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CONTAINER AND VALVE ASSEMBLY

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FIG. 1

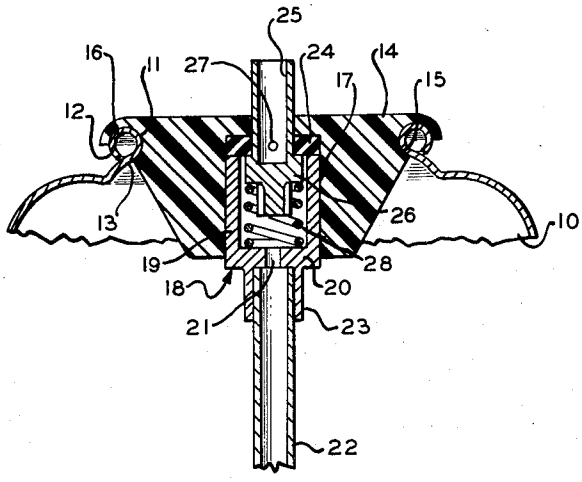
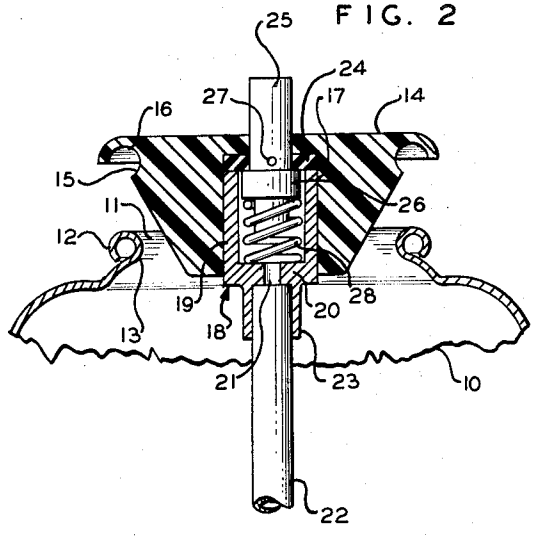


FIG. 2



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CONTAINER AND VALVE ASSEMBLY

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This invention relates to aerosol valves and mounting thereof.

Primarily the present invention contemplates simplification and reduction of the number of parts involved in the construction and mounting of an aerosol valve.

Somewhat generally, the invention proposes an improved means for both mounting and sealing a valve in place on its container.

More specifically, an object of the invention is to provide a combined sealing and mounting means that can be snapped into place in the container and which will remain in place under normal pressures present in the usual pressurized aerosol containers.

A further object of the invention is to provide a construction of valve and mounting means wherein the mounting means also holds the valve assembled.

In greater detail, a construction is provided enabling the valve parts to be pressed into assembled relation to each other as introduced into the mounting means and with the frictional engagement of the mounting means retaining the valve assembled.

A still further object of the invention is to utilize both the resilient character of the mounting and the inherent pressure in the container to apply the force obtaining the requisite frictional retention.

Other objects, advantages and novel structural features of the invention will appear to persons skilled in the art to which it appertains as the description proceeds, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawing, in which like numerals of reference are used in both views to designate the same parts;

Figure 1 is an axial sectional view of a valve and its mounting means in fully assembled relation in the mouth end of a container; and

Figure 2 is a similar sectional view showing the valve assembled in the mounting means and showing the mounting means approaching its position in the mouth of the container but not yet fully assembled therewith.

In the specific embodiment of the invention illustrated in said drawing, the reference numeral **10** designates an aerosol container providing a mouth **11** of appropriate material and here shown as a metal container with a curled lip **12** constituting the edge of said mouth. The head portion of the container next to said lip flares peripherally therefrom so that there will be a flare or shoulder **13** at the inside of the container adjacent to said lip.

A valve mounting **14** is provided which also constitutes a closure for the container mouth and is shaped to provide a peripheral ledge **15** adapted to be forced into a position underlying the flare **13** of the container. Said ledge is part of the wall of an inverted gutter-shaped trough **16** at the side of said mounting proximate to the top thereof. The mounting is composed of material having a reasonably high modulus of elasticity such that the breaking point of dilation is greater than 50%. Breaking dilation is defined as a percentage of increase of length when stretched to the breaking point, at room temperature, over the original length. Preferably a plastic material is employed to constitute said mounting, and from the present choice of plastic materials suitable for the mounting, a dicarboxylic acid polyamide has proved to be satisfactory. By virtue of its elasticity, this material may be stretched at the open side of the trough **16** and forced over lip **12** of the container mouth. In so applying the mounting, the ledge **15** is snapped under flare **13** of the container while the peripheral upper edge of the mounting snugly hugs the curvature of the lip. It will be understood that in forcing the mounting into said mouth of the container that the material of the mounting is squeezed or compressed but that due to its resiliency, it regains its shape as soon as the trough **16** comes into registration with the like curvature of the lip.

The mounting means **14** is prefabricated to provide a pocket **17** for reception and retention of an aerosol valve assembly **18**. This valve assembly provides a cylindrical housing **19** with a bottom wall **20** having a central perforation **21** by which fluid contents of the container may pass into the chamber formed within said housing. A dip tube **22** held by a collar **23** on the bottom of said housing leads as usual from the bottom of the container to said perforation **21** to convey the fluid thereto irrespective as to the level of the fluid in the container at the particular occasion of use.

On the top end of cylindrical housing **19** is seated a valve-gasket **24** of washer shape, and extending through the hole of this gasket and a corresponding hole in the otherwise closed end of pocket **17** is a hollow valve-stem **25** which is slidable with respect to said gasket and has a peripheral enlargement **26** at a location below said gasket which will act as a stop to limit upward movement of the valve-stem by engagement with the under face of valve-gasket **24**. Said valve-stem is open only at its upper end and closed at its lower end. The valve-stem **25** has a lateral port **27** communicating from the exterior to the hollow interior of said valve-stem, said port being at a part of the valve-stem above the enlargement **26** and at a location such that by sliding the valve-stem the port may be brought at one or upper position within the confines of the valve-gasket **24** and in another or lower position, below the said gasket. The gasket hugs the valve-stem and constitutes a seal against passage of fluid past the same between it and the valve-stem. It may also be noted that the same gasket also effects a seal at its margin where engaging the end edge of the cylindrical housing. When the valve-stem is depressed the port is within the housing chamber below the gasket and consequently provides for passage of fluid from the chamber, through said port and out through the upper end of the hollow of the stem. The stem is held normally upward to close the port by its inclusion within the confines of the gasket, a spring **28** being shown for that purpose situated within said chamber and bearing at one end against the under side of the enlargement **26** and at its other end seating on bottom wall **20**.

Attention is now directed to the fact that the pocket **17** is fabricated to have a diameter not greater than the outside diameter of housing **19** and preferably of slightly less diameter so that, by virtue of the elasticity of the mounting material, the housing will be retained in the pocket by its frictional engagement therein. Furthermore, said mounting, at the part thereof below trough **16**, is frusto-conical in shape at approximately a 60° angle of cone. One purpose of this tapering of the mounting is to enable it to be pushed into the container mouth with a compressive wedging effect upon the material so as to effect the snap seating of the lip **12** into trough **16**. The construction is such that the necessary pressure

to seat the mounting in its assembled position of interengagement of the trough on said lip, is very considerably greater than any unseating pressure which may develop within the container. It is a known fact that pressure of a fluid on a surface is in a direction normal to the surface, and taking advantage of such fact, I provide a taper which makes a smaller angle to the axis than to a diametric plane, and thus utilize the pressure in the container to be more effective in a radial direction of the mounting than in a longitudinal direction thereof, so the inherent pressure in the container applies a strong compressive force of the mounting against the housing to increase the grip of the mounting on said housing by the transverse moment of force, whereas the longitudinal moment of force is of less intensity and is insufficient to unseat the trough ledge **15** from the flare or shoulder **13** at the under side of the curled lip **12** of the container. An effective retention of the mounting and tight seal thereof in its engagement with the lip is accomplished by a construction that is simple and readily manufactured and assembled.

Furthermore, by utilizing a mounting the length of which in an axial direction is substantially coextensive with the cylindrical housing, a large area of frictional engagement is obtained between the mounting and the housing such that pressure exerted by spring **28** at times augmented by the user depressing the valve-stem **25** will be incapable of displacing the housing from its assembled position within the mounting. Thus, when the parts have been once assembled the housing maintains its compressive engagement against the margin of valve-gasket **24** and a permanent seal is retained thereat.

It will also be observed that the valve construction is radically simplified from the prior art structures, since no crimping is necessitated to hold parts together. All that is required in fabrication is to apply the spring and valve-stem in the housing and apply the valve-gasket on the valve-stem and then press that assembly home in pocket **17**, thus both completing the assembled relation of the mechanisms constituting the valve and simultaneously securing the valve assembly in its permanent position within the mounting by a single press operation. Then by a second press operation, the mounting is applied in its permanent position both as a sealed closure for container mouth **11** and as a fixed support for the valve assembly.

I claim:

1. The combination of a resilient mounting having a pocket therein, a valve assembly in said pocket and comprising a cylindrical housing and valve gasket in tight engagement with each other and retained in tight engagement by frictional retention of the said housing in place in said pocket, said mounting and housing being substantially coextensive in an axial direction.

2. The combination of a container having a mouth, a resiliently compressible valve mounting in said mouth and interlocking therewith under pressure developed in said mounting radial both to said mounting and to said mouth, and a valve assembly for controlling egress of pressurized material from said container, said valve assembly having a rigid housing embedded in said mounting, said housing being solely supported and retained by radial pressure developed in said mounting.

3. The combination of a container having a mouth with a circumferential lip, a resiliently compressible valve mounting having a peripheral trough interengaging with and radially compressed by said lip thereby developing radial pressure in said mounting, and a valve assembly providing a housing having greater rigidity than said mounting and resistive to deformation by pressure of said mounting, said assembly providing a valve seat and a valve movable toward and from said seat for controlling egress of pressurized material from said container, said valve assembly housing being embedded in said mounting and retained and supported solely by radial pressure developed in said mounting.

4. The combination of a container having a mouth with a circumferential lip, a resilient plastic valve mounting having a peripheral trough forming a shoulder, and said trough and shoulder engaging said lip both retaining said mounting in said mouth and developing radial pressure in said mounting, said mounting having a frustoconical portion depending into said container below said trough and said depending portion having a downwardly open pocket, and a valve assembly having a rigid housing substantially filling said pocket and the upper end of said pocket having a valve seat thereat, said housing being held against said valve seat and retained in said pocket with radial pressure of said mounting thereagainst, and said valve assembly providing a valve stem with an enlargement thereon, said enlargement also being engageable with said valve seat.

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