

June 3, 1958

P. MESHBERG

2,837,249

AEROSOL VALVE

Filed May 10, 1957

3 Sheets-Sheet 1

Fig. 1

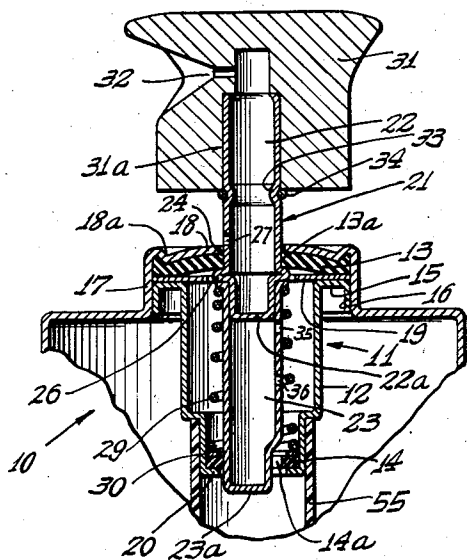


Fig. 2

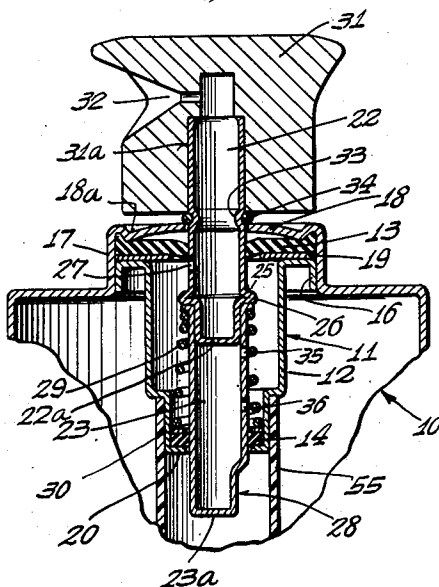


Fig. 3

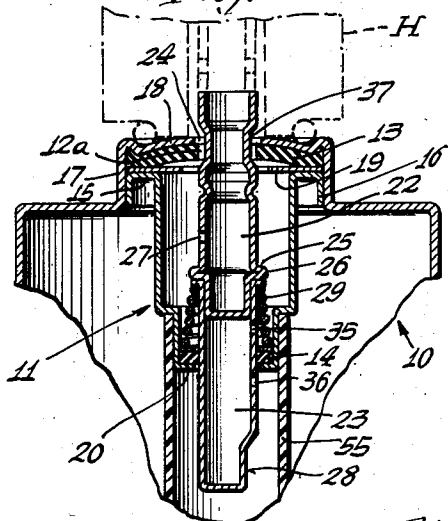


Fig. 4

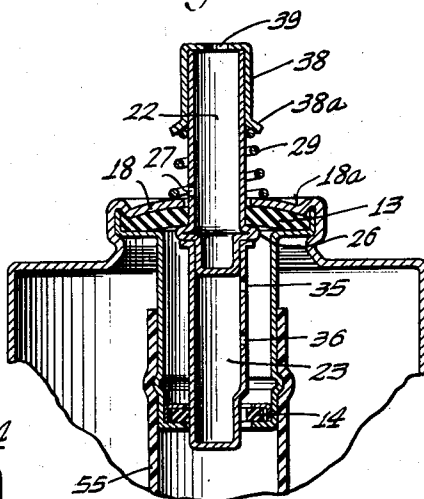


Fig. 13

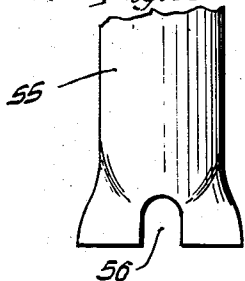
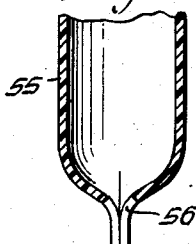


Fig. 14



INVENTOR.
Philip Meshberg
BY
Johnson and Kline
ATTORNEYS

June 3, 1958

P. MESHBERG
AEROSOL VALVE

2,837,249

Filed May 10, 1957

3 Sheets-Sheet 2

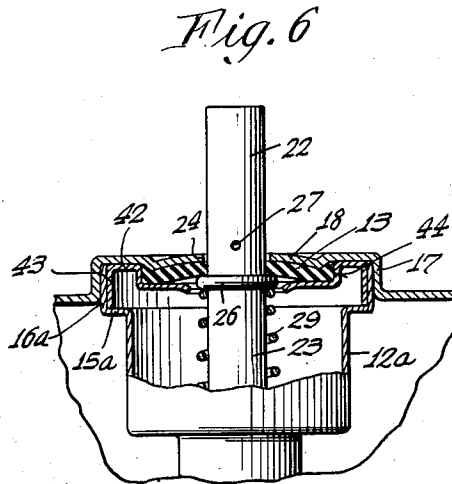
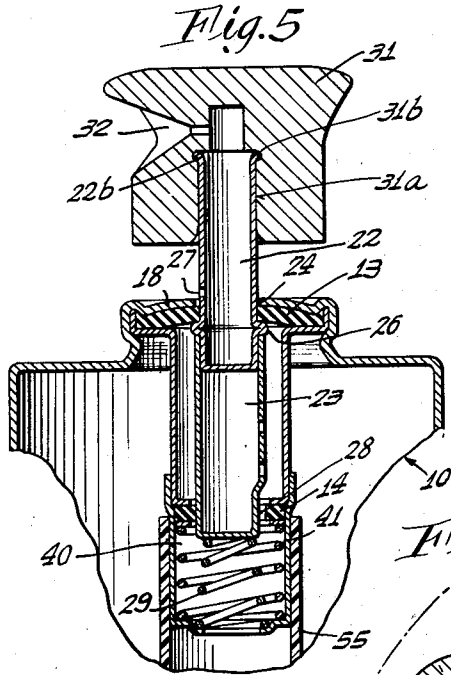


Fig. 10

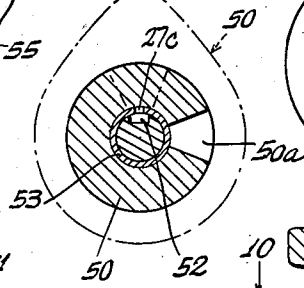


Fig. 9

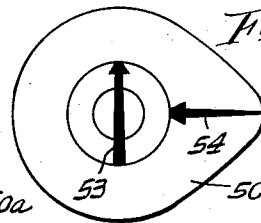


Fig. 7

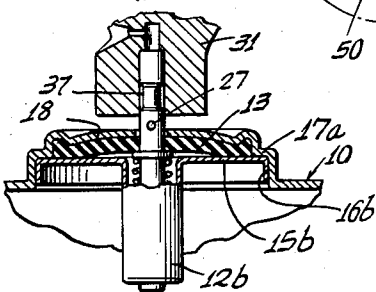


Fig. 8

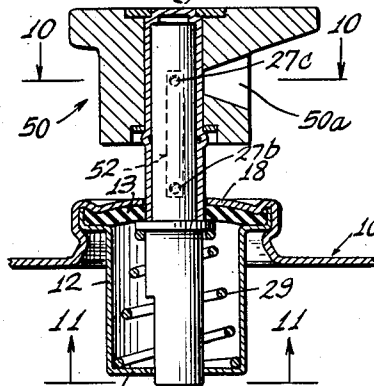
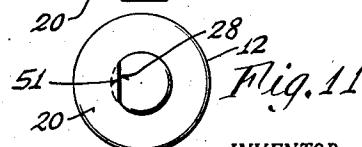
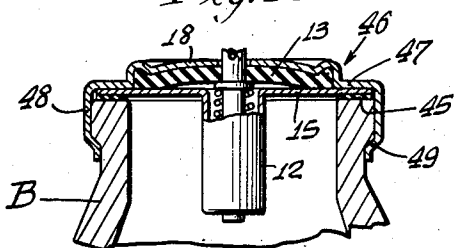


Fig. 12



INVENTOR.
Philip Meshberg
BY
Johnson and Kline
ATTORNEYS

June 3, 1958

P. MESHBERG

2,837,249

AEROSOL VALVE

Filed May 10, 1957

3 Sheets-Sheet 3

Fig. 15

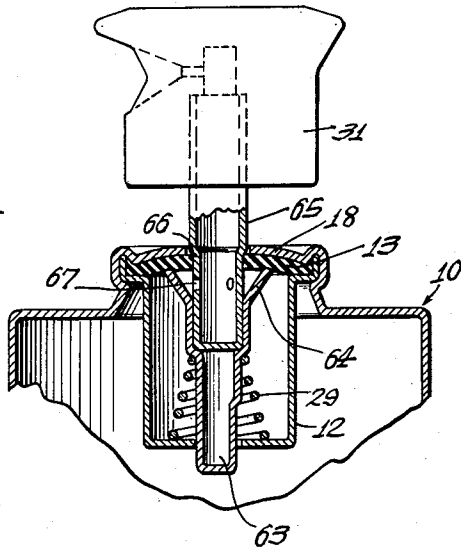
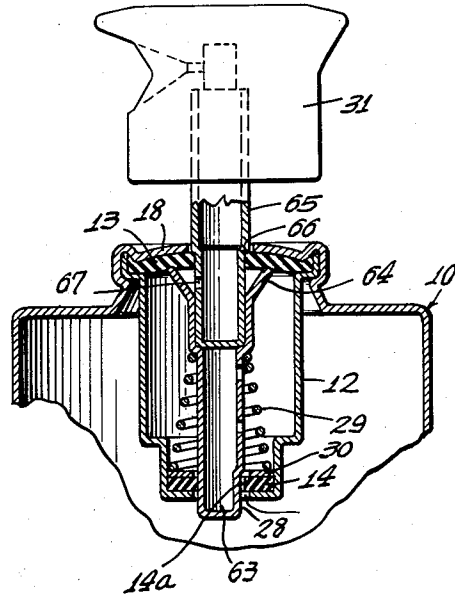


Fig. 16



INVENTOR.
Philip Meshberg
BY
Johnson and Kline
ATTORNEYS

1

2,837,249

AEROSOL VALVE

Philip Meshberg, Fairfield, Conn.

Application May 10, 1957, Serial No. 658,283

18 Claims. (Cl. 222—394)

The present invention relates to aerosol valves and more particularly to the stems utilized therein and to the means for mounting the valves on the container.

It is an object of the present invention to provide an improved two-part valve stem which can be more readily manufactured and assembled and which, when used in a metering valve, permits required variation in the stem to cooperate with measuring chambers of various sizes to produce varying capacities in the valve.

A feature of the present invention resides in the fact that the two-part stem can be made from eyelet parts or molded and can be kept to closer tolerances than could be the parts formed by screw machines. Furthermore, the stems when formed from drawn metal operate more successfully in the valve because of the longitudinal grain structure which permits easier sliding of the valve in the valve disks during its operation. Further, the tubular two-part stem can be readily provided with means to greatly facilitate pressure filling of the containers with the valve in position.

Another object of the present invention is to provide improved measuring chambers and means for mounting the same in the containers whereby chambers of varying diameter for dispensing predetermined varying amounts of fluid can be readily mounted in the container without substantially varying the container. Furthermore, in order to obtain accurate volumes of the aerosol material, the spring normally urging the valve stem into sealing relation can be mounted on the outside of the measuring chamber so as not to affect the volume of dispensed fluid as controlled by the measuring chamber.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawings in which:

Figure 1 is a longitudinal sectional view of a valve mounted on the container with the valve in normal sealing position.

Fig. 2 is a view similar to Fig. 1 showing the valve in dispensing position.

Fig. 3 is a longitudinal sectional view of a valve in pressure filling position.

Fig. 4 is a longitudinal sectional view of a valve with the spring disposed on the outside of the container.

Fig. 5 is a longitudinal sectional view of a valve having a spring disposed outside of the measuring chamber and within the container.

Fig. 6 is a view, partly in longitudinal section, showing a valve mounted in a measuring chamber of large diameter.

Fig. 7 is a view, partly in longitudinal section, showing the valve mounted in a measuring chamber of small diameter.

Fig. 8 is a longitudinal sectional view through a valve having a sealing button.

Fig. 9 is a top view of the button.

Fig. 10 is a sectional view taken along line 10—10 of Fig. 8.

2

Fig. 11 is a bottom view of Fig. 8 looking in the direction of the arrows 11—11.

Fig. 12 is a view of a valve mounted on an open-mouthed bottle.

Fig. 13 is a view of the bottom of the dip tube.

Fig. 14 is a longitudinal sectional view of the portion of the dip tube shown in Fig. 13.

Figs. 15 and 16 are longitudinal sections of valves showing another form of stem.

As shown in Figs. 1 and 2 of the drawing, a container 10 has mounted thereon a metering valve 11 adapted to dispense from the container a measured amount of fluid under pressure. The valve comprises a measuring chamber 12 adapted to be mounted on the container and is provided with a sealing valve disk 13 at the upper end thereof and a sealing valve disk 14 at the lower end thereof, said valve disks being made of suitable elastomeric material.

In the form of the invention shown in Fig. 1, the measuring chamber is enlarged at the upper end in order to secure the required volume of fluid for each operation of the valve and is provided with an outwardly extending radial flange 15 provided at its periphery with a rearwardly extending flange 16 which is adapted to be forced-fit into a neck 17 on the means for mounting the valve on the top of the container.

The sealing valve disk 13 is mounted to overlie the outer end of the chamber and is adapted to be located under the domed end wall 18 closing the neck 17 and is held in place by being clamped to the flange 15 by the indented portion 18a of the end wall so that the center is free to flex in operation.

In the form of the invention shown in Figs. 1 and 2, where a chamber of large diameter is employed, means are provided to control the flexing of the sealing disk. While this may take many forms, it is herein illustrated as a plate 19 disposed between the disk and the end of the chamber and extending over the open end of the chamber and limits the inward flexing of the sealing disk when the valve is in discharged position of Fig. 2, as will be explained.

The inner sealing valve disk 14 at the lower end of the housing is shown as overlying an apertured end wall 20 of the chamber 12. The valve disks 13 and 14 are provided with bores 13a, 14a in which is mounted a valve stem 21 which is adapted to cooperate therewith to control the dispensing of a measured amount of fluid from the container for each operation thereof.

According to the present invention a novel valve stem is provided which comprises inner and outer parts 22, 23, preferably formed as tubular members drawn from metal stock, each having a closed inner end 22a, 23a. As shown in the drawings, the diameter of the inner end of the outer member 22 is reduced so that it fits, with a forced-fit, into the open end of the inner member 23 and sealingly connects the two parts. The outer part of the stem passes through the bore in the outer sealing disk 13 and through an aperture 24 in the wall 18 and is provided with a shoulder 25 formed by an outwardly extending annular fold 26 formed in the walls thereof and adapted to engage the underside of disk 12 to form a seal therewith. The outer member is also provided with an aperture 27 in the wall thereof normally located outwardly of the seal and adapted, when the stem is moved to the dispensing position of Fig. 2, to connect the inner part of the tubular stem portion 22 with the measuring chamber to dispense the fluid therefrom. The inner stem part 23 is provided with a portion of reduced diameter, herein illustrated as a flattened portion 28, which is adapted to be normally disposed within the bore 13a of the inner sealing disk 13, as shown in Fig. 1, so as to permit the fluid from the container to pass into the measuring chamber, which por-

3

tion is moved out of the bore when the stem is moved to its dispensing position, as shown in Fig. 2, and permits the stem to seal the passage between the measuring chamber and the container.

It will be seen, therefore, that the two-part valve stem of the present invention can be accurately formed and, by assembling inner portions of varying diameter, can effectively aid in controlling the volume of fluid measured by the measuring chamber since inner portions of smaller diameter can be utilized to enlarge the capacity of the measuring chamber without changing the size of the chamber in cases where small increases in volume are required. In assembling the two-stem portions, if desired, the folded portion 26 forming the sealing shoulder can be utilized as a stop during the forced-fitting operation joining the stem portions.

The stem is normally urged to sealing position by resilient means. In the form of the invention shown in Figs. 1 and 2, the resilient means comprises a spring 29 disposed within the measuring chamber and having one end located under the folded portion 26 and its other end engaging a metal washer 30 overlying the sealing disk 13 at the inner end. This spring normally urges the stem to the sealing position of Fig. 1 in which the spring presses the shoulder into sealing engagement with the disk 13 and the measuring chamber is sealed off until the stem is moved to dispensing position, as shown in Fig. 2, by overcoming the pressure of the spring.

The outer end of the stem is provided with a usual button 31 provided with a bore 31a to receive the end of the stem and a dispensing aperture 32 in communication with the interior of the hollow tubular outer stem 22. If desired, the button can be held in place by a detent action formed by an outturned rim 22b on the end of the stem seating in a groove or recess 31b in the bore 31a of the button as shown in Fig. 5.

If desired, means can be provided for limiting the movement of the stem in its dispensing position. While the bottom of the button can be used for this purpose, it is at present preferred to provide a groove 33 formed in the wall of the outer stem and having a ring 34 snapped therein and adapted to engage the domed wall of the neck, as shown in Fig. 2, to limit the inward movement of the stem. This ring may also aid in stopping the button 31 as it is inserted over the end of the stem.

If the stem is to be used in situations where the container is pressure filled, the wall of the inner part of the stem is provided with a pair of spaced apertures 35, 36 which, when the stem is moved to its innermost or filling position with the filling head H connected as shown in Fig. 3 and before the button and ring are applied, are adapted to be exposed on either side of and to bypass the inner sealing disk 14 through the tubular inner stem part. While the container can be filled in this position by the passage of fluid along the outer stem and through the aperture 27 in the outer stem into the chamber and through the pair of apertures 35, 36 in the lower stem to the container, means may also be provided for facilitating the passage of fluid into the chamber. Preferably, this comprises providing the outer stem part with a bypass means, herein illustrated as an annular channel 37, located outwardly of the aperture 27 so as to be positioned in the bore of the outer disk when the stem is in filling position, as shown in Fig. 3. This permits a greater flow of fluid past the first seal and permits a more rapid filling of the container. Preferably, the bypass is so located that it will be covered by the button, as shown in Fig. 7, when the button is applied to the stem after filling.

It will be seen from the foregoing that the stem in moving to and from the sealing, dispensing and filling positions moves longitudinally through the bores in the sealing disks 13 and 14. By making the two parts of the stems of drawn metal it has been discovered that a much smoother action is obtained since the grain of the

4

metal extends in a longitudinal direction and facilitates the movement of the stem in the bore.

Under some circumstances where the volume of the fluid to be measured is critical, it may be desired to dispose the spring outside of the measuring chamber. In the form of the invention shown in Fig. 4, a cap 33 having a perforation 39 in the bottom thereof is mounted over the end of the outer stem portion and the spring 29 is disposed between the outwardly turned inner end 38a of the cap and the domed portion 18 of the neck to normally urge the stem to sealing relation.

In the form of the invention shown in Fig. 5, the measuring chamber has an additional spring housing 40 mounted on the bottom of the chamber and the inner sealing disk 14 is disposed in the upper end of the spring housing and is urged against the bottom 20 of the measuring chamber by an outer spring 41 while usual spring 29 is mounted within the housing to bear against the bottom of the stem and urge it to its outermost position.

In the form of the invention shown in Fig. 6, a large measuring chamber 12a is employed as might be used for cosmetic or toilet goods items including foam type products such as shaving cream or the like material. In order to mount the chamber in the neck 17, it is provided with an outward radial flange 15a and has a forwardly projected flange 16a at the periphery thereof which is mounted in the neck by a forced fit or by other suitable means. A transverse member 42 having a flange 43 supported on the flange 15a of the chamber and overlying the flange 16a extends over the end of the measuring chamber and is shaped to form a recess 44 in the face thereof in which the outer valve disk 13 is positioned with the wall of the recess underlying the disk controlling the flexing of the disk during the operations thereof.

In the form of the invention shown in Fig. 7, a very small measuring chamber 12b as might be used for pharmaceuticals or the like is illustrated. In order to mount this in the neck of the container, a large annular flange 15b is provided having a peripheral flange 16b adapted to be forced-fit into the neck. The outer valve disk 13 overlies the annular flange 15 and in order to prevent the annular flange from too tightly clamping the disk, the neck has a stepped portion 17a therein which limits the movement of the flange 15b as it is forced-fit into the neck and limits and confines the gripping by the portion 18a to the edge of the valve disk 13 and controls its flexing during the operation of the valve stem.

When the valve of the present invention is to be mounted on the mouth of a bottle or jar B shown in Fig. 12, the measuring chamber 12 is provided with a flat annular flange 15 which extends out and overlies the end of the mouth of the bottle or the like container. A sealing washer or ring 45 is disposed between the flange 15 and the mouth of the container and the mounting means for the valve comprises a stepped skirt or member 46 having a shoulder 47 overlying the flange 15 and a flange 48 which extends down and around and is clamped on a shoulder 49 on the outer surface of the container to seal the container and hold the valve in position thereon. The shoulder controls the clamping of the valve disk in the manner of the shoulder 17a in Fig. 7.

Should it be desired, means may be provided to seal off the outer end of the stem. In the form of the invention shown in Figs. 8-11, the end of the stem is provided with a dispensing button 50 having an aperture 50a, said button being mounted for limited rotation on the stem so that it can be turned from the sealed position of Fig. 9 to the dot-and-dash position of Fig. 10 to line up the aperture 50a with the passage to permit dispensing of the fluid. In the form of the invention illustrated in Fig. 10 the stem is held against rotation by forming the aperture in the bottom wall 20 of the measuring chamber with a flat portion 51 to coact with the flattened portion 28 on the stem and function as a loose keyway. The button can be used with the two-part stem of Figs. 1-4 or

5

can be used with a solid stem, as shown in Fig. 8, wherein a groove 52 is provided in the stem and is closed by a sleeve 53 having apertures 27b and 27c arranged to overlie the groove and form a dispensing passage therein. If desired, the top of the button 50 and the closed end of the sleeve on the stem can be provided with indicia 53, 54 to disclose the location of the aperture in the button with respect to the passage in the stem in sealed or dispensing position.

In all forms of the invention a dip tube 55 is connected to the lower end of the measuring chamber in order to conduct the liquid from the container to the measuring chamber. Preferably, the bottom of the dip tube is sealed off, as shown in Figs. 13 and 14, and is provided with a small aperture 56 which retards the flow of the liquid from the bottom of the tube and prevents gas from inadvertently passing into the tube to displace liquid in the tube.

Intstead of using the folded wall of the outer stem as a sealing means for the stem as shown in Fig. 1, the present invention provides another form of sealing means for the container 10 wherein the inner member 63 is provided with a flared bell-shaped mouth 64 and is adapted to receive the outer member 65, as shown in Figs. 15 and 16, with the mouth spaced radially from the outer member and forming an abutment 66 engaging the undersurface of the outer valve disk 13 to seal the same. This form of seal is particularly effective when used in connection with powder or powdered aerosols since it permits an aperture 67 in the wall of the outer member through which the powder passes to be located below the disk and to be exposed as soon as the seal is broken at the belled mouth so that the aerosol will propel the powder through the tubular outer member 65 of the stem and through the dispensing button 31.

As shown in Fig. 15, the stem is employed in a non-metering valve, and as shown in Fig. 16 the stem is employed in a metering valve. It will be noted that the outer stem member 65 is provided with a shoulder 66 adjacent the outer face of the valve disk 13 which causes said valve disk to move inwardly a limited amount before the disk flexes and the seal is broken. This enables an accurate control of the dispensing, and particularly where a measuring chamber 12 is involved for metering the contents of the container, it permits the bottom seal to be completed at the inner valve disk 14 prior to the opening of the seal at the outer valve disk 13.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first disk to seal the container and a portion at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem comprises an inner and outer tubular member, each having a closed inner end, the

6

other end of the inner member being sealingly secured to the inner end of the outer member and wherein the means cooperating with the second valve disk comprises a portion of reduced diameter on the inner member adapted to be normally disposed in the bore thereof and connect the chamber with the container and to be moved out of the bore when the stem is moved to dispensing position.

2. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber and a valve stem mounted for reciprocation in said chamber to control passage of fluid from the container to the chamber and to dispense the measured charge from the chamber, and means for mounting the valve means on said container, the improvement wherein the means for mounting the valve means on the container comprises a neck portion of the container and an outwardly extending annular flange on the outer end of the measuring chamber having a rearwardly extending flange at the edge thereof adapted to be forced-fit into said neck.

3. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber and a valve stem mounted for reciprocation in said chamber to control passage of fluid from the container to the chamber and to dispense the measured charge from the chamber, and means for mounting the valve means on said container, the improvement wherein the means for mounting the valve means on the container comprises a neck portion of the container having a shoulder in predetermined location therein and an outwardly extending annular flange on the outer end of the measuring chamber having a rearwardly extending flange at the edge thereof adapted to be forced-fit into said neck with the shoulder limiting the insertion of the annular flange into the neck.

4. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber and a valve stem mounted for reciprocation in said chamber to control passage of fluid from the container to the chamber and to dispense the measured charge from the chamber, and means for mounting the valve means on said container, the improvement wherein the container has an open mouth and an annular shoulder on the container adjacent the open mouth and the means for mounting the valve means on the container comprises an annular flange on the chamber engaging a sealing ring disposed on the mouth of the container and extending under a first valve disk and a stepped skirt having a shoulder engaging the flange with the edge of the skirt gripping the annular shoulder on the container.

5. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber and a valve stem mounted for reciprocation in said chamber to control passage of fluid from the container to the chamber and to dispense the measured charge from the chamber, and means for mounting the valve means on said container, the improvement wherein the measuring chamber is of substantially larger diameter than the stem and wherein a control plate is disposed between the end of the chamber and a first sealing disk to control flexing of the portion of the disk overlying the end of the chamber.

6. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a first combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first disk to seal the container and a portion

7

at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and said stem having a sealing abutment, said sealing abutment comprising an annular fold in the wall of the outer member projecting radially and forming a shoulder to engage the first valve disk in sealing position of the stem and form a seal therewith.

7. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a first combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first disk to seal the container and a portion at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and said stem having a sealing abutment, said sealing abutment comprising a bell-shaped mouth on the inner member adapted to engage the first valve disk in sealing position of the stem and form a seal therewith.

8. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a first combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first disk to seal the container and a portion at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem is adapted to be moved to an innermost filling position and comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and

8

wherein the outer member has a bypass recess in the wall thereof and said inner member having spaced apertures in the wall thereof, said bypass recess being adapted to be located within the bore of the first sealing disk and said spaced apertures being adapted to be located on opposite sides of said second valve disk when the stem is in filling position to bypass said second disk.

9. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a first combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first disk to seal the container and a portion at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem is adapted to be moved to an innermost filling position and comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and wherein the outer member has an aperture in the side wall normally located outside of the measuring chamber and adapted to be moved into communication with said chamber in dispensing position of said stem to permit fluid in said chamber to pass therethrough and along the upper tubular member and dispensed from said chamber, and has an annular bypass recess in the wall thereof spaced outwardly from said aperture along the stem and said inner member having means cooperating with the second valve disk comprising a flattened wall portion of the inner member adapted to be normally disposed in the bore of said second valve disk and connect the chamber with the container and to be moved out of the bore when the stem is moved to dispensing position and having spaced apertures in the wall located outwardly along the stem from said flattened wall, said annular recess being adapted to be located within the bore of the first sealing disk and said spaced apertures being adapted to be located on opposite sides of said second seal when the stem is in filling position.

10. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber and a valve stem mounted for reciprocation in said chamber to control passage of fluid from the container to the chamber and to dispense the measured charge from the chamber, and means for mounting the valve means on said container, the improvement wherein said stem comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and the outer member having an aperture in the side wall normally located outside of the measuring chamber and adapted to be moved into communication with said chamber in dispensing position of said stem to permit fluid in said chamber to pass therethrough and along the outer tubular member and dispensed from said chamber.

11. In a valve means for controlling the discharge of a measured amount of fluid under pressure from a container having a tubular measuring chamber, a first combined resilient sealing gasket and first valve disk having a bore mounted at the outer end of the chamber and a second

resilient valve disk having a bore mounted adjacent the inner end of the chamber, a valve stem mounted in said chamber and having portions extending through the bores in the valve disks and a sealing portion cooperating with the first valve disk to seal the container and a portion at the inner end passing through the second valve disk and having means to control passage of fluid from the container to the chamber, and means urging the stem into sealing position, movement of said stem against the urging means a predetermined distance from normal sealing position to a dispensing position causing said sealing portion to be moved out of sealing relation with the first valve disk and causing the stem to cooperate with the second valve disk to seal the chamber from the container prior to the breaking of the seal at the first valve disk, thereby dispensing only the fluid in the measuring chamber, the improvement wherein said stem comprises inner and outer tubular members, each having a closed inner end, the open end of the inner member being sealingly secured to the inner end of the outer member and the outer member having an aperture in the side wall normally located outside of the measuring chamber and adapted to be moved into communication with said chamber in dispensing position of said stem to permit fluid in said chamber to pass therethrough and along the outer tubular member and dispensed from said chamber.

12. A valve stem for use in a metering valve for fluids and having a measuring chamber provided with an inner and an outer valve disk having stem-receiving bores therein comprising an inner and an outer tubular member, each having a closed inner end and an open outer end, the inner end of the outer member being forced-fit into the open end of the inner member, the outer member having an aperture in the wall thereof adapted to be normally located outwardly of the outer valve disk and to be moved into the chamber in dispensing position to dispense fluid therefrom, and the inner member having a flattened wall portion adjacent the inner end thereof adapted to be normally located in the bore in the inner valve disk and to be moved out of said bore when the stem is moved to dispensing position whereby said stem seals the bore in said inner valve disk.

13. A valve stem for use in a metering valve for fluids and having a measuring chamber provided with an inner and an outer valve disk having stem-receiving bores therein comprising an inner and an outer tubular member, each having a closed inner end and an open outer end, the inner end of the outer member being forced-fit into the open end of the inner member, the outer member having an aperture in the wall thereof adapted to be normally located outwardly of the outer valve disk and to be moved into the chamber in dispensing position to dispense fluid therefrom, and the inner member having a flattened wall portion adjacent the inner end thereof adapted to be normally located in the bore in the inner valve disk and to be moved out of said bore when the stem is moved to dispensing position whereby said stem seals the bore in said inner valve disk, said inner and outer members having bypass means located in predetermined relation therein

adapted to bypass said inner and outer valve disks in filling position of said stem.

14. A valve stem for use in a metering valve for fluids and having a measuring chamber provided with an inner and an outer valve disk comprising inner and outer tubular members, each having a closed inner end and an open outer end, the inner end of the outer member being of reduced diameter and being adapted to be forced fit into the open end of the inner member, the outer member having an annular projecting fold adjacent the portion of reduced diameter and adapted to engage the outer valve disk to form a seal therewith and an aperture in the wall thereof spaced outwardly along the stem and adapted to be normally located outwardly of the outer valve disk and to be moved into the chamber in dispensing position to dispense fluid therefrom, and the inner member having a flattened wall portion adjacent the inner end thereof adapted to be normally located in a bore in the inner valve disk and to be moved out of said bore when the stem is moved to dispensing position whereby said stem seals the bore in said inner valve disk.

15. In a valve for use on a container having fluid under pressure, said valve having a reciprocating valve stem provided with a passage therein and a dispensing button on the outer end thereof having a dispensing aperture therein, the improvement wherein said button is rotatable on said stem from a sealing position in which the aperture is out of communication with said passage to a dispensing position in which the aperture communicates with said passage to dispense.

16. The invention as defined in claim 15 wherein means is provided on the stem and button to indicate the rotative position of the button on the stem.

17. In a valve for use on a container having fluid under pressure, said valve having a reciprocating valve stem provided with a passage therein and a dispensing button on the outer end thereof having a dispensing aperture therein, the improvement wherein said button has a bore to receive said stem and a recess in said bore and said stem has an outwardly projecting portion adapted to snap into said recess and hold the button in position thereon.

18. In an aerosol device comprising a container having means including a measuring chamber for dispensing a predetermined quantity of fluid under predetermined gas pressure therefrom, and a dip tube having one end connected to the chamber and the other end extending into the container to conduct fluid to the chamber, the improvement wherein said other end of said tube is provided with a restricted opening to prevent gas from passing to the chamber to displace the fluid therein whereby fluid is retained in said chamber to insure accurate quantities being dispensed therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

2,667,991	Boyer	Feb. 2, 1950
2,693,983	Howell	Nov. 9, 1954
2,721,010	Meshberg	Oct. 18, 1955