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METERING VALVE ASSEMBLY FOR USE WITH PRESSURIZED CONTAINERS HAVING AN INSOLUBLE PROPELLANT

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FIG. 2

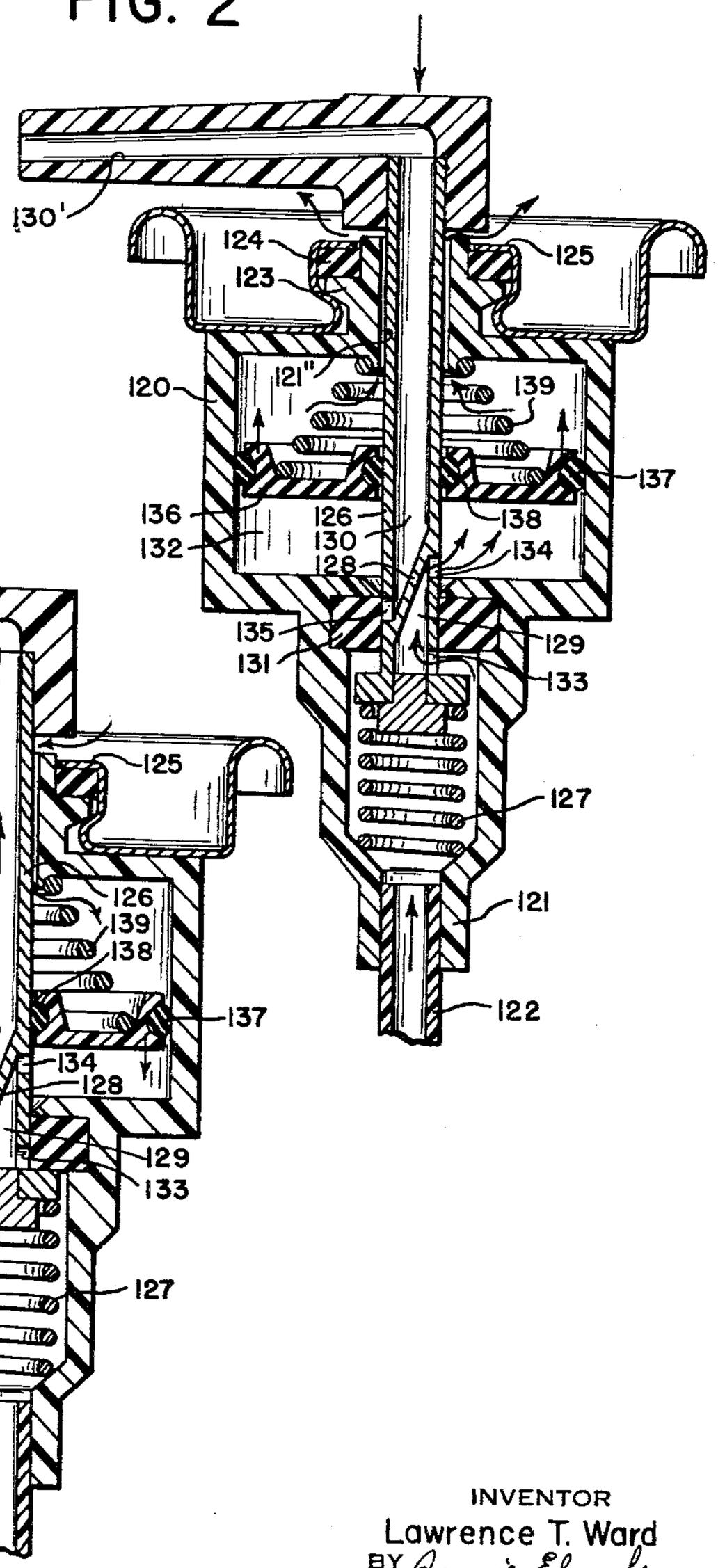

FIG. 1

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METERING VALVE ASSEMBLY FOR USE WITH PRESSURIZED CONTAINERS HAVING AN INSOLUBLE PROPELLANT

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Original application Sept. 27, 1961, Ser. No. 141,077, now Patent No. 3,138,301, dated June 23, 1964. Divided and this application Apr. 21, 1964, Ser. No. 361,358

1 Claim. (Cl. 222—335)

This invention relates to a metering valve assembly and more particularly to a metering valve assembly for use with pressurized containers having a gaseous propellant and having hollow stem depressible type discharge valves. This application is a division of my co-pending application Serial No. 141,077, now Patent No. 3,138,301 filed September 27, 1961 which, in turn, is a continuation-in-part of application Serial No. 115,776, now abandoned filed by me on June 8, 1961.

Metering valve assemblies have heretofore been used with aerosol type containers wherein the propellant is soluble in the goods to be propelled or ejected from the container. Containers filled with goods, such as deodorant, perfume, etc., have used Freon as a propellant or other derivatives of fluorine which are readily soluble in the goods to be ejected and which are ejected along with the goods in order to aerate them. Freon or other fluorine derivative propellants, however, are often unsuitable for use with many goods, such as food products, medicinal products, or in instances where fluorine may be toxic to the user. Another propellant used has been carbon dioxide which, while not toxic, often reacts with food products to vary their taste. It is desirable, therefore, that a relatively inert propellant be used which is not toxic and which will not react with the goods to be ejected from the container. Such an inert propellant, which is adaptable for use in pressurized containers is nitrogen where it will not react with the product to be propelled. This propellant is for the most part relatively insoluble in the goods to be ejected from the container and is used essentially as a pressure source to push the goods from the container up through a siphon tube into a discharge valve.

It is often desirable that a predetermined amount of goods be ejected from a pressurized container upon each application of the discharge valve. This is particularly true wherein the goods are to be mixed with a liquid in order to make a flavored beverage of constant strength or, where medicinal products are used and uniform dosage is desired. It is therefore an object of this invention to provide for a metered valve assembly which may be used to accurately meter goods ejected from a pressurized container having a relatively non-soluble gaseous propellant.

In some applications it is desirable that the complete valve assembly be positioned within the pressurized container utilizing a single integral valve housing. It is, therefore, a further object of my invention to provide for a valve construction which utilizes a single valve housing and which may be easily positioned within a pressurized container.

Broadly, a metering valve assembly constructed according to my invention comprises a valve housing adapted to be fitted into a pressurized container. A hollow depressible valve stem is positioned in the housing and has springs associated therewith for urging the stem outwardly of the housing. The housing has an inlet communicating with the interior of the container and a seal means sealingly surrounding the stem. The stem itself has an upper portion and a lower portion separated by a divider to form an outlet passage and an inlet passage. A port in the side wall of the upper portion of the stem is normally in communication with a metering chamber contained in the valve housing and is adapted to be sealed by the seal means when the stem is depressed by outside forces. A first port is included in the side wall of the stem in the lower portion and is normally closed by the seal. A second port also in the side wall of the lower portion is positioned above the first port and is always opened to the metering chamber. In addition, the metering chamber contains a spring biased plunger which forms a movable side wall of the chamber to force goods in the chamber to atmosphere out through the upper portion of the valve stem when the port in the upper portion is open to the chamber.

Referring to the drawings in which a preferred embodiment is shown,

FIG. 1 is a cross-sectional view of a valve assembly with the contents of a container being ejected therethrough; and,

FIG. 2 is a view similar to FIG. 1 illustrating flow into the metering chamber when the valve assembly is actuated.

Referring to FIG. 1 in greater detail, there is illustrated a metering discharge valve for use with an insoluble propellant wherein the complete valve assembly is contained within the pressurized container. The valve there illustrated comprises a valve housing **120** having at the bottom thereof a siphon tube receiving section **121** through which a siphon tube **122** may extend. The top of the housing **120** has a shoulder **123** which supports a seal **124** over which a portion **125** of the container is turned to seal the housing with respect to the container. A hollow depressible valve stem **126** extends through the valve housing and is biased upwardly by means of a spring **127**. An inner wall **128** of the valve stem separates the stem into a lower segment **129** and an upper segment **130**. A seal **131** grips the side walls of the stem and separates the interior of the pressurized container from the interior of the valve housing comprising the metering chamber **132**. The stem **130** has two parts **133** and **134** in the lower segment thereof so positioned that the bottom port **133** is closed by the seal **131** when the stem is in its upper or normal position. A third port **135** is contained in the stem above separating wall **128** and is so positioned that when the stem is depressed, it will be closed by seal **131**. One side wall of the metering chamber **132** comprises a movable piston **136** having O-ring seals **137** and **138** which is biased downwardly by means of a spring **139**. In addition, the housing **121** has a vent **121''** cut in the upper portion of the housing in order to provide an air passage to the space behind piston **136**.

The operation of the device shown in FIGS. 1 and 2 is as follows. As the valve stem is depressed as shown in FIG. 2, the goods in the container will be forced up the siphon tube **122** into the portion of the housing containing spring **127**. The goods will then flow through the port **133** into the lower segment of the stem and out through the port **134** into the metering chamber where the piston **136** will be moved in an upward direction against the force of the spring **139**. When the outside force is released as shown in FIG. 1, spring **127** will move the stem **130** in an upward direction so closing port **133** while opening port **135**. The spring **139** will then force the goods in the metering chamber outwardly through the port **135** and so out the upper segment of the stem **130** out through the discharge nozzle **130'**.

I claim:

A metering valve assembly for use with a pressurized container having an insoluble propellant, said assembly comprising; a housing, a hollow tubular depressible valve stem slidable in said housing, a wall element in said stem separating said stem into upper and lower segments, a

seal in said housing slidably engaging the sides of said stem and dividing said housing into a metering chamber section and a receiving section, a first resilient means in said receiving section urging said stem outwardly of said housing, a first port in said stem in said lower segments normally covered by said seal and uncovered when said stem is depressed to allow flow of goods into said lower segment from said receiving station, a second port in said lower segment communicating with said metering chamber, a third port in upper segment so positioned that it is normally open to said metering chamber and is covered by said seal when stem is depressed, and a movable side wall in said metering chamber urged by second resilient

means to decrease the size of said chamber; goods flowing into said chamber through said first and second ports when said stem is depressed under pressure of an insoluble propellant to increase the size of said chamber and goods being forced out said chamber through said third port and siad upper segment by said movable wall under force of said second resilient means when said stem moves outwardly of said housing under force of said first resilient means.

No references cited.

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