AEROSOL CAN CONSTRUCTION

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References Cited
UNITED STATES PATENTS
3,596,802 8/1971 Feldman..............................222/135

3,198,394 8/1965 Lefer.............................222/135
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ABSTRACT

An aerosol dispenser comprising a sealed container containing a plurality of compartments, each possessing a different dispensable material. A dip tube positioned in the container having radial inlet openings extending through it. Rotation of the dip tube about its axis aligns the inlet openings with ports which communicate with the compartments so a selected combination of materials can be dispensed.

7 Claims, 8 Drawing Figures
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BACKGROUND OF THE INVENTION

This invention relates to aerosol dispensers. It deals more particularly with aerosol dispensers for dispensing a selected combination of materials. Aerosol containers are presently used to dispense a variety of materials, including things such as hair sprays, shaving creams, deodorants and antiseptics and the like. Most of these aerosol dispensers are designed to contain and dispense a single material or mixture of materials.

Recently, however, dispensers have appeared which contain two materials separately and are designed to dispense them simultaneously. Examples of such dispensers are described in U.S. Pat. Nos. 3,217,936 and 3,325,056. Other recently developed dispensers, such as illustrated in U.S. Pat. Nos. 3,198,394 and 3,366,279, contain a plurality of materials separately and are designed to separately dispense one or another of the materials, selectively.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an aerosol dispenser which contains a plurality of materials in separate compartments and is designed to selectively dispense combinations of these materials. It is another object to provide an aerosol dispenser of this type which affords selectivity of dispensed materials and material combinations in varying degrees of ratios by merely rotating the dispensing nozzle assembly of the dispenser.

The foregoing and other objects are realized in accord with the invention by providing an aerosol dispenser comprising sealed container means having at least two separate compartments. Each compartment contains different dispensable material. A dip tube, having an axial bore and radial inlet openings extending through the tube into the axial bore, is positioned in the container. The tube is rotatable about its major axis whereby the inlet openings are selectively aligned with ports communicating with each of the compartments. The inlet openings in the dip tube and the ports communicating with the compartments are arranged so that a selected combination of materials can be dispensed through a nozzle assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view in section of an aerosol dispenser embodying features of a first form of the invention;

FIG. 2 is a side elevational view in section of a fragmentary portion of the aerosol dispenser of FIG. 1 showing the valve means in an open position;

FIG. 3 is a top plan view of the dispenser of FIG. 1;

FIG. 4 is a side elevational view in section of an aerosol dispenser embodying features of a second form of the present invention;

FIG. 5 is a top plan view of the dispenser of FIG. 4;

FIG. 6 is a section taken on line 6—6 of FIG. 4;

FIG. 7 is a section taken on line 7—7 of FIG. 4; and

FIG. 8 is a perspective view of a fragmentary portion of an aerosol dispenser embodying a modified form of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and more particularly to FIGS. 1 and 2, an aerosol dispenser embodying features of a first form of the present invention is illustrated generally at 10. The aerosol dispenser 10 includes an outer container 11 defining an outer compartment 12 storing a dispensable material X, and an inner container 15 defining an inner compartment 16 storing a dispensable material Y. In the present illustration, for purposes of example only, the material X is an unscented hair spray compound of any well-known composition and the material Y is a scented additive of any similarly well-known composition.

A dip tube 20 extends through the inner and outer compartments 16 and 12 and, through it, the dispensable materials are permitted egress to the atmosphere by the depression of a nozzle assembly 22 connected to the tube 20. However, the depression of the nozzle assembly 22 normally opens a pathway through the dip tube 20 to the atmosphere only from the outer compartment 12, thus allowing the dispensable material X to dispense. Rotation of the nozzle cover 22 and, accordingly, the dip tube 20, to a prescribed position connects both compartments 12 and 16 to the dip tube 20 so that materials X and Y will simultaneously be discharged.

Considering the aerosol dispenser 10 in more detail, the outer compartment 12 holds a chemical composition or mixture which comprises the basic hair spray compound and, in addition, a propellant vapor. The inner container 15, formed of plastic in the present illustration, has a thin and flexible outer wall 17 yieldable to the pressure. Thus, the pressure exerted by the propellant vapor is simultaneously exerted on the dispensable materials X and Y in both compartments.

The dispensable materials X and Y are discharged through the nozzle assembly 22 fastened by a connecting member 25 to the dip tube 20. The dip tube 20 extends through the inner compartment 16 and opens into the outer compartment 12 at 24. The plastic inner container 15 is formed concentrically about the dip tube 20 and has an inner sleeve 21 of slightly larger diameter than the dip tube 20 so that the tube 20 fits snugly but movably therein. The dip tube 20 contains a radial opening 32 and the sleeve 21 contains a radial opening 34 farming, in effect, valve means. The opening 32 and 34, when in register, make possible the flow of the material Y into the axial bore 36 of the tube 20.

The inner container 15 is rigidly secured to and depends from a housing 23 which forms the top closure of the outer container 11. An annular seal washer 35 is seated in the cap 27 of the housing 23 and has a central aperture 29 therein through which a nozzle pipe 31 extends.

The nozzle pipe 31 is a component of the nozzle assembly 22 and is depressible and rotatable with it. When the nozzle assembly 22 is depressed, as illustrated in FIG. 2, the connecting member 25, which is hollow and has radial slots 28 formed therein, is forced downward, compressing a coil spring 30 against the bottom of the housing 23. Since the dip tube 20 is rigidly joined to the connecting member 25, it is also forced downward.
An orifice 26 in the nozzle pipe 31, which is normally disposed in the seal washer 35, is moved downward into the housing 23 by the depression of the nozzle assembly 22 effecting an opening of the "valve means" formed by the orifice and washer. If the nozzle assembly 22 is rotated to a prescribed position, as seen in FIG. 3, the ports 32 and 34 are radially aligned and depression of the tube 20 brings them into registry. The propellant vapor then forces both selected materials X and Y into and up the axial bore 36 to the connecting member 25. Direct passage into the nozzle pipe 31 is prevented by a bulkhead 19 located below the orifice 26 in the pipe 31 so the materials exit through the slots 28 into the housing 23. The materials X and Y then pass through the orifice 26 and the nozzle pipe 31 to be expelled into the atmosphere.

It should be noted here that the dip tube 20 has a propensity to be expelled from the dispenser 10 by the vapor pressure in the compartment 12. However, the connecting member 25, to which the dip tube 20 is attached, is enlarged as illustrated so that it abuts the seal 35 and prevents the dip tube 20 from being expelled. Release of downward pressure on the nozzle 22 allows the spring 30 (and vapor pressure in the dispenser 10) to force the tube 20 and connecting member 25 upward and move the orifice 26 back into the seal washer aperture 29. The flow of materials X and Y from the dispenser is stopped until the nozzle assembly is again depressed.

To provide for a visual aid in selecting whether the basic material X alone or a combination of materials are to be dispensed, marks are located on the upper side wall 38 of the aerosol dispenser 10, as indicated at 39 in FIG. 3. The tip 37 of the nozzle pipe 31 is used as an indicator when aligned with one of the marks 39. In the present illustration, the marks 39 are labeled to indicate whether plain or scented hair spray, for example, will be dispensed when the tip 37 is in a selected position.

It should be pointed out here that although the dispenser 10 is illustrated and described with a single inner compartment 16, a plurality of circumferentially separated sub-compartments might be constructed within the container 15 instead. In such case, of course, any of a plurality of additive scents, for example, might be selectable.

In a second form of the present invention, there is provided a dispenser 110 embodying features of the invention and illustrated in FIG. 4 and 5. The construction of the dispenser 110 is broadly similar to that of the dispenser 10. However, the inner container 115 is axially separated into two compartments 140 and 142 containing dispensible materials B and B', respectively. The outer wall 150 of the inner compartments 140 and 142 is, in the present illustration, constructed of a rigid material. Recalling that the wall 17 of the container 15 in dispenser 10 was of flexible plastic, it must be pointed out that if the inner compartment wall is thin and flexible, only the outer compartment 12 needs to contain a propellant vapor, but if the wall is rigid, then both inner and outer compartments must contain a propellant vapor to assure dispensing of the inner compartment additive material into the outer compartment material. An inner sleeve 121 of slightly larger diameter than a dip tube 120, is common to both compartments 140 and 142. The dip tube 120 contains radial openings 146 and 148 communicating with the compartment 140 and radial openings 145 and 147 communicating with the compartment 142. The sleeve 121 contains radial openings 143 and 144 communicating with compartments 140 and 142, respectively. The openings 143 and 146 or 148 when in registry, make possible the flow of material B into the axial bore 136, and similarly the openings 144 and 145 or 147 when in registry, make possible the flow of material B' into the axial bore 136.

In the dispenser 110, in contrast to the dispenser 10, the dip tube 120 and the nozzle pipe 131 are not unitary. Rather, a helical spring 130 has one end rigidly secured to the top end of the separate dip tube 120 and the other end rigidly secured to the lower end of a connecting member 125, which is merely a solid, enlarged extension on the nozzle pipe 131. The dip tube 120 is retained on the housing 123 by an annular retainer slot 149 which is seated on a bead in the lower portion of a housing 123. The slot 149 restricts any vertical movement of the dip tube 120, but does not restrict a rotational movement occurring in conjunction with a nozzle assembly 122.

When the nozzle assembly 122 is depressed, the connecting member 125 is forced downward compressing the coil spring 130 against the bottom of the housing 123. Since the dip tube 120 and the nozzle pipe 131 are not unitary, the dip tube 120 is not forced downward. However, an orifice 126 in a seal washer 135, is moved downward into the housing 123 by the depression of the nozzle assembly 122. Also, the depression of the nozzle assembly 122 normally opens a pathway through the dip tube 120 to the atmosphere only from an outer compartment 112, thus allowing dispensable material to dispense. If the nozzle 122 is rotated to a prescribed position, as seen in FIG. 5, ports 143 and 146 are brought into registry, as seen in FIG. 6, as are ports 144 and 145 as seen in FIG. 7. Depression of the nozzle assembly 122 causes the propellant vapor to force all selected materials A, B and B' into and up the axial bore 136 and into the housing 123. Since the connecting member 125 is solid, the materials A, B and B' must first pass through the orifice 126 and then the nozzle pipe 131 to be expelled into the atmosphere.

Release of a downward pressure on the nozzle 122 causes the orifice 126 to move back into the seal 135 in a similar manner as discussed in the first form of the present invention. It should be noted, however, that the dip tube 120 does not move during this function as it is securely retained on the housing 123.

A visual aid, similar to that described in the first form of the present invention, is provided, as indicated at 139 in FIG. 5. In the present illustration, the marks 139 are labeled to indicate whether plain shaving cream or a combination of lemon and/or lime additives, for example, will be dispensed when the tip 137 is in a selected position.

In a third form of the present invention, there is provided an aerosol dispenser 210, shown in partial configuration in FIG. 8. The operation of the dispenser 210 is similar to the dispenser 110 described in the second form of the present invention. However, the structure is somewhat modified in that a plurality of circumferentially separated compartments 216a, 216b, 216c.
and 216d, each containing dispensable materials E, F, G and H, respectively, are constructed within the dispenser 210. Each compartment is separated from the adjacent compartments by rigid walls 218a, 218b, 218c and 218d, each terminating at the top of dispenser 210 and connected to a sleeve 221 which fits snugly over the dip tube 220. It is therefore necessary for each compartment 216a, 216b, 216c and 216d to contain a separate propellant vapor to assure dispensing of materials contained therein into the dip tube 220.

The dispensable materials are permitted to egress into the dip tube 220 through ports contained in both the rotatable dip tube 220 and the sleeve 221, as described in the first and second forms of the present invention.

Although it is not preferred, the ports 32 and 34 in FIG. 1 may be constructed of a series of small openings in contrast to the one large opening illustrated. Such a modification could be incorporated into all forms of the invention described herein.

Although the various forms of the invention have been described in terms of a single dial and dip tube, it is contemplated that multiple dial controls with corresponding nested dip tubes and sleeves might be employed. A wider range of selectivity would thus be afforded with a dial control for each tube or sleeve.

In addition, it will be appreciated that the aerosol dispenser may contain a valve system without a dip tube which affords selectivity of dispensed materials and material combinations by merely rotating the valve mechanism to facilitate registry with one or more compartments.

Furthermore, by utilizing ports of varying sizes the dispensing rate of flow of the materials could be controlled over a wide range.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

We claim:

1. An aerosol dispenser, comprising:
   a. a container having a plurality of compartments therein,
   b. each of said compartments adapted to contain a dispensable material,
   c. valve means in said container,
   d. valve means in said container for controlling the escape of dispensable material from said container through said nozzle means,
   e. said valve means including a dip tube extending downwardly into said container from adjacent said nozzle means and rotatable about its axis to selectively open and close a dispensable material outlet opening in at least one of said compartments, and
   f. means for rotating said dip tube.

2. The aerosol dispenser of claim 1 further characterized in that:
   a. said dip tube extends to a free end adjacent the bottom of the container and has an axial bore therein opening at said free end into one of said compartments.

3. The aerosol dispenser of claim 1 further characterized in that:
   a. said nozzle means and said dip tube are interconnected whereby rotation of said nozzle means on said container is effective to rotate said dip tube about its axis.

4. The aerosol dispenser of claim 2 further characterized in that:
   a. said dip tube extends through a sleeve forming a portion of at least one of said compartments,
   b. said dispensable material outlet opening being formed in said sleeve and a radial opening being formed through said dip tube for selective registry with said sleeve opening.

5. The aerosol dispenser of claim 4 further characterized in that:
   a. said sleeve forms a portion of a plurality of said compartments,
   b. a dispensable material outlet opening being formed through said sleeve from each of said compartments, and
   c. radial openings formed in said dip tube for selective registry with said sleeve openings to permit the escape of dispensable material from prescribed compartments.

6. The aerosol dispenser of claim 4 further characterized in that:
   a. said sleeve means defines the axis of a plurality of compartments radiating outwardly from said sleeve means,
   b. a dispensable material outlet opening being formed radially through said sleeve means into each of said compartments.

7. The aerosol dispenser of claim 1 further characterized in that:
   a. at least one of said compartments has thin, flexible wall means.

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