

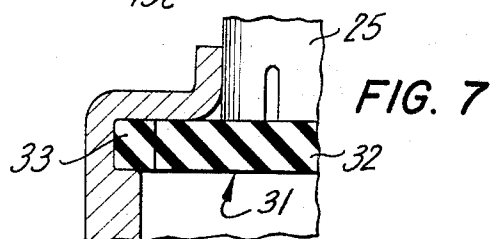
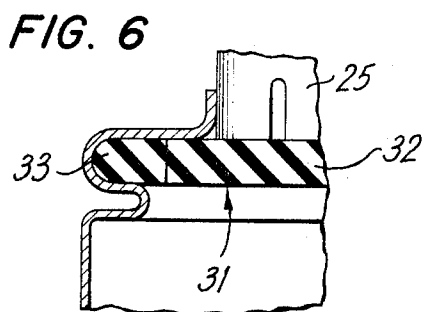
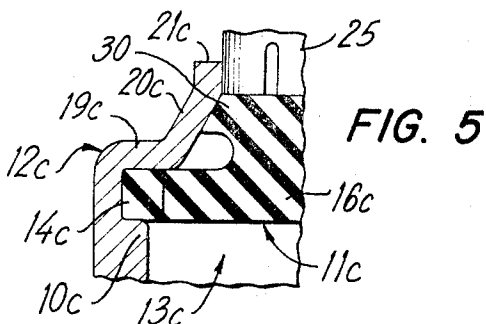
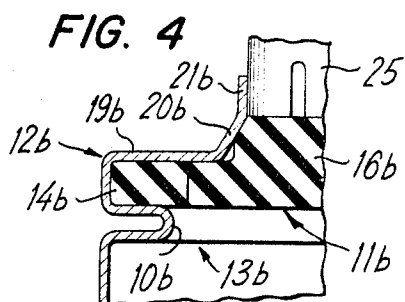
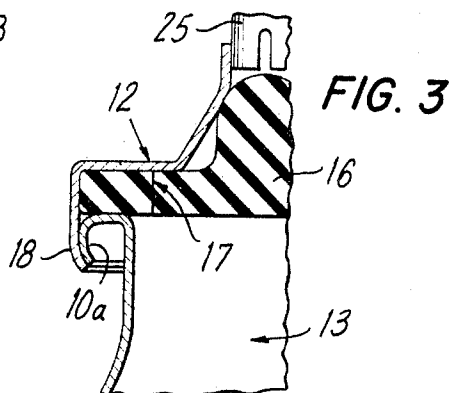
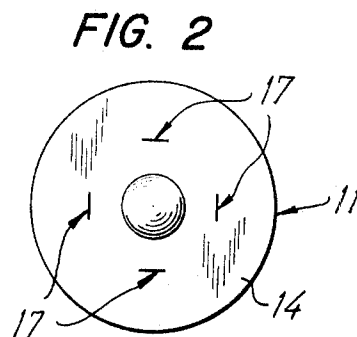
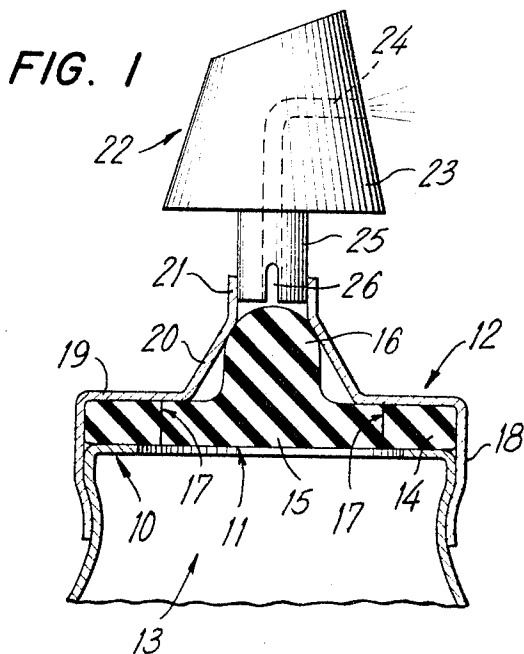
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3,272,403

VALVE FOR PRESSURE CONTAINER

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3,272,403

VALVE FOR PRESSURE CONTAINER

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6 Claims. (Cl. 222—394)

This invention relates to a dispensing valve for a pressure container, and more particularly to a low cost valve construction having a minimum of operational parts and which is simple to manufacture and assemble.

In the art of pressure containers for aerosol products, it is desirable to reduce the cost of the container to enable its economical use in a wider range of sizes and for a greater variety of products. The dispensing valve and its manner of assembly to the container are significant factors contributing to the overall cost of the container and are primarily responsible for the heretofore poor acceptance of the aerosol container for packing low cost products.

A primary object of the present invention is to simplify the construction of a dispensing valve for a pressure container.

Another object is to provide a valve construction of a minimum number of parts, each of which is inexpensively fabricated and easily assembled to the container as a valve unit.

Still another object of this invention is to provide a low cost, easily fabricated dispensing valve having improved sealing and operational characteristics.

These and other objects and advantages of this invention will become apparent from the following description, which, taken in connection with the accompanying drawings and appended claims, disclose a preferred embodiment and several modifications thereof.

Referring to the drawings:

FIGURE 1 is a fragmentary view, partly in section, showing one form of this invention.

FIGURE 2 is a top plan view of the elastomeric valve element shown in FIGURE 1.

FIGURES 3 through 7 are fragmentary sectional views of other forms of this invention.

In the exemplary embodiment of FIGURE 1, shown as a complete assembly, the dispensing valve of the present invention comprises a transverse wall means 10, an elastomeric valve element 11 and a ferrule 12 having the combined function of a retaining and seating member.

In this instance, wall means 10 is in the form of an inwardly turned rim formed by rolling in the marginal end of the container body 13, providing a transverse wall integral with the container body on which valve element 11 is supported.

Valve element 11, preferably of rubber or an equivalent elastomeric material having a high resiliency, comprises an outer planar portion 14 and a central portion 15 including an upstanding protuberance 16. A plurality of slitted perforations 17 are formed in planar portion 14 between its peripheral margin and central protuberance 16, at a location radially inwardly of the terminal edge of rim 10. Preferably, perforations 17 are cut through planar portion 14 at an angle normal to the diametral axis passing through the perforations, as illustrated in FIGURE 2, and are radially located so as to underlie a lateral wall member of ferrule 12, for reasons to be explained hereinafter.

Ferrule 12 comprises a depending skirt 18 which is crimped into a groove in the neck of container body 13 just below rim 10, a top wall 19 extending radially inwardly from skirt 18 over and in engagement with the upper surface of planar portion 14, and an upstanding an-

nular wall 20 which terminates in a cylindrical section 21. Annular wall 20 provides a valve seat sealably engageable with protuberance 16, and section 21 provides a guide for snugly receiving a depending stem of an actuator member 22. Top wall 19 of the ferrule overlies the discharge ends of perforations 17 and thereby contributes, along with the resiliency of the elastomeric material, in keeping the perforations normally closed until flexed and with the tight engagement between protuberance 16 and wall 20, to the sealing integrity of the valve unit.

Actuator 22, in the simplified form illustrated, comprises an upper head portion 23 having a discharge passage 24 in communication with a hollow stem 25 which snugly slides within and is guided by cylindrical section 21. The lower end of this stem has a slot 26 communicating with the passage in the stem to permit egress of product.

The valve unit thus described is operated by manually depressing actuator head 23, whereupon stem 25 depresses and unseats protuberance 16 from engagement with seat 20. This causes planar portion 14 to yield downwardly away from overlying wall 19 to expose the discharge ends of slitted perforations 17 and to simultaneously cause these perforations to flex open due to the tension induced in radial directions throughout the planar portion 14. A discharge path is thus effected for the egress of a pressurized product from within the container body.

It is thought to be apparent from the above description that there is provided by this invention a simplified valve assembly having improved sealing efficiency, and which is made up of low cost and easily fabricated component parts. Further, it is seen that these components are capable of easy assembly and that the resulting valve unit lends itself readily to the conventional practice of post-fill gassing.

FIGURE 3 illustrates a slight specification of the construction previously described. Here, the marginal end of the container body 13 is rolled outwardly to form a bead 10a on which the peripheral margin of valve element 11 is supported, and the depending skirt 18 is crimped under this bead 10a to lock the assembly together. In all other respects, this embodiment is identical with the preceding one.

FIGURE 4 illustrates another embodiment wherein the ferrule member of the preceding embodiments is formed integrally with the container body. In this instance, the container body 13b is beaded inwardly adjacent the valve end to provide an annular bead or ledge 10b on which valve element 11b is supported. The body wall then continues upwardly from bead 10b and is rolled inwardly over the upper surface and appropriately shaped in a finishing operation to provide integral top wall 19b, annular valve seat 20b and actuator stem guide 21b, identical with the preceding embodiments. Wall 19b is rolled tightly against the upper surface of planar portion 14b to anchor the peripheral margin of valve element 11b against bead 10b; and, of course, annular seat 20b is pressed downwardly into slightly biasing engagement with protuberance 16b. Thus, the end of the body wall itself, when appropriately rolled and shaped, provides an integral retaining-seating member.

FIGURE 5 depicts still another embodiment of this invention wherein a slightly modified type of valve element 11c is used. It comprises a perforate planar portion 14c and a protuberance 16c having an enlarged externally tapered lip 30 at its upper extremity. In this version, valve element 11c is supported on an inner annular shoulder 10c formed by recessing the upper cylindrical wall of container body 13c. Extending beyond shoulder 10c is a thin integral wall 12c which, as in the preceding embodiment of FIGURE 4, is rolled in as at

19c over the upper surface of planar portion 14c and is shaped with a valve seat 20c and actuator stem guide 21c.

FIGURES 6 and 7 depict similar valve assemblies but wherein the rubber valve element is in the form of a flat circular disc, without a central protuberance shown in the preceding embodiments. Designated generally as 31, this disc comprises a solid central portion 32 underlying and sealing a central port and an outer perforate portion 33 having slitted perforations as heretofore described. The container body wall is either beaded or recessed to provide a supporting surface for the valve disc, and the body wall extending beyond the supporting surface is rolled inwardly over the top of the disc to seal the discharge ends of the perforations. As before, the terminus of the body wall is shaped to provide a cylindrical port which acts as a guide for the stem 25 of the actuator member.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction, and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A dispensing valve for a pressure container comprising an annular transverse wall means surrounding an opening leading to the interior of said container, an elastomeric valve element bridging said opening with its peripheral margin resting upon said wall means, said valve element having a solid central portion and a plurality of slitted perforations disposed between said peripheral margin and central portion, said perforations being normally closed because of the inherent resiliency of said valve element when in its normal relaxed position but adapted to be flexed open when said central portion is depressed, and a retaining-seating member extending upwardly and inwardly from said wall means to sealingly anchor said valve element in said bridging position, said retaining-seating member including a central annular portion disposed over and sealingly engaging said central portion of said valve element to provide a valve seat therefor, and an actuator including a hollow depending stem slidably disposed in said annular portion for depressing said valve element.

2. The construction of claim 1 wherein said retaining-seating member is integral with said transverse wall means.

3. The construction of claim 1 wherein said transverse wall means is in the form of an annular inwardly directed ledge formed in the wall of said container.

4. The construction of claim 1 wherein said retaining-

seating member includes a transverse portion overlying and embracing said valve element around said central portion to seal the discharge end of said perforations when said valve member is in normal relaxed position.

5. A dispensing valve for a pressure container comprising an annular transverse wall means surrounding an opening leading to the interior of said container, an elastomeric valve element bridging opening with its peripheral margin resting upon said wall means, said valve element including an outer planar portion and a central portion having a solid protuberance projecting upwardly from said planar portion, said planar portion having a plurality of circumferentially spaced slitted perforations between said central portion and peripheral margin, a retaining-seating member extending upwardly from said wall means and inwardly over said peripheral margin to anchor said valve element in said bridging position, said retaining-seating member including a central upstanding tubular portion sealingly engaging said protuberance when said valve element is in its normal relaxed position and providing a guide for an actuator member having a hollow stem adapter to slidably move within said guide to depress said valve element.

6. A dispensing valve for a pressure container comprising an annular wall means having a transverse surface surrounding an open end of said container, and an elastomeric valve element supported on said surface and bridging said opening, said valve member including an outer planar portion and a central portion having a solid protuberance projecting upwardly from said planar portion, said planar portion having a plurality of circumferentially spaced slits, said slits being normally closed because of the inherent resiliency of said valve element when in its normal relaxed position, but adapted to be flexed open when said protuberance is depressed, said annular wall means extending upwardly beyond said surface to snugly embrace the periphery of said planar portion and being turned inwardly at its terminus to provide a valve seat sealingly engaging the upper peripheral surface of said protuberance, said protuberance and valve seat being disposed relative to said surface so that said planar portion is pressed tightly against said surface and said protuberance is slightly biased against said valve seat.

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