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A. C. ROWLEY

1,863,455

SEALING AND RELEASE DEVICE

Filed Dec. 4, 1930

Fig. 2.

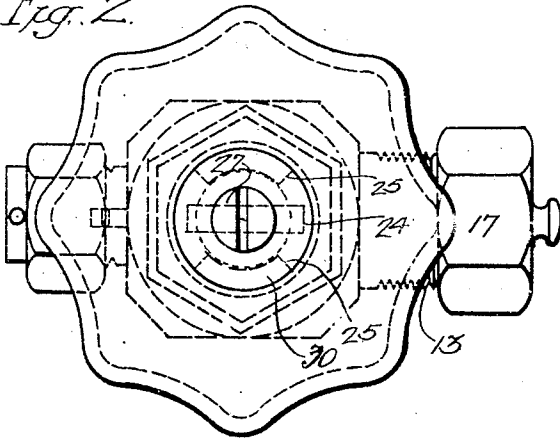


Fig. 5.

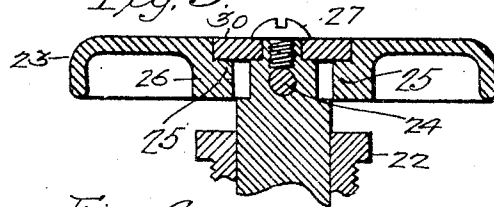


Fig. 4.

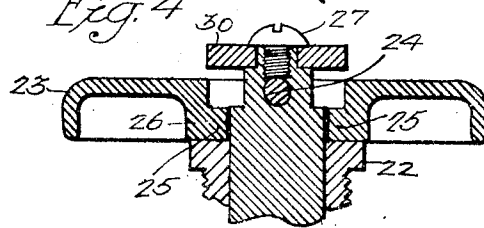


Fig. 3.

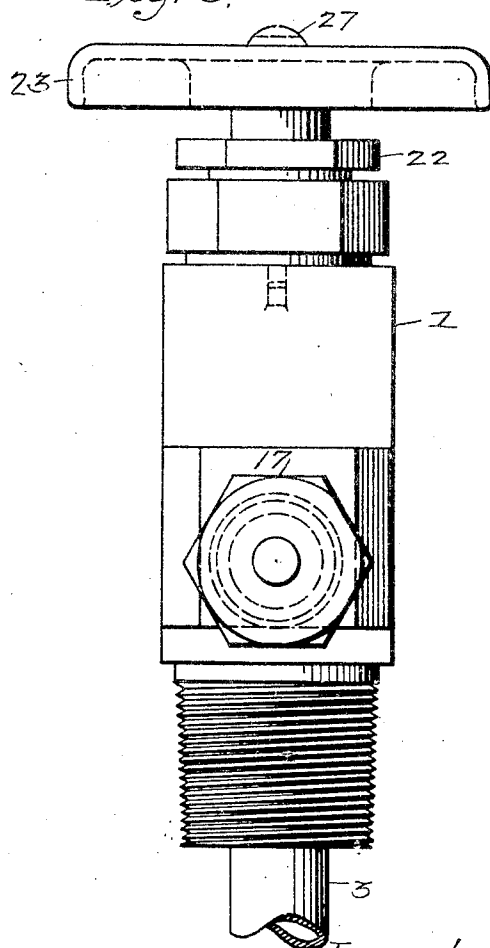
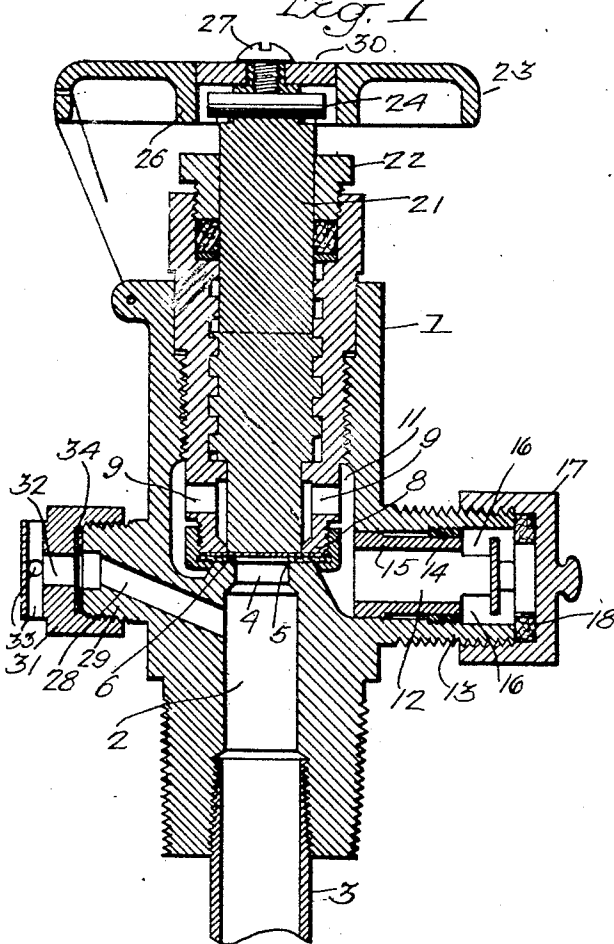


Fig. 1.



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UNITED STATES PATENT OFFICE

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SEALING AND RELEASE DEVICE

Application filed December 4, 1930. Serial No. 500,099.

This invention relates to improvements in fire extinguishing apparatus, and while involving features of general application relates more specifically to improvements in systems employing carbon dioxide and similar inert substances as the fire extinguishing medium.

More particularly, the invention relates to improvements in sealing and release devices for the containers in which the aforesaid fire extinguishing medium or its equivalent is stored under pressure, and a principal object of the invention is to provide a generally improved sealing and release device of this character.

Another object of the invention is to provide a device of the stated character in which the fluid fire-extinguishing medium is releasable by rupture of a diaphragm which normally hermetically seals the container and in which provision is made subsequent to the rupture of the diaphragm for again temporarily sealing the container before the contents are fully exhausted.

Another object of the invention is to provide in a device of the stated character novel means for precluding accidental release of the sealing device.

The invention further resides in certain novel and advantageous structural features and details hereinafter described and illustrated in the attached drawing, in which:

Figure 1 is a longitudinal sectional view of a valve made in accordance with my invention;

Fig. 2 is a plan view of the valve;

Fig. 3 is an elevational view;

Fig. 4 is a fragmentary sectional view of the upper portion of the device illustrating the hand wheel in an inoperative position, and

Fig. 5 is a view similar to Fig. 4 and illustrating the hand wheel in the elevated or operative position.

With reference to the drawing, the sealing and release device forming the subject of my invention comprises in a preferred form a casing 1 externally threaded at its lower end for attachment in a container for the CO₂ or other fire extinguishing medium.

Extending inwardly from the lower end of the housing is a passage 2 which in the present instance is longitudinally threaded at its lower extremity for reception of the threaded end of a tube 3 which in assembly extends downwardly into the container to which the device is attached. The passage 2 terminates at its upper end in a somewhat restricted opening 4, which in turn terminates in a seat 5, upon which seat in assembly and as hereinafter set forth is confined a frangible disk 6, preferably of German silver or other material inert to the effects of the fire extinguishing medium, this disk sealing the upper end of the passage 2 and effectively preventing escape of the fluid contents of the container to which the device is attached.

In assembly, the disk 6 is secured by means of a threaded flange 7 to the lower end of a sleeve 8, this sleeve being threaded into the upper end of the casing 1 and projecting in part beyond the end of the latter. The projecting portion of the sleeve 8 is formed for reception of a wrench or other suitable means whereby the sleeve may be turned down in the casing to bring the disk 6 against the seat 5, as previously set forth. It will be noted that the lower end of the sleeve 8 against which the peripheral portion of the disk 6 is held by means of the screw flange 7 overlies the outer portion of the seat 5 and limits the downward movement of the sleeve 8, thereby preventing accidental rupture of the disk by reason of too great pressure against the seat 5. The lower end of the sleeve 8 is provided with ports 9 which afford communication between the interior of the sleeve and a chamber 11 in the housing which communicates with a discharge port 12, this port extending outwardly through an externally threaded boss 13 on the casing 1, which boss is adapted for connection to a pipe line or other distributing system for the fire extinguishing medium. Threaded into the interior of the boss 13 is a bushing 14 which constitutes a stop for a hollow plunger 15 slidably mounted within the boss. This plunger is open at its inner end and has at its outer end side openings 16 through which the fire extinguishing medium is pro-

jected transversely under conditions hereinafter set forth. In the present instance, the boss 13, is shown closed by a screw cap 17 and a gasket 18 within the latter, the plunger 15 being retained in the retracted position by engagement of the outer extremity thereof with the said cap.

The interior of the sleeve 8 is threaded for reception of a correspondingly threaded plunger stem 21, the lower end of this stem being adapted to rest against the face of the disk 6 thereby to constitute a backing for the disk preventing rupture by pressure of the fluid fire extinguishing medium within the container. The inner end of the plunger stem 21 is of greater diameter than the diameter of the opening 4 whereby the peripheral portion of the end surface of the stem in assembly overlies the inner portion of the seat 5 whereby the plunger is prevented from exerting pressure upon the disk 6 tending to rupture the latter. A packing gland 22 is provided in the upper end of the sleeve 8 whereby the joint between the stem 21 and the said sleeve is effectively sealed. As illustrated, the stem 21 projects above the top of the gland 22 and is adapted for reception of a hand wheel 23 by means of which the stem may be turned either to advance the stem inwardly into a position, as illustrated, abutting the disk 6, or to back the stem away from the disk to release the contents of the container, as hereinafter set forth.

The upper end of the stem 21 carries a transverse pin 24, the ends of which project outwardly beyond the surface of the stem, the extremities of this pin being adapted for interlocking engagement with lugs 25 which project inwardly from the surrounding hub portion 26 of the hand wheel 23. The lugs 25 are so dimensioned and located on the hand wheel, however, that they can engage the pin 24 only when the hand wheel is elevated, as illustrated in Fig. 5. When, as illustrated in Fig. 4, the hand wheel is depressed, the lugs are carried out of engagement with the pin 24 whereby the hand wheel is free to turn upon the stem without affecting the latter. A washer 30 secured to the upper extremity of the stem 21 by a screw 27 is adapted to be engaged by the upper surfaces of the lugs and thereby to act as a stop preventing accidental removal of the hand wheel from the stem.

It will be noted further that the passage 2 has a branch passage 28 which terminates in the outer end of a boss 29 on the casing, this boss being externally threaded for reception of a cap 31 having therein a passage 32 in alignment with the outer end of the passage 28. The passage 32 terminates in the present instance in a plurality of radially extending transverse passages 33. The cap 31 functions in the present instance to retain against the outer end of the boss 29 and in position seal-

ing the passage 28 a frangible disk 34 which is adapted to rupture under a predetermined pressure exerted through the passage 28, this constituting a pressure safety vent releasing the contents of the container if the internal pressure of the latter exceeds a predetermined safe amount.

The operation of the device is as follows: The casing 1, as previously set forth, is secured in a port in a container for the fire extinguishing medium, the latter being held in the container under relatively high pressure. The port 12, also as previously set forth, is in communication with a suitable distributing system, and under normal conditions, the plunger 21 is threaded down so as to abut the upper surface of the frangible disk 6 which rests upon the seat 5, thereby sealing the opening 4 and preventing passage of the fluid contents of the container to the port 12. Also under the normal conditions, the hand wheel 23 is in the depressed position whereby rotation thereof fails to affect the plunger 21. When it is desired to release the CO₂ or other contents of the container, the hand wheel 23 is pulled upwardly so that the lugs 25 are in position to engage the extremities of the pin 24, whereupon the stem 21 may be backed away from the disk 6. This disk being unsupported by the lower end of the stem or plunger 21 has not sufficient strength to withstand the pressure of the fluid within the container exerted through the passage 2 and ruptures, thereby permitting a flow of the contents of the container through the ports 9 in the sleeve 8 to the port 12, and through this latter port to the distributing system. The initial flow of fluid from the container causes an outward projection of the cylindrical plunger 15, the fluid thereafter impinging upon the outer end of the plunger 15 and being diverted transversely through the ports 16, this transverse projection of the fluid in opposite directions preventing undue recoil or reaction effects upon the casing.

Following operation of the release device as described above, the ruptured disk 6 may be replaced by removing the sleeve 8 and the flange 7 thereon. Thereafter and with a new disk in place, the sleeve may be re-threaded into the casing, bringing the disk to the seat 5, the plunger 21 thereafter being turned down into engagement with the disk.

An important characteristic of the device, not found in other frangible disk-sealing devices, resides in the ability to temporarily reseal the container following rupture of the disk before the contents are exhausted. This is accomplished by turning down the stem 21 until it engages the seat 5, thereby effectively closing the port 4.

There may, of course, be modification without departure from the invention.

I claim:

1. In a device of the character set forth, a

casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a stem in the casing adapted to constitute a backing for one side of the disk preventing rupture of the latter by pressure exerted from the opposite side, and threaded means for retracting said stem to permit rupture of said disk by said pressure. 70

2. In a device of the character set forth, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a reinforcing member for the disk, means for rotating said reinforcing member, and means associated with said member whereby rotation thereof effects a translational movement of the member with respect to the disk. 75

3. In a device of the stated character, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, and a reinforcing member for said disk in the form of a plunger threaded into the casing and adapted for rotation from the exterior of the casing. 80

4. A device of the character set forth comprising a casing having a through passage, a frangible element extending across and sealing said passage, a plunger threaded in said casing and adapted to occupy a position abutting one side of said frangible element thereby to constitute a backing for the latter preventing rupture by pressure exerted from the opposite side, and means providing for manual actuation of said threaded stem from the exterior of the casing. 85

5. In a device of the character set forth, a casing having a passage terminating in a seat, a sleeve secured in said casing, a frangible disk normally confined to said seat by the sleeve, and a disk-reinforcing plunger threaded within said sleeve and adjustable with respect to the disk from the exterior of the casing, said plunger being operative in one position of adjustment to prevent rupture of the disk by pressure exerted from the opposite side, and in another position permitting said rupture. 90

6. In a device of the stated character, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a plunger having threaded engagement in said casing and adapted to reinforce the disk at one side to prevent rupture of the disk by pressure exerted upon the disk from the opposite side, a hand wheel mounted on the plunger exteriorly of the casing, and a normally disengaged clutch device for operatively connecting the hand wheel with the plunger. 95

7. In a device of the character set forth, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a reinforcing member for one side of the disk normally preventing rupture of the latter by pressure exerted from the opposite side, said member being retractible from the exterior of the casing to permit the disk to rupture, and means operative from the exterior of the casing for advancing the member into engagement with the said seat to reseal the passage. 100

8. In a device of the character set forth, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a reinforcing member for one side of the disk normally preventing rupture of the latter by pressure exerted from the opposite side, and means for retracting said member to permit the disk to rupture. 105

9. In a device of the character set forth, a casing having a passage terminating in a seat, a frangible disk overlying and sealing the terminal end of said passage, a reinforcing member for one side of the disk normally preventing rupture of the latter by pressure exerted from the opposite side, and means for retracting said member to permit the disk to rupture and for subsequently advancing the member into engagement with the said seat to reseal the passage. 110

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