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3,506,162

SPRAY APPLICATOR

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FIG. 1

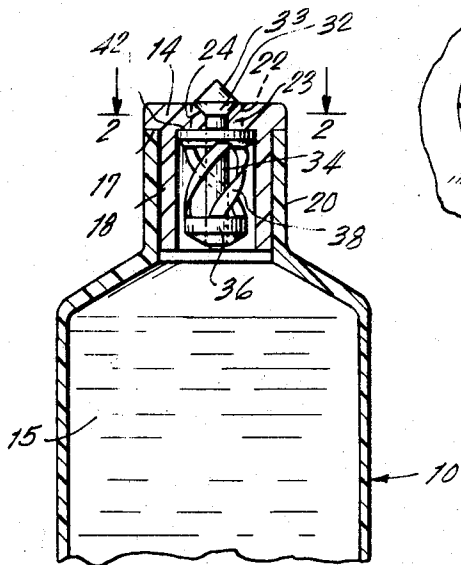


FIG. 2

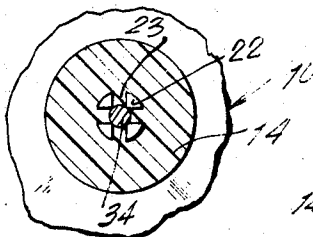


FIG. 5

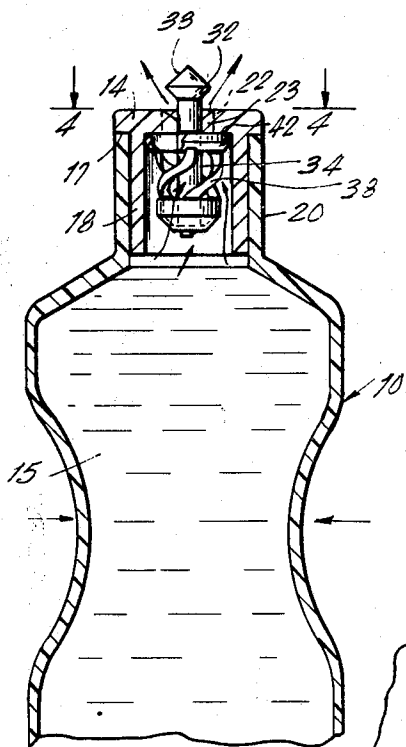
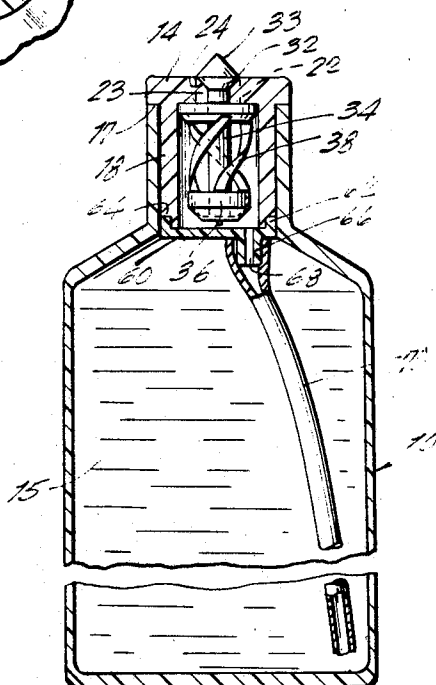


FIG. 3

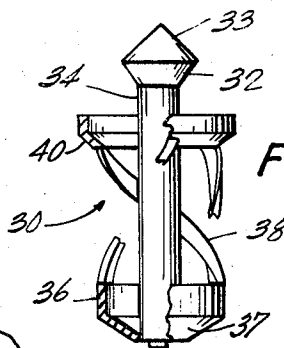


FIG. 6

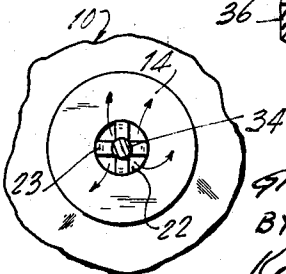


FIG. 4

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SPRAY APPLICATOR

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7 Claims

ABSTRACT OF THE DISCLOSURE

A spray applicator comprising a squeeze container having a retainer ring provided with a fluid delivery opening. The retainer ring is seated in the container neck. A valve member having a conical valve head is provided for closing the opening and includes an outwardly flared resilient valve head and a ring of larger diameter than the opening with engaging the retainer ring so that helical coil springs integrally interconnecting the valve head and ring are continuously maintained under tension normally closing the opening but allowing the valve head to open upon squeezing the container so that fluid under pressure is sprayed in a diverging conical pattern.

This invention relates to a spray applicator and more particularly to valve arrangement for a squeeze container for facilitating the metering and spraying of fluids such as cleaning compounds, cosmetics, medications, pigments, and the like in a highly desirable diverging conical pattern.

Squeezable containers made of plastic or other materials have been devised for packaging various types of fluids. These containers in the past have been provided with closures which allow the non-controlled delivery of fluid upon squeezing of the container. The direction of the spray is generally in a thin stream in a single direction with some wasted spray also being delivered at widely divergent and in useless directions. The present inventor assures delivery of a controlled divergent conical flow of fluid for optimum application upon the surface to be covered.

The present invention has for its primary object the provision of a fluid metering and spraying device for controlling fluid flow for a squeeze container which will also prevent suck back of material which has already passed beyond the valve assembly of the squeeze bottle device and for preventing air and/or other contaminants from being sucked back into the container.

The construction of this invention features the use of a valve assembly which is normally urged by helical springs under stress into a closed position so that only upon application of the pressure due to squeezing of a container can material be sprayed outwardly in a divergent conical pattern with the squeezing of the container being the only practical means for opening the valve assembly, the amount of pressure on the container controlling the volume and force of the spray.

Still further objects and features of this invention reside in the provision of a combination spray valve and anti-suck back device for squeezable containers for use in applying or metering fluids that is simple in construction, capable of being used on various types of containers, and which is inexpensive to manufacture, thereby permitting wide use and distribution.

These, together with the various ancillary objects and features of this invention, which will become apparent as the following description proceeds, are attained by this valve assembly for a spray container, preferred embodiments of which are illustrated in the accompanying drawing, by way of example only, wherein:

FIG. 1 is a longitudinal section view through a con-

tainer showing the valve assembly utilized in the container in a normally closed position;

FIG. 2 is a transverse sectional view taken along the plane of line 2—2 in FIG. 1;

FIG. 3 is a view showing the invention in a valve open position after squeezing of the container;

FIG. 4 is a transverse sectional view taken along the plane of line 4—4 in FIG. 3;

FIG. 5 is a longitudinal sectional view of a modified form of the invention; and

FIG. 6 is a perspective view with parts broken away of the valve assembly utilized in the invention.

With continuing references to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate a squeezable container preferably molded from plastic material or the like. The container 10 is filled with any suitable fluid material 16 such as cleaning fluids including window washing compounds, cosmetics and like preparations including deodorants, medications, polishes and other various liquids.

The container 10 includes a neck 20 and may be externally threaded if desired for receiving a cap thereon. The neck 20 has an open end in which a retainer ring 14 having a projecting portion 18 is seated. The side wall 15 of the retainer ring is flush with the neck 20 and rests on shoulder 17 at the upper edge of the neck. The retainer ring has an opening 22 therein. A plurality of trapezoidal shaped spacers 23 integral with the ring 14 extend into the opening for centering the valve stem of the valve assembly to be hereinafter described. The spacers 23 have tapered upper surfaces 24.

A valve member generally indicated at 30 having a truncated conical shaped valve head 32, a conical spray tip 33, a valve stem or rod 34, a ring 36, a cup 37, and helical springs 38, all either integrally molded with each other or made in two pieces with the stem 34 being secured to the ring 36 by bonding, snap fitting, swaging, or otherwise as desired.

The cup 37 is integral with the ring 36 and is for the purpose of providing a surface against which fluid pressure can be applied. The valve assembly 30 is inserted into the retainer ring 14 in any convenient manner as by first fitting the stem 34 from the top through opening 22. The springs 38 are integrally formed with an engagement ring 40. The ring 40 with the integral springs, cup 37 and ring 36 are then secured to the stem 34 with the ring 40 bearing against the under surface 42 of the retainer ring 14. The ring 40 is of a greater size than the diameter of the opening 22. Alternatively, if the valve assembly 30 is formed of a unitary member, the head 32, 33 thereof is formed after insertion of the valve rod from the underside of the retainer ring by any suitable flaring or peening tube.

It is noted that the springs 38 are constantly under compression thereby continuously urging the valve head 32 against the tapered surfaces 24 of the spacers 23.

In use with the retainer ring 14 inserted into the container 10, upon squeezing on the walls of the container 10 fluid will be forced upwardly against the undersurface of the head 32 and against the cup 37 thereby further compressing springs 38 to open the valve assembly. The fluid will pass along the surface of the valve head 32 which is divergently conical in shape and thereby be sprayed in a conical pattern at an intensity depending upon the amount of pressure that is applied on the container 10. Release of the container 10 will permit the helical springs 38 to force the valve head 32 back to its closed position. This will prevent the possibility of contamination of the contents of the container 10.

In FIG. 5 there is shown a modified form of the invention wherein the retainer ring has a lower cup 60 bonded

or otherwise secured thereto which is provided with an interlocking flange 62 which seats in a groove 64 provided in the lower surface of the projecting portion 18. A fitting 66 provided in lower surface of the projecting portion 18. A fitting 66 provided with a bore 68 therethrough is integrally formed with the cup 60 for securing a tube 70 for picking up fluid from close to the bottom of the container 10 for those types of applications of material which where it is desired to be able to spray outwardly and upwardly in normal application which assures, even when the contents of the container 10 have been partially exhausted.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances, some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. A spray applicator comprising a squeeze container provided with a neck, a retainer ring having an opening for permitting fluid flow therethrough and defining a valve seat, on an outer surface of said retainer ring, said retainer ring having a projecting portion received in said neck, a valve member disposed in said retainer ring and having an outwardly flared resilient valve head engaging said valve seat for closing said opening and an engagement ring of larger diameter than said opening, said valve head being outwardly flared for guiding fluid from said container in a controlled conical pattern, said engagement ring engaging said retainer ring, spring means integrally formed with said engagement ring integrally interconnecting said valve head and said ring, for continuously urging said valve head inwardly into resilient engagement with said valve seat.

2. A spray applicator according to claim 1, wherein said valve member includes cup means providing a surface against which fluid pressure is applied spaced from said engagement ring so that upon application of external pressure on said squeeze container fluid pressure bears against said cup means and said valve head to open said valve member.

3. A spray applicator according to claim 2, wherein said valve member further includes an elongated rod integrally formed with said valve head extending through and below said engagement ring and having an end re-

mote from said valve head, said spring means including a plurality of spaced helical spring members integrally formed with said engagement ring under compression interconnected to said engagement ring and said cup means of said rod below said engagement ring.

4. A spray applicator according to claim 3, wherein said valve head has a portion substantially conical in shape.

5. A spray applicator according to claim 4, including a plurality of spacers integral with said retainer ring and extending inwardly of said opening for centering said rod, said spacers having downwardly convergingly sloped surfaces corresponding to and for seating said conically shaped portion of said valve head.

6. A spray applicator according to claim 1, including a cup secured to said retainer ring closing said ring, a fitting integral with said cup having a bore therethrough, and a fluid intake tube on said fitting communicating said retainer ring with the lower portion of said container.

7. A spray applicator according to claim 6, wherein said valve member includes an elongated rod extending through and below said engagement ring and having an end remote from said valve head, said spring means including a plurality of spaced helical spring means under compression connected to said engagement ring and said rod at a location below said engagement ring.

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U.S. Cl. X.R.

222—211, 212, 496, 518; 239—327