This invention in general relates to a valve construction similar to that illustrated in my United States Patent No. 3,128,924 with the difference that the present invention is adapted for use with compressed gas, i.e., gases which are not mixed with the material to be expelled, as distinct from the patented valve which is for expelling materials with which the gas is miscible.

In the present case the invention contemplates the use of a valve, made in general of suitable materials such as plastics, the construction providing a tighter seal between the parts of the valve and the valve stem itself while at the same time the tank portion of the device is provided with a metering chamber of an improved design providing an additional compartment resulting in the trapping of gas in one compartment when material to be expelled is admitted to the chamber, and upon depression of the valve stem the trapped gas expands and pushes the material in the chamber through the stem and out to the atmosphere. In my prior patent the construction is such that there is no compressed gas entrapment.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which:

FIG. 1 is a cross sectional view through the new valve, and

FIG. 2 is a sectional view on line 2—2 of FIG. 1.

In the upper portion of the chamber there is provided a valve body 42 which is centrally hollow. At its lower end it is directed inwardly forming an annular shelf 44 against which a valve spring 46 exerts its lowermost abutment. This spring encircles the valve stem 4 and finds its upper abutment on a flange 48 which is fixed relative to the valve stem 34.

Inwardly of its lower portion, the valve stem is provided with an annular shoulder at 48 which reacts against another gasket 50 located in position as will be described and this gasket forms the upper portion of a chamber in the lower portion of the tank 20. The valve stem extends through an opening in the central portion and the shoulder 48 abuts it, which determines the upper limit of motion of the valve stem.

The central portion of the valve body 42 forms a chamber with which a port at 52 is in communication through the central opening 54 of the valve stem. When the valve stem 34 is depressed against the action of spring 46, the port 52 enters the chamber in the tank 20 past gasket 50, and any material under pressure therein will therefore be expelled through the hollow central portion 54 of the valve stem to the atmosphere.

There is provided in the tank chamber a meter insert plug generally indicated by the reference numeral 56. It will be seen that this plug may be provided with projections at the top and bottom so that it is firmly anchored with respect to gaskets 56 and 58. This chamber is hollow providing openings for the valve stem so that it may operate between its uppermost and downwardmost positions, but its essential feature is that it is provided with a central generally annular baffle which is indicated at 58. This baffle has a lower edge 60 which terminates short of the upper surface of the gasket 36 and therefore it will be seen that not only is there an inner chamber formed in the tank but there is also an auxiliary outer chamber 62 of generally cylindrical form located separate from the inner chamber but communicating therewith at the lower end thereof.

In the operation of the device with the parts as shown in FIG. 1, and assuming the use of gas under pressure such as nitrogen which does not mix with the contents of the aerosol, there is of course gas in chambers 60 and 62. In order to operate the device without a dip tube, it is necessary to invert the container. Some liquid is therefore pushed into these chambers as for instance at 60 and 62 along with the gas and the gas is under pressure because the gas in the entire container is under pressure.

With the container inverted, the stem at 34 being depressed, the gas in the chamber at 62 expands because the liquid is pushed out by the gas pressure through the port 52 which is now in alignment with the chamber 60 and the chamber 60 is therefore open to the atmosphere. However there is still gas left in the chamber which is now not under pressure, and therefore pressure in the container (inverted) forces another charge of liquid and gas under pressure when the stem 34 is once more released. The port 52 is again closed with relation to chamber 60, and again chamber 60 is open with relation to the interior of the container by ports 40.

The dip tube can be applied to member 38, in which case the device will work right side up, because the liquid is forced by the gas pressure up through the dip stick from the bottom of the container through orifices into chamber 60. When the stem 34 is depressed, port 52 opens to the chamber 60 and thus a charge is released. Whenever the stem 34 is depressed, the port at 40 are closed off.

The operation is substantially the same using the dip tube with the container in upright condition or without the dip tube in inverted condition.

There may also be provided an aperture at 64 for the
pressure filling of the container, this being normally closed by a downturned flange 66 which is a part of the gasket 14, and it communicates with a groove 68.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A dispensing device for controlling the discharge of a metered amount of material from a container under pressure of immiscible gas, said device comprising a tank, means to secure the tank to a container, said tank having a metering chamber therein, means in said metering chamber forming a pair of chambers, one of the latter being radially spaced from the other, a valve stem, a spring for said valve stem normally urging the same to valve-closed condition, said valve stem being retractable against the action of the valve spring to open said valve stem to the atmosphere, and means communicating between the metering chamber and the interior of the container whereby both material to be propelled and the immiscible gas are located therein, the gas being in effect trapped in the outermost of said pair of chambers, whereupon when said valve stem is retracted the gas expands and expels material in the chamber out through the valve stem.

2. The dispensing device of claim 1 wherein the means providing the chambers comprises a baffle.

3. The dispensing device of claim 1 wherein the means providing the chambers comprises a baffle, said baffle extending downwardly from the top portion of said metering chamber to a point spaced from the bottom thereof.

4. The dispensing device of claim 1 wherein the means providing the chambers comprises a baffle, said baffle extending downwardly from the top portion of said metering chamber to a point spaced from the bottom thereof and surrounding the valve stem.

5. A metering valve construction for use with immiscible materials to be expelled by gas and comprising means providing a tank, a metering chamber in the tank, an insert plug in the chamber, means holding the plug in position, a valve stem extending through the tank and the plug, said valve stem having means for admitting material under pressure out to the atmosphere when in one position thereof and when in the other position thereof closing the metering chamber to the atmosphere, and means in said insert plug providing an inner and an outer chamber dividing the metering chamber into a plurality of chambers entrapping gas in the metering chamber.

References Cited

UNITED STATES PATENTS
2,693,983 11/1954 Howell 222—402.2
2,721,010 10/1955 Meshberg 222—402.2
2,746,796 5/1956 St. Germain 222—402.2
2,856,105 10/1958 Ward 222—402.2
2,995,278 8/1961 Clapp 239—337 X

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