

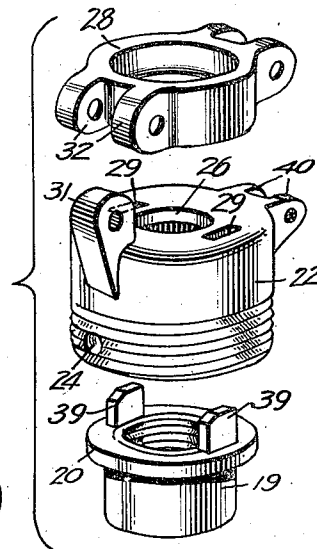
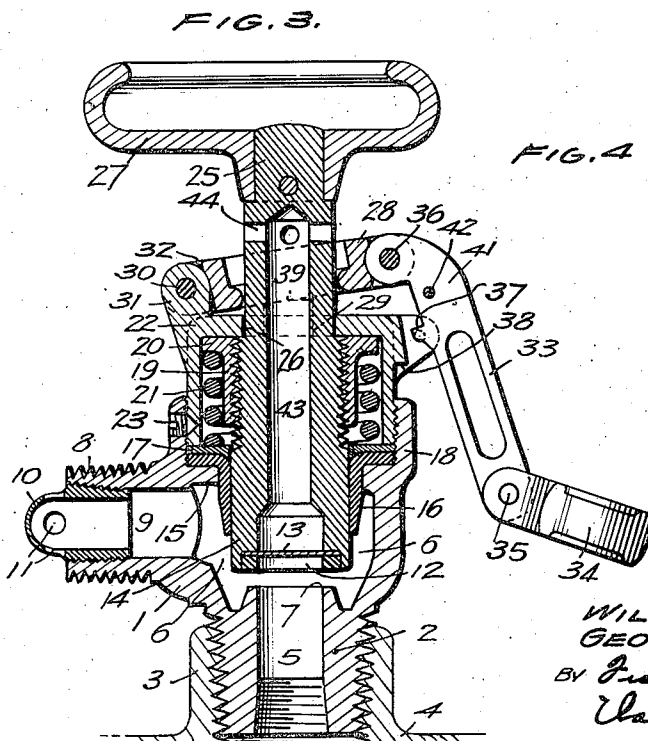
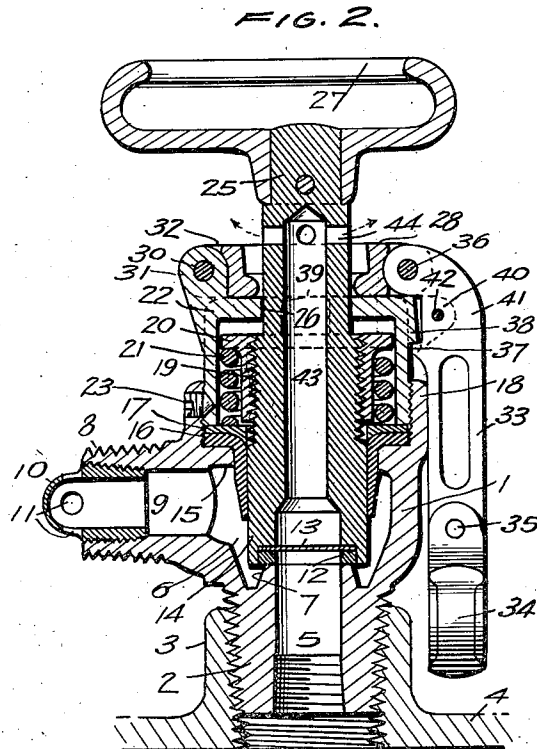
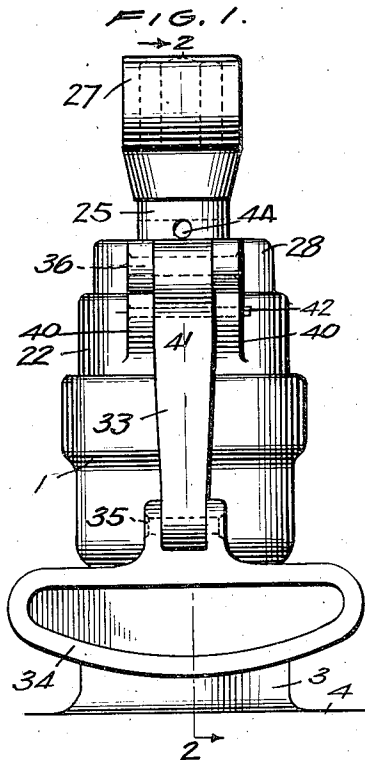
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QUICK RELEASE VALVE

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QUICK RELEASE VALVE

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8 Claims. (Cl. 251—26)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

5 This invention relates to a quick release valve assembly designed for use with a CO₂ (or other gas) container and serving as a combined filling and discharge fixture for the container.

10 Objects of the invention are, first, to provide novel means of closing the container so as to retain the gas therein and at the same time provide a protective seal to prevent leakage, second, to provide a means of quickly discharging the gas through the discharge orifice for the purpose intended, such as for extinguishing fires or inflating flotation equipment; and, third, to provide a means of safely discharging or venting the gas at excessive pressures due to high temperatures, etc.

20 With the above and other objects in view, the invention resides in the novel construction, arrangement, and combination of parts hereinafter described in detail with reference to the accompanying drawing, wherein:

25 Figure 1 is a view in vertical elevation of a valve assembly constructed and applied in accordance with the invention.

30 Figure 2 is a vertical longitudinal section on line 2—2 of Figure 1 with the valve in closed and latched position.

Figure 3 is a sectional view similar to Figure 2 but with the valve in opened and unlatched position.

35 Figure 4 is a composite detail view of certain valve parts.

40 This device comprises a chambered valve body 1 provided with a threaded lower portion 2 by means of which it is screwed into the neck 3 of a gas container 4. Threaded portion 2 has a central bore or gas passage 5 in communication with a central valve body chamber 6 and a raised valve seat 7 is formed in the bottom of the valve chamber and around the inner end of the passage 5. A lateral extension 8 on one side of the valve body serves as a combined filling and discharge nozzle and has a through passage 9 leading directly to the valve chamber 6. The valve body chamber 6 and the valve body passages 5 and 9 constitute a fluid conduit by means of which the CO₂ or other compressed gas is conducted to and from the container in the filling and discharging of the latter. Nozzle 8 is screw-threaded externally and internally and a plug, or nozzle fitting, 10 is screwed into the discharge orifice of the 55 nozzle. Plug 10 has a central bore or passage and

a hemispherical outer head or cap provided with four diametrically opposed openings or parts 11.

Flow of gas through the fluid conduit is regulated and controlled by a valve including sealing means adapted in the closed position of valve to be firmly engaged with the valve seat 7 and to seal the passage 5. The sealing means is composed of an annular gasket 12 of phenol composition or other suitable material and a blow-out safety disk 13 of thin frangible material designed to rupture at a predetermined maximum pressure. The disk and gasket are carried by a valve plug or plunger 14 and are mounted in the bottom end of the plug which, as shown, is recessed and shouldered to seat the disk and gasket therein; the disk being on the top side of the gasket so that the latter contacts directly with the valve seat when the valve is closed. The lower end of rim of the recessed part of the valve plug 14 is turned in and over the edge of gasket 12 to retain the seal within the recess of the plug. 20

The valve plug 14 is so assembled with the valve body that an appreciable part of its lower portion lies within the valve chamber 6; the plug being movable inwardly and outwardly of the valve chamber through a central opening or orifice in the top wall 15 of the chamber. Leakage between the valve plug and the valve body is prevented by means of a short tubular piece of packing 16, preferably leather, which lines the central opening or orifice with its upper end flanged over upon the upper surface of the chamber wall 15 and its remaining portion depending well into the valve chamber 6 and snugly embracing the valve plug so as to provide both a valve plug packing and a valve plug guide. The packing 16 is removably anchored to its seat by means of a threaded retainer or washer 17 which is screwed down tight within the internally screw-threaded and recessed upper portion 18 of the valve body. 40

Disposed within the recessed upper portion 18 of the valve body is a valve plug carrier or support, consisting of a short tubular member or sleeve 19 having a screw-threaded bore and a shoulder or flange 20 at its upper end by means of which it is supported upon the upper coil of a helical spring 21, the latter encircling the sleeve in the manner shown with its bottom coil resting upon the packing retainer washer 17. The valve plug carrier is enclosed within the recessed upper end of the valve body by means of a cap 22 screwed on the body portion 18 and holding the carrier under a slight compression so that the upward thrust of the spring tends to maintain the sleeve up against the underside of the top of the 55

cap. A cone point headless set screw 23 threaded in the body part 18 and seating in a recess 24 in the cap 22 prevents the latter from turning relative to the body.

5 The valve plug 14 is screwed into the bore of the carrier sleeve 19 and moves up and down with the sleeve in which it is positioned so as to place the seal 12—13 in engagement with the valve seat in the down position of the valve-plug carrier and to hold the seal raised above the valve seat in the elevated position of the valve-plug carrier. By reason of its screw-threaded connection with the carrier-sleeve, the plug 14 can be adjusted manually with respect to the valve-plug carrier to position the seal on or off the valve seat independently of whether the valve-plug carrier is in either lowered or elevated position. To provide for manual adjustment of the valve, the valve plug 14 has a handle-stem portion 25 which projects upwardly through a central orifice 26 in the valve body cap 22 and carries a handle 27 at its upper end.

The valve is adapted to be held down upon the valve seat by a readily releasable latch mechanism including a lever or yoke 28 disposed to lie across the top face of the valve body cap 22 and over apertures or slots 29 in the cap. The yoke 28 is pivoted at one end by a pivot pin 30 engaged in the pivot lugs 31 and 32 respectively formed on the cap 22 and the yoke 28. The yoke is raised and lowered with respect to the cap by means of a latch bar 33 and the latch bar pull-handle 34, the latter being pivotally connected at 35 to the lower end of the latch bar. The latch bar 33 has its upper end pivotally connected as at 36, to the free or lifting end of the lever or yoke 28 and depends downwardly along one side of the valve body, being adapted to be swung into or away from the body for engaging or disengaging the latch lug 37 of the latch bar with respect to a latch lug shoulder or keeper 38, on the side of the valve cap 22.

In the released position of the latch mechanism, the yoke 28 is supported in upwardly raised position above the cap 22 by lugs 39 mounted on the valve carrier sleeve 19 and projecting upwardly through the openings 29 in the cap when the sleeve is thrust up against the underside of the cap. In the absence of any superior downward force or pressure on the valve-plug carrier the upward thrust of the spring 21 is sufficient to maintain the parts in elevation. As shown in Figure 3, in the released position of the latch mechanism the seal 12—13 is elevated above the valve seat so that passage of gas into or out of the container is permitted through the passages 5 and 9 and the intermediate connecting chamber 6. To close the passage, the latch handle 34 is pulled downwardly to lower the yoke 28 upon the cap and to cause the valve plug and valve plug carrier to be moved downwardly as the lugs 39 are forced inwardly of the cap by the downward movement of the yoke. When the valve is seated, as illustrated in Figure 2, the latch is engaged with the latch shoulder or keeper 38 to hold the parts in the down or latched position.

To prevent accidental release of the latch mechanism, the latter may be tied with standard safety wire for which purpose the cap 22 is provided with spaced apertured lugs 40 between which an apertured portion 41 of the latch bar 33 is adapted to be positioned when the latch bar lug is engaged with the latch lug keeper. The

safety wire 42 is inserted through the aligned apertures of the lugs 40 and latch bar portion 41 and normally retains the latch bar in operative or latching position. When the latch bar handle is pulled outwardly, as when intentionally releasing the valve, the wire is readily fractured or broken.

The valve plug 14 and seal members 12 and 13 also constitute a pressure relief or blow-off means for automatically venting or discharging the container when the gas confined therein attains a predetermined maximum pressure. As is well known, the pressure in CO₂ and other gas containers may become dangerous and excessive due to high temperatures unless adequately relieved and to this end, the valve plug 14 has a longitudinal bore, or vent passage, 43 opening inwardly of the lower or recessed end of the plug and terminating within the upper portion of the valve plug stem 25, the latter having pressure escape ports 44 leading from the vent passage 43 to the outside of the stem. The disk 13 seals the plug vent passage 43 and hence prevents any gas escaping through the vent when the valve is opened for filling or discharging the container. When the valve is closed, the sealing disk and gasket effectively prevents the gas in the container from passing into either the chamber 6, or the vent 43, but when the gas pressure attains a predetermined maximum, the disk 13 is adapted to rupture and to thereby permit the gas to pass from the passage 5 of the valve body into the vent passage 43 of the plug, and from whence it escapes to the atmosphere through the ports 44.

In the operation of the device, when an empty cylinder equipped with the fixture is to be filled or charged, the valve is latched in the down or closed position and tied with standard safety wire, as shown in Fig. 2. The valve plug is then unseated and raised to its uppermost position by turning the handle 27. The cylinder is then charged to its required capacity by a filling hose or pipe connected to, and delivering the charge through, the passage 9. When the charging has been completed, the valve is closed by screwing the valve plug down to its seat in the same manner as closing an ordinary screw valve. The valve is now ready for operation. To release the gas, it is only necessary to exert a slight pull on the latch handle 34, releasing the latch. With the latch in the released position, the pressure of the gas against the disk 13 and the upward thrust of spring 21, causes the plug to lift and unseat the disk 13 and gasket 12, thereby providing free passage of the gas from the container to the discharge nozzle 8 of the valve fixture. If, after release of the valve, it is desired to temporarily shut off the flow of gas, the valve may be closed by turning the valve handle so as to screw the valve down to its seat.

Having thus described the invention, what is claimed as new, is:

1. A valve assembly comprising a valve body having an external shoulder and provided internally with a fluid passage having a discharge orifice and a valve seat, a valve plug carrier slidably mounted in said body for movement up and down relative to said valve seat, a valve plug positioned in and secured to said carrier and having a sealing means to engage the valve seat in the down position of the carrier and to be raised from said seat in the elevated position of the carrier, tensioned carrier-elevating means adapted to hold the said carrier, valve plug and sealing

means elevated above the seat and a releasable lever-and-latch element pivoted at one end to the valve body for swinging movement downwardly against the carrier to press the sealing means to the valve seat and at its free end having a latch lug engageable with the external shoulder of the valve body for retaining the said carrier down against the tension of the carrier-elevating means.

2. A valve assembly including a valve body having a valve seat and a valve plug orifice in line with said seat, a cap secured to said valve body to provide an enclosed space above the said valve plug orifice and having an aperture in the top thereof, a valve plug carrier in said inclosed space and having a projection, means resiliently supporting said carrier and adapted to hold the same elevated with the said projection exposed through and above the aperture in the said cap, a lever pivoted to the said cap and movable downwardly against the said projection to depress the carrier against the tension of the resilient supporting means, releasable latch means for retaining the said lever in its position downwardly against the projection, and a valve plug and sealing means supported by said carrier and movable therewith to engage the seat when the carrier is depressed and to be unseated when the carrier is elevated.

3. A valve assembly including a valve body having a valve seat and a valve plug orifice in line with said seat, a cap secured to said valve body to provide an enclosed space above the said valve plug orifice and having an aperture in the top thereof, a valve plug carrier in said enclosed space and having a projection, means resiliently supporting said carrier and adapted to hold the same elevated with the said projection exposed through and above the aperture in the said cap, a lever pivoted to the said cap and movable downwardly against the said projection to depress the carrier against the tension of the resilient supporting means, releasable latch means for retaining the said lever in its position downwardly against the projection, and a valve plug and sealing means supported by said carrier and movable therewith to engage the seat when the carrier is depressed and to be unseated when the carrier is elevated, said valve plug being mounted in the carrier by screw threading to permit it to be moved toward and away from the valve seat independently of the carrier.

4. A valve assembly including a valve body having a fluid passage provided with a valve seat, a valve carrier in said body normally movable up and down relative to said seat, a valve supported by and movable with said valve carrier and including a plug having a vent passage and a frangible disk seal in the lower end of the plug adapted in the down position of the valve-carrier and plug to engage the said valve seat to seal the fluid passage therethrough, said disk seal normally closing the said plug vent passage and being adapted to rupture under a predetermined maximum pressure to open said vent passage, and readily releasable means for holding the said valve carrier and plug down in fluid-passage seating position.

5. A quick release valve device including a valve body, a valve having a stem, an adjustable operating sleeve on the valve stem, a spring engaging said sleeve and tensioned to normally force

and hold the said sleeve and the said valve in valve opening position, and a lever pivotally mounted on the valve body for movement against the sleeve to force the latter and the valve into valve-closing position against the resistance of the said spring, the said valve body and the said lever having complementary latch elements adapted to be relatively engaged in the valve-closing condition of the lever and the said valve being adjustable relatively to the sleeve into and out of valve-closing and valve-opening positions without changing the position of the sleeve.

6. A valve assembly comprising a valve body having a seat therein, a valve carrier adapted for movement within said body toward and away from said seat, a valve secured to and positioned in said carrier for movement therewith whereby it is adapted to be engaged with said seat when the carrier is moved to one position and to be displaced from the seat when the carrier is moved to another position, said valve being adapted for movement relatively to the valve carrier and having means whereby it can be adjusted toward and away from the said seat without changing the position of the carrier, and a lever mounted on said body to be manually moved against the said carrier to force the latter and the valve into valve-seating position, and readily releasable latch means for holding said lever against the said carrier in the valve seating position of the latter.

7. A valve assembly comprising a valve body having a seat therein, a valve carrier adapted for movement within the body toward and away from said seat, said carrier having a part projecting exteriorly of the said body, a valve having screw threaded engagement with said carrier, lever means on said body adapted to be moved against the projecting part of the said carrier for moving the latter toward the valve seat to seat the said valve, latch means for holding the said carrier in valve-seating position, a carrier-tensioning member adapted upon release of the latch to quickly thrust the said carrier and the valve away from the said valve seat, and means for screwing said valve into and out of engagement with the valve seat without changing the position of the carrier or the tension of the carrier-tensioning member.

8. A valve assembly comprising a valve body having a fluid passage provided with a valve seat, a frangible disk seal engageable with said seat to close the fluid passage, a carrier for said disk seal freely movable relative to the seat to permit the disk seal to be unseated by fluid pressure exerted on the underside thereof and including a plunger in which the said seal is mounted and a support in which the plunger is secured, said carrier having a vent passage normally closed by the said disk seal and being adapted for movement relative to the support toward and away from the said valve seat, and a lever pivoted at one end to the valve body for movement against the support to press the said seal to the seat and being adapted at its free end to have releasable interlocking engagement with the valve body when so moved against the support for retaining said disk seal carrier and disk seal in fluid passage closing position.

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