March 24, 1953 H. F. TOMASEK 2,632,585

LIQUID SPRAYING VALVE STRUCTURE

Filed Oct. 16, 1946

Fig. 1.

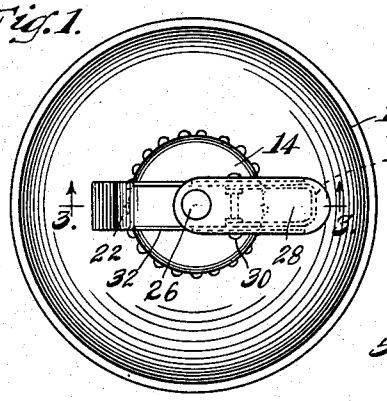


Fig. 5.

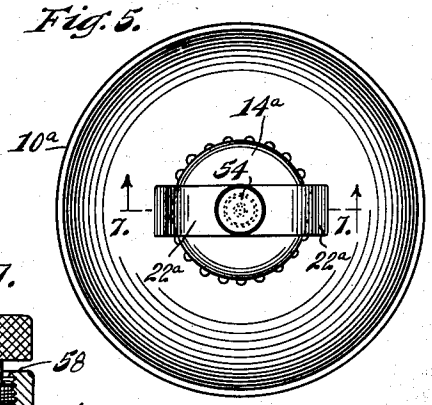


Fig. 7.

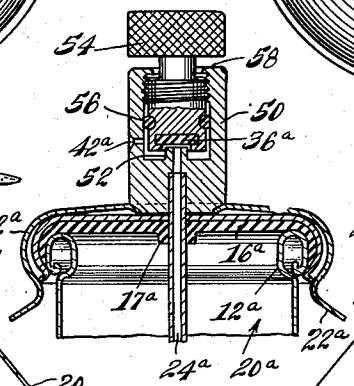


Fig. 2.

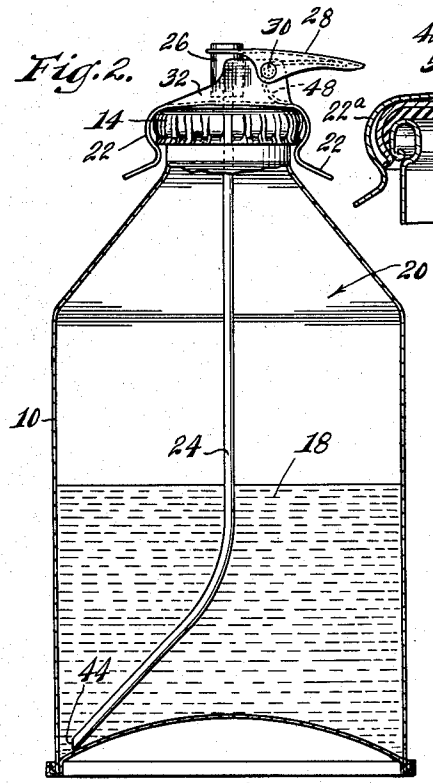


Fig. 6.

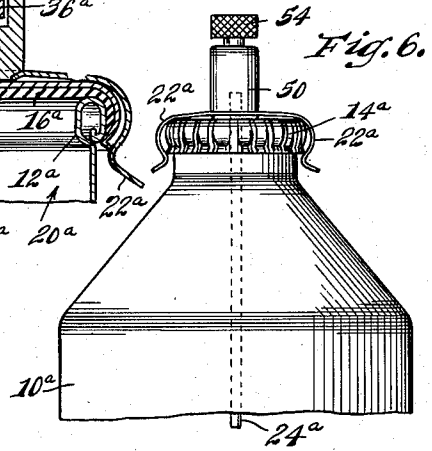


Fig. 4.

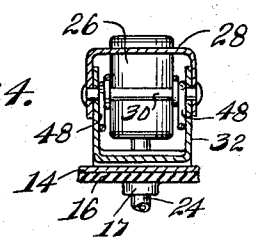


Fig. 8.

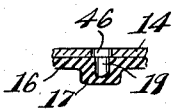
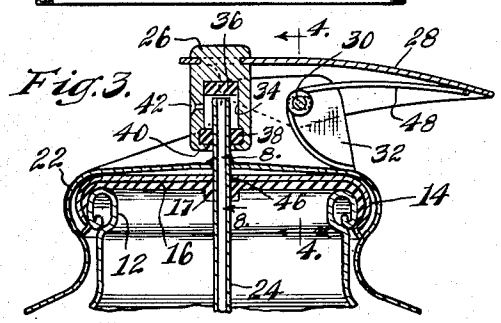


Fig. 3.



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LIQUID SPRAYING VALVE STRUCTURE

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1 Claim. (Cl. 222—394)

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My present invention relates to a liquid dispenser for spraying liquid in the form of an aerosol from a container of insecticide or the like.

One object of the invention is to provide a dispenser of this general type having a cheap throw-away container for the liquid to be dispensed, such container being a standard drawn or seamed can such as used for beer and the like and designed for the use of a closure cap of the crown type.

Another object is to provide an inexpensive assembly of valve structure and syphon tube attachable to the crown cap of the container when it is desirable to dispense the contents thereof, and detachable therefrom after the contents are dispensed whereupon the valve and syphon tube assembly can be applied to another container of liquid.

Still another object is to provide a gasket of neoprene or the like within the crown cap, the cap having an opening through which the syphon tube may be extended, the lower end of the syphon tube being sharpened so as to pierce the gasket in such manner that the gasket seals around the syphon tube to prevent leakage of gas under pressure at this point thus retaining the pressure in the can for future spraying operations if the initial one does not result in dispensation of the entire contents of the can.

A further object is to provide the valve structure with a snap-on base that can be associated with or readily removed from the crown cap of the liquid containing can.

Still a further object is to provide a novel valve structure particularly adapted for the type of dispensing device here under consideration which is inexpensive to manufacture and yet reliable in operation.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a liquid dispenser embodying my present invention.

Figure 2 is a side elevation thereof with the container shown in section.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1 showing one form of valve structure.

Figure 4 is a detail sectional view on the line 4—4 of Figure 3.

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Figure 5 is a plan view of a similar dispenser showing a modified type of valve.

Figure 6 is a side elevation of Figure 5.

Figure 7 is an enlarged sectional view on the line 7—7 of Figure 5; and

Figure 8 is an enlarged sectional view on the line 8—8 of Figure 3 showing the top wall of a crown cap and a gasket associated therewith before the gasket is punctured as in Figure 3.

On the accompanying drawings I have used the reference numeral 10 to indicate a cheap disposable can of the type now generally used for containing beer and other beverages. This type of can is inexpensive to manufacture and may with economy be thrown away after using.

The can 10 has a rolled upper edge 12 on which is normally positioned a crown cap 14. Ordinarily a cork disc is placed between the crown cap and the upper edge 12 of the can to serve as a liquid-tight seal. I propose to substitute for this cork disc a diaphragm or disc 16 of neoprene, rubber or the like to serve as a sealing gasket capable of holding the contents of the can under pressure.

The contents of the can may consist of insecticide, germicide, fungicide, air cleaner, or deodorant liquid or the like indicated at 18. Above the liquid 18 is a space 20 adapted to contain Freon 11, Freon 12 or other gas under pressure for displacing the liquid 18 from the can, as will hereinafter appear. A can of the character disclosed I have found to be capable of withstanding an internal pressure of 300 to 325 pounds per square inch ultimate, which is sufficient for dispensing all the liquid in the form of an aerosol spray.

In Figures 1 to 4, I illustrate a valve and syphon tube assembly comprising a spring clip 22, a syphon tube 24 (capillary type), a valve cap 26 and a lever 28 for opening the valve. The tube passes through a hole in the center of the clip 22 and is soldered thereto. The lever 28 is pivoted on a pin 30 carried by a pair of ears 32 upstanding from the sides of the clip 22.

The valve cap 26 is riveted to the lever 28 and includes a cavity 34 having therein a sealing disc 36 and a packing washer 38. The packing washer is held in position by a flange 40 spun inwardly from the lower end of the cap 26. The cap 26 is provided with a minute discharge opening 42.

The lower end of the syphon tube 24 is sharpened by cutting it at an angle as shown at 44 so that the sharpened end after passing through an opening 46 at the center of the crown cap

14 is capable of entering a socket 19 slightly smaller than the tube and piercing a thickened portion or boss 17 of the neoprene disc 16 as shown in Figure 3. Figure 8 shows the condition of the parts before piercing. After piercing the boss 17 closes around the tube 24 to seal off the interior of the container 10 to atmosphere around the syphon tube. The internal pressure in the space 20 aids in this sealing action.

The valve cap 26 is normally in the closed position of Figure 2 due to the action of a spring 48 wrapped around the pivot pin 30 and having its ends contacting with the spring clip 22 and the lever 28 as shown in Figure 3.

In Figures 5, 6, and 7, I show a modified construction wherein the syphon tube 24 is soldered into a valve body 50, the valve body in turn being soldered to a spring clip 22*a*. The valve body 50 has an annular valve lip 52 and a valve disc 36*a* to seat against it when a valve plug 54 carrying the disc is screwed inwardly.

The valve plug, it will be noted, is screw threaded in relation to the valve body 50 and an O ring 56 may be provided as a means to seal against liquid flow through the threads of the valve. The valve body 50 is provided with a discharge opening 42*a*. To prevent the plug 54 from being screwed entirely out, the upper end of the valve body 50 is spun inwardly as shown at 58.

Practical operation

In the operation of the type of dispenser shown in Figures 1 to 4, after the syphon tube 24 is inserted through the opening 46 of the crown cap 14 it pierces the portion 17 of the gasket 16 and permits the syphon tube to be lowered to the position shown in Figure 2 with the valve and tube assembly held on the crown cap by the ends of the spring clip 22 snapping over opposite edges thereof.

Thereafter when it is desirable to dispense liquid the right hand end of the lever 28 is depressed as in Figure 3 thus unseating the disc 36 from the upper end of the capillary tube which acts as a valve seat. The liquid then flows under pressure into the cavity 34 and out through the opening 42, it being inhibited from flow around the tube 24 at the lower end of the valve cap 26 by the packing washer 38.

Due to the pressure at which the liquid is forced outwardly through the opening 42 and the minute size of the opening the liquid is atomized or broken up into very fine particles so that its issue is in the form of a mist or vapor commonly termed aerosol. This type of spray is desirable for insecticides and the like as it effects a suspension of the liquid in the air so that it can penetrate to all crevices where insects may be.

In the type of valve structure shown in Figures 5, 6 and 7 it is merely necessary to rotate the knurled head on the upper end of the valve plug 54 in one direction for unscrewing the plug as in Figure 7 thus spacing the disc 36*a* from the valve lip 52 to permit fluid flow to the discharge opening 42*a*. After the desired quantity of liquid has been dispensed the valve plug is screwed inwardly again to the seated position.

After the liquid 18 has been completely dispensed the can 10 can be thrown away after the valve and syphon tube assembly has been removed therefrom. This assembly can then be associated with another can of liquid and gas under pressure and the valve thus re-used in connection with a great number of cans.

The valve structures shown are comparatively simple and inexpensive to manufacture and can thus be sold at small cost. The containers 10 are also inexpensive thus eliminating the usual bother of returning containers for refund. At the same time the container has sufficient strength to withstand a pressure high enough to effect dispensation of all the liquid with sufficient pressure to insure an aerosol type spray.

The valve and tube structures disclosed are rugged enough to be associated with heavier containers and to control the flow of liquid at considerably higher pressure than a can type of container is capable of containing.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claim any modified forms of structure or use of mechanical equivalents which may be reasonably included within its scope.

I claim as my invention:

In a valve structure for a syphon tube to control the flow of fluid therefrom, said valve structure comprising a mounting member secured to said syphon tube adjacent the upper end thereof with said upper end projecting above said mounting member, a cap enclosing said upper end, a pair of pivot ears extending upwardly from said mounting member, a lever having a pair of pivot ears extending downwardly therefrom, a pivot pin through both pairs of ears, said cap being mounted on one end of said lever spaced from said pivot pin, spring means tending to rotate said lever about said pivot pin to normally engage the inner end of said cap with said upper end of said syphon tube to close it against flow of fluid therefrom, said cap having a side opening and a sealing washer below said opening and spanning the distance between the inner wall of said cap and the outer surface of said syphon tube, the other end of said lever on the opposite side of said pivot pin serving as manually depressible means to lift said cap from said upper end of said syphon tube.

HERBERT F. TOMASEK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,078,213	Patnaude	Nov. 11, 1913
1,875,821	Nazare	Sept. 6, 1932
1,913,274	Hayden	June 6, 1933
2,004,013	Strauss	June 4, 1935
2,030,510	Griffiths	Feb. 11, 1936
2,082,706	Maggiora	June 1, 1937
2,091,737	Longway	Aug. 31, 1937
2,099,847	Gebauer	Nov. 23, 1937
2,114,583	Adams	Apr. 19, 1938