DISPENSING VALVE AND MEANS FOR REMOVABLE ATTACHMENT THEREOF TO PRESSURIZED FLUID CONTAINERS

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3 Claims

ABSTRACT OF THE DISCLOSURE

A valve of novel construction is attached to a pressurized fluid container by means of superimposed assembled clamping plates which are rotatable relatively to each other and coat to removably clamp the valve to the container cap or closure.

The invention relates to dispensing valves for pressurized fluid containers, but has reference more particularly to means for removably attaching the valve to such containers.

A primary object of the invention is to provide means of simple construction for removably clamping the valve to the closure of such containers, whereby the valve may be quickly and easily removed from an exhausted container and as quickly and easily attached to the closure of a new container.

Another object of the invention is to provide means of the character described, consisting of a pair of superimposed assembled clamping plates, one of which is rotatable relatively to the other to provide coacting clamping elements which grip the edge of the container closure.

A further object of the invention is to provide means of the character described, in which the coacting clamping elements are spaced uniformly about the edge of the closure so as to grip the closure evenly.

A still further object of the invention is to provide a valve of novel construction, embodying novel means for puncturing the closure and for sealing the valve in relation to the closure.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same.

FIG. 1 is a top plan view, of the dispensing valve and means for removable attachment thereof to a pressurized fluid container;

FIG. 2 is a fragmentary cross-sectional view, taken on the line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view, taken on the line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view, taken on the line 4—4 of FIG. 2, and

FIG. 5 is a fragmentary cross-sectional view, taken on the line 5—5 of FIG. 4.

Referring more particularly to the drawings, reference numeral 1 designates a closed container or can, containing a fluid under pressure, such, for example, as "Freon-12."

The container 1 is similar, in general, to that shown in Wrenn Patent 2,807,391 and Franck Patent 3,092,291, and has a neck 2 defining an outlet opening 3. The upper end of the neck 2 has a turned upper end 4.

A container closure 5 is provided comprising a cup-shaped metal member including a transverse wall portion 6 circumscribed by an upstanding annular wall 7 having a turned upper end 8 wrapped around the upper end 4 of the neck 3. The center of the transverse portion 6 of the closure 5 is defined by an upstanding, annularly corrugated, generally cylindrical boss 9 having a closed upper end 10.

For the purpose of dispensing the contents of the container 1, a dispensing valve is provided, consisting of a valve body 11 having an upper end 12 of cylindrical external configuration, an intermediate portion 13 of square external configuration, and a lower end 14 of cylindrical configuration and provided externally with threads 15.

The valve body is provided with an axial bore 16, the lower end of which is counterbored, as at 17, to provide an anular shoulder or valve seat 18. Below the counterbored 17, an annular recess 19 is provided, in which a gasket 20 of neoprene or like material is mounted, having a central opening 21, which is, in effect, a continuation of the counterbore 17.

The portion of the bore 16 which extends through the squared portion 13 of the valve body is threaded, as at 22. The upper end of the bore 16 is counterbored, as at 23, to provide a recess, in which are mounted a washer 24 and an O-ring seal 25. The counterbore 23 is further counterbored, as at 26, to provide a recess, in which a second washer 27 is mounted, the washers 24 and 27 and seal 25 being maintained in assembled relation by crimping the wall of the counterbore 26 over the washer 27, as at 28.

The valve body is further provided with an outlet bore 29 which communicates with and extends radially from the bore 16. The bore 29 is counterbored, as at 30, to provide an annular recess 31 in which is mounted a male adapter 32, having an axial passageway 33 which is, in effect, a continuation of the bore 29.

The valve further includes a valve stem 34 having a handle 35 extending transversely through the upper end of the stem to facilitate rotation of the stem in the valve body 11. The stem 34 has an upper portion 36 which passes through the washers 24 and 27 and seal 25, and is in fluid-tight sealing engagement with the seal.

The intermediate portion 37 of the stem is threaded and in threaded engagement with the threads 22 of the valve body.

The lower portion 38 of the valve stem is of slightly smaller external diameter than that of the portion 36, so as to provide an annular fluid-outlet passageway 39 between the wall of the portion 38 and the wall of the bore 16. The lower end of the portion 38 of the valve stem is beveled, as at 40, to provide a seat which bears on the valve seat 18, in the closed position of the valve.

The lower end of the portion 38 of the valve stem is also provided with an axial recess 41 in which is mounted a needle 42 having a pointed end 43, the needle extending through the counterbore 17 and central opening 21 of the gasket 20.

The valve, before being assembled with the container, has its stem 34 in a raised position, so that the point 43 of the needle is disposed within the opening 21 and is protected against damage thereto, both during shipment and during handling, prior to such assembly.

A particularly important feature of the invention resides in means for removably securing the valve to the container. Such means comprises a bottom plate 44 of disc-like form having an upstanding collar 45 providing an opening 46 which is normally threaded for securement to the threads 15 of the valve body 11.

The plate 44 is provided at its periphery with radially extending flanges 47 and 48, which are spaced apart about 120° circumferentially, and have, as seen in FIG. 5, downturned lugs 49, terminating in inwardly-directed ends 49'. The plate is also provided, at a point intermediate the flanges 47 and 48, with an upturned flange 50, which terminates in a rebent flange 51, the purpose of which will be presently described.
A second or top plate 52 is provided, also of disc-like form, having an opening 53 through which the collar 45 of the plate 44 extends, so as to enable the plate 52 to be rotated about the collar 45.

The plate 52 is provided at its periphery with a radially-extending flange 54 having a downturned lug 55 terminating in an inwardly directed end 56. The plate 52 is also provided with a tangentially-extending portion 57 which terminates at one end in an abutment 58 and at the other end in an upstanding flange 59 which constitutes a handle or pull element.

To facilitate assembly of the plates 44 and 52, the flanges 50 and 51 of the plate 44 are, prior to assembly, left in the position indicated by the broken lines in FIG. 2. The plate 52 is then placed over the plate 44, with the lug 55 and end 56 thereof disposed at a position approximately 120° from both the flanges 47 and 48, after which the flanges 50 and 51 are bent to the position shown in solid lines, so that the flange 51 thereafter is effective to prevent axial displacement of the plate 52 from the plate 44.

With the plates 44 and 52 mounted on the valve body, the plate 44 at the lower end of the portion 38 of the valve stem and the pointed end of the needle 43 disposed within the opening 21 of the gasket 20, the valve is secured to the container 1 in the following manner:

The plate 52 is rotated, by means of the handle 59, in a counter-clockwise direction (as viewed in FIG. 1) from the position shown in solid lines in FIG. 1 to that shown in broken lines bringing the lug 55 into abutment with the lug 49 of the flange 48. This brings the flanges 47 and 54 to positions which are spaced apart sufficiently to permit the plate 44 to be slid over the upper end 8 of the closure 5 of the container, this sliding movement being continued until the lugs 49 of the flanges 47 and 48 come into engagement with the end 8 of the closure and the inturnd ends 49 of these lugs hook under the end 8. This provides a hooked engagement with the closure 5 at points spaced 120° apart circumferentially of the closure.

With the plate 44 thus positioned, the plate 52 is then rotated in a clockwise direction (as viewed in FIG. 2), by means of the handle 59 until the abutment 58 comes into engagement with the flange 50, thereby bringing the flange 54 to a position approximately 120° from the flanges 47 and 48, at which position, the lug 55 of the flange 54 comes into engagement with the end 8 of the closure and the inturnd end 56 of this lug hooks under the end 8. This provides a hooked engagement with the closure 5 at a point spaced 120° from each of the ends 49', so that the valve is clamped to the closure at three points spaced 120° apart, thus providing a highly effective means of rigidly securing the valve to the container.

With the valve thus clamped to the container, the body 11 of the valve is rotated to bring the gasket 20 into tight engagement with the closed upper end 10 of the boss 9 of the closure, it being noted that this engagement is made prior to puncturing of the closure.

When it is desired to puncture the closure, the valve stem 34 is rotated by means of the handle 35 to cause the needle point 43 to penetrate the end 10 of the boss 9, this rotation being continued until the beveled end 40 of the stem seats on the valve seat 18 to thereby close the valve and prevent escape of fluid from the container 1.

When it is desired to eject fluid from the container, the valve stem is rotated sufficiently to cause the end 40 of the stem to be lifted from the valve seat 18, to permit the pressure within the container to eject fluid through the puncture in the end 10 of the closure, and through the opening 21, counterbore 17, passageway 39, and outlet bore 29 and passageway 33.

When the contents of the container have been exhausted, and it is desired to attach the valve to a new container, the valve body is raised to a position such that the gasket 20 and needle point are clear of the end 8 of the container, after which the plate 52 is rotated in a counter-clockwise direction until the lug 55 comes into abutment with the lug 49. The plate 44 may then be slid off the end 8 of the container. The valve may then be attached to a new container in the manner already described.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred form of the same, and that various changes may be made in the shape, size, and arrangement of parts thereof, without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In combination with a pressurized container having a closure affixed thereto, a valve means for releasing the contents of said pressurized container, a clamping means for clamping the valve on said closure, said clamping means comprising a first circular plate member carried by the valve body; a pair of depending lugs formed at the peripheral edge of said plate and engageable with the periphery of said closure; an upstanding lug formed at the peripheral edge of the plate and positionally mediated by an angular distance between said depending lugs both of which are located on one side of a diametrical line passing through said plate and generally parallel to a radius passing through said upstanding lug; a second plate mounted on said first plate and being rotatable with respect thereto, said second plate having formed thereon a radially outstanding stop lug and a downwardly depending locking lug also engageable with the periphery of said closure at its peripheral edge, said downwardly depending locking lug being movable from a first position lying on to a second position on the opposite side of said diametrical line, said radially projecting stop lug engaging the upstanding lug on said first plate to inhibit rotation of said second plate beyond said second position when said downturned lug on said second plate is disposed at a point diametrically opposite to the position of said upstanding lug on said first plate; and lever means for rotating said first plate relative to said second plate whereby when said downturned lug on said second plate is in a first position on said diametrical line said valve may be positioned on said closure by lateral movement relative to the container and whereby rotation of said second plate clamps said valve to said closure at an approximately equally spaced points around said valve.

2. The combination, as defined in claim 1, wherein said first plate has an upstanding central collar, and said second plate has an opening therein through which said collar extends, whereby said collar comprises a hub about which said second plate is rotatable.

3. The combination, as defined in claim 1, wherein said valve has a body provided with an exteriorly threaded portion, and said first-named plate is threadedly secured to said threaded portion, whereby said means may be adjusted axially relative to said valve body.

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