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ATOMISING DISCHARGE VALVES

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FIG.1

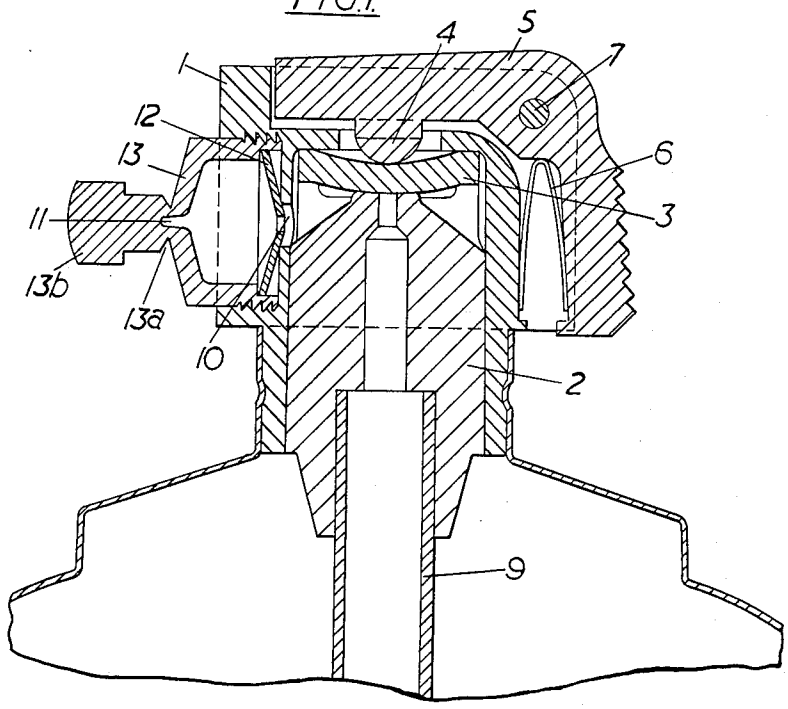
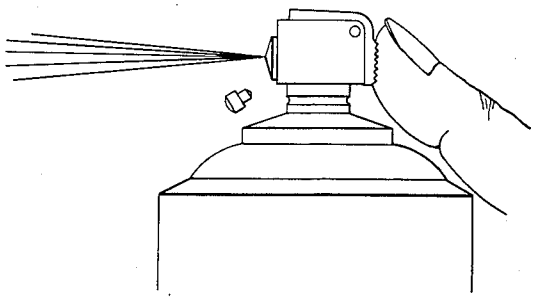


FIG.2



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ATOMISING DISCHARGE VALVES

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This invention concerns atomising discharge values for containers of pressurised liquids and has for one object the provision of a new or improved valve of this character which is of a simple and inexpensive construction and may be made substantially entirely of plastics material.

Accordingly the valve of this invention comprises a cap having an aperture and a communicating bore therein, a discharge plug assembly in said cap and in communication with said bore, said assembly including a hollow body, two opposite ends to said body, a discharge nozzle at one said end of said body and a delivery regulating valve at the other said end, said other end being securable to said cap, a valve seat located in an axially fixed position within said bore of said cap and defining with the latter a chamber communicating with said discharge nozzle, such seat having a bore which emerges into said chamber and is adapted, in use of the valve, to be placed in communication with the liquid in the container, a resilient valve member formed separately from the cap and mounted in the latter at the upper part of said chamber and aligned with said valve seat, a lever pivoted to said cap externally thereof, and a boss on said lever which passes through said aperture in said cap and bears on said valve member, said lever being biassed so that said boss normally applies pressure to said valve member to distort the latter against the valve seat and close the bore therein, but capable of being pivoted against such biasing to release said pressure on said valve member.

The valves of this invention, having a separate resilient pad to form the valve head, makes for an extremely simple manufacture and also improves the operation of the valve in that only a slight displacement of the lever is necessary to unseat the pad from the valve seat and thus release some of the contents of a container to which the valve is applied.

In order that this invention may be understood more readily the following description is given, by way of example, of one embodiment of the invention with reference to the accompanying drawings in which:

FIGURE 1 is a longitudinal section through the upper part of an aerosol producing liquid container incorporating a valve according to the invention; and

FIGURE 2 is a side elevation on a different scale of the upper part of the container and illustrating the operation of the valve.

As seen in FIGURE 1, the valve comprises a cap **1** sealed into the top of a container which is conveniently a conventional cylindrical container as shown but may be of any suitable desired shape, such cap including in its upper portion an aperture. On one side, the cap **1** is provided with a discharge passage **10**. On the other side of the cap and mounted between two supporting lugs is a pin **7** on which is pivoted an angled lever **5**. The lever **5** is normally urged in a counter-clockwise sense, as seen in FIGURE 1, by a spring **6**, so that a boss **4** on the lower side of the upper arm of the lever is urged downwardly through the aperture in the upper portion of the cap.

The cap **1** is also provided with a bore into which is fitted a disc-shaped resilient pad **3**. This pad is held in place against the underside of the upper portion of the cap **1** by raised shoulders at the top of a plug **2** which is

tightly fitted into the bore in the cap. At its upper part the diameter of the plug **2** is reduced to form an annular chamber in communication with the passage **10** and from the annular chamber fluid distributor ducts extend radially inwardly to a raised central valve seat slightly below the level of the said shoulders. Thus fluid can be fed from the valve seat to the discharge passage **10** whatever the orientation of the plug **2**. The plug **2** has, at its lower end, a downwardly extending central spigot having a central bore in which is fitted a dip tube **9**. To provide fluid communication between the dip tube and the centre of the valve seat, the main portion of the plug **2** has a central bore having a restricted neck portion.

The action of the spring **6** on the lever **5** is to urge the boss **4** downwardly onto the pad **3** and force the latter into fluid tight engagement on the valve seat. The side arm of the angled lever **5** is ribbed to facilitate pressing of the lever with the finger.

Fitted into cap **1** is an independent hollow plug assembly which comprises an atomising diaphragm **11**, an apertured delivery regulating diaphragm **12** and an assembly plug **13**. These elements may each form a separate part which is manufactured separately, or a plurality of them may be combined in a single part. Thus the assembly consisting of the three elements may be obtained by blowing a bulb of plastics material having suitably calibrated orifices and a suitably calibrated engaging skirt. Alternatively, as shown in the drawings, the delivery regulator is a metal diaphragm **12** inserted in the plug **13**, the rigidity of which it ensures at the level of the anchoring zone.

According to the latter form of realization, the plug **13** is made of injection-moulded synthetic material, the atomising orifice **11** is not open but only outlined in the form of a blind hole of a form suitable for the jet desired and carrying, if so desired, the well-known helical grooves. This blind hole terminates in a protuberance **13*b*** of the plug. A groove **13*a*** determines a weakening zone and enables the atomising orifice to be opened at the appropriate level either by breaking off or by cutting off the protuberance. An arrangement such as this ensures the inviolability of the container, which remains hermetically sealed as long as the protuberance **13*b*** has not been detached.

This method of fixing the plug **13** is unimportant; it may simply be fitted in, screwed in, welded, cemented, set or anchored by pins or a bayonet device. According to a preferred constructional form, the fixing is obtained by anchoring which gives an inviolable assembly without requiring any special tools.

As has been said above, the device according to the invention permits the filling of containers already equipped with their valve. To this end, it is sufficient to fit the injection tube of the metering pump to the lateral orifice **10** of the cap **1**; the fluid lifts the sealing element from its seat and penetrates into the container, which has previously been freed of air in accordance with the usual technique.

The spring **6** which ensures the fluid-tightness of the valve can be placed in position after filling and the drawing shows a type of spring particularly simple to insert in a valve which has already been assembled. It should be observed, however, that the presence of a spring in no way prohibits the filling. In fact, the pressure exerted by the metering pump below the sealing diaphragm is applied to a surface much larger than the area of the orifice of the valve and the result is a thrust on the lever much greater than that which must normally balance the spring. Under these conditions, the valve recloses automatically after filling and the container can be subjected directly to the usual tests, such as warm water bath, before the plug **13** is placed in position.

In order to operate the valve, once the atomising orifice **11** is opened, pressure is exerted on the side arm of the lever **5** thereby compressing the spring **6**. Thus the boss **4** is raised and the resilient pad **3** is unseated from the seat at the top of plug **2** by the pressure of the pressurised liquid in the container. The liquid then passes through the radial ducts into the annular chamber through discharge passage **10** and emerges through the atomising orifice **11** as a fine spray.

To close the valve, the side arm of the lever is released and the spring **6** urges the lever in a counter-clockwise direction, as seen in FIGURE 1, and the boss 4 passes the pad **3** back into sealing engagement with the valve seat.

We claim:

1. An atomising discharge valve comprising: (a) a cap having a bore therein, (b) a discharge plug assembly projecting laterally outwardly from the side of said cap and communicating with the upper end of said bore in the cap said assembly including a hollow body, two opposite ends to said body, a discharge nozzle at one said end of said body and a delivery regulating apertured diaphragm at the other said end, said other end being securable to said cap, (c) a wall integral with said cap and forming the top of the latter, (d) said wall having an axial aperture therein, (e) a plug fitted fixedly in the lower end of said bore in the cap so as to be spaced below said top-forming wall of the cap, (f) said plug having a vertical central bore extending completely therethrough, (g) a valve seat on said plug at the upper end thereof and having a bore communicating with the bore in said plug, (h) a resilient valve member of disk-like configuration formed separately from said cap and plug and disposed between said top forming wall of the cap and the said valve seat, (i) said valve member being of greater dimensions than both the bore in the valve seat and said aperture in the top-forming wall of the cap and engaging said top-forming wall of the cap to close said aperture therein, (j) a lever pivoted to said cap externally thereof at a position remote from said valve member, (k) an end on said lever and (l) the lever being biassed with said end normally projecting through the aperture in the top-forming wall of the cap and applying pressure to the valve member to press the valve member against the valve seat to close the bore therein, but being capable of being pivoted against such biassing to move said end out of contact with the valve member to release the pressure on the valve member.

2. A container for liquid under pressure, such container having mounted at the top thereof an atomising discharge valve comprising: (a) a cap having a bore thereon, (b) a discharge plug assembly on said cap and in communication with said bore, said assembly including a hollow body, two opposite ends to said body, a discharge nozzle at one said end of said body and a delivery regulating apertured diaphragm at the other said end, said other end being securable to said cap, (c) a wall integral with said cap and forming the top of the latter, (d) said top-forming wall of the cap having an aperture therein, (e) a plug fixedly in the lower part of said bore in said cap, (f) said plug having a through bore which at one end enlarges into a recess, (g) a tube fitted into said recess and extending downwardly into said container, (h) a dished valve seat in said plug and a bore in said valve seat communicating with said through bore in said plug, (i) said seat defining with said cap a chamber communicating with said discharge nozzle, (j) a resilient valve member of disk-like configuration formed separately from said cap and plug and of dimensions greater than both the bore in the valve seat and the aperture in said top-forming wall of the cap, (k) said valve member being disposed in said chamber and closing the aperture in said wall, (l) a lever pivoted to said cap externally thereof at a position remote from said valve member, (m) an end on said lever and (n) the lever being biassed so that said end normally projects through the aperture in the top-forming wall of the cap applying pressure to the valve member to press the valve member against said dished valve seat to close the bore therein, but being capable of being pivoted against such biassing to move said end out of contact with said valve member to release the pressure on the latter.

3. An atomising discharge valve comprising: (a) a cap having a vertical bore therein, (b) a separate integral discharge plug assembly projecting outwards from the side of said cap means defining a blind bore in said assembly communicating with said bore in the cap, a closed end to said bore and a thinned portion of said assembly and adjacent said closed end, (c) said assembly having an apertured diaphragm for discharge therethrough of liquid in the form of a spray, (d) a wall integral with the cap and forming the top of the latter, (e) said top-forming wall of the cap having an axial aperture therein, (f) a plug fitted fixedly in the lower end of said bore in said cap, (g) said plug having a vertical through bore, (h) a dished valve seat formed on said plug and having a bore communicating with said vertical bore in said plug, (i) said valve seat defining with said cap a chamber communicating with said discharge plug assembly, (j) a resilient valve member of disk-like configuration formed separately from said plug and cap and having dimensions greater than both the bore in the valve seat and the aperture in said top-forming wall of the cap, (k) said valve member being disposed within said chamber and closing said aperture in said wall, (l) a lug projecting outwardly from the side of said cap opposite to said discharge plug assembly, (m) a lever pivoted to said lug at a position remote from said valve member, (n) a boss integral with said lever and projecting through said aperture, (o) said boss, valve member and valve seat being in alignment and (p) the lever being biassed so that said boss applies pressure to the valve member to press the valve member against the said dished valve seat to close the bore therein, but being capable of being pivoted against such biassing to move said end out of contact with said valve member to release the pressure on the latter.

4. A container for liquid under pressure, such container being of a generally cylindrical form and having its top defined by an atomising discharge valve comprising: (a) a cap having a vertical bore therein, (b) a separate discharge plug assembly projecting laterally outwardly from the side of the cap, means defining a blind bore in said assembly and communicating with said bore in said cap, a closed end to said bore and a thinned portion of said assembly adjacent said closed end, (c) said assembly having an apertured diaphragm for discharge therethrough of liquid in the form of a spray, (d) a wall integral with said cap and forming the top of the latter, (e) said top forming wall of the cap having an axial aperture therein, (f) a plug fitted fixedly in the lower end of said bore, (g) said plug having a vertical bore extending completely therethrough, (h) a recessed portion at the lower end of said plug communicating with said vertical central bore, (i) a tube fitting into said recess and extending downwardly into said container, (j) a dished valve seat formed in said plug and having a bore communicating with said vertical bore in said plug, (k) said valve seat defining with said cap a chamber communicating with said discharge plug assembly, (l) a resilient valve member of disk-like configuration formed separately from said plug and cap, and having dimensions greater than both the bore in the valve seat and the aperture in said top-forming wall of the cap, (m) said valve member being disposed within said chamber and closing said aperture in said wall, (n) a lug projecting outwardly from the side of said cap opposite to said discharge plug assembly, (o) a lever pivoted to said lug at a position remote from said valve member, (p) a boss integral with said lever and projecting through said aperture, (q) said boss, valve

member and valve seat being in alignment and (r) the lever being biassed so that said boss applies pressure to the valve member to press the valve member against the said dished valve seat to close the bore therein, but being capable of being pivoted against such biassing to move said end out of contact with said valve member to release the pressure on the latter.

References Cited by the Examiner

UNITED STATES PATENTS

2,530,583	11/1950	Nurkiewicz	169—31
2,586,575	2/1952	Smye	169—31
2,772,744	12/1956	Beadet	169—31
2,982,448	5/1961	Leonard et al.	222—153
3,085,720	4/1963	Boch et al.	

FOREIGN PATENTS

627,709	8/1927	France.
100,706	1/1941	Sweden.

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