

(19)



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

(11)

N° de publication :

92937

(12)

BREVET D'INVENTION**B1**

(21)

N° de dépôt: 92937

(51)

Int. Cl.:
F17C 13/04

(22)

Date de dépôt: 31/12/2015

(30)

Priorité:

(43)

Date de mise à disposition du public: 21/07/2017

(47)

Date de délivrance: 21/07/2017

(73)

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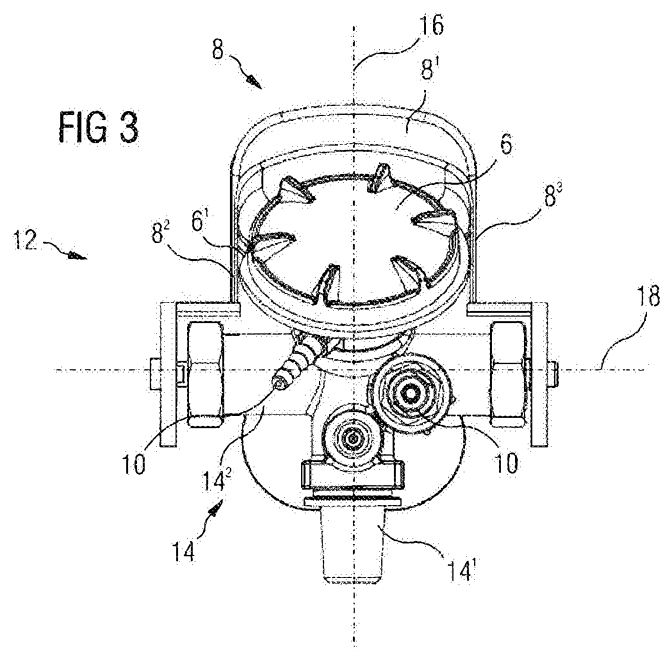
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Tap assembly for gas cylinder with operating lever and cover.

(57)

Abstract: The invention is directed to a tap (12) for gas cylinder, comprising a body (14) with a threaded gas inlet extending along a longitudinal axis (16) and adapted to be connected to a collar of the gas cylinder, a gas outlet (10) and a gas delivery passage interconnecting said inlet and outlet; a shut-off device of the passage, said device comprising a seat in the delivery passage and a shutter extending through and cooperating with said seat; and a lever (82) adapted for moving the shutter against a delivery flow direction in the delivery passage from the inlet towards the outlet, in order to open the shut-off device. The lever (82) is rotatable around a transversal axis (19) that is perpendicular to the longitudinal axis (16) or that forms an angle with said perpendicular that is less than 30°, preferably less than 20°, more preferably less than 10°. (fig. 3) 92937



Description**TAP ASSEMBLY FOR GAS CYLINDER WITH OPERATING LEVER AND COVER****Technical field**

[0001] The invention is directed to the field of taps for gas cylinder, more particularly to taps for compressed industrial and/or medical gases.

Background art

- [0002] Prior art patent document published FR 2 865 263 A1 discloses a cover for a tap mounted on a gas cylinder. The cover comprises a general ball-shaped shell housing the cylinder tap. The shell comprises an opening for an outlet connector, and a lever for actuating a lid that closes and opens said opening. The main goal of this lid is to protect the connector from dust pollution by the ambient air. The opening of the tap is made by pre-setting the pressure reducer. This construction fails to provide a reliable and ergonomic shut-off device.
- [0003] Prior art patent document published FR 2 502 290 A1 discloses a tap for a gas cylinder that provides a reserve position. The tap comprises a shutter that is urged by a spring towards a seat in a direction opposite to the normal gas flow, i.e. when being delivered from the cylinder to a user. When the pressure inside the cylinder decreases down to a level that is predetermined by the shutter and its spring, the pressure of the gas is not able anymore to move the shutter against the spring force. The tap remains therefore closed. A lever mounted on the tap body can be actuated for moving the shutter in an open position and thereby allowing the reserve amount of gas to be used. The function of this tap is limited to providing a reserve of gas.
- [0004] Prior art patent document published WO 2015/132092 A2 discloses a cover for a gas cylinder tap. The cover comprises a shell for housing the tap and a hook pivotally mounted on the shell, the hook being configured for securing the gas cylinder to a horizontal bar, like a bar of a hospital bed. The shell comprises reservations on its external surface configured for receiving the hook in a folded position so as to generally conform to said external surface. The invention is also directed to a gas storage

assembly comprising a gas cylinder, a tap and a cover. The shell comprises an upper half-shell and a lower half-shell joined together. The tap comprises a rotatable wheel for actuating a flow selector, said wheel being on the upper half-shell. The tap fails to provide a shut-off device distinct from the flow selector.

- [0005] Prior art patent document published FR 2 244 123 A1 discloses a tap for gas cylinder with a rotating lever that permits to purge the outlet and the circuit connected thereto. To that end, the rotating lever comprises a slope contact surface that slides on the stems of two shutters cooperating with corresponding seats in the tap body. That gas cylinder tap addresses a particular problem and fails to be particularly compatible with a protective cover that becomes nowadays a standard for reasons of ergonomics, security and aesthetic. This is particularly true when the cover comprises a gripping handle at the top which prevents a convenient operation of the operating lever.

Summary of invention

Technical Problem

- [0006] The invention has for technical problem to provide a tap for gas cylinder with a shut-off valve whose operation is convenient and reliable. More particularly, the invention has for technical problem to provide a tap with a shut-off valve whose operation is compatible with a protective cover for said tap.

Technical solution

- [0007] The invention is directed to a tap for gas cylinder, comprising: a body with a threaded gas inlet extending along a longitudinal axis and adapted to be connected to a collar of the gas cylinder, a gas outlet and a passage interconnecting said inlet and outlet; a shut-off device of the passage, said device comprising a seat in the passage and a shutter extending through and cooperating with said seat; a lever adapted for moving the shutter against a delivery flow direction in the passage from the inlet towards the outlet, in order to open the shut-off device; wherein the lever is rotatable around a transversal axis that is perpendicular to the longitudinal axis or

- that forms an angle with said perpendicular that is less than 30°, preferably less than 20°, more preferably less than 10°.
- [0008] According to a preferred embodiment, the shutter of the shut-off valve is slidably movable along a transversal direction that is parallel to the rotation axis of the lever or that forms an angle with said axis that is less than 30°, preferably less than 20°, more preferably less than 10°.
- [0009] According to a preferred embodiment, the shutter of the shut-off valve is urged towards the seat of said device by a spring in the delivery flow direction.
- [0010] According to a preferred embodiment, said the lever comprises a contact surface that is sloped relative to plane perpendicular to the rotation axis, said sloped surface contacting an actuating rod slidably mounted in the body and contacting the shutter.
- [0011] According to a preferred embodiment, the actuating rod extends through the passage downstream of the seat in the delivery flow direction.
- [0012] According to a preferred embodiment, said tap comprises a residual pressure device arranged in the passage downstream of the seat in the delivery flow direction, and preferably wherein said device comprises a shutter urged by a spring towards a seat in a direction opposite to the delivery flow direction, the actuating rod extending through said shutter.
- [0013] According to a preferred embodiment, said tap comprises an anti-refill device arranged in a refill passage interconnecting a refill port and the inlet, said passage intersecting the passage upstream, in the delivery flow direction, of the shut-off device.
- [0014] According to a preferred embodiment, the anti-refill device comprises a shutter urged by a spring towards a seat in the refill passage in refill flow direction from the refill port to the inlet, the shutter of the shut-off device being adapted, in a refill position, for contacting and moving said shutter of the anti-refill device off said seat of the anti-refill device in order to open the refill passage.
- [0015] According to a preferred embodiment, the shutter of the anti-refill device is slidable along a direction that is aligned with the sliding direction of the shutter of the shut-off device, said shutter preferably comprising a

protruding portion extending through the seat of the anti-refill device for contacting said shutter of the anti-refill device.

- [0016] According to a preferred embodiment, wherein the lever comprises a first position where the shut-off device is closed, a second position where the shut-off device is opened, and third position where the shut-off device is further opened and the anti-refill device is opened.
- [0017] Advantageously, the actuating rod can comprise a shoulder that abuts against the shutter of the residual pressure device when passing from the second position to the third position so as to keep the residual pressure device in a closed position.
- [0018] According to a preferred embodiment, said tap comprises blocking means that prevent rotation of the lever to the third position, said means being releasable.
- [0019] According to a preferred embodiment, the body comprises a longitudinal portion comprising the gas inlet, and a transversal portion extending transversally on each side of the longitudinal portion and housing the shut-off device, the residual pressure device and the anti-refill device.
- [0020] According to a preferred embodiment, the lever comprises two side arms rotatably mounted on both sides of the body, and a handle interconnecting said arms.
- [0021] According to a preferred embodiment, one of the two arms is adapted for converting the pivoting movement of the lever into a movement the shutter of the shut-off device and the other of said two arms is freely rotatably mounted on the body.
- [0022] According to a preferred embodiment, the two side arms are mounted on the transversal portion of the body.
- [0023] The invention is also directed to a tap assembly comprising: a tap for gas cylinder; and a cover housing the tap; wherein the tap is according to the invention, and the tap assembly further comprises a lid fixed with the lever of said tap, said lid covering or uncovering a front area of the cover when actuating said lever.
- [0024] According to a preferred embodiment, the lid uncovers the front area comprising an indicator and/or a hand-wheel for adjusting the delivery

outlet pressure and/or flow rate when the lever is actuated for opening the shut-off device.

- [0025] According to a preferred embodiment, the tap comprises a flow selector, and the front area of the cover comprises a hand-wheel for actuating said selector, said hand-wheel comprising at its periphery a flattened portion that allows movement of the lever in a closing direction of the shut-off valve only when the hand-wheel is in an angular position that corresponds to a null flow rate.

Advantages of the invention

- [0026] The invention is particularly interesting in that it provides a reliable and convenient operation of the shut-off device, in particular in relation with a tap assembly that comprises a cover housing the tap.

Brief description of the drawings

- [0027] Figure 1 is front perspective view of a tap assembly in accordance with the invention, the tap being in an open position.
- [0028] Figure 2 is a view of the tap assembly of figure 1 in a close position.
- [0029] Figure 3 is a front view of the tap of the tap assembly of figures 1 and 2.
- [0030] Figure 4 is a side view of the tap of figure 3.
- [0031] Figure 5 is a sectional view of the central portion of the tap of figures 3 and 4, the tap being in a close position.
- [0032] Figure 6 corresponds to figure 5 where the tap is in an open position.
- [0033] Figure 7 correspond to figures 4 and 5 where the tap is in a refill position.

Description of an embodiment

- [0034] In the following description of the invention, the concepts of "upstream" and "downstream" are expressed with reference to the flow direction when gas is delivered from the cylinder to a user. A reverse gas flow can indeed take place for refilling the cylinder but this flow direction is not referred to with these concepts, unless expressly mentioned.
- [0035] Figures 1 and 2 illustrate a tap assembly in accordance with the invention. The tap assembly 2 comprises a cover 4 housing a tap (not visible in figures 1 and 2). The cover 4 comprises, essentially, a shell 4¹ that can be generally ball-shaped, a handle 4² extending generally horizontally above

the shell 4¹, and two side arms connecting the handle 4² to the shell 4¹. The tap (not visible) and the shell can be attached to each other so as to form an assembly that can be mounted as a unit on a gas cylinder.

- [0036] The tap assembly 2 comprises also a hand-wheel 6 that actuates a flow selector provided in the tap. The hand-wheel is located on a front area of the shell 4¹. The tap assembly 2 comprises a lid 8 that is pivotally mounted on the tap around a transversal axis, i.e. an axis that is at least generally perpendicular to the longitudinal axis of the assembly. The longitudinal axis is vertical when the assembly is oriented as in figures 1 and 2, i.e. oriented as when mounted on an upright cylinder gas.
- [0037] Still with reference to figures 1 and 2, the tap assembly can comprise two outlets 10, one being a barbed connector for a hose and the other one being a quick connector. These outlets are advantageously positioned on the front area of the shell 4¹, below the hand-wheel 6.
- [0038] With reference to figure 2 illustrating the tap assembly in a closed position, the lid 8 is pivoted downwardly so as to cover the hand-wheel. The pivoting movement of the lid 8 interacts with the tap so as to open or close a shut-off device in said tap, as this will be explained further in relation with figures 5 to 7.
- [0039] Figures 3 and 4 illustrate the tap of the tap assembly of figures 1 and 2. The tap 12 comprises a body 14 with a first longitudinal portion 14¹ extending along the longitudinal axis 16, and a second transversal portion 14² extending along the transversal axis 18 that is generally perpendicular to the longitudinal axis 16. The transversal portion 14² of the body 14 supports the two lateral arms 8² and 8³ of the pivoting lid 8. These two arms are interconnected by a gripping and covering portion 8¹. As is best visible in figure 4, this portion 8¹ is indeed generally curved so as to travel around the tap, more particularly the hand-wheel 6. It comprises also a gripping portion for facilitating its manoeuvring by a user.
- [0040] The hand-wheel 6 can comprise at its periphery a flattened portion 6¹ that cooperates with one of the arms 8² and 8³, for instance with the arm 8² such that this flattened portion 6¹ needs to be positioned towards said arm to allow its pivoting movement down to a position as illustrated in figure 2.

This position of the flattened portion 6¹ can correspond to an angular position of the hand-wheel that sets a null flow rate. Such measures provide the effect that the lid can only be moved back to the position as illustrated in figure 2 when the flow selector is set to a flow rate of zero. This provides an enhanced security and also ergonomics of the tap assembly since it requires from the user who wants to stop the delivery of gas and use of the assembly to first sets the flow rate to zero and second to move the lid over the hand-wheel to close the shut-off device.

- [0041] Still with reference to figures 3 and 4, the body 14 comprises a gas inlet at the lower end of the longitudinal portion 14¹ and a gas passage (not visible) that interconnects the inlet with the outlet(s) 10. A shut-off device is provided in the body 14 for shutting-off the passage. A pressure reducer 20 and a flow selector operated by the hand-wheel 6 are also provided downstream of said shut-off device. The pressure reducer and the flow selector are as such well known to the skilled person and do not need to be further detailed.
- [0042] Figures 5 to 7 are sectional views of the tap 12, more particularly of the transversal portion of the body 14 of the tap, illustrating the interaction between the arms of the lid 8 and the shut-off device. Figure 5 corresponds to a closed state, figure 6 to an open state and figure 7 to a refill state of the tap.
- [0043] With reference to figure 5, the transversal portion 14² of the body comprises a gas passage 22 interconnecting the inlet (not represented) with the outlet(s) (also not represented). A shut-off device 24 is provided in the passage 22. More specifically, the passage 22 comprises a portion 22¹ that is in direct connection with the inlet (not represented) and upstream of the shut-off device. The passage 22 comprises also a portion 22² that is downstream of the shut-off device 24 and in direction connection with the above mentioned pressure reducer (20 in figure 4) towards the outlet(s) (10 in figures 1 and 3).
- [0044] The shut-off device 24 comprises a seat 26 in the passage 22, a shutter 28, also in the passage and upstream of the seat 26, and a spring 29 urging the shutter 28 against the set 26. In the absence of additional

external forces, the shutter 28 is in a gas tight contact with the seat 26 so as to shut-off the passage 22 between the portions 22¹ and 22² of said passage. The high pressure present in the cylinder and in the portion 22¹ of the passage 22 further urges the shutter 28 against the seat 26.

[0045] An actuating rod 30 is provided between the lever 8² and the shutter 28. More specifically, one end of the rod 30 is in contact with a trunnion 32 that is rotatably attached to the lever 8² by means of its end portion 32¹. This latter can comprise a flattened portion for providing a secure torque transmission between the lever 8² and the trunnion 32. The trunnion 32 comprises a contact surface 32² that is sloped relative to a plane perpendicular to the transversal axis 18. The axis of rotation 19 of the trunnion is parallel and offset to the transversal axis 18. The rotation of the trunnion 32 can therefore move the actuating rod 30 towards the shutter 28 so as to move it to an open position and vice versa.

[0046] Still with reference to figure 5, the tap can comprise residual pressure device 34 adapted for maintaining a residual pressure in the gas cylinder, e.g. comprises between 10 and 1 bars. The purpose of such a device is to avoid a direct contact between the interior of the cylinder and the ambient environment of the cylinder in the absence of gas flow because such a direct contact could contaminate the interior of the cylinder. The residual pressure opens when gas is delivered to a user as long as the pressure inside the cylinder is high enough to open the device. When the pressure in the cylinder is below the critical pressure of the device, this latter remains closed, thereby preventing contamination of the cylinder when the shut-off device remains open.

[0047] The residual pressure device 34 is arranged downstream of the shut-off device 24. It comprises essentially a shutter 36, a seat 38 and a spring 40. The spring 40 urges the shutter 36 in the reverse direction of the delivery flow of the gas towards the seat 38. As soon as the pressure difference on the shutter 36 is high enough, this latter is moved against the resilient force of the spring off the seat 38 so as to open the passage. The actuating rod 30 extends in a gas tight fashion through the spring 40 and the shutter 36 of the residual pressure device 34. This construction

prevents the rod 30 from disturbing the functioning of the residual pressure device and vice versa.

[0048] In the present embodiment, the seat 38 of the residual pressure device 34 is formed on a bushing that is inserted into a bore of the body portion 14². This bushing forms a cavity that houses the shutter 36. Its front portion comprises a deepening that houses the seat 26 of the shut-off device 24. Its rear portion is in contact with plug 42 that closes the bore cavity and through which the actuating rod 30 extends in a gas tight fashion.

[0049] Still with reference to figure 5, the tap can comprise an anti-refill device 44 adapted to prevent a refill of the cylinder by an unauthorized person. Such an uncontrolled refilling could indeed change the composition of the gas contained in the cylinder and could also contaminate it. The anti-refill device 44 is arranged in a portion 22³ of the passage that branches off the upstream portion 22¹ of the passage to a refill port (not represented). As is visible in the figure, the anti-refill device is arranged along the transversal axis 18 at the opposite of the residual pressure device 34 and the actuating rod 30.

[0050] The anti-refill device 44 comprises essentially a shutter 46, a seat 48 and a spring 50 urging the shutter 46 towards the seat 48. More specifically, the closing sliding movement of the shutter 46 is in the refill flow direction, i.e. from the (not represented) refill port connected with the refill portion 22³ of the passage towards the upstream portion 22¹ of said passage 22. During normal use of the tap assembly, the refill portion is closed and the anti-refill device remains closed by virtue of the spring 50. If the refill port would be opened, the anti-refill device 44 remains closed. Indeed, the shutter 46 forms with the plug 52 a gas tight cavity housing the spring 50. It comprises also a gas channel interconnecting the cavity with the downstream side of shutter (relative to the refill flow direction). The cavity housing the spring 50 has a cross-sectional surface that is larger than the cross-sectional surface of the front face of shutter downstream (relative to the refill flow direction) the seat 48. This means that even if the pressure at in the refill portion 22³ of the passage drops down, the pressure at the inlet and in the upstream section 22¹ of the passage generates a resulting force

on the shutter 46 that is towards the seat 48. When a refill pressure is applied to the refill port, i.e. a pressure that is higher than the pressure inside the cylinder and at the inlet, the anti-refill device 44 remains also closed, thereby preventing unauthorized refilling of the cylinder.

- [0051] In the present particular embodiment, a bushing 54 is inserted into a bore formed in the corresponding end of the transversal portion 14² of the body 14. The seat 48 of the anti-refilling device 44 is housed in a circular recess formed in the bottom wall of the bore. The seat 48 is held in said recess by the front wall of the bushing 54. This latter houses the shutter 46. The plug 52 is in contact with rear of the bushing 54, so as to keep the bushing 54 and the seat 48 in place in the bore. A trunnion 56 is attached to the body portion 14² and supports in free rotation around the axis 19 the arm 8³ of the lid.
- [0052] In the state of the tap as illustrated in figure 5, the shutter 28 of the shut-off device 24 is in contact with the seat 26 so that the gas passage from the section 22¹ toward the section 22² is shut-off. The shutter 28 comprises a front portion 28¹ that protrudes downstream through the seat 26. The corresponding end of the actuating rod 30 is distant from the front portion 28¹ of the shutter 28, so as not to interfere with the shut-off device. The closed state of figure 5 can correspond to the position of the lid 8 as illustrated in figure 2.
- [0053] Figure 6 illustrates the tap of figure 5 in an open state. The arms or levers 8² and 8³ have pivoted having for effect to rotate the trunnion 32 and to move the actuating rod 30 by virtue of movement of the sloped contact surface 32². The actuating rod 30 contacts the front portion 28¹ of the shutter 28 and moves it off the seat 26. The shut-off device 24 is then open and allows a delivery flow of gas from the inlet towards the outlet(s). The pressure at the inlet is applied to the shutter 36 of the residual pressure device 34 and moves it off its seat 38 so as to open the passage. The rear portion 28² of the shutter 28 of the shut-off device remains distant from the anti-refill device 44. This latter remains closed as in the closed state of the tap described in relation with figure 5.

- [0054] The open state of figure 6 can correspond to the position of the lid 8 as illustrated in figure 1.
- [0055] Figure 7 illustrates the tap in a refill state. Compared with the state of figure 6, the arms 8² and 8³ have pivoted further so that the trunnion 32 is rotated further and its sloped contact surface 32² moves further the actuating rod 30. The shutter 28 of the shut-off device is moved further in the open position to such an extent that its rear portion 28² contacts the shutter 46 of the anti-refill device 44 so as to open it. In that state, a refill flow of gas can be applied from the refill section 22³ of the passage towards the upstream portion 22¹ through the anti-refill device forced in an open position. In that state, the shut-off device 24 is open. This is therefore necessary to shut-off the passage 22 downstream of the shut-off device. This can be achieved with the residual pressure device which can be held in a closed position. The actuating rod 30 can comprise a shoulder portion 30¹ is adjusted to rest on the shutter 36 of the residual pressure device 34 in the refill state as illustrated in figure 7. This corresponds to a position of the shoulder portion that is to the right of the shoulder portion 30¹ as illustrated in figure 7. Alternatively, the tap can comprise a further shut-off means downstream in section 22² of the passage.
- [0056] The refill state as illustrated in figure 7 can be normally blocked for normal users by limiting the pivoting movement of the arms 8² and 8³ between the positions corresponding to the closed and opened states as illustrated in figures 5 and 6. A mechanical element can be provided for normally blocking a further pivoting movement of the arms 8² and 8³ from the open state as illustrated in figure 6 towards a refill state as illustrated in figure 7. This mechanical element can be designed to be deactivated by a special tool that would be provided to authorised persons for refilling the gas cylinder.

Revendications

1. Robinet (12) pour bouteille de gaz, comprenant:
 - un corps (14) avec une entrée de gaz fileté s'étendant le long d'un axe longitudinal (16) et adaptée pour être reliée à un col de la bouteille de gaz, une sortie de gaz (10) et un passage (22) reliant ladite entrée et ladite sortie;
 - un dispositif de fermeture (24) du passage (22), ledit dispositif comprenant un siège (26) dans le passage (22) et un obturateur (28) traversant et coopérant avec ledit siège (26);
 - un levier (8¹, 8², 8³, 32) adapté pour déplacer l'obturateur (28) contre le sens d'écoulement de distribution dans le passage (22) de l'entrée vers la sortie, afin d'ouvrir le dispositif de fermeture (24) ;caractérisé en ce que
le levier (8¹, 8², 8³, 32) est tournant autour d'un axe transversal (19) qui est perpendiculaire à l'axe longitudinal (16) ou qui forme un angle avec ladite perpendiculaire qui est inférieure à 30°, préférentiellement inférieure à 20°, plus préférentiellement inférieure à 10°.
2. Robinet (12) selon la revendication 1, dans lequel l'obturateur (28) du dispositif de fermeture (24) est mobile de façon coulissante le long d'une direction transversale (18) qui est parallèle à l'axe de rotation (19) du levier (8²) ou qui forme un angle avec ledit axe qui est inférieur à 30°, préférentiellement inférieur à 20°, plus préférentiellement inférieur à 10°.
3. Robinet (12) selon la revendication 2, dans lequel l'obturateur (28) du dispositif de fermeture (24) est sollicité vers le siège (26) dudit dispositif (24) par un ressort (29) dans la direction d'écoulement de distribution.
4. Robinet (12) selon l'une quelconque des revendications 1 à 3, dans lequel le levier (8¹, 8², 8³, 32) comprend une surface de contact (32²) qui est inclinée par rapport à un plan perpendiculaire à l'axe de rotation (19), ladite surface inclinée (32²) étant en contact avec une tige d'actionnement (30) montée de façon coulissante dans le corps (14) et adaptée pour venir en contact de l'obturateur (28).
5. Robinet (12) selon la revendication 4, dans lequel la tige d'actionnement (30) s'étend le long du passage (22) en aval du siège (26) dans la direction d'écoulement de distribution.
6. Robinet (12) selon l'une quelconque des revendications 4 et 5, dans lequel ledit robinet (12) comprend un dispositif de pression résiduelle (34) disposé dans le passage (22²)

en aval du siège (26) dans la direction d'écoulement de distribution, et de préférence dans lequel ledit dispositif (34) comprend un obturateur (36) sollicité par un ressort (40) vers un siège (38) dans une direction opposée à la direction d'écoulement de distribution, la tige d'actionnement (30) traversant ledit obturateur (36).

7. Robinet (12) selon l'une quelconque des revendications 1 à 6, dans lequel ledit robinet (12) comprend un dispositif anti-remplissage (44) disposé dans un passage de remplissage (22³) reliant entre eux un orifice de remplissage et l'entrée, ledit passage (22³) étant en intersection avec le passage (22¹) en amont, dans la direction d'écoulement de distribution, du dispositif de fermeture (24).
8. Robinet (12) selon la revendication 7, dans lequel le dispositif anti-remplissage (44) comprend un obturateur (46) sollicité par un ressort (50) vers un siège (48) dans le passage de remplissage (22³) dans le sens d'écoulement de remplissage à partir de l'orifice de remplissage vers l'entrée, l'obturateur (28) du dispositif de fermeture (24) étant adapté, dans une position de remplissage, pour venir en contact avec et déplacer ledit obturateur (46) du dispositif anti-remplissage (44) à distance dudit siège (48) du dispositif anti-remplissage (44) afin d'ouvrir ledit passage de remplissage (22³).
9. Robinet (12) selon la revendication 8, dans lequel l'obturateur (46) du dispositif anti-remplissage (44) est apte à coulisser le long d'une direction qui est alignée avec la direction de coulissement de l'obturateur (28) du dispositif de fermeture (24), ledit obturateur (28) comprenant de préférence une partie en saillie (28²) se prolongeant à travers le siège (48) du dispositif anti-remplissage (44) pour entrer en contact avec l'obturateur (46) dudit dispositif anti-remplissage (44).
10. Robinet (12) selon l'une quelconque des revendications 7 à 9, dans lequel le levier (8¹, 8², 8³, 32) comprend une première position dans laquelle le dispositif de fermeture (24) est fermé, une seconde position dans laquelle le dispositif de fermeture (24) est ouvert, et une troisième position dans laquelle le dispositif de fermeture (24) est davantage ouvert et le dispositif anti-remplissage (44) est ouvert.
11. Robinet (12) selon la revendication 10, dans lequel ledit robinet (12) comprend des moyens de blocage qui empêchent la rotation du levier (8¹, 8², 8³, 32) à la troisième position, lesdits moyens pouvant être libérés.
12. Robinet (12) selon l'une quelconque des revendications 1 à 11 et selon les revendications 6 et 7, dans lequel le corps (14) comprend une partie longitudinale (14¹) comprenant l'entrée de gaz, et une partie transversale (14²) s'étendant transversalement de chaque côté de la portion longitudinale (14¹) et logeant le

dispositif de fermeture (24), le dispositif de pression résiduelle (34) et le dispositif anti-remplissage (44).

13. Robinet (12) selon l'une quelconque des revendications 1 à 12, dans lequel le levier (8¹, 8², 8³, 32) comprend deux bras latéraux (8², 8³) montés à rotation sur les deux côtés du corps (14), et une poignée (8¹) interconnectant lesdits bras (8², 8³).
14. Robinet (12) selon la revendication 13, dans lequel un (8²) des deux bras (8², 8³) est adapté pour convertir le mouvement de pivotement du levier en un mouvement de l'obturateur (28) du dispositif de fermeture (24) et l'autre (8³) desdits deux bras (8², 8³) est monté libre en rotation sur le corps (14).
15. Robinet (12) selon la revendication 12 et l'une des revendications 13 et 14, dans lequel les deux bras latéraux (8², 8³) sont montés sur la partie transversale (14²) du corps (14).
16. Ensemble de robinet (2) comprenant:
 - un robinet (12) pour bouteille de gaz; et
 - une coiffe (4) logeant le robinet (12);caractérisé en ce que
le robinet (12) est selon l'une quelconque des revendications 1 à 15, et l'ensemble de robinet (2) comprend en outre un couvercle (8¹) fixe avec le levier (8¹, 8², 8³, 32) dudit robinet, ledit couvercle (8¹) couvrant ou découvrant une zone avant de la coiffe (4) lors de l'actionnement dudit levier.
17. Ensemble de robinet (2) selon la revendication 16, dans lequel le couvercle (8¹) découvre la partie avant comprenant un indicateur et/ou un volant à main (6) pour régler la pression de sortie et/ou le débit de distribution lorsque le levier est actionné pour l'ouverture du dispositif de fermeture.
18. Ensemble de robinet (2) selon l'une des revendications 16 et 17, dans lequel le robinet comprend un sélecteur de débit, et la zone avant de la coiffe (4) comprend un volant à main (6) pour actionner ledit sélecteur, ledit volant à main (6) comprenant à sa périphérie une partie aplatie (6¹) qui autorise le mouvement du levier (8¹, 8², 8³, 32) dans une direction de fermeture du dispositif de fermeture (24) lorsque le volant à main (6) est dans une position angulaire qui correspond à un débit nul.

FIG 1

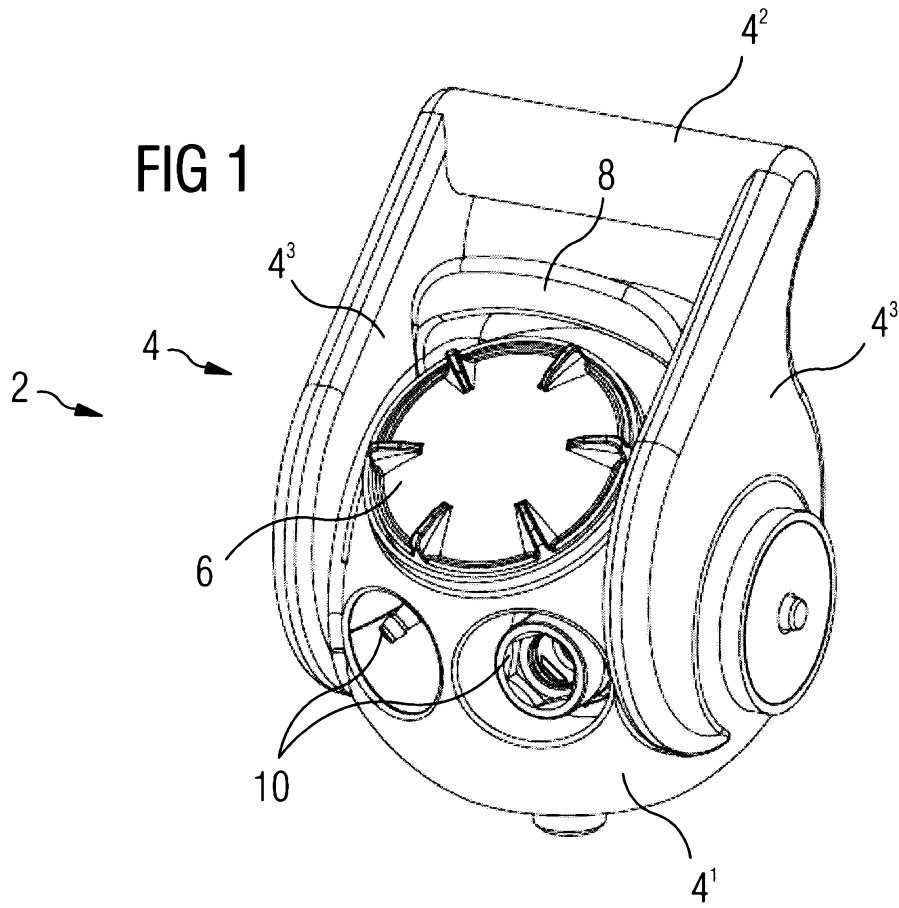
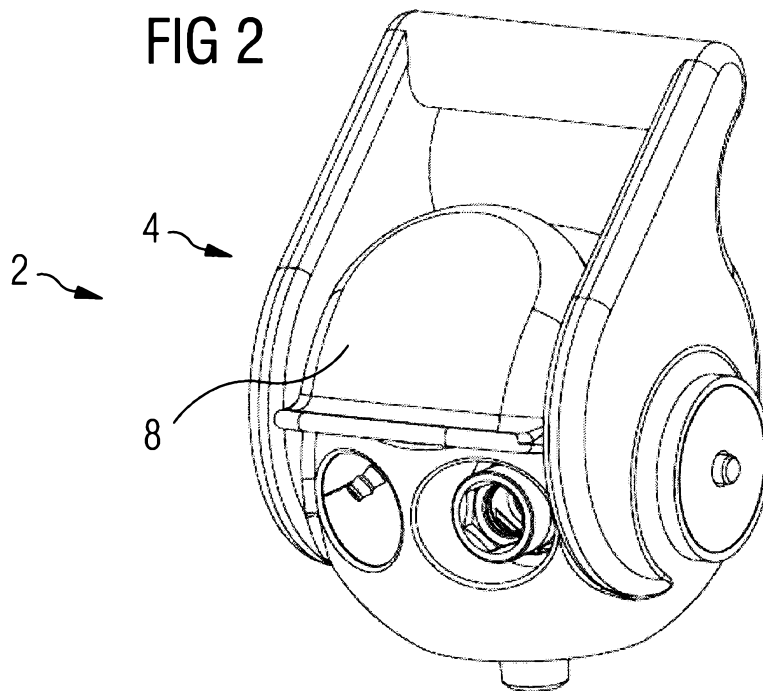
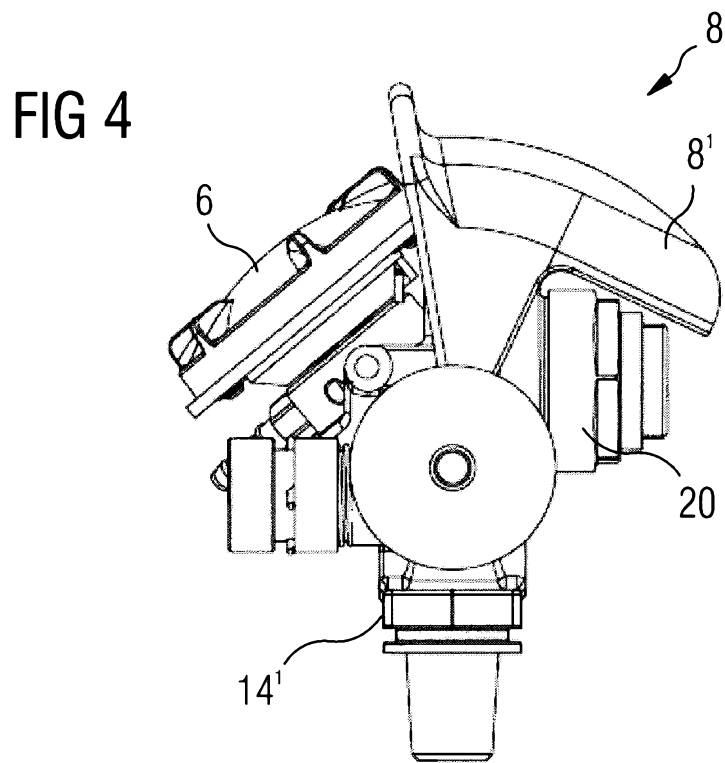
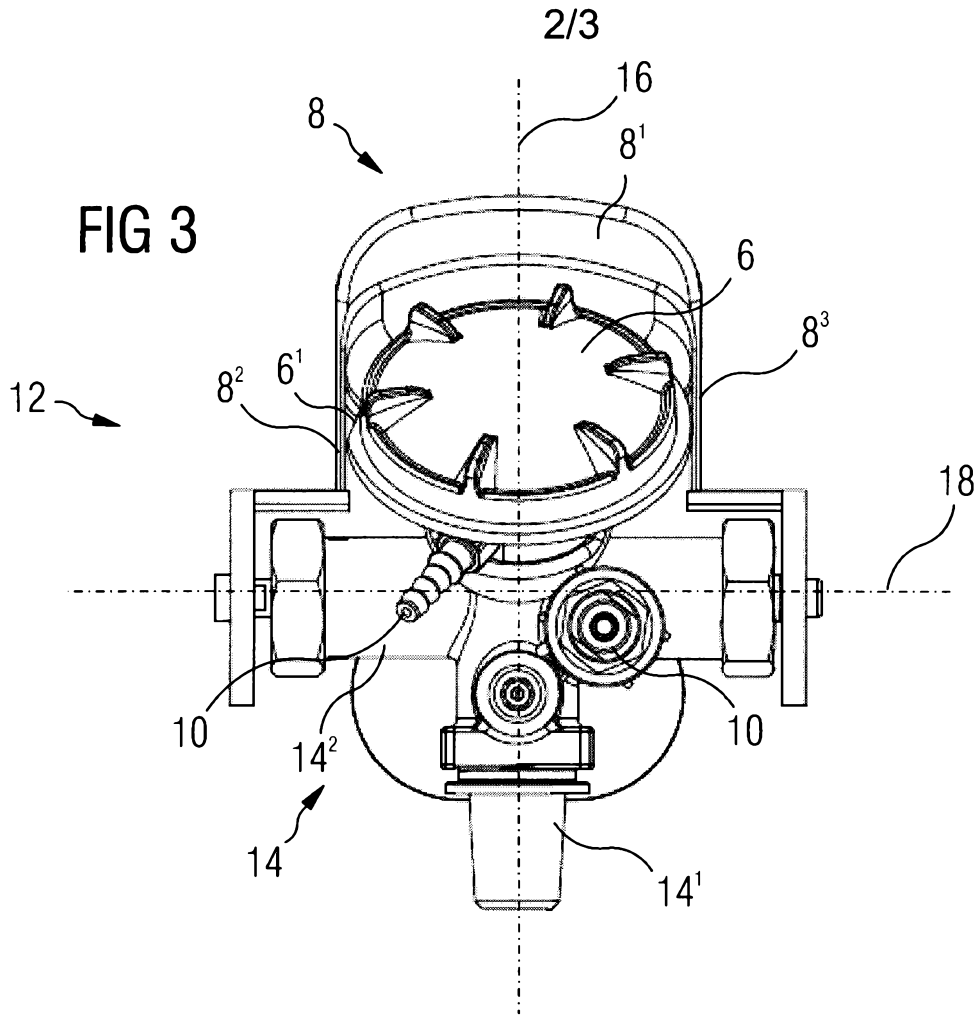


FIG 2





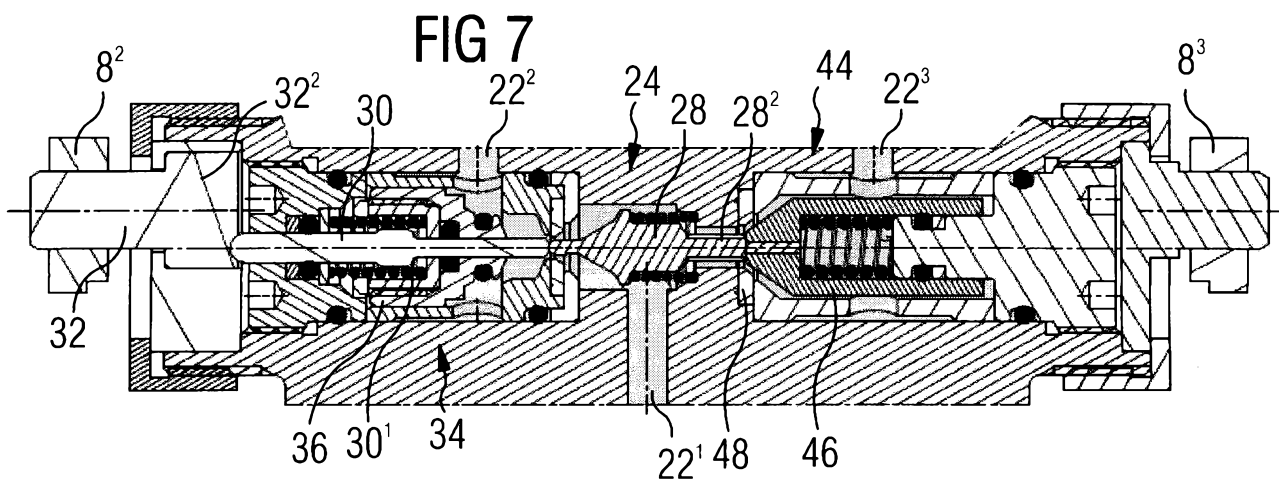
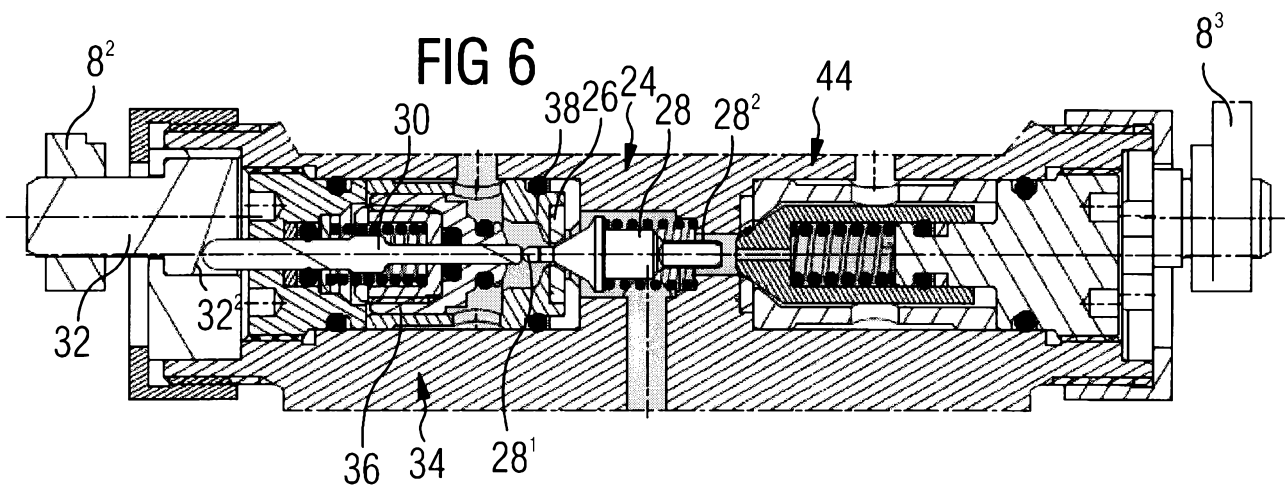
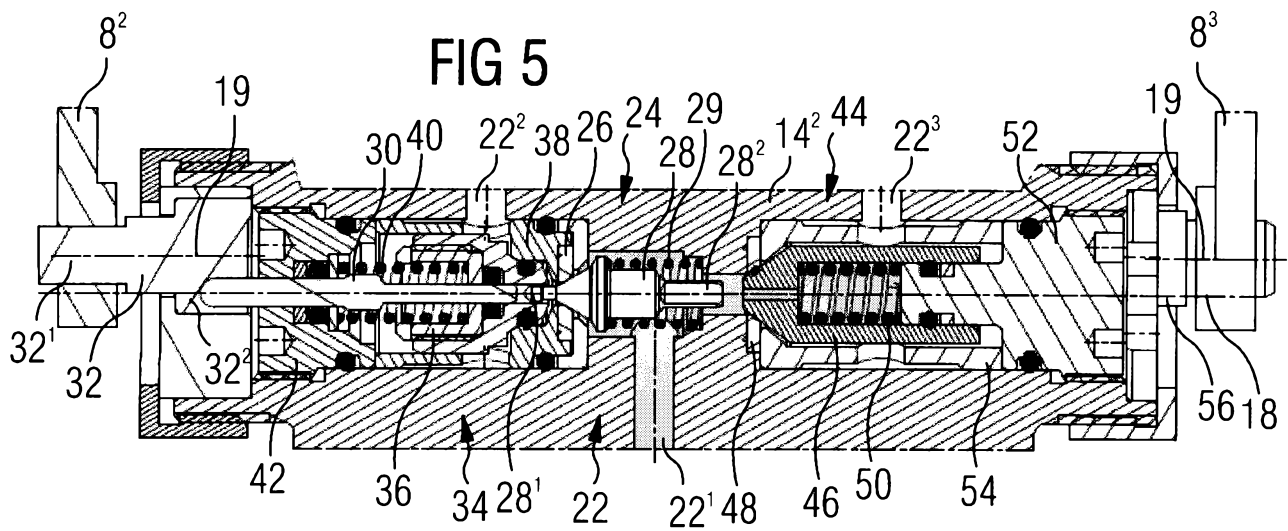
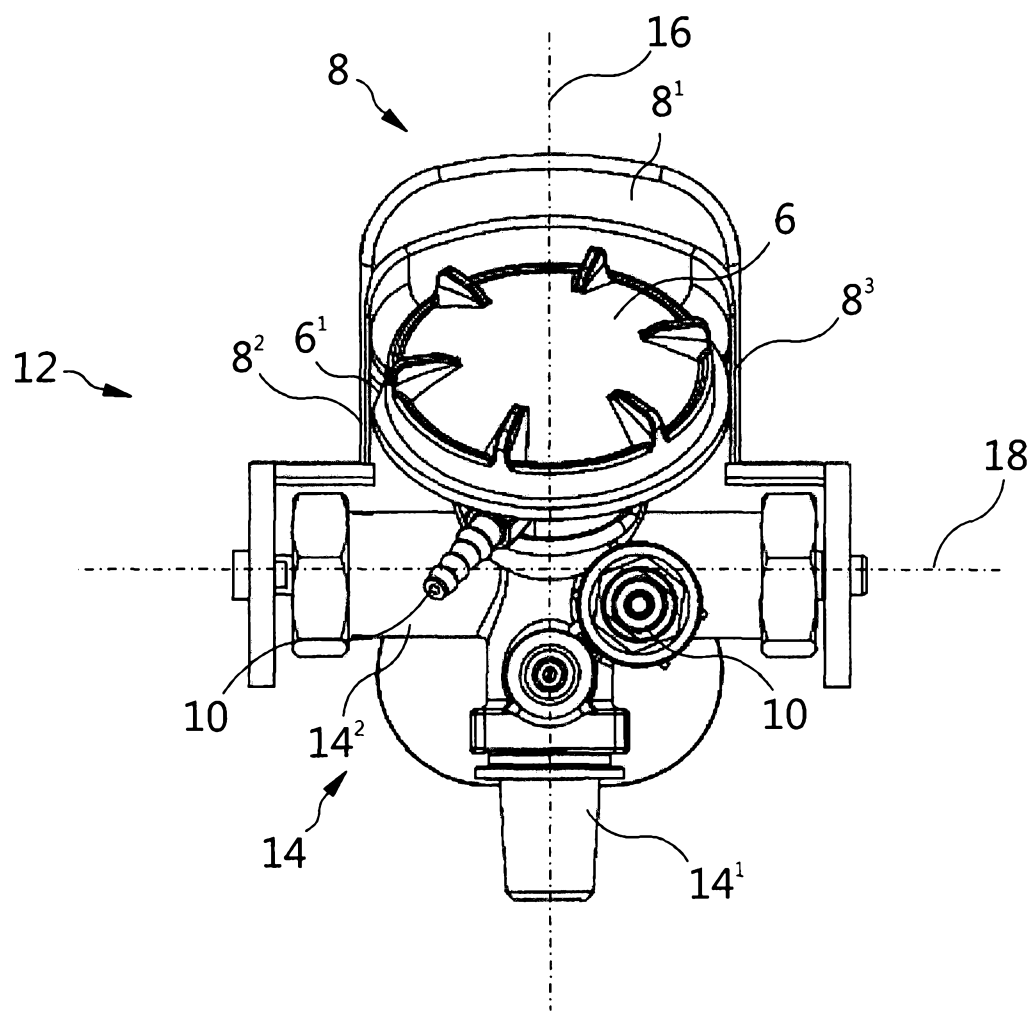


FIGURE POUR PUBLICATION



Abstract**TAP ASSEMBLY FOR GAS CYLINDER WITH OPERATING LEVER AND COVER**

The invention is directed to a tap (12) for gas cylinder, comprising a body (14) with a threaded gas inlet extending along a longitudinal axis (16) and adapted to be connected to a collar of the gas cylinder, a gas outlet (10) and a gas delivery passage interconnecting said inlet and outlet; a shut-off device of the passage, said device comprising a seat in the delivery passage and a shutter extending through and cooperating with said seat; and a lever (8²) adapted for moving the shutter against a delivery flow direction in the delivery passage from the inlet towards the outlet, in order to open the shut-off device. The lever (8²) is rotatable around a transversal axis (19) that is perpendicular to the longitudinal axis (16) or that forms an angle with said perpendicular that is less than 30°, preferably less than 20°, more preferably less than 10°.

(fig. 3)



SEARCH REPORT
in accordance with Article 35.1 a)
of the Luxembourg law on patents
dated 20 July 1992

LO 1259
LU 92937

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 970 313 A1 (AIR LIQUIDE [FR]) 13 July 2012 (2012-07-13)	1-5, 13-16, 18	INV. F17C13/04
Y	* figures 6,7 * * page 5, lines 11-25 * * page 6, lines 4-20 * * page 7, line 1 - page 8, line 2 * * page 9, lines 11-36 *	6-12, 17	

X	WO 2014/174236 A1 (LINDE AG [DE]; CHRISTIE GEMMA LOUISE) 30 October 2014 (2014-10-30)	1	
Y	* page 4; figure 2 *	17	

X	US 2012/175375 A1 (LIGONESCHE RENAUD [FR] ET AL) 12 July 2012 (2012-07-12)	1	
Y	* paragraphs [0029] - [0038] *	17	

Y	LU 91 690 A1 (LUXEMBOURG PATENT CO [LU]) 21 November 2011 (2011-11-21)	6-12	
	* figures 3,4 * * paragraphs [0035] - [0047] *		

A	FR 2 974 402 A1 (AIR LIQUIDE [FR]) 26 October 2012 (2012-10-26)	1-18	TECHNICAL FIELDS SEARCHED (IPC)
	* page 5, line 35 - page 9, line 3; figures 3-4 *		F17C

A	FR 2 955 170 A1 (AIR LIQUIDE [FR]) 15 July 2011 (2011-07-15)	1-18	
	* page 1, line 1 - page 2, line 7; figures 5-6 * * page 3, line 15 * * page 4, line 23 * * page 5, lines 26-30 * * page 7, lines 7-15 *		

The present search report has been drawn up for all claims			
Date of completion of the search		Examiner	
13 September 2016		Ott, Thomas	
CATEGORY OF CITED DOCUMENTS			
T : theory or principle underlying the invention			
E : earlier patent document, but published on, or after the filing date			
D : document cited in the application			
L : document cited for other reasons			

& : member of the same patent family, corresponding document			

1

EPO FORM 1503 03.82 (P04C55)

X : particularly relevant if taken alone
Y : particularly relevant if combined with another
document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

**ANNEX TO THE SEARCH REPORT
ON LUXEMBOURG PATENT APPLICATION NO.**

LO 1259
LU 92937

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-09-2016

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2970313	A1	13-07-2012	EP 2663793 A1	20-11-2013
			ES 2542778 T3	11-08-2015
			FR 2970313 A1	13-07-2012
			WO 2012098318 A1	26-07-2012

WO 2014174236	A1	30-10-2014	CA 2910057 A1	30-10-2014
			CN 105378371 A	02-03-2016
			EP 2989371 A1	02-03-2016
			JP 2016520177 A	11-07-2016
			KR 20160003717 A	11-01-2016
			US 2016047487 A1	18-02-2016
			WO 2014174236 A1	30-10-2014

US 2012175375	A1	12-07-2012	AU 2011355182 A1	11-07-2013
			CA 2820017 A1	19-07-2012
			CL 2013001998 A1	13-12-2013
			CN 103299115 A	11-09-2013
			CN 104806812 A	29-07-2015
			DK 2663797 T3	23-11-2015
			EP 2663797 A1	20-11-2013
			EP 2863093 A1	22-04-2015
			EP 2902684 A1	05-08-2015
			ES 2552658 T3	01-12-2015
			FR 2970314 A1	13-07-2012
			JP 5960166 B2	02-08-2016
			JP 2014503775 A	13-02-2014
			KR 20140029366 A	10-03-2014
			MA 34891 B1	01-02-2014
			NZ 611666 A	27-06-2014
			PT 2663797 E	23-11-2015
			RU 2013137434 A	20-02-2015
			TN 2013000235 A1	10-11-2014
			UA 109686 C2	25-09-2015
			US 2012175375 A1	12-07-2012
			US 2015144210 A1	28-05-2015
			US 2015144824 A1	28-05-2015
			WO 2012095570 A1	19-07-2012

LU 91690	A1	21-11-2011	EP 2572126 A1	27-03-2013
			LU 91690 A1	21-11-2011
			WO 2011144573 A1	24-11-2011

FR 2974402	A1	26-10-2012	CN 103492786 A	01-01-2014
			DK 2699837 T3	23-03-2015
			EP 2699837 A1	26-02-2014
			ES 2533214 T3	08-04-2015

EPO FORM P0457

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE SEARCH REPORT
ON LUXEMBOURG PATENT APPLICATION NO.**

LO 1259
LU 92937

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-09-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		FR 2974402 A1	26-10-2012
		US 2014048169 A1	20-02-2014
		WO 2012143635 A1	26-10-2012

FR 2955170	A1	15-07-2011	NONE



WRITTEN OPINION

File No. LO1259	Filing date (day/month/year) 31.12.2015	Priority date (day/month/year)	Application No. LU92937
International Patent Classification (IPC) INV. F17C13/04			
Applicant Luxembourg Patent Company S.A.			

This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

Form LU237A (Cover Sheet) (January 2007)	Examiner Ott, Thomas
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WRITTEN OPINION

Application No.

LU92937

Box No. I Basis of the opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	2-12, 14, 17, 18
	No: Claims	1, 13, 15, 16
Inventive step	Yes: Claims	
	No: Claims	1-18
Industrial applicability	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application No.
LU92937

Box No. VII Certain defects in the application

The following defects in the form or contents of the application have been noted:

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Documents

Closest prior art

D1 FR 2 970 313 A1 (AIR LIQUIDE [FR]) 13 July 2012 (2012-07-13)

State of the art

D2 WO 2014/174236 A1 (LINDE AG [DE]; CHRISTIE GEMMA LOUISE) 30
October 2014 (2014-10-30)

D3 US 2012/175375 A1 (LIGONESCHE RENAUD [FR] ET AL) 12 July 2012
(2012-07-12)

D4 LU 91 690 A1 (LUXEMBOURG PATENT CO [LU]) 21 November 2011
(2011-11-21)

D5 FR 2 974 402 A1 (AIR LIQUIDE [FR]) 26 October 2012 (2012-10-26)

D6 FR 2 955 170 A1 (AIR LIQUIDE [FR]) 15 July 2011 (2011-07-15)

Objections

Lack of novelty

Independent claim 1

D1 discloses a tap (see D1, figure 6) for a gas cylinder (see D1, page 1, line 2) comprising:

- a body with a threaded gas inlet (see D1, figure 1, position 1 and page 5, lines 12-15) extending along a longitudinal axis (see D1, figure 6, vertical axis) and adapted to be connected to collar of the gas cylinder, a gas outlet (see D1, figure 6, position 12) and a passage (see D1, figure 3, position 8) interconnecting said inlet and outlet;
- a shut-off device (see D1, figure 6, position 7) of the passage, said device comprising a seat (see D1, figure 6, position 12) in the passage and a shutter (see D1, figure 6, position 7) extending through and cooperating with said seat;
- a lever (see D1, figure 4, position 16) adapted for moving the shutter against a delivery flow direction in the passage from the inlet towards the outlet, in order to open the shut-off device (see D1, figure 6) ;
- wherein the lever is rotatable around a transversal axis (see D1, figure 6, position 19) that is perpendicular to the longitudinal axis.

The subject-matter of this claim is thus **not novel**.

Claim 13 See D1, figure 4.

Claims 15, 16 See D1, figure 4 et page 7, lines 14-19.

Lack of inventive step

Claim 2 This feature seems to be an obvious design possibility for the skilled person.

Claim 3 See D1, figure 6, position 10.

Claim 4 See D1, figure 7, positions 17 and 18, together with the rotation from claim 2.

Claim 5 See D1, figure 6, position 18.

Claim 6 Incited by D1, page 5, line 25 to include residual pressure valve into the device, the skilled person would have consulted D4 to find out (see D4, figure 2, positions 30 and 24 for the PRV, position 28 for the actuating rod and positions 14,12 and 20 for the shut-off device) and obtained the features of the claim.

Claims 7, 8, 9, 10 See D4, paragraphs 46 and 47.

Claim 11 See D4, paragraph 48.

Claim 12 See D1, figure 6 together with D4, figure 2.

Claim 14 See D1, figure 4, together with claim 2.

Claim 17 This feature seems obvious with regard to D2, figure 2, or D3, figure 2.

Claim 18 This feature seems an obvious design possibility for the skilled person.

Re Item VII

Certain defects in the international application (form or content)

Two-part form

Those features known from D1 are not placed in the preamble of the independent claim.

Background art

The relevant background art D1 is not mentioned in the description.

Re Item VIII

Certain observations on the international application (clarity)

Lack of clarity

Claim 4 "said the lever" should be replaced by "said lever".

Claims 6, 8 The term "shutter" should be used so as to unambiguously differentiate positions 28, 36 and 46.