

[54] **SEAL FOR AEROSOL DISPENSER**

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[51] **Int. Cl.**..... **B67d 5/60**

[58] **Field of Search**..... 222/4, 136, 145, 222/402.24, 92, 95, 563; 285/158; 239/310, 311, 318, 328; 220/46; 215/47, 40

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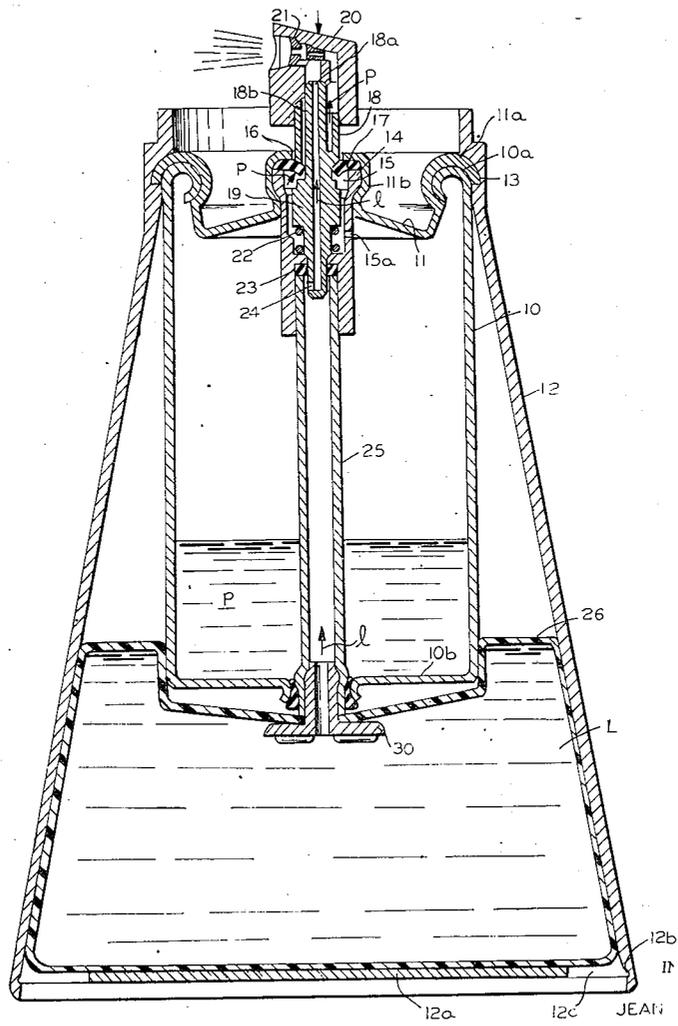
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[57]

ABSTRACT

A seal for use in an aerosol type dispenser of the type having an outer product container and a cover thereon with a valve assembly mounted on the cover and a tube through the propellant cartridge into the valve assembly and a flexible product containing bag within the outer container for containing a product to be dispensed. The seal is between the tube and the bottom of the propellant cartridge laterally and the bag and the tube longitudinally. The bottom of the propellant cartridge has a turned down flange around the tube where the tube passes through the bottom of this cartridge, the flange defining a shoulder together with the bottom. An annular gasket is positioned within the flange between the flange and the tube. A bag adapter is provided which is comprised of a hollow stem, an adapter flange on one end of the stem and an annular projection extending outwardly from the end of the stem opposite that on which the adapter flange is positioned. The adapter flange is adhered in a leakproof manner against the inside of the bag and the stem extends out of the bag and into the interior of the tube, the projection being positioned and held slightly inwardly in the direction into the propellant cartridge on the shoulder and bulging the tube outwardly forming a stop to hold said bag adapter in position. The annular gasket is compressed between the bulge and the shoulder forming said seal.

3 Claims, 3 Drawing Figures



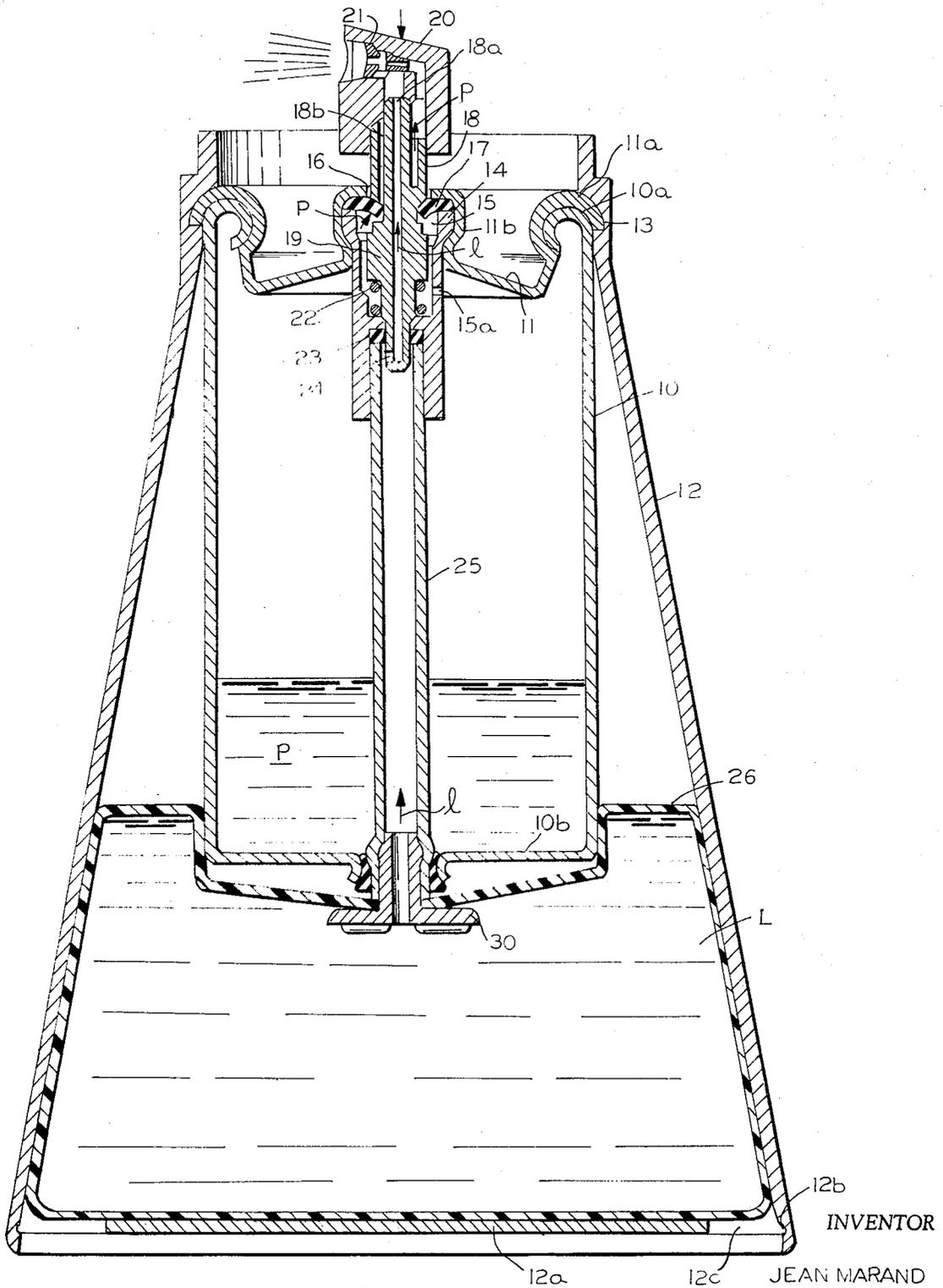


FIG. 1

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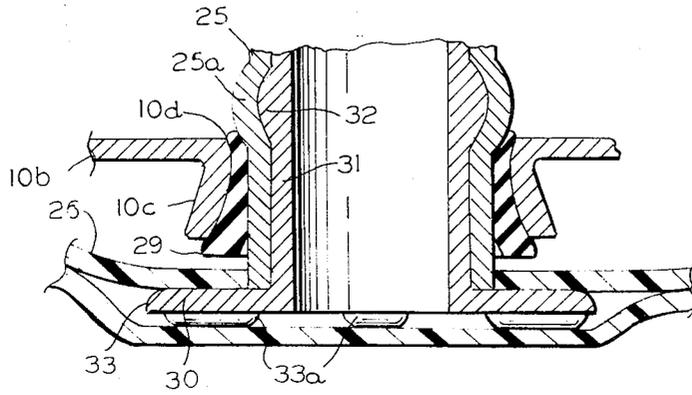


FIG. 2

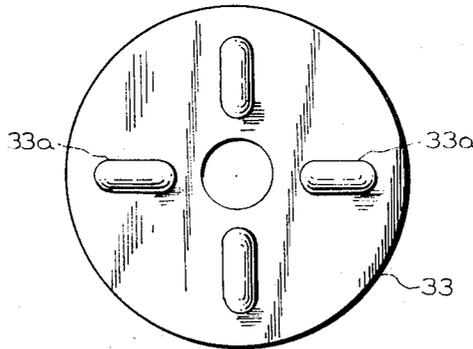


FIG. 3

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SEAL FOR AEROSOL DISPENSER

This application relates to a seal for use in an aerosol dispenser, and more particularly to a seal for use in an aerosol dispenser of the type in which the product to be dispensed is kept in a container separate from the propellant for dispensing the product.

In co-pending application Ser. No. 42,790 filed June 2, 1970, in the name of Jean Marand, there is disclosed the same general type of aerosol dispenser as that to which the present invention pertains. This dispenser generally consists of an outer container within which is suspended from a cover an interior propellant cartridge. A tube extends upwardly through the middle of the propellant cartridge to a valve assembly mounted on the top of the container. Within the lower part of the container is a flexible and collapsible bag within which is contained the product to be dispensed. The bag has a connector which connects the bag to the bottom of the above-mentioned tube, so that the contents of the bag can flow freely into the tube. Upon actuation of the valve assembly, propellant is caused to flow through the valve assembly in such a way as to aspirate product from the bag through the tube and to dispense it in a spray.

The propellant cartridge must be sealed around the tube at the bottom thereof, and it is also necessary to seal the bag to the bottom of the tube. This can require a rather complicated sealing structure, and unless it is properly assembled, there is the danger of leakage of the propellant from the propellant cartridge from the joint between the tube and the bottom of the propellant cartridge, as well as leakage of the product from the joint between the bag and the bottom of the tube.

It is an object of the present invention to provide a simple yet effective sealing structure for the joint between the bottom of the propellant cartridge and the tube and between the bag and the tube.

To this end the present invention provides a bag adapter which has a hollow stem with a flange on one end thereof and an enlargement on the other end thereof. The bag adapter is inserted from within the bag into the lower end of the product tube, and around the product tube is positioned an annular sealing gasket. The gasket is positioned between the outer surface of the tube and a flange which is turned down from the bottom of the propellant cartridge. The enlargement distorts the tube outwardly serving to position the bag adapter, and to compress the annular gasket between the enlarged portion of the tube and the turned-down flange. Good sealing is, therefore, established both between the flange and the tube and between the tube and the stem.

The invention will be explained in greater detail in connection with the accompanying drawings, in which:

FIG. 1 is a sectional elevational view of an aerosol dispenser with the particular sealing structure according to the present invention;

FIG. 2 is a partial sectional view on an enlarged scale of the sealing structure of the present invention; and

FIG. 3 is a bottom plan view of the adapter.

In FIG. 1 there is shown the overall dispenser comprising an outer container 12, frustoconical in shape, having a bottom 12a with a chamfered edge force fitted in a groove 12b provided in the vicinity of the lower end of the wall of container 12. The bottom 12a has ap-

ertures 12c therein placing the inside of the container in communication with the atmosphere.

In the container 12 is mounted a sub-assembly comprising a cylindrical propellant cartridge 10 containing the propellant P, a flexible sac 26 below the cartridge 10 and containing the product L to be dispensed, and a valve means. The valve means comprises, as will be described in detail hereinafter, a two-way valve for controlling the flow of the propellant P and of the product L to be dispensed.

The flexible sac 26 is preferably a thin walled sac having great flexibility. It should be of a material which is impervious to the product to be dispensed. The sac 26 can be made of any suitable flexible collapsible material, such as polyethylene, unplasticized polyvinyl chloride, polyamide or a lamination of such materials.

The valve means comprises a valve body 14 held in an enlarged part 11b of the top 11. A flexible annular gasket 17 is held between the end of valve body 14 and the enlarged part 11b. Gasket 17 is a high pressure obturator for the propellant. The valve body 14 has a chamber 15 therein which communicates through one or more apertures 15a with the interior of cartridge 10 and in which a hollow stem 18 is slidable. The stem 18 has an axial bore 18a and a peripheral duct 18b. The stem further has an enlarged portion 19, which, when the parts are at rest, is urged by a spring 22 against the gasket 17. The inner periphery of gasket 17 engages in a constriction in the stem 18 and is urged by stem 18 against the end of the enlarged part 11b and closes the opening into the peripheral duct 18b. Thus, the gaseous propellant contained in the inner cartridge 10 and the chamber 15 cannot pass through the duct.

The part of the stem 18 which projects outside enlarged part 11b has a pushbutton 20 removably mounted thereon. The pushbutton contains an atomizer nozzle 21 of the Venturi type having an axial duct which is connected through a recess with the peripheral duct 18b. The neck of the nozzle 21 is connected in turn with the axial bore 18a of the stem 18. The other end of the stem 18 has a lateral aperture 24 which, at rest, is closed by a low pressure gasket 23 which is retained in a recess in the valve body 14 by the end of a tube 25. The tube 25 passes right through the cartridge 10 and is sealed at the lower end to the bottom of the cartridge 10 to ensure both a fluid and pressure tight engagement. The product L can thus flow freely into the tube 25 as far as the gasket 23 and the propellant P is contained in the cartridge 10.

The connection between this sub-assembly and the outer container 12 is by force fitting of the rolled edge 11a of the top 11 into an inner groove 13 around the inside of the top of the container 12, the edge 11a abutting against a shoulder of the groove.

The dispenser can be assembled both with the sac 26 filled with product L and with the sac empty, although the latter is preferred. In all cases, the filling can be effected by removing the pushbutton 20 and by using a filling apparatus such as the type described in U.S. Pat. application No. 55,685, now U.S. Pat. No. 3,642,035. Such a device makes it possible, in particular, to effect a simultaneous filling of the cartridge 10 and the sac 26.

In all cases it may be seen that with the parts at rest the high and low pressure obturators of the valve means are closed. No leakage is possible whatever the position of the dispenser.

When the pushbutton 20 is pressed down to the position shown in FIG. 1, the inner periphery of the gasket 17 is bent downwardly and the channel 18b is placed in communication with the chamber 15 which enables the propellant to flow to the nozzle 21 in the direction of arrows *p*. The reduced pressure thus created in the central bore 18a aspirates the material L into the tube 25. The agent is thus drawn up to the nozzle and into the stream of propellant and atomized.

As the sac 26 is emptied, it collapses and the material L is always present in the vicinity of the open lower end of the tube 25.

The sealed joint at the bottom of the tube 25 between the tube and the bottom 10b of the cartridge 10 is shown in detail in FIG. 2. The bottom 10b of the cartridge is turned down in an annular flange 10c around the opening through which the bottom of tube 25 extends, the curved portion between the flat bottom and the inner peripheral surface of the flange being a shoulder 10d. Positioned within this annular flange and extending up slightly over the shoulder is an annular sealing gasket 29.

A bag connector or adapter 30 is inserted from within the bag 26 up into the bottom of the tube 25. The bag adapter is comprised of a hollow stem 31 having on the lower end a flange 33. The bottom surface of the flange has a series of radially extending projections 33a thereon extending generally radially from the hollow of the stem 31. The upper end of the stem opposite the end on which the flange is located has thereon a radially outwardly extending enlargement 32.

The edge of the bag 26 around the opening of the upper portion thereof is adhered to the upper surface of the flange, as shown using any suitable sealing method; i.e., heat, sonic adhesion. This adherence is leakproof. Preferably, the edge of the bag around the opening thereof fits tightly against the outer surface of the stem immediately above the flange.

The enlargement 32 on the upper end of the stem 31 produces a distention 25a in the lower end of the tube 25 at a point slightly inwardly, in the direction into the propellant cartridge, of the shoulder 10d. The length of the stem 31 is such that the distention is produced at this point when the flange with the bag thereon is tightly against the bottom of the tube 25. An annular sealing gasket 29 is positioned between the tube 25 and the flange 10c, the portion thereof between the shoulder 10d and distention 25a being compressed.

It will be understood that, as in conventional aerosols, the tube 25 and the flange 33 are of a plastic which can be deformed under pressure, whereas the cartridge 10 is of metal, such as spun aluminum, or an extremely hard plastic, which does not readily deform. Thus, in assembling the joint between the tube, the propellant cartridge, and the bag, the bag adapter 30 is placed in the bag with the stem 31 projecting out through the bag opening, and the edges of the bag opening are adhered to the top of the flange 33.

The annular sealing gasket 29 is placed within the turned-down flange 10c, and the tube 25 is positioned within the annular gasket. In a preferred embodiment of the invention gasket 29 and tube 25 are then crimped or swaged in place by a slight mechanical constriction of flange 10c. This helps hold tube 25 in place during insertion of bag adaptor stem 31. A quantity of sealing adhesive might also be added to shoulder 10d to insure good contact. The bag adapter stem 31 is then

inserted into the bottom of the tube 25, the plastic material of the tube 25 being deformed to accommodate the enlargement, until the flange 33 and the bag thereon come into engagement with the bottom of the tube 25. At that point, the parts are in the position shown in FIG. 2, with the distention 25a compressing the sealing gasket 29 tightly against the shoulder 10d, and holding bag adapter 30 in said position.

It will thus be seen that with a very simple assembly operation a very tight and secure seal is formed between the bottom 10b of the cartridge, the lower end of the tube 25, and the bag adapter 30 and the tube 25. The dimensions of the parts prior to the insertion of the bag adapter stem 31 into the tube 25 will be such that the annular sealing gasket 29 is substantially uniform in thickness and fills substantially all of the space between the turned down flange 10c and the tube 25. It is when the enlargement 32 produces the distention 25a that the gasket is compressed to the condition shown in FIG. 2 in which the portion between the distention and shoulder 10d is compressed into tight engagement with the flange 10c and the tube 25. It is this engagement that produces the tight seal between the interior of the propellant cartridge 10 and the space around the bag 26. This compression also forms a seal between the adapter 30 and tube 25 and prevents the adaptor from pulling free during filling or use.

What is claimed is:

1. In an aerosol type dispenser, the combination of an outer product container and a cover thereon having a valve assembly mounted on the cover, a propellant cartridge depending into the container from the cover, a tube through the propellant cartridge into the valve assembly, a flexible product containing bag within the container for containing a product to be dispensed, and a seal means between the tube and the bottom of the propellant cartridge and the bag and the tube, said seal means comprising a turned down flange on the bottom of the cartridge around the tube where the tube passes through the bottom of the cartridge, said flange defining a shoulder together with said bottom, an annular gasket within said flange between said flange and said tube, and a bag connector comprised of a hollow stem, a connector flange on one end of the stem and an enlargement extending outwardly from the end of the stem opposite that on which the connector flange is positioned, said connector flange being adhered against the inside of the bag for sealing the bag to the adaptor flange and the stem extending out of the bag and into the interior of the tube in sealing engagement with the tube, the enlargement being positioned slightly inwardly of said shoulder in the direction into the cartridge and the tube being distended outwardly around the enlargement, the annular gasket being compressed in sealing engagement between said distended portion of said tube and said shoulder.

2. The seal as claimed in claim 1 in which the connector flange holds the bag tightly against the end of the tube.

3. The dispenser as claimed in claim 1 in which said connector flange is immediately adjacent the free end of said turned down flange and in its compressed condition said annular gasket extends slightly past said free end of said turned down flange, whereby any further movement of said annular gasket under pressure of propellant within said cartridge is blocked by said connector flange.

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