

May 10, 1966

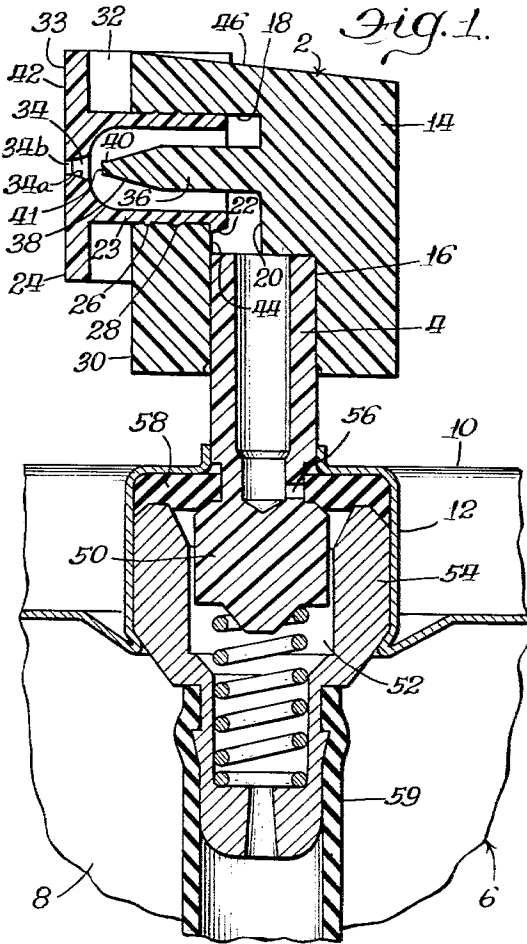
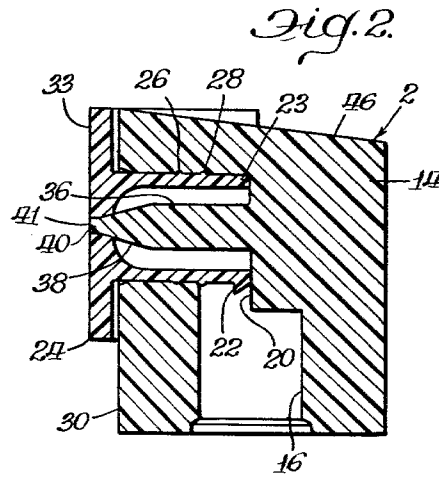
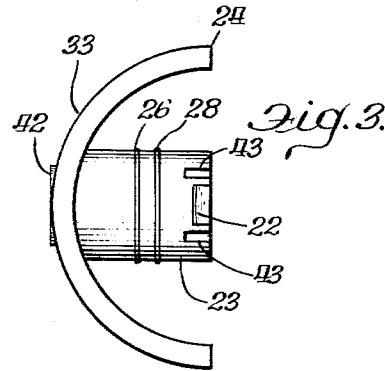
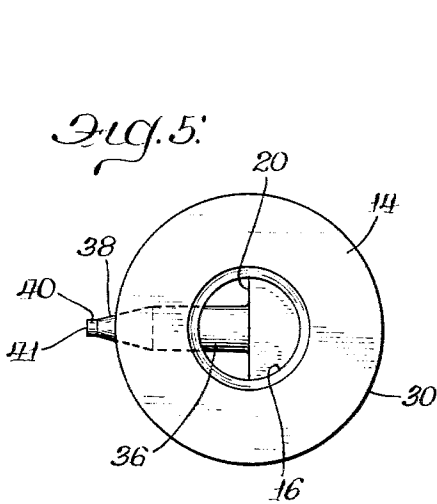
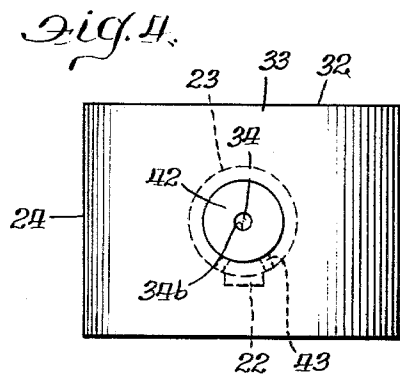
E. J. McKERNAN

3,250,474

ANTI-CLOG AEROSOL DISPENSER

Filed Oct. 25, 1963

2 Sheets-Sheet 1



INVENTOR
Edward J. McKernan
BY Walter F. Schlegel, Jr.
Att'y.

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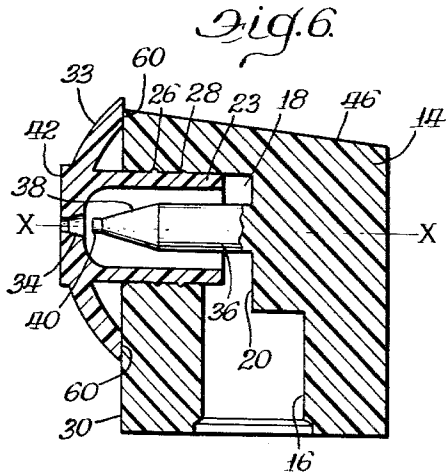
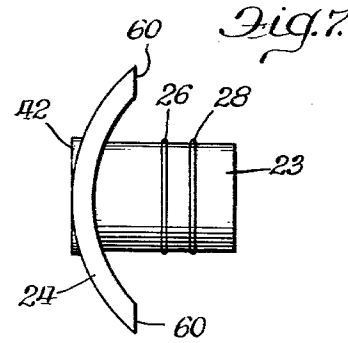
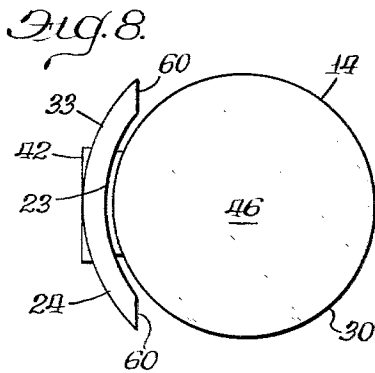
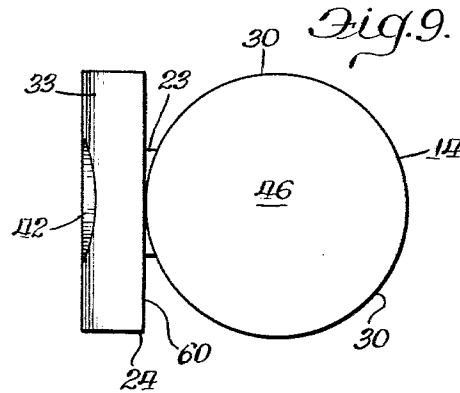
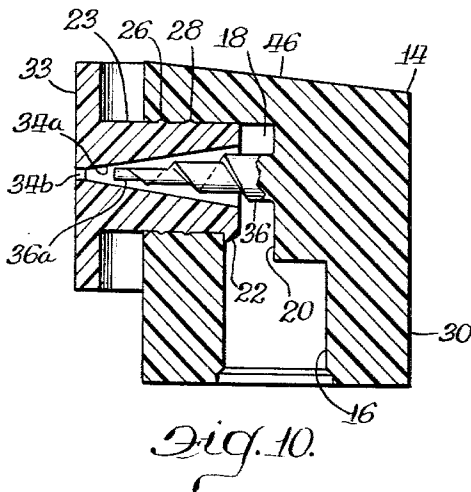
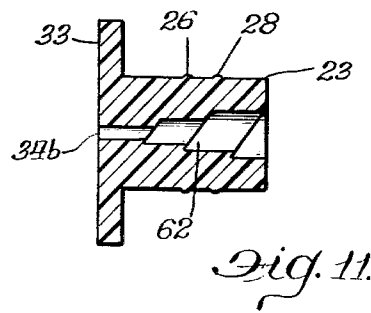
E. J. McKERNAN

3,250,474

ANTI-CLOG AEROSOL DISPENSER

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2 Sheets-Sheet 2



INVENTOR.
Edward J. McKernan
BY *Walter L. Schlegel, Jr.*
Att'y.

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3,250,474

ANTI-CLOG AEROSOL DISPENSER

Edward J. McKernan, 430 James St., Crystal Lake, Ill.

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1 Claim. (Cl. 239-117)

This invention relates to dispensers of the type generally designated as aerosol dispensers wherein a sealed container is provided with normally closed manually opening valve means for releasing from the container a dispensable fluid under superatmospheric pressure within the container.

Many prior art aerosol dispensers are known wherein the dispensed fluid is a liquid having a high solubility for a propellant gas whereby as the dispensed liquid enters the atmosphere the propellant gas expanding rapidly atomizes the dispensed liquid in a fine spray.

In another type of aerosol dispenser the dispensed liquid has low solubility for the propellant gas, thus requiring mechanical means for atomizing the dispensed liquid as it is discharged from the dispenser into the atmosphere. Such prior art devices have used a spiral passage or groove with the discharge or dispensing port connected to the passage or groove at the small end of the spiral for the purpose of accelerating flow of the dispensed liquid from the large end of the spiral to the small end thereof with the objective of achieving such velocity of flow that the liquid becomes atomized as it passes into the atmosphere from the discharge port of the dispenser.

Mechanical break-up devices such as those heretofore described have been inefficient in operation, expensive to manufacture, and excessively complicated in assembly.

A primary object of the present invention is to devise an aerosol dispenser wherein the dispensing port is formed in an insert which is slideably fitted within a button and defines therewith an outlet chamber adapted to be connected to the dispensed liquid within the container by manual depression of the button.

A more specific object of the invention is to provide a projection on the button which precisely fits within the port of the insert when the latter is in closed position whereby any accumulation of the dispensed liquid within the port is prevented, thereby avoiding possible clogging of the port by dried accumulation of such liquid in the port after initial use of the dispenser.

Still another object of the invention is to prevent any accumulation of the dispensed liquid around the projection when the latter is in closed position.

A further object of the invention is to devise a dispensing port or orifice which has an outer cylindrical portion and an inner portion tapering toward its merger with the outer portion to prevent atomization of a liquid such as paint before the liquid leaves the dispensing orifice.

Yet another object of the invention is to provide one or more integral elastic sealing rings on the insert web which slides within a complementary cylindrical opening of the button to afford easy movement of the insert to open and closed positions and to prevent leakage of the dispensed liquid around said web as the liquid is being dispensed.

In certain embodiments of my invention the button and stem parts are particularly formed and arranged for mechanical atomization of the dispensed liquid and in other embodiments of my invention such parts are formed and arranged for atomization of the liquid by expansion of a propellant gas dissolved therein.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following specification and the accompanying drawings, wherein:

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FIGURE 1 is a fragmentary central vertical sectional view through an aerosol dispenser embodying one form of the invention, with the insert shown in open position;

FIGURE 2 is a central vertical sectional view through the button and insert of FIGURE 1, with the insert shown in closed position;

FIGURE 3 is a bottom plan view of the insert;

FIGURE 4 is a front elevational view of the insert;

FIGURE 5 is a bottom plan view of the button;

FIGURES 6-9 illustrate a modified form of the invention, FIGURE 6 being a central vertical sectional view through the button and insert, FIGURE 7 being a plan view of the insert, FIGURE 8 being a diagrammatic plan view of the button and insert with the insert in closed position and FIGURE 9 being a diagrammatic plan view with the insert in open position;

FIGURE 10 is a central vertical sectional view through a button and insert embodying another modification of the invention; and

FIGURE 11 is a central vertical sectional view of still another modification of the insert adapted for use with the button of FIGURE 10.

Describing the invention in detail and referring first to FIGURE 1, it will be seen that a preferred embodiment of the novel two-piece button assembly 2 is illustrated as applied to a hollow valve stem 4 of a conventional aerosol dispenser 6 comprising a steel container 8 having a spun connection as at 10 to a steel mounting cup 12.

The container 8 is adapted to contain a liquid such as paint or adhesive to be dispensed by spraying the liquid from the novel button assembly 2, and the container also is adapted to contain a propellant gas under superatmospheric pressure, which gas boils at atmospheric pressure and room temperature.

The gas may be, for example, Freon and is at a minimum pressure in the container of the order of 25 pounds per square inch absolute at 70° F. Generally 85 pounds per square inch absolute is considered to be a safe maximum.

The novel button assembly 2 comprises a button 14 press-fitted as at 16 on the stem 4 which extends into a cylindrical stem passage formed within the button 14. The button also comprises a cylindrical outlet passage 18 communicating with the interior of stem 4 by a semi-cylindrical hook aperture 20 which receives a hook 22 on a cylindrical wall 23 of a novel spray tip insert 24. The insert 24 is preferably formed of a resilient material, such as plastic, for a purpose hereinafter described.

The wall 23 is slideably fitted in the outlet passage 18 and is provided with one or more, preferably two, integral, resilient sealing rings 26 and 28 having a slideable interference fit in the passage 18, so that the rings are resiliently deformed when they are forced into the cylindrical passage 18 to prevent leakage of the dispensed liquid and yet permit easy manual actuation of the spray tip 24 to its open and closed positions hereinafter described.

The outer perimeter 30 of the button 14 is cylindrical, and the wall 23 of the spray tip insert 24 is connected to a web 32 which is semi-cylindrical and complementary in curvature to the perimeter 30. Centrally of the web 32 intersecting its front surface 33 is a discharge port 34 having an outwardly tapered portion 34a (FIG. 1) which is connected to a cylindrical portion 34b intersecting the front surface 33 of the web 32.

The button is provided with a forwardly extending projection 36 which extends through the outlet passage 18 and comprises a forwardly tapered frusto-conical stem 38 complementary in form to the portion 34a of the port 34 and received therein when the insert 24 is in the closed position of FIGURE 2. Under these conditions, a cylin-

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drical nose 40 on the stem 38 is snugly fitted within the cylindrical portion 34b of the port 34, and the nose 40 extends to and has a flat end 41 flush with a flat pad 42 on the forward surface 33 of the insert web 32, to positively prevent any accumulation of the dispensed liquid around the port 34 or the nose 40 when the insert is in closed position.

The insert web 32 is preferably provided with a pair of hook slots 43 at opposite sides of the hook 22 as best seen in FIGURES 3 and 4 so that the portion of the web 32 to which the hook is attached is very flexible to prevent gouging of the button surface which defines passage 18 when the web 23 is initially forced through the passage 18 during assembly of the device.

In operation of the novel device, assuming that the insert 24 is in the closed position of FIGURE 2 the operator manually grasps the ends of the insert web 32 and pulls the web forwardly, away from the button perimeter 30 until the hook 22 engages the button as at 44 (FIGURE 1). The button is now depressed as by finger pressure on the top 46 of the button, whereupon a head 50 on the stem is urged downwardly within a chamber 52 of a valve body 54 until a port 56 of the stem 4 is released from a sealing gasket 58, whereupon the dispensed liquid is forced through the stem port 56 upwardly through the hollow stem and through the hook aperture or passage 20 and thence through the outlet chamber 18 into the discharge port 34 from which the dispensed liquid is sprayed by the pressure of the propellant gas in the container 8.

It will be understood that the dispensed liquid is supplied to the chamber 52 in a usual manner, as by a delivery tube 59 which extends downwardly from body 54 to a point just above the bottom of the container 8.

Referring now to the modification of FIGURES 6-9, parts corresponding to those of the previously described embodiment are identical except as hereinafter described and are identified by corresponding numerals. In the embodiment of FIGURES 6-9, the hook 22 has been eliminated, and the ends of the insert web 32 have been cut off to form cam surfaces 60. Thus the insert 24 is rotated ninety degree on an axis X-X (FIGURE 6) to actuate the insert to open position by coaction of cam faces 60 with the cylindrical perimeter 30 of the button. FIGURES 8 and 9 are diagrammatic plan view illustrations of the insert 24 and button 14, with the insert in open position in FIGURE 9. In FIGURE 8, the insert is shown in closed position to which the insert is pushed after or while being rotated 90° on axis X from the open position of FIGURE 8.

FIGURE 10 shows another modification of the invention, wherein parts corresponding to those of FIGURES 1-6 are identical therewith and are identified by corresponding numerals except as hereinafter described. In the modification of FIGURE 10, the projection 36 is in the form of a tapered helix and the tapered portion 34a of the port 34 extends continuously from portion 34b to the inner end of the insert wall or web 23 to define a conical surface surrounding and spaced from the projection 36 when the insert 24 is in the open position of FIGURE 10. Thus the projection 36 defines with this surrounding conical surface a vortex chamber which imparts a swirling action to the dispensed liquid, affording a mechanical break-up or atomization thereof which is particularly useful in a dispenser wherein the propellant gas is not soluble in the dispensed liquid.

It will be understood by those skilled in the art that in the modification of FIGURE 10 the smallest land 36a

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of the projection 36, when the insert 24 is pushed to closed position (not shown) snugly fits in the port portion 34b and extends to the outermost end thereof flush with the outer face of pad 42 (not shown in FIGURE 10) to prevent accumulation of the dispensed liquid in the port 34 or around said land as heretofore discussed.

FIGURE 11 shows still another modification of the invention wherein the insert is identical with that of FIGURE 10, except that the insert has been modified to substitute for the conical surface of FIGURE 10 a tapered helical passage 62 complementary to the helical form of the projection 36 of FIGURE 10. It will be understood that the insert 24 of FIGURE 11 is to be used with the button 14 of FIGURE 10, and the insert 24 is adapted for rotation in one direction to closed position whereas the projection 36 is threaded into the complementary helical passage of the insert of FIGURE 11. In such an arrangement, the insert of FIGURE 11 is actuated to open position by rotation in the opposite direction to unthread the projection 36 from the helical passage of the insert 24 whereupon the space defined by said passage and said projection define a vortex chamber for the purpose heretofore described in connection with FIGURE 10.

It will be understood that when the insert of FIGURE 11 is rotated to closed position in the button of FIGURE 10, the smallest land of the button projection 36 snugly fits within the port portion 34b and extends to the outermost end thereof and the outer end of said land is flat and flush with the outer face of the pad 42 (not shown in FIGURES 10 or 11) to prevent any accumulation of the dispensed liquid within the port 34 or around the projection 36 as heretofore discussed in connection with previous embodiments.

What is claimed is:

An aerosol bomb comprising a sealed container containing a liquid and a propellant gas under superatmospheric pressure, a hollow valve stem extending into said container, valve means carried by the container for closing a port in the stem, a button on the stem for depressing the stem to release said port from said valve means, an outlet passage in the button communicating with the interior of said stem, an insert slideably fitted in said outlet passage, a discharge port through said insert, and means on the button to completely fill said port and squeeze said liquid therefrom when the button is released and the insert is pushed to closed position, said insert having cam surfaces engageable with the button to move the insert to open position when the insert is rotated about an axis passing through the discharge port.

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ROBERT B. REEVES,	Primary Examiner.	
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R. STROBEL,	Assistant Examiner.	