United States Patent

Ruscitti

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[54] **VALVE FOR DISPENSING TWO DISTINCT LIQUIDS FROM AN AEROSOL CONTAINER**

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[51] **Int. Cl.** **B65d 83/14**

[58] **Field of Search**.....222/136, 145, 193, 402.21, 222/402.24; 239/579, 302, 303, 307, 573, 304

[56] **References Cited**

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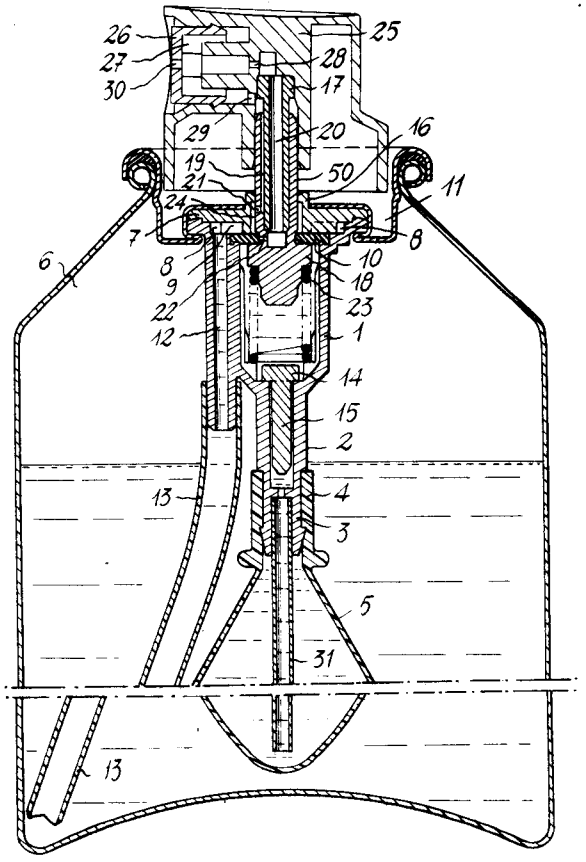
[57] **ABSTRACT**

A valve applicable to an aerosol container of the type containing two liquids, one of which in the container and the other of which in a deformable vessel in turn enclosed within the container. The valve is capable of dispensing the two liquids separately for supply thereof to a dispensing cap where said liquids are intermixed. The valve comprises a hollow body, in which a first hollow extension projects and on which a deformable vessel containing one of said liquids is carried. The valve comprises a second hollow extension communicating with a chamber connected to a further chamber by a duct which, under inoperative conditions, is closed by a seal pressed by a flange projecting the valve stem on which a spring is operative. In the stem, two longitudinal conduits are provided, at the lower end of which in the stem two distinct small holes are provided and located above said seal.

6 Claims, 3 Drawing Figures



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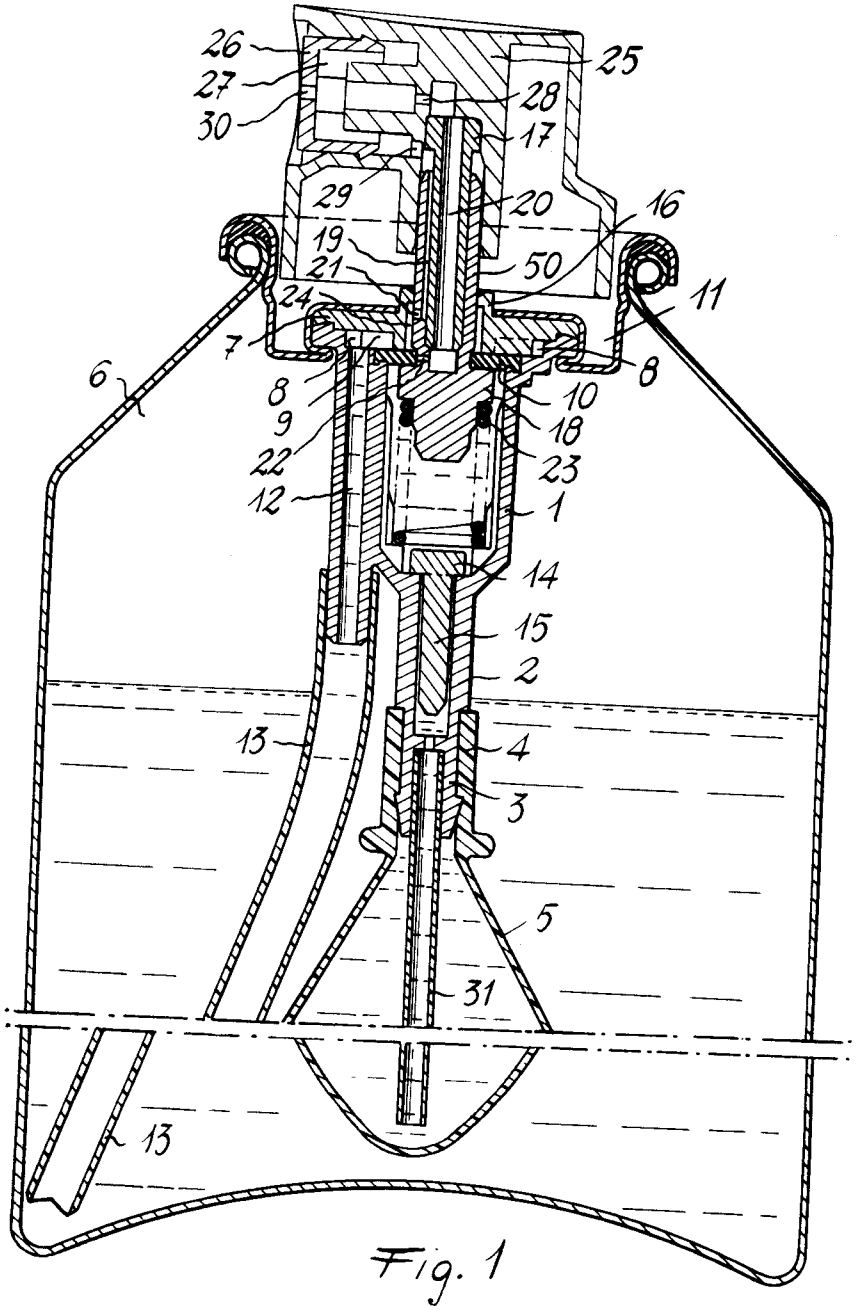

Fig. 1

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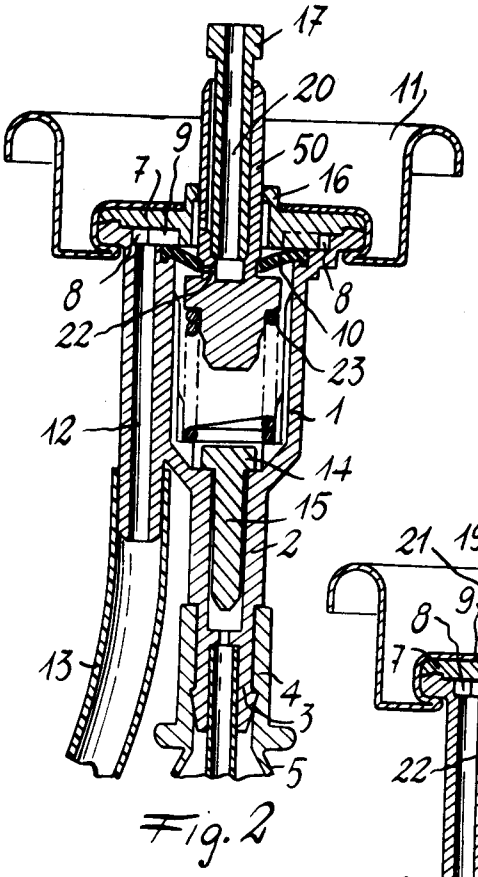

Fig. 2

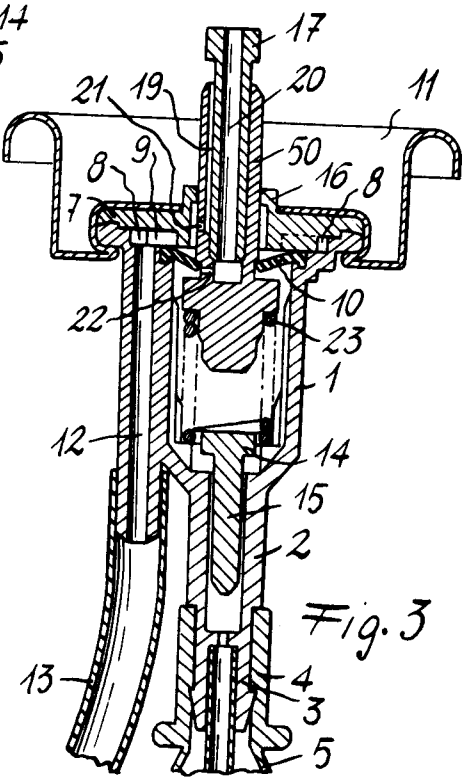

Fig. 3

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VALVE FOR DISPENSING TWO DISTINCT LIQUIDS FROM AN AEROSOL CONTAINER

This invention relates to a valve for dispensing two distinct liquids from an aerosol container, and more particularly a valve applicable to an aerosol container and capable of dispensing two different liquids which are kept separated from each other within the container.

Aerosol containers are known, in which two distinct liquids are introduced, one liquid being introduced directly into the container, and the other liquid being introduced into a deformable vessel accommodated in said container.

Dispensing valves are known as applicable to these containers and suitable to dispense simultaneously the two liquids therein, such valves suffering however from a number of disadvantages.

A disadvantage of the prior art valves is that the two liquids are intermixed in a chamber within said valves, which makes it impossible to use such valves in many instances, such as when on mixing the two liquids give rise to chemical reactions, such as of a polimerizing character.

Another disadvantage in the prior art valves is that, where a propelling gas is introduced into a container after applying one of such valves thereto and assembling the deformable vessel onto the valve, a passage will occur of some of this gas into the deformable vessel, which may cause serious drawbacks.

The passage into the deformable vessel of some of the gas being introduced into the container is also promoted in that the gas pressure within the valve body is at least initially higher than in the container and deformable vessel during pressure filling.

The main object of the present invention is to provide a valve for dispensing two distinct liquids from an aerosol container and by which the two liquids are separately dispensed without mixing within the valve, so as to avoid in any manner the possibility for a flow-back of some of the two liquids mixed in the rigid container and deformable vessel.

Another object of the invention is to provide a valve of the above character which, after being tight-sealingly applied to the inlet of the above mentioned design of container, will allow to directly introduce into the container a high pressure propelling gas following the introduction into the container of the two liquids to be dispensed, preventing any possibility for this gas from entering the deformable vessel arranged in the container.

A still further object is to provide a valve for sealingly separate the two liquids in the container and preventing any leakage to the outside, so that the container can be pressurized and maintained at this condition.

These and still other objects are accomplished by a valve comprising a main body having an inner hollow open at one end of the body, from the other end of which a first hollow extension projects and on which the inlet of a deformable vessel containable within said container can be fitted, a shaped disc overlying the main body at the opening of the hollow thereof, a wall projecting outwardly of the main body and by which said disc defines a first chamber communicating with the hollow of the main body through at least one duct, a resilient seal between the disc and the main body, a bottom capable of being secured to the inlet of an aerosol container and rigidly bonding the disc to the seal and main body, a second tubular extension projecting laterally of the main body and one end of which opens on said first chamber and on the other end of which a drawing tube insertable in said container is fitted, a plunger having an enlarged head located within the hollow of the main body, a stem extending therefrom and being accommodated and movable within the bore of the first extension, this bore having a cross-section area larger than that of the plunger stem, a valve stem having an end thereof within the hollow of the main body and the other end thereof outward extending through a hole of said seal and a hole of said disc, and a second chamber provided between the outer surface of the valve stem, the seal and disc, an annular flange extending from the stem portion within the hollow of the main body, this flange being acted upon by a spring accommodated within the hollow of said main body and which, under valve inoperative conditions, urges the flange on the seal pressing it against the disc, closing said duct and separating said first chamber, second chamber and hollow of the main body from one another, in the valve stem there being formed at least two longitudinal conduits open adjacent the free end of said stem and at each of which, in the stem, at least one small hole is provided, these small holes being located above said valve stem flange and being spaced apart from one another along the stem so that, under the conditions at which the valve stem is held downward pressed against the action of said spring, one of said small holes opens into the hollow of the main body and the other small hole opens into said second chamber.

For a better understanding of the valve structure and features, an embodiment thereof will now be described by mere way of not limiting example, reference being had to the appended drawings in which:

FIG. 1 is a cross-section of a valve at inoperative conditions, as fitted on an aerosol container;

FIG. 2 is a sectional view showing the valve when introducing a propelling gas directly into the container, on which said valve is fitted; and

FIG. 3 is a sectional view showing the valve at dispensing attitude.

Referring first to FIG. 1, showing the valve at inoperative conditions, the valve comprises a main body 1 having an inner hollow open at one end of said body and from the other end of which there projects a first hollow extension 2, on the lower end 3 of which the inlet 4 is fitted for a deformable vessel 5 containing a liquid and accommodated, in turn, within a container 6.

On said main body 1 and at the opening of the hollow thereof, a shaped disc 7 overlies and with a wall outwardly projecting from the body 1 forms a first chamber 8 communicating with the hollow of body 1 through a number of ducts 9, only one of which being shown in the drawing.

Between said disc 7 and the main body wall outward projecting a resilient seal 10 is located: said disc 7, seal 10 and body 1 are sealingly made integral to one another by a bottom 11 which is seamed or riveted below the free projecting edge of body 1, as clearly

shown in the drawing, and which can be fitted, in turn, on the inlet of an aerosol container **6**, as shown in the drawing.

Laterally of said body **1** a tubular extension **12** projects, one end of which opens on the first chamber **8**, and the other end of which is free and carries a drawing tube **13** extending to the bottom of container **6**.

The valve also comprises a plunger having an enlarged head **14** located within the hollow of body **1**, a stem **15** extending therefrom and being accommodated and movable within the hollow of the first extension **2**, the hollow of this extension **2** being of a cross-section area larger than that of said stem **15**.

Disc **7** has a central hole, at which a cylindrical wall **16** extends and has its free edge inward bent, as shown in the drawing. Seal **10** also has a hole and through this hole and that of disc **7** the valve stem extends which, in the embodiment shown, is made of two pieces fitted to each other, of which one piece comprises a tubular element **17** having an enlarged free end and the other piece having at the bottom an annular flange **18** and at its top portion **50** having a longitudinal seat, in which the tubular element **17** is inserted and the outer surface of which defines with the adjacent surface of the other piece **50** a longitudinal conduit **19** parallel to the conduit **20** defined within the element **17**, this conduit **20** opening at the free end of the valve stem and conduit **19** opening on the side surface of said stem.

In the valve stem, a small hole **21** is formed adjacent the lower end of the conduit **19** and a small hole **22** is also formed adjacent the lower end of conduit **20**. These small holes are both positioned above said flange **18** and are spaced apart from each other along the stem so that, under the conditions at which the valve stem is held upward urged by a spring **23**, neither of them will open into the hollow of body **1**; under these conditions, which are the inoperative conditions shown in FIG. **1**, said spring **23** urges the stem flange **18** against the seal **10**, pressing it against the disc **7**, closing the duct **9** and separating the first chamber **8**. It will be seen that between the outer surface of the valve stem, seal **10** and disc **7** a second chamber **24** is formed which, under the inoperative conditions, is also separated due to seal **10** from the first chamber **8** and hollow of body **1**.

On the outer surface of the valve stem an annular groove is provided, at which said small hole **22** is located and the seal **10** is positioned for a sealing effect on the stem surface, as shown in FIG. **1**.

In order to improve the sealing between the main body **1** and the valve disc **7** and between the latter and the valve bottom **11**, said disc **7** is preferably made of a softer material than that comprising said body **1**. All of the elements comprising the valve are advantageously made of plastic material, except for the spring which is made of metal and the seal which is of rubber.

On the end of the valve stem projecting from the aerosol container, a dispensing cap can be fitted, such as that shown in FIG. **1**. This cap comprises a body **25**, in which a glass or socket type of element **26** defines a chamber **27** communicating with the conduit **20** through a hole **28** and communicating with the conduit **19** through a hole **29**, this chamber **27** communicating in turn with the outside through a hole **30** on the bottom of the glass or socket element.

Assume that the vessel **5**, made of deformable plastic material, contains one liquid and a different liquid is in container **6**, in which also a pressure gas is provided. Suppose, under these conditions, to downward press by a finger the dispensing cap fitted on the valve stem: this would cause the stem to be lowered relative to the main body of the valve which takes the attitude as shown in FIG. **3**.

Owing to the pressure within the aerosol container, the liquid in the deformable vessel **5** rises up a small tube **31** carried on the lower end **3** of the first extension, causes the plunger to raise as shown in said FIG. **3** and then, by flowing into the space between the stem and the adjacent surface of the first extension, enters the hollow of body **1**, passes to the small hole **22** now not closed by seal **10**, rises up along the stem conduit **20** and reaches the dispensing cap chamber **27** by passing through the hole **28**. The liquid in the container outside the vessel **5** rises up along the tube **13** and the hollow of extension **12**, fills up the first chamber **8** and passes to the second chamber **24** through the duct **9**, which is now not closed by the seal **10**, the latter being downward deflected by the stem. This liquid, from chamber **24** via the small hole **21**, conduit **19** and hole **29** also reaches the cap chamber **27**, where it intermixes with the liquid from the vessel **5**, the so mixed up liquid exiting then from the hole **30** of element **26**.

By suitably dimensioning the above mentioned holes, conduits and passages, a desired mixing can be provided within the mixing chamber of the dispensing cap, it being avoided in any manner a possible mixing of the two liquids within the valve.

Assume now that the bottom **11** with the valve is seamed on the container inlet, a liquid is contained within the vessel **5** and it is desired to introduce a high pressure propelling gas into the container outside of the vessel **5** and containing a second liquid previously introduced. By a known type of machine the valve stem is lowered relative to the main body **1** attached to the bottom as shown in FIG. **1**, and a high pressure gas stream is supplied; this gas enters the container through the conduit **20** and small hole **22**, but is prevented from entering the vessel **5** through the hollow of extension **2** as the upper opening of said hollow is closed by the plunger head **14**, the latter being firmly on the underside of body **1** by the gas pressure in the hollow of said body **1**, this pressure being higher than that in said vessel **5**.

The gas via conduit **19**, small hole **21**, chamber **24**, duct **9**, chamber **8** and hollows of extension **12** and small tube **13** enters the container **6** and pressurizes it. The gas could also flow between the adjacent surfaces of the bent edge of wall **16** of disc **7** and the outer surface of the stem to reach the chamber **24** and therefrom through duct **9** again into the container. As apparent, some of the gas in chamber **24** could enter the hollow of body **1** downward deflecting said seal **10**, but the gas therefrom cannot enter the vessel **5** according to the above statement.

It will be appreciated that, under the inoperative conditions of the valve, it is unnecessary that the small hole **21** is located at the chamber **24**, since said small hole could be as well outside the disc **7**, provided that on crushing the valve stem said small hole would be positioned within the chamber **24**.

What we claim is:

1. A dispensing valve for two distinct liquids from an aerosol container, comprising a main body having an inner hollow open at one end of the body, from the other end of which a first hollow extension projects and on which the inlet of a deformable vessel containable within said container can be fitted, a shaped disc overlying the main body at the opening of the hollow thereof, a wall projecting outwardly of the main body and by which said disc defines a first chamber communicating with the hollow of the main body through at least one duct, a resilient seal between the disc and the main body, a bottom capable of being secured to the inlet of an aerosol container and rigidly bonding the disc to the seal and main body, a second tubular extension projecting laterally of the main body and one end of which opens on said first chamber and on the other end of which a drawing tube insertable in said container is fitted, a plunger having an enlarged head located within the hollow of the main body, a stem extending therefrom and being accommodated and movable within the bore of the first extension, this bore having a cross-sectional area larger than that of the plunger stem, a valve stem having an end thereof within the hollow of the main body and the other end thereof outwardly extending through a hole of said seal and a hole of said disc, and a second chamber provided between the outer surface of the valve stem, seal and disc, an annular flange extending from the stem portion within the hollow of the main body, this flange being acted upon by a spring accommodated within the hollow of said main body and which, under valve inoperative conditions, urges the flange on the seal pressing it against the disc, closing said duct and separating said first chamber, second chamber and hollow of the main body from one another, in the valve stem there being formed at least two longitudinal conduits open adjacent the free end of said stem and at each of which, in the stem, at least one small hole is provided, these small holes being located above said valve stem flange and being spaced apart from one another along the stem so that, under the conditions at which the valve stem is held downwardly pressed against the action of said spring, one of said small holes opens into the hollow of the main body and the other small hole opens into said second chamber.

2. A valve as claimed in claim 1, wherein on the outer surface of the valve stem an annular groove is provided, at which that small hole closer to the flange projecting from the stem is located and at which said seal is positioned under the inoperative conditions of the valve.

3. A valve as claimed in claim 1, wherein one of said longitudinal conduits in the valve stem opens at the free end of said stem, whereas the other conduit opens on the side face of the stem somewhat spaced apart from said free end.

4. A valve as claimed in claim 1, wherein the valve stem portion projecting externally of the main body hollow has a longitudinal seat in which a tubular element is inserted, the outer surface of this tubular element defining with the adjacent surface of said stem one of said longitudinal conduits, the other of which being defined by the hollow of the tubular element.

5. A valve as claimed in claim 1, wherein that of the small holes provided in the valve stem which is farther from said flange opens at said second chamber.

6. A valve as claimed in claim 1, wherein said shaped disc is made of a softer material than that comprising said main body.

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