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VALVE CONSTRUCTIONS FOR AEROSOL CONTAINERS

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FIG. 1

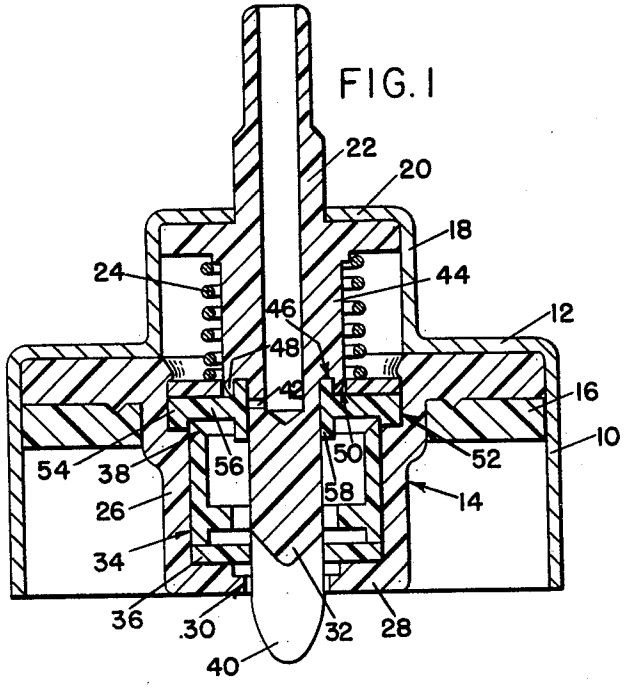
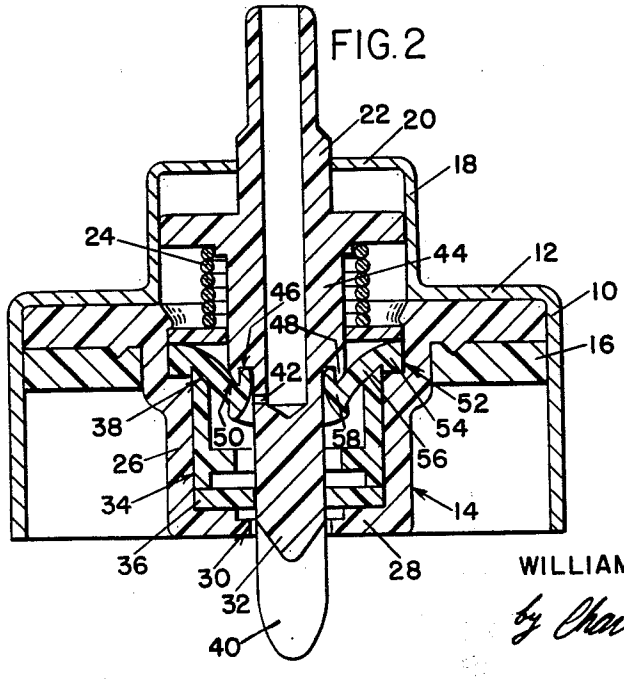


FIG. 2



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VALVE CONSTRUCTIONS FOR AEROSOL CONTAINERS

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This invention relates to a new and improved valve construction for aerosol containers. One of the main problems involved in devices of this nature resides in the provision of tight efficient sealing gaskets particularly with relation to the connection between the tank gasket and the valve stem. The valve stem must be easily movable in order to release the metered amount of material that is desired to be dispensed but at the same time the seal cannot be so tight as to cause the valve to stick. The valve must be movable easily to uncover the exit port in the valve stem to provide communication to the metering chamber in order to provide for the useful actuation of the device.

It is the primary object of the present invention to provide a new and improved valve construction for aerosols wherein the valve stem is easily and positively movable to a position to open the valve stem exit port to the metering chamber but at the same time providing for a positive seal against the escape of any of the material under pressure between the valve stem and the tank gasket therefor.

The invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly set forth in the appended claims.

Reference is to be had to the accompanying drawings, in which

FIG. 1 is a section through the construction illustrating the same in closed position; and

FIG. 2 is a similar view showing the parts in open position.

In carrying out the invention, there is a ferrule **10** which is adapted by means of its inwardly directed annular flange **12** to hold the tank generally indicated at **14** and the body or sealing gasket **16** in position on the mouth of the aerosol container which may be of any usual construction. The ferrule may extend upwardly in cylindrical form at **18** and again inwardly in a flange **20**, the flange **20** being apertured centrally thereof to provide for reception of the valve stem **22**. The valve stem is held in its closed position by means of the spring **24** which allows motion of the valve stem to the open position of FIG. 2, returning the valve to the FIG. 1 position when the valve stem is released.

The tank **14** is provided with a cylindrical portion at **26** and it has a bottom member or wall **28** which is centrally apertured as at **30** to receive the lower or inner portion **32** of the valve stem. The portion of the tank at **26** provides for a metering chamber which in this case is formed by means of an inserted plug generally indicated at **34**. By using a different plug with a different volume, the metering chamber volume itself may be changed. The plug **34** is in the form of an upright cylinder and it rests at its lower edge upon a stem gasket **36** and at its upper edge it is provided with an inwardly directed bevel **38** for a purpose to be described.

The lower portion **32** of the valve stem has a slot **40** which provides communication of the metering chamber with the aerosol container when the valve is in its closed position as in FIG. 1. When the valve stem is depressed to the FIG. 2 position, this slot is completely closed off from the metering chamber so that only the contents of the metering chamber can escape through the exit port **42** of the valve stem.

The upper portion of the valve stem which is indicated

at **44** is enlarged with relation to the lower portion at **32** and is provided with a downwardly opening annular groove **46** which forms a downwardly extending annular ring **48**. This downwardly extending annular ring is beveled at its outermost surface as indicated at **50** for a purpose to be described.

The tank is provided with an inwardly directed recess **52** in which may be mounted an outermost rim portion **54** of a gasket **56** which is referred to as the "tank" gasket. This tank gasket extends inwardly from the rim **54** just over the upper edge of the beveled portion at the top edge of the plug **34** and is provided at its central portion with a cylindrical portion **58** having an upstanding edge which is received in the groove **46** in the widened portion of the valve stem. This cylindrical portion **58** also extends downwardly and it will be seen in FIG. 1 that a very good seal is provided with the valve stem and that the exit port at **42** is completely closed off from the metering chamber by the cylindrical portion **58** of the gasket **56**.

Now when it is desired to discharge the amount of material in the metering chamber, the valve stem **22** is pushed inwardly to the FIG. 2 position and this closes the aerosol container with respect to the metering chamber as above described, but at the same time due to the positive mechanical interconnection between the tank gasket and the valve stem, the tank gasket is deformed and the cylindrical portion **58** is spread out or flared at its lower portion. The tank gasket in general assumes the shape shown in FIG. 2 wherein the under surface thereof rests generally on the beveled portion of the plug **34** and the beveled portion at **50** of the downwardly extending rim **48** on the valve stem comes in general contact with the upper surface of the gasket **56**. These bevels at **38** and **50** provide room for the gasket to become distorted and somewhat centrally elongated and also they avoid sharp edges which might otherwise cut into the material of the gasket which necessarily has to be resilient and stretchable.

In any event it will be seen in FIG. 2 that the exit port **42** is uncovered to form a communication between the metering chamber and the interior of the valve stem, and since the metering chamber is cut off from the interior of the aerosol, only the contents of the metering chamber are allowed to escape through the valve stem.

When pressure is relieved from the valve stem, the same will of course return to its original position as shown in FIG. 1 under influence of the spring and also under the influence of the inherent resiliency provided by the gasket **56**, and in some cases the spring **24** could even be omitted. There is little or no sliding friction between the valve stem and the tank gasket, these members being at all times mechanically connected together as stated providing for the interaction of the parts as above described.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A metering valve construction for an aerosol container comprising a tank member, means holding the tank member in position on the aerosol container, means forming a metering chamber in said tank, a valve stem, means supporting said valve stem for motion between two positions to fill the metering chamber and selectively to cause discharge of the metering chamber, an exit port in said valve stem, means in said valve stem normally providing communication between the interior of the aerosol and the metering chamber but preventing such communication when the valve stem is in metering chamber discharge position, a tank gasket, said tank gasket having an enlarged portion surrounding the valve stem

and normally closing the exit port, said enlarged portion comprising a cylindrical sleeve or like member surrounding the portion of the valve containing the lateral port, said sleeve-like member extending above and below the main body of the gasket, the portion of the sleeve-like member extending above the gasket being engaged in a mating, annular, cylindrical recess in the valve stem. means on said valve stem engaging the enlarged portion of the tank gasket whereby the tank gasket is movable and distorted by the valve stem as the valve stem is moved inwardly with relation to the metering chamber to discharge position, said valve stem extending generally through the tank gasket, the enlarged portion of said tank gasket being distorted and flared by said valve stem in the motion thereof inwardly, said distortion opening said exit port to the metering chamber for the discharge of the contents of the metering chamber out through the exit port.

2. A metering valve construction for an aerosol container comprising a tank member, means for holding the tank member in position on the aerosol container, means forming a metering chamber in said tank, a valve stem, means supporting said valve stem for motion between metering chamber discharging and filling positions, an exit port in said valve stem, means in said valve stem normally providing communication between the interior of the aerosol and the metering chamber and preventing such communication when the valve stem is in metering chamber discharge position, a gasket for the tank, said tank gasket having a central opening, there being a cylindrical member on the gasket surrounding the opening and the valve stem and normally closing the exit port, the cylindrical member on the gasket extending above and below the main body of the gasket, the portion thereof extending above the main body of the gasket being engaged in a mating, cylindrical recess in the valve stem, whereby the cylindrical portion of the tank gasket is distorted and flared out by the valve stem as the valve stem is moved inwardly with relation to the metering chamber opening the exit port, and means holding the tank gasket in fixed position at certain parts thereof, said tank gasket being otherwise distorted and stretched by said valve stem in the motion thereof inwardly.

3. Valve construction for aerosols and the like comprising an aerosol container, a tank, means to hold the tank in cooperative position with respect to said aerosol container, means forming a metering chamber in the tank, a movable valve stem having a portion extending through a wall of the tank, means to provide communication between the metering chamber and the aerosol container to fill the metering chamber when the valve stem is in normal valve closed i.e. metering chamber filling position, means closing said communicating means when the valve stem is in the valve open i.e. metering chamber discharge position, an exit port in said valve stem, a tank gasket, means holding the tank gasket at the periphery thereof, interengaging means on said valve stem and said tank gasket adjacent the central portion thereof, the valve stem extending through the tank gasket, said exit port coinciding with a portion of the tank gasket adjacent said interengaging means, said interengaging means being capable of extending and distorting a part of the tank gasket to open said exit port with respect to said metering chamber when the valve stem is in its metering chamber discharge open position and the aerosol container is cut off from communication with the metering chamber, said interengaging means including a cylindrical portion on said tank gasket and an annular groove on said valve stem, said cylindrical portion having an edge arranged in said groove and another portion of said cylindrical portion being free but arranged in close association with said valve stem in the metering chamber filling position of the valve, and said tank gasket being distorted so that said free portion of the tank gasket is forced outwardly flaring away from the portion of the valve stem that it normally covered, the exit port being located in this portion of said valve stem.

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