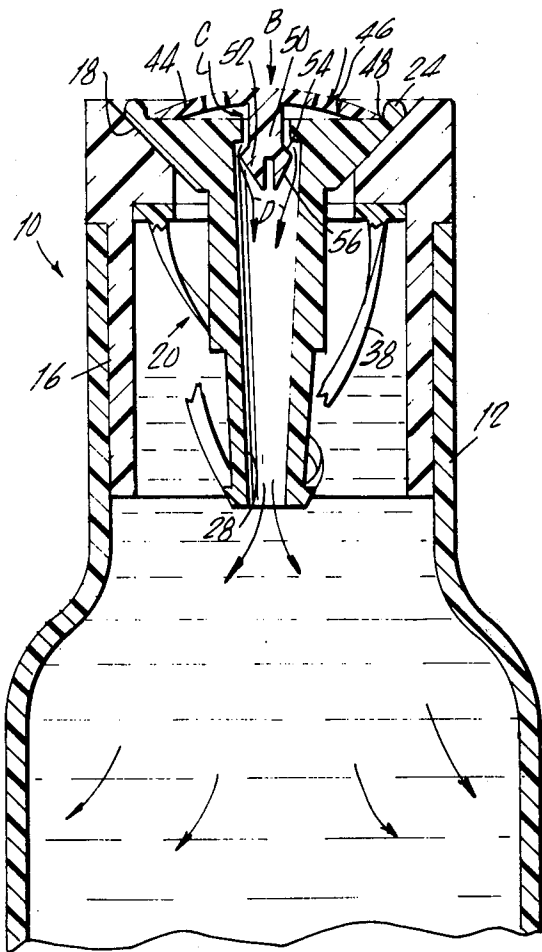
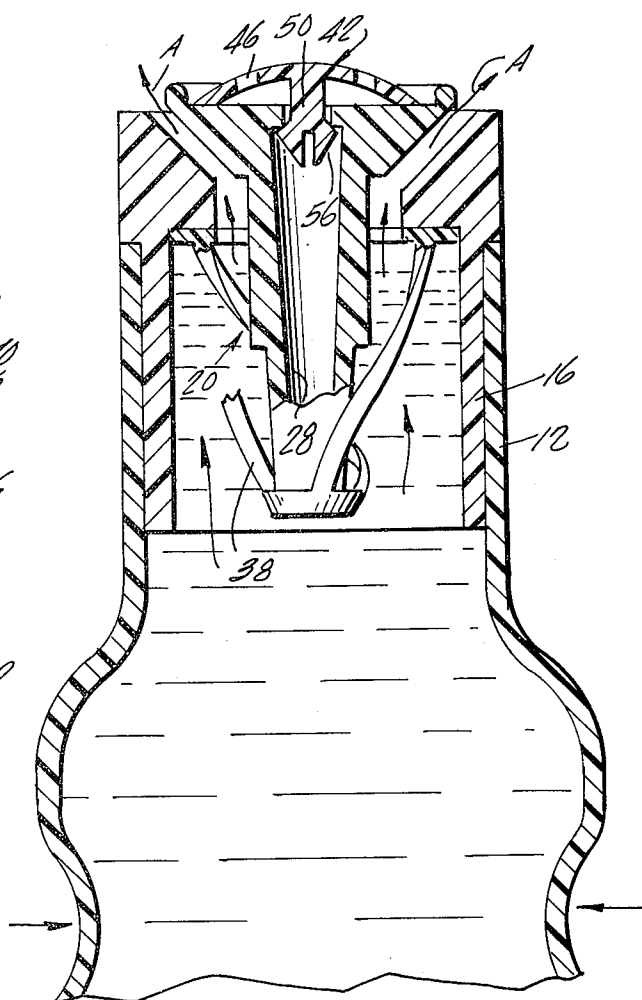
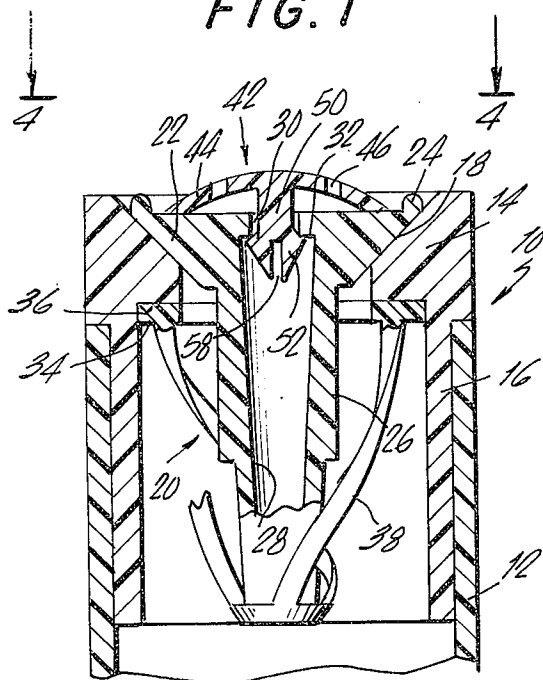


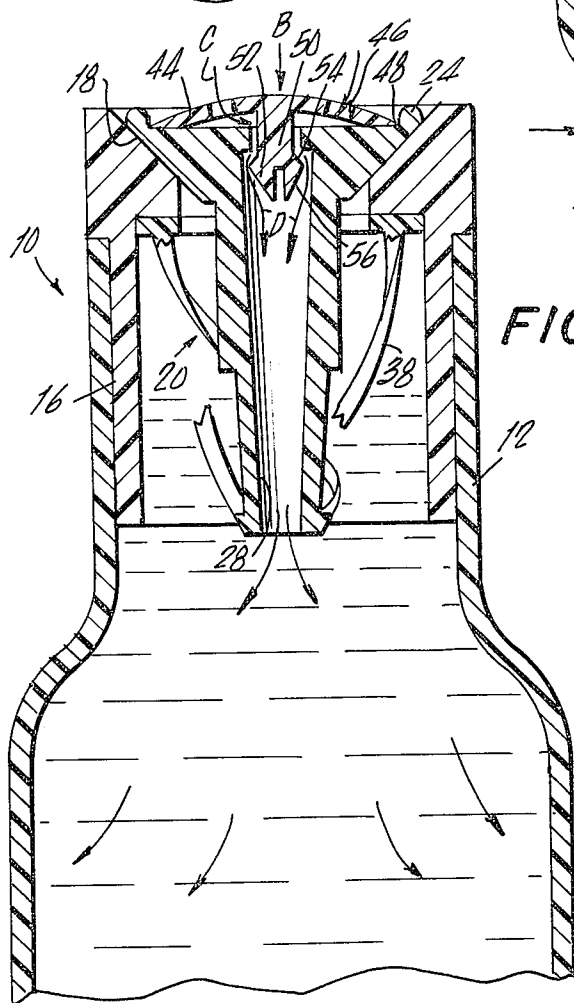
[54]	APPLICATOR HAVING MULTIPLE VALVE ASSEMBLIES		2,695,737	11/1954	Schlicksupp.....	222/513
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[76]	Inventor:	Gilbert Schwartzman, 20 Wilmot Cir., Scarsdale, N.Y. 10583	3,656,660	4/1972	Mueller.....	222/212 X
[22]	Filed:	June 19, 1973	Primary Examiner—Robert B. Reeves			
[21]	Appl. No.:	371,408	Assistant Examiner—Charles A. Marmor			
			Attorney, Agent, or Firm—Kenneth S. Goldfarb			
[52]	U.S. Cl.....	222/213, 222/496, 222/482	[57]	ABSTRACT		
[51]	Int. Cl.....	B65d 37/00	A fluid applicator comprising a retainer ring adapted to be seated in a container and having a valve assembly for controlling liquid flow. The valve assembly includes a valve head having a peripheral flange which maintains a disc valve assembly for controlling air flow in a bowed convex position.			
[58]	Field of Search .....	222/212, 213, 518, 495, 222/496, 487, 402.25, 493, 513, 478, 482, 525; 401/186, 273, 205, 206				
[56]	References Cited					
	UNITED STATES PATENTS					
	553,389	1/1896	Brower .....	222/518 X	7 Claims, 4 Drawing Figures	



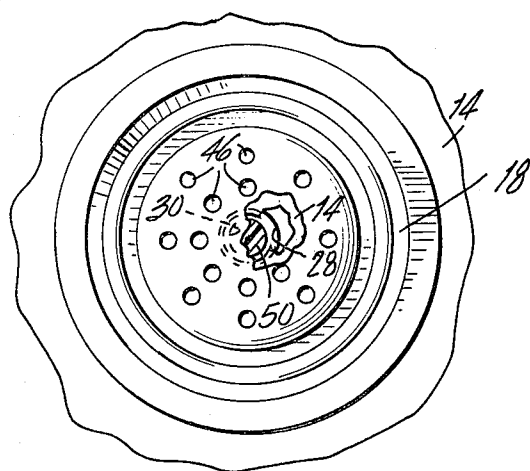
**FIG. 1**



**FIG. 2**



**FIG. 3**



**FIG. 4**

# APPLICATOR HAVING MULTIPLE VALVE ASSEMBLIES

This invention relates to a fluid applicator especially adapted for use in conjunction with squeeze containers.

In the past, various types of valve arrangements for fluid applicators have been devised. In U.S. Pat. No. 3,203,026 to Gilbert Schwartzman, issued Aug. 31, 1965, for "Fluid Applicator," there is disclosed a retainer ring which is provided with a valve assembly employing helical coil springs. This valve assembly is highly effective and useful, but makes no provision for controlled feed back of air when the applicator is utilized on a squeeze container.

The concept of this invention features the use of a novel combination of two valve assemblies, one of which seats in the other and is of a type which is capable of effective use in metering air back into a squeeze container, and which may be used with squeeze containers of conventional construction.

The construction of this invention features the use of a disc-shaped valve assembly employing a disc which is placed under stress into a concave shape and so arranged so as to bow the disc into an outwardly convex shape which only serves to draw the valve element against its seat to prevent flow of air. The disc-shaped valve assembly is mounted in a valve assembly which meters the flow of fluid from a squeeze container.

Still further objects and features of this invention reside in the provision of a fluid applicator employing two cooperating valve assemblies that is simple in construction, capable of being assembled in a rapid and convenient manner and which is inexpensive to manufacture thereby permitting wide use and distribution for employment particularly on squeeze container applicators.

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 applicator provided with multiple cooperating valve assemblies for squeeze containers, a preferred embodiment of which is illustrated in the accompanying drawing, by way of example only, wherein:

FIG. 1 is a vertical sectional view of an applicator constructed in accordance with the concepts of the present invention;

FIG. 2 is a vertical sectional view similar to FIG. 1 showing liquid being metered by the multiple valve assemblies;

FIG. 3 is a view similar to FIG. 1, but showing the applicator in use with the multiple valve assemblies permitting air flow; and

FIG. 4 is a top plan view looking along the plane of line 4-4 in FIG. 1.

With continuing reference to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate a fluid applicator constructed in accordance with the concepts of the present invention, which is adapted to be inserted into the neck of any type of suitable squeeze container 12. The applicator 10 includes a retainer ring 14 having a projecting portion 16 which is designed to fit in the neck of the container.

A valve assembly 20 is seated in said retainer ring and includes a valve head 22 of generally truncated conical shape which engages the valve seat 18. The valve head

22 has a peripheral circular flange 24 thereon. The valve assembly 20 includes a valve stem 26 which is hollow defining a chamber 28 generally of a tapered configuration. The valve head has an aperture 30 therethrough which is of less diameter than the diameter of the chamber 28 forming a shoulder 32. A mounting ring 34 engages the shoulder 36 of the retainer ring and is integrally connected to the base of the stem 26 by helical coil springs 38. The valve seat 18 is defined by the tapered opening in the retainer ring 14.

A disc valve assembly 42 is provided for controlling fluid flow through the opening 30 and includes a disc 44 provided with a plurality of rows of annularly spaced bores 46 therethrough. The disc has a larger diameter than the inner diameter of the flange 24 so that when the peripheral edge 48 of the disc engages the flange, while the disc is also in engagement with the flange 24, it is under stress and is bowed outwardly in a convex manner as shown in FIG. 1.

Integral with, and depending from the disc 44 is a valve body 50 adapted to extend through the aperture 30. Integral with the valve body 50 is a valve element 52 having a lower downwardly diverging truncated conical portion 54 and a lower conical portion 56. The valve element 52 may be snapped into place through the aperture 30 or may be formed by a heated tool after the valve body 50 has been pushed through the aperture 30 as may be desired. The valve element 52 may be slotted as at 58 for facilitating force fitting.

In use, the container 12 is overturned and upon squeezing the container 12, the valve head will permit fluid flow in the direction of arrows A (FIG. 2) through the opening 18. When the squeeze bottle is released, valve head 22 will close preventing air from filling the squeeze bottle. However, manual depression of the disc 44 in the direction of arrow B will permit air flow in the direction of arrows C through bores 46 and through the aperture 30 in the direction of arrows D. Release of the disc will render the container fluid tight.

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.

I claim:

1. A fluid applicator comprising a retainer ring having a projecting portion, said retainer ring having an opening therethrough forming a valve seat, a valve assembly having a valve head engageable with said valve seat, said valve assembly further including a valve stem extending through said opening, a mounting ring engaging said retainer ring and spring means integrally interconnecting said mounting ring and said valve stem, said stem being hollow forming a chamber, the top of said valve head having an aperture therethrough, said aperture being of less diameter than said chamber forming a shoulder, said valve head having a flange thereon, a disc valve assembly extending through said aperture, the diameter of said disc when in an unstressed condition being greater than the inside diameter of said flange, the peripheral edge of said disc engaging said flange thereby stressing said disc into an upwardly convex position, said disc having at least one bore therethrough, a valve body depending from said disc and having a valve element on said body, said valve element being below said shoulder and being engageable with said shoulder to close said aperture, said ap-

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erture and said opening being concentric, said aperture being located inwardly of said opening.

2. A fluid applicator according to claim 1, wherein said body is integral with said disc.

3. A fluid applicator according to claim 2, wherein said element is integral with said body.

4. A fluid applicator according to claim 3, wherein said valve element includes a truncated conical portion flaring outwardly and downwardly, and a lower down-

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wardly converging conical portion.

5. A fluid applicator according to claim 3, wherein said valve element has a recess therein.

6. A fluid applicator according to claim 1, wherein said stem is integral with said valve head.

7. A fluid applicator according to claim 1, wherein in said disc there are a plurality of annularly spaced bores therethrough.

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