United States Patent

Davenport et al.

[15] **3,696,977**

[45] **Oct. 10, 1972**

[54] **STRETCH ELASTOMER VALVE**

[72] Inventors: **Richard L. Davenport; Gerald M. Niemiec,** both of Racine, Wis.

[73] Assignee: **S. C. Johnson & Son, Inc.,** Racine, Wis.

[22] Filed: **April 21, 1971**

[21] Appl. No.: **135,955**

[52] **U.S. Cl.** **222/561**

[51] **Int. Cl.** **B65d 47/20**

[58] **Field of Search** 251/193, 511, 326, 491; 222/561, 505, 511; 221/64, 303

[56] **References Cited**

UNITED STATES PATENTS

2,590,437	3/1952	Maves	222/561 X
3,312,238	4/1967	Voit, Jr.	222/561 X
3,622,824	11/1971	Atlee	313/311 X
2,863,083	12/1958	Schram	313/330

FOREIGN PATENTS OR APPLICATIONS

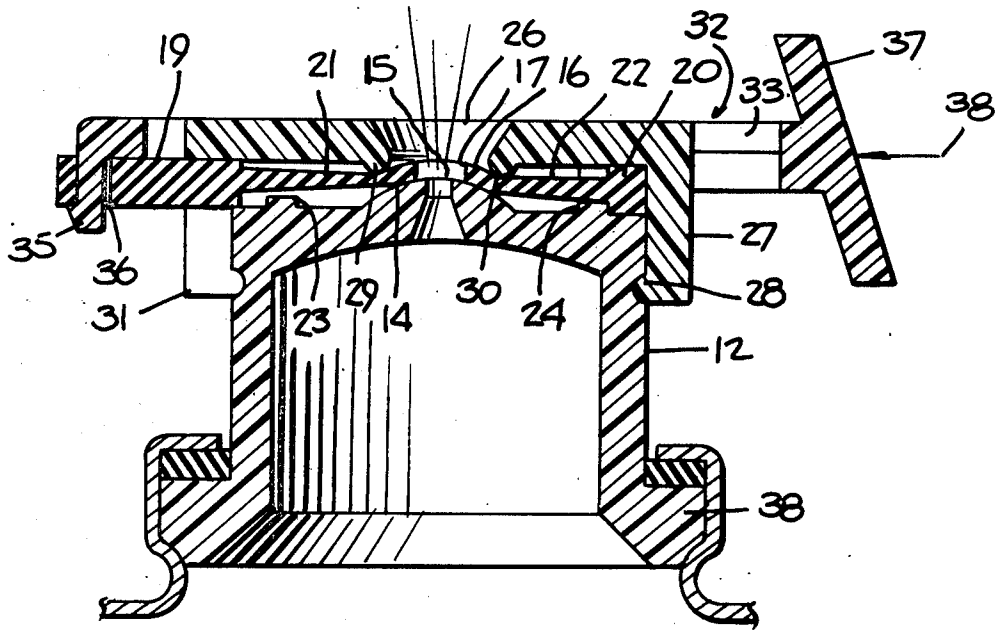
1,464,251	7/1969	Germany	313/55

Primary Examiner—Stanley H. Tollberg
Assistant Examiner—Norman L. Stack, Jr.
Attorney—Joseph T. Kivlin, Jr. and Thomas A. Hodge

[57] **ABSTRACT**

The discharge orifice in an aerosol valve is controlled by means of a stretchable elastomeric membrane having an aperture therein. The membrane is arranged to be selectably stretched across the mouth of the orifice to draw the aperture into and out of registration with the orifice thereby opening and closing the valve.

8 Claims, 9 Drawing Figures



PATENTED OCT 10 1972

3,696,977

SHEET 1 OF 2

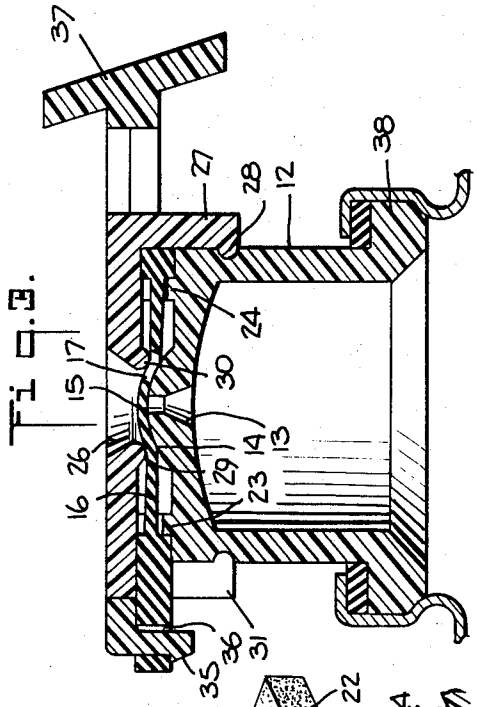


Fig. 3.

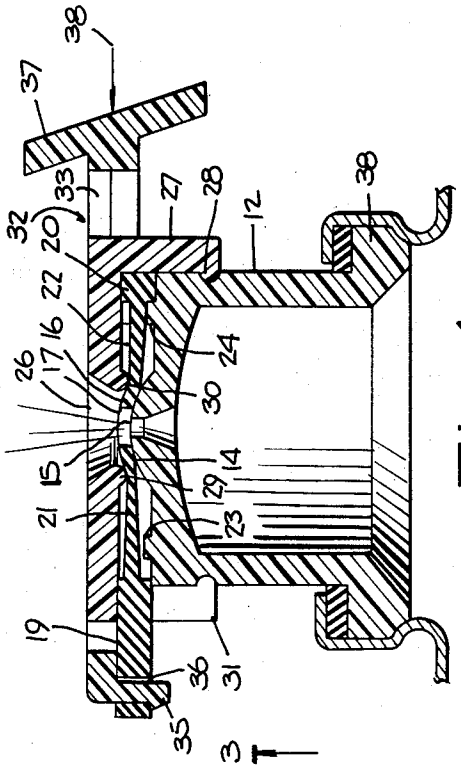


Fig. 4.

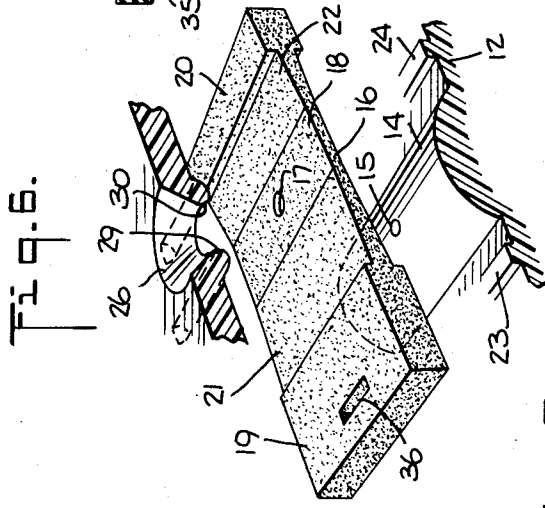


Fig. 6.

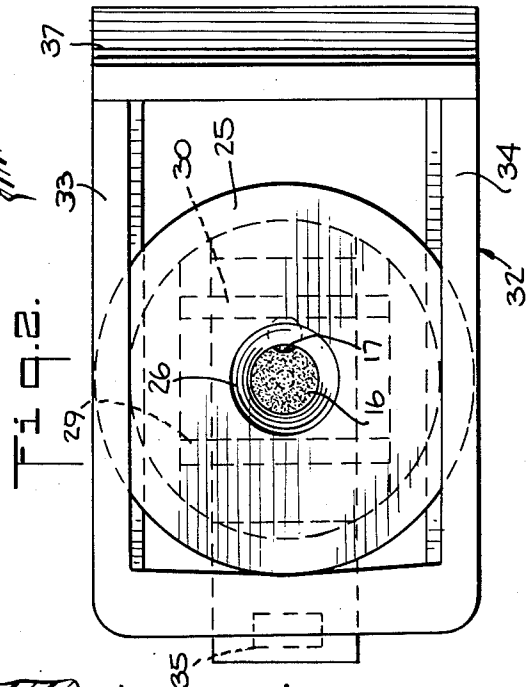


Fig. 2.

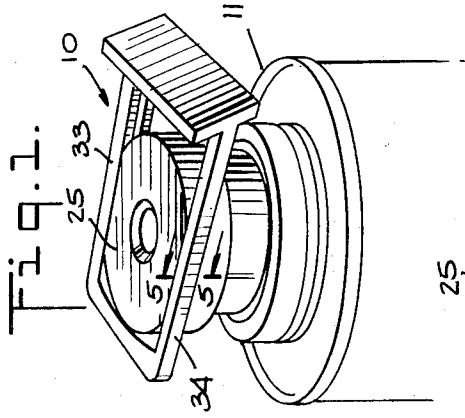


Fig. 1.

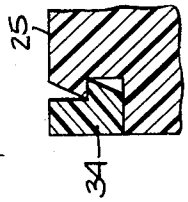


Fig. 5.

INVENTORS
RICHARD L. DAVENPORT
BY GERALD M. NIEMIEC

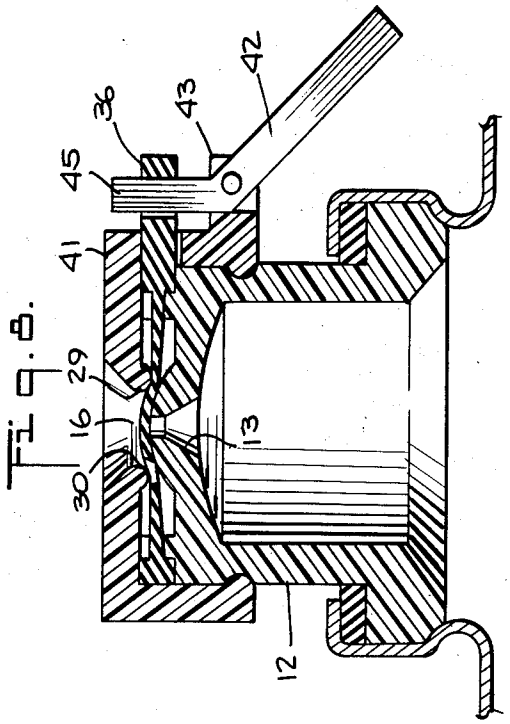


Fig. 8.

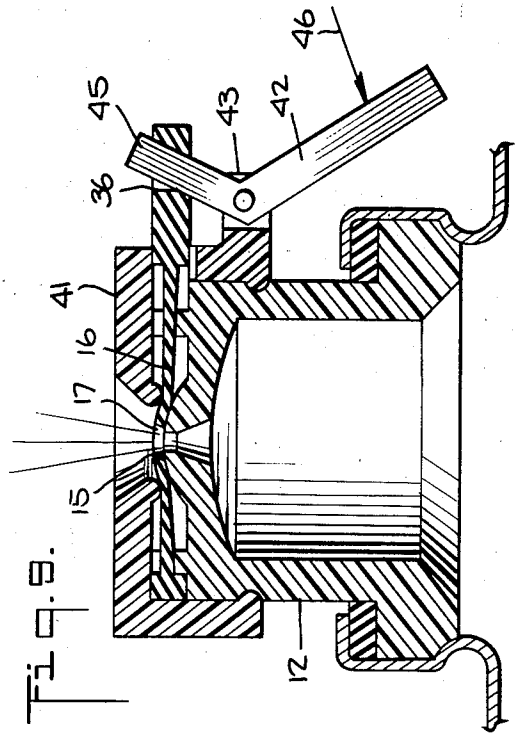


Fig. 9.

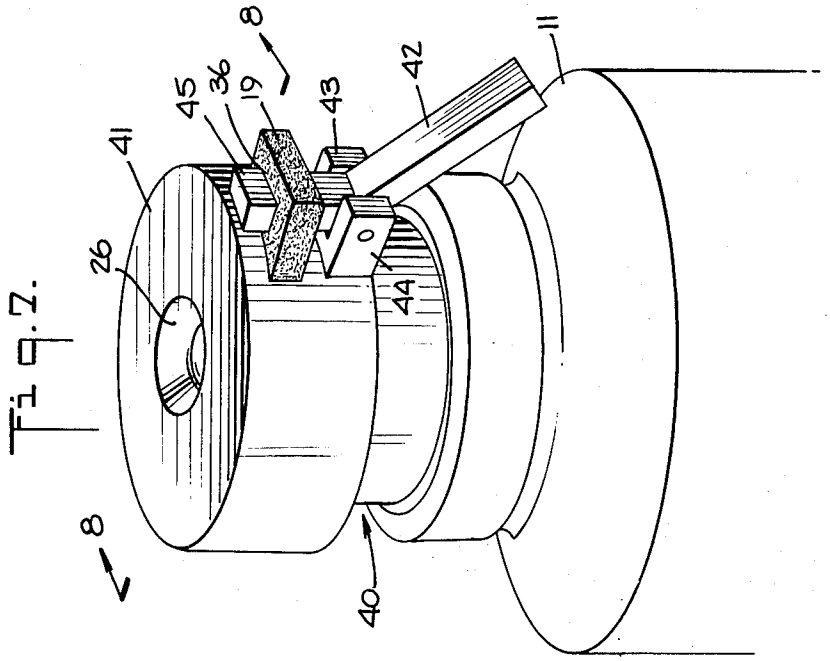


Fig. 7.

INVENTORS
RICHARD L. DAVENPORT
BY GERALD M. NIEMIEC

STRETCH ELASTOMER VALVE

The present invention relates to a dispensing valve and, more particularly, to a dispensing valve for controlling the outflow of the contents from a pressurized container. Such valves are generally referred to as aerosol valves.

One class of aerosol valve employs a sliding closure member which selectably occludes a discharge orifice. Such valves have, heretofore, required manufacturing to close tolerances in order to produce a satisfactory structure. It is, therefore, an object of the present invention to provide a sliding closure aerosol valve of novel construction free from tolerance problems in manufacture.

In accordance with the invention, the dispensing valve is provided with a body member having a through passage terminating at one end at a surface of said body member in a discharge orifice. The other end of the passage is arranged for communicating with the contents of the container. A closure member for the orifice in the form of a stretchable elastomeric membrane is provided with the membrane being secured to the body member overlying the orifice. The membrane has an aperture therethrough and means are provided for selectably stretching the membrane to shift the position of the aperture relative to the body member into and out of registration with the orifice to thereby open and close the valve.

The invention will be better understood after reading the following detailed description of certain presently preferred embodiments thereof with reference to the appended drawings in which:

FIG. 1 is a perspective view of a dispensing valve incorporating the invention shown installed on the top of a pressurized container;

FIG. 2 is a top plan view of the valve of FIG. 1;

FIG. 3 is a vertical sectional view taken along the line 3—3 in FIG. 2 showing the valve in closed position;

FIG. 4 is a view similar to FIG. 3 showing the valve in open position;

FIG. 5 is an enlarged fragmentary sectional view taken along the line 5—5 in FIG. 1;

FIG. 6 is a fragmentary exploded view showing details in construction of the membrane and valve body;

FIG. 7 is a perspective view similar to FIG. 1 showing a second embodiment of the invention;

FIG. 8 is a vertical sectional view taken along the line 8—8 in FIG. 7 showing the valve in closed position and

FIG. 9 is a view similar to FIG. 8 showing the valve in open position.

The same reference numerals are used throughout the several figures of the drawings to designate the same or similar parts.

Referring now to FIGS. 1 to 6 of the drawings, the dispensing valve is shown generally by the reference numeral 10 mounted on the top of a pressurized container 11. The valve 10 includes a body member 12 having a through passage 13 terminating at one end at a surface 14 of said body member in a discharge orifice 15 and having its other end arranged for communication with the contents of the container. A closure member is provided for the discharge orifice 15 in the form of a stretchable elastomeric membrane 16. An aperture 17 is provided through the central portion of the membrane 16. As best seen in FIG. 6, the membrane is provided with a median section 18 of reduced thickness between two thicker marginal areas 19 and 20. The marginal areas 19 and 20 are joined to the median section 18 by tapered transition zones 21 and 22.

The surface 14 of the body member surrounding the orifice 15 is convexo-cylindroidal. The membrane 16 is disposed over the body member 12 with the thickened portions 19 and 20 on opposite sides of the two ribs or shoulders 23 and 24, respectively. A cap member 25 having a central aperture 26 with a flaring sidewall overlies the membrane 16 and is joined to the body member through the cylindrical skirt portion 27 and the integral bead 28. A pair of spaced apart parallel rounded beads 29 and 30 formed on the underside of the cap member 25 on opposite sides of the aperture 26 are disposed parallel to and spaced from the convexo-cylindroidal surface 14 by a distance slightly greater than the thickness of the membrane 16. The beads 29 and 30 are located relative to the surface 14 for causing the membrane to conform to the surface 14 as best seen in FIGS. 3 and 4.

The thickened area 20 of the membrane 16 is anchored in fixed position relative to the body member 12 by the cap member on one side of the orifice 15. The other end of the membrane extends through a slot 31 in the cap member 25 projecting to the exterior thereof. A slide 32 having side rails 33 and 34 which snap into complementary grooves in the sidewall of the cap member 25, is provided with a barbed extension 35 projecting through a slot 36 in the thickened section 19 of the membrane 16.

As seen in FIG. 3 the membrane 16 is normally under sufficient tension and has sufficient body strength to oppose the internal pressure of the container and retain the contents therein. When it is desired to release the contents the finger portion 37 of the slide 32 may be urged in the direction of the arrow 38 shown in FIG. 4 for applying further tension to the membrane 16 stretching the central portion thereof to move the aperture 17 into registration with the orifice 15. When the slide 32 is released the tension in the membrane 16 will restore the valve to the closed position shown in FIG. 3. Thus, the slide 32 provides means for movement along a straight line passing through the orifice 15 for selectably elongating the membrane 16 to draw its aperture 17 from a point on one side of the orifice to a point overlying the orifice.

The body member 12 of the valve may be provided with a lower flange 38 and may be secured to the top of a pressurized container in any suitable manner such as shown in FIG. 3.

Turning now to FIGS. 7 to 9, there is shown a modification of the valve assembly differing from the previous embodiment in the nature of the mechanism for moving the membrane 16. As shown in FIG. 7 to 9, the valve assembly 40 is provided with a cap 41 to which a lever 42 is fulcrumed between the ears 43 and 44. The end 45 of the lever 42 projects through the slot 36 in the membrane 16, as shown. In all other respects this embodiment is similar to the one previously described and operates in substantially the same manner. With the lever 42 in the position shown in FIG. 8 the valve is closed. When the lever is manipulated in the direction of the arrow 46 as shown in FIG. 9 the membrane 16 is elongated and the valve is opened.

The invention has been described in connection with the presently preferred embodiments thereof. It will be apparent to those skilled in the art that changes in construction may be made therein without departing from the true spirit of the invention as defined in the appended claims.

What is claimed is:

1. A dispensing valve for controlling the outflow of the contents from a pressurized container comprising in combination a body member having a through passage terminating at one end at a surface of said body member in a discharge orifice and having its other end arranged for communicating with the contents of said container, a closure member for said orifice in the form of a stretchable elastomeric membrane, said membrane being secured to said body member overlying said orifice and having an aperture therethrough, and means for selectably stretching said membrane to shift the position of said aperture relative to said body member into and out of registration with said orifice to thereby open and close said valve.

2. A dispensing valve according to claim 1, wherein said membrane is anchored to said body member on one side of said orifice, and means are secured to the membrane on the other side of said orifice movable relative to said body member along a straight line passing through said orifice for selectably elongating said membrane to draw said aperture from a point on said one side of said orifice to a point overlying said orifice.

3. A dispensing valve according to claim 2, wherein said means for elongating said membrane comprises a slide mounted on said body member and coupled to said membrane.

4. A dispensing valve according to claim 2, wherein said means for elongating said membrane comprises a lever pivotally joined to said body member and coupled to said membrane.

5. A dispensing valve according to claim 1, wherein the surface of said body member at least surrounding said orifice is convexo-cylindroidal, and means are provided overlying said membrane and joined to said body member for guiding said membrane down over said orifice so as to conform to said convexo-cylindroidal surface at least in the vicinity of said orifice.

6. A dispensing valve according to claim 5, wherein said means overlying said membrane comprises a pair of spaced apart parallel rounded beads on opposite sides of an aperture in a cap member, said beads being parallel to and spaced from said convexo-cylindroidal surface by a distance slightly greater than the thickness of said membrane but being located relative thereto for causing said membrane to conform to said surface.

7. A dispensing valve according to claim 1, wherein said membrane comprises a median section of reduced thickness between two thicker marginal areas, and said membrane is secured to said body member and joined to said means for stretching it at said marginal areas.

8. A dispensing valve according to claim 7, wherein said median section varies in thickness being thickest adjacent said marginal areas and tapering toward the center whereby elongation is concentrated in the central portion of said median section.

* * * * *