United States Patent

[11] 3,547,317

[72] Inventor **Edward H. Green**
11 Army Trail Road, Addison, Ill. 60101

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[54] **VALVE ASSEMBLY FOR DISPENSING METERED AMOUNTS OF PRESSURIZED PRODUCT**
18 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **222/402.2**
[51] **Int. Cl.** **B65d 83/00**
[50] **Field of Search** 222/402.2

[56] **References Cited**

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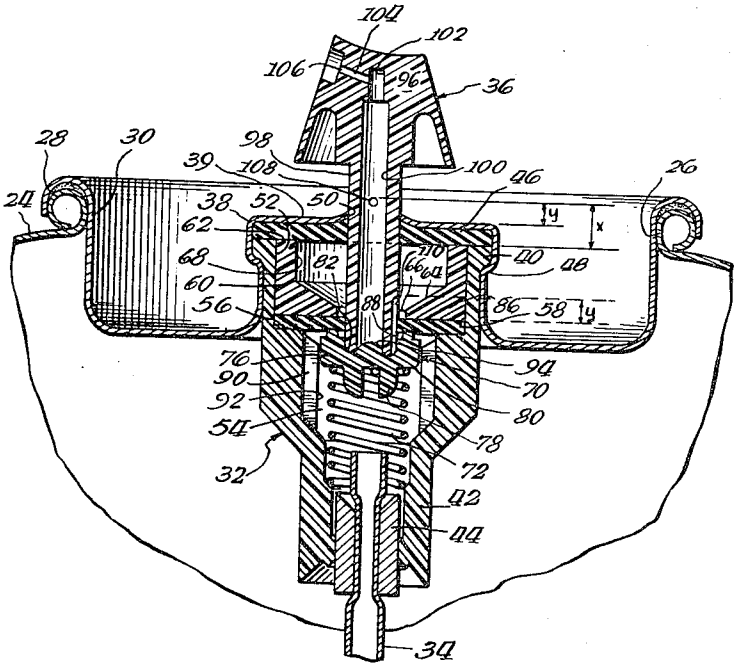
Primary Examiner—Samuel F. Coleman
Attorney—Silverman and Cass

ABSTRACT: Valve assembly for dispensing a metered amount of aerosol on a downward stroke to be mounted to a canister containing pressurized product. The valve assembly has an annular metering chamber with top and bottom perforated seals and includes a removable spray head with a hollow stem passing through both seals and engaged in a valve plunger blocking the bottom seal perforation from the interior of the canister while the stem itself blocks the top seal perforation from the atmosphere. The stem has a radial passageway through its wall connected between the hollow bore and the outside of the stem, normally on the exterior of the assembly above the upper seal and open to the atmosphere, as well as an axial groove in its wall at the bottom end, opening radially outward. The bottom axial end of the hollow bore of the stem is blocked by the seated valve plunger which also blocks the lower end of the groove while the upper end of the groove opens to the metering chamber. The downward stroke first unseats the plunger, connecting the groove between the chamber and canister interior to fill the chamber before the radial passageway moves into the chamber; then moves the groove out of communication with the chamber while still not connecting the radial passageway with the chamber; and finally connects the radial passageway with the chamber to permit its contents to pass into the bore by way of the radial passageway and thence out the external orifice of the spray head. On permitted return of the spray head there will be aerosol product introduced into the chamber but not released. The metering chamber is defined by a cuplike member of predetermined volume.



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SHEET 1 OF 3

Fig. 2

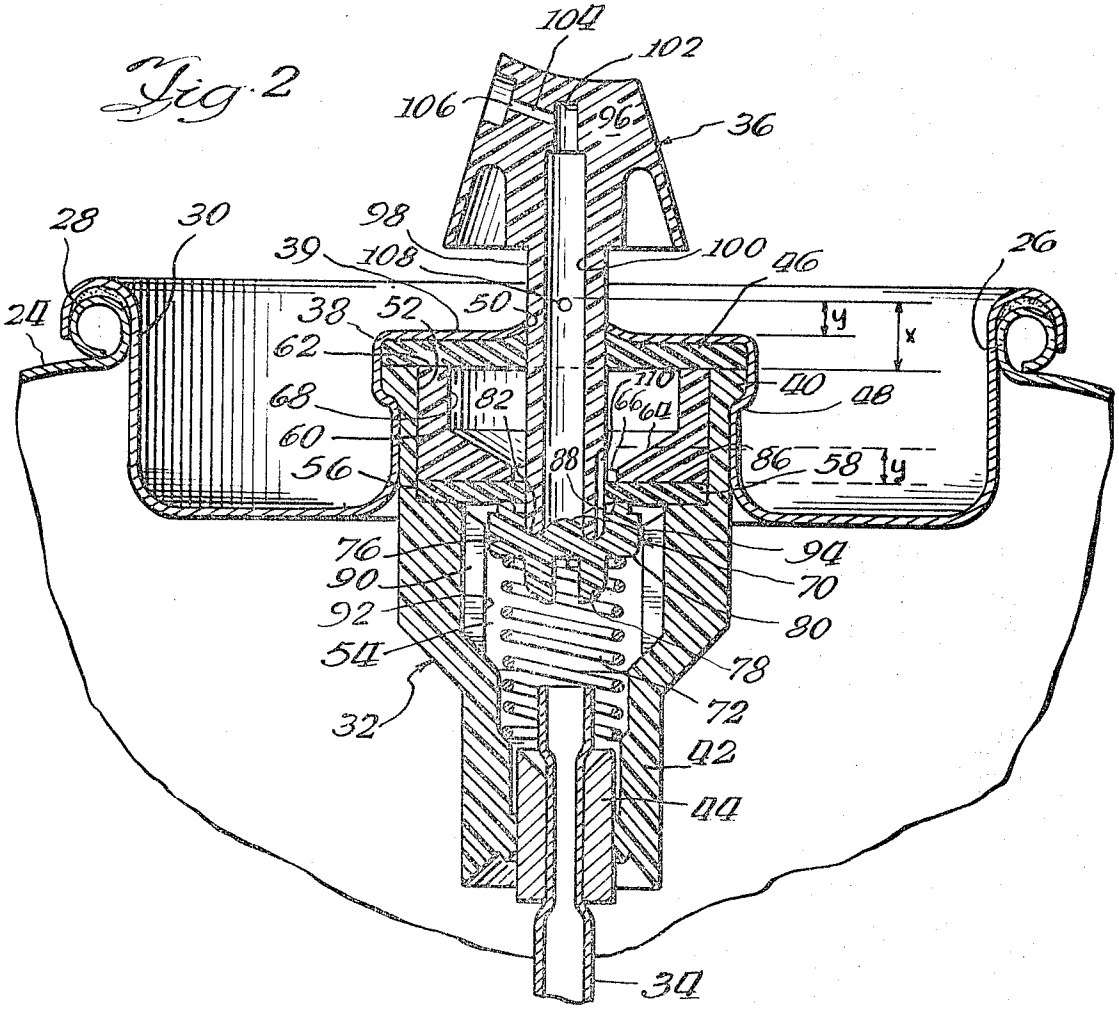


Fig. 1

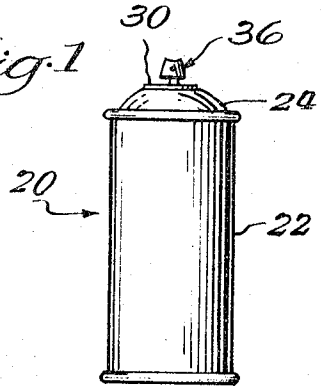
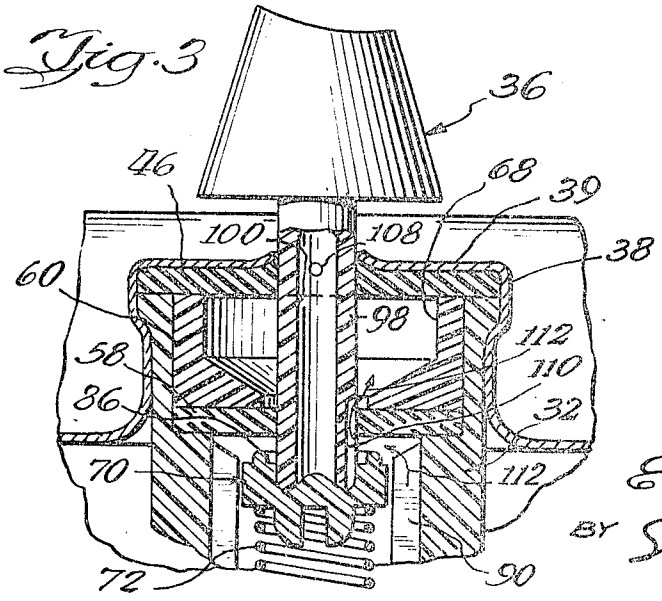


Fig. 3



INVENTOR
Edward H. Green
BY Silverman & Cass
ATTORNEYS

Fig. 4

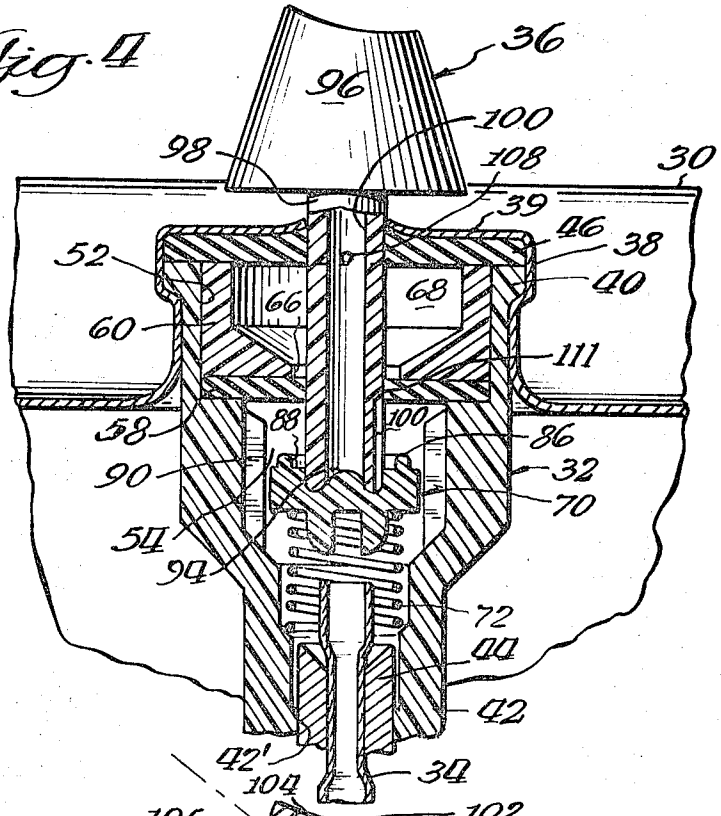
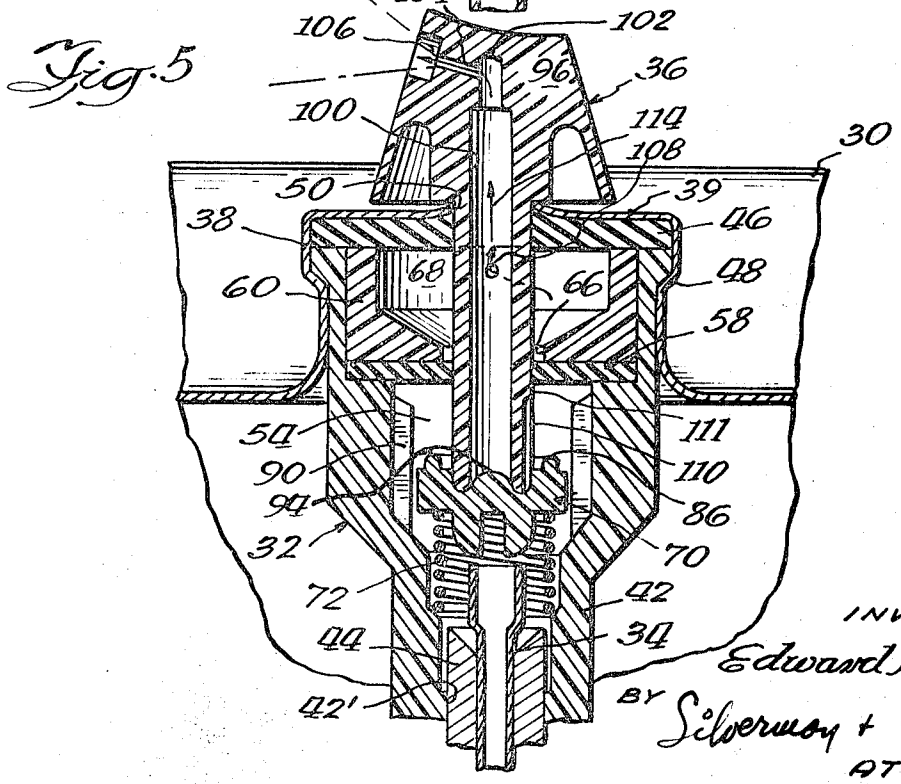


Fig. 5



INVENTOR
Edward H. Green
BY Silverman + Cass
ATTORNEYS

Fig. 6

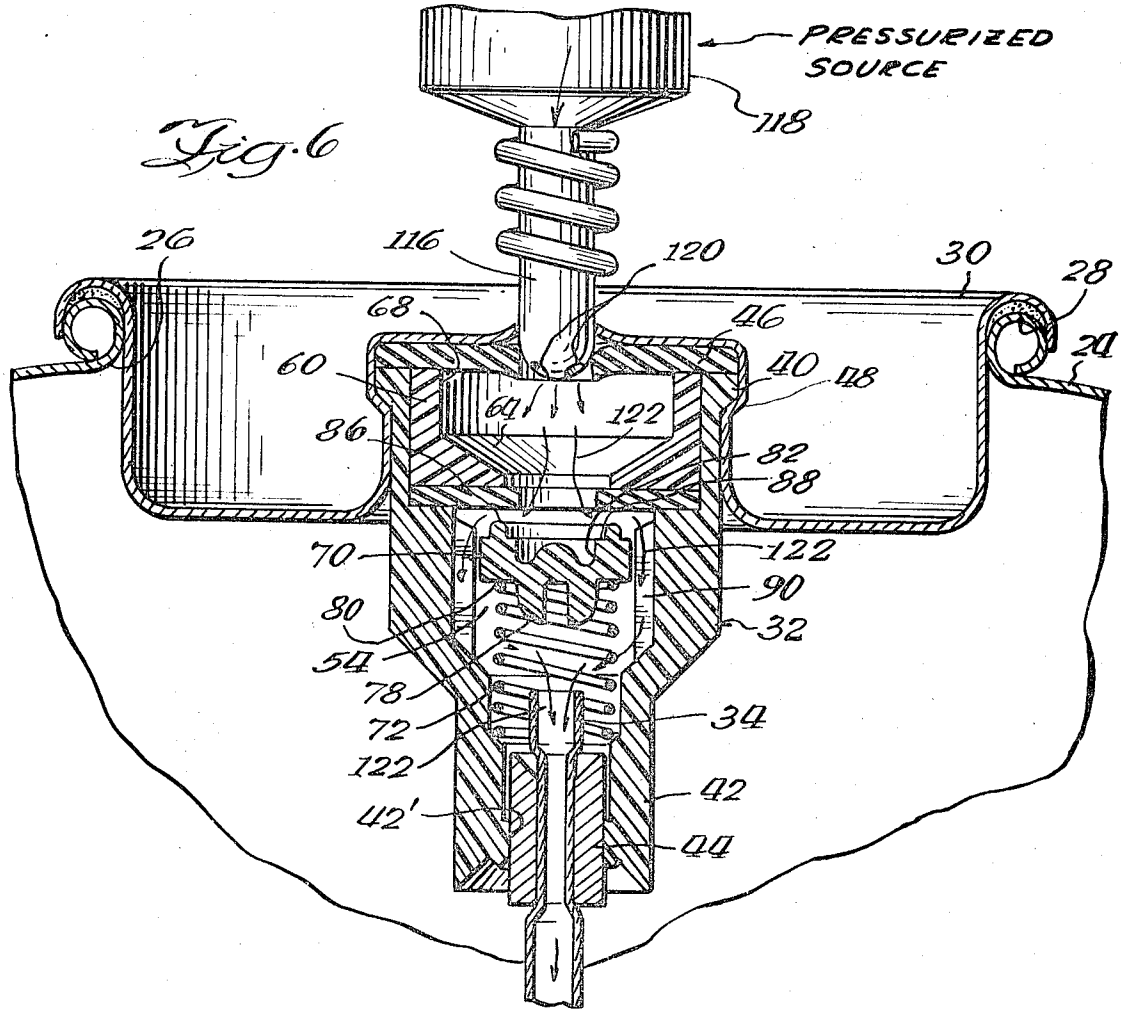
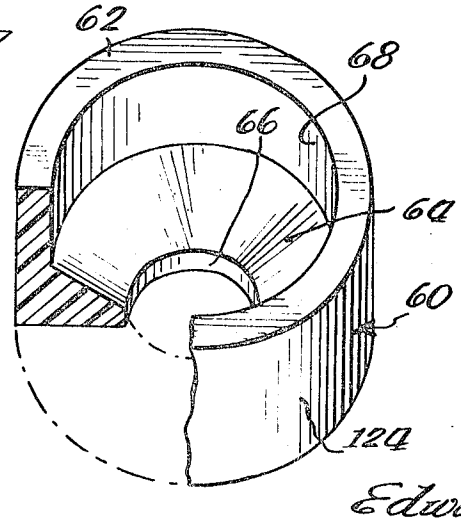


Fig. 7



INVENTOR
Edward H. Green

BY Silverman + Cass

ATTORNEYS

VALVE ASSEMBLY FOR DISPENSING METERED AMOUNTS OF PRESSURIZED PRODUCT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to pressurized packages, and more particularly, concerns the provision of an improved valve assembly therefor capable of dispensing a single predetermined amount of pressurized product upon each full downward stroke of a removable and replaceable spray head, said assembly including a metering chamber filled both during the downward and return strokes of said spray head.

2. Discussion of the Prior Art

In U.S. Pat. No. 2,777,735, there was disclosed a valve construction for pressurized packages which included a removable and replaceable spray head having a depending hollow stem and a separate spring biased valve plunger carrying a socket arranged to receive the stem. The plunger was arranged normally seated to seal off the interior of the package from the atmosphere. The stem carried an axially extending slot in the wall thereof at the lower end, the length of the slot being selected to define the only passageway for flow of fluid from the package into the stem when the plunger was unseated. The spray head could be removed, cleaned and replaced without loss of fluid from the package. Moreover, change in the rate of spray or spray pattern could be effected by substitution of another spray head carrying a different dimensioned slot, or a different external orifice or dispensing aperture.

Valve constructions made in accordance with the general teachings of the above mentioned patent have become widely known and accepted, particularly in the dispensing of heavier pressurized products where clogging of the valves is a problem. However, when one considers the dispensing of metered quantities of product product, the valve constructions heretofore available for that purpose fail to provide a structure which can be easily cleaned should clogging occur.

Generally, valve constructions heretofore utilized for dispensing pressurized product in metered amounts are provided with internal chambers capable of being filled and purged in accordance with the stroke cycle of a spray head associated therewith. The metering chambers normally either are empty, being filled on the downstroke and purged on the return, or, normally are in communication with the product and hence filled, dispensing occurring by blocking such communication and establishing communication between the chamber and the atmosphere. Complete filling and purging are not always assured. Most metering-type valve constructions utilize unitary stem and plunger arrangements, thus making impossible the cleaning of the critical passageways by removal, cleaning and replacement of the stem carrying same. Those few constructions which enable the use of a removable spray head also require complex and difficult to fabricate other components rendering the structures less than acceptable for economic and fabrication limitations.

Often, the operator is given the option of dispensing the pressurized product either in metered amounts or continuously. In continuous dispensing, it would be advantageous to utilize the features of the patented valve constructions above discussed to gain the benefit of the many advantages resulting therefrom. However, the prior art merely presents such option in the form of dual passageways selectively either brought into communication with the metering chambers or by passing such chambers for continuous spray. No valve structures available heretofore are capable of affording such option by substitution of one removable spray head for another. None of such prior structures provide for variation in the metering orifice to vary spray rate under the continuous spray option. Where the said option is provided heretofore, internal variation of the metering orifice is not possible.

SUMMARY OF THE INVENTION

The invention solves the problems previously existent in metering valve structures found in the prior art and enumerated above, and other advantages result by the provision of a metering valve assembly:

1. which can be cleared, if clogged, by removal, cleaning and replacement of a spray head associated therewith;

2. which includes, as metering chamber defining means, a cuplike insert member separately fabricated and assembled as a part of the valve assembly which has a predetermined interior capacity so that the charge to be dispensed on each actuation of the spray head can be changed without variation in the other valve components by substitution of a like insert having a different capacity;

3. which includes a metering chamber filled during both the downstroke and return stroke of the spray head, thereby assuring complete fill and dispensation;

4. which is easily fabricated without complex molds and machinery;

5. which is adapted for pressure filling procedures;

6. which is provided with a separate valve plunger having a socket to receive a hollow stem, the socket having an annular gallery surrounded by an annular rim functioning as a valve seat, instant response being effected to fill the metering chamber when the rim is unseated;

7. which is characterized by a removable and replaceable spray head and depending hollow stem, the stem carrying a radial passageway in he wall thereof at the upper end and axially extending longitudinal groove in the wall at the lower end and opening radially outwardly thereof, the groove forming the only path for product to enter the metering chamber and the radial passageway forming the only path for product to leave the metering chamber, thereby affording access to the two most critical areas of the valve assembly for clearing thereof if clogging should occur.

Other benefits and advantages of the metering valve assembly according to the invention will be evident to one skilled in the art as a detailed description of a preferred embodiment follows hereinafter with reference to the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a reduced fragmentary side elevational view of a pressurized package having the valve assembly according to the invention secured thereupon.

FIG. 2 is an enlarged elevational sectional view taken along lines 2–2 of FIG. 1 and in the direction indicated.

FIG. 3 is a view similar to that of FIG. 2, but illustrated in the condition during initial downstroke of the spray head whereupon filling of the metering chamber occurs.

FIG. 4 is a view similar to that of FIG. 2, but illustrating the condition assumed at the intermediate stage of depression of the spray head.

FIG. 5 is a view similar to that of FIG. 2 but illustrating the condition assumed when the spray head is fully depressed.

FIG. 6 is a view similar to that of FIG. 2 illustrating the condition of the valve assembly during pressure filling of the canister.

FIG. 7 is a perspective view of the removable cup defining the metering chamber of the valve assembly.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings, in FIG. 1, there is shown the upper end of a pressurized package designated generally by reference character 20. There is provided a canister comprising a metal cylinder 22 having an upper dome 24 and a bottom end (not shown) all designed to contain the pressure to which such package is subjected. The dome 24 has an upper opening 26 formed with a rolled edge 28 as shown in FIG. 1 and the entire valve structure and spray head are adapted to be secured to said opening 26 in sealing engagement with the rolled edge 28.

The product manufactured and sold to the filler by the valve maker consists of the parts shown in FIG. 1 exclusive of the canister 22. These parts are given general characters of reference and the specific details will also be identified. The character 30 is a metal cover member; the character 32 is the valve housing assembled in sealed connection with the cover member; the character 34 is a long, resilient plastic dip tube attached to the housing 32 and the character 36 is the spray head mounted on the valve mechanism contained in the housing.

Only the essential operating parts of the valve assembly according to the invention are illustrated in FIGS. 2 through 6, and it should be understood that details of conventional parts will only be illustrated in those figures where necessary. The cover member 30 preferably is formed of sheet metal and includes, conventionally, a curled-over lip formed on the annular edge thereof which provides an annular well by reason of the formation of an upwardly extending central boss 38, the upper wall 39 thereof being shown in FIGS. 2—5. The cover is secured to the canister by crimping same over the rolled edge 28 of the dome 24.

The valve housing 32 is a separate, generally cylindrical hollow structure having a flared upper end 40, and a thickened constricted lower end 42 defining a port 42' into which the dip tube 34 is attached. The dip tube 34 is formed of resilient plastic material and extends down to the bottom of the cylinder 22. The dip tube 34 is tightly engaged within the constricted or thickened lower end 42 of housing 32 by means of a split collar 44. The split collar 44 is forced into the throat of the constricted lower end 42 with the tube seized therein and contracts about the tube 34 frictionally holding the same and itself in place. Further details of housing 32 may be found in U.S. Pat. No. 3,159,318.

The housing 32 is secured to the boss, represented by upper wall 39 thereof, by having its flared end 40 engaged against the bottom of an annular, perforated gasket 46 which is formed of rubberlike material. The gasket 46 is disposed engaged against the underside of end wall 39 of the boss and the assembly is tightly held in place by suitable crimps or pinches 48 upsetting the metal of the boss inwardly in places around the circumference thereof and under the flared portion 40. The center of the wall 39 is perforated, as at 50, and in accordance with conventional practice, the resulting opening has its edges turned up slightly so as to achieve a sliding and sealing fit between the gasket and the stem of the spray head 36.

The valve housing 32 provides an enclosed upper chamber 52 and a lower valve chamber 54, with upper chamber 52 being of greater diameter than lower chamber 54 and set of off by annular shoulder 56. A second resilient perforated gasket 58 rests upon the shoulder 56. Said gasket 58 is of a diameter equal to the diameter of the upper chamber 52. The perforations of both gaskets 46 and 58 are substantially equal in diameter and coaxially aligned.

A cuplike annular insert 60 having an outer diameter equal to the diameter of the chamber 52 is disposed within said chamber 52 in a tight, frictional engagement, the rim 62 of the insert 60 being flush with the top of flared end 40 of the valve housing 32 so that it engages the undersurface of the gasket 46. The floor 64 of the cuplike insert 60 is tapered centrally to an opening 66 therein, also coaxial with the perforations of gaskets 46, 58 and opening 50 of wall 39. The interior of the cup insert 60 may be molded of plastic material and has a predetermined volume capacity to define the metering chamber 68. The opening 66 of said insert 60 has a diameter slightly greater than the diameters of the perforations of gaskets 46 and 58. The dosage or charge dispensed may be changed by substitution of another insert of different capacity.

The thus-enclosed lower valve chamber 54 will permit the pressurized product to pass up the dip tube 34 and flow into the metering chamber and thence out to the atmosphere unless prevented from doing so by some means blocking the opening defined by said perforated gasket 58. Obviously, other means must be present to block the opening 50 in wall 39 as well as the opening defined by the perforated gasket 46. The means provided to block the opening defined by the perforated gasket 58 comprise a valve plunger 70 which is reciprocable in the chamber but normally is pressed upward by a helical spring 72, the bottom end of which engages the inside of the housing at the thickened constricted portion 42.

The body 76 of plunger 70 is generally of cylindrical configuration having a reduced diameter lower portion 78 which defines a shoulder 80 functioning as a seat for the upper portion of helical spring 72. A shallow upwardly opening central axial socket 82 is formed in the valve plunger 70 and is normally coaxial with the perforations of gaskets 46 and 58 and opening 50. The upper rim 86 of the valve plunger 70 has an inner gallery formation 88 surrounding the socket 82. Axial ribs 90 may be provided spaced circumferentially about the inner wall 92 of the housing 32 within the lower valve chamber 54, functioning as means for guiding the vertical reciprocation of the valve plunger 70. The ribs 90 may be molded integrally with the valve housing 32.

The valve plunger 70 normally is biased upwards by spring 72 so that the upper surface of rim 86 is engaged against the undersurface of gasket 58 defining a valve seat blocking communication between the metering chamber 52 and the interior of the valve chamber 54. The socket 82 has a central pilot protrusion 94 to engage the axial end of the hollow stem to be described.

The spray head 36 has a body or actuator portion 96 and a depending hollow stem 98 having an axial bore 100 defined therein and extending entirely along the length thereof into the body 96. A shallow chamber 102 is provided interior of the actuator body 96 leading to a radial bore 104 of narrow diameter which terminates in a recessed dispensing orifice 106. The bottom end of bore 100 is open.

The stem 98 is selected of a length and diameter sufficient to extend slidably and sealingly through both gaskets 46 and 58 terminating bottomed in socket 82. The stem 98 extends outward of said boss a sufficient distance to permit two stages of movement through said gaskets first, dislodging the engagement of the valve seat of rim 86 with the gasket 58 and a second stage explained hereinafter. Intermediate the ends of the stem 98, there is provided a radial passageway 108 extending through the stem wall at the upper end thereof. The lower end of the stem wall is provided with a longitudinal groove 110 opening radially outward. The length of said groove 110 and the location of the passageway 108 are selected to establish a careful relationship mandatory to the successful operation of the valve assembly. The location of the radial passageway 108 is chosen so that when the spray head 36 initially is stroked downward the distance y, communication is established between the interior of the metering chamber 68 and the interior of the valve chamber 54 only through the groove 108 and without connecting the radial passageway 108 to said chamber 68.

The length of the longitudinal groove 110 is selected so that when the spray head 36 first is stroked downward, and the valve seat of rim 86 is unseated, pressurized fluid will flow only through the groove 110 to the interior of the metering chamber 68 until the stroke travels the distance y. continued depression of the spray head 36 equal to the distance x results in the groove 108 being blocked off from the metering chamber 52 by the stem outer wall at 111 immediately above the upper end of longitudinal groove 110. At this point in the downstroke cycle, the metering chamber 68 is isolated. The downward stroke of the spray head 36 is continued to terminate when the radial passageway 108 has traversed an axial distance greater than the distance x. At this point, the passageway 108 now is disposed below the upper gasket 46. Thus, only the charge of product previously captured within the metering chamber 68 is discharged to the bore 100, which functions as an expansion chamber, thence to the passages 102 and 104 to the dispensing orifice 106.

Now, as the spray head 36 is released, pressurized product once again passes along through the longitudinal groove 110

into the interior of the metering chamber **68** at least partially to fill same. Thus, filling of the metering chamber **68** occurs during both the downstroke and the return or upstroke of the spray head **36** and depending stem **98**.

As can be understood from the above, preferably the length of the longitudinal groove is such as to enable the upper end to open to the metering chamber **68** when the stem is engaged bottomed in socket **82** with the valve plunger **70**, and particularly, its valve seat in normal sealing engagement with the undersurface of the lower gasket **58**. As explained above, when the spray head **36** is depressed first, the valve plunger is forced against the spring **72** to unseat the plunger and permit pressurized product to pass over the rim **86** into the groove **110** and thence to fill the metering chamber **68**.

The so-called two-stage or downstroke-upstroke filling of the metering chamber provided by the valve assembly according to the invention ensures that the said chamber always is filled to its capacity before any pressurized product is dispensed.

When continuous rather than intermittent dosage spray is desired, one merely removes the spray head **36** and its depending stem **98** from engagement within the socket **82** —without any dispensing or waste occurring but for the quantity of material found within the metering chamber **68**, which is minor. Then, a spray head and hollow depending stem similar to that disclosed in U.S. Pat. No. 2,777,735 can be substituted, although the stem length thereof would remain common with that of stem **98**. A through slot would be formed in the wall of the substitute stem in accordance with the teachings of said U.S. Pat. No. 2,777,735 in lieu of the groove **110** of stem **98**.

Thus, for the first time, the advantages of the so-called patented slot valves as first set forth in U.S. Pat. No. 2,777,735 can now be utilized in a metering or dosage valve. Removal, cleaning and replacement of spray head **36** is adequate for clearing and cleaning of both hole **108** and groove **110**. Since there is a filling of the metering chamber **98** both on upstroke and downstroke, the metering chamber **68** is always filled, and accordingly, accumulation of debris or hardened product within the metering chamber is materially inhibited. Accordingly, the full capacity of the metering chamber is maintained available throughout the useful life of the pressurized package **20** incorporating the invention.

Further, other valve plunger arrangements advantageously are substitutable in lieu of valve plunger **70** whereby to enable the teachings and advantages of patented structures such as found in U.S. Pat. Nos. 3,045,877; 3,188,008; 3,233,792; 3,209,960; 3,231,153; 3,235,140 and 3,206,082 easily to be incorporated for the first time in a metering valve structure.

In FIG. **3**, the spray head **36** is shown as first partially depressed to enable product to pass along the path indicated by arrows **112**, over the rim **86**, into the longitudinal groove **110** and then into the metering chamber **68**. The radial passageway **108** of stem **98** is exterior of the boss **38**, or, at most, is disposed within the perforation of gasket **46**. Thus radial passageway **108** does not communicate with chamber **68** at this stage in the valve's operation. This condition will ensue for depression of the spray head **36** through a distance equal to *y* (FIG. **2**).

In FIG. **4**, the valve assembly is shown in the condition assumed when the spray head **36** has reached an intermediate stage in its downstroke. The spray head **36** has been depressed a distance equal to *x* (FIG. **2**). Passage of pressurized product through the radial passageway **108** and through the groove **110** is blocked, notwithstanding the unseated condition of the valve plunger. The radial passageway **108** is shielded by engagement with the gasket **46** while the stem wall is engaged with gasket **58** at **111** to block passage of fluid from the groove **110** into the metering chamber **68** isolating same.

In FIG. **5**, the valve assembly is shown in the condition assumed for dispensing the capacity of the metering chamber **68** through side hole **108** along the path indicated by arrows **114**. The circumferential wall of the stem immediately above the longitudinal groove **110** remains engaged with the gasket **58** and thus blocks passage of product from the valve chamber **54** to the metering chamber **68**. The radial passageway **108** is exposed to the interior of the metering chamber **68** and fluid is permitted to pass through said passageway **108**. On release of the spray head **36** from its fully depressed condition, the valve assembly returns to the condition shown in FIG. **3** until the rim **86** is once again engaged with the gasket **58**.

In FIG. **6**, the valve assembly according to the invention is shown in the condition assumed upon pressure filling with product subsequent to the assembly of the valve housing **32** and attendant parts upon the assembled cylinder **22**, dome **24** and cover **28**. An injector head **116** of known construction and leading from a source **118** of pressurized product (shown diagrammatically) is inserted through opening **50** to engage the gasket **46** sealingly through perforation thereof. Pressurized product is then released through openings **120** in the injector head **116** into the metering chamber **68** and through opening **66** and the perforation in gasket **58**. Said product overcomes the bias of spring **72** to dislodge the valve plunger **70** whereby pressurized product enters the valve chamber **54** and the interior of the package **20** through the dip tube **34**. The flow path taken by the pressurized product is indicated by arrows **122**.

In FIG. **7**, there is shown a typical insert **60** used to define the metering chamber **68**. This insert **60** preferably is a plastic molded member having a cylindrical body **124**, a tapered floor **64** and a central opening **66** formed in said floor. The annular rim **62** thereof is imperforate and uniform. The chamber **68** defined interior of the body **124** is of predetermined capacity and can be changed by change in the dimensions thereof.

I claim:

1. A valve assembly for dispensing a metered amount of a pressurized product contained in a canister to which said valve assembly is mounted, during a single stroke cycle of spray head associated with said valve assembly and said valve assembly comprising:
   a. a cover member adapted for securement to a canister;
   b. a hollow housing secured to said cover member and having a port at the bottom end thereof for establishing communication with the interior of the canister when the cover member is mounted thereon;
   c. a first perforated gasket disposed between the housing and the cover member;
   d. a second perforated gasket disposed within the housing spaced from the first perforated gasket and coaxial therewith;
   e. means defining a metering chamber of predetermined volume in the housing and between said gaskets;
   f. a spring-pressed valve plunger mounted in the housing between said port and said second gasket and normally seated against the bottom thereof, isolating said metering chamber blocking the movement of pressurized product between the metering chamber and said port;
   g. a removable spray head having a depending hollow stem slidably sealingly engaged through said perforated gaskets and engaging said valve plunger and the stem including:
      i. a radial passageway through a wall thereof at the upper end; and
      ii. an axially extending longitudinal groove in the exterior surface of said stem wall, adjacent the bottom thereof and opening radially outwardly of said stem; and
   h. said stem normally having its lower end engaged with the valve plunger with only its groove communicating with the metering chamber and with said radial passageway communicating only with the atmosphere, flow of pressurized product between the said port and the metering chamber being possible only by way of said groove and said pressurized product being blocked from entering said groove by the seated condition of said valve plunger; and
   i. said stem adapted to be stroked downward upon depression of said spray head first only to unseat the valve plunger, filling the metering chamber, said stem stroke

continuing downward again to isolate the metering chamber and said stem stroke further continuing to establish the connection of the radial passageway only to the metering chamber for purging of the contents thereof.

2. The valve assembly as claimed in claim 1 in which the relative location of the radial passageway and the upper portion of the longitudinal groove is selected so that flow of product from the port into the metering chamber through the groove on unseating of the valve plunger is effected without changing the normal condition of the radial passageway, and that continued movement of the spray head in the downward stroke thereof moves the groove out of communication with the metering chamber notwithstanding the unseated condition of the valve plunger but without connecting the radial passageway to said metering chamber.

3. The valve assembly as claimed in claim 1 in which the return stroke of the spray head places the groove in communication with the metering chamber after isolating the radial passageway therefrom and thereby at least partially to refill the metering chamber until the valve plunger is reseated.

4. The valve assembly as claimed in claim 1 in which the radial passageway is located spaced from the upper end of the longitudinal groove a distance sufficient to establish communication between the said radial passageway and the metering chamber only when the upper end of the longitudinal groove is isolated from said metering chamber.

5. The valve assembly as claimed in claim 1 in which the length of the stroke required to place the radial passageway in communication with the metering chamber is greater than the length of the stroke required to isolate the metering chamber from the said port through said groove.

6. The valve assembly as claimed in claim 1 in which said valve plunger has a socket defined therein and said stem is bottomed within said socket.

7. The valve assembly as claimed in claim 1 in which said valve plunger has a socket defined therein an upper annular rim surrounding said socket to define a valve seat and an annular pocket formed between said valve seat and the socket bottom, said groove opening to the pocket.

8. The valve assembly as claimed in claim 1 in which said means defining the metering chamber comprise a cuplike member of predetermined interior volume and having an upper annular rim engaged with the first gasket and a central floor passageway opening to the second gasket and coaxial with the perforation thereof.

9. A valve assembly for dispensing a metered amount of a pressurized product contained in a canister to which said valve assembly is mounted during a single stroke cycle of a spray head associated with said valve assembly, said valve assembly comprising, a cover member adapted for securement to a canister, a hollow housing secured to the cover member and having a port at the bottom end thereof for establishing communication with the interior of the canister when the cover member is mounted thereon, a first gasket having a central opening and disposed between the cover member and the housing, a second gasket having a central opening coaxial with the first gasket opening and arranged within the housing spaced from said first gasket, means defining a metering chamber seated within the housing between the first and second gaskets, blocking means in the housing and disposed below the second gasket normally to isolate the metering chamber from said port, a removable spray head having a depending hollow stem slidably sealingly engaged through said gasket openings, said stem having a radial passageway through a wall thereof near the stem upper end and a longitudinal groove in the stem wall at the stem lower end, said longitudinal groove opening radially outward from said wall, said spray head and stem operably engaged with said blocking means to effect a normal condition isolating the metering chamber from both said port and the radial passageway, said spray head and stem adapted to be stroked downward to a first condition unseating said blocking means exposing said groove to pressurized product without exposing the radial passageway to the metering chamber whereby pressurized product is permitted to flow from said port only through said groove into said metering chamber to fill same, the downward stroke continuing to a second condition whereat the metering chamber is again isolated from both said groove and radial passageway and further continuing through to a final condition establishing communication between the radial passageway and the metering chamber to purge same while the metering chamber is maintained isolated from communication with the groove, said spray head and stem being returnable to the normal condition aforementioned through said conditions to enable at least partial refilling of the metering chamber prior to reseating of the valve plunger.

10. A valve assembly for dispensing metered amounts of pressurized product contained in a canister to which the valve assembly is mounted and during a single stroke cycle a spray head associated with said valve assembly, said valve assembly comprising, a removable spray head having a dispensing orifice and an integral hollow depending stem communicating thereto, a radial passageway formed in the wall of said stem at the upper portion thereof and an axially extending longitudinal groove formed in the stem wall opening radially outward therefrom, the upper end of said groove being spaced a predetermined axial distance from said radial passageway toward the lower end of the stem, a valve cover having a central perforated boss and adapted for securement to the canister, a valve housing seated within said boss and having a port opening to the interior of the canister when the cover member is mounted thereon, a first centrally perforated gasket disposed between the valve cover and the housing coaxial with said boss, a second centrally perforated gasket arranged within said housing spaced from the first gasket and coaxial therewith, means seated within said housing and between said gaskets defining a metering chamber of predefined volume, a spring-pressed valve plunger arranged for vertical reciprocation within said housing between said port and said second gasket and normally engaged seated against the said second gasket isolating said metering chamber from said port, said stem being slidably, sealingly engaged through both gaskets with the lower end thereof operatively coupled to the valve plunger and only the said groove communicating to said metering chamber, spray head and stem adapted to be stroked downward initially to unseat the valve plunger permitting pressurized product to pass through said groove into the metering chamber, further continuing downward stroke of the spray head and stem disposing the upper end of said groove within said second gasket to block flow of pressurized product into the metering chamber and the downward stroke continuing to bring the radial passage only disposed in communicating relation with the metering chamber for purging of the contents thereof to the dispensing orifice, release of said spray head and stem reestablishing communication between said port and said metering chamber until the valve plunger is reseated, thereby at least partially to refill said metering chamber.

11. The valve assembly as claimed in claim 10 in which the said predetermined distance is selected so that the radial passage is brought into communication with the metering chamber only subsequent to the disposition of the upper end of said groove within said gasket.

12. The valve assembly as claimed in claim 10 in which said means defining said metering chamber comprises a cup member opening toward the first gasket and the annular wall thereof arranged seated thereagainst and a perforated base arranged seated against the second gasket.

13. The valve assembly as claimed in claim 12 in which the interior of the cup has a known volume and a floor tapered toward the perforation of the base.

14. The valve assembly as claimed in claim 13 in which said cup is disposed within said housing with the perforated base coaxial with said second perforated gasket.

15. The valve assembly as claimed in claim 10 in which said valve plunger has an upwardly opening socket defined therein,

an annular rim surrounding said socket and a gallery formation defined in said rim, said groove opening to said gallery formation.

16. A valve assembly for dispensing metered amounts of pressurized product from a pressurized package in which there is a cover member secured thereto, a hollow housing secured to the cover member and a port at the lower end thereof communicating to the interior of the package when the cover is secured thereupon, said valve assembly comprising, a gasket clamped between the housing and the cover member, cup means defining a metering chamber interior of the housing at the upper end thereof and a second gasket separating said metering chamber from the remainder of the interior of the housing, a reciprocable valve plunger disposed within said remainder and a spring disposed in the remainder biasing said valve plunger to a normal condition sealingly seated against said second gasket, said metering chamber normally being isolated from said remainder, a removable spray head having a depending hollow stem slidably seatingly engaged through said gaskets and coupled with said valve plunger, said stem having upper and lower portions, said upper portion having a radial passageway formed through the wall thereof and said lower portion having a longitudinal side opening groove formed in the outer circumferential surface thereof, the location of said hole being selected so that the distance of travel to establish communication between the metering chamber and the interior of the stem is greater than the distance necessary to establish communication between the said remainder by way of the said longitudinal groove and the metering chamber.

17. A pressurized package comprising a canister containing pressurized product and a valve assembly for dispensing metered amount of pressurized product from the canister, said valve assembly comprising a cover mounted to the canister, a tubular valve housing mounted to the cover, said housing including an upper chamber and a ported lower chamber, a pair of perforated gaskets spaced apart at opposite ends of said upper chamber, an upwardly opening cuplike member disposed tightly within said upper chamber between said gaskets, a valve plunger reciprocably arranged within said lower chamber, a spring normally biasing said valve plunger into seated engagement against the undersurface of the lower one of said gaskets, said cuplike member defining a metering chamber of predetermined capacity, said metering chamber being normally isolated from said lower chamber and a removable spray head having a depending hollow stem, said stem having a radial passageway at its upper end and an outer longitudinal groove at its lower end, said stem being engaged slidably sealingly through said gaskets and operably coupled to said valve plunger, the radial passageway normally located exterior of the valve cover and the longitudinal groove communicating with the metering chamber, depression of the spray head causing the stem to be stroked downward initially to unseat the valve plunger to enable pressurized product to enter the metering chamber by way of the groove but without exposing the radial passageway to said chamber, said stroke continuing thereafter to reisolate the metering chamber, and further continuing lastly to connect the radial passageway to the metering chamber from the valve chamber while the metering chamber remains so isolated whereby to dispense the full capacity of the metering chamber, the release of the spray head again isolating the interior of the stem from the valve chamber while permitting entry of pressurized product from the lower valve chamber into the metering chamber by way of said groove until the valve plunger is seated against the lower gasket.

18. A valve assembly for dispensing a metered amount of a pressurized product contained in a canister to which said valve assembly is mounted, during a single stroke-release cycle of a spray head associated with said valve assembly, and said valve assembly comprising:

a. a cover member adapted for securement to a canister;
b. a hollow housing secured to said cover member and having a port at the bottom end thereof for establishing communication with the interior of the canister when the cover member is mounted thereon;
c. first and second perforated gaskets;
   i. spaced apart; and
   ii. coaxially disposed within the housing;
d. means defining a metering chamber of predetermined volume in the housing between the gaskets;
e. a spring-pressed valve plunger mounted in the housing between said port and said gaskets and normally seated against the bottom of the lower gasket and blocking movement of pressurized fluid between the metering chamber and said port;
f. a removable spray head having a depending hollow stem, sealingly, slidably engaged through said gaskets, and the stem including:
   i. a radial passageway through a wall thereof at the upper end; and
   ii. an axially extending longitudinal groove in the wall of said stem adjacent the bottom thereof and opening radially outward;
g. said stem normally having its lower end operatively coupled with the valve plunger, with only its groove communicating with said metering chamber, and with said radial passageway and hollow stem communicating only with the atmosphere, flow of pressurized product between the said port and metering chamber being possible only by way of said groove, said metering chamber being normally isolated from said port; and
h. said spray head and stem arranged for downward movement to move the plunger downward and thereafter released:
   i. the first portion of the downward stroke moving the valve plunger to unseated condition and permitting flow of pressurized product from said port through said groove and into said metering chamber without changing the normal condition of the radial passageway so that there is no connection between the hollow stem and the metering chamber;
   ii. the second portion of the downward stroke moving the groove out of communication with the metering chamber notwithstanding unseated condition of said valve plunger, but without connecting the said radial passageway to said metering chamber;
   iii. the third and final portion of said downward stroke connecting said radial passageway to said metering chamber to enable the discharge of the contents thereof through said spray head by way of the hollow stem; and
   iv. the upward release stroke of the spray head returning same to normal condition, the metering chamber at least partially refilling during said return stroke but not until the said radial passageway is no longer in communication with said metering chamber.