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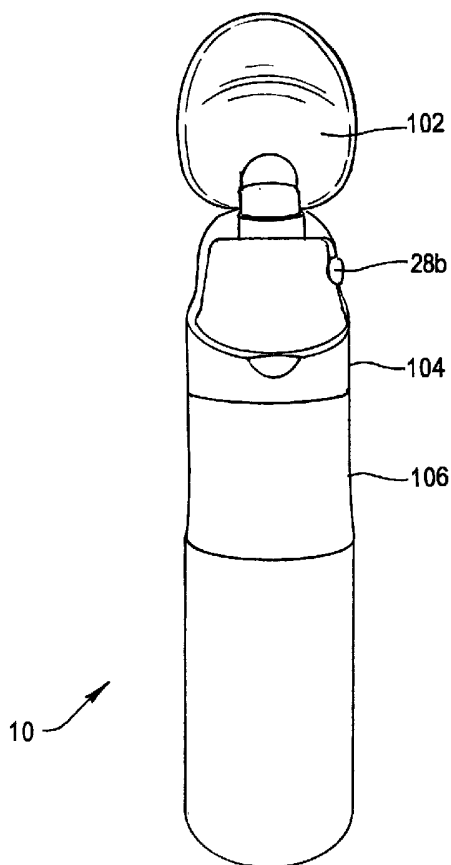
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[Continued on next page]

(54) Title: DISPENSING BOTTLE FOR A PERSONAL SUPPLY OF OXYGEN

(57) Abstract: dispensing bottle (10) for dispensing a personal supply of gas such as oxygen. Bottle (10) includes a regulator, a valve and a gas container. The regulator has a push button release piston (28b) arranged to enable the user to release a flow of gas from bottle (10) when the piston (28b) is pushed by the user. Bottle (10) includes a mouthpiece (102) for delivering the gas to the user's nose. Bottle (10) is refillable and can be readily held and operated by one hand of the user.





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A DISPENSING BOTTLE

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Field of the Invention

The present invention relates to a dispensing bottle and more particularly to a dispensing bottle for dispensing a gas, such as oxygen, for personal use. The
10 invention further relates to attachments for the dispensing bottle.

Background of the Invention

People all around the world now recognise the need to reduce and one day
15 hopefully eliminate all forms of pollution to our environment. One of the most concerning forms of pollution is air pollution. The health risks associated with continually breathing polluted air are well documented. Despite the recognition of these risks and the efforts of governments all around the world, air pollution is a continuing problem. This means that inevitably the air we breathe will on
20 occasion be of a recognisably poor quality. For example, the air may have an odour or may be visibly poor containing dust, smoke or the like.

It has also been recognised that there are advantages in breathing air of high oxygen quantity. Such air may benefit a person who is generally tired, feeling
25 unwell or is stressed.

To be functional, any supply of personal use oxygen needs to be packaged in a manner that enables it to be readily carried, easy to use and preferably cost effective.
30

The present invention seeks to provide a dispensing bottle that can dispense a gas, such as oxygen, for personal use.

Summary of the Invention

According to one aspect of the present invention there is provided a dispensing bottle including a regulator, a valve and a gas container, said regulator having a
5 push button release piston arranged to enable a user to release a flow of gas from said dispensing bottle when said release piston is pushed and wherein said valve is permanently connect to said gas container.

According to another aspect of the invention there is provided a dispensing
10 bottle for dispensing a gas to a user, said dispensing bottle including a regulator, a valve and a gas container, said regulator having a push button release piston arranged so that whilst the dispensing bottle is held in one of the user's hands the push button release piston can be pushed by a finger or thumb of that hand so as to release a flow of gas from said dispensing bottle.

15 According to a further aspect of the invention there is provided a dispensing bottle for dispensing a gas to a user, said dispensing bottle including a regulator, a valve and a gas container, said regulator having a push button release piston arranged to enable a user to release a flow of gas from said
20 dispensing bottle by applying finger pressure to the release piston and wherein said dispensing bottle further includes a mouthpiece including a shroud arranged to substantially cover the user's nose and mouth so that during use the shroud can be pressed against the user's face to reduce inadvertent loss of gas to atmosphere.

25 Preferably, the regulator includes a regulator body and a valve pin actuator. The regulator body includes a gas flow path and an outlet port. The valve pin actuator and the push button release piston are mounted within the regulator body so as to only allow gas to flow through the outlet port when the push
30 button release piston is in an open position.

Seal means are preferably provided in the regulator to prevent inadvertent leakage of gas.

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The valve preferably includes a valve body having an opening extending there through, said opening having a lower and an upper end. The opening is shaped to receive various components of the valve as well as a portion of the regulator.

- 5 The valve further includes a valve pin, biasing means and a top sleeve. The valve pin and the biasing means are mounted in a portion of the opening and are arranged so that the valve pin is movable between an upper and a lower position.
- 10 The sleeve is arranged for attachment to the upper end of the opening in the valve body. When the sleeve is secured in the opening the valve pin is located in the upper position. The sleeve includes a gas flow path and is configured so that when it is attached to the valve body, a portion of the valve pin and a seal means in conjunction with the action of the biasing means prevent gas from
- 15 passing through the gas flow path of the sleeve. The seal means is typically an o-ring.

- The valve is arranged to be attached to the gas container. Seal means may be provided to ensure the seal between the valve and the gas container. The seal
- 20 means may include an insert that is preferably attached to the gas container. The insert may be made of a material such as Teflon or any other suitable oxygen compatible material.

- Preferably, when the regulator is attached to the valve, the valve pin actuator
- 25 engages with the valve pin so as to move the valve pin against the action of the biasing means in the valve. The valve pin is thus caused to move into the lower position. When the valve pin is in the lower position the gas flow path in the sleeve is open so that gas can flow up through the opening and through the gas flow path in the sleeve. The gas can then flow into the gas flow path in the
- 30 regulator. When the push button release piston is in the open position gas can then flow out through the outlet port.

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Biasing means is preferably provided in the regulator to position the valve pin actuator so that it engages with the valve pin and maintains its engagement whilst the regulator is attached to the valve.

- 5 The push button release piston and the valve pin actuator preferably each have an elongate axis which are mounted at substantially 90° to one another. Such an arrangement enables single handed operation of the dispensing bottle.

10 In a preferred embodiment of the invention, the regulator is arranged for threaded engagement with the valve and the valve is arranged for threaded engagement with the gas container.

The gas flow path in the regulator preferably extends substantially parallel to the elongate axis of the valve pin actuator.

15

The dispensing bottle is preferably arranged to dispense oxygen enriched air (OEA) and other forms of human consumption oxygen mixes. The dispensing bottle may also contain flavourings and scents. Preferably, the gas container is a high-pressure gas container. Pressure release means is preferably provided
20 to release the pressure in the gas container when it reaches a predetermined pressure. The pressure release means may include a burst disc arrangement.

The dispensing bottle may further include a mouthpiece arranged for connection to the regulator. The mouthpiece preferably includes a shroud that in use is
25 arranged to fit over a user's nose and mouth to prevent inadvertent loss of oxygen as it is dispensed from the dispensing bottle. The shroud is preferably movable between a closed position and an in use position. In the closed position, the shroud preferably closes over a top part of the regulator, whilst in the in use position it is located proud of the top part of the regulator.

30

The shroud is preferably arranged so that it can pivot between the in use and closed positions.

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The mouthpiece may further include a cover for covering the regulator and a cover for covering the valve.

5 The mouthpiece is preferably made from a plastics material and is designed for reuse by the user.

Brief Description of the Drawings

10 Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is an assembly view of a dispensing bottle and mouthpiece in accordance with an embodiment of the invention;

15 Figure 2 is a cross-sectional view of the assembled regulator of the dispensing bottle shown in Figure 1;

Figure 3 is a cross-sectional view of the regulator body along the line x-x shown in Figure 2;

20

Figure 4 is a cross-sectional view of the valve body shown in Figure 1;

Figure 5 is a side view of the push button release piston shown in Figure 1;

25 Figure 6 is a cross-sectional view of the sleeve shown in Figure 1;

Figure 7 is a cross-sectional view of the gas container shown in Figure 1; and

30 Figures 8 to 11 illustrate respectively the sleeve, first washer, burst disc and second washer of the burst disc assembly in plan and side view.

Figure 12 is a front view of a dispensing bottle according to an embodiment of the invention with a mouthpiece attached thereto.

Detailed Description of the Preferred Embodiments

5 Figure 1 illustrates an assembly view of a dispensing bottle 10 including a regulator 12, a valve 14 and a gas container 16. The gas container 16 of the preferred embodiment is a high-pressure gas container which is designed to have a full operating pressure of 215 bar (3160 psi). The gas container 16 shown in the Figures is "bottle" shaped. However, it will be appreciated that
10 other shapes of container are envisaged.

Figure 1 also illustrates a mouth piece 100 which includes a shroud 102 and a regulator cover 104. Figure 1 further illustrates a valve cover 106. The particulars of the mouth piece 100 and valve cover 106 will be described in
15 more detail subsequently.

Figure 2 illustrates the assembled regulator 12 in more detail. As shown in this Figure, the regulator 12 includes a regulator body 18 having a vertical bore 20 in which a valve pin actuator 22 and a spring 24 are mounted. The valve pin
20 actuator 22 is held in the bore 20 against the spring 24 by a circlip 25.

The regulator body 18 also includes an open ended bore 26, which extends substantially horizontally, in which a push button release piston 28 is mounted for sliding movement. A push button 28b is mounted on the operative end of
25 the push button release piston 28.

The regulator body 12 further includes a gas flow path 30 which extends substantially vertically and an outlet port 32.

30 The gas flow path 30 has an upper end 30a which opens into the open ended bore 26. The outlet port 32 has a lower end 32a which opens into the open ended bore 26. A vent port 33 extending substantially horizontally opens at one end into the vertical bore 20 in the regulator body 18 (see Figure 3).

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Figure 4 illustrates the valve body 34 of the valve 14. The valve body 34 has an opening 36 extending substantially vertically there through which is shaped to receive various components of the valve 14, as well as a portion of the regulator 12. The components of the valve 14 received within the opening 36 include a valve pin 38, a spring 40, an O-ring 42 and a sleeve 44 (see Figure 1). Spring 40 is mounted in the lower portion 36d of the opening 36 so that it sits on the ledge 36c. The valve pin 38 is located in the lower portion 36d of the opening 36 so that it sits on top of the spring 40 and the o-ring 42 sits over the top of the valve pin 38. The valve pin 38 is thus movable between an upper and a lower position. Movement of the valve pin 38 will be described in more detail subsequently.

The sleeve 44 is arranged for threaded attachment to a mid portion 36a of the opening 36 in the valve body 34. When the sleeve 44 is screwed into the mid portion 36a of the opening 36 and the regulator 12 is not attached, the valve pin 38 is located in the upper position under the action of the spring 40.

The sleeve includes a centrally located gas flow path 46 and is configured so that when the sleeve 44 is attached to the valve body 34, a portion of the valve pin 38 and the o-ring 42 act to seal off the gas flow path 46 through the sleeve 44. This prevents gas from escaping from the gas container 16 and out through the valve 14.

The lower end of the valve body 34 is also threaded so as to enable the valve 14 to be connected into the opening 16a of the gas container 16. A seal 47, which may be in the form of a Teflon or other oxygen compatible material insert attached to the gas container 16 is provided to ensure the integrity of the connection between the gas container 16 and the valve 14. Once the valve body 34 is screwed into the opening 16a of the gas container 16, it is crimped thereto so as to permanently attach the valve body 34 to the gas container 16.

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The regulator 12 is arranged to be attached via a screw thread to a threaded upper portion 36b of the opening 36 formed in the valve body 34. When the regulator 12 is secured to the valve 14, the lower end 22a of the valve pin actuator 22 presses against the upper end 38a of the valve pin 38 so as to
5 depress the valve pin 38 against the action of the bias of the spring 40. When the valve pin 38 is thus moved to its lower position, the seal between the o-ring 42 and the pin 38 is broken. Gas contained within the gas container 16 is thus free to flow up through the opening 36, around the valve pin 38 and out through the gas flow path 46 in the sleeve 44. The gas can then flow up through the
10 gas flow path 30 formed in the regulator 12.

The valve body 34 also includes a bore 80 which opens into the opening 36. Bore 80 is arranged to receive a burst disc assembly 82. The burst disc assembly 82 includes a first washer 84, a burst disc 86, a second washer 85
15 and an externally threaded sleeve 88. The burst disc 86 is made from a material that will predictably fail at a predetermined pressure. The burst disc 86 is typically of metal composition and is arranged, in this embodiment, to fail when the pressure inside the gas container 16 exceeds 272bar (4000 psi). When the burst disc 86 fails, gas is released through the failed burst disc
20 assembly 82, thereby releasing the pressure in the gas container 16 regardless of the positioning of the valve pin 38.

When a user desires to receive gas from the gas container 16, the push button release piston 28 is pushed inwardly against the bias of the spring 29. Figure
25 2 shows the push button release piston 28 in the closed position. It will be appreciated that in this closed position, the pair of seals 50a, 50b prevent the escape of gas out through the outlet port 32. When the push button release piston 28 is in the fully open position, gas within the gas flow path 36 is free to pass around the body 28a of the push button release piston 28 and up and out
30 through the outlet port 32 (see Figure 5). Seal 50b and seal 52 prevent gas from escaping out of the open ended bore 26 when the push button release piston 28 is in the open position.

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To prevent a flow of gas from passing out of the outlet port 32, the user removes inward pressure from the push button release piston 28, so that the push button release piston 28 returns to its closed position under the action of the bias of the spring 29.

5

In accordance with one preferred embodiment of the invention, the gas container has a burst pressure of 606 bar (8800 psi), a water capacity of 0.95 litres and an operating capacity of 20.43 litres at full operating pressure. The regulator 12 is arranged to release gas at a set rate of 2 litres per minute. In
10 such a preferred embodiment, the regulator 12 is arranged to either prevent the flow of gas or release it at the set rate. Release of gas will cease once the user stops pressing the push button 28b.

From the above description, it will be apparent that the regulator 12 can be
15 readily removed from the valve body 14 to enable the gas container 16 to be refilled. To refill the gas container 16, the regulator 12 is unscrewed from its threaded engagement with the valve 14. When the regulator 12 is disconnected from the valve 14, the valve pin 38, under the action of the bias of spring 40 returns to its upper position. In this position the upper portion of the valve pin
20 38, the o-ring 42 and the sleeve 44 provide a seal to prevent gas from flowing out of or into the gas container 16.

In order to refill the gas container 16, a filling manifold is attached to the valve body 34 to seal off the gas flow path 36 and the pressure of the gas entering
25 into the gas flow path 46 of the sleeve 44 is sufficient to push the valve pin 38 to its lower position, against the bias of the spring 40. Gas can then flow through the opening 36, around the valve pin 38 and into the gas container 16. When the pressure within the gas container 16 and the filling tank is approximately the same, the valve pin 38 will return to its upper position so as to close the valve
30 14. The manifold can then be removed and a regulator 12 can then be reconnected to the valve 14. It will thus be appreciated that the gas container 16 can be refilled as required by the user on demand. Alternatively, a user may have a number of filled gas containers with valve 14 attached, so that when a

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fresh gas container is required, the user's regulator 12 can simply be attached to a full gas container 16.

Figure 12 illustrates a dispensing bottle 10 in accordance with an embodiment of the invention with a mouthpiece 100 attached thereto. The mouthpiece 100 is shown in the closed position. As is evident from Figure 12, the regulator cover 104 of the mouthpiece 100 serves to cover the components of the regulator 12. Similarly, the valve cover 106 serves to cover the componentry of the valve 14. The regulator cover 104 and valve cover 106 prevent dirt, dust or other contaminants coming into contact with the regulator 12 or valve 14.

The shroud 102 is pivotally connected to the regulator cover 104 so that it is movable between a closed position and an in use position. Alternatively, the shroud 102 may be arranged for sliding movement. The closed position is shown in Figure 12. In the in use position the shroud 102 is located proud of the top part of the regulator 12 and is arranged to fit over a user's nose and mouth and to thereby prevent inadvertent loss of oxygen as it is dispensed from the outlet 32 of the regulator 12.

The components of the mouthpiece 100 and the valve cover 106 are preferably made from a plastics material, rubber material or any other suitable material. The valve cover 106 is arranged to be connected to the gas container 16, whilst the shroud 102 and regulator cover 104 (i.e. the mouthpiece 100) are arranged to snap fit onto the regulator 12. The shroud 102, regulator cover 104 and regulator 12 are preferably arranged to be readily removed in order to allow refilling or replacement of the gas container 16. It will be appreciated that the valve 14 is retained on the gas container 16 at all times and that the condition of the valve 14 and gas container 16 should be checked before a refilling operation takes place.

The mouthpiece 100 and valve cover 106 additionally serve to improve the aesthetic appeal of the dispensing bottle 10.

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The described embodiment provides a dispensing bottle which is easy to use because release of gas is achieved by simply pushing the push button release piston inwardly. Upon removal of inward pressure by the user, the flow of gas from the gas container 16 is prevented. The dispensing bottle can be operated
5 by the user's thumb or forefinger whilst being held to the face by the same hand. Thus, the invention provides a dispensing bottle which can be operated and held by one of the user's hands.

The dispensing bottle 10 is preferably sized so that it can be readily carried by
10 the user. The reusable nature of the dispensing bottle's components provides cost effectiveness to the overall product. It will also be appreciated that because the regulator 12 and mouthpiece 100 can be retained by the user for personal use, a user can simply swap an empty gas container and valve combination with a fresh one and then reattach their own mouthpiece 100 and
15 regulator 12. It will be appreciated that the dispensing bottle 10 does not necessarily need to include the mouthpiece 100 or valve cover 106.

The embodiments have been described by way of example only and modifications within the spirit and scope of the invention are envisaged.

Claims

1. A dispensing bottle for dispensing a gas to a user, said dispensing bottle including a regulator, a valve and a gas container, said regulator having a push
5 button release piston arranged to enable a user to release a flow of gas from said dispensing bottle when said release piston is pushed and wherein said valve is permanently connected to said gas container.
2. A dispensing bottle for dispensing a gas to a user, said dispensing bottle
10 including a regulator, a valve and a gas container, said regulator having a push button release piston arranged so that whilst the dispensing bottle is held in one of the user's hands the push button release piston can be pushed by a finger or thumb of that hand so as to release a flow of gas from said dispensing bottle.
- 15 3. A dispensing bottle for dispensing a gas to a user, said dispensing bottle including a regulator, a valve and a gas container, said regulator having a push button release piston arranged to enable a user to release a flow of gas from said dispensing bottle by applying finger pressure to the release piston and wherein said dispensing bottle further includes a mouthpiece including a shroud
20 arranged to substantially cover the user's nose and mouth so that during use the shroud can be pressed against the user's face to reduce inadvertent loss of gas to atmosphere.
4. A dispensing bottle according to any one of the preceding claims wherein
25 the regulator includes a regulator body and a valve pin actuator.
5. A dispensing bottle according to claim 4 wherein the regulator body includes a gas flow path and an outlet port, and wherein the valve pin actuator and the push button release piston are mounted within the regulator body so as
30 to only allow gas to flow through the outlet port when the push button release piston is in an open position.

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6. A dispensing bottle according to claim 5 wherein the outlet port in the regulator body is located in line with the longitudinal axis of the gas container.
7. A dispensing bottle according to claim 5 wherein when the regulator is attached to the valve, the valve pin actuator engages with the valve pin so as to move the valve pin against the action of the biasing means in the valve so as to move the valve pin to the lower position and so that gas can flow up through the opening and through the gas flow path in the sleeve.
8. A dispensing bottle according to claim 7 further including biasing means in the regulator arranged to position the valve pin actuator so that it engages with the valve pin and maintains its engagement whilst the regulator is attached to the valve.
9. A dispensing bottle according to any one of claims 4 to 8 wherein the push button release piston and the valve pin actuator each have an elongate axis which are mounted at substantially 90° to one another.
10. A dispensing bottle according to any one of the preceding claims wherein the regulator is arranged for threaded engagement with the valve and the valve is arranged for threaded engagement with the gas container.
11. A dispensing bottle according to any one of the preceding claims wherein the valve includes a valve body having an opening extending there through, said opening having a lower and an upper end.
12. A dispensing bottle according to claim 11 wherein the opening in the valve body is shaped to receive components of the valve and a portion of the regulator.
13. A dispensing bottle according to claim 11 or claim 12 wherein the valve further includes a valve pin, biasing means and a sleeve.

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14. A dispensing bottle according to claim 13 wherein the valve pin and the biasing means are mounted in a portion of the opening in the valve body and are arranged so that the valve pin is movable between an upper and a lower position.

5

15. A dispensing bottle according to claim 13 or claim 14 wherein the sleeve is arranged for attachment to the upper end of the opening in the valve body.

10 16. A dispensing bottle according to any one of claims 13 to 15 wherein the sleeve includes a gas flow path and is configured so that when it is attached to the valve body, a portion of the valve pin and a seal means in conjunction with the action of the biasing means prevent gas from passing through the gas flow path of the sleeve.

15 17. A dispensing bottle according to claim 16 wherein the seal means is an o-ring.

18. A dispensing bottle according to claim any one of the preceding claims wherein valve seal means is provided between the valve and the gas container
20 to provide a seal between the valve and the gas container.

19. A dispensing bottle according to claim 18 wherein the valve seal means includes an insert that is attached to the gas container.

25 20. A dispensing bottle according to claim 19 wherein the insert is made of Teflon, or an oxygen compatible material.

21. A dispensing bottle according to claim 16 wherein the gas flow path in the regulator extends substantially parallel to the elongate axis of the valve pin
30 actuator.

22. A dispensing bottle according to any one of the preceding claims containing oxygen enriched air (OEA), an oxygen mix, flavours or scents.

23. A dispensing bottle according to any one of the preceding claims further including release means arranged to release the pressure in the gas container when it reaches a predetermined pressure.

5

24. A dispensing bottle according to claim 23 wherein the pressure release means includes a burst disc arrangement.

25. A dispensing bottle according to claim 1 or claim 2 further including a
10 mouthpiece arranged for connection to the regulator.

26. A dispensing bottle according to claim 25 wherein the mouthpiece includes a shroud that in use is arranged to fit over a user's nose and mouth to prevent inadvertent loss of oxygen as it is dispensed from the dispensing bottle.

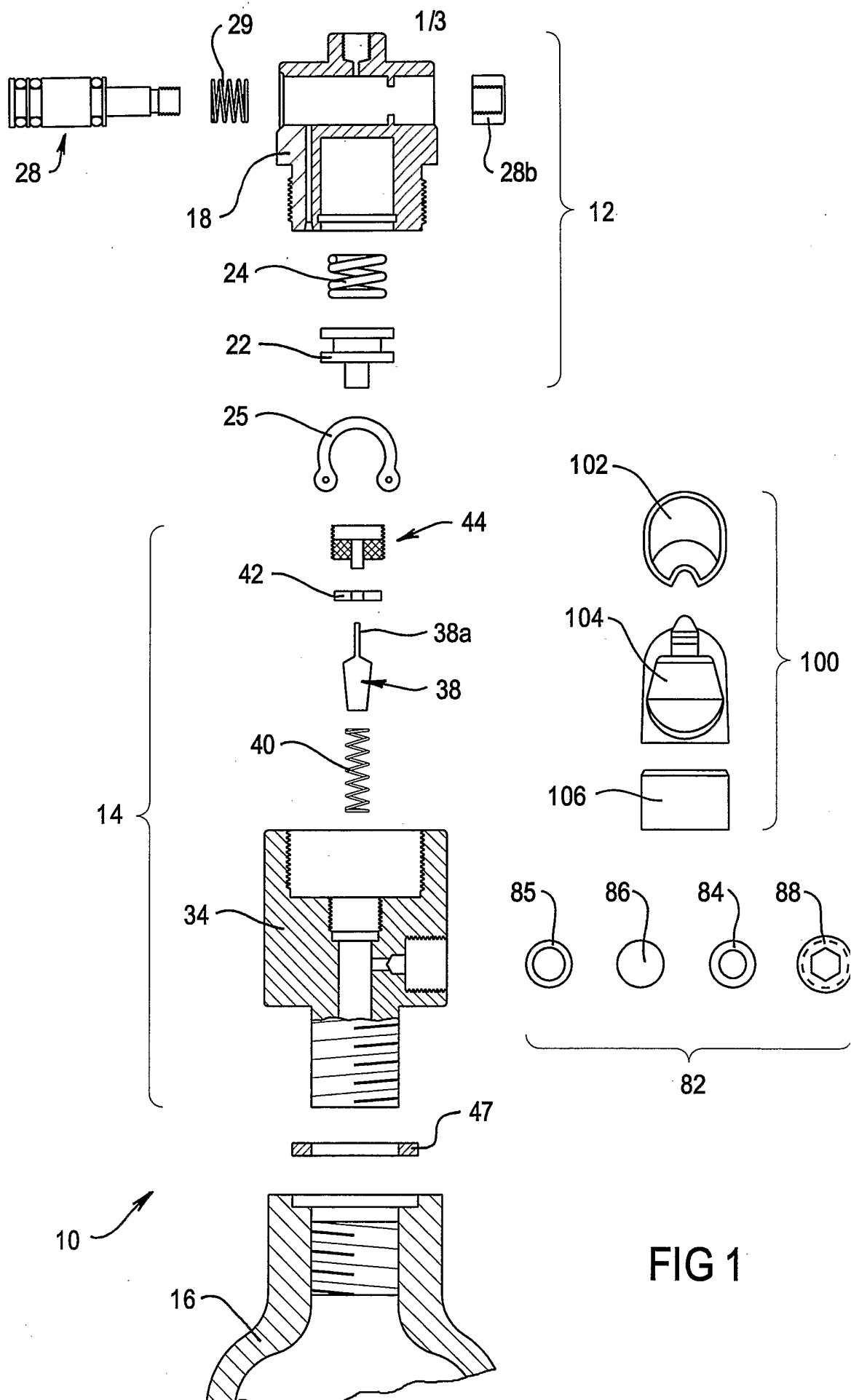
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27. A dispensing bottle according to claim 26 wherein the shroud is movable between a closed position and an in use position.

28. A dispensing bottle according to claim 27 wherein in the closed position,
20 the shroud closes over a top part of the regulator, whilst in the in use position it is located proud of the top part of the regulator.

29. A dispensing bottle according to claim 3 or claim 26 wherein the mouthpiece further includes a cover for covering the regulator and a cover for
25 covering the valve.

30. A dispensing bottle according to claim 29 wherein the mouthpiece is made from a plastics or rubber material.



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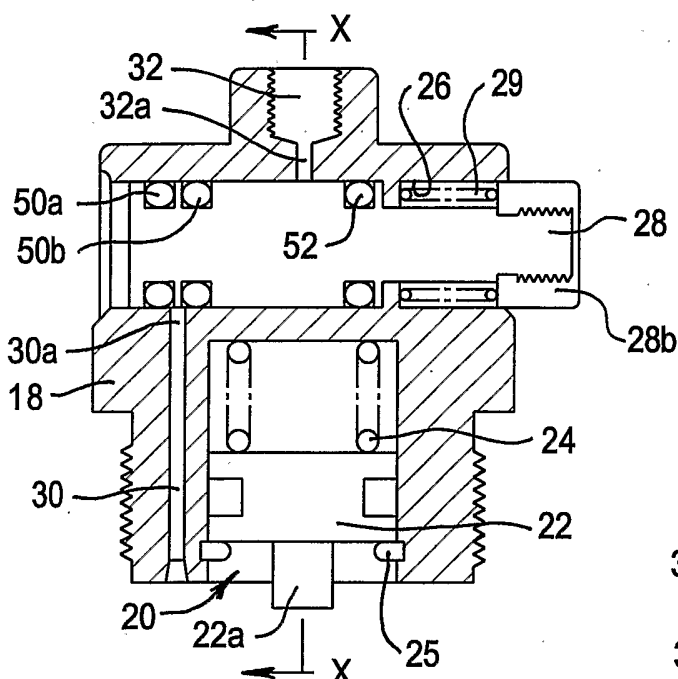


FIG 2

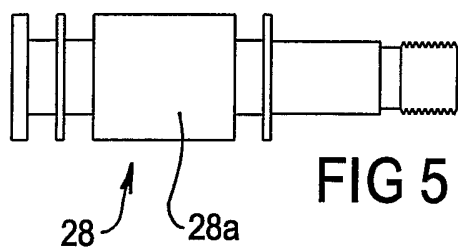


FIG 5

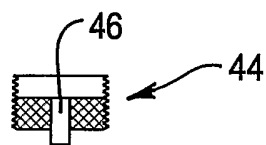


FIG 6

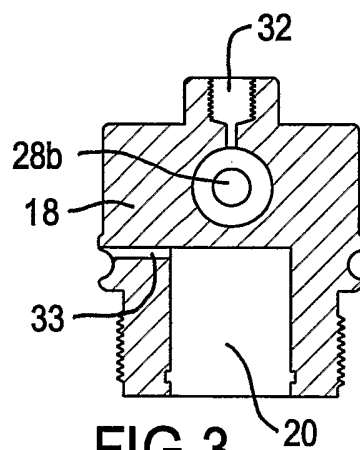


FIG 3

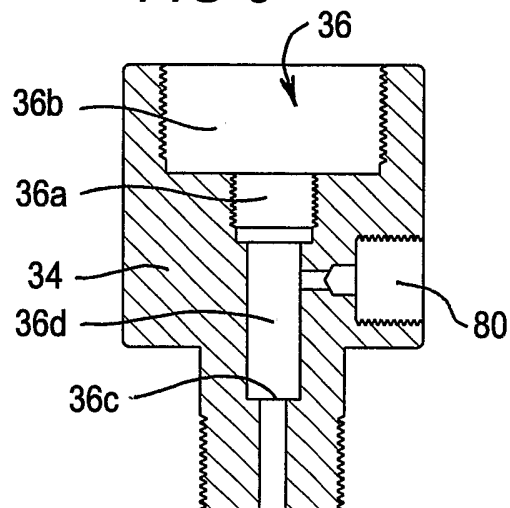


FIG 4

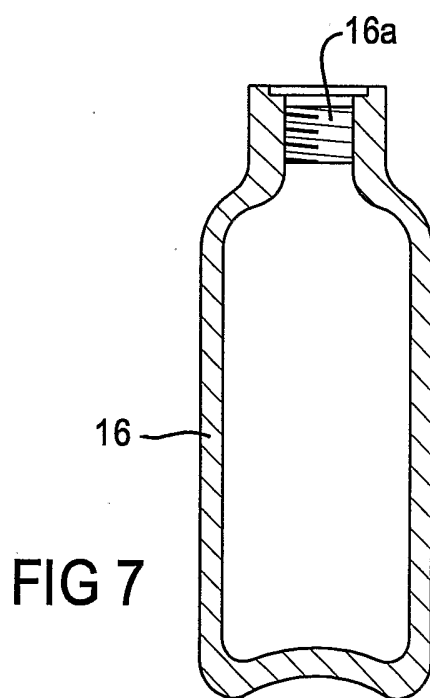
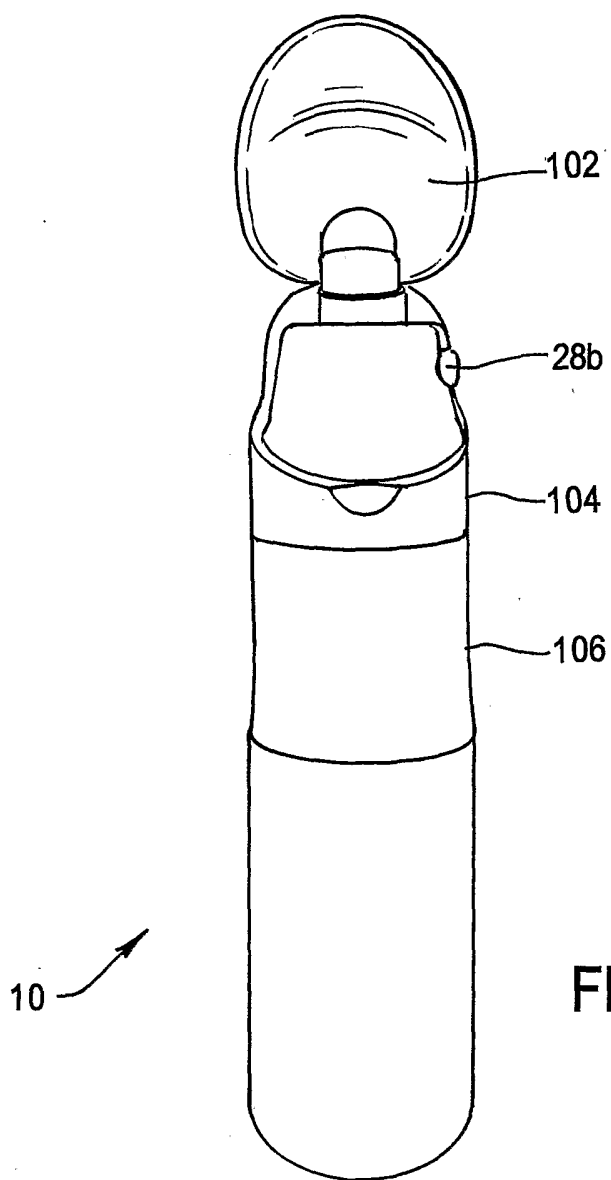
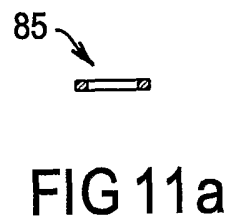
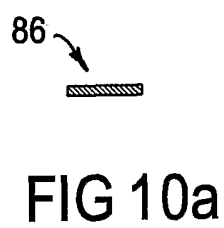
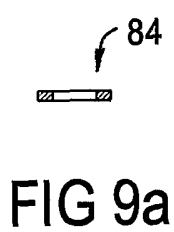
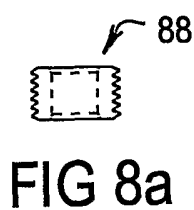
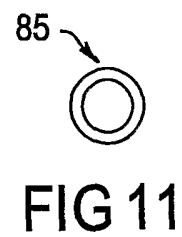
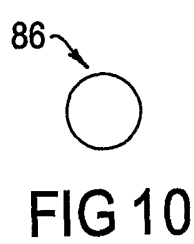
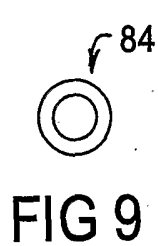
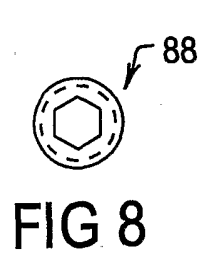


FIG 7

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU03/01050

A. CLASSIFICATION OF SUBJECT MATTER												
Int. Cl. ⁷ : A62B 7/02, 9/02; A61M 16/00												
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)												
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched												
AU: IPC A62B 7/02, 9/02												
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)												
USPTO with keywords such as personal, breath, oxygen, bottle and similar terms.												
C. DOCUMENTS CONSIDERED TO BE RELEVANT												
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.										
X	US 5386824 A (NELEPKA) 7 February 1995 Whole document	1-30										
X	US 3019788 A (HUGHES) 6 February 1962 Whole document	1-8, 18-20, 22, 25, 26										
X	US 4582054 A (FERRER) 15 April 1986 Whole document	1-6, 18-20, 22, 25, 26, 29, 30										
☒ Further documents are listed in the continuation of Box C ☒ See patent family annex												
* Special categories of cited documents: <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; 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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; 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	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed	
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family											
"P" document published prior to the international filing date but later than the priority date claimed												
Date of the actual completion of the international search 12 September 2003		Date of mailing of the international search report 17 SEP 2003										
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer JEFFREY CARL Telephone No : (02) 6283 2543										

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU03/01050

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5429125 A (WAGNER et al) 4 July 1995 Whole document	1-8, 18-20, 22, 25, 26
X	US 5979442 A (ORR) 9 November 1999 Whole document	1-5, 22, 25

Information on patent family members

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