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AEROSOL DISPENSER FOR PLURAL FLUIDS

Filed Dec. 24, 1963

FIG. 1

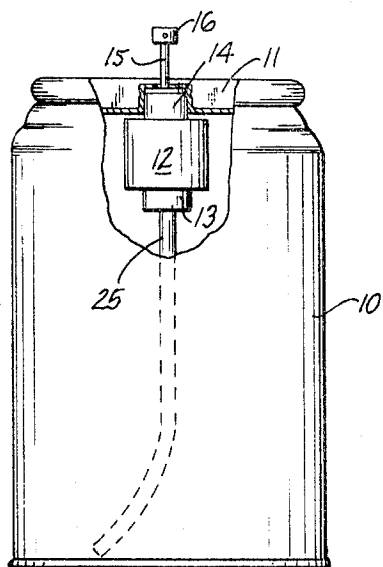


FIG. 2

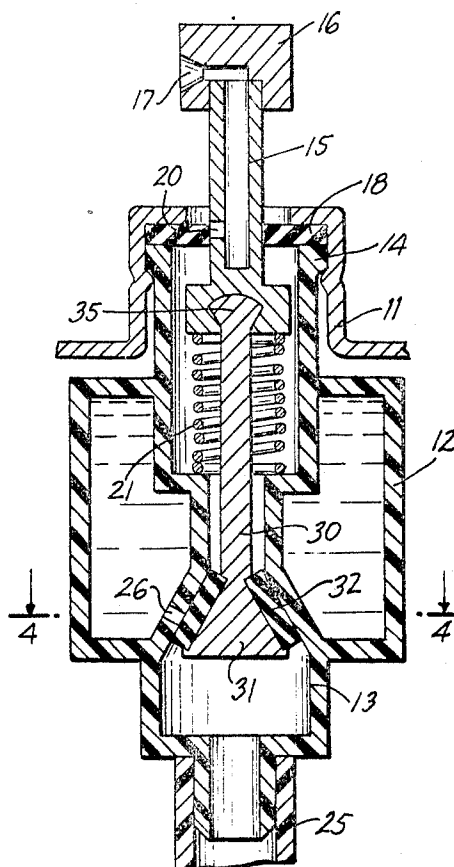


FIG. 3

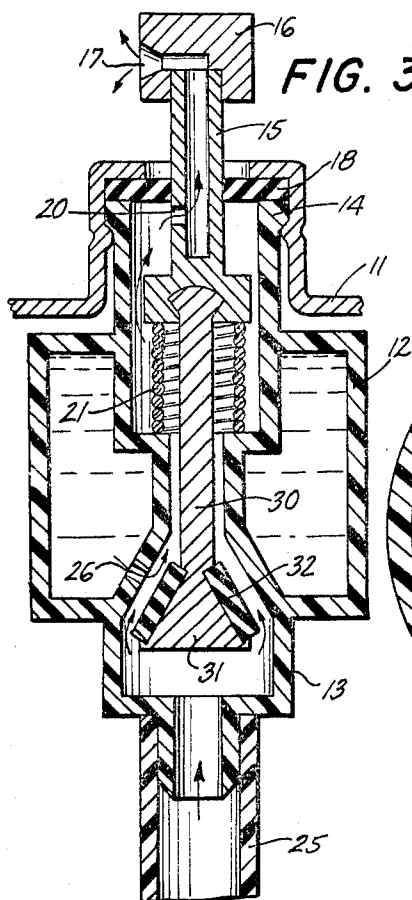
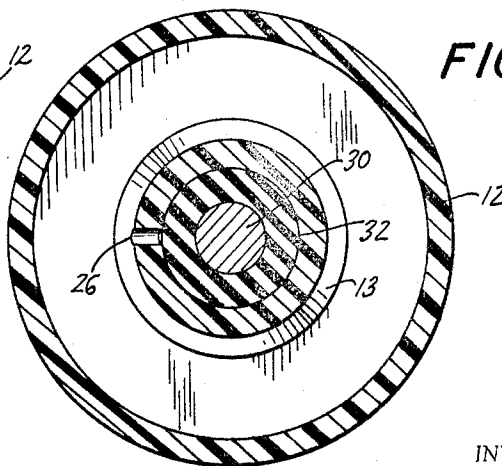


FIG. 4



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AEROSOL DISPENSER FOR PLURAL FLUIDS
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This invention relates to dispensing fluids from pressure containers under the propelling action of a gas or other propellant within the container and, more particularly, to arrangements for simultaneously dispensing a mixture of two different materials from the same container but in which the two materials are maintained separated from each other within a container and admixed only at the moment of dispensing therefrom.

As will be understood, a wide variety of materials may be dispensed from pressurized containers under the action of gaseous or vaporizable propellant therein as with the so-called aerosol types of packaging. Generally in situations of this character, the material to be dispensed is admixed with a propellant (gas or highly volatile liquid, etc.) in a sealed container having a valved eduction tube therein whereby opening the valve provides for the propellant to force the material to be dispensed up the eduction tube and out of the container.

For certain applications, it may be desired to provide for the simultaneous dispensing of an admixture of two distinct materials from the same container and, indeed, to provide further for maintaining the different materials separate from each other within the container for admixture only at the moment of ejection from the container. Merely as illustrative some such applications may be noted the provision of two reactive materials to react only upon dispensing for such purposes as providing a warm shaving foam or interjecting a catalyst or curing agent into plastic foam or an oxidant or other reactant into dyes and colors, etc.

According to this invention, then, there is provided apparatus for maintaining a second fluid material within a pressurized aerosol-type container separately from and out of contact with a first material therein and for dispensing both such materials simultaneously with admixture thereof only as ejected through the dispensing valve mechanism; and, as a further feature of this invention, there is also provided valving and sealing arrangements preventing contamination of the first material in the container with even residual amounts of either the second material or an admixture of the two which might otherwise result after each dispensing of the desired mixture.

With the foregoing and additional objects in view, this invention will now be more particularly described, and other objects and advantages thereof will be apparent from the following description, the accompanying drawings, and the appended claims.

In the drawings:

FIG. 1 is a view in elevation with parts broken away of apparatus embodying and for practicing this invention;

FIG. 2 is a partial detailed view in axial section of valving and mixing arrangements embodying and for practicing this invention and with the valve shown in closed position;

FIG. 3 is a view similar to FIG. 2 with the valve shown in open position during mixing and dispensing of the materials from the container; and

FIG. 4 is a transverse section along the line 4—4 of FIG. 2.

Referring to the drawings, in which like reference characters refer to like parts throughout the several views thereof, there is shown in FIG. 1 generally an aerosol-type container embodying and for practicing this inven-

tion and including a pressurized container 10 having a sealed top closure 11 which also supports a chamber for containing the second material within container 10 and indicated generally by the numeral 12, as well as mixing passage 13 and dispensing valve body 14, with a valve stem 15 protruding through closure 11 to the outside of the container and having a cap 16 for operating the valve by depressing stem 15 and a dispensing nozzle 17 from which material is ejected upon operation of the device.

The separating and valving and mixing arrangements are shown in somewhat more detail in FIGS. 2 and 3. Thus, a generally cylindrical valve body 14 is supported in known manner from top closure 11 of container 10 and includes a seal 18 through which valve stem 15 protrudes. As will be understood from conventional knowledge of aerosol dispenser valves, valve stem 15 is hollow so as to be closed or sealed off or above seal 18 in the closed position of the valve as maintained by spring 21 within valve body 14. Upon depressing cap 16 and stem 15 (to the position in FIG. 3) port 20 is moved below seal 18 affording flow communication from the inside of valve body 14 and up through hollow stem 15 to the atmosphere at dispensing nozzle 17 so that the pressure of the propellant within container 10 forces material therein upwardly through eduction tube 25 into valve body 14 and, ultimately, out through hollow stem 15 and nozzle 17.

Also within container 10 is secondary or auxiliary chamber 12, in the illustrated embodiment shown as integral with and depending from valve body 14, in which chamber is stored the reactant or other secondary material which it is desired to admix with the principal material in container 10 upon dispensing thereof. As indicated in FIGS. 2 and 3, whatever material is within chamber 12 is completely separated and isolated from the propellant and/or other material in container 10 except for one or more mixing ports 26 arranged in a general conical upper section of mixing passage 13. Depending from the lower end of valve stem 15 is auxiliary mixing valve stem 30 carrying a conical mixing valve member 31 at the lower end thereof around which are arranged resilient valve seats 32 in such manner as to seal mixing ports 26 whenever valve stem 15 is in the raised or closed position in FIG. 2, but to open a passage adjacent ports 26 when valve stem 15 is in depressed or open position as in FIG. 3.

Preferably, a non-rigid interconnection between the lower end of valve stem 15 and the upper end of auxiliary stem 30 is provided, as indicated generally at 35, to allow some axial flexibility of movement between the two valve stems for assuring firm seating of members 32 all around the conical section of mixing channel 13 despite axial misalignments of valve stem 15, and such flexible interconnection may also include a small amount of lost motion to assure firm seating of mixing valve seats 32 in the position shown in FIG. 2 momentarily before actual sealing of outlet port 20 by seal 18.

In the operation of the device, as will be apparent from the foregoing, any material in chamber 12 is effectively isolated from material in the major portion of container 10. Upon depressing valve stem 15 for dispensing from the device, outlet port 20 is moved to below the level of seal 18 (as in FIG. 3) while conical mixing valve seats 32 are lowered into the position shown, thereby permitting direct communication between the interior of container 10 and the atmosphere. Thus, the gaseous or vaporizable propellant in container 10 forces material therein up eduction tube 25, through mixing passage 13, and on up into the interior of valve body 14, from which it is ejected through outlet port 20, hollow valve stem 15, and dispensing nozzle 17.

As the material from container 10 passes through the annular passages defined by depressed mixing valve 31 and past mixing ports 26, the rapid flow of material upwardly past ports 26 causes, in well understood manner, a pressure reduction which withdraws material from chamber 12 into the flowing stream and with resultant admixture of such material with that passing into valve body 14 for ejection therefrom. Upon returning valve stem 15 to the closed or upper position (as by relieving finger pressure thereon under the action of spring 21), mixing valve seats 32 interrupt passage of all the material through mixing channel 13 and mixing ports 26, while also preventing reverse flow of any minor portions of admixed material which may remain trapped within valve body 14 after raising of outlet port 20 into sealing engagement with seal 18. As noted, the provision of lost motion in the connection between main valve stem 15 and auxiliary mixing valve stem 30 may also provide closing and seating of mixing valve 32 prior to sealing of outlet port 20 so that any such admixed material can effectively be emptied from valve body 14, although, in any event, any tiny portions which remain trapped in valve body 14 between actual uses of the dispenser cause no difficulty and are prevented from backward flow or contamination of the main body of material in container 10 or the secondary material in chamber 12.

As will be apparent from the foregoing, then, there is provided in accordance herewith arrangements and apparatus for maintaining a completely separate chamber a secondary material or reactant within a pressurized container, and for the admixture thereof with the primary material in the container only upon dispensing or pressure ejection of both materials through the mixing and valving apparatus, while also providing against rearward flow or contamination of the primary material with either the secondary material or mixtures of the two between dispensing operations. Although the arrangement shown in the illustrative embodiment utilizes a volume of secondary or reactant material substantially smaller than that of the primary material in the container, it is to be understood that such relative proportionings are readily adjusted or correlated merely by varying the size of chamber 12 and/or the quantity of material originally placed therein and/or the number or size or effective areas of mixing ports 26. Although, in every case, it may not be absolutely necessary to preserve the strict isolation of the two materials between dispensings, the arrangement shown as illustrative is particularly adapted to maintain such isolation as may be desired in instances where premature admixture or contamination of one material with the other might result in an undesired reaction within the container prior to actual dispensing of a mixture of the materials therefrom.

While the forms of apparatus disclosed are preferred embodiments of this invention, this invention is not limited to these precise forms of apparatus and changes may be made therein without departing from the scope of this invention which is defined in the appended claims.

What is claimed is:

1. In a pressure container and dispenser of the character described for containing a plurality of different fluid materials separately and unmixed within said container and for simultaneously dispensing and mixing said materials under the action of a propellant in said container, the combination which comprises separate compartments within said container for maintaining said materials therein unmixed and separate, one of said compartments also being adapted to contain said propellant for pressure dispensing of materials therefrom, dispensing valve means at the top of said container for emission of material therefrom under the action of said propellant when said valve means is opened, a mixing chamber in flow communication with said dispensing valve means and said other compartment, an eduction tube in said propellant con-

tainer having one end in flow communication with said mixing chamber and the opposite end disposed adjacent the bottom of said container and within said propellant-containing compartment for conducting fluid therefrom to said mixing chamber, outlet means from said other compartment and in flow communication with said eduction tube at a point therein adjacent said end thereof which is in flow communication with said mixing chamber, means forming a venturi adjacent said outlet from said other compartment and disposed with respect to fluid flow from said eduction tube to said mixing chamber whereby said fluid flow out said eduction tube and through said venturi means induces fluid flow from said other compartment for admixture of said materials from said separate compartments in said mixing chamber immediately prior to emission of said mixture through said dispensing valve means, additional conical valve means for opening and closing said outlet from said other compartment and interfitting said venturi means for selectively permitting and preventing flow therethrough and admixture of said materials in said separate compartments, and operating means interconnecting said dispensing valve means and said additional valve means for opening and closing said additional valve means upon opening and closing of said dispensing valve means.

2. In a pressure container and dispenser of the character described for containing a plurality of different fluid materials separately and unmixed within said container and for simultaneously dispensing and mixing said materials under the action of a propellant in said container, the combination which comprises a separate compartment in the upper portion of said container for containing one of said materials separated from the other, dispensing valve means at the top of said container for emission of material therefrom under the action of said propellant when said valve means is opened, an eduction tube in said container having one end in flow communication with said valve means and the opposite end disposed adjacent the bottom of said container for conducting fluid therefrom to said valve means, a plurality of outlets from said separate compartment and in flow communication with said eduction tube at a point therein adjacent said one end thereof which is in flow communication with said valve means, means forming a venturi adjacent said plurality of outlets from said separate compartment and disposed with respect to fluid flow from said eduction tube to said valve means whereby said fluid flow out said eduction tube and through said venturi means induces fluid flow therearound from said separate compartment for admixture of said materials at said venturi means immediately prior to emission of said mixture through said dispensing valve means, additional conical valve means for opening and closing said plurality of outlets from said separate compartment and interfitting said venturi means for selectively permitting and preventing flow therethrough and admixture of said materials, and operating means interconnecting said dispensing valve means and said additional valve means for opening and closing said additional valve means upon opening and closing of said dispensing valve means.

3. In a pressure container and dispenser of the character described for containing a plurality of different fluid materials separately and unmixed within said container and for simultaneously dispensing and mixing said materials under the action of a propellant in said container, the combination which comprises dispensing valve means at the top of said container for emission of material therefrom under the action of said propellant when said valve means is opened, a separate compartment within said container and adjacent said valve means for containing one of said materials and maintaining it separate from the other of said materials in said container, a mixing chamber in flow communication with said dispensing valve means, an outlet from said separate compartment into said mixing

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chamber, an eduction tube in said container having one end in flow communication with said mixing chamber and the opposite end disposed adjacent the bottom of said container for conducting fluid therefrom into said mixing chamber for admixture therein with material flowing through said outlet from said separate compartment, additional valve means for opening and closing said outlet from said separate compartment into said mixing chamber, and operating means for simultaneously opening and closing both said dispensing valve means and said additional valve means.

4. A container as recited in claim 3 in which the portion of said mixing chamber to which said outlet communicates is formed as a venturi passage in flow communication with said dispensing valve means whereby fluid flow out of said eduction tube and through said mixing chamber induces fluid flow through said outlet from said separate compartment for admixture of said materials in said venturi portion of said mixing chamber and immediately prior to emission of said mixture through said dispensing valve means.

5. A container as recited in claim 4 in which said additional valve means for controlling said outlet from said separate compartment is formed as a generally conical valve for interfitting and closing off said venturi passage and said outlet from said separate compartment preventing backflow of said admixed materials from said passage and said dispensing valve means.

6. A container as recited in claim 3 in which said dispensing valve means includes a hollow valve body adjacent the top of said container and downstream with respect to said mixing chamber, a movable valve stem having a flow channel leading from inside said valve body to outside said container when said valve stem is moved into dispensing position, and spring means for urging said valve stem out of dispensing position.

7. A container as recited in claim 6 in which said operating means for said additional valve means includes a valve stem depending from said dispensing valve stem for movement therewith for opening and closing said outlet from said separate compartment as said dispensing valve stem is moved to and away from dispensing position.

8. In a pressure container and dispenser of the character described for containing a plurality of different fluid materials separately and unmixed within said container and for simultaneously dispensing and mixing said materials under the action of a propellant in said container, the combination which comprises dispensing valve means at top of said container for emission of material therefrom under the action of said propellant when said valve means

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is opened, said dispensing valve means including a hollow valve body adjacent the top of said container and a movable valve stem having a flow channel leading from inside said valve body to outside said container when said valve stem is moved into dispensing position, biasing means for urging said valve stem out of dispensing position, a separate compartment within said container and adjacent said valve means for containing one of said materials and maintaining it separate from the other of said materials in said container, a mixing chamber in flow communication with said dispensing valve means, an outlet from said separate compartment into said mixing chamber and formed as a venturi passage in flow communication with said dispensing valve means, an eduction tube in said container having one end in flow communication with said mixing chamber and the opposite disposed adjacent the bottom of said container for conducting fluid therefrom into said mixing chamber for admixture therein with material flowing through said outlet from said separate compartment whereby fluid flow out of said eduction tube and through said mixing chamber induces fluid flow through said outlet from said separate compartment for admixture of said materials in said venturi portion of said mixing chamber and immediately prior to emission of said mixture through said dispensing valve means, additional conical valve means for opening and closing said outlet from said separate compartment into said mixing chamber and for interfitting and closing off said venturi passage thereby preventing backflow of said admixed materials from said passage and said dispensing valve means, operating means for said additional valve means and including a valve stem depending from said dispensing valve means for simultaneously opening and closing both said dispensing valve means and said additional valve means, and flexible connecting means between said depending valve stem and said dispensing valve means which incorporates a slight axial lost motion whereby said additional valve means is firmly seated to close said outlet from said separate compartment before said dispensing valve means has moved completely to closed position.

References Cited by the Examiner

UNITED STATES PATENTS

45	2,733,102	1/1956	Croce	-----	222-193 X
	3,115,277	12/1963	Montague	-----	222-394 X

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