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Description

A high pressure gas cartridge may move or fly in reaction to escape of gas from within when the cartridge is in distribution or in use, and this is very dangerous. Causes of moving or flying of such a cartridge include the following. A first is the case when the cartridge has been thrown into a fire and the sealing plate has exploded due to excessive inner pressure. A second is when the sealing plate has been pierced by a boy's mischief with a nail. A third is when a cartridge is removed from a piercing device with some gas remaining in it. The present invention relates to high pressure gas cartridges which are safe in such conditions.

JP—B—57(1982)—54679 discloses a high pressure gas cartridge with a safety device. The device is provided with a small chamber having an orifice under the sealing plate, and is so planned as not to produce a rocketing or jetting gas stream, as the gas is throttled by the orifice when its temperature becomes high and the sealing plate is broken. The orifice, however, has an object to allow the gas to flow gradually when its pressure becomes high at high temperature. Hence the device is impractical as the cross-sectional area of the orifice is very small and the gas flow induced by the inner pressure at the normal temperature is very small. Both the sealing plate and the small chamber with the orifice must be pierced, if this type of device is to be used effectively at normal temperatures, and that needs strong force and a piercing pin with a long stroke. This is also impractical.

JP—B—58(1983)—27439 discloses a gas cartridge having an orifice in an opening. Interest is directed only to controlling quantity of flow of gas. Insufficient consideration has been given to the task of charging the cartridge with gas, and that takes a long time. Accordingly, the rate of production of such cartridges is limited, so that the cost of production has to be high.

JP—A—5586995 discloses a gas cartridge in which an orifice in a regulating chamber is used to reduce the pressure of gas to prevent the cartridge moving by reaction when the pressure in the cartridge rises due to an increase in temperature or when the sealing plate of the cartridge is broken. The cross-sectional area of the orifice must therefore be very small so that gas flow therethrough is limited during normal use.

An object of the present invention is to provide high pressure gas cartridges with a double safety device, which can be charged speedily with gas, which can be saved from rupture of the cartridge body when the inner pressure is increased excessively, which do not move or fly in reaction even if the sealing plate has been pierced manually and the inner gas can flow out freely into atmosphere, and which in general use can allow gas to be discharged at a useful flow rate, by piercing the sealing plate.

Another object of the present invention is to minimize the force to be exerted on, and the stroke of a piercing pin for piercing the sealing plate.

A further object of the present invention is to allot the safety function to the safety device of the sealing plate when the inner pressure has increased excessively and to a gas regulator when the inner gas flows freely after the sealing plate has been broken.

The foregoing objects and other objects as well as the characteristic features of the invention will become more apparent and more readily understandable by the following description and the appended claims when read in conjunction with the accompanying drawings.

The drawings show embodiments of the present invention, and throughout the drawings, the same numeral shows the corresponding portion.

Fig. 1 is a side view which shows one form of opening portion of a cartridge in which the present invention is embodied and which is sectioned along the line A—A of Fig. 2, that part of the figure to the right of the centre line shows the parts before, and that to the left of the centre line shows them after the sealing plate is joined to the body.

Fig. 2 is a plan view of Fig. 1 with the sealing plate removed.

Fig. 3 is a side view of another embodiment similar to Fig. 1, which is sectioned along the line B—B of Fig. 4.

Fig. 4 is a plan of Fig. 3 with the sealing plate removed.

Fig. 5 is a sectioned side view of a further embodiment similar to Fig. 1.

Fig. 6 is a sectioned side view of a further embodiment similar to Fig. 1.

Fig. 7 is a similar sectional side view of a further embodiment.

Fig. 8 is a similar sectional side view of a further embodiment.

Fig. 9 is a side view similar to Fig. 1, sectioned along the line C—C of Fig. 10, and in which the filter is used as a regulator.

Fig. 10 is a plan with that part of the sealing plate below the centre line removed.

Fig. 11 is a side view of a further embodiment similar to Fig. 1 in which those portions of the sealing plate and the regulator to the right of the centre line are not sectioned.

Fig. 12 is a plan with that part of the sealing plate below the centre line removed, and

Fig. 13 is a sectioned side view similar to Fig. 1 of a further embodiment in which the regulator is composed of a portion with an orifice and a filter portion.

1 is a body of capacity less than 100 cc and into the body 1 a high pressure gas, such as CO_2 or O_2, is charged. There are two types of the body 1, one of which has a shoulder 12 on the inner wall around an opening 11 (see Figs. 1, 3, 5 and 9) and the other has no such shoulder (see Figs. 6, 7, 8, 11 and 13).

2 is a sealing plate, which is a usual safety type having a recess 21 operable to vent the inner pressure

through a hair crack when the inner pressure rises excessively. There are two types of sealing plate 2, one of which has a circular leg 22 on its underside (see Figs. 1, 3, 5, 6, 8, 9, 11 and 13) and the other has no such circular leg (see Fig. 7).

These sealing plates 2 are all put on the end face 13 of the opening 11 of the body 1. Gas is charged into the body 1 through a clearance formed between the body 1 and the sealing plate. The clearance is formed either by means of radial protrusions 23 of the sealing plate 2 or of radial grooves 14 in the end face 13 of the body 1. After the body 1 has been charged with gas, the sealing plate 2 is joined onto the body 1, as before, such as by welding or by calking.

3 is a regulator for regulating gas flow through it. The body 1 is provided with the regulator 3 at the inner side of the sealing plate 2 and in a gas flow path. The regulator 3 has an orifice 31 which is operable to throttle gas flow at the normal temperature within the body 1 so as not to move or cause the cartridge to fly due to reaction to gas emission, and also forms a clearance 32 for flow of charging gas around itself within the body 1. The regulator 3 may be a plate, but, in the examples shown in the drawings, the regulator 3 takes the form of a cylinder having a bottom wall 33 and a side wall 34.

The clearance 32 may take various forms. One form of clearance 32 is between the periphery of the regulator 3 and the inner wall of the body 1 (see Figs. 6 to 8, 11 to 13). Another is between radial ribs 35 and the inner wall of the body 1 (see Figs. 1 to 5, 9, 10). The clearance 32 may be formed by radial grooves. At all events it is desirable for the clearance 32 to be formed when the regulator 3 is placed in the body 1.

There are various possible dispositions of the regulator, such as to put the regulator on the shoulder 12 of the body 1 (see Figs. 1, 3, 5, 9), to carry it by calking the lower end of the circular leg 22 of the sealing plate 2 (see Fig. 6), to unite the regulator 3 and the sealing plate 2 as one body by a soldered portion 41 by which the regulator 3 is soldered directly to the sealing plate (Fig. 7), to spigot the upper portion of the regulator into the aperture formed by the circular leg 22 of the sealing plate 2 (see Figs. 8 and 13), to fix the regulator to the sealing plate in a body (Fig. 11), etc.

Fig. 8 shows a filter 51 supported against the underside of the orifice 31 so that the orifice 31 may not be clogged with residual swarf in the body. The filter 51 does not have a regulating function corresponding to that described for the orifice 31. Though such a filter is not shown in Figs. 1 to 7, the same effect can be obtained by providing such a filter at the underside of the orifice in each of those embodiments.

A filter, which is essentially different from the filter 51 of the embodiment of Fig. 8, is used as a gas flow regulator in the embodiments of Figs. 9 to 13. The filter is of the continuous foam type, and the interstices are selected for a certain pressure of gas. The filter regulates gas flow, either alone or in combination with the orifice 31, such that the regulated gas flow is sufficient to actuate a device which uses the gas (for example an oxygen inhaler) but is not enough to move the cartridge by reaction even if the cartridge is in a state where the sealing plate has been broken and the gas can flow out freely.

Fig. 13 shows a regulator 3 which consists of a cylinder portion 3b with the orifice 31 and a filter portion 3a. Of course the regulated gas flow through both portions is determined as stated above. In this case the filter portion 3a can be thinner than in the embodiments of Figs. 9 and 11. When the body has been charged with gas and the sealing plate 2 has been joined to the body 1, it is necessary in several embodiments to bar direct access from the interior of the body 1 to the limited recess 21 of the sealing plate through the clearance 32, in order to ensure that the regulator 3 functions as it should.

Therefore, in the embodiment of Fig. 1, the top of the regulator 3 is pressed onto the underside of the sealing plate 2. In the embodiment of Fig. 3, the upper inner portion of the regulator is closely fitted onto the outer periphery of the ciruclar leg 22, and in the embodiments of Figs. 5 and 9, the lower portion of the circular leg 22 is pressed into the regulator 3.

When using the cartridges shown in the drawings, after the cartridge has been attached to a piercing device, it will be sufficient to pierce the sealing plate 2 only. Also, by employing a material for the regulator which a needle N can pierce readily, as in the embodiment of Fig. 11, the force that has to be applied to the needle and the stroke of the needle can be minimized. A required quantity of gas is taken out from within the body, through the regulator, by piercing.

When the cartridge is overheated, say by throwing into fire in error or by a fire, the gas within the body 1 expands and the pressure increases. At a certain pressure, the sealing plate 2 begins to bend outwardly and a hair crack through the bottom of the limited recess 12 forms. The gas in the boy begins to flow out gradually through the crack and an explosion of the body 1 is avoided. Also when, at the normal temperature, the sealing plate 2 is pierced by mischief or the cartridge is removed from the piercing device with some gas remaining in it the rate of escape of gas is kept fixed by the regulator 3 so that the cartridge does not fly and damage is not caused to men and beasts or structures.

The diameter of the orifice 31 required to avoid the cartridge taking off is, in the case of CO_2 gas calculated as follows.

Calculating condition

Subject works:

Capacities of cartridges 10 cc, 50 cc, 95 cc.

Values of propellant force:

(criterion is total weight) 10 cc—30 g, 50 cc—150 g, 95 cc—270 g.

Working temperatures: 20°C, 100°C, 150°C.

Subject gas:

Carbonic acid gas (CO_2) (charging ratio) 1.34

Calculation (provided that P: pressure Kg/cm^2,

d: diameter mm,

f: initial quantity of flow l/s and charging ratio 1.34)

d: diameter mm,

f: initial quantity of flow 1/s and charging ratio 1.34)

Subject works	Propellent forces		Temperatures		
			20°C	100°C	150°C
10cc	30g	p	60	388.4	602.0
		d	0.225	0.089	0.071
		f	0.96	0.48	0.43
50cc	150g	p	60	388.4	602.0
		d	0.504	0.198	0.159
		f	4.81	2.41	2.15
95cc	270g	p	60	388.4	602.0
		d	0.676	0.266	0.213
		f	8.66	4.33	3.87

From the above calculation, the diameter of the orifice 31 is deduced as follows.

	20°C	100°C	150°C
10cc	0.20	0.08	0.07
50cc	0.50	0.19	0.15
95cc	0.65	0.26	0.21

It will be understood that the diameter of the orifice 31 required to avoid the cartridge taking off, even if the sealing plate is broken by a rise in temperature, varies in accordance with the weight of the cartridge though it is not limited to the conclusions of the foregoing calculation if the gas and the charging ratio are charged.

As regulation of gas flow when the inner pressure rises excessively is left to a crack through the recess 21, the diameter of the orifice 31 of the regulator 3 and the size of the interstices of the filter can be selected so that they can secure effective quantity of gas flow at the usual temperature.

Having regard to a charging time, the diameter is about 0.6 mm in the case of 0.3 mm^2 as an example among sectional areas of the orifice from 0.03—0.3 mm^2, which are cited by the inventor. According to experiments by the inventor, the time spent for charging approximately 60 g of CO_2 gas in a cartridge having a capacity of 95 cc was about 3.4 seconds, where the diameter of the orifice was 0.6 mm, and was 1.4 seconds in the case of a cartridge which embodied the present invention in which the gas is charged through the clearance 32 between the regulator 3 and the body 1. Indeed the gas has been charged more quickly by the order of 2.4 times or more.

Claims

1. A high pressure gas cartridge comprising a body (1) to be charged with a high pressure gas, a sealing plate (2) which is provided with a safety device (21) to act for leaking the inner pressure should it become excessive due to an increase in temperature and which seals an opening (11) and the body (1) after the latter has been charged with a high pressure gas, a gas regulator (3) set on the inner side of the sealing plate (2) and effective on the flow of high pressure gas, and a clearance (32), through which the body (1) is charged with gas, formed between the regulator (3) or the sealing plate (2) and the body (1), characterised in that the safety device (21) is operable to vent the inner pressure through a hair crack to regulate gas flow therethrough and avoid the cartridge exploding or moving by reaction when the pressure rises excessively and the regulator (3) is arranged such that gas flow therethrough is maximised with the constraint that, up to room temperature only, the gas flow would be insufficient to move the cartridge by reaction if the sealing plate (2) is broken and the gas can flow freely out of the cartridge.

2. A high pressure gas cartridge as claimed in claim 1, wherein said regulator (3) is a cylinder which is closed at an end remote from the sealing plate (2) by a wall (33) having an orifice (31) therein, and which is carried on a shoulder (12) formed on the inside of the body (1), and wherein said clearance (32) is shut off and the gas in the body is blocked from access to said safety device (21) of said sealing plate (2), bypassing said orifice (31), by joining said sealing plate (2) onto said body (1).

3. A high pressure gas cartridge as claimed in claim 2, wherein said clearance (32) is shut off from the safety device (21) by joining the regulator (3) and the sealing plate (1) around the safety device (21).

4. A high pressure gas cartridge as claimed in claim 2, wherein said clearance (32) is shut off from the safety device (21) by pressing a circular leg (22), which surrounds the safety device (21), into the regulator (3), through the top thereof.

5. A high pressure gas cartridge as claimed in claim 2, wherein said clearance (32) is shut off from the safety device (21) by joining the periphery of a circular leg (22), which surrounds the safety device (21), and the adjacent face of the regulator (3).

6. A high pressure gas cartridge as claimed in claim 1, wherein said regulator (3) is a cylinder which is closed at an end remote from the sealing plate (2) by a wall (33) having an orifice (31) therein, and which is fixed with respect to the sealing plate (2), round the safety device (21), and wherein said clearance (32) is shut off and the gas in the body is blocked from access to said safety device (21) of said sealing plate (2), bypassing said orifice (31), by joining said sealing plate (2) onto said body (1).

7. A high pressure gas cartridge as claimed in any one of claims 2, 3, 4, 5 and 6, wherein said wall (33) has a cavity on its side remote from the sealing plate (2), and a filter (51) for dust is set in the cavity.

8. A high pressure gas cartridge as claimed in claim 1, wherein said regulator (3) is a filter which is of a column type, which has interstices of continuous foam type adapted for a certain pressure of the gas in the body (1), and which is carried on a shoulder (12) formed on the inside of the body (1), and wherein said clearance (32) is shut off and the gas in the body (1) is blocked from access to said safety device (21) of said sealing plate (2), bypassing said regulator (3), by joining said sealing plate (2) onto said body (1).

9. A high pressure gas cartridge as claimed in claim 1, wherein said regulator (3) is a filter which is of a column type, which has interstices of continuous foam type adapted for a certain pressure of the gas in the body (1), and which is fixed with respect to the sealing plate (2), and wherein said clearance (32) is shut off and the gas in the body (1) is blocked from access to said safety device (21) of said sealing plate (2), bypassing said regulator (3), by joining said sealing plate (2) onto said body (1).

10. A high pressure gas cartridge as claimed in claim 2 and claim 6, wherein said regulator (3) consists of a cylindrical portion which has a cavity on the side of its wall (33) remote from the sealing plate (2), and a filter (51) which is set in the cavity and has interstices of continuous foam type adapted for a certain pressure of the gas in the body (1).

Patentansprüche

1. Hochdruckgaspatrone mit einem mit einem Hochdruckgas zu befüllenden Gehäuse (1), einer Dichtungsplatte (2), die mit einer Sicherheitsvorrichtung (21), ausgerüstet ist, um den Innendruck abzulassen, falls er infolge einer Temperaturerhöhung zu hoch werden sollte, und die eine Öffnung (11) des Gehäuses (1) abdichtet, nachdem das letztere mit einem Hochdruckgas befüllt wurde, einem Gasregler (3), der an der Innenseite der Dichtungsplatte (2) angeordnet ist und auf den Strom des Hochdruckgases einwirken kann, und einem Freiraum (32), durch den das Gehäuse (1) mit Gas gefüllt wird, und der zwischen dem Regler (3) oder der Dichtungsplatte (2) und dem Gehäuse (1) gebildet ist, dadurch gekennzeichnet, daß die Sicherheitsvorrichtung (21) einsetzbar ist, um den Innendruck durch einen Haarriß abzulassen, um den dort hindurchtretenden Gasstrom zu regeln und zu vermeiden, daß die Patrone explodiert oder sich durch eine Reaktionskraft bewegt, wenn der Druck übermäßig ansteigt, und der Regler (3) so angeordnet ist, daß der dort hindurchtretende Gasstrom maximal wird, mit der Einschränkung, daß, bis zur Raumtemperatur nur, der Gasstrom unzureichend wäre, um die Patrone durch eine Reaktionskraft zu bewegen, wenn die Dichtungsplatte (2) gebrochen ist und das Gas aus der Patrone frei ausströmen kann.

2. Hochdruckgaspatrone nach Anspruch 1, bei welcher der Regler (3) ein Zylinder ist, der an einem von der Dichtungsplatte (2) entfernten Ende durch eine Wand (33) geschlossen ist, die eine Öffnung (31) hat, und der auf einer Schulter (12) abgestützt wird, die auf der Innenseite des Gehäuses (1) gebildet ist, und bei welcher der Freiraum (2) verschlossen ist und der Zugang des Gases in dem Gehäuse zu der Sicherheitsvorrichtung (21) der Dichtungsplatte (2) versperrt ist, wobei es die Öffnung (31) umgeht, indem die Dichtungsplatte (2) mit dem Gehäuse (1) verbunden wird.

3. Hochdruckgaspatrone nach Anspruch 2, bei welcher der Freiraum (32) durch Verbinden des Reglers (3) und der Dichtungsplatte (1) um die Sicherheitsvorrichtung (21) herum von der Sicherheitsvorrichtung (21) abgesperrt wird.

4. Hochdruckgaspatrone nach Anspruch 2, bei welcher der Freiraum (32) durch Eindrücken eines kreisförmigen Fusses (22), der die Sicherheitsvorrichtung (21) umgibt, in den Regler (3) durch dessen Oberteil von der Sicherheitsvorrichtung (21) abgesperrt wird.

5. Hochdruckgaspatrone nach Anspruch 2, bei welcher der Freiraum (32) durch Verbinden des Randes eines kreisförmigen Fusses (22), der die Sicherheitsvorrichtung (21) umgibt, in der angrenzenden Stirnfläche des Reglers (3) von der Sicherheitsvorrichtung (21) abgesperrt wird.

6. Hochdruckgaspatrone nach Anspruch 1, bei welcher der Regler (3) ein Zylinder ist, der an einem von der Dichtungsplatte (2) entfernen Ende durch eine Wand (33) geschlossen ist, die eine Öffnung (31) hat, und der bezüglich der Dichtungsplatte (2) um die Sicherheitsvorrichtung (21) herum befestigt ist, und bei welcher der Freiraum (32) abgesperrt ist und der Zugang des Gases in dem Gehäuse zu der Sicherheitsvorrichtung (21) der Dichtungsplatte (2) versperrt ist, wobei es die Öffnung (31) umgeht, indem die Dichtungsplatte (2) mit den Gehäuse (1) verbunden wird.

7. Hochdruckgaspatrone nach einem der Ansprüche 2, 3, 4, 5 und 6, bei welcher die Wand (33) eine Aushöhlung auf derjenigen Seite hat, die von der Dichtungsplatte (2) entfernt ist, und ein Staubfilter (51) in der Aushöhlung angeordnet ist.

8. Hochdruckgaspatrone nach Anspruch 1, bei welcher der Regler (3) ein säulenförmiger Filter ist, der Zwischenräume eines durchgängigen Schaumtyps hat, der für eine bestimmten Druck des Gases in dem Gehäuse (1) geeignet ist, und der auf einer Schulter (12), die auf der Innenseite des Gehäuses (1) gebildet ist, abgestützt ist, und bei welcher der Freiraum (32) abgesperrt ist und der Zugang des Gasses in dem Gehäuse (1) zu der Sicherheitsvorrichtung (21) der Dichtungsplatte (2) versperrt ist, wobei es den Regler (3) umgeht, indem die Dichtungsplatte (2) mit dem Gehäuse (1) verbunden wird.

9. Hochdruckgaspatrone nach Anspruch 1, bei welcher der Regler (3) ein säulenförmiger Filter ist, der Zwischenräume eines durchgängigen Schaumtyps hat, der für einen bestimmten Druck des Gases in dem

Gehäuse (1) geeignet ist, und der bezüglich der Dichtungsplatte (2) befestigt ist, und bei welcher der Freiraum (32) abgesperrt ist und der Zugang des Gases in dem Gehäuse (1) zu der Sicherheitsvorrichtung (21) der Dichtungsplatte (2) versperrt ist, wobei es den Regler (3) umgeht, indem die Dichtungsplatte (2) mit dem Gehäuse (1) verbunden wird.

10. Hochdruckgaspatrone nach Anspruch 2 und Anspruch 6, bei welcher der Regler (3) aus einem zylindrischen Teil, der eine Aushöhlung auf derjenigen Seite seiner Wand (33) hat, die von der Dichtungsplatte (2) entfernt ist, und einem Filter (51) besteht, der in der Aushöhlung angeordnet ist und Zwischenräume eines durchgängigen Schaumtyps hat, der für einen bestimmten Druck des Gases in dem Gehäuse (1) geeignet ist.

Revendications

1. Une cartouche à gaz sous haute pression comprenant un corps (1) à remplir d'un gaz sous haute pression, une plaque d'étanchéité (2) qui est équipée d'un dispositif de sécurité (21) ayant pour fonction de dégager la pression interne si celle-ci devenait excessive sous l'effet d'un accroissement de la température et qui ferme une ouverture (11) du corps (1) lorsque ce dernier a été rempli d'un gaz sous haute pression, un régulateur de gaz (3) monté sur la face interne de la plaque d'étanchéité (2) et agissant sur l'écoulement du gaz sous haute pression, et un interstice (32), à travers lequel le corps (1) est rempli de gaz, formé entre le régulateur (3) ou la plaque d'étanchéité (2) et le corps (1), caractérisée en ce que le dispositif de sécurité (21) peut fonctionner en dégageant la pression interne à travers une fissure capillaire pour régler l'écoulement de gaz qui le traverse et éviter que la cartouche explose ou se déplace par réaction quand la pression monte excessivement et le régulateur (3) est agencé de manière que l'écoulement du gaz qui le traverse soit maximal avec la contrainte, que, jusqu'à la température ambiante seulement, l'écoulement du gaz serait insuffisant pour déplacer la cartouche par réaction si la plaque d'étanchéité (2) était rompue et que le gaz puisse s'écouler librement de la cartouche.

2. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 1, dans laquelle ledit régulateur (3) est un cylindre qui est fermé à une extrémité éloignée de la plaque d'étanchéité (2) par une paroi (33) percée d'un orifice (31), et que est supporté sur un épaulement (12) formé à l'intérieur du corps (1), et dans laquelle ledit interstice (32) est fermé et le gaz bloqué à l'intérieur du corps sans pouvoir accéder audit dispositif de sécurité (21) de ladite plaque d'étanchéité (2), en faisant une dérivation sur ledit orifice (31), par assemblage de ladite plaque d'étanchéité (2) sur ledit corps 1.

3. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 2, dans laquelle ledit interstice (32) est isolé du dispositif de sécurité (21) en assemblant le régulateur (3) et la plaque d'étanchéité (2) autour du dispositif de sécurité (21).

4. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 2, dans laquelle ledit interstice (32) est isolé du dispositif de sécurité (21) en comprimant une patte circulaire (22) qui entoure le dispositif de sécurité (21) à l'intérieur du régulateur (3) en passant par le haut.

5. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 2, dans laquelle ledit interstice (32) est isolé du dispositif de sécurité (21) en assemblant le pourtour d'une patte circulaire (22), qui entoure de dispositif de sécurité (21), et la face adjacent du régulateur (3).

6. Une cartouche à gaz sous haute pression, comme revendiqué à la revendication 1, dans laquelle ledit régulateur (3) est un cylindre qui est fermé à l'extrémité éloignée de la plaque d'étanchéité (2) par une cloison (33) percée d'un orifice (31), et qui est fixé par rapport à la plaque d'étanchéité (2), autour du dispositif d'étanchéité (21), et dans laquelle ledit interstice (32) est fermé et le gaz retenu dans le corps et bloqué par rapport à l'accès audit dispositif de sécurité (21) de ladite plaque d'étanchéité (22), en formant une dérivation sur ledit orifice (31) par une liaison entre ladite plaque d'étanchéité (2) et ledit corps (1).

7. Une cartouche à gaz sous haute pression comme revendiqué dans l'une quelconque des revendications 2, 3, 4, 5 et 6, dans lequelle ladite cloison (33) présente une cavité sur sa face éloignée de la plaque d'étanchéité (2), et dans laquelle un filtre (51) à poussière est placé dans la cavité.

8. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 1, dans laquelle le régulateur (3) est un filtre du type en colonne, qui comporte des interstices du type en mousse continue, adapté à une certaine pression du gaz à l'intérieur du corps (1), et qui est supporté sur un épaulement (12) formé à l'intérieur du corps (1), et dans lequel ledit interstice (32) est fermé et le gaz contenu dans le corps (1) est empêché d'accéder audit dispositif de sécurité (21) de ladite plaque d'étanchéité (2), formant une dérivation sur ledit régulateur (3), par l'assemblage de ladite plaque d'étanchéité (2) sur ledit corps (1).

9. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 1, dans laquelle ledit régulateur (3) est un filtre du type en colonne, qui comporte des interstices en mousse de type continu prévue pour une certaine pression du gaz dans le corps (1), et qui est fixé par rapport à la plaque d'étanchéité (2), et dans laquelle ledit interstice (32) est fermé et le gaz contenu dans le corps (1) est empêché d'accéder audit dispositif de sécurité (21) de ladite plaque d'étanchéité (2), en formant une dérivation dans sur ledit régulateur (3), par assemblage de ladite plaque d'étanchéité (2) sur ledit corps (1).

10. Une cartouche à gaz sous haute pression comme revendiqué à la revendication 2 et à la revendication 6, dans laquelle ledit régulateur (3) est constitué d'une partie cylindrique qui présente une cavité sur la face de sa paroi (33) éloignée de la plaque d'étanchéité (2), et un filtre (51) qui est monté dans

la cavité et comporte des interstices en mousse de type continu adaptée pour une certaine pression du gaz dans le corps (1).

FIG. 1

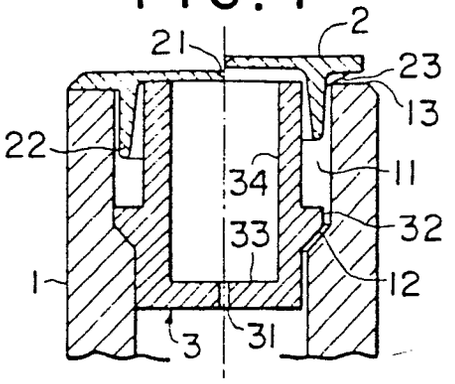

FIG. 3

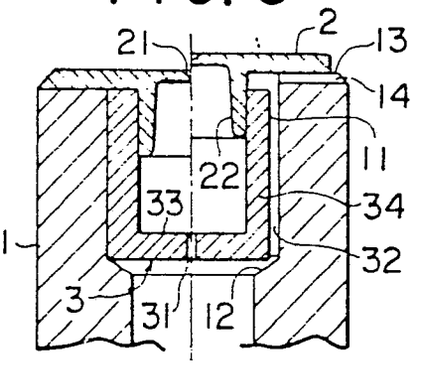

FIG. 2

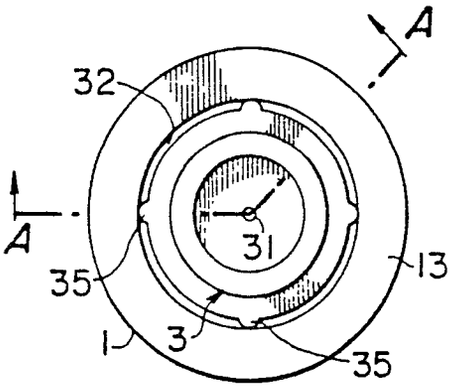

FIG. 4

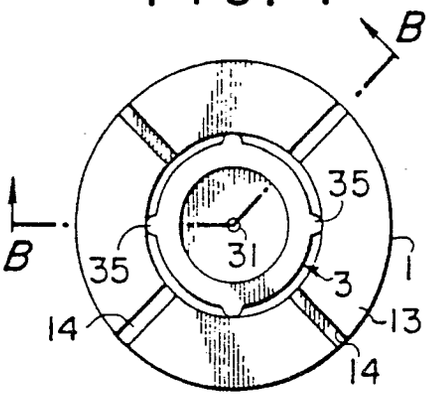

FIG. 5

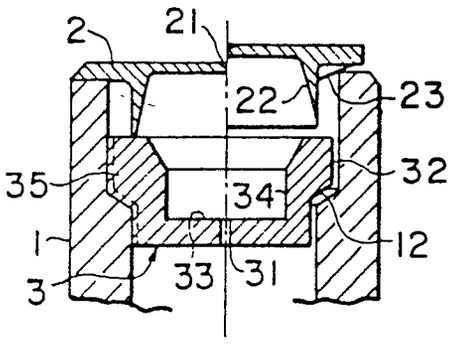

FIG. 7

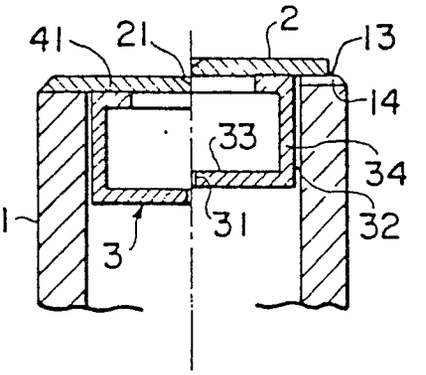

FIG. 6

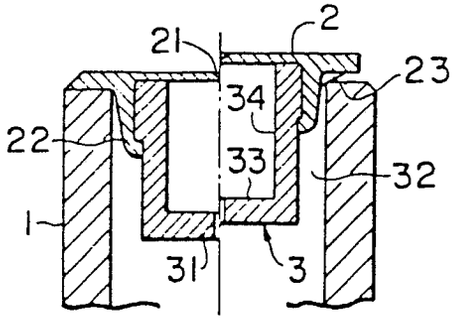

FIG. 8

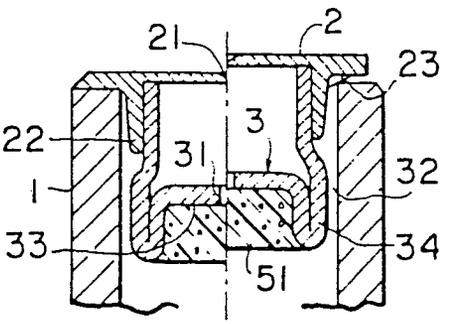

FIG. 9

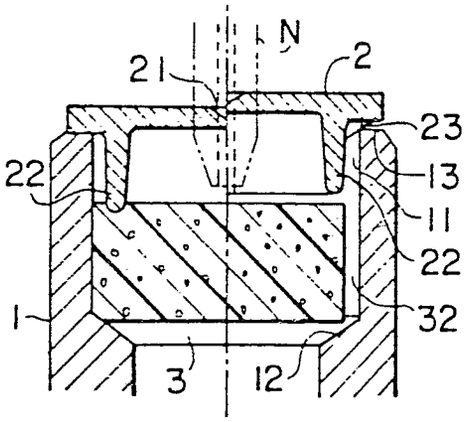

FIG. 11

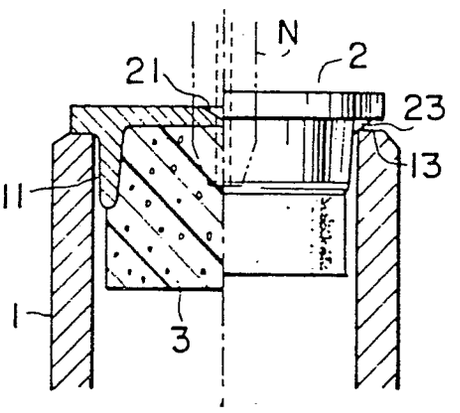

FIG. 10

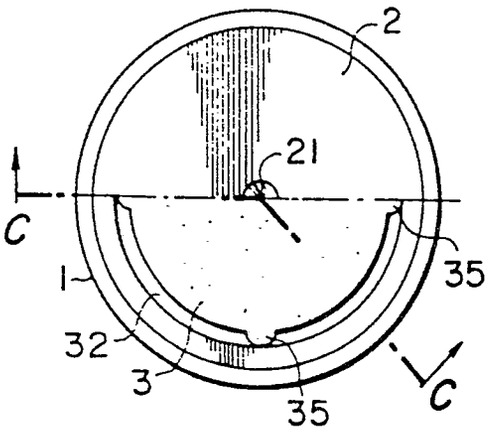

FIG. 12

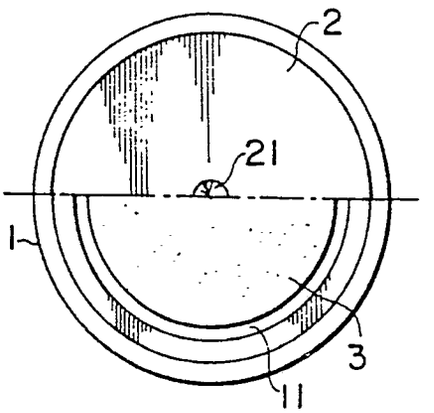

FIG. 13