SPRAY PACKAGE EQUIPPED WITH A SELF-CLEANING VALVE

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In accordance with this invention I have provided another form of self-cleaning valve for a hermetically sealed container, which valve is provided with a cleaning member which may be moved to effect the loosening or dislodgment of the accumulated material within the discharge tube. In one form of the invention this may be accomplished without at the same time effecting the opening of the valve. Thus, for example, the cleaning member may be turnable within the discharge tube to effect such loosening or dislodgment of the accumulated material within the discharge tube, and such turning movement may be effected without opening the valve. In another form of the invention the cleaning action may be effected by movement of the cleaning member in a longitudinal direction relative to the discharge tube; in this form of the invention, preferably, the cleaning action is effected concurrently with the opening of the valve. If desired, the valve may be designed so that the cleaning member is both turnable and movable longitudinally so that either or both types of movement may be imparted to the cleaning member to effect the cleaning or dislodgment of material within the discharge tube.

In the preferred embodiment illustrated on the drawing the invention is shown incorporated in a hermetically sealed paint container and the description which follows will be confined to the present illustrative embodiment of the invention. It will be understood, however, that this invention is not confined to such paint packages but is applicable to hermetically sealed packages for storing, distributing and applying suspensions of finely divided solid materials in a liquid medium and/or liquids including solutions, which have a tendency to sediment.

In the accompanying drawing forming part of this specification and showing, for purposes of exemplification, preferred forms of this invention without limiting the claimed invention to such illustrative instances:

Figure 1 is a vertical sectional view partly in elevation of a hermetically sealed container embodying my invention;

Figure 2 is a fragmentary vertical section through the valve and communicating discharge tube of Figure 1;

Figure 3 is a fragmentary vertical section through the valve showing a modified form of valve mechanism embodying my invention.

In the drawing referring to Figure 1, 10 indicates a container desirably of aluminum, steel or other material, comprising a cylindrical side wall 11, a base 12 and a top 13. In the embodiment illustrated in Figure 1, the base 12 is shown as having a convex interior and the top 13 is dome shaped. It will be understood the invention is not limited to this type of container but includes containers in which both top and base have convex interiors, as shown, for example, in my Patent No. 2,580,132, granted December 25, 1951, and also other shaped containers.

During storage pigment will tend to settle to the bottom 12 and collect thereon. In accordance with the invention of my Patent 2,580,132, the container may be provided with an agitator or dispersing member 13'. This agitator may be made of a material such as steel, metal or plastic of a specific gravity substantially greater than that of the paint. Hence, it settles to the bottom of the container and rests thereon. The agitator desirably is shaped as disclosed in my aforesaid patent to provide relatively sharp elongated cutting edges which contact the pigment adhering to the base of the container and upon agitation of the contents of the container remove the pigment from the base so that it becomes dispersed in the vehicle.

Top 13 of the container desirably is formed with a cup
in which valve 15 is disposed. Cup 14 has a central opening 16, disposed so that its center is on the longitudinal axis of container 10. Opening 16 is sealed by the concentric housings 17 and 18 defining an enlarged chamber 19, the function of which will be hereinafter described. Housing 18 has a reduced lower portion 21 provided with a base flange 22. Suitably fixed to the reduced portion 21 is the upper end of discharge tube 23, which, as best shown in Figure 1, extends to near the base of the container 10. Chamber 19 is of greater cross sectional area than that of discharge tube 23.

A hollow thimble 24 extends through central opening 25 in housing 17 and has a conically flared valve seating surface 26 at its base. Suitable packing 27 is disposed at the top of housing 17 to provide a gas tight seal between the hollow thimble 24 and opening 25. An annular valve seating member 28 having a conical valve seat 29 is disposed congruent with the valve seating surface 26 is disposed just below packing 27. Member 28 is suitably fastened, as by welding, to housing 17 so that it remains fixed. It has a central opening 31 of a diameter such as to provide a clearance or flow space between the outer wall of thimble 24 and the inner wall defining the central opening 31. Openings 32 are provided in the thimble 24 to provide a flow passageway through which flow may take place when the valve is in open position from chamber 19 through opening 31 into the hollow thimble 24.

A valve head 33 is securely fastened to top of the thimble 24. This head 33 is provided with a discharge passage 34 which leads from the interior of the hollow thimble 24, i.e., from the valve bore, to the atmosphere.

Suitably fastened to thimble 24 near the base thereof is a cleaning member 35. The upper portion of member 35 may be fixedly secured to the base of thimble 24 just as in the opening 32. But in the side walls thereof so as not to interfere with flow through these openings when the valve is opened. Cleaning member 35 may be of any desirable length, preferably, but not necessarily, extending to near the base of the discharge tube 23, as shown in Figure 1. Desirably, its surface is strengthened to facilitate the cleaning action. In the cases involving a bent discharge tube, the cleaning member desirably may follow the shape of the tube and be coaxial therewith. The cleaning member may be a solid rod having a roughened surface, as above noted, so that when moved it effects loosening of material within the discharge tube.

A compression spring 36 encircles the upper portion of cleaning member 35. Spring 36 is confined under tension between the aforesaid flange 22 and the flared lower end of the thimble 24 so that it tends to maintain the valve seating surface 26 on this flared lower end in seated position against the valve seat 29 to close the valve. Pressure on the valve head 33 moves thimble 24 downwardly against the action of spring 36 opening the valve. Such pressure simultaneously effects movement of cleaning member 35 relative to the discharge tube 23 dislodging the column of material within the tube 23 or loosening the same so as to permit flow therethrough to take place. While this movement linearly is relatively small, of the order of 1/16 of an inch or even less, it usually will effect loosening of the contents of the suspension within the tube 23 and within chamber 19, which chamber, it will be noted, is disposed entirely concentrically to and below the valve seat 29 with which the valve seating surface 26 cooperates. As chamber 19 has a substantially greater diameter than that of discharge tube 23, there is considerable room for expansion to take place as the material flows from discharge tube 23 into the chamber 19. This, it has been found, minimizes the tendency of the formation of a column of suspension immediately below the valve seat 29 of such density as to prevent flow therethrough when the valve is open.

Usually reciprocatory motion imparted to cleaning member 35 by compressing valve head 33 and releasing this pressure to effect opening and closing of the valve is adequate to maintain the valve clean, i.e., in satisfactory operative condition. In the dispensing of relatively thick paints and other materials which tend to congeal, such cleaning action may not be enough, particularly after storage of containers for relatively long periods of time. It will be understood that in the present invention head 33 may be turned or rotated and this effects turning or rotation of cleaning member 35. Such turning movement does not result in opening of the valve. It may be resorted to in the dispensing of such thick paints and other materials which tend to congeal and require loosening of the valve, so as to loosen the material in the discharge tube providing a channel through which the liquefied gas and vehicle can flow when the valve is opened.

In the embodiment of the invention shown in Figure 3, the cleaning member 35 is rotatable relative to the discharge tube 23 and is instead of being fixed to thimble 24, as in Figures 1 and 2, is mounted for rotation or turning movement within the thimble 24. In this embodiment, cleaning member 35 extends through thimble 24 and head 33 and is provided with a bore 37 which has an opening 38 communicating with discharge passageway 34. The top of cleaning member 35 is provided with a suitable button 39 which may be engaged by the user and turned. Such turning movement effects rotation of the cleaning member 35 within the hollow thimble 24 as a bearing; it does not open the valve.

With the construction of Figure 3, cleaning member 35 may be rotated sufficiently to effect dislodgement or loosening of the material in tube 23 and/or chamber 19 to insure adequate cleaning. Thereafter pressure is applied to head 33 to open the valve and effect dispensing of the material within container 10.

It will be noted this invention provides a spray package and particularly a paint spray package, the needle valve of which is designed to minimize, if not completely eliminate, clogging of the discharge tube, i.e., the needle valve is substantially self-cleaning. In this invention the cleaning member within the needle valve may be moved whenever the valve is operated to effect cleaning of the valve, and in certain embodiments of the invention it may be moved independently of the opening or closing of the valve to effect dislodgement or loosening of material within the discharge tube so as to insure flow of material through the valve when opened.

Since discharge changes may be made in the spray package or needle valve therefor embodying this invention without departing from the scope of this invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a hermetically sealed container for dispensing paints and other suspensions of solid material which tend to form dense suspensions, in combination, a valve comprising a sealing surface disposed at the top of the container, a valve member having a bore and a flared valve seating member arranged to seat on said valve seating surface to close said valve, said valve member being arranged to be moved to open said valve, a discharge tube extending downwardly from said valve bore in a direction towards the base of said container, and a cleaning member having one end disposed in said discharge tube and the other end disposed in said valve bore and arranged to be moved when said valve bore is moved to effect loosening of the dense suspension of solid material within the tube and thus permit flow therethrough when the valve is opened.

2. In a hermetically sealed container for dispensing paints and other suspensions of solid material which tend to form dense suspensions, in combination, a valve comprising a valve seat disposed near the top of said container, a hollow thimble having a flared seating surface arranged to seat on said valve seat to effect closing of said valve, said hollow thimble having openings in the walls thereof.
disposed above said flared member for flow therethrough when said valve is opened, a discharge tube extending from said valve seating member towards the base of said container, spring means for moving said hollow thimble to maintain it in valve closed position, a valve operating member for moving said thimble against the action of said spring means to valve open position, and a valve cleaning member extending from the lower end of said thimble past the valve seating surface into said discharge tube and constructed and arranged to loosen any dense suspension of solid material within said discharge tube when said valve cleaning member is actuated to facilitate the dispensing of said suspension of solid material when said valve is opened.

3. In a hermetically sealed container as defined in claim 2, in which the valve cleaning member is turnable within the discharge tube.

4. In a hermetically sealed container as defined in claim 2, in which the valve seat and seating surface are disposed in a chamber of enlarged cross sectional area as compared with that of the discharge tube and the discharge tube communicates with this chamber.

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