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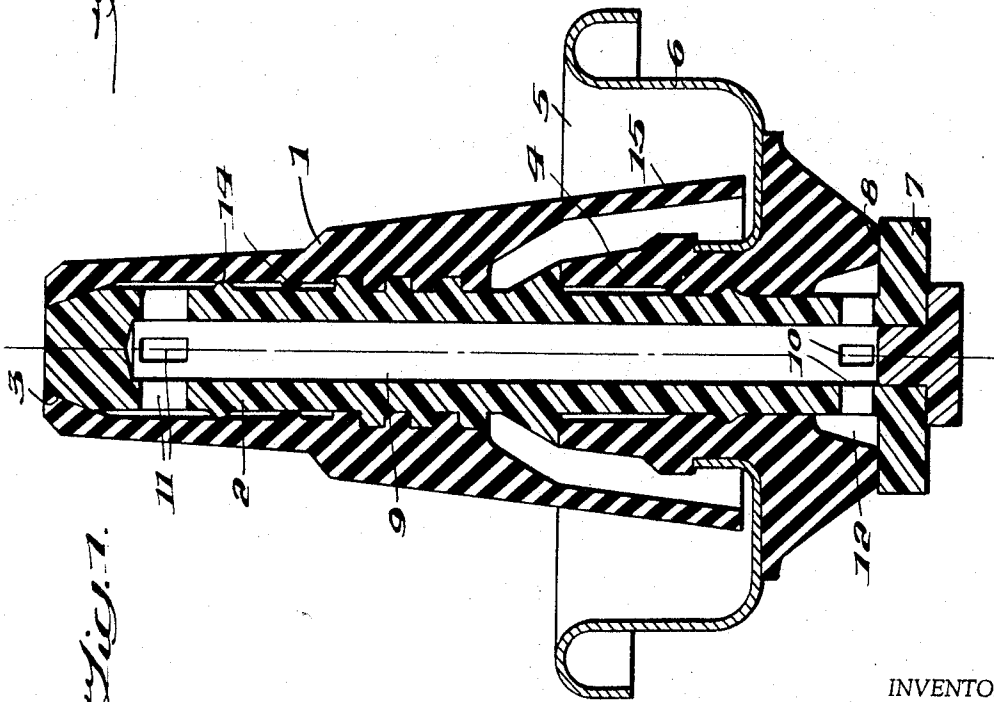
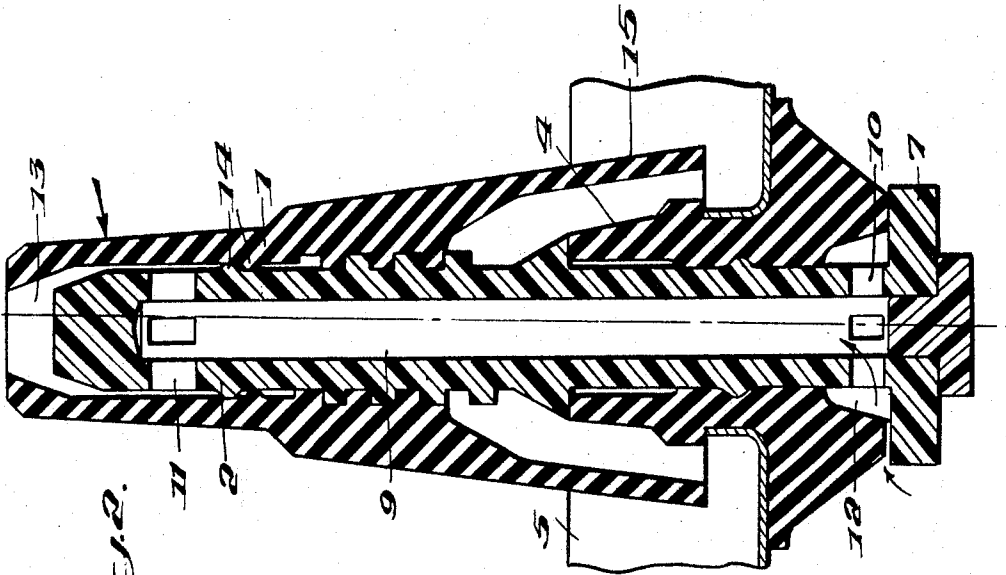
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AEROSOL TILT VALVE FOR COMESTIBLES

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Sheet 1 of 2



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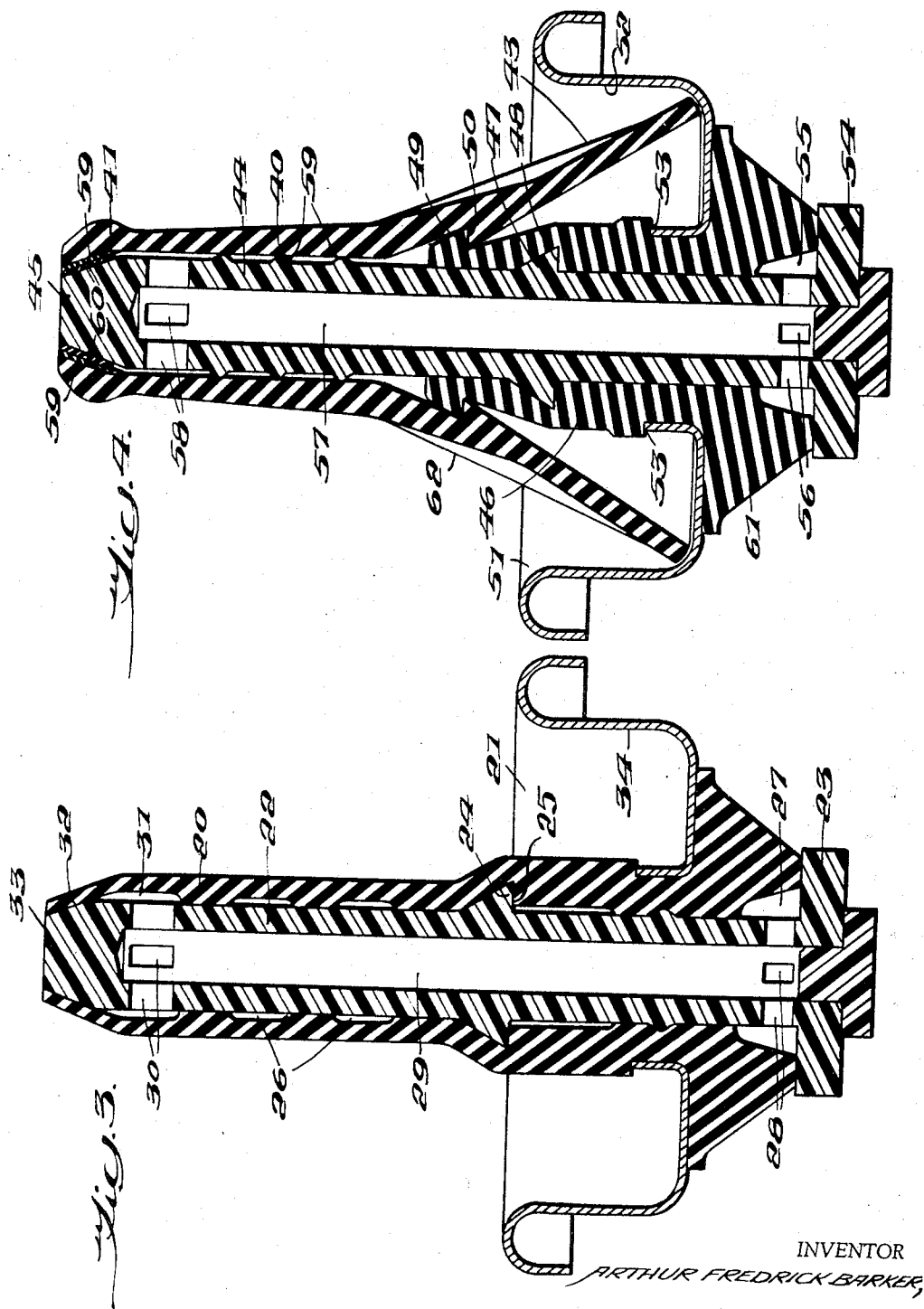
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AEROSOL TILT VALVE FOR COMESTIBLES

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1 Claim

ABSTRACT OF THE DISCLOSURE

Valve assembly for a pressurized aerosol container comprising tiltably operable valve closing means, discharging means and means for separating sealing surfaces of the discharging means, said means being constructed and arranged such that an air-exclusion seal is effected at the closed discharge orifice when the valve assembly is not discharging.

The present invention is directed to novel aerosol valve assemblies for pressurized aerosol containers. More specifically, the present invention is directed to an improved aerosol valve assembly adapted to be self-sealing, that is, having provision for automatically closing off from the atmosphere the discharge opening in the valve assembly except during those periods when the package is in use.

In relatively recent years, a great many commodities have come to be sold in pressurized aerosol containers in which a product is discharged from the container under pressure generated by an aerosol propellant within the container. Control of the discharge of the product is had by means of a valve assembly ordinarily mounted at the mouth of the container. The valve assembly usually includes an actuating device for opening the valve closure and a discharge orifice through which the product is dispensed.

Despite the continually increasing number of commodities being marketed in aerosol containers, there has been heretofore a large number of comestible products which could not be effectively marketed in this manner. There are several reasons why present-day aerosol valves fail as dispensing assemblies for food products. First of all, the particle size of many food products is of such a nature that the discharge metering orifice in the standard valve is easily clogged by such particles. Secondly, the food particles, when trapped in the standard valve closure, can prevent an effective seal from forming, thereby allowing the product to continuously seep through the closure. Finally, the standard valves are designed in such a manner that the residue product is left exposed to the air in the valve passageways after discharge. It is well known that food products are of such nature that prolonged exposure to air adversely affects their quality or other physical characteristics.

Any one of these problems is easily solved by itself, but the solution of one problem usually magnifies the other problems. It has been difficult to design a valve assembly especially adapted to food products and the like which solves all these problems in one design.

The main difficulty arises from the fact that in the usual arrangement of the valve assembly there is a substantial distance between the point where the valve closes and the discharge opening through which the aerosol contents are discharged to the atmosphere. As a result, the passageways connecting these points through which the product must pass before discharge are essentially dead spaces which are constantly exposed to the atmosphere. Inasmuch as there is always some residue of product left within this dead space between the valve closure and valve discharge, any residue product which includes a

non-volatile substance, such as comestibles, will eventually dry out in these passageways. At the same time, any product which will be adversely affected by exposure to the action of aerobic bacteria will have the residue in these passages so affected. Thus, upon subsequent usage of the aerosol, the dried out and/or contaminated residue will be dispensed with fresh product, rendering the discharged product totally unacceptable.

Accordingly, this invention is directed to an improved aerosol valve assembly to be used in combination with a pressurized aerosol container for dispensing comestibles and the like which does not leave the space between the discharge orifice and the valve closure exposed to the atmosphere. In this manner, the problems which occur because the residue is exposed to the atmosphere are eliminated. A further advantage of the present invention is that the discharge opening is formed by at least one member made of a resilient material. When the orifice is closed, any particles or fibers trapped in the orifice are temporarily embedded in the resilient member, thereby allowing a complete air-exclusion seal to form at the discharge opening.

The present preferred form of the invention is shown in the accompanying drawings which will be described in detail hereinafter for the purpose of illustrating the ways in which the invention may be made and used. From what has been said above, it will be apparent to those skilled in the art that the principles and advantages of the invention could be obtained in other forms of the invention not specifically shown herein. The accompanying drawings and description to follow are, accordingly, made by way of example only and are not intended to define or restrict the scope of the invention.

A better understanding of the invention will be obtained by reference to the accompanying drawings which form a part of this application and illustrate a preferred embodiment of this invention.

In the accompanying drawings:

FIGURE 1 is an elevational view in section of an embodiment of the valve assembly of this invention. The valve assembly in FIGURE 1 is in a closed or non-operating position.

FIGURE 2 is an elevational view in section of the valve assembly of FIGURE 1 when in an open or discharging position.

FIGURE 3 is an elevational view in section of another valve assembly falling within the scope of this invention. The valve assembly in FIGURE 3 is shown in the closed position.

FIGURE 4 is an elevational view in section of still another embodiment falling within the scope of the present invention. FIGURE 4 shows the valve assembly also in the closed position.

Referring first to FIGURE 1, there is shown a pressurized container valve assembly comprising a standard internal tilt valve mechanism with a screwably sealing outer orifice enclosure. This outer enclosure consists of a spout 1 screwably engaging the rigid tubular member 2. When the spout 1 is screwed tight over the rigid tubular member 2, an air-tight seal 3 is formed at their uppermost portion where their surfaces engage. Rigid tubular member 2 is resiliently mounted in grommet 4 which in turn is press fitted within container cap 5 in a manner well known to those skilled in the art, being more fully described in U.S. Patent 2,704,621. The container cap 5 is easily attached to the aerosol container by crimping the cap 5 at 6 to the mouth of the aerosol container by methods well known in the art.

At the base of tubular member 2 is annular flange 7 which forms a valve closure by sealing with resilient grommet 4 at 8. The tubular member 2 contains an in-

ternal passageway 9 which connects with side ports 10 at the bottom and side ports 11 at the top. The bottom side ports 10 open into a chamber 12 which is formed by the top of the annular flange 7 and the grommet 4.

FIGURE 2 shows the valve assembly in the open or discharging position. In operation, the spout 1 is unscrewed from rigid tubular member 2 a turn or two, thereby forming opening 13 by unmating the upper end of tubular member 2 from spout 1. Spout 1 is then tilted by applying an external force (finger pressure) in the direction of the arrow. As the spout 1 is tilted, the force is transmitted by ridges 14 and the threads to the rigid tubular member 2 causing it also to tilt. As tubular member 2 tilts, the flange 7 also tilts compressing the grommet 4 on the side where the tilting force is applied and unmating the flange from the grommet on the opposite side. As this unmating occurs, the active ingredients within the container are forced by the propellant into chamber 12, through side ports 10, up internal passageway 9, through outlet ports 11, and out the opening 13. The ridges 14 on tubular member 2 also function to prevent the aerosol product from backing into the area between spout 1 and tube 2. When the external tilting force is removed, the compression setup in resilient grommet 4 acts as a spring-like force to return tubular member 2 and spout 1 to the upright position, thereby causing the flange 7 to form a seal around its periphery with the grommet 4. Spout 1 is then screwed down on tubular member 2 causing their surfaces to meet at 3. Any particles or fibers caught in the closure 3 are embedded in the resilient material of the closure provided by the internal surface of the spout 1, thereby effecting an air seal. Skirt 15 of spout 1 is in close proximity to the aerosol container cap 5 and thereby prevents the valve from being operated accidentally when spout 1 is fully engaged on tubular member 2.

Grommet 4 is made of an elastomer such as natural or synthetic rubber or a soft plastic such as polyethylene. The rigid tubing 2 is made of hard plastic such as nylon, polystyrene, polypropylene, or an acetal or metal. Spout 1 is preferably made from a material which is resilient enough to effect an air-tight seal at 3, and yet is sufficiently rigid and smooth to screwably engage tubular member 2, such as polyethylene. Alternately, spout 1 may be made of a hard plastic, such as nylon, and adapted with inserts at 3 of resilient material, such as rubber, as will be more fully described hereinafter.

Another embodiment of the present invention is disclosed in FIGURE 3. Turning to FIGURE 3, there is shown in combination a tiltable operated external spout 20 made of a resilient material which is resiliently mounted within container cap 21. The lower portion of spout 20 forms a sealing grommet. Axially contained within spout 20 is a rigid tubular member 22 having at its lower end a flange 23 which forms a standard tilt valve mechanism with the lower grommet section of spout 20 similar to the tilt valve mechanism shown in FIGURE 1. The top section of tubular member 22 is tapered and mates with the internal surface of the tip of spout 20. The internal diameter of spout 20 is smaller than the external diameter of the top section of tubular member 22.

The tubular member 22 is fixed within spout 20 by boss 24 which engages internal groove 25 of spout 20. The tilt valve mechanism is, in turn, attached to an aerosol container by crimping the container cap 21 to the aerosol container at 34 by methods well known to those skilled in the art. The annular internal chambers 26 of spout 20 reduce the sliding friction when the tubular member 22 is fitting within spout 20 and also prevent the product from backing up between tubular member 22 and spout 20.

When an external force is applied to the side of spout 20, tubular member 22 tilts causing flange 23 to be separated on one side from the sealing surface of the grommet section of spout 20, thereby causing an opening to chamber 27. The contents of the aerosol container flow

under pressure into chamber 27, through ports 28, and into central passageway 29 of the tubular member 22. From the central passageway 29, the contents flow through ports 30 into annular space 31. Upon entering the annular space 31, the pressure of the contents of the aerosol container forces an opening between the outer thin end 32 of resilient spout 20 and the top tapered section 33 of rigid tubular member 22, thereby allowing the contents to discharge. When the external tilting force is removed, tubular member 22 is returned to its upright position, thereby forcing flange 23 to seal with the grommet section of spout 20, thereby stopping the flow of ingredients into chamber 27. As the pressure from the contents is relieved, the thin resilient end 32 of spout 20 mates with the tapered top section 33 of rigid tube 22, thereby sealing the contents of passageway 29 from the atmosphere. Any particles or fibers trapped between tapered top section 33 and the outer end 32 of spout 20 are embedded in the large resilient surface area of the outer end 32. In this manner, outer end 32 effectively seals out air from the space between the valve closure and the discharge opening.

The resilient spout 20 is made of an elastomeric material, such as natural rubber or a suitable synthetic rubber. The rigid tubular member 22 may be made of a hard plastic, such as nylon, polystyrene, polypropylene, or an acetal, or a metal.

Still another embodiment of the present invention is shown in FIGURE 4. Referring now to FIGURE 4, there is shown a tiltable operable external spout 40 froming an inwardly tapered nozzle 41 and having a flared skirt 43 at its bottom section. If desired, the flared skirt 43 can be supported by ribs 62. Internally positioned within spout 40 is an axially fixed tubular member 44 ending in a solid tapered plug 45. Tubular member 44 is held in position by being resiliently mounted within the upper portion 46 of grommet 61. The shoulder 47 of tubular member 44 fits within internal groove 48 of upper portion 46 of grommet 61. At the top of upper portion 46 of grommet 61 is groove 49 which is adapted to engage shoulder 50 of spout 40, thereby holding spout 40 and tubular member 44 in fixed relationship to each other. A pressure seal between the grommet 61 and the container cap 51 is effected in a manner well known to those skilled in the art as more fully described in U.S. Patent 2,704,621. The container cap 51 is attached to the aerosol container by crimping at 52 by techniques well known to those skilled in the art.

To operate, the whole external assembly is pushed laterally, thereby pivoting skirt 43 of sprout 40 against the container cap 51. At the same time, tubular member 44 is pivoted approximately at fulcrum 53. It can be seen that the difference in location of pivot centers of tubular member 44 and spout 40 will cause the functional separation of the outer plug 45 of tubular member 44 from the inwardly tapered nozzle 41, thereby creating an opening at this point. At the same time, similar to the valve closure mechanism of FIGURES 1 and 3, the flange 54 at the base of tubular member 44 tilts, allowing the contents of the aerosol under pressure to flow into annular chamber 55, through ports 56, up passageway 57, through ports 58, and out the opening between plug 45 and nozzle 41. Tubular member 44 is banded with ridges 59 which allow axial positioning between tubular member 44 and spout 40 on opening and closing and prevents the discharging contents from backing up between spout 40 and tubular member 44. If desired, the engaging surfaces of tapered plug 45 and nozzle 41 may be lined with resilient inserts 59 and 60. These resilient inserts embed any food particles trapped in the juncture so that the trapped particles do not destroy the air-exclusion seal at closing.

Tubular member 44 may be made from a rigid material, such as nylon, polypropylene, polystyrene, or an acetal, or metal. Spout 40 can be made of a rigid material, such as nylon, polypropylene, polystyrene, or an acetal,

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or metal if resilient inserts 59 and 60 are employed. Alternatively, spout 40 can be made of a resilient material, such as polyethylene, which is sufficiently resilient to form the air seal at the discharge opening and yet rigid enough so that rib-supported skirt 43 can pivot on container cap 51. The grommet 61 can be made of resilient material such as rubber, polyethylene, or polyvinyl chloride. Rubber is preferred. The annular elastomeric inserts 59 and 60 are made of resilient materials such as rubber, polyethylene, polyvinyl chloride, or like elastomeric materials. Rubber is the preferred material.

If desired, the tilt valve of the present invention may be used with a dip tube attachment. A dip tube is a conduit of sufficient length to extend to the bottom of the container to insure that all the contents are discharged by the propellant. The dip tube is attached to the valve assembly by techniques well known to those skilled in the art.

It will be seen that in the novel valve assembly of this invention an air-exclusion seal is effected at the closed discharge orifice when the valve assembly is not discharging. Thus, the space between the valve closure and the discharge orifice is not exposed to the atmosphere. It will also be seen that any particles or fibrous material trapped in the opening upon closing will become temporarily embedded in the resilient material forming the opening, thereby enabling a complete air seal to be made.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that this invention is not limited to the specific embodiments thereof except as defined in the appended claim.

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1. A valve assembly for a pressurized aerosol container comprising

(A) a tiltably operable valve closing means comprising an external spout made of rubber, an internal tubular member resiliently mounted in a grommet, said tubular member having an internal passageway with outlets at both ends and a sealing flange at the base, said grommet abutting said flange around its periphery so that a seal is formed when the tubular member is in the upright position,

(B) a discharging means formed by abutting surfaces of the upper portions of said spout and said tubular member wherein at least one of said surfaces is made of a resilient material, and

(C) means for separating the sealing surfaces of the discharging means, said means for separating comprising using the internal pressure from the aerosol container to separate said sealing surfaces.

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