July 24, 1962 E. H. GREEN 3,045,877

AEROSOL DISPENSER VALVE

Filed July 1, 1960

Fig. 1

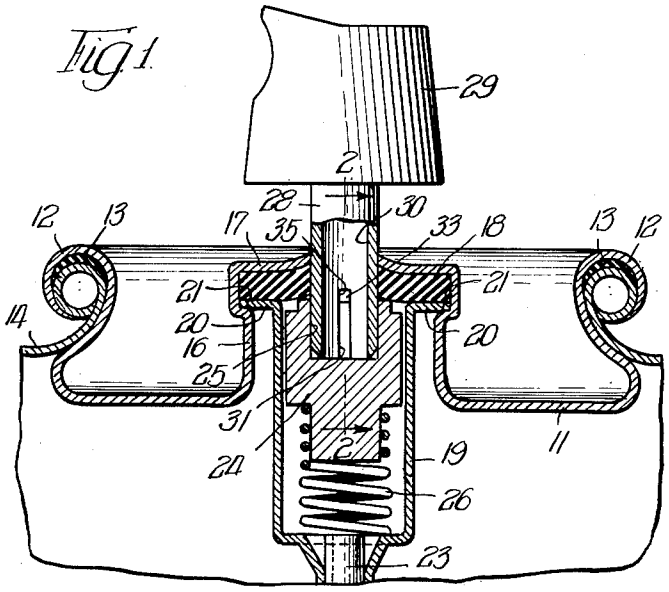


Fig. 2

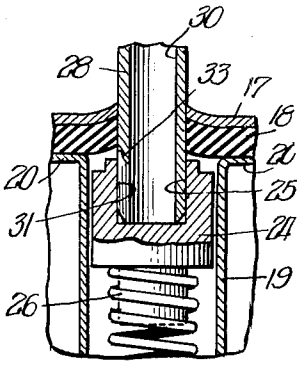


Fig. 3

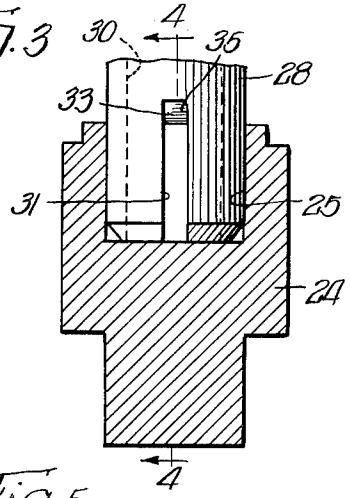


Fig. 4

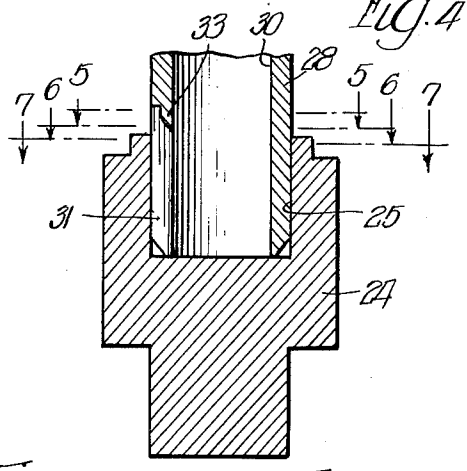


Fig. 5

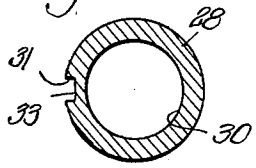


Fig. 6

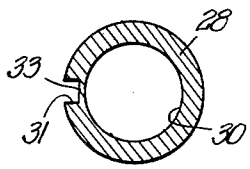
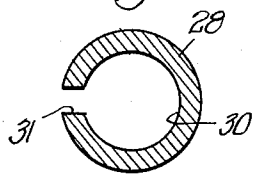


Fig. 7



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AEROSOL DISPENSER VALVE

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The present invention relates to an aerosol dispenser valve and, more particularly, to an improved spray head of the type having a hollow stem provided with a metering slot therein, which stem extends through a sealing gasket and into telescopic interfitting engagement with a valve member. A dispenser valve of this general type is disclosed in my Patent No. 2,777,735.

Spray caps for dispenser valves of the character described are often formed of the class of materials including nylon, rigid polyethylene, and polypropylene. These spray caps have not proved completely successful inasmuch as some products dispensed therethrough tend to cause distortion of the upper portion of the metering slot in the hollow stem of the spray head, thus preventing proper metering of these products through the valve.

It is therefore the general object of the present invention to provide a new and improved construction for spray caps of this general type which permits forming them of materials of the class including nylon, rigid polyethylene, and polypropylene, which construction eliminates the danger of the upper portions of the metering slots therein being distorted by the products dispensed therethrough.

A more detailed object of the invention is to provide a new and improved spray cap construction for a dispensing valve of the character described wherein a small recessed baffle is provided at the upper end of the slot in the hollow stem whereby to prevent any undesirable variance in the size of the metering window at the upper end of the slot.

A further object of the invention is to provide a new and improved spray cap structure for aerosol dispensing valves which structure may be easily and economically mass produced.

Certain other objects of the invention will, in part, be obvious, and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention reference may now be had to the accompanying drawings wherein:

FIG. 1 is a fragmentary enlarged vertical section taken through a dispensing valve mounted in an aerosol container and provided with a spray cap embodying the invention, the valve being shown in its closed position;

FIG. 2 is a fragmentary vertical section taken generally on the line 2—2 of FIG. 1 with the valve shown in its open position;

FIG. 3 is an enlarged front elevational view of the lower slotted end of the hollow stem of FIGS. 1 and 2 with the valve member being shown in vertical section;

FIG. 4 is a vertical section taken generally on the line 4—4 of FIG. 3; and

FIGS. 5, 6 and 7 are horizontal sections taken respectively on lines 5—5, 6—6 and 7—7 of FIG. 4.

An aerosol dispensing valve of the general type disclosed in my Patent No. 2,777,735 is illustrated in FIG. 1. This valve includes a sheet metal cover 11 having a rolled rim 12 which extends over a composition sealing gasket 13 fitted over the rim of the mouth of an aerosol container 14. The cover 11 is offset inwardly of the mouth of the container 14 and is provided with a central upstanding tubular portion 16 having a top wall 17. A sealing gasket 18 formed of rubber or other suitable elastic material is disposed against the top wall 17 and a cylindrical valve shell 19 is provided at its upper edge with an outwardly turned flange 20 which is disposed

against the underside of the sealing gasket 18. The gasket 18 and the flange 20 of the valve shell 19 are retained in position against the top wall 17 by an inwardly turned shoulder 21 of the tubular portion 16. The upper end of a dip tube 23 is secured by suitable means in the lower end of the valve shell 19 with its lower end adapted to extend into close proximity with the bottom of the container 14. A valve member 24 having a cup-shaped socket 25 formed in its upper end is slidably disposed within the valve shell 19 and is normally resiliently urged upwardly into sealing engagement with the sealing gasket 18 by a spring 26 which is seated between the lower end of the valve shell 19 and a downwardly facing shoulder formed on the valve member 24.

The sealing gasket 18 and the top wall 17 of the cover 11 are provided with aligned apertures for receiving a vertically movable hollow stem 28 of a removable spray head 29 which is formed of a class of plastic materials including nylon, rigid polyethylene and polypropylene. The hollow stem 28, which is provided with an inner bore 30, is sealingly engaged by the gasket 18 and the lower end of the stem 28 is adapted to be sealingly received telescopically within the cup-shaped socket 25 of the valve member 24 with an interference fit. The portions of the gasket 18 and the top wall 17 of the cover 11 adjacent the apertures therein are inclined upwardly at an angle of approximately 30° whereby to facilitate non-binding upward movement of the hollow stem 28 relative to the gasket 18.

The spray head 29 is provided with a conventional spray opening (not shown) which communicates with the bore 30 of the stem 28 and the lower end of the hollow stem 28 is provided with a vertically extending slot 31 the upper end of which terminates a predetermined distance above the upper surface of the valve member 24 when the stem is properly fitted or seated in the socket 25 therein. The upper end of the slot 31 provides a metering passage or window for controlling the discharge rate of the product to be dispensed through the valve. Different products may, of course, require metering passages of different sizes. In normal operation of the dispensing valve illustrated in FIG. 1, depressing the spray head 29 is effective to move the valve member 24 downwardly out of sealing engagement with the gasket 18 whereby to permit the product in the container 14 to flow upwardly through the dip tube 23, past the valve member 24, between the gasket 18 and the upper end of the valve member 24, through the upper metering portion of the slot 31 into the bore 30 of the stem 28, and out the spray opening in the spray head 29.

As previously indicated herein, the spray head 29, including the hollow stem 28 thereof, is formed of one of the materials of the class including nylon, rigid polyethylene and polypropylene. It has been found that some products which are likely to be dispensed through the valve, particularly aqueous solution products, tend to cause the foregoing materials to swell, soften or otherwise yield. If this occurs at the upper end of the slot 31 the initial and desired metering characteristics of the upper end of the slot 31 for a particular product are adversely affected by the change in size of the metering window. The present invention is primarily concerned with the provision of means adapted to prevent size distortion of the upper metering end of the slot 31 whereby to provide proper metering of the product to be dispensed from the container 14. As best illustrated in FIGS. 3–7, a specially designed integral recessed baffle or flashing 33 is provided in the upper metering end of the slot 31, which baffle 33 serves to prevent swelling, softening or other yielding of the material defining the sides of the slot 31 at the upper end thereof. Any yielding or distortion of the material defining the lower end of the slot

31 is not critical inasmuch as the metering of the product to be dispensed occurs at the upper end of the slot 31.

In the preferred embodiment of the invention illustrated in the drawings, the vertical length of the slot 31 above the upper surface of the valve member 24, when the lower end of the hollow stem 28 is properly fitted or seated in the cup-shaped socket 25 in the valve member 24, is substantially equal to the width of the slot 31. Likewise, the vertical length of the recessed baffle 33 is substantially equal to the width of the slot 31 whereby the lower end of the baffle 33 is horizontally aligned with the upper surface of the valve member 24. As the side edges of the baffle 33 are integrally formed with the sides of the upper metering end of the slot 31, the recessed baffle 33 serves to retain the sides of the slot 31 at the metering window in their initial spaced relationship. The transverse or lateral thickness of the recessed baffle 33 at its upper end is substantially less than the thickness of the wall of the hollow stem 28 with this baffle thickness decreasing progressively toward the lower end thereof, as best illustrated in FIG. 4. In profile, the outer surface of the baffle 33 curves inwardly toward the vertical axis of the hollow stem 28 in a downward direction.

With the recessed baffle structure disclosed herein, when the valve member 24 is moved downwardly to an open position, a vertically disposed square metering orifice or window 35 is provided in the stem 28 between the interior of the cylindrical valve shell 19 and the bore 30 in the hollow stem 28, through which orifice or window must pass the product to be dispensed from the container 14. In a typical dispensing valve structure, for example, the width of the slot 31 in the hollow stem 28 is in the order of .017 inch. Therefore, the dimensions of the vertically disposed square metering orifice or window 35 in the upper end of the slot 31 which controls the discharge rate of the product to be dispensed through the valve when the valve is open would be .017 inch x .017 inch with the area of the square metering orifice or window 35 being in the order of .00289 square inch. The foregoing dimensions, of course, are not intended to be limiting.

It will be understood that certain changes may be made in the construction or arrangement of the dispensing valve spray cap disclosed herein without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In an aerosol dispenser valve of the type which is characterized by a sealing gasket of resilient material having a central aperture, a valve member beneath the gasket having a centrally located upwardly opening socket of cylindrical configuration coaxially aligned with said aperture and the upper end surface of said valve member surrounding said socket defining an annular rim, a spring normally urging said valve member upwardly to seal said annular rim against the underside of the gasket surrounding said aperture, a removable spray head having a depending hollow stem of cylindrical exterior configuration extending downwardly from above the gasket through the aperture in slidable but peripherally sealed engagement with said aperture, said stem having its lower portion seated in the socket in a sealed engagement therewith but removable therefrom, the lower portion of the stem having a vertically extending slot opening to the bottom end of the stem of a vertical length many times greater than its width, and open along its entire length to the exterior of the stem with the upper portion extending part way into the gasket above the said annular rim, said spray head being arranged for only vertical reciprocatory movement together with said valve member against said spring to unseat said rim and permit aersol product to pass into the upper portion of the slot above said rim and thence by way of said slot into said hollow stem; the improvement which comprises providing in said upper portion of said slot a web extending transversely of the slot and recessed away from said exterior of the stem to permit access from that open portion of the slot above said rim, past the web to the remainder of said slot, and the remainder of the slot being open clean through to the hollow of the stem, said web serving as a spacing strut to oppose closing of the upper end of the slot.

2. The improvement of claim 1 in which the bottom end of the web is substantially at the same level as the said rim and is tapered at its axially outermost edge so as not to present a sharp corner to passage of aerosol.

References Cited in the file of this patent

UNITED STATES PATENTS

2,565,954	Dey	Aug. 28, 1951
2,777,735	Green	Jan. 15, 1957
2,913,154	Kuffer	Nov. 17, 1959