Dec. 17, 1957 L. T. WARD 2,816,691

SPRAY DEVICE HAVING A FLEXIBLE SAC LINING

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Fig. 1.

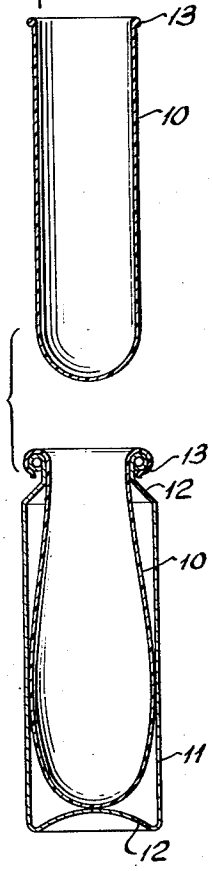

Fig. 2.

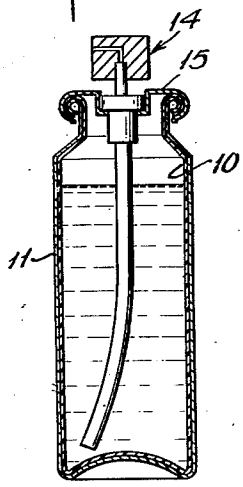

Fig. 3.

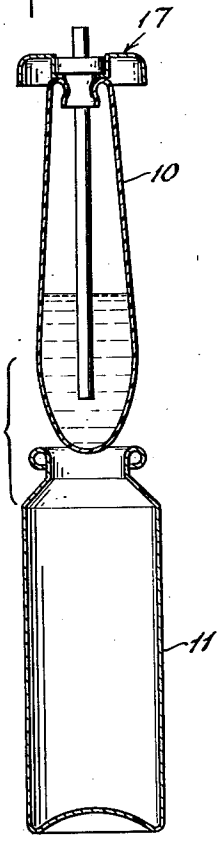

Fig. 4.

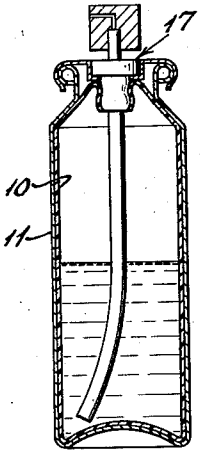

Fig. 5.

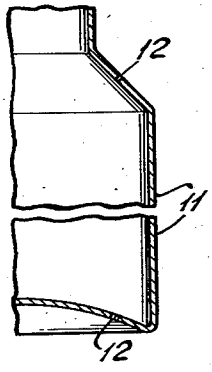

Fig. 6.

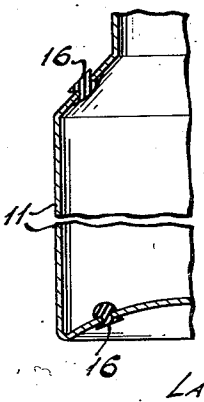

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Fig. 7.

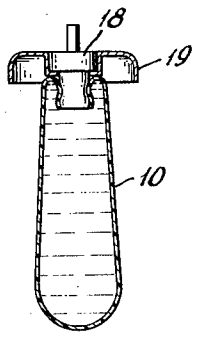


Fig. 8.

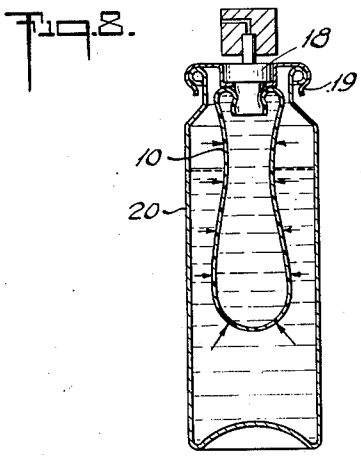
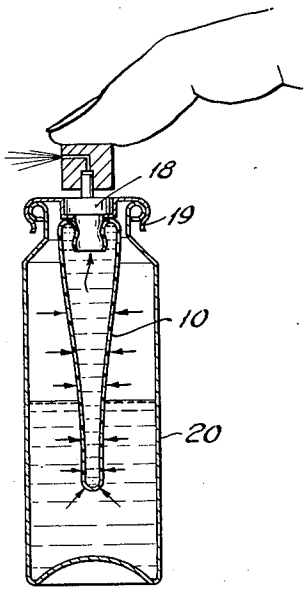


Fig. 9.



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SPRAY DEVICE HAVING A FLEXIBLE SAC LINING

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2 Claims. (Cl. 222—183)

This invention relates to a spray device and more particularly to a spray device having a flexible or resilient sac or bag therein.

It is an object of this invention to provide a spray container with a flexible bag.

It is a further object to provide a spray device having a flexible bag of plastic for containing liquid propellant.

It is another object of this invention to provide a spray device having a pliable bag disposed in a rigid container and containing liquid to be sprayed and adapted to be squeezed by liquid propellant disposed intermediate the flexible bag and the rigid container.

It is another object of this invention to provide a spray device having a flexible or resilient plastic liner or sac and adapted for filling through the spray nozzle.

These and other objects of this invention will become apparent upon reading the following disclosure taken in connection with the drawing in which;

Fig. 1 is a vertical section of a flexible plastic bag and also of a container lined with said bag,

Fig. 2 is a vertical section through a spray device showing the plastic bag of Fig. 1 pressed against the inner container wall,

Fig. 3 is a vertical section of a modified spray device showing the manner of inserting the combination of a liquid propellant containing flexible bag secured to a spray valve closure assembly into a pressure resistant container.

Fig. 4 is a vertical section of the assembled elements of Fig. 3 and showing liquid propellant in the bag and the contact effected between the bag wall and the container.

Fig. 5 is a vertical section view of a container, broken away in part, and showing apertures in the container shoulder and bottom wall for permitting exit of air trapped between the bag and container.

Fig. 6 is a modification of Fig. 5 showing depressable rubber inserts disposed in the apertures of the container wall.

Fig. 7 is a vertical section of a flexible bag secured to a spray valve assembly and filled with liquid to be dispensed.

Fig. 8 is a vertical section of a spray device showing the assembly of Fig. 7 disposed in a rigid container with liquid propellant disposed between the bag and the container, and

Fig. 9 is a vertical section of the device of Fig. 8 showing the squeezing effect of the liquid propellant on the pliable or flexible bag containing dispensable liquid therein.

One of the disadvantages of spray devices using liquid propellants is that the liquid propellant may be corrosive to the metal or solid container. Also where a propellant mixture is sprayed the ingredient added to the propellant may attack or may be attacked by the material constituting the container.

Furthermore, it is often desirable to spray a liquid undiluted and therefore containing no liquid propellant.

This invention provides a spray device overcoming the above mentioned disadvantages.

Referring to Figs. 1 and 2 a propellant resistant plastic or rubber, resilient or flexible tubular bag or sac **10** is disposed in a pressure resistant container **11** provided with apertures **12** in the container shoulder and base. The flexible bag lip **13** is disposed over the container lip and a spray valve dip-tube assembly **14** having a cover plate **15** sealingly secured thereto is disposed fixedly partly within the container **11** with the cover plate **15** clinching the container lip through the intermediate plastic bag lip **13** in a gas-tight manner.

In filling the bag lined container shown in Figs. 1 and 2 the liquid propellant may be cooled to a low temperature at which its vaporization rate is substantially zero and then poured into the bag lined container after which the valve assembly **14** is applied and then clinched to the container (Fig. 2). When the liquid propellant in the sealed container upon standing at room temperature attains an elevated temperature relative to the cold temperature used in the filling operation, the flexible bag **10** expands and snugly engages the interior wall of container **11** (Fig. 2). In this expansion procedure of bag **10** the air trapped between the bag **10** and container **11** is forced out of the small apertures **12**, the apertures being of a small dimension sufficient to prevent extrusion of the sac **10** wall when the assembled spray valve container is at room temperature.

Alternately, the sac **10**, container **11** and a filling valve assembly **14** may be assembled in a gas-tight manner and the liquid propellant then introduced through the filling valve at room temperature to attain the filled spray container of Fig. 2.

In lieu of small apertures **12** in the container wall, I may employ larger apertures provided with finger depressable resilient buttons **16** made of rubber or plastic (Fig. 6). These buttons **16** may be inserted from the inside of the container and when depressed from the outside of the container they release the air entrapped between the sac **10** and the container **11** to the atmosphere. The rubber inserts prevent the sac **10** from injury as by contacting the sharp edge of the apertures **12**.

In the modification shown in Figs. 3 and 4 the liquid propellant containing sac **10** is sealed to a spray valve dip-tube assembly **17** in a pressure-tight manner and then inserted into a container **11**. In this modification the sac **10** and valve dip-tube assembly **17** are sealed together and the liquid propellant is introduced into the sac **10** preferably before the sac is inserted into a container **11** (Fig. 3).

In the modification shown in Figs. 7 to 9 a spray valve **18** preferably having no dip tube is sealingly secured to a clinchable cover plate **19** and sealed to a pliable chemically resistant sac **10** filled with a liquid or liquid solution to be dispensed. The liquid in the sac **10** of the modification of Figs. 7 to 9 contains no propellant.

The assembled valve **18** and liquid filled sac **10** (Figs. 7 to 9) is inserted into a pressure resistant container **20** having no apertures in its walls and containing a suitable amount of liquid propellant. The clinchable cover plate **19** is then clinched to the rim of the container **11** preferably with the aid of a sealing substance or sealing means of conventional use, to obtain a gas-tight seal between plate **19** and the container **20**.

The completely assembled unit of this modification (Fig. 8) has a liquid filled sac **10** squeezably suspended in the liquid propellant, said propellant being confined within container **20** and disposed between the sac **10** and the container walls. The operation of the spray valve **18** permits the propellant to squeeze the pliable sac **10** causing the liquid contents therein to be dispelled as a spray (Fig. 9).

Use of a filling spray valve which permits filling through the valve plunger, permits repeated re-filling of the emptied sac **10** of the assembled unit of Fig. 9. This modification avoids contact or contamination of the dispensed liquid by the liquid propellant, and employs the expansive force of the liquid propellant to eject a liquid, for example an aqueous solution such as a mouth wash, contained in sac **10.**

This invention has been described by a plurality of illustrative embodiments but clearly its scope is more generic as defined in the claims herein.

I claim:

1. A hand portable finger operable aerosol bomb comprising a rigid cylindrical upright pressure resistant container having at least one continuously open aperture in the cylinder wall and having a top large circular mouth; a circular rolled-over flange integral with the container disposed about the container mouth; a conventional finger depressable spray valve assembly having a circular flange and a depending syphon tube disposed in said mouth of said container, said spray valve flange being rolled over said container flange in gas tight relationship; and a flexible sac having a circular mouth engaging said spray valve assembly in a gas tight manner whereby self-propellant liquid contents disposed within said flexible sac are dispensed through said syphon tube upon depressing the finger depressable plunger of said spray valve.

2. The aerosol bomb of claim 1 wherein the mouth of said flexible sac is disposed intermediate the flange of said spray valve assembly and the flange of said rigid container.

References **Cited** in the file of this patent

UNITED STATES PATENTS

1,939,611	Purvis	Dec. 12, 1933
1,996,792	Bystricky et al.	Apr. 9, 1935
2,126,973	Piquerez	Aug. 16, 1938
2,301,724	Vischer	Nov. 10, 1942
2,513,455	Cornelius	July 4, 1950
2,529,937	Hale	Nov. 14, 1950
2,564,163	Leperre	Aug. 14, 1951
2,671,578	McBean	Mar. 9, 1954
2,689,768	Falligant	Sept. 21, 1954