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Prussin et al.

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[54] **METHOD OF CONTROL FOR AEROSOL DISPENSING AND A MULTIPHASE AEROSOL DISPENSER**

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[52] **U.S. Cl.** **222/136**

[51] **Int. Cl.** **B67d 5/24**

[58] **Field of Search** 222/136, 402.21–402.23, 222/506, 508, 509

[56] **References Cited**

UNITED STATES PATENTS

3,520,449	7/1970	Prussin et al.	222/136 X
3,525,456	8/1970	Prussin et al.	222/136 X

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Assistant Examiner—Norman L. Stack, Jr.

[57] **ABSTRACT**

A method for controlling flow of material from a multiple fluid aerosol product wherein a non-pressure producing fluid is intentionally overfilled whereby flow from the aerosol container will cease when the pressure producing fluid is exhausted.

4 Claims, 4 Drawing Figures

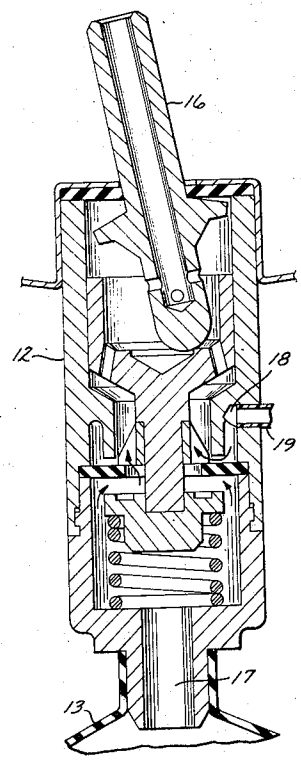


FIG. 1

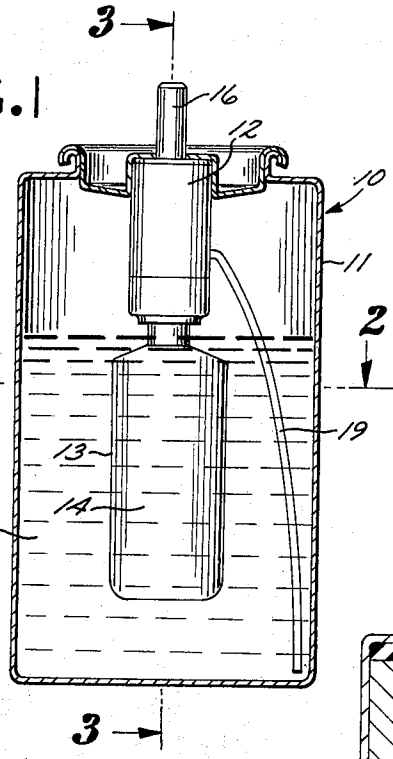


FIG. 3

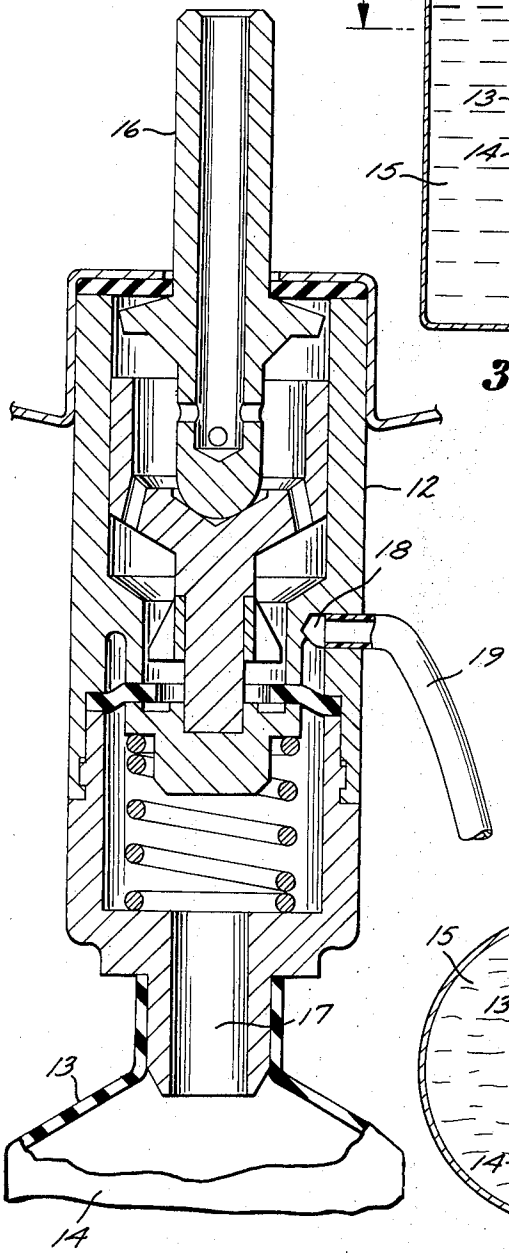
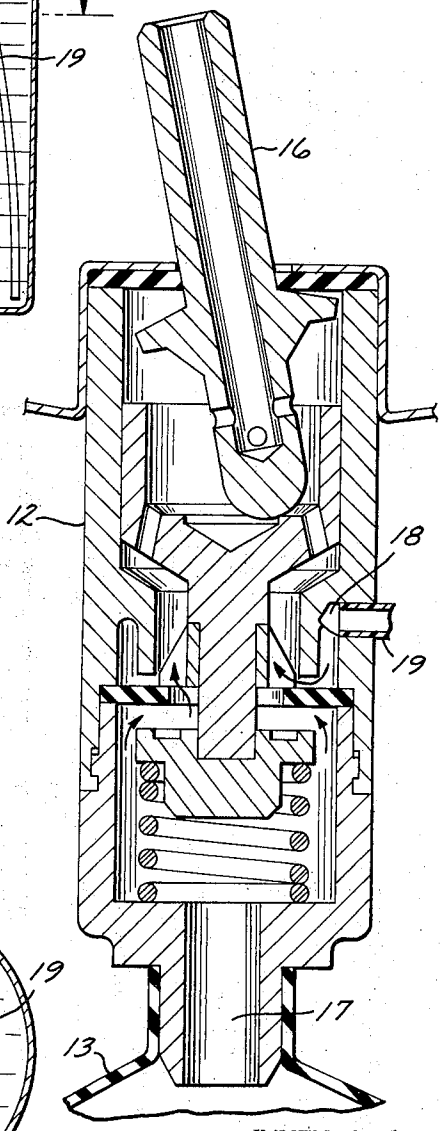


FIG. 4



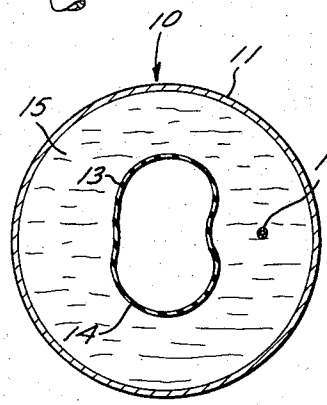


FIG. 2

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METHOD OF CONTROL FOR AEROSOL DISPENSING AND A MULTIPHASE AEROSOL DISPENSER

This invention relates generally to aerosol products. More specifically, it relates to a method for controlling flow of material from a multiple fluid aerosol product container and to a novel multiple fluid aerosol product.

A variety of products have become available in the recent past wherein a plurality of reactive fluids can be maintained apart in a single aerosol container and dispensed simultaneously, preferably with mixing of the two ingredients in the valve. These products include hot shaving cream which is heated by an exothermic reaction between components of the various fluids; oxidizing hair dye wherein an oxidizing material is contained in one of the components, and other products wherein a desirable reaction can be obtained when they are mixed.

In many products of the foregoing type, one of the fluids alone may contain a material which is hazardous or irritating if it were to be dispensed without mixing with the other components. An example of this is a fluid having a large percentage of hydrogen peroxide as an oxidizing agent. It will be appreciated that a high percentage of hydrogen peroxide could have deleterious results if it were to be dispensed alone. The magnitude of this problem can be appreciated when considering an oxidizing hair dye which utilizes in one of the fluids a substantial amount of hydrogen peroxide. If the peroxide alone were to be dispensed, the aerosol product would bleach, rather than dye, a user's hair. Myriad other similar problems exist with various products having a fluid that cannot be used alone.

In various aerosol products, it is difficult if not impossible to proportion two fluids exactly so that each fluid will be exhausted simultaneously. For this reason, there is a possibility in most multi-fluid aerosol systems for a deleterious fluid to be dispensed alone after the complementary fluid is exhausted.

A number of attempts have been made to solve the foregoing problem. In one multi-fluid hot shaving cream aerosol, for example, an excess of the non-deleterious fluid is used. Thus, after the deleterious fluid is exhausted there still remains under pressure in the aerosol can a single fluid which, in this case, happens to be soap. The result is that a substantial amount of unheated soap will be dispensed from the can after the exhaustion of one of the fluid. Of course, this creates a problem inasmuch as the user will not get the benefit of a heated product throughout the life of the hot shaving cream aerosol product. Another solution to the problem has been the utilization of mechanical actuation means in dual dispensing valves whereby complex mechanical systems responsive to the supply of both fluids are utilized to shut off one fluid when the other is exhausted. Although this method is far more desirable, these valves are for the most part complicated and expensive to produce.

According to this invention, there is provided a simplistic, yet highly advantageous, method for controlling the flow of materials from multiple fluid of an aerosol product. The method is particularly applicable to aerosol products of the type which flow is effected by internal pressurization of the materials to be dispensed, and said product has a pressure producing fluid and a non-pressure producing fluid with the former being separated from the later by means which will transmit pressure to effect dispensation of both fluids simultaneously. The method includes the steps of providing a valve means for the aerosol product that will dispense both fluids in a given ratio. The aerosol product is then filled in a manner such that there is an excess of the non-pressure producing fluid. Upon the exhaustion of the pressure producing fluid, flow of the non-pressure producing fluid will substantially cease due to the lack of motive power normally provided. A feature of the foregoing method resides in the utilization of a pressure producing fluid of the type that will produce a sputtering through the valve means at a point near exhaustion whereby the end of flow from the aerosol container will be audibly signalled.

There is also provided according to the invention a novel multiple fluid aerosol product. The aerosol product includes a pressure producing fluid and a non-pressure producing fluid. A valve is provided for the container to dispense said fluids in a given ratio. Means are provided in the container for separating the fluid and for transmitting pressure from one fluid to the other. The non-pressure producing fluid is provided substantially in excess of that required to quantitatively mix with the pressure producing fluid, whereby flow of such fluid will be shut off upon the exhaustion of the pressure producing fluid.

It was an object of this invention to provide an aerosol product adapted to dispense a material comprised of different simultaneously dispensed materials which would shut off upon the exhaustion of one of the materials.

Another object of the invention was the provision of a method for controlling flow from multiple fluid aerosol containers.

Yet another object of the invention was the provision of such a container and product which would be economically advantageous.

Yet another object of the invention was the provision of such a container which would not require special valves.

These, and other objects of the invention, will be apparent from the following specification and the drawings which show one embodiment of an aerosol product according to the invention and in which:

FIG. 1 is an elevational view and cross section showing an aerosol product according to the invention;

FIG. 2 is a view in cross section taken on line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view showing a valve that can be utilized according to the invention in an inoperative position; and

FIG. 4 is a view similar to FIG. 3 showing the valve in an operative position.

Referring now to the drawings, FIG. 1 shows an aerosol product **10** which includes container **11**, valve **12**, fluid separating means **13**, a non-pressure producing fluid **14**, and a pressure producing fluid **15**. Fluid separating means **13** is preferably in the form of a flexible plastic bag which will transmit pressure from the pressure producing fluid even by as the non-pressure producing fluid is being dissipated.

The valve shown in FIGS. 3 and 4 is described more fully in U.S. Pat. No. 3,447,722 to J. L. Mason, issued June 3, 1969. As set forth, inter alia, in that patent, nozzle **16** actuates the valve causing flow of material simultaneously through conduit **17** and port **18**, which in this case is attached to dip tube **19**. The non-pressure

producing fluid is forced through conduit **17**, the pressure producing fluid is forced through port **18**, and the two fluids are mixed in the valve and expelled together through nozzle **16**.

In the event a deleterious product of the type that will not be desirable to be dispensed alone is used in the multi-fluid system, it will be introduced into the second fluid or non-pressure producing fluid. The non-deleterious component, along with propellent, will be introduced into the pressure producing fluid. The container will intentionally be overfilled with an excess quantity of the non-pressure producing fluid. Accordingly, when the pressure producing fluid is exhausted, pressure upon fluid separating means **13** will be relieved and consequently the pressure upon the non-pressure producing fluid will be relieved cutting off flow of such through conduit **17** even though the valve is actuated. Thus, there is provided according to the invention, a safe means and method of simultaneously dispensing a product.

The aerosol product and method according to the invention can be used with a variety of materials utilizing various fluid components. It has been found desirable to utilize as the pressure producing fluid a substance which is non-foaming. This latter type of substance, it has been found, entraps gas particles in the container resulting in a substantially longer period of time to reduce the pressure in the pressure reducing fluid than those products which do not foam. The method and product according to the invention are particularly applicable for aerosol compositions utilizing oxidents, skin irritants, or other deleterious compositions in or as part of the non-pressure producing phase.

The following specific examples serve to show the advantages of the invention:

Example 1

A hair dye system was utilized in an aerosol container similar to the one shown in FIG. **1**. Six ounces of hair dye, which included four percent by weight isobutane propellent, were introduced into the container as the pressure producing fluid therein. The non-pressure producing fluid included 2.2 ounces of 11 percent by volume H_2O_2 as an oxident for the hair dye. The calculated amount of such non-pressure producing fluid shown necessary was two ounces. Therefore, the non-pressure producing fluid represented a 10 percent excess. The aerosol container shut completely off within seconds after an audible sputtering sound signaling exhaustion of the pressure producing fluid was heard.

Example II

A shaving cream system was utilized in an aerosol container substantially like that shown in FIG. **1**. The pressure producing fluid included an emulsion of three fatty acids including three percent H_2O_2 and four percent hydrocarbon propellent consisting of propane and isobutane. The total volume of the pressure producing fluid was **6** ounces. An alkali reducing agent in the form of a sodium thiosulfate solution in the amount of 2.2 ounces, representing a 10 percent quantitative excess, was used as the non-pressure producing fluid. Material ceased to flow from the valve almost immediately after a sputtering sound signalled the exhaustion of the pressure producing fluid.

Various propellents can be used in aerosol products. It has been found that in products of the foregoing type, hydrocarbon propellents such as isobutane or propane in an amount of about four percent are preferable inasmuch as the pressure producing fluid when exhausted drops in pressure rapidly, thus sharply shutting off the aerosol system. Due to deficiency and inaccuracy in filling techniques in proportionation of valves, it is preferred to over-fill the non-pressure producing fluid by about five to 15 percent excess with eight to 12 percent seemingly optimum in most cases.

We claim:

1. A method for controlling the flow of material from a multiple fluid aerosol product of the type where flow is effected by internal pressurization of the materials to be dispensed having a pressure producing fluid and a non-pressure producing fluid, said pressure producing fluid being separated from said non-pressure producing fluid by a means which will transmit pressure thereto to effect dispensation of both fluids simultaneously, said method comprising providing a valve means for said aerosol product adapted to dispense said pressure producing fluid and said non-pressure producing fluid in a given ratio and introducing into said container an excess of said non-pressure producing fluid, whereby flow of said non-pressure producing fluid will substantially cease when said pressure producing fluid is exhausted.

2. A method according to claim **1**, wherein said pressure producing fluid is of the type that will produce a sputtering through said valve means at a point near exhaustion whereby the exhaustion of said fluid will be audibly signalled.

3. A method according to claim **1**, wherein said non-pressure producing fluid will be in excess of about 8 percent to about 12 percent by volume of that required to be quantitatively dispensed with said pressure producing fluid in the given ratio of said valve means.

4. A multiple fluid aerosol product including a pressure producing fluid and a non-pressure producing fluid and comprising in combination:

a container;

a valve means for said container adapted to dispense said pressure producing fluid and said non-pressure producing fluid in a given ratio;

means for separating said non-pressure producing fluid from said pressure producing fluid said means transmitting pressure from said pressure producing fluid to said non-pressure producing fluid;

said pressure producing and said non-pressure producing fluid being in said container with an excess of said non-pressure producing fluid beyond that required to quantitatively mix with said pressure producing fluid in the given ratio of said valve means.

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