

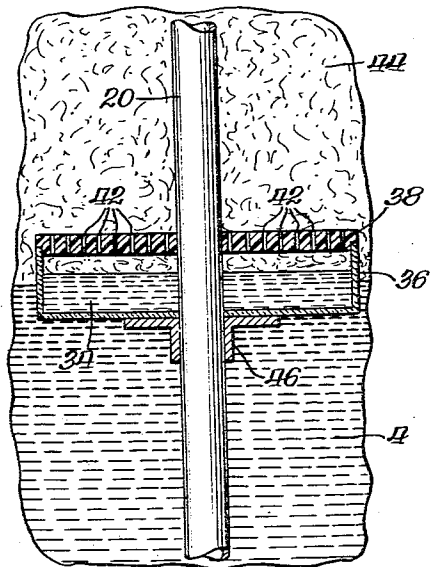
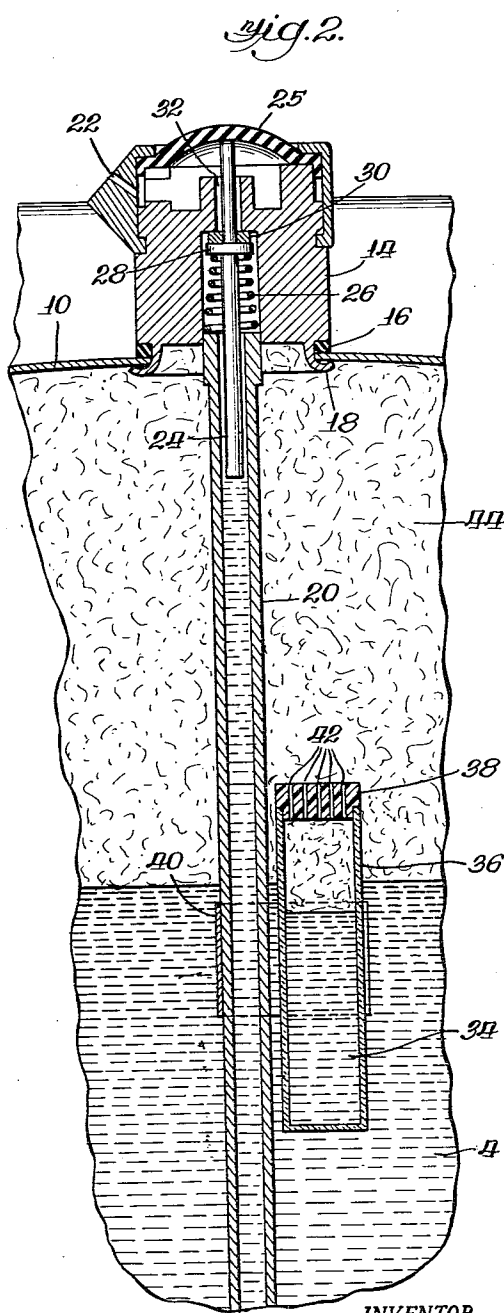
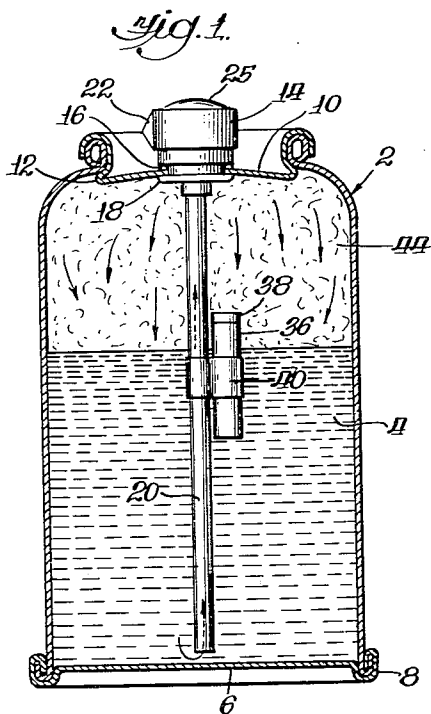
June 4, 1957

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2,794,579

AEROSOL BOMB HAVING SPACED PROPELLANT AND DISPENSABLE LIQUIDS

Filed March 31, 1954



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2,794,579

AEROSOL BOMB HAVING SPACED PROPELLANT AND DISPENSABLE LIQUIDS

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Application March 31, 1954, Serial No. 420,106

6 Claims. (Cl. 222-399)

This invention relates to aerosol bombs, and more particularly to a type of bomb wherein a low boiling point propellant liquid, such as freon or ether is disposed within the bomb container to develop vapor pressure therein for the purpose of expelling a dispensed liquid.

According to prior art practices, such propellant liquids have been dissolved in or mixed with the dispensed liquid, so that the propellant liquid at room temperature maintained propellant vapor pressure in the container as the dispensed liquid was forced therefrom.

For this reason aerosol bombs of this type have not been satisfactory for dispensing food products due to the taste and even toxicity of the propellant. Also, such prior art bombs have required the use of excessive amounts of propellant and have been somewhat hazardous due to possible explosion as the result of accidental heating to temperature values above room temperature. The possibility of explosion has also limited the use of such bombs to relatively small containers. Another disadvantage of prior art bombs has been their tendency to lose pressure after continued use, thereby resulting in shortening of the spray.

Accordingly, a primary object of the present invention is to devise an aerosol bomb which is economical to manufacture and is unusually capable of withstanding higher than normal pressures.

Another object of the invention is to eliminate the possibility of corrosion and the possibility of toxicity in the dispensed product.

Still another object of the invention is to devise a bomb which can be safely utilized in larger sizes than heretofore possible.

A further object of the invention is to maintain substantially constant pressure in the bomb until the dispensed liquid has been entirely used.

Yet another object of the invention is to reduce the amount of propellant liquid necessary to maintain pressure in the bomb.

A more specific object of the invention is to separate the dispensed and propellant liquids by a gas permeable, liquid impermeable membrane accommodating flow of the propellant in its vapor phase to the pressure chamber of the bomb.

In one illustrated embodiment of the invention the propellant liquid is disposed within a container attached to the dispensing valve delivery tube at one side thereof, and in another illustrated embodiment of the invention the container for the propellant liquid surrounds the delivery tube and is attached thereto.

However, it will be understood by those skilled in the art that the propellant container may be mounted in any desired manner within the container for the dispensed liquid and may even form a part thereof provided that the dispensed and propellant liquids are separated.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following specification and accompanying drawing, wherein:

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Figure 1 is a side elevational view, partly in central vertical section, of an aerosol bomb embodying a preferred form of the invention;

Figure 2 is an enlarged view similar to Figure 1 but showing the dispensing valve, the delivery tube, and the propellant container in central vertical section; and

Figure 3 is a fragmentary view similar to Figure 2 but illustrating a modification of the invention wherein the propellant container surrounds the delivery tube.

Describing the invention in detail and referring first to the embodiment of Figures 1 and 2, the novel aerosol bomb comprises a container 2 for a volume of dispensed product 4 which may be any desired liquid having a boiling point above room temperature at atmospheric pressure.

The bottom of the container is sealed, as by a wall or partition 6 crimped in any desired manner as at 8, and the top of the container is similarly sealed by a head 10 crimped as at 12.

A valve body 14 is sealed within a complementary opening of the head 10, as for example by a gasket 16, the lower end of the body 14 being crimped as at 18 against the underside of the head 10 to compress the gasket.

The valve body 14 is provided with a delivery tube or conduit 20 extending adjacent to but spaced from the wall 6 to deliver the liquid 4 as it is dispensed from the container 2 through a nozzle 22 of the valve body 14 when a stem 24 therein is manually actuated to open position by an operator's finger pressing against a resilient diaphragm 25.

The stem is normally biased to closed position by a spring 26 acting against a flange 28 on the stem 24, the upper or outer side of said flange 28 having a resilient gasket 30 which seats against a port 32 in the valve body 14 to cut off communication between the container 2 and the nozzle 22 when pressure against the diaphragm 25 by the operator's finger is released.

It will be understood that the container 2 and its valve may be of any desired design, although the structure above described is particularly useful in accomplishing the novel results of the invention as hereinafter discussed.

A propellant liquid 34 (Figure 2) is disposed within a liquid-impermeable container 36, the top of which is sealed by a diaphragm or cap 38 having a sealed fit in the container 36. The diaphragm is impermeable to flow of liquid 34 therethrough but is provided with a plurality of apertures or openings 42 permitting flow of gas through the diaphragm 38. These openings are too small to permit flow of liquids 4 and 34 through the diaphragm 38.

The propellant liquid 34 may be of any desired chemical composition, preferably one having a boiling point substantially below room temperature, such as ethyl chloride, methyl bromide, ether, or freon.

The size of the openings 42 may vary dependent upon the viscosity of the dispensed and propellant liquids utilized; however, in actual practice openings of about 0.02 inch have proved to be very effective in accommodating flow of said propellant in its vapor phase from said container and in preventing flow of said propellant in the liquid phase thereof.

The container 36 may be attached in any desired manner to the inside of the container 2, as for example by a clip or bracket 40 on the tube 20. Preferably, the diaphragm or cap 38 is positioned within a gas chamber 44 at the upper end of the container 2, when the latter is in normal upright position illustrated in the drawing, although the liquid impermeable nature of the diaphragm 38 makes it possible to position it at any point in the container, even below the normal upper level of the liquid 4.

By attaching the container 36 to the tube 20 as above

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described, the valve body 14 and its related parts, together with the head 10, the tube 20, and the container 36, may be assembled as a unitary subassembly which may be attached to the container prior to filling of the latter with the dispensed liquid 4; however, if desired, the container 36 may be attached to the container 2 or its bottom wall 6.

A modification of the container 36 is illustrated in Figure 3, wherein the container and the propellant liquid 34 surround the tube 20, and the container 36 is attached to the tube 20, as by a collar 46 thereon, said collar having a sealed fit on the tube 20 and having a sealed connection as by brazing to the bottom of the container 36. In this modification, the diaphragm 38 also surrounds the tube 20 and is afforded a sealed fit thereon.

The propellant liquid 34 in the modification is spaced at all times by the diaphragm 38 from the liquid 4 which is to be dispensed. The diaphragm 38 is provided with openings or apertures 42 such as those described in connection with Figures 1 and 2, said apertures 42 being small enough to prevent flow of liquid 34 or 4 there-through, but accommodating flow of the propellant liquid in its vapor phase to the container 2.

Preferably, the container 2 and liquid 4 are at a temperature below the boiling point of liquid 34, when the bomb is assembled, thereby permitting assembly at atmospheric pressure. After the container 2 is completely sealed, as illustrated in the drawings, the bomb is ready for use at room temperature whereat the liquid 34 boils to develop a charge of vapor pressure in the chamber 44 until the pressure is sufficient to prevent further boiling of liquid 34 until the pressure is released by dispensing of part of the liquid 4 from the nozzle, whereupon the liquid 34 again boils until the proper pressure is developed in the container 2.

What is claimed is:

1. An aerosol bomb comprising an outer container containing liquid to be dispensed therefrom, a valve assembly comprising normally closed valve means for dispensing said liquid, and a delivery tube connected to said valve means and extending approximately to the bottom of said container, an inner container in the first-mentioned container, propellant liquid in said inner container, said propellant liquid having a boiling point substantially below room temperature at atmospheric pressure, said inner container being attached to the delivery tube and having openings above the level of the first mentioned liquid, said openings connecting the interior of said inner container to the interior of said outer container, said openings accommodating flow of gas therethrough and preventing flow of said liquids therethrough.

2. An aerosol bomb comprising inner and outer containers, a plurality of holes in the inner container, said holes being small enough to prevent liquid flow between the containers and being large enough to accommodate

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gas flow therebetween, liquid in the outer container to be dispensed therefrom, propellant liquid in the inner container, valve means in the outer container for accommodating flow of the dispensed liquid therefrom, and a delivery tube supporting the inner container and extending approximately to the bottom of the outer container, said holes being above the upper level of said first mentioned liquid.

3. An aerosol bomb comprising a container containing liquid to be dispensed therefrom, a propellant liquid in said container, another container within the first mentioned container comprising a gas permeable, liquid impermeable partition spacing said liquids from each other, said propellant liquid having a boiling point below room temperature at atmospheric pressure, valve means carried by the container and connected to the first-mentioned liquid for releasing the latter from the container, and a delivery tube connected to the valve means and extending approximately to the bottom of the first mentioned container, said delivery tube communicating with the first mentioned liquid to deliver the latter to said valve means upon opening thereof.

4. An aerosol bomb comprising a container containing a liquid to be dispensed, said liquid having a boiling point above room temperature at atmospheric pressure, a gas chamber in said container above said liquid when the container is in upright position, a valve body connected to the top of said container, a delivery tube connected to said valve body and extending into said liquid, releaseable valve means in said body responsive to pressure in said container for preventing flow of fluid from said tube, a liquid-impermeable container in said first-mentioned container and containing a propellant liquid having a boiling point below room temperature at atmospheric pressure, and a cap on said second-mentioned container, said cap having openings accommodating flow of gas through said openings, said openings being too small to permit flow of said liquids through said openings, said cap being positioned in said chamber above said first mentioned liquid.

5. A bomb according to claim 4 wherein the second-mentioned container is attached to the tube.

6. A bomb according to claim 5, wherein the container surrounds the tube.

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