Sept. 30, 1952 D. MICHEL 2,612,293

CONTAINER CLOSURE MEMBER HAVING A DISPENSING VALVE THEREIN

Filed Jan. 21, 1949

Fig. 1

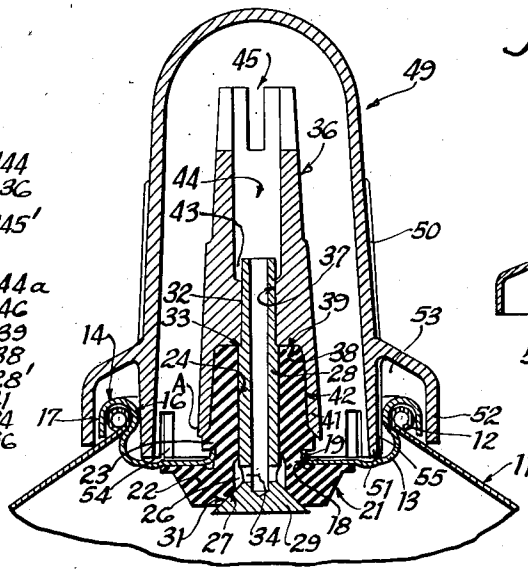


Fig. 7

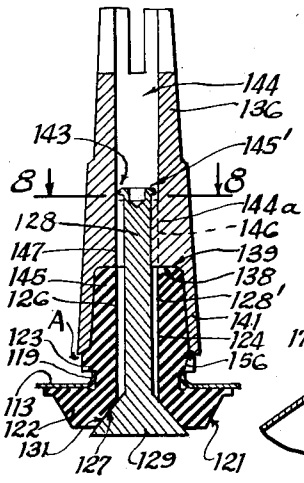


Fig. 3

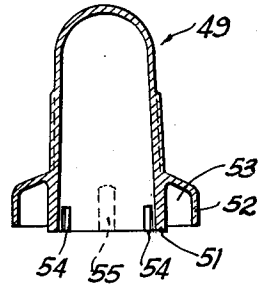


Fig. 4

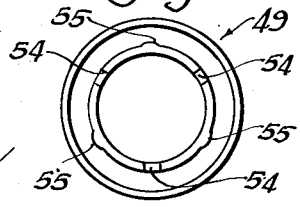


Fig. 2

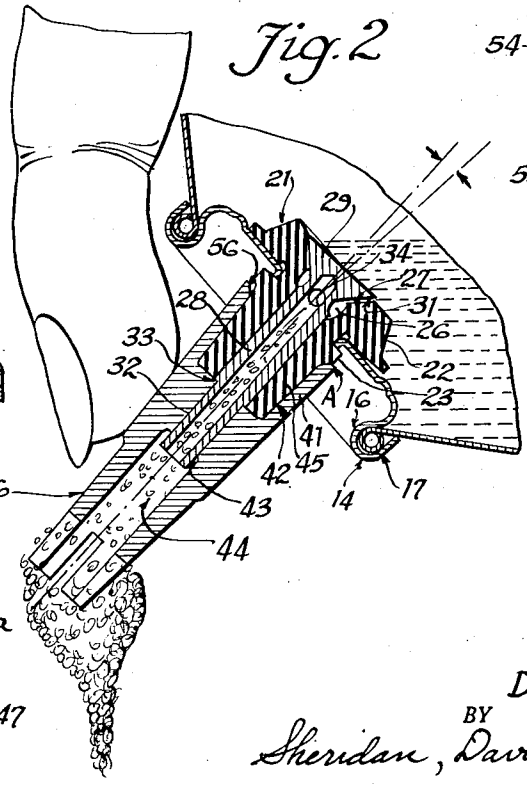


Fig. 6

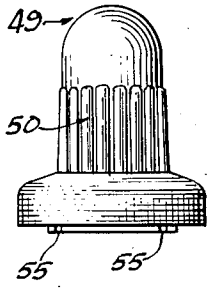


Fig. 5

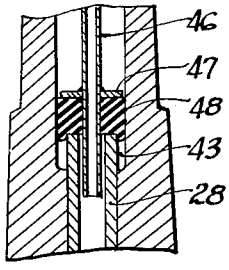
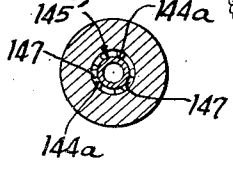


Fig. 8



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CONTAINER CLOSURE MEMBER HAVING A DISPENSING VALVE THEREIN

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Application January 21, 1949, Serial No. 71,853

6 Claims. (Cl. 222—182)

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This invention relates in general to dispensing means, and more particularly, to a simple and inexpensive throw-away device for dispensing liquids, powders and the like by gas retained under pressure.

A principal object of this invention is the provision of an improved valve means through which a container on which the valve means is mounted may be charged with gas under pressure, and through which the gas-charged product may subsequently be dispensed from the container, said valve means being effective for the purpose described, yet at the same time, being so simple and inexpensive that it may be discarded with the container after the latter has been emptied.

Another object of the invention is the provision of a novel, sanitary, protective cover for the valve means. In this connection, a specific object is the provision of the combination of a closure member for the container having permanently mounted thereon manually manipulable valve means and having removably mounted thereon a sanitary, protective cover, the latter comprising a housing having an open end defined by a pair of annularly spaced skirts adapted to embrace, respectively, inner and outer edges of an upstanding bead formation on the closure member.

Other objects and advantages will be apparent from the following description taken in connection with the figures of the drawings in which:

Figure 1 is a vertical, sectional view of the upper or mouth portion of a container equipped with the improved valve and protective cover means, the valve means being shown in its normally closed position and the cover means being shown as it would be assembled on the container to protect both the valve and the closure member during handling and storage;

Fig. 2 is a longitudinal, sectional view similar to that of Fig. 1 showing the container without the protective cover means and showing the dispensing valve as being deflected to open position;

Fig. 3 is a vertical, sectional view of the protective cover;

Fig. 4 is a bottom or open end view of protective cover shown in Figs. 1 and 3;

Fig. 5 is a fragmentary, sectional view of the valve means showing how it may be used with a vacuum- or pressure-applying lance to extract air from the container or charge gas into the container;

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Fig. 6 is an outside elevational view of the protective cover;

Fig. 7 is a view, similar to Fig. 1 but without the protective cover, of a modified form of the invention; and

Fig. 8 is a sectional view of the valve shown in Fig. 7 taken substantially on line 7—7 of that figure.

Referring now more particularly to the drawings, the container, generally designated 11, and which is only partially shown, is here illustrated as of the conventional "seamless" type which is more fully shown and described in my co-pending application, Serial No. 51,725, filed September 29, 1948 and later abandoned. It will be understood that the present invention is adaptable for use with many other specific types of containers, including, for example, the common cylindrical, lap-soldered tin can. The upper portion of the container 11 is formed with a mouth or opening defined by a peripherally extending bead 12. A closure 13, more specifically described in my above mentioned co-pending application, is clinched within the opening defined by the bead 12 and itself presents an upstanding bead 14 defined by inner and outer walls 16 and 17 (see Fig. 2), respectively.

At the center of the closure member 13 there is provided an aperture 18 defined by an upstanding, substantially cylindrical wall 19. Within that aperture is pressed a resilient body 21 of rubber or rubber-like material such as neoprene. The body 21 is formed with axially spaced inner and outer flanges 22 and 23, respectively, which grip the wall 19 therebetween in a grommet-like manner.

The body 21 is formed with a longitudinally or axially extending bore 24 and has at its interior end portion an enlarged chamber 26 in alignment and communication with the bore 24. The extreme inner end of the body 21 is formed with a frusto-conical valve-seating surface 27 which is also axially aligned with the bore 24. A tubular member 28 of metal or plastic material is embraced within the body bore 24. At its inner end it carries a valve 29 having a frusto-conical surface 31 engageable with the valve seat 27; at its other end is a reduced diameter section 32 which extends inwardly to the shoulder 33. Passage means, which in this instance constitutes four radial openings 34 formed in the tubular member or valve stem in line with the enlarged chamber 26, provides a communication between that chamber and the interior of the member 28.

Dispensing nozzle means, generally designated **36**, is carried on the end of the tubular member **28** for the 3-fold purpose of, (*a*) compressing the body **21**, (*b*) urging the valve **29** outward to a seated position even when there is low gas pressure within the container, and (*c*) providing a convenient passageway for charging and discharging the container. The dispensing means **36** is formed preferably of a sanitary plastic material such as polymerized cellulose acetate. A bore **37** is formed therein for a press fit with the reduced outer section **32** of the tubular member. The inwardly facing end surface **38** of the dispensing nozzle abuts the outer end surface **39** of the body **21**, the shoulder **33** serving as a stop to fix the assembled position of the member **36**. The shoulder **33** is so positioned upon the stem **28**, and the body **21** is so dimensioned with respect to the latter, that when the parts are assembled, as shown, the resilient body will be placed under compression between the valve **29** and the nozzle end surface **38**. The latter surface is thus, in effect, a flange for initially compressing the resilient body so as to urge the valve **29** to its normally seated position against the inner surface **27**.

Another feature of the dispensing nozzle **36** is that it is provided with an inwardly extending peripheral skirt **41** which closely embraces the peripheral surface **42** of the outer, reduced diameter, end portion **45** of the resilient body, thereby maintaining the valve-seating compression of the body. The end **56** of the skirt **41** bears against the outer flange **23** of the resilient body thereby facilitating opening the valve with a minimum of displacement by causing it to tilt about a fulcrum point (designated "A" in Figs. 1 and 2) remote from the outer end of the body. The outer flange is normally compressed between the skirt end **56** and the closure member wall **19** to help maintain the valve **29** urged to a closed position.

Another important advantage of the dispensing nozzle construction shown is that an annular space **43** is provided between the extreme outer tip portion of the stem **28** and the extreme inner portion of the nozzle bore **44**. This facilitates drawing the air from the container and recharging it with a selected gas under pressure by use of a lance such as indicated at **46** in Fig. 5. The lance **46** comprises a long, narrow tube connected at one end to a vacuum, or suitable gas-pressure, source. At its inner or opposite end it is provided with a fixed flange **47** forward of which is assembled a resilient rubber-like gasket **48**. When the lance is pressed into the outer end of the tube **28**, as shown in Fig. 5, the resilient gasket **48** is forced partially down into the annular space **43** and at the same time is caused to lend itself flexibly to the adjacent portion of bore **44** thereby forming a positive gas or vacuum seal during the vacuumizing or gas-charging step.

The tip of the nozzle **36** may be castellated as shown at **45** to impart a special effect or pattern to the dispensed product if desired.

Another important feature of this invention resides in the protective cover, generally designated **49**, which serves the dual function of: (*a*) protecting the valve against accidental tilting and consequent discharge of the container contents, and (*b*) protecting the valve and the entire container closure member **13** against the accumulation of soil during transport and storage. This latter point is of considerable importance in the dispensing of food products.

The cover **49** is made preferably of a plastic material such as polymerized cellulose acetate and is also part of the throw-away assembly, being discardable with the container when the latter is empty. It is generally cup shaped with its external surface knurled as at **50** to facilitate handling, and having an opening or mouth defined by an inner skirt **51** and an outer skirt **52**, the skirts having an annular space **53** therebetween. As shown in Fig. 1 the inner and outer skirts normally embrace the inner and outer surfaces **16** and **17**, respectively, of the closure member bead formation **14**. Preferably, one of the skirts should be formed so as to be resilient as well as frictionally engageable with its corresponding bead surface. In the present instance the inner bead **51** is formed with a plurality (in this case three) of longitudinally extending slits **54** to impart to it the desired resilience, and as shown in Figs. 1 and 4, it is formed with a plurality of external ribs **55** which are frictionally engageable with the corresponding bead surface **16** to hold the cover in place. Minor manufacturing variations between the inner surface **16** of the flange and the skirt **51** will be taken up by variable flexing of the latter when assembled. Obviously, it is a relatively simple job to pull the cover off or to press it into place when desired.

One of the important advantages of this invention resides in the ease with which it may be assembled, yet will retain the pressures of up to 200 pounds per square inch utilized in gasifying or aerating cream and like food products. By constructing the nozzle **36** as a separate piece (instead of integral with the valve stem, as illustrated, for example, by Card Patent 1,869,049 issued July 26, 1933), I can employ a rubber body **21** of very great strength and firmness and still readily assemble it by first inserting the stem within bore **24** followed by pressing the nozzle **36** "home" on the reduced stem section **32**. By contrast, the nearest prior art structure such as illustrated by the above-mentioned Card patent is necessarily limited to use of a relatively soft rubber so as to permit assembly by forcing the enlarged, integral outer tip portion through it. Such relatively weaker rubber is inherently less pressure-retentive than I can use and cannot be safely applied to the dispensing of gas-charged mixtures at pressures as high as 200 pounds per square inch.

The manufacturer who packages a product such as cream, paint, insecticide, or the like, in a discardable tin can employing a valve and protective cover according to the present invention, will generally receive the can from the supplier in three separate subassemblies comprising, (*a*) the can body, (*b*) the valve means including the closure **13**, tubular member **28**, resilient body **21** and nozzle **36**, and (*c*) the cover **49**. For example, a dairy marketing aerated cream in such containers will carry out the final assembly and packaging operations as follows: cream will be poured into the container through the opening defined by the bead **12** following which the closure **13** will be applied and clinched in place. Then a hollow needle or lance such as designated at **46** in Fig. 5 and which is connected to a vacuum source will be pressed into the nozzle bore **44** against the end of tube **28** with sufficient force to depress the latter inwardly thereby opening the valve **29**. When the air is withdrawn from the interior of the can, another similar hollow needle or lance, connected to a source of aerated gas under pressure, will be similarly inserted into

the bore 44 and the can charged with a suitable quantity of gas following which the container will usually be shaken for a predetermined number of times to complete the solution of gas in the cream. The protective cover 49 is then pressed into place and the packaged aerated cream is ready for delivery to the ultimate consumer.

When the consumer receives the above-mentioned device, filled as described, he may have a whipped-cream-like product at the touch of his finger simply by removing the cover 49, inverting the can and tilting the valve to its open position as shown in Fig. 2.

While a modified form of valve means is illustrated in Fig. 7, it is similar in many respects to that disclosed in Fig. 1. It will be preferred for certain highly competitive products because it can be made somewhat cheaper since it avoids the use of the hollow valve-carrying stem.

The modified valve means is mounted in a closure member 113 (partially shown) which may be identical with the closure member 13 already described. At the center of the closure member 113, there is provided an aperture defined by an upstanding wall 119. Within that aperture is pressed a resilient body 121 of rubber, or rubber-like material, formed with axially spaced inner and outer flanges 122 and 123, respectively, which grip the wall 119 therebetween. So far, the description of the body 121 is the same as the body 21 previously described. The bore 124 varies from that disclosed in the body 21 in that it is a simple, straight-through bore, with no enlargement except for the frusto-conical valve seating surface 127. A solid stem or rivet 128 extends through the bore 124 and is undersized relative to that bore to provide an annular transfer passage or chamber 128' therebetween. The stem or rivet 128 will preferably be made of metal, such as aluminum or some readily deformable plastic material. At its inner end the stem 128 carries a valve 129 having a frusto-conical surface 131 engageable with the valve seat 127. The opposite or outer end portion of the stem extends beyond the outer end of the body 121.

The resilient body is provided with an outer extension 145 of reduced diameter relative to that of the outer flange 123.

A tubular dispensing nozzle, generally designated 136, is formed with a bore 144 having an inner shoulder or flange 144*a*. The parts will be assembled by first pressing the resilient body 121 in place, then inserting the stem 128 from the inner side, and mounting the dispensing tube 136 on the outer side with the outer end portion of the stem inserted beyond the shoulder 144*a* and peened or enlarged as shown at 145' (Fig. 7).

Passage means, generally designated 146, is provided between the tube 136 and the stem 128 at the outlet end of the chamber 126 to provide communication between said chamber and the dispensing nozzle. In this specific instance, the passage means comprises a plurality of axially extending fluted openings 147 formed in the nozzle 136. Obviously, if desired, such openings might be formed, in part, or in their entirety, in the stem 128.

The inwardly facing surface 133 of the dispensing nozzle comprises, in effect, a flange engageable with the outer extreme end portion 139 of the resilient body. Likewise, the peripheral skirt 141 has its end portion 156 engageable with the flange 123, to maintain the resilient body in compression to thereby urge the valve 129 to a normally seated position. This compression of the resilient body also serves the function of sealing the outer end of the chamber 126 at the interface 138—139 to prevent the loss of the product being dispensed. It will be noted, also, that an annular space 143 is provided between the extreme outer tip portion of the stem 128 and the extreme inner portion of the nozzle bore 144. This annular space corresponds to that designated 43 in Fig. 5, and functions similarly to facilitate vacuumizing and pressurizing of the container.

In use, the valve embodiment shown in Fig. 7 functions in the same way as that described for the previous embodiment, that is, the consumer simply inverts the can which carries the valve, presses the nozzle 136 to one side, causing it to tilt about the fulcrum located at A'. This causes the valve 129 to be tilted away from one side of the seat 127, permitting the contents of the container to be discharged past the valve 129, through the transfer passage or chamber 126, through the passage means 146, and out of the bore 144.

While particular forms of the present invention have been shown, it will be apparent that minor changes therein will readily suggest themselves to those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In combination, a container for containing a fluid product under pressure, said container having an opening, a closure for said container opening having a second opening therethrough, a valve for controlling the flow of said product from said container through said second opening, said container and said closure comprising an assembly having an endless bead encircling said valve, said closure having a recess directed inwardly of said container immediately adjacent said bead, an elongated nozzle for guiding the flow of said product from said container, said nozzle extending outwardly away from said container and being operatively connected to said valve whereby a small lateral force against the free end of said nozzle causes said valve to open, and a cover removably attachable to said bead and internally recessed to receive said nozzle when so attached to said bead, said cover including an outer apron and a resilient inner member defining an annular channel for receiving said bead and for securing said cover to said bead, said recess being of such depth as to permit secure engagement of the radially inner surface of said bead by said resilient inner member of said cover and being of such scope as to permit tilting of said nozzle and said valve stem to open said valve, said channel being of such width that said outer apron may substantially engage the radially outer surface of said bead.

2. In combination, a container for containing a fluid product under pressure, said container having an opening, a closure for said container opening having a second opening therethrough, a valve for controlling the flow of said product from said container through said second opening, said container and said closure comprising an assembly having an endless bead encircling said valve, said closure having a recess directed inwardly of said container immediately adjacent said bead, an elongated nozzle for guiding the flow of said product from said container, said nozzle extending outwardly away from said container and being operatively connected to said valve whereby a small lateral force against the free end of said nozzle causes said valve to open, and a cover re-

movably attachable to said bead and internally recessed to receive said nozzle when so attached to said bead, said cover including an outer apron and an inner apron defining an annular channel for receiving said bead and for securing said cover to said bead, said inner apron being slit to provide resilient gripping of said bead, said recess being of such depth as to permit secure engagement of the radially inner surface of said bead by said resilient inner member of said cover and being of such scope as to permit tilting of said nozzle and said valve stem to open said valve, said channel being of such width that said outer apron may substantially engage the radially outer surface of the bead.

3. In combination, a container for containing a fluid product under pressure, said container having an opening, and a valve and nozzle mechanism for controlling and guiding the flow of said product from said container through said opening, said valve and nozzle mechanism including a resilient tubular plug secured to the edges of said container defining said opening, said resilient plug having an axial opening therethrough and a valve seat at the inner end thereof and contiguous to the inner end of said axial opening, a relatively rigid valve stem extending through said opening in said plug, said valve stem extending outwardly beyond said resilient plug and having at its inner end a valve member for cooperating with said valve seat, and a relatively rigid nozzle surrounding the outer end portion of said valve stem and engaging the outer surface of said resilient plug and having a skirt portion encircling and engaging a portion of the sides of said resilient plug, said nozzle being connected to the outer end portion of said valve stem in such manner as to permit compression of said resilient plug between said nozzle and said valve member and to permit lateral movement of said valve stem by said nozzle.

4. In combination, a container for containing a fluid product under pressure, said container having an opening, and a valve and nozzle mechanism for controlling and guiding the flow of said product from said container through said opening, said valve and nozzle mechanism including a resilient tubular plug secured to the edges of said container defining said opening, said resilient plug having an axial opening therethrough and a valve seat at the inner end thereof and contiguous to the inner end of said axial opening, a relatively rigid valve stem extending through said opening in said plug, said valve stem extending outwardly beyond said resilient plug and having at its inner end a valve member for cooperating with said valve seat, and a relatively rigid nozzle surrounding and secured to the outer end of said valve stem, said nozzle engaging the outer surface of said resilient plug and having a skirt portion encircling and engaging a portion of the sides of said resilient plug, said resilient plug being compressed between said nozzle and said valve member.

5. In combination, a container for containing a fluid product under pressure, said container having an opening, and a valve and nozzle mechanism for controlling and guiding the flow of said product from said container through said opening, said valve and nozzle mechanism including a resilient tubular plug secured to the edges of said container defining said opening, said resilient plug having an axial opening therethrough and a valve seat at the inner end thereof and contiguous to the inner end of said axial opening, a relatively rigid valve stem extending through said opening in said plug, said valve stem extending outwardly beyond said resilient plug and having at its inner end a valve member for cooperating with said valve seat, and a relatively rigid nozzle surrounding and secured to the outer end of said valve stem, said nozzle engaging the outer surface of said resilient plug and having a skirt portion encircling and engaging a portion of the sides of said resilient plug, said resilient plug being compressed between said nozzle and said valve member.

6. A valve and nozzle mechanism for controlling and guiding the flow of a fluid product through an opening in a container for containing such fluid product under pressure, said valve and nozzle mechanism including a resilient tubular plug securable to the edges of said container defining said opening, said resilient plug having an axial opening therethrough and a valve seat at the inner end thereof and contiguous to the inner end of said axial opening, a relatively rigid valve stem extending through said opening in said plug, said valve stem extending outwardly beyond said resilient plug and having at its inner end a valve member for cooperating with said valve seat, and a relatively rigid nozzle surrounding and secured to the outer end of said valve stem, said nozzle engaging the outer surface of said resilient plug and having a skirt portion encircling and engaging a portion of the sides of said resilient plug, said resilient plug being compressed between said nozzle and said valve member.

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