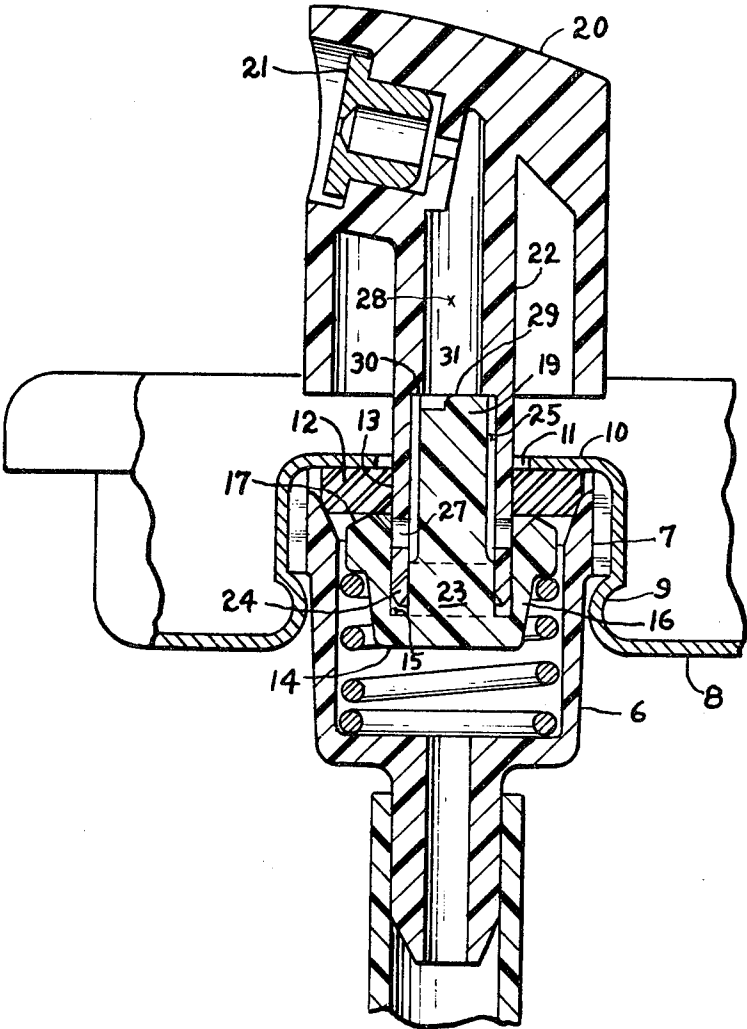


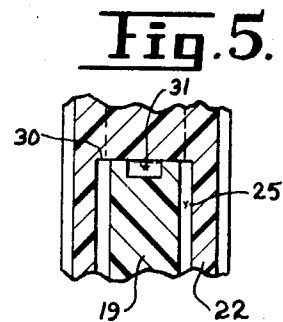
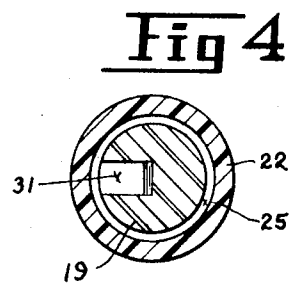
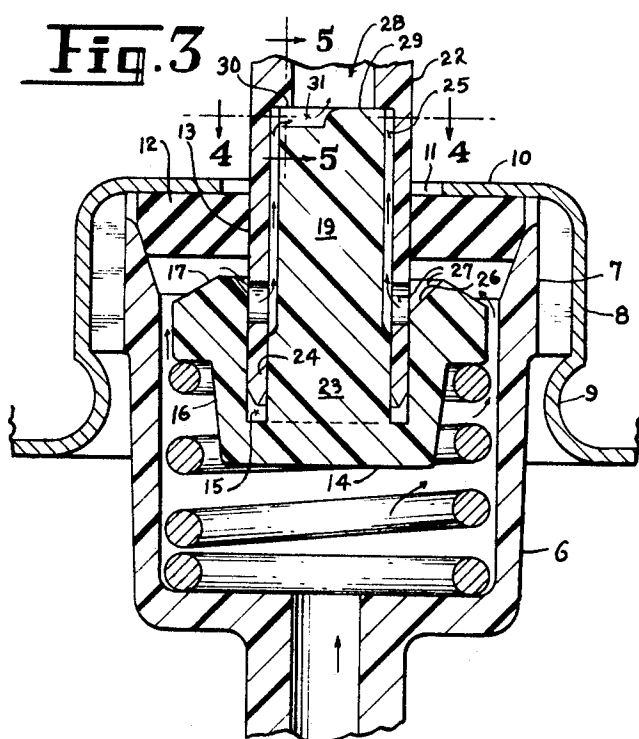
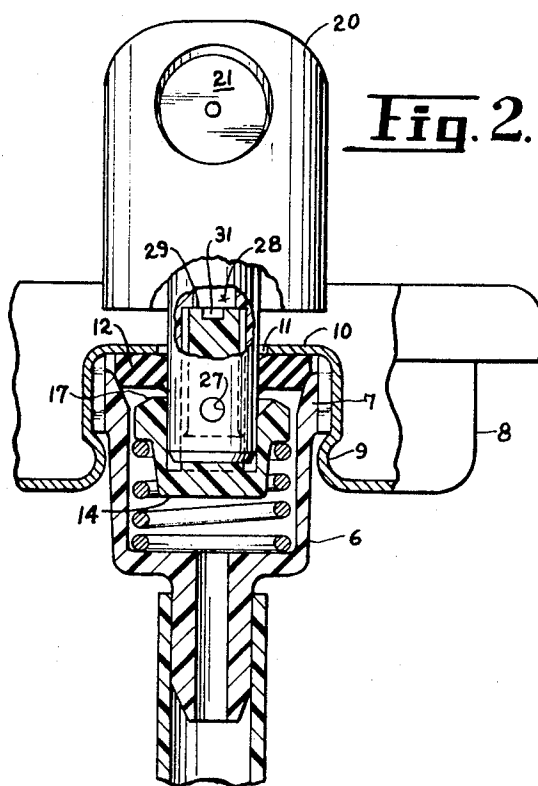
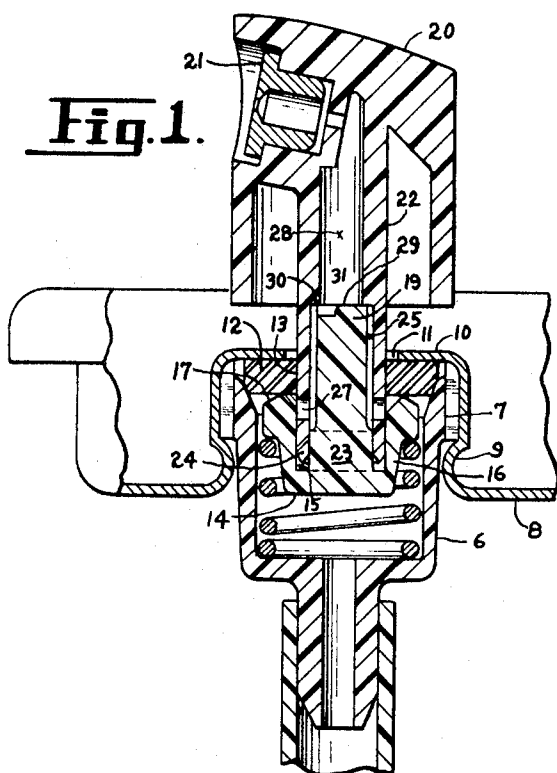
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[54] **AEROSOL VALVE WITH METERING PASSAGE**
3 Claims, 5 Drawing Figs.
[52] U.S. Cl. 222/402.24
[51] Int. Cl. B65d 83/00
[50] Field of Search..... 222/402.2,
402.24, 402.1, 402.21, 402.22, 402.23
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ABSTRACT: An improved aerosol valve with a metering passage formed in the intermediate portion of the flow channel has a removable spray head with a tubular portion fitting around an upwardly projecting post on the valve. The metering passage is provided by a groove in the upper end of the post in combination with an internal shoulder in the tubular portion of the spray head.





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AEROSOL VALVE WITH METERING PASSAGE

This invention relates to an aerosol valve with removable spray head and having a metering passage or restriction in the flow channel in order to provide better expansion and spray characteristics. Such valves are particularly useful for dispensing viscous fluids such as paints and varnishes. One example shown in the Green U.S. Pat. No. 3,045,877, employs a slot through the tubular part of the spray head which is partially covered by the wall around the socket in the valve to provide the necessary restriction.

As distinguished from these prior devices, my invention provides a metering groove in the top end of a post which projects upwardly from the valve which groove cooperates with an internal shoulder on the spray head to provide the desired controlled restriction to flow. Such a groove can be very easily cleaned when the spray head is removed because it is plainly visible and easily accessible. An important advantage is that a closer control is provided of the metering function because the degree of restriction is determined solely by the groove and is, therefore, dependent only on its depth and width. This avoids variations which inevitably result when two or more mating parts are employed because of the possible buildup of tolerance variations.

Other objects and advantages will hereinafter more fully appear.

In the accompanying drawings, I have shown for purposes of illustration, one embodiment which the invention may assume in practice. In these drawings:

FIG. 1 is a vertical cross section of an aerosol valve made according to my invention;

FIG. 2 is a view at right angles to FIG. 1 partly in vertical section and partly in elevation;

FIG. 3 is a vertical central section on an enlarged scale of a portion of the valve indicating the flow path when the valve is open;

FIG. 4 is a cross section on the line 4-4 of FIG. 3; and

FIG. 5 is a detailed cross section on line 5-5 of FIG. 3.

The valve with which I have shown my invention associated has a cup-shaped valve housing 6 with a rim 7 by which it is secured in a metal mounting cup 8 by means of suitable indentations 9. The cup 8 has a flat disclike top wall 10 with a central hole 11. A sealing gasket 12 of elastic material is seated against the under surface of the top wall 10 and has an aperture 13 in line with the hole 11. A valve member 14 has an upwardly opening socket 15 surrounded by a wall 16 which has an annular sealing rim 17 normally in engagement with the gasket 12. A solid post 19 projects from the bottom of the socket, in spaced relation to the surrounding wall 16, upwardly through the gasket 12 and preferably a substantial distance beyond the gasket.

A removable spray head has an operating button 20 for actuating the valve either by tilt action or vertical action, and the button may be fitted with an orifice insert 21. In FIG. 3, the valve is shown opened by a vertical movement but it could also be operated by a lateral force on the button 20 which would tilt the valve to open position. The spray head has a depending hollow stem 22 which extends downwardly through the aperture 13 in the gasket. The outer surface of the stem 22 is cylindrical and in peripherally sealed engagement with the gasket at all times. The lower portion 23 of the post is of somewhat larger diameter than the top portion of the post and is spaced from the wall 16 of the valve just enough to allow firm seating of the lower end portion 24 of the valve stem. The parts are dimensioned so that the valve is supported firmly on the spray head but not tight enough to prevent easy removal when desired for cleaning purposes.

Because of the reduced diameter of the upper portion of the post 19, the wall of the stem above the seated lower portion 24

is spaced from the post to provide a vertical free flow channel 25 around the post. That portion of the socket in the valve above the seated lower end of the stem provides a well 26 which communicates with the flow channel 25 through one or more openings 27 which are sized to allow comparatively unrestricted flow.

The expansion chamber 28 above the upper end surface 29 of the post is of somewhat smaller diameter than the bore in the lower portion of the stem which fits around the post 19. This provides a downwardly facing internal shoulder 30 which extends over the end surface 29 of the post. It will be observed that the length of the hollow stem between shoulder 30 and the bottom end is slightly less than the height of the post 19 so that when assembled the shoulder 19 will always abut against the end surface 29 of the post. A metering groove 31, which is here shown as being rectangular in cross section, extends radially into the end surface 29 to about the centerline of the post so that it is open outwardly toward the vertical flow channel 25 and upwardly into the chamber 28 leading to the spray orifice insert 21. In this manner, the groove provides in combination with the shoulder a restricted passage which meters the flow through the spray head. It is an easy matter to mold such a groove since it opens upwardly through the end of the post 19 and the metering is accurately controlled since it depends entirely on the dimensions of the groove 31.

Since there are no small holes, slots or grooves required in the bottom portion of the valve or stem, there is nothing likely to become clogged in those regions. The metering is accomplished by the groove 31 in cooperation with the shoulder 30. If it should become clogged, it may be easily observed and cleaned upon removal of the spray head.

I claim:

1. In an aerosol valve of the type characterized by a sealing gasket having a central aperture, a valve member beneath the gasket having an upwardly opening socket, a wall surrounding the socket and having an annular sealing rim around its upper edge and a spring normally urging said valve member upwardly to hold said annular rim in sealing engagement with said gasket, the invention comprising

- a. a post on said valve member projecting from the bottom of said socket in spaced relation to said surrounding wall upwardly through and beyond said gasket;
- b. a removable spray head having a depending hollow stem extending downwardly through said aperture in peripherally sealed engagement with said gasket, said stem having its lower portion removably seated in said socket, the wall of said stem above said seated lower portion being spaced from said post to provide a vertical free flow channel, the stem wall having at least one opening therethrough below said gasket large enough to provide free flow communication between the upper portion of said socket and said vertical flow channel;
- c. an internal downwardly facing shoulder in said hollow stem which abuts against the upper end surface of said post; and
- d. said post being formed with a metering groove in its end, the groove opening outwardly to said vertical flow channel and upwardly into said hollow stem above said shoulder, so that said groove in combination with said shoulder meters the flow to the upper portion of the spray head.

2. The combination defined in claim 1 wherein the height of said post above the bottom of said pocket is slightly greater than the length of that portion of said stem between said internal shoulder and the bottom end of the stem.

3. The combination defined in claim 1 wherein said metering groove is rectangular in cross section and extends radially from the outer vertical surface of the post to about the centerline of the post.