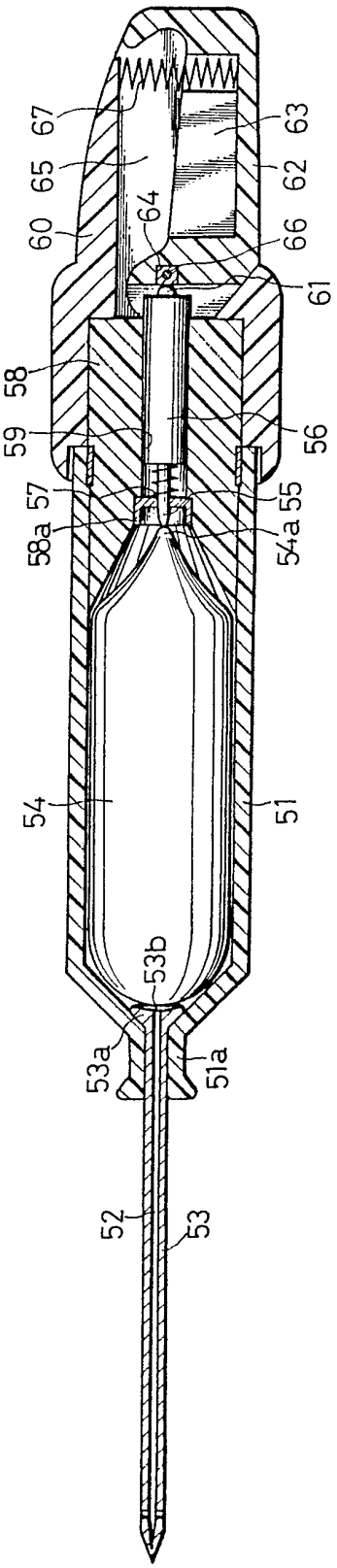
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FIG.4

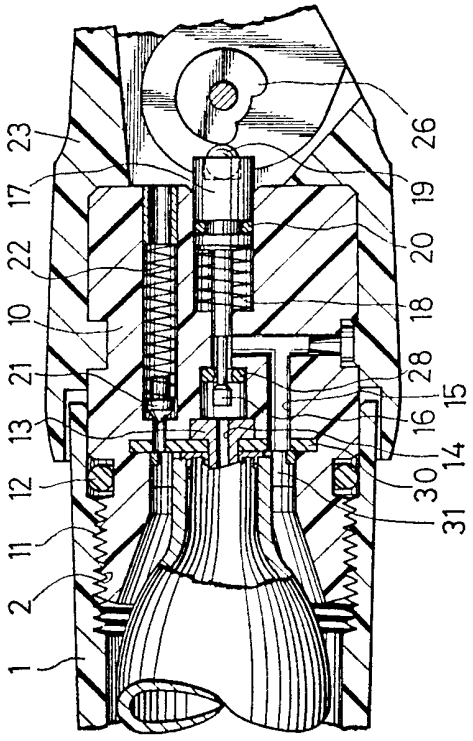
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FIG.2

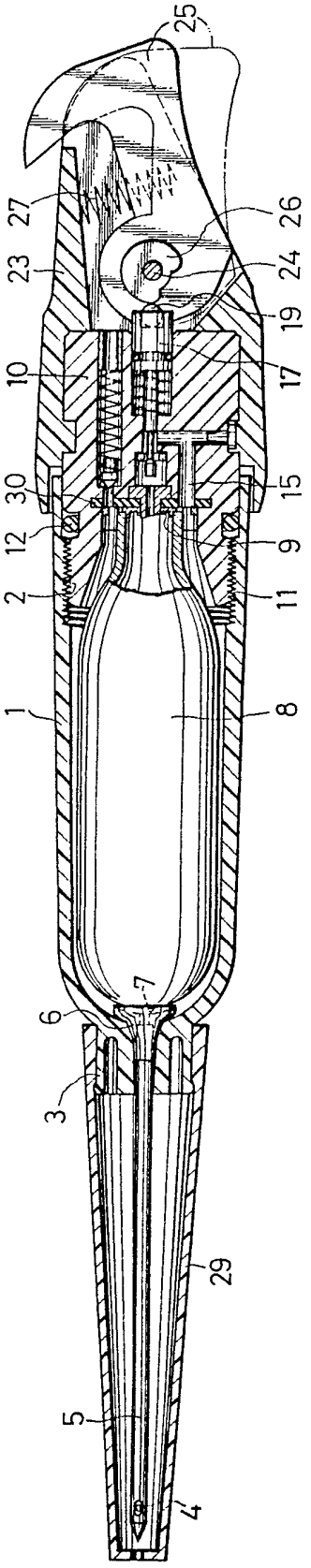
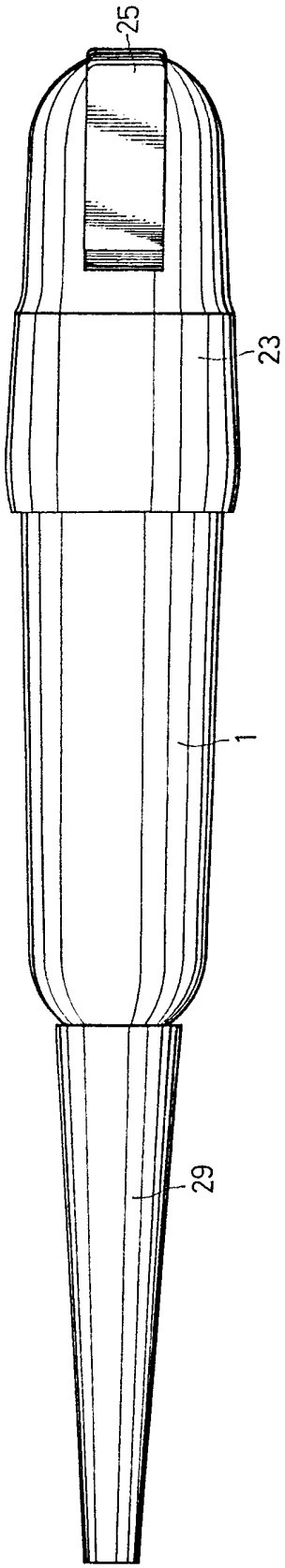


FIG.3



SPECIFICATION

Improved Bottle Opener

The present invention relates to a bottle opener and, more particularly, to an improved bottle opener which is capable of opening a bottle tightly sealed with a cork or the like in a simple and reliable manner.

A bottle opener is known with which a bottle is opened by inserting a penetrating needle into the cork sealing the bottle and introducing a gas such as carbon dioxide gas into the bottle through the penetrating needle.

As in example of such a known bottle opener, the one that is disclosed in the Japanese Patent Publication No. 42—17718 (1967) is illustrated in Figure 1 of the accompanying drawings. Referring to Figure 1, a cylinder 51 which has at the bottom end thereof an opening 51*a* through which extends a penetrating needle 53 with a through hole 52. The penetrating needle 53 is supported by a head portion 53*a* in the opening 51*a*. A groove 53*b* is formed at the head portion 53*a*. A gas cartridge (a "bomb") 54 contains means for generating gas, such as carbon dioxide gas, and has at the upper surface thereof a gas outlet port 54*a* which is closed by a metal film. The gas cartridge 54 is encased in the cylinder 51 and spaced from it by a distance which allows the gas to pass between the gas cartridge 54 and the cylinder 51. A projecting rod 55 is fixed to a support 56. The projecting rod 55 is biased upwardly by a coil spring 57 and is disposed in a through hole 59 formed in a holding body 58. The projecting rod 55 also protrudes from a bottom plate 58*a* of the holding body 58 so as to face the gas outlet port 54*a*, that is the metal film of the gas cartridge 54. An outer cylinder 60 is fixed to the holding body 58 and together these constitute a cap body which is screwed to the cylinder 51. At the top surface of the support 56 is rotatably mounted a ball 61. A plunger 62 has a hollow part 63, which has at the bottom surface thereof a metal pressing part 64 for the ball 61. The metal pressing part 64 is disposed in a recess 65 of the outer cylinder 60 and is axially supported on a shaft 66. A coil spring 67 inside the hollow part 63 is interposed between the plunger 62 and the outer cylinder 60 so that the metal pressing part 64 does not constantly press the ball 61.

In a conventional bottle opener of the above construction, when the penetrating needle 53 is inserted into a cork sealing a bottle, and the plunger 62 is pressed while the cylinder 51 is held, the plunger 62 pivots about the shaft 66 against the biasing force of the coil spring 67 so as to press the ball 61. The projecting rod 55 is pressed downward by the ball 61 and breaks through the metal film of the gas outlet port 54*a* of the gas cartridge 54. The gas in the gas cartridge 54, such as carbon dioxide gas, flows out and passes through the space between the gas cartridge 54 and the cylinder 51. The gas further flows inside the through hole 52, through the groove 53*b* of the penetrating needle 53 and into the bottle. The gas thus introduced inside the bottle raises the internal pressure and presses the cork upwardly. The cork is thus removed.

However, with this type of bottle opener, once the gas outlet port of the gas cartridge is broken, the gas inside the gas cartridge is exhausted through the through hole of the penetrating needle until the pressure inside the gas cartridge equals the external pressure. Consequently, the gas cartridge must be replaced every time a bottle is opened. This is extremely uneconomical. Furthermore, the bottle itself often breaks before removal of the cork, when the strength of the bottle used is smaller than that required to withstand the pressure of the gas to be introduced from the gas cartridge into the bottle. A bottle opener of this type was furthermore found to be defective for long-term use, because the space between the bottom plate and the projecting rod and the space between the support and the through hole can become widened so that the gas to be introduced from the gas outlet into the bottle leaks out.

It is an object of the present invention to provide an improved bottle opener which is capable of removing, in a simple and reliable manner, a cork or the like tightly sealing a bottle, a bottle opener of a construction according to which a gas cartridge containing an agent for generating gas, such as carbon dioxide gas, to be introduced into a bottle may be used for opening a plurality of bottles, as well as a bottle opener which is capable of opening a bottle safely without breaking the bottle.

According to the present invention, there is provided a bottle opener which comprises a cyclindrical body suitable for encasing a gas cartridge have a gas outlet port, a needle member provided at one end of the cylindrical body, a cylindrical member screwed on the other end of the cyclindrical body, there being disposed in the cylindrical member a gas cartridge needle disposed so as to face the gas outlet port of a gas cartridge inserted in the cylindrical body, a gas flow path communicating with the gas cartridge needle and the needle member, a valve means for opening and closing the gas flow path, the valve means being biased into the closed position, and a safety valve communicating with the gas flow path downstream of the valve means, means for actuating the valve means, the actuating means being biased in a closing direction, and airtight sealing means being disposed so as, in use to seal between an inserted gas cartrige and the cylindrical member and between an inserted gas cartrige and the gas cartridge needle.

In accordance with a preferred embodiment of the present invention, there is provided a bottle opener which comprises a gas cartridge containing an agent for generating gas, such as carbon dioxide gas, and having a gas outlet port; a cylindrical body encasing the gas cartridge with a predetermined space therebetween; a needle member mounted at one end of the cylindrical body and communicating with the space; a

cylinder screwed to the other end of the cylindrical body, in which cylinder are disposed a gas cartridge needle facing the gas outlet port of the gas cartridge, a gas flow path communicating with the gas cartridge needle and the space, a piston having at one end a valve for opening and closing the gas flow path, which valve is constantly biased by a first elastic member in a direction for closing the path, and a safety valve communicating with the space; a lid body mounted on the cylinder; a handle for acting on the other end of the piston, which handle is mounted on the cylinder and which handle is constantly biased by a second elastic member in a closing direction; and airtight sealing members disposed between the gas cartridge and the cylinder, between the gas cartridge and the gas cartridge needle and between the piston and the cylinder.

The present invention enables the provision of a bottle opener of a construction which is capable of withstanding use over a long period of time and which does not allow leakage of the gas.

A bottle opener in accordance with the present invention may be constructed in the manner to be described below. An agent for generating gas, such as carbon dioxide gas, is filled in a gas cartridge which has a gas outlet port and the gas cartridge inserted into a cylindrical body which encases the gas cartridge with a predetermined space therebetween. A needle member is mounted at one end of the cylindrical body and communicates with the above-mentioned space. A cylinder is screwed to the other end of the cylindrical body and has a gas cartridge needle which faces the gas outlet port of the gas cartridge. A gas flow path is formed in the cylinder in the bomb needle and the above-mentioned space. A piston has at one end a valve for opening and closing the gas flow path and is constantly biased by a first elastic member in a direction to close the path. A lid is mounted on the cylinder. A handle is mounted on the lid for acting on the other end of the piston so that the piston is constantly biased in the closing direction by a second elastic member. Airtight sealing members are also included in the cylinder between the cylindrical body and the cylinder, between the gas cartridge and the gas cartridge needle and between the piston and the cylinder. The air-tight sealing member interposed between the gas cartridge and the gas cartridge needle preferably has a central hole communicating with the gas cartridge needle and comprises a thick, substantially disc-shaped member having at the periphery thereof an opening connecting the safety valve and the above-mentioned space and another opening through which extends the air flow path.

For a better understanding of the present invention and to show how the same may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:—

Figure 1 shows a vertical sectional view of a conventional bottle opener;

Figure 2 shows a vertical partially sectional view of an embodiment of a bottle opener in accordance with the present invention;

Figure 3 shows a front view of the bottle opener of Figure 2, and

Figure 4 shows a partially cutaway, vertical sectional view of the main part of the bottle opener of Figure 2.

Referring now to Figures 2, 3 and 4 of the drawings, there is shown a cylindrical body 1 which is of substantially cylindrical shape and which has screw threads 2 at the upper end of the inner surface thereof (the end to the right in Figure 2). The cylindrical body 1 is tapered towards the other end thereof, the lower end, and has an opening 3 at the lower end. Through the opening 3 penetrates a needle 5 which has a through hole 4 inside, and a head portion 6 of the needle 5 is provided with a groove 7 and is mounted in the opening 3 of the lower end of the cylindrical body 1. A gas cartridge 8 is filled with an agent for generating gas, such as carbon dioxide gas, and has at the upper end thereof a gas outlet port 9 which is closed with a metal film. The cylindrical body 1 encases the gas cartridge 8 with a predetermined space therebetween. The space and the through hole 4 of the needle 5 are connected by the groove 7 of the head portion 6.

The gas cartridge 8 is encased inside the cylindrical body 1 with the gas outlet port 9 oriented away from the needle 5 and facing a cylinder 10. At the lower edge of the outer surface of the cylinder 10 are formed screw threads 11 for threadable engagement with the screw threads 2 formed at the upper end of the inner surface of the cylindrical body 1.

An airtight sealing member, for example an O-ring 12, is disposed at the position where the cylinder 10 and the cylindrical body 1 overlap each other for forming an airtight seal between the cylinder 10 and the cylindrical body 1.

A gas cartridge needle 13 is disposed on the cylinder 10 so it faces the gas outlet port 9 of the gas cartridge 8. The gas cartridge needle 13 is used for breaking through the metal film attached to the gas outlet port 9 and is of substantially conical shape with a communicating hole 14 at the centre thereof. A gas flow path 15 is formed in the cylinder 10 joining the communicating hole 14 of the gas cartridge needle 13 with the space between the cylindrical body 1 and the gas cartridge 8. In this gas flow path 15 is disposed a piston 17 which has a valve 16 at one end for opening and closing the gas flow path 15 and which is constantly biased by a first elastic member, a coil spring 18, toward the closing direction. The other end of the piston 17 protrudes upwardly into the cylinder 10 and a ball 19 is rotatably supported on the top surface of the piston 17. An airtight sealing member, for example an O-ring 20, is mounted on the outer circumference of the piston 17 for forming an

airtight seal between the piston 17 and the cylinder 10. A safety valve 21 communicating with the above-mentioned space is mounted in the cylinder through a coil spring 22 so that, when the pressure inside the space exceeds a certain value, the gas inside is exhausted.

A lid body 23 is mounted on the cylinder 10 and a handle 25 is pivotably mounted inside the lid body 23 on a pivot shaft 24 supported by the lid body 23. A cam 26 is fixed to the pivot shaft 24. As the cam 26 pivots, the ball 19 mounted on the top surface of the piston 17 is pressed downwardly and opens the valve 16. A second elastic member, for example a coil spring 27, is interposed between the handle 25 and the lid body 23 for constantly biasing the valve 16 in the closing direction.

The valve 16 as described above is a valve for opening and closing the gas flow path 15 and comprises a large diameter portion at one end of the piston 17. An O-ring 28 is interposed between the valve 16 and the gas flow path 15 for complete sealing. A cap 29 can be mounted to cover the needle 5 for safety at the opening 3 of the cylindrical body 1.

The gas outlet port 9 of the gas cartridge 8 and the gas cartridge needle 13 are constructed in the manner to be described hereinbelow for preventing gas leakage. An airtight sealing member, for example a thick disc-shaped rubber ring 30, is interposed between the conical gas cartridge needle 13 and the gas outlet port 9. The rubber ring 30 has at the central part thereof a central hole through which extends the gas cartridge needle 13; at the periphery thereof, there is an opening for connecting the safety valve 21 with the above mentioned space and an opening through which passes the gas flow path 15. A guide ring 31 for correctly guiding the gas cartridge needle 13 to the gas outlet port 9 of the gas cartridge 8 is disposed at the centre of the bottom of the cylinder 10.

The operation of the bottle opener of the above mentioned construction will now be described.

The gas cartridge 8 filled in advance with a gas is correctly mounted in the cylindrical body 1, in such a manner that the gas outlet port 9 faces upwardly in the cylindrical body 1. Thereafter, the lid body 23 is slowly turned and screwed onto the lower end of the cylindrical body 1. When the lid body 23 is screwed to the cylindrical body 1, the gas outlet port 9 of the gas cartridge 8 correctly faces the gas cartridge needle 13 through the guide ring 31 mounted on the cylinder 10. The gas cartridge needle 13 breaks through the metal film of the gas outlet port 9. Because the handle 25 is not being gripped by a hand, the valve 16 closes the gas flow path 15 by the biasing force of the coil springs 18 and 27. Thus, the gas flowing out of the gas cartridge 8 flows from the communicating hole 14 of the gas cartridge needle 13 to the valve 16, but does not flow along the gas flow path 15. Because the thick disc-shape rubber ring 30 of large diameter is interposed between the gas outlet port 9 and the gas cartridge needle 13, the gas from the gas cartridge 8 does not leak into the space between the gas cartridge 8 and the cylindrical body 1. Because the rubber ring 30 is thick, the ring 30 strongly resists degradation and secular changes caused by the gas flowing out from the gas cartridge 8 and is capable of withstanding use over long periods of time.

For opening a bottle sealed by a cork or the like using the above described bottle opener, after the cap 29 has been removed, the needle 5 is inserted in the cork and the handle 25 is firmly gripped. The cam 26 of the handle 25 pivots against the biasing force of the coil springs 18 and 27 and presses the piston 17 downwardly. When the piston 17 is pressed downardly, the valve 16 opens the gas flow path 15 (as shown in Figure 2). The gas from the gas cartridge 8 thus passes along the gas flow path 15, into the space between the cylindrical body 1 and the gas cartridge 8, into the through hole 4 of the needle 5 and into the bottle. The pressure inside the bottle gradually increases, to the point at which the cork is not able to withstand the pressure and the cork pops out of the bottle. After opening the bottle, the handle 25 is released, thereby automatically closing the valve 16 by the biasing forces of the coil springs 18 and 27, so as to prevent the gas in the gas cartridge 8 from leaking out. Accordingly, the bottle opener may be used for opening bottles a plurality of times as long as the gas generating agent in the gas cartridge 8 generates gas of the required pressure.

With the conventional bottle opener, accidents often occurred when the cork could not be removed easily and the bottle was broken. However, with the bottle opener according to the present invention described above, such accidents can be prevented in advance by adjusting the elasticity of the coil spring 22 of the safety valve so that the gas is released to the outside when the pressure inside the bottle being opened exceeds a certain value.

Claims

1. A bottle opener which comprises a cylindrical body suitable for encasing a gas cartridge have a gas outlet port, a needle member provided at one end of the cylindrical body, a cylindrical member screwed on the other end of the cylindrical body, there being disposed in the cylindrical member a gas cartridge needle disposed so as to face the gas oulet port of a gas cartridge inserted in the cylindrical body, a gas flow path communicating with the gas cartridge needle and the needle member, a valve means for opening and closing the gas flow path, the valve means being biased into the closed position, and a safety valve communicating with the gas flow path downstream of the valve means, means for actuating the valve means, the actuating means being biased in a closing direction, and airtight sealing means being disposed so as, in use, to seal between an inserted gas cartridge and the

cylindrical member and between an inserted gas cartridge and the gas cartridge needle.

2. A bottle opener according to claim 1, wherein the valve means comprises a piston having at one end a valve for opening and closing the gas flow path, the piston being constantly biased by a first elastic member in a direction for closing the gas flow path, and wherein the actuating means comprises a handle for acting on the other end of the piston, the handle being contantly biased by a second elasctic member in a direction for closing the gas flow path.

3. A bottle opener according to claim 1 or 2, wherein there is a predetermined space between the cylindrical body and an inserted gas cartridge to provide the gas flow path between the needle member mounted at said one end of the cylindrical body and the gas cartridge needle and wherein a lid body is mounted on the cylindrical member.

4. A bottle opener according to claim 1, 2 or 3 wherein the airtight sealing means interposed between an inserted gas cartridge and the gas cartridge needle is thick and substantially disc-shaped and has a central hole penetrated by the gas cartridge needle and, at its periphery, an opening which connects the safety valve and the gas flow path and an opening through which extends the gas flow path.

5. A bottle opener according to claim 2 or claim 3 or 4 when appended to claim 2, wherein the valve comprises a projecting part of large diameter formed at the end of the piston and an airtight sealing member interposed between the projecting part and the gas flow path.

6. A bottle opener according to any one of the preceding claims, wherein the safety valve comprises a needle valve and a coil spring.

7. A bottle opener according to claim 2 or any one of claims 3 to 6 when appended to claim 2, wherein engagement of the handle with the piston is effected by a cam mounted on the handle and a ball rotatably supported on the piston.

8. A bottle opener according to claim 2 or any one of claims 3 to 7 when appended to claim 2, wherein the first elastic member and the second elastic member are coil springs.

9. A bottle opener according to any one of the preceding claims, wherein a gas cartridge is inserted in the cylindrical body with the gas cartridge needle inserted in the gas outlet port of the gas cartridge.

10. A bottle opener which comprises a gas cartridge containing an agent for generating gas, such as carbon dioxide gas, and having a gas outlet port; a cylindrical body encasing the gas cartridge with a predetermined space therebetween; a needle member mounted at one end of the cylindrical body and communicating with the space; a cylinder screwed to the other end of the cylindrical body, in which cylinder are disposed a gas cartridge needle facing the gas outlet port of the gas cartridge, a gas flow path communicating with the gas cartridge needle and the space, a piston having at one end a valve for opening and closing the gas flow path, which valve is constantly biased by a first elastic member in a direction for closing the path, and a safety valve communicating with the space; a lid body mounted on the cylinder; a handle for acting on the other end of the piston, which handle is mounted on the cylinder and which handle is constantly biased by a second elastic member in a closing direction; and airtight sealing members disposed between the gas cartridge and the cylinder, between the gas cartridge and the gas cartridge needle and between the piston and the cylinder.

11. A bottle opener, substantially as hereinbefore described with reference to, and as shown in, Figures 2, 3 and 4 of the accompanying drawings.

12. Any novel feature or combination of features described herein.

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