Nov. 1, 1966 W. G. GORMAN 3,282,474

PISTON TYPE AEROSOL UNIT

Filed Nov. 12, 1964

FIG. 1

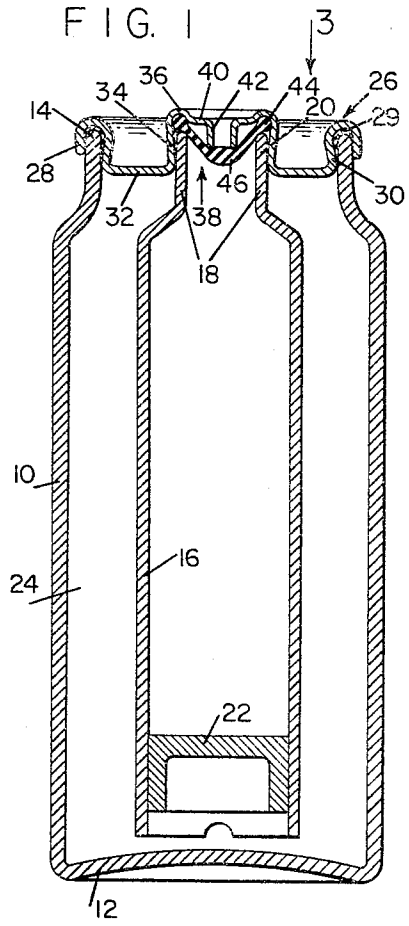


FIG. 5

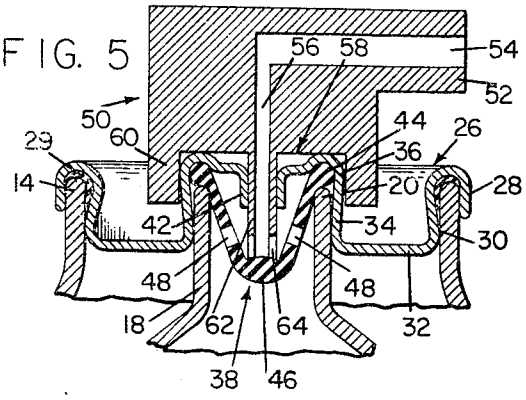


FIG. 3

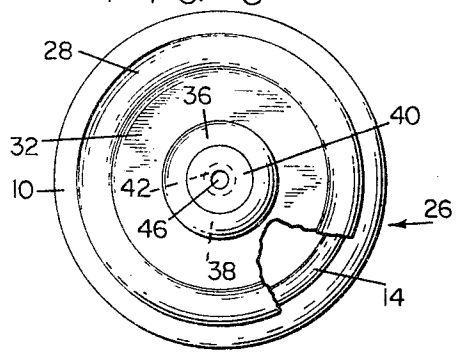


FIG. 2

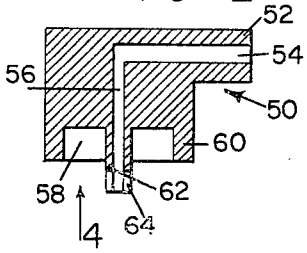


FIG. 6

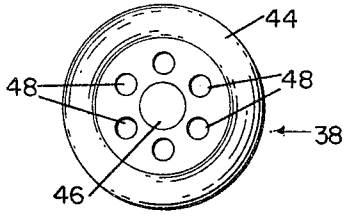
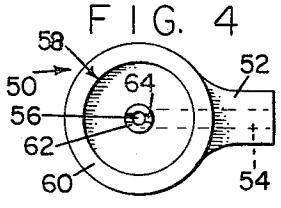


FIG. 4



INVENTOR
WILLIAM G. GORMAN

BY Charles P. Fay,
ATTORNEY

United States Patent Office

3,282,474

Patented Nov. 1, 1966

3,282,474

PISTON TYPE AEROSOL UNIT

William G. Gorman, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y., a corporation of Delaware

Filed Nov. 12, 1964, Ser. No. 410,693

6 Claims. (Cl. 222—389)

This invention relates to a new and improved piston type aerosol unit which is simple in construction, inexpensive to manufacture, and is easily filled while at the same time being easily operated in any position and not subject to inoperation resulting from minor denting or other damage. The new unit avoids the need of separate containers and valves or cartridges, gaskets, and sealing means of the prior art.

The novel piston type aerosol unit comprises a two-part container. One container is located within the other in spaced relation thereto, and contains the product to be expressed and utilized, there being a chamber between the inner container and the outer container, this chamber containing the propellant. The inner container is open at its lower end and it acts as a cylinder for a piston, located therein. The propellant in the chamber provides a pressure on this piston which in turn imparts pressure on the product in the inner chamber. At the other end of the inner container and located and held in a valve cup mounted on a rim of the outer container, there is a gasket valve normally closing the inner container but which is easily opened by the use of a novel actuator which forms a part of the present invention and which comprises a member having a relatively small elongated stem for engagement in a guide in the valve cup to stretch the valve, thus opening it and allowing the product to be expelled from the inner container through the stem to the atmosphere in a position for use.

Another object of the invention resides in the provision of an actuator for a piston type aerosol unit as described in which the actuator is provided with means for centering it relative to the gasket valve and has an angled passage so that the product is propelled outwardly from the container in a generally radial relation with respect thereto.

This invention provides an acuator and valve combination for a piston type aerosol unit where the actuation or expression of the product is accomplished without the use of any kind of needle, screw device, or other relatively expensive or complicated valve mechanism.

Other objects and advantages of the invention will appear hereinafter.

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

FIG. 1 is a cross sectional view of the container illustrating the device with the valve in closed position with respect thereto;

FIG. 2 is a cross sectional view of the actuator;

FIG. 3 is a plan view looking in the direction of arrow 3 in FIG. 1;

FIG. 4 is a bottom plan view looking in the direction of arrow 4 in FIG. 2;

FIG. 5 is a view showing the use of the actuator in opening the valve, parts being broken away, and

FIG. 6 is a detail view of the gasket valve.

In carrying out the present invention, there is provided an exterior container generally indicated by the reference numeral **10**. This container is closed as for instance at the bottom at **12** but is has an open relatively wide mouth defined by a ram **14**. There is an inner container **16** which is both shorter and narrower than that at **10** and this inner container is open at both ends. In this case it has a somewhat restricted neck portion **18** and an open

mouth defined by a relatively narrow rim at **20**. The inner container **16** however is closed at its lower end by a sliding piston **22**. It will be seen that there is a chamber **24** between the two containers and this chamber is conveniently filled with a propellant, the container **16** being filled with the product to be utilized. The action of the device is that the propellant in the chamber **24** urges the piston **22** in an upward position in FIG. 1 imposing a pressure on the product in the container **16**.

There is a valve cup generally indicated by the reference character **26** and this has a peripheral turned-down lip or rim **28** about rim **14**, there being a gasket **29** therebetween. From this rim the valve cup extends downwardly forming the upstanding rim at **30** which is crimped to closely engage the inside surface of the neck of the outer container, and then it turns inwardly in the form of a solid, continuously closed web **32**. Towards the central portion of this web, the material of the valve cup extends upwardly as at **34**, and again is crimped to closely engage the outer surface of the neck **18** of the inner container, and then it extends inwardly and downwardly in a lip portion indicated at **36**. This rim portion **36** is for the purpose of holding a gasket generally indicated at **38** in position closing the product container **16**, and from the turned-over lip at **36** the valve cup extends inwardly in the flat area as at **40** to a position closely adjacent the center thereof where it turns down once more into a hollow cylindrical stem or guide **42**.

Closely gripped between the turned-over lip **36** and the lip **20** of the inner container **16** there is a wheel gasket valve shown in FIG. 6. This wheel valve is provided with an enlarged rim indicated at **44** and this is gripped between the turned-over lip **36** and the rim **20** of the inner container **16**. It will be seen that the wheel gasket valve therefore extends under the central portion of the valve cup, and the central part thereof which is preferably thickened as at **46**, is engaged by the lower end of the guide **42** which extends slightly below the rim **20** of container **16**, so that the wheel valve which is made of rubber or some stretchy material is held in a stretched position as is clearly shown in FIG. 1, with the lower open end of the guide **42** tightly closed.

The wheel valve is provided with a series of openings therein at **48** and it will be seen that in the condition of the wheel gasket as shown in FIG. 1 it is closed, but the openings at **48** provide for communication between the interior of the container **16** and the chamber defined by the portion of the valve cup at **40** and the wheel valve itself, so that the product in the container **16** which has pressure applied to it by the piston **22** fills this chamber. However, the lower end of the guide **42** being in contact with the stretched gasket inside the openings **48**, prevents escape of the product.

The actuator per se is shown in FIGS. 2 and 4 and it comprises a generally cylindrical main body portion **50** of some suitable metallic or plastic material having a laterally directed offset portion **52** thereon, this portion having a passage at **54** therein leading to the center thereof where it intersects another passage **56** which is arranged generally axially of the actuator **50** and leads to the atmosphere.

The projecting portion **52** is preferably at one end of the actuator and at its opposite end it is indented at **58** forming an annular rim **60**. At the central portion thereof however it extends outwardly as in a narrow stem at **62** which contains passage **56**. The stem projects outwardly beyond the rim of the skirt portion at **60** and the extreme end of the stem is provided with a notch **64** for a purpose to be described. This notch is usually closed by the guide **42**.

The inner surface of the rim **60** has a diameter sub-

stantially equal to that of the annular lip portion 36 of the valve cup 26 and is slidably engageable therewith with the stem 62 engaged in the guide 42. It will be seen that the parts can be held together in this position without any action taking place, but if pressure is applied to the top of the actuator, then it can move further inwardly (or downwardly) stretching the wheel gasket to a greater extent and uncovering the notch 64, forming communication between the stem 62 and the chamber between the central portion at 40 of the valve cup and the stretchable wheel gasket. Because of the notch 64, the product which is under pressure in the inner container 16 will be expelled through the stem 62 and passages 56 and 54 and into usable relationship as desired by the operator.

It will be seen that this invention provides a very simple piston type aerosol unit which is operative in any position. Viscous and heavy materials as well as finer liquids can be dispensed with this device and the usual gaskets, sealing means, and expensive and complicated valves are done away with. The inner container 16 is easily filled and applied to the outer container with the propellant therein and the onepiece valve cup is secured thereto, holding the parts in position, closing the outer container completely, and closing the inner container and holding it and the valve in position ready for expression of the contents thereof.

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 piston type aerosol unit comprising an outer container having a closed end and an open end, an inner smaller container having both ends open and located within the outer container with an end of the inner container generally aligned with the open end of the outer container, a movable piston in the inner container whereby pressure in the outer container will provide pressure on the piston in turn providing pressure on the contents of the inner container, a valve for the inner container at its end opposite the piston, said valve including a resilient gasket, an actuator for said valve to open the same to provide expression of the contents of the inner container to the atmosphere, means closing the open end of the outer container, the last-named means holding the inner container within the outer container and including an inwardly directed guide engaging the gasket and stretching the same to a limited extent, said actuator including a stem for sliding reception in the guide and impinging thereon to stretch the gasket to open position thereof.

2. The aerosol unit of claim 1 wherein the two last-named means form portions of the same device and comprises a cup-like member engaged with the mouth of the outer container at the open end thereof and also engaging the portion of the inner container adjacent the valve end thereof and holding the same in position.

3. The aerosol unit recited in claim 1 wherein the valve includes a resilient gasket and the means holding the inner container within the outer container includes an elongated depending inwardly directed guide engaging the gasket and stretching the same and maintaining the same normally in stretched condition, the actuator including a stem for sliding reception in said guide and impingement on said gasket to stretch the same to a greater extent, said gasket including apertures therein in an area thereof located diametrically outwardly from said inwardly directed guide means, whereby the gasket can be stretched to provide a communication between the apertures and said stem, and an aperture in said stem adjacent the free end thereof that engages the gasket.

4. A piston type aerosol unit comprising an outer container having a closed end and an open end, a smaller inner container having both ends open, means holding the inner container with one end adjacent to but spaced from the open end portion of the outer container, said inner container being located substantially within the outer container, a piston in the inner container adjacent the end thereof that is opposite the open end of the outer container, the containers together forming an enclosed chamber containing a propellant applying pressure on the piston tending to move it within the inner container and thereby applying pressure to the contents of the inner container,

valve means for the inner container at the end thereof adjacent the open end of the outer container, said valve comprising a resilient gasket extending across the open end of the inner container, said gasket having apertures therein arranged eccentrically thereof, the means holding the inner container within the outer container including an inwardly directed generally cylindrical hollow guide open at both ends and impinging upon the central portion of said gasket and maintaining the same in normally stretched condition, the only egress from the inner container being through said hollow guide, and the contact of the guide with the gasket maintaining the unit closed,

and an actuator, said actuator including a passage therein for conducting contents of the inner container to the atmosphere, and a hollow stem which includes a portion of said passage, said stem extending outwardly of said actuator and having a diameter to fit in said guide, said stem being longer than said guide and thereby being capable of engaging said gasket and further stretching the same, an aperture in said stem which is normally obstructed by the guide but being free of said guide when the actuator is moved inwardly to stretch the gasket to a greater extent than normal, to provide communication between the interior of the inner container, the stem, and the passage in the actuator to an external point.

5. The piston type aerosol container of claim 4 including means closing the outer container and sealing the propellant therein, said means including a cup-like member attached to the edge portion of the opening of said outer container and gripping the same in sealed condition with relation thereto, said cup extending inwardly and having a portion thereof gripping and holding the edge portion of the open end of the inner container.

6. The piston type aerosol container of claim 4 including means closing the outer container and sealing the propellant therein, said means including a cup-like member attached to the edge portion of the opening of said outer container and gripping the same in sealed condition with relation thereto, said cup extending inwardly and having a portion thereof gripping and holding the edge portion of the open end of the inner container, said guide forming a portion of said cup-like member, said guide being centrally located with respect to said gasket and to said inner container.

References Cited by the Examiner

UNITED STATES PATENTS

1,707,425	4/1929	Baker	239—322 X
2,823,953	2/1958	McGeorge	222—389 X
2,863,699	12/1958	Elser.	
2,973,883	3/1961	Modderno	222—94
3,101,876	8/1963	Ayres.	
3,106,321	10/1963	Gorman	239—579 X
3,217,936	11/1965	Abplanalp	222—136

FOREIGN PATENTS

1,303,048	7/1962	France.
293,571	7/1928	Great Britain.

RAPHAEL M. LUPO, *Primary Examiner.*