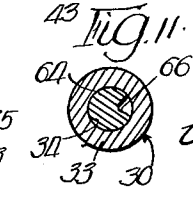
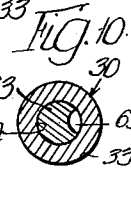
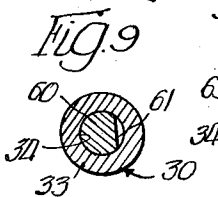
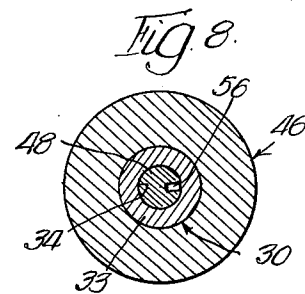
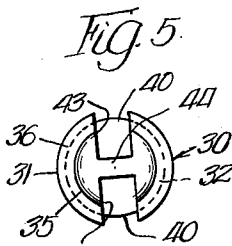
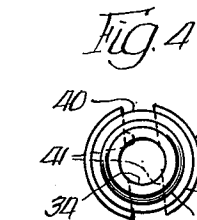
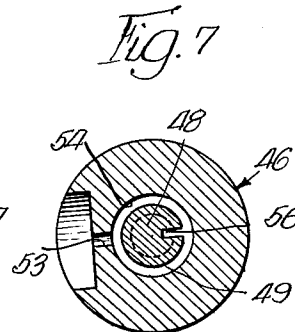
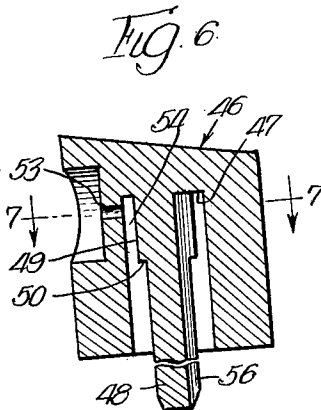
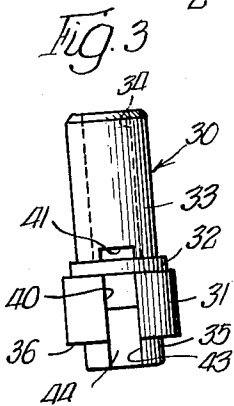
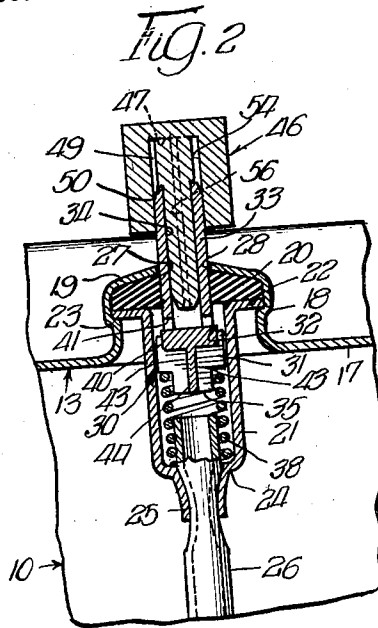
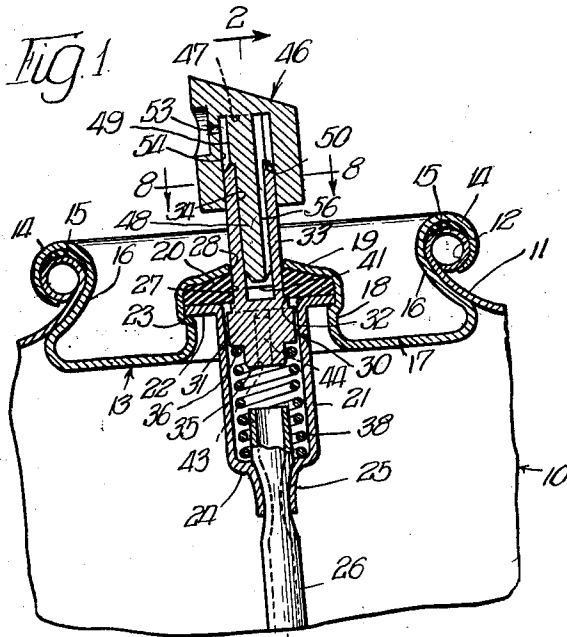


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E. H. GREEN
DISPENSER VALVE
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INVENTOR.
Edward H. Green,
BY
Cromwell, Smith & Warden
attys

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3,095,127

DISPENSER VALVE

Edward H. Green, % Newman-Green, Inc.,

151 Interstate Road, Addison, Ill.

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The present invention relates to improvements in dispensing valves for aerosol containers.

A great variety of products are now being marketed in aerosol-type containers. Inasmuch as the dispensing or flow characteristics of the various products to be dispensed will vary widely, it is necessary to provide metering orifices or passageways of different sizes in the valves for dispensing different products. In most dispensing valves, the metering orifices or passageways are located or associated with elements of the dispensing valve which are permanently mounted within the confines of the containers whereby only a single product may be dispensed by a particular valve.

It is, therefore, a general object of the invention to provide a new and improved dispensing valve for aerosol containers wherein the elements of the valve permanently mounted within the container may be substantially identical for any product to be dispensed therethrough.

An important object of the invention is to provide a new and improved dispensing valve for aerosol containers, which valve is provided with a removable and replaceable spray head having a metering passage associated therewith whereby a spray head having a metering passage of the desired size may be assembled to the valve of a container for dispensing a specific product.

A more detailed object of the invention is to provide a new and improved dispensing valve of the character described wherein the valve plunger member includes a tubular portion which projects above the top of the container and wherein the removable and replaceable spray head is provided with a depending generally solid stem adapted to be inserted into the tubular portion of the valve member, which stem has an external metering passage formed thereon.

A further object of the invention is to provide a new and improved dispensing valve of the character described wherein the external metering passages on the generally solid stems of the spray heads may be formed of various shapes and sizes corresponding to the flow or dispensing characteristics of a wide variety of products to be dispensed.

Another important object of the invention is to provide a new and improved dispensing valve of the character described wherein the containers may be rapidly pressure filled through the valves with minimum flow restrictions inasmuch as the product does not pass through the metering passage.

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 vertical central section through an aerosol dispensing valve embodying the invention with the valve being shown in its closed position;

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

FIG. 3 is an enlarged elevational view of the valve plunger member of the valve in FIGS. 1 and 2;

FIG. 4 is a top plan view of the valve plunger member; FIG. 5 is a bottom plan view of the valve plunger member;

FIG. 6 is an enlarged vertical section through the spray head of FIGS. 1 and 2;

2

FIG. 7 is a horizontal section taken generally on the line 7-7 of FIG. 6;

FIG. 8 is an enlarged horizontal section taken generally on the line 8-8 of FIG. 1; and

FIGS. 9, 10, and 11 are horizontal sections taken through stem portions of spray heads telescopically fitted in the upper tubular portion of the valve plunger member of FIG. 3 and illustrating various shaped metering passages defined, respectively, by a flat surface, by a rounded groove, and by a triangularly shaped groove formed on the outer surfaces of the stem portions.

In FIG. 1 there is illustrated the upper portion of an aerosol container 10 having a top wall 11 which is provided with an open mouth having an upturned rolled rim 12. The dispensing valve for the container 10 includes a sheet metal cover or cap 13 characterized by a rolled edge 14 which extends over a composition sealing gasket 15 fitted over the rim 12 of the mouth of the container 10. The cover 13 is further characterized by an outwardly crimped tubular portion 16 which extends downwardly into the mouth of the container 10 from the rolled edge 14, by a bottom wall 17, and by an upstanding tubular portion 18 having a top wall 19. A sealing gasket 20 which is formed of rubber or other suitable elastic material is disposed in the tubular portion 18 against the underside of the top wall 19. A cylindrical valve shell 21 is provided at its upper end with an outwardly turned flange portion 22 which is disposed against the underside of the sealing gasket 20. The sealing gasket 20 and the valve shell 21 are retained in engagement with the underside of the top wall 19 by an inwardly turned shoulder 23 formed in the tubular portion 18. The valve shell 21 is provided with a bottom wall 24 having a depending tubular portion 25 which is swaged about the upper end of a dip tube 26 which extends into proximity with the bottom of the container 10.

The gasket 20 and the top wall 19 of the cover 13 are provided with centrally located aligned apertures 27 and 28, respectively. A valve plunger member 30, which is best shown in FIGS. 3-5, is characterized by a plunger portion 31 which is slidably fitted in the valve shell 21 for guiding thereby, an upper reduced-in-diameter shoulder portion 32 having an upper surface the outer edge portion of which is engageable with the underside of the sealing gasket 20 adjacent the edges of the aperture 27 formed therein to provide a seal therebetween, and a further reduced-in-diameter, upwardly projecting tubular portion 33 which slidably extends through the apertures 27 and 28 in the sealing gasket 20 and top wall 19, respectively, in sealing engagement with the sealing gasket 20. The tubular portion 33 is provided with a bore 34 which is open at its upper end and closed at its lower end by the shoulder portion 32. The lower end of the plunger portion 31 is provided with a reduced-in-width portion 35 providing a downwardly facing shoulder 36. A coil spring 38 is seated between the downwardly facing shoulder 36 and the bottom wall 24 of the valve shell 21 whereby to normally urge the valve plunger member 30 upwardly to the position shown in FIG. 1 wherein the shoulder portion 32 is retained in sealing engagement with the underside of the sealing gasket 20. The top wall 19 of the cover 13 and the upper surface of the sealing gasket 20 are inclined upwardly adjacent the apertures 28 and 27 formed therein, respectively, at an angle of approximately 30° whereby to facilitate non-binding upward movement of the tubular portion 33 of the valve plunger member 30 relative to the sealing gasket 20.

A pair of longitudinally extending, diametrically opposite grooves 40 are formed on the plunger portion 31 of the valve member 30 whereby to permit a flow of the product to be dispensed from the upper end of the dip tube 26 past the plunger portion 31 of the valve plunger

member 30 into the upper end of the valve shell 21. A pair of transversely extending, diametrically opposite openings or windows 41 are formed in the lower end of the tubular portion 33 of the valve plunger member 30 with the lower edges of the openings 41 being flush with the upper surface of the shoulder portion 32. With the valve plunger member 30 in its closed position as illustrated in FIG. 1, the openings 41 are closed by the sealing gasket 20. However, when the valve plunger member 30 is moved downwardly against the action of the spring 38 to its open position illustrated in FIG. 2, the upper surface of the shoulder portion 32 and the openings 41 are moved away from their sealing engagement with the sealing gaskets 20 whereby to permit the product to flow from the upper end of the valve shell 21 through the openings 41 into the bore 34 of the tubular portion 33 of the valve plunger member 30. A pair of longitudinally extending slots 43 separated by a thin web 44 are formed in the lower end of the plunger portion 31 in vertical alignment with the grooves 40 whereby the product flowing from the upper end of the dip tube 26 through the grooves 40 into the upper portion of the valve shell 21 may bypass the spring 38.

The elements of the dispensing valve thus far described herein, which elements are permanently mounted in the aerosol container 10, may be of standard shape and size for a particular size aerosol container whether the valve is to be used for dispensing products having such widely differing flow or dispensing characteristics as perfume and paint, for example. The metering of the flow of such widely diversified products is accomplished by a novel form of spray head 46 which is best illustrated in FIGS. 6, 7 and 8. The spray head 46 is provided with a downwardly opening socket 47 and an integral centrally located generally solid stem 48 which extends downwardly from the upper or inner end of the socket 47 and terminates at a point substantially below the bottom surface of the spray head 46. The stem 48 is of a size to be telescopically inserted into the open upper end of the tubular portion 33 of the valve plunger member 30 in sealed engagement therewith and is provided near its upper end with cooperating means for limiting the movement of the tubular portion 33 into the socket 47 comprising, an enlarged portion 49 defining a downwardly facing shoulder 50 adapted for supporting engagement on the upper end of the tubular portion 33 of the valve plunger member 30. A spray orifice 53 in the spray head 46 communicates with an annular passage 54 defined between the wall of the cylindrical socket 47 and the enlarged portion 49 of the stem 48.

The stem 48, preferably on a portion thereof spaced angularly from the spray or discharge orifice 53, is provided with an external groove 56 which is formed on the outer surface thereof and extends longitudinally the full length of the stem 48 whereby to provide a metering passage. The groove 56 is open at the lower end of the stem 48 and has its upper end in communication with the annular passage 54 in the spray head 46. It may be noted that when the shoulder 50 is engaged upon the upper end of the tubular portion 33, the passageway 54 may be defined as an otherwise enclosed gallery formation formed in the socket 47 communicating between the orifice 53 and the upper end of the metering passage 56.

When the spray head 46 is assembled on the dispensing valve with the stem 48 fitted in the tubular portion 33 of the valve plunger member 30 and when the valve plunger member 30 is moved downwardly to its open position shown in FIG. 2 as the result of finger pressure applied to the spray head 46, the product to be dispensed flows from the dip tube 26 past the plunger portion 31 of the valve plunger member 30 as previously described herein into the upper portion of the valve shell 21, through the openings 41 into the bore 34 of the tubular portion 33 of the valve plunger member 30, and thence through the metering passage groove 56 and the annular passage 54 to the discharge orifice 53. In manufacturing the spray

head 46, the cross-sectional area of the metering passage groove 56 is determined by the particular product to be dispensed. Likewise, the discharge orifice 53 may also vary in size according to the product to be dispensed. Thus, identical aerosol containers having identical valve assemblies, except for the spray heads 46, may be utilized for dispensing a wide variety of products having greatly differing flow characteristics by merely selecting the spray head 46 having a metering passage 56 of the suitable size for the particular product to be dispensed.

The novel valve assembly disclosed herein is particularly well adapted for pressure filling of aerosol containers. In pressure filling such containers, the spray head 46 is removed and the filling element is inserted into the tubular portion 33 of the valve plunger member 30 sufficiently to move the valve plunger member 30 downwardly into its open position. Inasmuch as the metering passage 56 is formed on the stem 48 of the spray head 46, the containers may be pressure filled with a desired product through the dispensing valves with minimum restrictions to the flow thereof whereby to permit rapid filling of the containers. With many dispensing valves, the metering orifice or passage is associated with the elements of the valve permanently mounted in the container whereby the product being pressure filled must pass through the metering passage or orifice thus unduly extending the time for pressure filling the container.

The operation of the assembled valve to dispense the product from the aerosol container 10 is as follows: Upon application of finger pressure to the spray head 46, the valve plunger member 30 is moved downwardly into its open position as shown in FIG. 2 whereby to permit the flow of the product from the upper end of the dip tube 26 through the valve assembly to the spray orifice 53. As previously described herein, the passage for the flow of product from the upper end of the dip tube 26 includes the slots 43, the grooves 40, the openings 41 in the tubular portion 33 of the valve plunger member 30, the metering passage groove 56, and the annular passage 54 which communicates with the spray orifice 53.

The external metering passage may, of course, be formed of any suitable shape, as illustrated in FIGS. 9, 10 and 11. In FIG. 9, a spray head stem 60, which is telescopically fitted in the upper tubular portion 33 of the valve plunger member 30, is provided on its outer surface with a longitudinally extending flat surface 61 whereby to define a metering passage between the flat surface 61 and the bore 34 of the tubular valve portion 33. In FIGS. 10 and 11, spray head stems 63 and 64 are provided on their outer surfaces, respectively, with a longitudinally extending rounded groove 65 and a longitudinally extending V or triangularly shaped groove 66 whereby to define suitable metering passages.

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

I claim:

1. In an aerosol valve assembly having a generally cylindrical valve shell with a dip tube projecting from the lower end thereof, and a sealing gasket closing the upper end of said shell and having an aperture formed therein, the improvement which comprises a valve plunger member having an upper tubular portion slidably projecting through said aperture in sealed engagement with said gasket and an enlarged plunger portion slidably fitted in said shell and having a shoulder engageable with the underside of said gasket, a spring seat formed on the lower end of said valve plunger member, a spring seated between the lower end of said shell and said valve member seat for normally urging said valve plunger member upwardly into a first position relative to said sealing gasket with said shoulder disposed in sealing engagement with said gasket, a pair of diametrically opposite transversely extending openings formed in said tubular portion immediately above said shoulder whereby said openings

5

are sealingly closed when said valve plunger member is in said first position, at least a pair of longitudinally extending grooves formed on the outer surface of said enlarged plunger portion of said valve plunger member whereby to permit passage of material from said dip tube into the upper portion of said shell, a replaceable spray head having a spray orifice and an integral depending solid stem adapted to be telescopically fitted in the outer end of said tubular portion of said valve plunger member in sealed engagement therewith whereupon the application of finger pressure to said spray head is effective to move said valve plunger member downwardly into a second position relative to said sealing gasket wherein said shoulder is spaced away from said gasket to permit material to flow from the upper portion of said shell through said openings into the tubular portion of said valve plunger member, an external groove of predetermined cross-sectional area and shape for the particular material to be dispensed formed on the outer surface of said stem and extending longitudinally the full length thereof whereby to define with the inner wall surface of said tubular portion of said valve plunger member a metering passage specifically adapted for the flow characteristics of the material to be dispensed between said stem and the inner surface of said tubular portion of said valve plunger member, and passage means in said spray head between the upper end of said groove and said spray orifice.

2. In an aerosol valve assembly of the type in which there is a valve structure adapted to be mounted on a container body and there is a spray head which is disposed externally of the container body but coupled with the valve structure and readily removable therefrom, in which the valve structure is normally in closed condition, but in which depressing the spray head will operate the valve structure to open condition to permit dispensing of the aerosol product contained within said container body, the invention which comprises: a valve shell having means at one end thereof to provide communication with the interior of a container body and an annular gasket of resilient material mounted to the opposite end thereof and presenting a central aperture to said shell, a valve plunger mounted for limited reciprocating movement in said shell and having a hollow bore tubular portion open at its upper end and closed at its lower end with the lower end sealingly engaged and slidably reciprocable within said aperture, a substantial part of said tubular portion extending outwardly of said gasket away from said shell, said valve plunger including a part internal of said shell provided with a seating shoulder and there being a spring in the shell urging the plunger in a direction to push the shoulder against the bottom of the gasket, a passageway means in said internal part to lead

6

aerosol product to said seat past said spring, at least one transverse passageway in said tubular portion at the lower end communicating between the external surface of said tubular portion and the closed end of the hollow bore, but located above said shoulder so that when the shoulder is seatingly engaged there is no communication between the interior of the shell and the hollow bore, but when the tubular portion is pushed into the shell reciprocating the valve plunger against the urging of the spring, the transverse passageway will be carried below the bottom of the gasket and provide communication between the interior of said shell and said hollow bore, a removable spray head having a socket sealingly engaging upon the exterior of said tubular portion and a depending integral stem coaxial with said socket and telescopically and sealingly engaging within the hollow bore, a groove on the exterior surface of the stem along the length thereof and forming a metering passageway with the interior wall of the tubular portion, a spray orifice in the head and an otherwise enclosed gallery formation in the socket communicating between said orifice and the upper end of said groove when said head is engaged upon said tubular extension, and the head and tubular extension having cooperating means limiting the extent to which the one may be moved telescopically relative to the other during assembly, the metering groove providing a passageway between the closed end of the hollow bore and the said formation.

3. The structure claimed in claim 2 in which the cooperating means comprises an enlargement on said stem adjacent the upper end thereof adapted to engage the open end of said tubular portion and limit movement of said tubular portion into said socket.

4. The structure as claimed in claim 2 in which said formation comprises an annular passageway having the spray orifice and the said upper end of the groove diametrically opposed relative one another and connected with said metering passageway.

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