

[54] **DOUBLE DIP TUBE AEROSOL**
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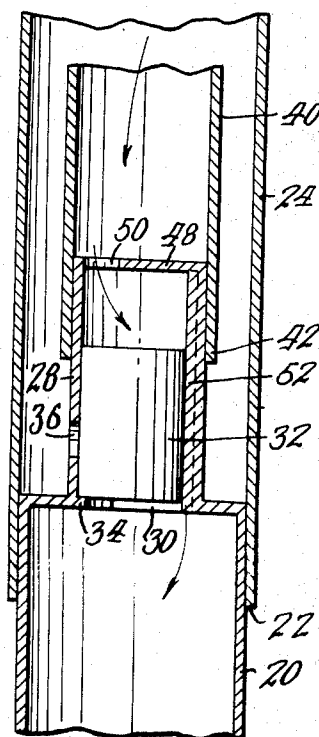
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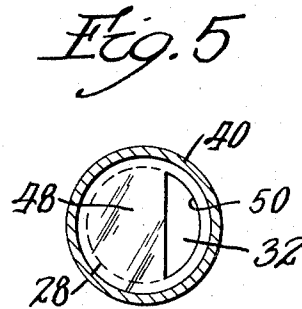
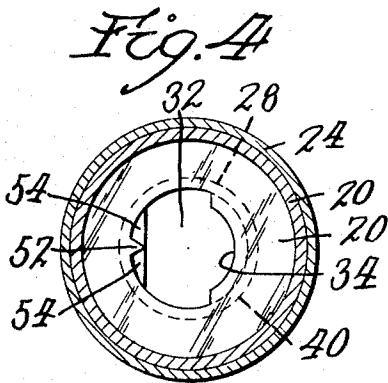
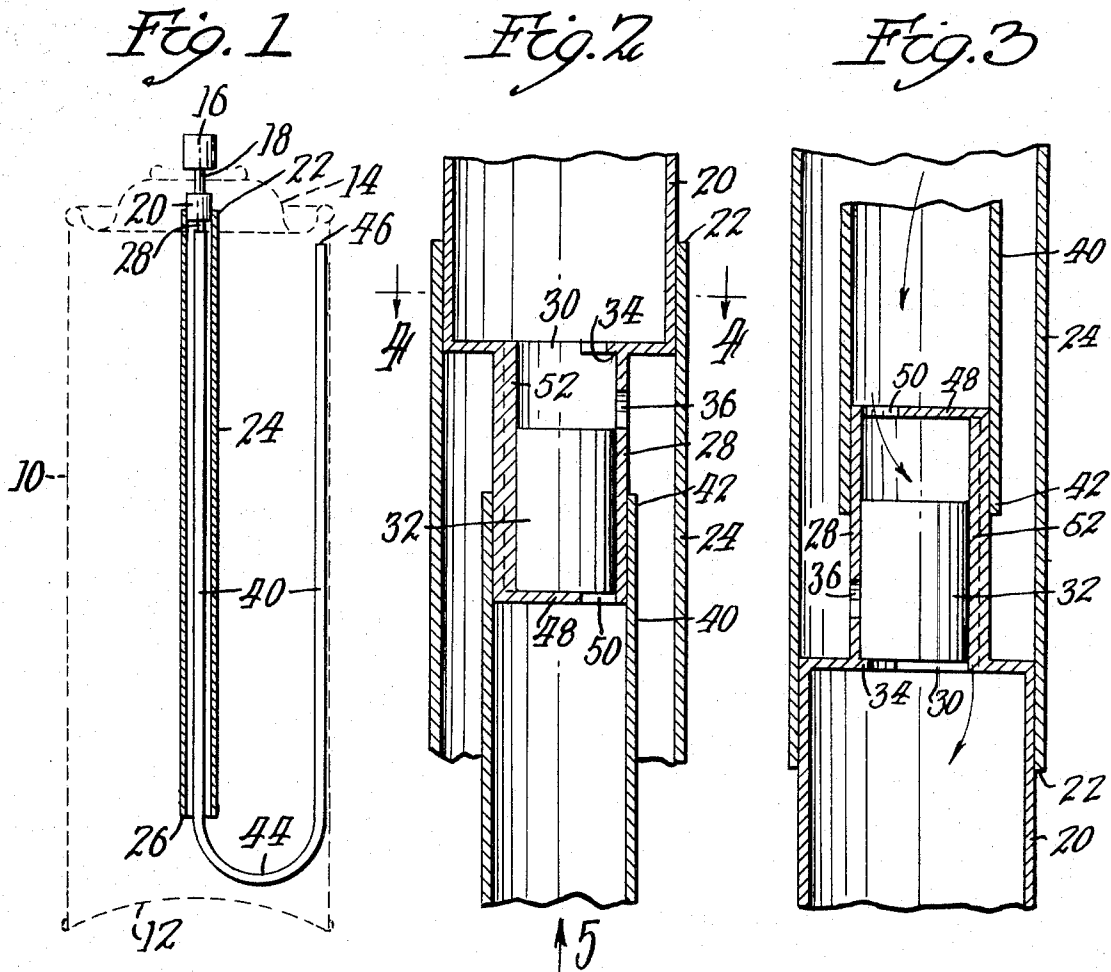
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[57] **ABSTRACT**

In an aerosol valve, a pair of dip tubes located one within the other and attached to the valve body for the valve, the outer dip tube extending to a point adjacent the bottom of the aerosol container and the inner dip tube extending from the outer tube and being reversed to terminate adjacent the area of the valve at the top of the aerosol container, and a gravity actuated sliding plug in a housing having two entrances arranged to close the inner dip tube when the aerosol is operated in an upright position, and closing the outer tube when the aerosol is used in inverted position.

10 Claims, 5 Drawing Figures





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DOUBLE DIP TUBE AEROSOL

BACKGROUND OF THE INVENTION

One of the problems with certain kinds of aerosols resides in the fact that in many cases the aerosol operates well only when upright. There have been suggestions for correcting this by providing for a valve for closing off the interior of the aerosol to the valve body depending upon the manner in which the aerosol is held and utilizing a single dip tube for operation in upright position of the aerosol. However this suggestion has a fault in that there is no positive gas pressure at all times because of the fact that the aerosol may be desired to be used at many different angles of inclination, and it is the object of the present invention to provide a construction which is positively operable upright, inverted, or at any angle or inclination.

SUMMARY OF THE INVENTION

An aerosol container is provided with the usual valve and valve body, the valve body having attached thereto one end of an outer dip tube which extends substantially to the closed or lower end of the container. On the valve body there is an extension within the dip tube, said extension being hollow and cylindrical and containing a gravity operated sliding plug. An inner, elongated dip tube is attached to the extension and passes out the lower end of the outer tube, is reversed and extends almost to the upper end of the aerosol. The extension freely communicates with the valve body at one end, there being a port in a side wall extension uncovered by the sliding plug when the aerosol is used in upright position, for communication between the outer dip tube and the valve.

There is also a port in the bottom wall or floor of the extension which is closed by the sliding plug when the aerosol is upright but which is open upon inversion thereof, the plug then closing the first mentioned port so that in this case the inner dip tube is now in communication with the valve body through a special conformation of the sliding plug.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view through an aerosol, showing the double dip tube construction, the outer dip tube being in section and the inner dip tube being in elevation;

FIG. 2 is a view in section illustrating the operation of the aerosol in an upright position;

FIG. 3 is a similar view but showing the parts in inverted position of the aerosol;

FIG. 4 is a section on line 4—4 of FIG. 2, and

FIG. 5 is a bottom plan view showing the floor of the extension.

PREFERRED EMBODIMENT OF THE INVENTION

An aerosol container of more or less conventional design is generally indicated at 10, having a closed end at 12 and a dome at 14 holding the valve structure. The valve comprises a depressible button 16, a valve stem at 18, and a valve body housing at 20, all more or less as conventional. The valve body 20 has secured thereto the upper end 22 of an outer dip tube 24 which terminates as at 26 in relatively close association with respect to the bottom 12.

However the valve body 20 is provided with a downwardly extending extension member 28. This has a free

opening relative to the interior of the valve body as at 30. It contains a gravity operated sliding plug 32 and there is a stop 34 preventing the plug from moving into the valve body.

Plug 32 is shorter than the interior of the longitudinal dimension of the extension 28 and will therefore have the positions shown in FIG. 2 with the aerosol upright and in FIG. 3 with the aerosol inverted.

The extension 28 also has a port 36 for communication with the outer dip tube 24, and as seen in FIG. 2, the dip tube 24 is in communication with the valve body. When the valve 16 is depressed in upright position of the aerosol, the spray material will take the path indicated for being sprayed out under pressure of the material in the aerosol.

Mounted on the lower end of the extension 28 is an inner dip tube 40 by its end 42. Dip tube 40 extends out of the lower end of outer dip tube 24 as at 44 and being reversed, terminates as at 46 adjacent to dome 14. Extension 28 is provided with a floor 48 having a port 50 therein for communication between the inner dip tube 46 and the valve body when the aerosol is inverted, the port 50 then being open and port 36 closed, see FIG. 3.

The extension 28 is provided with a longitudinal rib or the like generally indicated at 52 and the plug 32 is provided with a chordal longitudinal cutout 54 riding against the free edge of the rib 52. The cutout provides a passage for the spray material when the aerosol is inverted as in FIG. 3 but of course there is no such passage available when the aerosol is upright as in FIG. 2 since port 50 is closed under these conditions.

In the operation of the device when the same is upright, the plug falls by gravity blocking port 50 and opening port 36 so that the outer dip tube 24 provides communication between the area at the bottom of the container and the valve. Thus when the valve is open material will be sprayed as will be clear.

However upon inverting the aerosol, port 50 is now open and port 36 closed but there is communication from the end at 46 of the inner tube 40 with respect to the valve body through port 50 and the cutout area at 54 directly into the valve body, the plug 32 being held in this position by the stop 34.

This aerosol will also operate while held in any inclination, there always being one tube or the other in communication with the spray material. In the event that the plug is moved partially away from its FIG. 1 position, but not fully to the FIG. 3 position, the material will still be sprayed as desired even though there may possibly be two paths. In any event the material to be sprayed will be definitely under pressure of the gas in the aerosol container.

I claim:

1. An aerosol having a closed end and a valve end, a valve at the valve end including a valve body, a dip tube on the valve body, said dip tube extending adjacent to and having an open end at the closed end of the aerosol container,

a second dip tube, said second dip tube being located in the first dip tube and being elongated and extending reversely outside of the first dip tube to a point adjacent the valve end of the aerosol, there being a passage between the first-named dip tube and the valve body and a passage between the second-named dip tube and the valve body,

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and single means alternatively preventing communication between the first dip tube and the valve body and permitting communication between the second dip tube and the valve body and permitting communication between the first dip tube and the valve body and preventing communication between the second dip tube and the valve body.

2. The aerosol of claim 1 wherein said means comprises a gravity actuated member.

3. The aerosol of claim 1 including an extension on the valve body, said extension being hollow, said means comprising a gravity operated sliding plug in said extension.

4. The aerosol of claim 1 including an extension on the valve body, said extension being hollow, said means comprising a gravity operated sliding plug in said extension, said plug being shorter than said extension, said plug having positions closing either of said passages depending upon the position of the plug in the extension, while opening the other passage.

5. The aerosol recited in claim 4 wherein the passage between the inner dip stick and the valve body includes a cutaway portion along the plug.

6. An aerosol according to claim 1 wherein the second dip tube is substantially coextensive with the first dip tube and is located interiorly thereof.

7. An aerosol comprising a container having a closed end and a valve end, a valve at the valve end including a valve body within the container and a depressible button exterior of the container to operate the valve,

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a hollow extension on said valve body, said extension including a side wall, a floor closing the extension, a passage between the valve body and the extension, a port in the floor and a port in the side wall of the extension,

a gravity actuated sliding plug in the extension, said plug providing passages from said ports to the valve body alternatively, depending on the position of the plug in the extension, the plug closing one port while uncovering the other,

a first dip tube on the valve body of greater diameter than the extension and encompassing the latter and extending to an open end located adjacent the closed end of the container, the port in the side wall of the extension opening to the first dip tube interiorly thereof,

and a second dip tube of lesser diameter than the first dip tube, said second dip tube being attached to the extension, the port in the floor of the extension opening to the second dip tube interiorly thereof.

8. The aerosol of claim 7 wherein the second dip tube is substantially coextensive with the first dip tube and is located therewithin.

9. The aerosol of claim 7 wherein the second dip tube extends out of the first dip tube at its open end.

10. The aerosol of claim 9 wherein the second dip tube extends reversely to a point adjacent the valve end of the container.

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