Nov. 5, 1968 R. S. SCHENK 3,409,180

PRESSURIZED CARTRIDGE FOR AEROSOL DISPENSER

Filed May 29, 1967

FIG. 1.

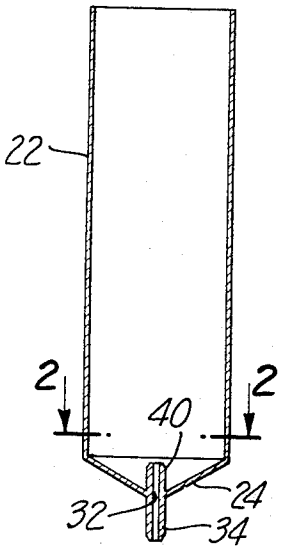


FIG. 3.

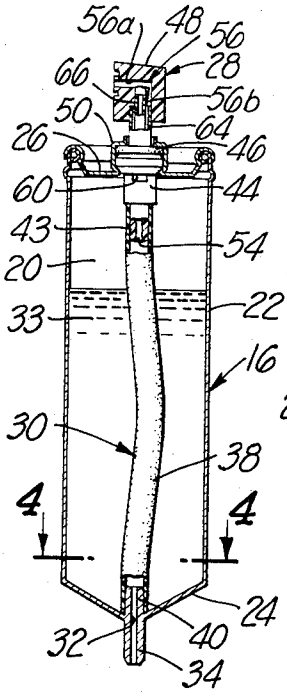


FIG. 5.

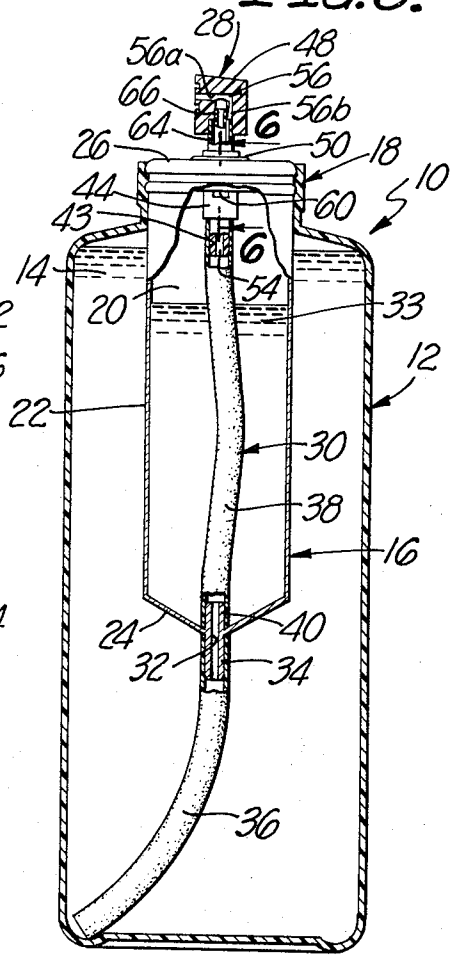


FIG. 2.

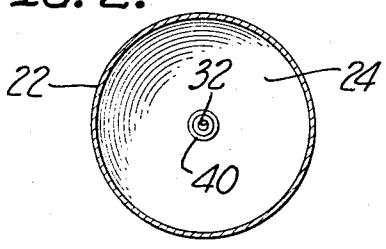


FIG. 4.

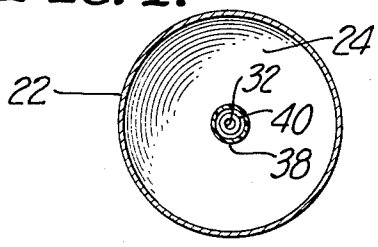
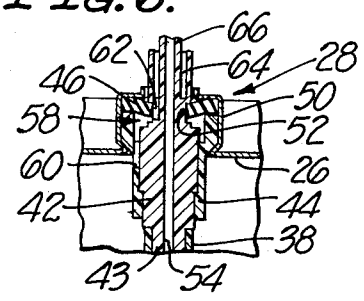


FIG. 6.



INVENTOR

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PRESSURIZED CARTRIDGE FOR AEROSOL DISPENSER

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1 Claim. (Cl. 222—193)

ABSTRACT OF THE DISCLOSURE

A valve controlled, pressurized fluid-containing cartridge for drawing a commodity from a container and for dispensing the commodity through a valve. The cartridge includes internal and external tubular projections which permit the separate airtight connection of inner and outer tubes thereto for directing the commodity from the container and through the cartridge without leakage of fluid from the cartridge into the container.

The present invention relates to aerosol dispensers and, more particularly, to an improved pressurized, fluid-containing cartridge for dispensing a commodity from a container preferably as a spray.

Commercially available aerosol dispensers commonly comprise a container having a fluid or powdered commodity therein under pressure, a valve for dispensing the commodity from the container, and a nozzle for directing the dispensing of the commodity on or at predetermined articles or portions of the body. To maintain the commodity under pressure, it is necessary that the aerosol container be sturdy and airtight. For this reason, aerosol containers presently take the form of rigid metal cylinders. Great care is exercised during manufacture of the metal cylinders to insure that they are truly airtight and that the pressurized commodity will not leak around the valves contained therein. Because of the care required in manufacture and the use of relatively rigid materials, conventional aerosol dispensers are rather expensive packages.

Recent improvements have reduced the production costs of aerosol dispensers. These improvements include a relatively small, pressurized fluid-propellant-containing cartridge which eliminates the need for sturdy, airtight construction of aerosol containers. The pressurized cartridge includes a metal cylinder filled with a fluid propellant under pressure, such as Freon. A valve having a dispensing nozzle thereon is stationed at a top of the cylinder and a tube extends from the valve through the cylinder. The cylinder is designed for mounting in a container storing a liquid or powdered commodity for dispensing the commodity upon operation of the valve. In particular, operation of the valve releases pressurized fluid propellant (Freon gas) from the cylinder over the end of the tube to draw the commodity from the container through the nozzle.

Such operation of the pressurized cartridge does not require that the container be of an airtight construction. Therefore, the pressurized cartridge allows aerosol containers to be formed of nonrigid and permeable materials and permits elimination of the expensive airtight seal-forming steps from their manufacture.

Although the pressurized cartridge represents a substantial improvement in aerosol spray dispensers, leakage

of the pressurized fluid from such cartridges and into their associated aerosol containers has proved to be a serious problem. In particular, great difficulty has been encountered in developing an effective, inexpensive and long lasting seal between the tube and the cylinder of the cartridge at the point where the tube extends through the cylinder. Various forms of such sealing arrangements have been proposed to solve the leakage problem but without success.

Accordingly, it is an object of the present invention to provide an improved pressurized fluid-containing cartridge for drawing a commodity from a container into the cartridge and for dispensing the commodity therefrom without leakage of fluid from the cartridge into the container.

Another object of the present invention is to provide a pressurized cartridge of the foregoing character including a simple, inexpensive and effective sealing arrangement between the cartridge and the entrance for the commodity into the cartridge which prevents leakage of the high pressure fluid from the cartridge into the container.

A further object of the present invention is to provide a pressurized cartridge of the foregoing character wherein the sealing arrangement comprises internal and external tubular projections which permit the separate airtight connection of inner and outer tubes thereto for directing the commodity from the container and through the cartridge without leakage of high pressure fluid from the cartridge into the container.

It is still another object of the present invention to provide an improved aerosol dispenser including a pressurized cartridge of the foregoing character.

The foregoing, as well as other objects and advantages of the present invention, may be more clearly understood by reference to the following detailed description when considered with the drawing, which, by way of example only, illustrates one form of pressurized fluid-containing cartridge and aerosol dispenser including the features of the present invention.

In the drawing:

FIG. 1 is a sectional side view of a cylinder main body portion of the pressurized cartridge;

FIG. 2 is a sectional top view taken along the line 2—2 at FIG. 1;

FIG. 3 is a sectional side view of the pressurized cartridge with the fluid propellant contained therein;

FIG. 4 is a sectional top view taken along line 4—4 in FIG. 3;

FIG. 5 is a sectional side view of an aerosol dispenser including the pressurized cartridge of FIG. 3; and

FIG. 6 is a fragmentary sectional view taken along line 6—6 in FIG. 5, illustrating the inner construction of the valve included in the pressurized cartridge.

In the drawing, the aerosol dispenser is represented by the numeral **10** and includes a container **12** having a liquid or powdered commodity **14** stored therein. A metal, pressurized fluid-propellant-containing cartridge **16** extends downwardly through a neck portion **18** of the container **12** and into the commodity **14**.

Generally speaking, the cartridge **16** includes a pressurized fluid-filled chamber **20** defined by a hollow cylinder **22** having a funnel-shaped bottom **24** and a closed top **26** supporting a valve assembly **28**. Tubular integral means **30** project upwardly from the inside of the chamber **20** around a side port **32** in the funnel-shaped bottom **24** and connect to the valve assembly **28**.

In operation, the valve assembly **28** functions to selectively pass pressurized fluid **33**, such as Freon from the cylinder **22** over the upper end of the tubular means **30**. As this occurs, a suction is created in the tubular means **30** which draws a portion of the commodity **14** from the container **12** upwardly through the tubular means and valve assembly where it combines with the pressurized fluid and exits from the dispenser as a stream, foam, or spray.

More particularly, in the illustrated form of the pressurized cartridge **16** (FIGS. 1–5), the neck portion of the funnel-shaped bottom **24** defines an external tubular projection **34** from the cylinder **22** around the side port **32**. The projection **34** is designed to fit tightly within the upper end of a flexible plastic tube **36** which in turn is adapted to extend into a bottom portion of the container **12** when the cartridge **16** is seated in the neck **18** (see FIG. 5). Thus, during operation of the cartridge **16**, the commodity is drawn by the tube **36** from the bottom of the container upwardly into the tubular means **30** and hence through the valve assembly **28**.

In the preferred form of the cartridge **16**, the tubular means **30** comprises a flexible radially compressible tube **38** and an internal tubular projection **40** from the top surface of the funnel-shaped bottom **24** around the side port **32**. The internal projection **40** is adapted to fit snuggly into an open lower end of the tube **38**. Thus positoned, the high pressure fluid **33** acts on the tube **38** to press the tube tightly against the projection **40**, thereby creating an airtight seal which prevents leakage of the high pressure fluid from the bottom of the cylinder **22** and into the container **16**.

A similar airtight seal is developed between the upper end of the tube **38** and the valve assembly **28** to prevent undesired leakage of the fluid **33** through the valve assembly to atmosphere. In this regard, the valve assembly **28** comprises a slidable valve body **42**, a valve body support sleeve **44**, a resilient disc **46**, and a nozzle **48**. The support sleeve **44** is fixedly seated within a collar **50** formed in the top **26** of the cylinder **22** and bears upwardly against an outer annular portion of the lower surface of the disc **46**. The disc **46**, in turn, is captured between the top of the sleeve **44** and the top of the collar **50** and includes a central opening **52** for tightly receiving the valve body **42**. The valve body **42** is supported for sliding movement by the sleeve **44** with a lower end portion **43** of reduced radial dimension extending downwardly therefrom and into the upper open end of the tube **38**. The pressure of the fluid **33** in the chamber **20** causes the tube **38** to press tightly around the lower end portion **43**, thereby creating an airtight seal between the tube and the valve assembly **28** which prevents leakage of the fluid into and through a commodity inlet port **54** to atmosphere.

As illustrated most clearly in FIG. 6, the commodity inlet port **54** extends upwardly through the valve body **42** and into the horizontal leg **56***a* of an inverted L-shaped outlet port **56** in the nozzle **48**, the nozzle being seated on the top of the valve body. The outlet port **56** is open to atmosphere at its outer end and in addition to the leg **56***a* includes a vertical leg **56***b* which connects to a high pressure fluid inlet port **58** upstream of the connection to inlet port **54** to horizontal leg **56***a*.

Still referring to FIG. 6, the fluid inlet port **58** comprises a slot **60** in the valve body support sleeve **44** open to the inside of the chamber **20**, the interior of the sleeve **44** within the collar **50**, a small hole **62** in the valve body **42**, and an annular passageway **64** connecting to the vertical leg **56***b* of outlet port **56** at the rear of a central tubular stem **66** defining an upper end of the inlet port **54**. Accordingly, in the inlet port **58**, high pressure fluid **33** passes through the slot **60** into the main body of the sleeve **44** and upwardly through the small hole **62** into the annular passageway **64** and hence to the outlet port **56**. Upon entering the outlet port **56**, the high pressure fluid travels over the top of the junction of the inlet port **54** and outlet port **56** and creates a suction which draws some of the commodity **14** upwardly through the tubes **36** and **38**, and inlet port **54** into the outlet port **56**. In the outlet port **56**, the commodity mixes with the fluid **33** and is dispensed from the nozzle **48**.

Normally, the resilient disc **46** covers the hole **62** and functions to force the valve body **42** to an upward position within the support sleeve **44** (the slide valve body **42** being shown in a downward position with the inlet port **58** open in FIG. 6). Accordingly, the inlet port **58** is normally blocked and the commodity **14** is not dispensed from the container **12**. Then, when it is desired to dispense a predetermined amount of the commodity, the end of the outlet port **56** is directed at the article or portion of the body to receive the commodity and a downward force is exerted on the nozzle **48**. The downward force moves the valve body **42** downwardly within the support sleeve **44**, causing the resilient disc **46** to bow downwardly as illustrated in FIG. 6. As this occurs, the small hole **62** is opened and high pressure fluid **33** escapes from the chamber **20** through the inlet port **58** and into the outlet port **56** to dispense the commodity **14** in the manner just described. Upon a release of nozzle **48**, the disc **46** forces the valve body **42** upwardly to its normal position and again seals the opening **62** to block the inlet port **58** and terminate the dispensing of the commodity.

During operation of the dispenser **10**, the high pressure fluid **33** within the chamber **20** continues to exert pressure on the tube **38** to maintain the airtight seals between the tube and the valve assembly **28** and internal projection **40**. Accordingly, despite the release of the high pressure fluid from the chamber **20**, the fluid is prevented from leaking into the container **12** or into the commodity inlet port **54**.

From the foregoing, it is appreciated that the combination of the internal tubular projection **40** and radially-compressible tube **38** provides a simple, yet completely effective, seal which economically overcomes the leakage problems of prior pressurized cartridges designed for use in aerosol spray dispensers.

While the pressurized cartridge has been shown as being mounted in a container, it should be appreciated that the cartridge is useable for dispensing commodities from various types of receptacles by merely inserting the lower end of tube **36** into the commodity in the receptacle, an example being a can of paint for spray painting.

While a particular form of pressurized fluid-containing cartridge and aerosol dispenser has been described in some detail herein, changes and modifications may be made therein without departing from the spirit of the invention. It is therefore intended that the present invention be limited in scope only by the terms of the following claim.

I claim:

1. A pressurized fluid containing cartridge for mounting in a container and for dispensing a commodity therefrom, said cartridge comprising:

(a) a hollow body defining a pressurized fluid chamber, said body having side and bottom walls with an open top, a port in the bottom wall and opening into said container when said cartridge is mounted therein;

(b) a pressurized propellant in said chamber;

(c) a first tubular sleeve integral with and projecting inwardly from the bottom wall of said chamber and surrounding said port;

(d) a second tubular sleeve integral with and projecting outwardly from the outside of the bottom wall and surrounding said port;

(e) a valve assembly mounted on and closing the open top of said body and extending outwardly therefrom, said valve assembly including a first port means open to said chamber and second port means, and an outlet port means connecting said first and second port means and leading to the atmosphere;

(f) a first tube positioned inside said hollow body

and affixed to and connecting said second tubular sleeve with said first valve port means; and

(g) a second tube affixed to said second tubular sleeve and extending downwardly from the hollow body toward the bottom of the container in which the cartridge is mounted, and having a lower end disposed within the commodity to be dispensed from the container.

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WALTER SOBIN, *Primary Examiner.*