United States Patent

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[54] **PRESSURIZED SPRAY CONTAINER FOR SELECTIVE DISPENSING OF PRODUCT**
6 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **222/135,** 222/144.5
[51] **Int. Cl.** **B67d 5/52**
[50] **Field of Search** 222/144.5, 394, 402.12, 135

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ABSTRACT: An aerosol dispenser having a plurality of separately contained products therein and a means for preselecting a mixture of one or more preselected amounts of the products for dispensing therefrom.

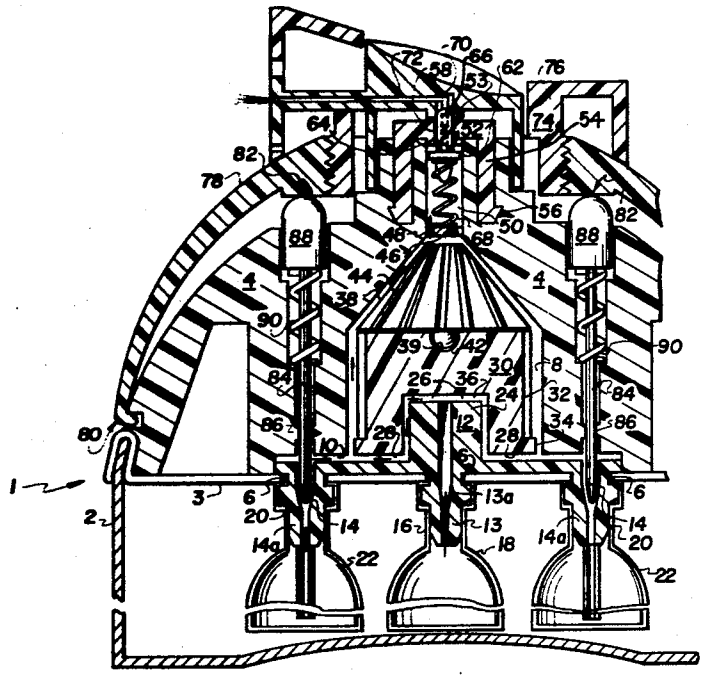
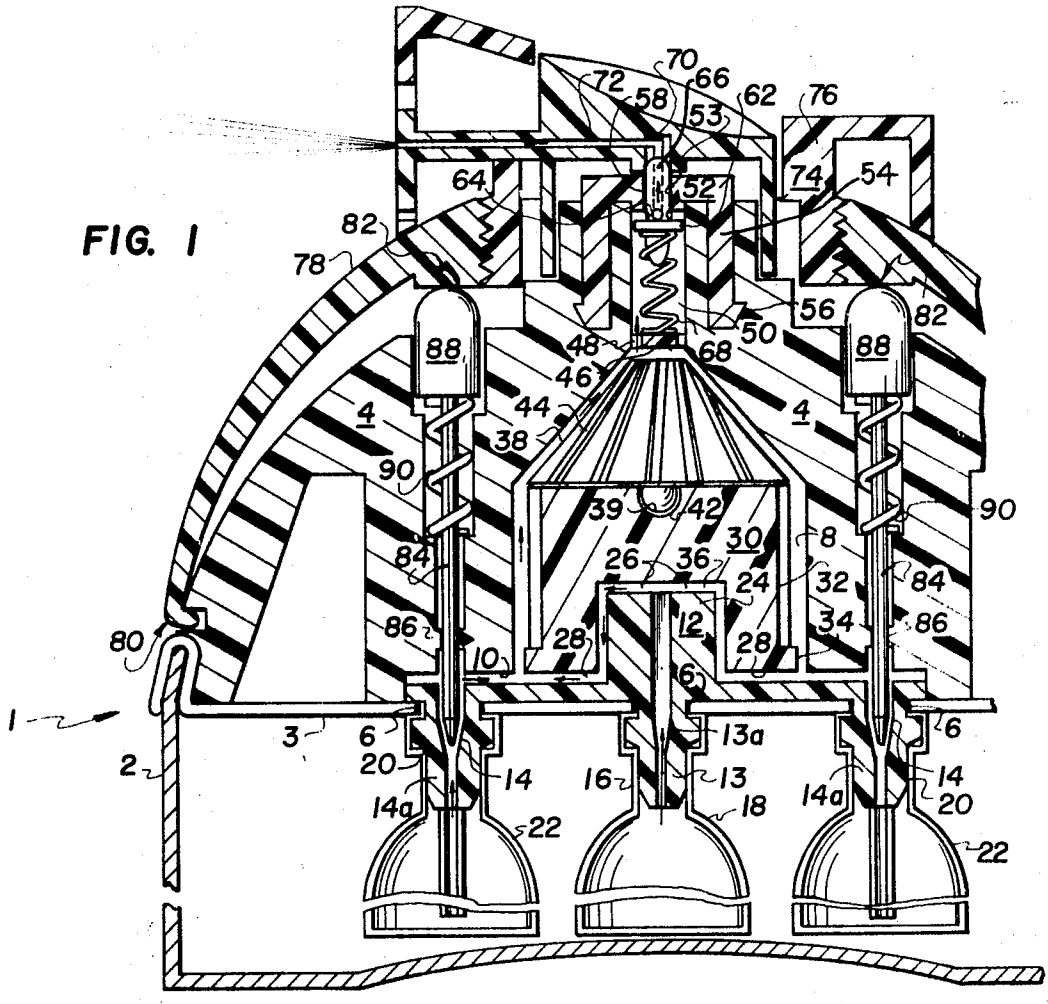


FIG. 1



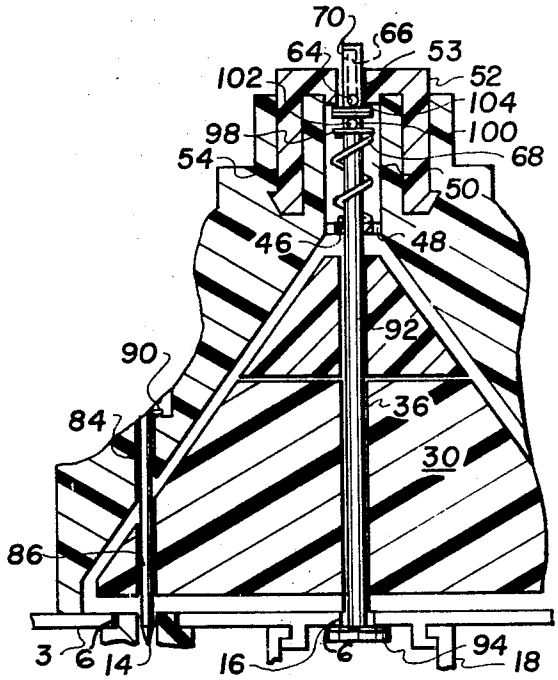


FIG. 2

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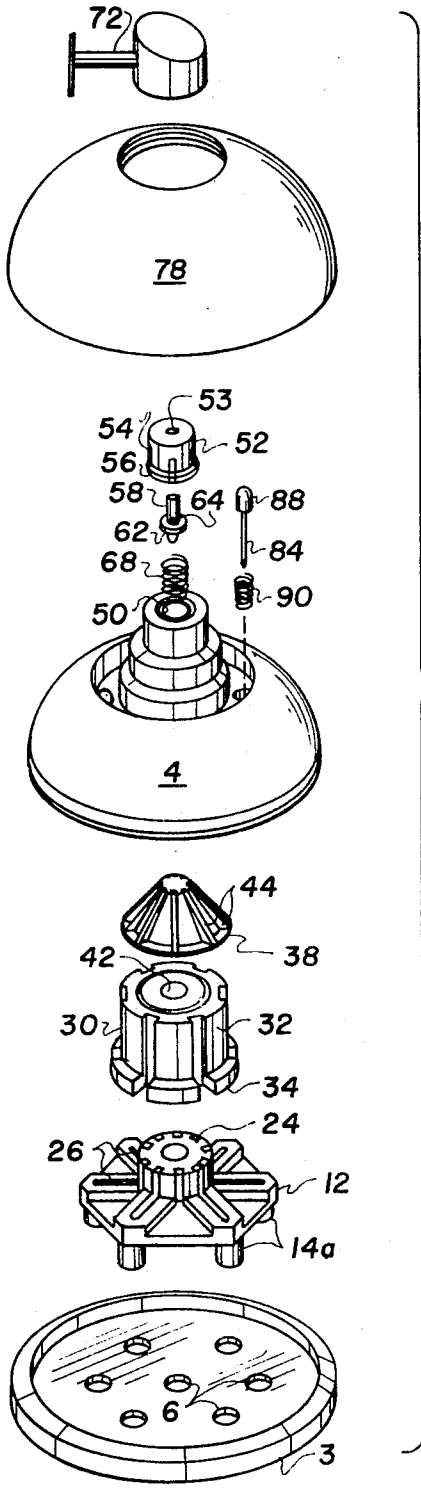

FIG. 3

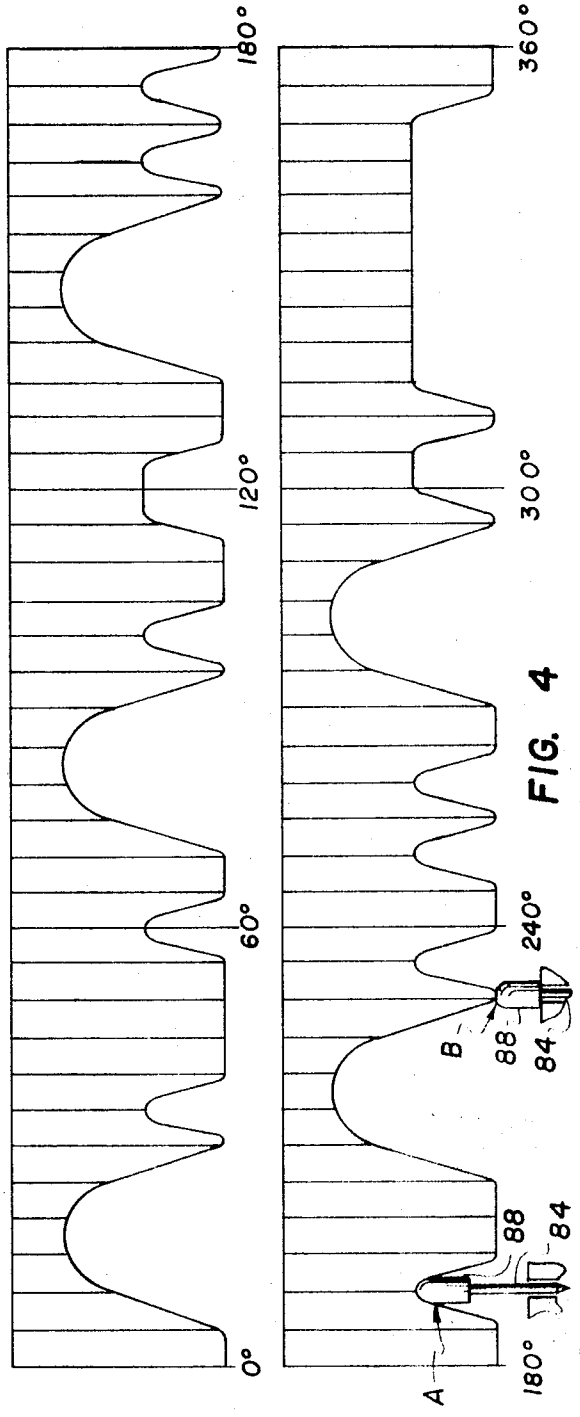

FIG. 4

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PRESSURIZED SPRAY CONTAINER FOR SELECTIVE DISPENSING OF PRODUCT

BACKGROUND OF THE INVENTION

This invention relates to an aerosol dispenser for dispensing a preselected mixture of separately contained product which may be selectively varied to include desired proportions of a plurality of products stored within. More particularly, it relates to an aerosol dispenser capable of selectively dispensing a particular color of paint from a wide range of colors.

Simple, single use, convenient pressurized dispensing containers have become widely used to dispense flowable material. These containers have become commonly referred to as "aerosol" containers and generally include a propellent (fluorinated hydrocarbons, for example) which cause the dispensing of the substance through a nozzle, which, in one position, seals the material in the container, and in another position, allows it to extrude as the substance is vented into the atmosphere. These propellents have been defined as liquified gas with a vapor pressure greater than atmospheric pressure (14.7 p.s.i.a.) at a temperature of 105° F. but should include nonliquifiable gases and compressed gases as well.

Although some of the aerosol dispensers of the prior art are capable of dispensing two materials concurrently or selectively dispensing one of a plurality of segregated flowable substances contained therein through a single nozzle, none of the containers are capable of discriminating between segregated products contained in the dispenser and mixing these for extrusion in proportion to preselected amounts of the product. Such a capability is especially desirable when it becomes advantageous to dispense a variety of flavors, colors, or products, from a single container. For example, it is advantageous to provide a dispenser capable of selectively dispensing a successive variety of colors of paint from primary colors contained therein.

SUMMARY OF THE INVENTION

Briefly stated, there is described an aerosol dispenser for dispensing a preselected mixture of at least two separately contained liquids the dispenser comprising in combination a can, a separate product container disposed within the can for each of the liquids, a propellent container having a chemical propellent therein and disposed within the can, a channelled member mounted on the can and including a plurality of passageways and a mixing chamber having an outlet communicating with the atmosphere, the first channelled member being coupled to each of the product containers and the propellent container to permit fluid communication of each of the product containers with the propellent container and with the mixing chamber, a plurality of product valves each having a cam operable adjustable opening operatively coupled with the passageways of the channelled member for controlling the flow of the liquids to the mixing chamber, manually presettable cam means operatively coupled with the product valves for presetting each of the openings of the product valves, and a manually operable outlet control valve operatively coupled with the outlet of the channelled member for permitting the liquids in the mixing chamber to be discharged.

It is also in accordance with the present invention, and described therein, that the cam means is a cam ring integral with a cover for the can and the product valves are needle valves having a portion of their surface in contact with the cam surface and seal on valve seats in communication with the product containers whereby there is a combination of proportional amounts of the liquid from each of the product containers to comprise the substantially homogenous liquid.

Accordingly, it is an object of the present invention to provide an aerosol dispenser capable of selectively dispensing flowable substances through a single dispensing nozzle from a plurality of separately contained ingredients therein. It is another object of the present invention to provide a new and improved unit, of the character indicated, utilizing a cluster or collection of individual containers, each containing a different paint—so arranged, whereby these paints which, for example, can be of the primary colors such as red, yellow and blue, plus additional of black and white, can be preselectively mixed to produce any color tone desired.

These and other objects of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawing, wherein the invention will be further understood by reference thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings represent preferred forms of the invention, wherein:

FIG. 1 is a partial, sectional view of the aerosol dispenser taken in a place which intersects the longitudinal axis of the dispenser along a diameter with the center portion and symmetrical right side broken away. It is a partial sectional view because portions of the upper part of the dispenser, including the valve, valve pins and valve cam follower, are not shown in section.

FIG. 2 is a partial sectional view of the valve portion of the aerosol dispenser to describe an alternate embodiment of the present invention.

FIG. 3 is an exploded pictorial assembly of the embodiments of FIG. 1 of the portion of the aerosol dispenser above the cam body; and

FIG. 4 is a layout of the ring cam of the invention showing the contour of the cam surface.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring more particularly to the drawing wherein like numerals of reference indicate corresponding parts throughout the several figures, an aerosol dispenser is generally shown at 1 comprising a container body 2 having a flanged cover 3 thereon. The container body 2 may consist of any rigid material that is capable of withstanding the pressures necessary to provide extrusion of the material out of the container. Specifically, the container body 2 may consist of a metal alloy such as that used to form the aerosol containers of the prior art.

The flanged cover 3 is circular and joins to the container body 2 at its outer periphery. A valve housing 4 is in conventional sealing contact with the top of container body 2 and the periphery of the flanged cover 3. Seven apertures 6 are disposed in the center and a six equidistantly spaced points from the center of the flanged cover 3. If desired, the sealed joint of the container body 2, flanged cover 3, and valve housing 4 may be gasketed or coated with a sealing compound prior to the crimping thereof to insure a sealed joint.

A stepped recess 8 is provided in the interior of the valve housing 4 in open communication with the apertures 6 spaced from the center. The bottom step 10 of the recess 8 fits over the outer portion of a valve seat support 12. The valve seat support 12 is hexagonally shaped to conform with the periphery of the bottom step 10 thereby preventing rotation therebetween.

Disposed in the center of the valve seat support 12 is a propellent nipple 13 having a propellent passageway 13 therein. Also disposed at an equal distance from the center and on the lines joining the center of the valve seat support 12 to the outer hexagonal points of the valve seat support 12 are six product valve seats 14. The nipple 13 fits through the center aperture 6 in the flanged cover 3 and is connected in a fluidtight manner to a neck 16 of a propellent container 18.

The product valve seats 14 are each formed in a product nipple 14*a* and each product nipple 14*a* fits through a separate one of the apertures 6 spaced from the center of the flanged cover 3. Each product nipple 14*a* is individually connected in a fluidtight manner to a neck 20 of a product container 22. It should be understood that the shape of the valve seat support 12 requires only one flat side to prevent relative rotation between itself and the valve housing 4. Also the number of product valve seats 14 is dependent on the number of separate

product containers desired, for example, three product valve seats **14** being required when only three product containers are desired.

The center portion of the valve seat support **12** is a raised cylinder **24** having six channels **26** therein which communicate with the upper portion of the propellent passageway **13***a*, extend along the top surface (along lines joining the center to the points of the hexagon), down the sides of the raised cylinder **24** and along the lower surface **28** to the respective product valve seats **14**.

It can be seen that there is open communication between the propellent container **18**, the propellent passageway **13***a*, the channels **26**, the product valve seats **14**, and the product container **22**.

An impeller support housing **30** comprises a cylindrical body portion **32** with a flanged bottom **34** and a central opening **36** therein which is concentrically formed and extending sufficiently deep to fit over the cylindrical channel guide **24** of the valve seat support **12** while the flanged bottom **34** is supported on the lower surface **28**.

The resting surfaces of the impeller support housing **30** including the flanged bottom **34** and the top of the central opening **36**, cover the top of the channels **26** to form enclosed passages. The diameter of the flanged bottom is such that an opening is provided between the interior of the valve housing **4** and the outer periphery of the flanged bottom **34**.

A truncated conical impeller **38** fits over the impeller support housing **30** and is disposed thereon for rotational movement about the axis thereof, for example, by a knob portion **39** extending from the lower surface of the impeller **38** fitting into a mating support hole **42** in the top of the impeller support housing **30**. It should be understood that a shaft can be disposed through the center axis of the impeller **38** and supported in the top of the impeller support housing **30** at one end and above the impeller **38** at the other end, in a conventional support opening.

Impeller blades **44** are disposed along the outer periphery of the truncated cone portion and adapted to cause the impeller to rotate when coming into contact with a moving fluid. The recess **8** of the valve housing **4** adapts to the same shape as the body portion **32** and outer periphery of the impeller **39**, but is spaced a small distance away therefrom to allow for fluid movement through the space so created. A thin spring support **46** disposed in the ceiling portion of the recess **8** above the top of the impeller blades **44** has openings **48** about the periphery thereof which communicate with the passage along the recess **8**. A chimney portion **50** extends in open communication above the openings **48**.

A valve retainer **52** having a hollow cylindrical interior and an aperture **53** of a smaller diameter than the hollow interior in the upper center thereof, is disposed with a cylindrical skirt **54** disposed in a mated annular hollow in the valve housing **4**. The bottom portion of the cylindrical skirt **54** is adapted to form a prong **56** thereon so as to prevent raising of the valve retainer **52** out of the annular hollow in the valve housing **4**.

A main valve **58** is disposed in the central aperture **53** of the valve retainer **52**. The main valve **58** is formed with a washer **62** at the bottom portion thereof below a cross-hole **64** therein which communicates with a central conduit **66** therein. The washer **62** can be formed integrally with the main valve **58**. The main valve **58** is a conventional aerosol valve and is urged in sealing position with the central aperture **53** by a compression spring **68**.

It should be understood that the aerosol pressure itself will keep the main valve **58** in a closed position but that once the main valve **58** has been opened the pressure from the propellent will act to keep the main valve **58** open and the compression spring **68** is necessary to close the same.

A second cross-hole **70** is provided in the top of the main valve **58** which communicates with the central conduit **66**. A tube **72** is provided in communication with the second cross-hole **70** and extends to the outer periphery of the aerosol dispenser **1** where it is flanged.

A conventional cover cap **74** has a double flapped skirt. The interior skirt **76**, of the cover cap **74**, is externally threaded at the bottom thereof and threads into an internally threaded ring cam holder **78**. The ring cam holder **78** has a mushroom top surface which has an internally threaded opening at the central top portion. The bottom skirt of the ring cam holder **78** fits over the valve housing **4** and is joined thereto at **80** in a gripping fashion to prevent relative rotation therebetween. A ring cam **82** is provided integrally or otherwise in the ring cam holder **78**.

As can be seen from FIG. **1**, when the main valve **58** is depressed, there is a pressure differential between the propellent outlet **16** and the tube **72** in communication with the atmosphere. Propellent is thereby released and follows the path through the propellent passageway **13**, through the channels **26**, up the path between both the impeller support housing **30** and the impeller **38** and the recess **8**, through the openings **48** and into the first cross-hole **64** which is now in its depressed condition below the valve retainer **52**, up through the conduit **66**, through the second cross-hole **70** and out the tube **72** to the atmosphere.

Although it is not understood, it is surmised that as the propellent travels in the cylindrical channels **26** and up about the flanged bottom **34**, a vacuum is drawn over the open product outlets **20** and by the Bernoulli effect, products therein are drawn out to mix with the propellent and are carried up into recess, or mixing, chamber **8**. As the product passes the impeller, the force thereof causes the impeller to rotate on its knob portion **40** and to cause a thorough mixing of the products.

Valve pins **84** are disposed to fit in each of the product valve seats **14**. The valve pins **84** extend through conduits **86** in the valve housing **4**. It is understood that the conduits **86** communicate with respective product containers **22**. The upper portion of the conduit **86** is wider than the lower portion and the upper surface of each of the valve pins **84** forms a valve cam follower **88** which is rounded on top and is disposed so that the top portion is urged against the bottom of the ring cam **82** by a compression spring **90** which fits in the conduit **86**. The compression spring **90** seats against the bottom of the valve cam follower **88** and the necked in step of the conduit **86**.

The bottom surface of the ring cam **82** will be described below and it should be understood that as the ring cam holder **78** is rotated, the ring cam **82** urges the valve cam follower **88** to varying depths thus opening or closing, more or less, the valve pins **84** in the valve seat **14**. This allows a varying amount of the product to be drawn out of the product container **22**, the amount varying from nothing to the maximum amount that will be drawn with a fully opened valve. By varying each of the depths of the valve pins **84** in the respective valve seats **14** a predetermined amount, a desired mixed product is mixed in the mixing chamber.

In an alternate embodiment of the present invention shown in FIG. **2**, wherein like parts are similarly numbered to FIG. **1**, the main valve is a cylindrical shaft **92** having a flange **94** at the bottom portion thereof. A first washer **96** is disposed on the cylindrical shaft **92** adjacent the flange **94**, and fixed adjacent the propellent outlet **16** so as to prevent propellent entering propellent outlet **16** in the closed position.

The propellent outlet **16** in FIG. **2** is an opening into a cylindrical conduit in the valve seat support **12** and does not have the propellent valve seat **13** and the unnumbered but shown flange to which the propellent container **18** is attached.

That portion of the cylindrical shaft **92** disposed below the valve retainer **52** has a second washer **98** disposed on the cylindrical shaft **92** above the compression spring **68**. A cross-hole **100** is disposed in the shaft above the washer where a pin **102** is fitted therein. The second washer **98** is made of a hard material, for example, steel. The pin **102** can be made of a similar steel with a different softness to prevent undue wear. A pair of washers **104** are then fitted into the cylindrical shaft **92** and above the pin **102**. The top-most washer of the pair of washers **104** being soft, for example, plastic, so as to secure a

tight fitting so that propellent will not leak out of the center aperture 53 of the valve retainer 52. The lower washer of the pair of washers 104 can be made of a hard material, for example, steel, to act as a bearing surface against the pin.

Above the pair of washers a first cross-hole 64 connects to a conduit 66 similar to the main valve 58. The provision of the washers and pin in the cross-hole of the cylindrical shaft 92 allows the cylindrical shaft 92 to fit through central conduits (unnumbered) in the impeller support housing 30 and impeller 38 during manufacturing. The spring support 46 also has a central opening through which the shaft fits. It should be obvious that the parts of the impeller support housing 30 and the impeller 38 which bear upon each other are smooth for ease of turning of the impeller 38.

In the embodiment of FIG. 2 a small amount of propellent passes up through the central conduits of the impeller support housing 30 and impeller 38 into the mixing chamber which causes an additional amount of mixing for a more homogenous mix.

A push button (unnumbered) is disposed over the main valve 58 in FIGS. 1 and 2 which is conventional and when urged toward the main valve 58 causes the main valve 58 to be depressed.

FIG. 4 shows a cam plot of the bottom surface of the ring cam 82. When the ring cam 82 is rotated in position on the aerosol dispenser 1, varying amounts of red, white, yellow, green, blue, as well as gloss, are drawn through the product valve seats 14, as described above. It should be understood that the varying amounts can include the absence of one or more products when the valve pins 84 are fully seated on the valve seats 14 by the selected position of the ring cam 82.

With the valve cam follower 88 at an intermediate position, as shown at A in FIG. 4 for purposes of clarity, the valve pin 84 allows an intermediate flow of product to enter the mixing chamber through the valve seat. As a further example of the invention, the valve cam follower 88 is urged by the ring cam 82 all the way down at B. Thus, the valve pin 84 is fully seated on the valve seat 14 and, thus, in a closed position so that there is no product entering the mixing chamber.

Each of the valve cam followers 88, for example, shown as six in number in the drawing, can be held at varying or similar heights by the ring cam 82. By rotating the ring cam 82, the aerosol dispenser with red, white, yellow, green, blue and gloss in the product containers 22 will dispense from varying shades of yellow (from a pale yellow to the duller yellows and mixed with or without gloss for an enamel effect) through the oranges and reds, purples, greens, blues and finally purples.

The ring cam 82 is shown in FIG. 4, with six zones, each occupying one-sixteenth of the total length of the ring cam 82 or 60°. The zones control the valve pins 84 of the respective paints or pigments which are in the respective product container 22. It should be understood that the ring cam 82 controls the valve pins 84 so that an operator can obtain any one of the pigments solely or any combination of any number of the pigments. It should be clear that the mixing of paints is a well known art but that all the user need do with the aerosol dispenser 1 is to rotate the ring cam and continually depress the main valve 58 to determined the color dispensed. As an aid in selecting the proper colors, the top of the can can be marked with a color code to coincide with the color of paint which will be dispensed from the aerosol dispenser 1.

Although not shown, positions can be made on the ring cam 82, for example at every 60° in the embodiment shown, to follow after each color, where all the valve pins 84 are seated tightly in their product valve seats 14 so that product will not be lost from the product outlets 20 when the aerosol dispenser 1 is not in an upright position.

Although the ring cam 82 has been shown to have six quadrants and the valve pins 84 to be six in number for the products, any amount of products can be stored in the aerosol dispenser 1 and mixed an any desired amount by varying the ring cam 82 to so vary the valve pins 84 in the product valve seats 14. The number of zones in the ring cam 82 will always be equal to the number of product valve seats 14, there being usually one product valve seat 14 for each product container 22 housed therein.

Also, although the embodiment of the present invention has been described in terms of pigments or paints, any desired product can be used and stored in the product containers 22.

While there has been described what is at present considered to be preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is therefore intended to cover all such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. An aerosol dispenser for dispensing a preselected mixture of at least two separately contained liquids, said dispenser comprising in combination:
   a. a can,
   b. a separate product container disposed within said can for each of said liquids,
   c. a propellent container having a chemical propellent therein and disposed within said can,
   d. a channelled member mounted on said can and including a plurality of passageways and a mixing chamber having an outlet communicating with the atmosphere, said first channelled member being coupled to each of said product containers and said propellent container to permit fluid communication of each said product container with said propellent container and with said mixing chamber,
   e. a plurality of product valves each having a cam operable adjustable opening operatively coupled with said passageways of said channelled member for controlling the flow of said liquids to said mixing chamber,
   f. manually presettable cam means operatively coupled with said product valves for presetting each said opening of said product valves, and
   g. a manually operable outlet control valve operatively coupled with said outlet of said channelled member for permitting said liquids in said mixing chamber to be discharged.

2. An aerosol dispenser as defined in claim 1, wherein said cam means is a pivotably mounted ring cam disposed with the cam surface of said ring cam in urging contact with said product valves.

3. An aerosol dispenser as defined in claim 2, wherein said product valves are needle valves having a surface thereof in contact with said ring cam surface so as to act as a cam follower.

4. An aerosol dispenser as defined in claim 3, wherein said ring cam is integral with a pivotable cover mounted on said can for relative pivotal movement therewith, said needle valves being disposed for adjustment by the position of said ring cam surface on said cover to regulate the amount of said liquid flowing from each of said product containers for mixing in said mixing chamber.

5. An aerosol dispenser as defined in claim 1, which also includes a mixing impeller rotatably mounted in said mixing chamber of said channelled member for rotation when said fluid flows through said mixing chamber thereby causing a homogenous mixture of liquids to be dispensed.

6. An aerosol dispenser as defined in claim 5, which further includes a support means mounted on said can.