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3,240,391

SPRAY CONTAINER

Filed July 17, 1962

Fig. 1.

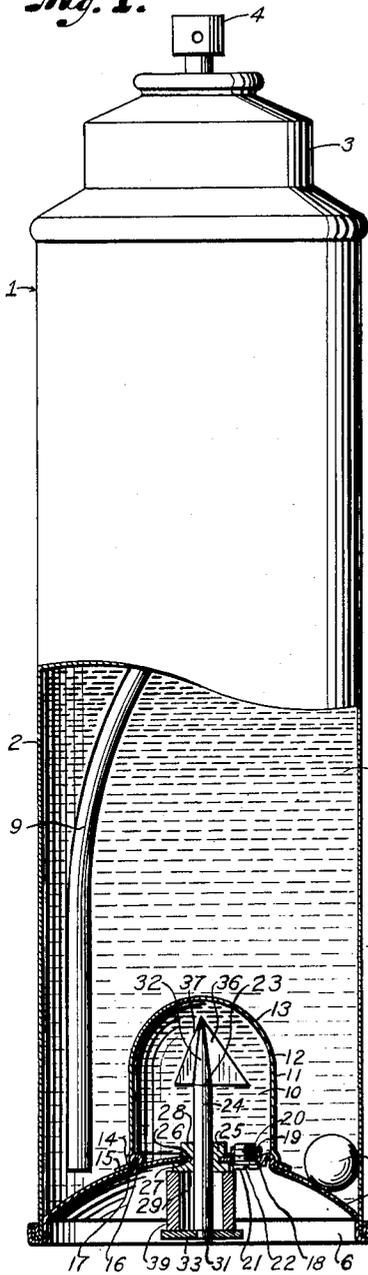


Fig. 2.

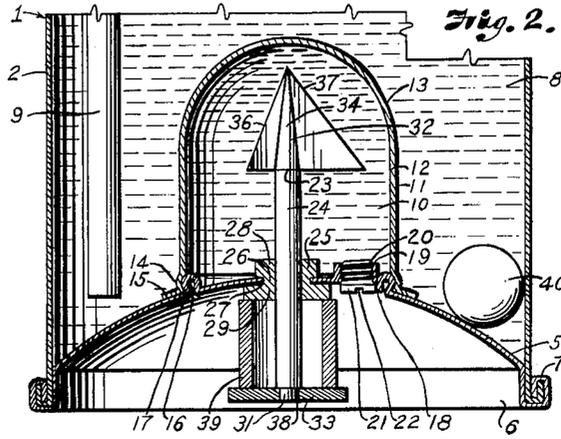


Fig. 3.

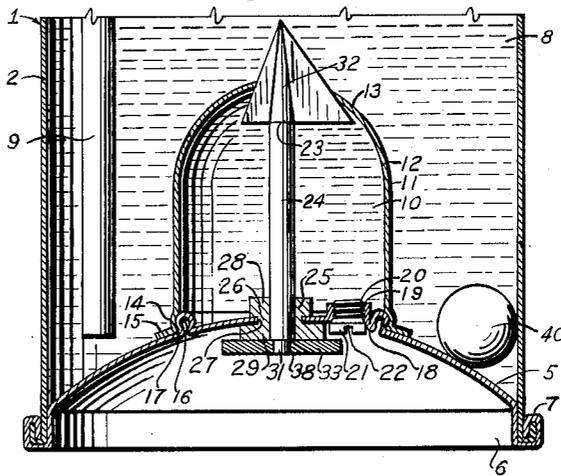


Fig. 4.

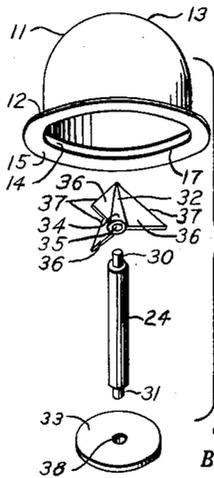
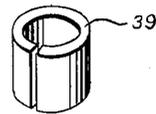


Fig. 5.



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SPRAY CONTAINER
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This invention relates to a pressurized spray container for packaging separately a plurality of liquids which are to be mixed together within the container immediately before use thereof, so that a uniform aerosol mixture is dispensed in spray form.

For example, aerosol spray containers are now available with a spray nozzle controlled by a valve for releasing the contents of the container under pressure of an absorbed liquefied gas. Such containers are especially useful for packaging and applying liquid enamels, lacquers, varnishes, and other coating materials that may be applied in the same composition as the preparation packaged therein. Such containers are most convenient and a highly professional spray job can be obtained therewith. However, it is desirable to package in this type of container materials capable of producing a coating that better withstands the elements, salts, acids, et cetera, one type of which is a polyester resin. However, polyester resins require a hardener which cannot be mixed with the resin until just before use thereof. Two-compartment containers have been previously devised for individually containing ingredients separately, but the construction involves the simultaneous dispensing of the ingredients from the separate compartments through a common spray head, consequently, whatever mixing is obtained in the spray head is not uniform, and it is obvious that such spray containers are not successful where accurate, uniform mixes are required. If the ratio of resin to hardener is too great, the coating will remain tacky and will not dry. If the proportion of the hardener is too high, the resin will set up too rapidly, often hardening in the container, so that it is impossible to obtain a satisfactory spray job with such multi-compartment containers.

It is, therefore, the principal object of the present invention to provide a spray container with compartments for individually and separately containing therein the resin material and a hardener, and to provide for release of one of the materials into the other just before use, so that the materials may be quickly and thoroughly mixed in the container while under pressure; then when the valve of the container is opened, a uniform mixture is sprayed onto the work having the proper setting and drying characteristics for obtaining a satisfactory finish.

It is also an object of the invention to provide a container of this character that is of simple construction and capable of being manufactured at low cost.

In accomplishing these and other objects of the invention, as hereinafter pointed out, the invention contemplates a container forming a main compartment for packaging the primary material therein under pressure, such as polyester resin, and having the customary nozzle and release valve at the upper end, and provided with a built-in compartment at the bottom end for containing the other, or secondary, material, such as the hardener, with the compartments having a capacity relatively to each other so that the components are separately contained in their desired proportions.

The invention also contemplates a built-in means for releasing the hardening material into the polyester resin just prior to use, whereby the components may be quickly and easily intermixed by shaking the container.

In carrying out the invention, I have provided improved structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

FIG. 1 is a perspective view of a spray container con-

structed in accordance with the present invention, and showing the lower portion thereof in section to better illustrate the construction of the secondary compartment.

FIG. 2 is an enlarged vertical central section of the lower end of the container, and showing the puncturing device retained in retracted position, as during shipping and storage of the charged container.

FIG. 3 is a similar view showing the puncturing device released and actuated for discharging the hardener into the polyester resin.

FIG. 4 is a perspective view of the parts forming the secondary compartment and the parts of the puncturing device, in disassembled, spaced relation.

FIG. 5 is a perspective view of the retainer or spacer for holding the puncturing device in retracted position.

Referring more in detail to the drawings:

1 designates an aerosol spray container constructed in accordance with the present invention. The container 1 follows in part the construction of present aerosol spray bombs, in that it includes an elongated cylindrical wall 2 closed at the upper end by a cap 3 securely sealed thereto and carrying the usual depressible spray nozzle and valve unit 4, the specific construction of which forms no part of the present invention. The opposite or bottom end of the container is closed by a concavo-convex bottom 5 that is inset within the container so that the concave side faces outwardly to accommodate one of the features of the present invention. The bottom 5 has an annular flange portion 6 that is crimped to the wall of the container for providing a leaktight seam 7. The container thus far described provides a main compartment 8 adapted to contain the primary component to be packaged therein, in the same manner as is conventional with the usual aerosol spray container, and from which the material is discharged upon pressing of the nozzle 4 inwardly to open the valve and discharge the material under pressure of the liquefied gas with which the container is also charged, the liquid being discharged through a tube 9 connected with the valve and depending to a point adjacent the inner peripheral portion of the bottom 5, whereby substantially the entire contents of the container may be dispensed.

In accordance with the present invention, the container also includes a smaller inner secondary compartment 10, for containing the secondary component to be subsequently mixed with the primary component. The compartment 10 includes a dome-shaped shell 11, having an annular wall 12 of smaller diameter than the cylindrical wall 2, to provide an annular space therearound when the shell is assembled into the container, as later described. The upper end of the wall 12 is closed by a dome-shaped top 13 that may be formed integrally with the wall. The lower end of the wall 12 has an annular corrugation 14, terminating in an outwardly extending flange 15 which conforms to the curvature of the bottom 5. The bottom 5 is preferably formed on the inner face with an internally extending annular bead 16 conforming to the annular groove 17 that is provided by the annular corrugation 14, whereby the shell may be snapped over the bead 16 and, if required, sealed thereto by soldering or the like, to provide a leaktight joint prior to assembly of the bottom 5 into the wall 2. The shell is preferably of a size to contain a quantity of the secondary component proportionate to the primary component.

In order to fill the secondary compartment 10, the bottom may be provided with an internally flanged opening 18 located adjacent the inner side of the bead 16. The flanged opening has internal threads 19 to engage the external threads 20 of a closure plug 21. The plug 21 may have a grooved head 22, whereby it may be turned into and out of the opening by a turning device, such as a screwdriver or the like.

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In order to release the secondary component into the primary component, the invention also provides a puncturing device 23 by which the dome 13 of the shell may be ruptured through manipulation of the puncturing device externally of the bottom 5. The puncturing device includes a stem 24 that is slidably mounted within a grummet 25 that is inserted within an opening 26 located in the center of the bottom 5. The grummet 25 is of resilient material that is resistant to the contents of the shell, and which resiliency provides a leaktight sliding fit of the stem 24, as well as a leaktight fit within the opening 26. To enhance the seal of the grummet with the opening and to better insure the retention thereof, the grummet has an annular groove 27 to contain the margin of the bottom that surrounds the opening 26, and to provide upper and lower flanges 28 and 29 engaging inner and outer faces of the bottom.

The ends of the stem are preferably provided with reduced extensions 30 and 31, to mount a spear-shaped head 32 and a knob or disk 33, respectively. The spear-shaped head is best illustrated in FIG. 4, and includes a conical hub portion 34 that has an axial recess 35 opening inwardly from the base thereof to accommodate the extension 30, the respective diameters of the extension 30 and recess being such as to provide a press fit thereof when the spear-shaped head is applied to the stem 24. Radiating outwardly from the hub 34 are a plurality of blades 36, preferably three in number, and having upper cutting edges 37 converging toward the point of the hub. The knob or disk 33 has an axial opening 38 so that it may be pressed on the lower extension 31.

In order to retain the puncturing device in retracted position during storage and shipping of the spray container, I provide a split sleeve 39, that may be of plastic material or the like, and which is applied over the stem, with ends thereof engaging between the grummet 25 and the disk 33, respectively, as shown in FIG. 2, so as to prevent accidental puncturing of the shell and releasing of the secondary component into the primary component in the outer container.

In order to facilitate mixing of the material in the primary compartment, one or more mixing devices, such as a ball or balls 40, may be inserted in the container prior to assembly thereof.

In assembling the bottom of the spray container as above described, the grummet 25 is first inserted in the opening 26 of the bottom member 5. The stem 24 is then pushed through the grummet 25, after which the spearhead 32 is pressed upon the reduced extension 30. The knob or disk 33 is then pressed upon the extension 31. The shell 11 is then snapped over the annular bead 16. One or more of the mixing balls 40 are dropped into the container. The assembled bottom is then inserted into the lower end of the container and secured to the wall thereof making the seam 7. The spacing sleeve or collar 39 is then sprung over the stem so that the ends thereof engage between the grummet 25 and disk 33, in which position the point of the spearhead 32 is kept from contact with the dome of the shell 11. The nozzle 4 and tube 9 are applied to the cap of the container and the cap is applied to the container in the usual manner.

When the container is used for packaging the coating material, the primary medium is inserted in the container in the usual way, after which the plug 21 is removed and the shell is filled with the secondary medium. The plug is then reinserted and screwed tightly into the opening 18. With the collar 39 in place, the disk 33 thereon is kept within the cavity of the bottom 5, so that the container may be set on end in an upright position.

When a filled spray container is to be used by the purchaser thereof to spray coat an article, the sleeve 39 is removed from the stem 24 by springing the split portion thereof apart a sufficient distance to pass the sleeve over the stem 24. The stem may then be pushed into the shell by pressure applied to the disk 33 until

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the spearhead 32 has penetrated and ruptured the dome portion of the shell 11. Then by turning the container upsidedown, the secondary medium flows into the primary compartment and mixes with the primary medium. The mixing action is supplemented by shaking the container so that the mixing ball or balls 4 agitate the mediums to effect a uniform mixture. The material may then be sprayed onto a surface to be coated by pressing the nozzle 4 downwardly to release the valve thereof so that the mixed medium is discharged through the nozzle and onto the work to be coated.

In using a polyester resin, the polyester resin is the primary component and the hardening material is the secondary component, which are kept separate prior to use, so that the polyester resin can be kept in liquid form, but when the hardener is added thereto a mixture is formed that hardens to a smooth dry coat within a short period of time after it has been sprayed upon the work.

If desired, the secondary compartment may be left empty, to be filled by the user. This is accomplished without losing pressure on the primary component by removing the plug 21 and using the concavity of the bottom as a funnel to fill the secondary compartment just prior to use of the spray. After the secondary compartment is filled, the plug 21 is reinserted to retain the secondary component. Then when the spearhead 32 is actuated to puncture the shell 11, the pressure equalizes between the compartments and the secondary component readily flows into the primary compartment when the container is turned upsidedown. Bodily shaking of the container soon forms a uniform mixture of said components. The grummet 25 and plug 21 are sufficient to retain the pressure on the mixture.

What I claim and desire to secure by Letter Patent is:

1. A pressurized spray container for a polyester resin liquid and a liquid hardener, said container including
 - a cylindrical wall,
 - a bottom member closing the lower end of the cylindrical wall,
 - a cap closing the upper end of the cylindrical wall to cooperate with the bottom member in providing a primary compartment for containing the polyester resin liquid and a pressure medium,
 - a smaller cylindrical wall sealed to said bottom member and extending upwardly from said bottom member within the lower portion of the primary compartment and having a closed upper end to provide a relatively smaller secondary compartment within the lower portion of the primary compartment for containing the hardening liquid,
 - a stem having one end projecting inwardly of the secondary compartment and the other end projecting outwardly from said bottom member,
 - means sealingly mounting the stem slidably in said bottom member,
 - a spearhead on the inwardly projecting end of the stem,
 - a knob on the outwardly projecting end of the stem by which the stem is pushed inwardly to drive the spearhead through said top of the secondary compartment and provide a discharge opening for flow of the hardening liquid from the secondary compartment into the primary compartment for mixture with the polyester resin liquid when the container is inverted and shaken in forming said mixture, and
 - a nozzle in the cap through which the mixture is discharged in spray form under expansion of the pressure medium.
2. A spray container for a polyester resin liquid and a liquid hardener, said container including
 - a cylindrical wall,
 - a concavo-convex bottom member closing the lower end of the cylindrical wall with the concave side

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facing outwardly to provide an external recess at the bottom of the container,

a cap closing the upper end of the cylindrical wall to cooperate with the bottom member in providing a primary compartment for containing the polyester resin liquid and a pressure medium,

a smaller coaxial cylindrical wall sealed to the convex side of said bottom member and extending upwardly from said bottom member into the primary compartment and having a closed upper end to provide a relatively smaller secondary compartment within the lower portion of the primary compartment for containing the hardening liquid,

a stem having one end projecting inwardly of the secondary compartment and an outer end projecting within said recess at the bottom of the container, means sealingly mounting the stem slidably in said bottom member,

a spearhead on the inwardly projecting end of the stem,

a knob on the outwardly projecting end of the stem by which the stem is pushed inwardly to drive the spearhead through said top of the secondary compartment and provide a discharge opening for flow of the hardening liquid from the secondary compartment into the primary compartment for mixture with the polyester resin liquid when the container is inverted and shaken in forming said mixture, and

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a nozzle in the cap through which the mixture is discharged in spray form under expansion of the pressure medium.

3. A spray container as described in claim 2, including

a split collar on the stem and engaging between the knob and bottom member for preventing actuation of the stem until said collar is removed.

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