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 [33] **Germany**
 [31] **P 17 86 354.6**

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[54] **CONTAINER FOR SUBSTANCE INCORPORATING VOLATILES**
2 Claims, 8 Drawing Figs.

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206/0.5, 206/84, 261/122
 [51] Int. Cl..... **B65d 85/70**
 [50] Field of Search..... **206/84, 0.5,**
47 A, 47 B, 47; 261/122; 215/6; 424/22, 45, 47

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ABSTRACT: A container for a substance, which must retain a necessary concentration of volatile constituents throughout storage and its useful life, includes a main container permeable to the volatiles and a depot element of a sealing material containing the volatile substance and which provides a sustained slow release thereof. This depot element, particularly intended for thin-walled plastic bottles permeable to volatiles, is shown in the following forms:

- (1) Poured fusion of sealing material and volatiles;
- (2) Granules of the aforementioned;
- (3) Loose depot element either fused or filled with volatiles;
- (4) Fixed inside container;
- (5) Annular depot element surrounding dip tube;
- (6) Elongated depot element extending above and below surface of liquid;
- (7) Hollow internal container sealed to wall of container; and
- (8) Internal partition.

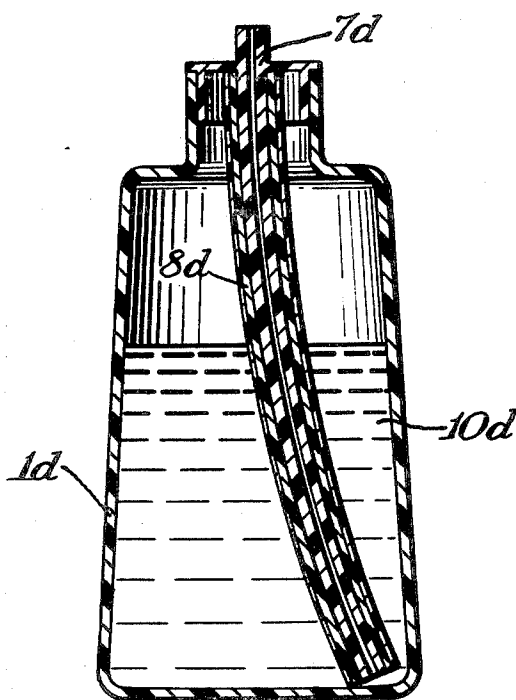


Fig.1.

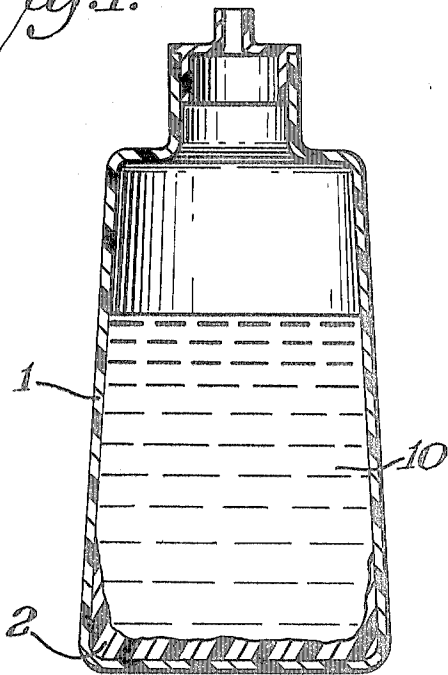


Fig.2.

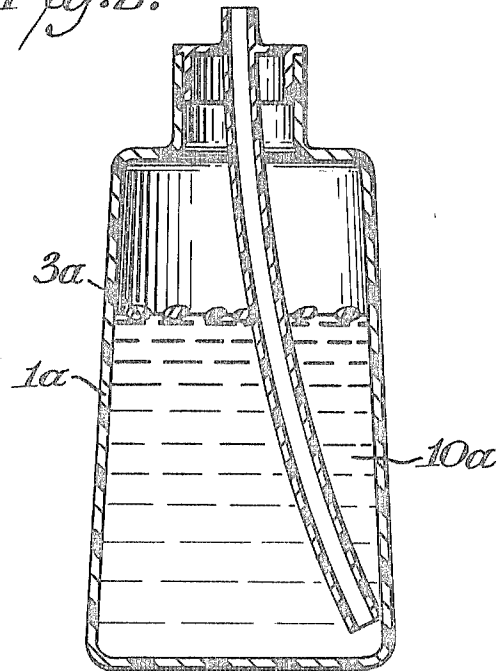


Fig.3.

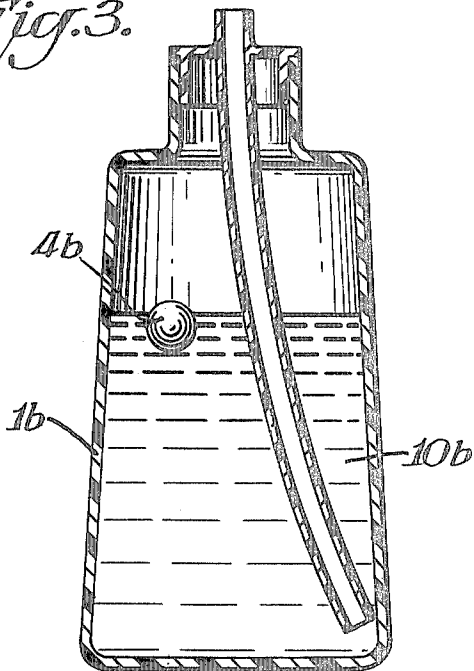


Fig.4.

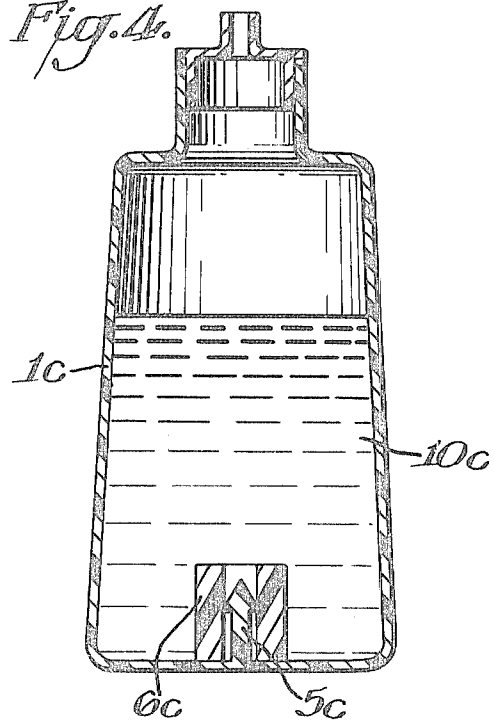


Fig. 5.

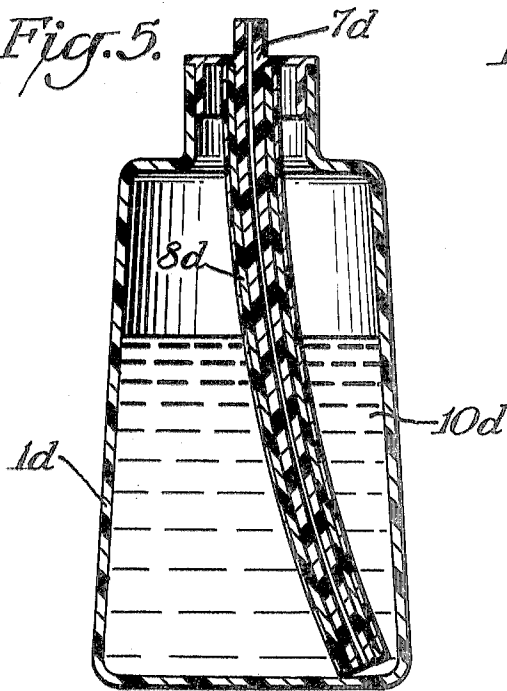


Fig. 6.

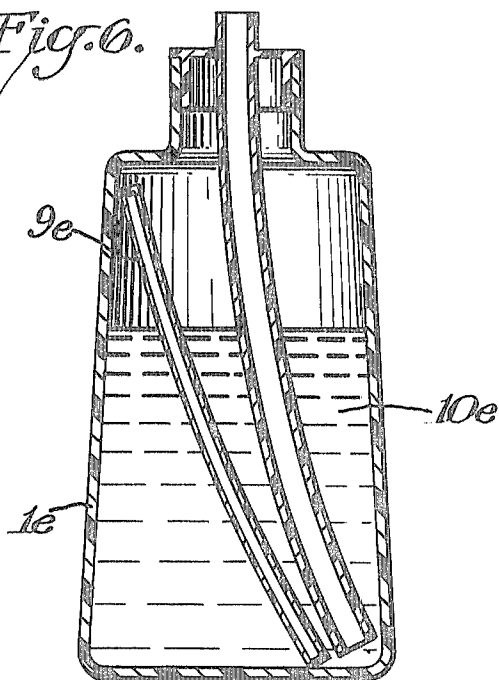


Fig. 7.

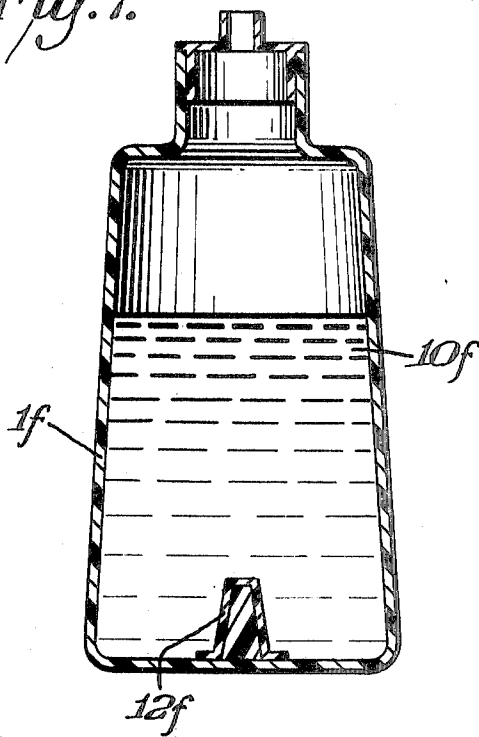
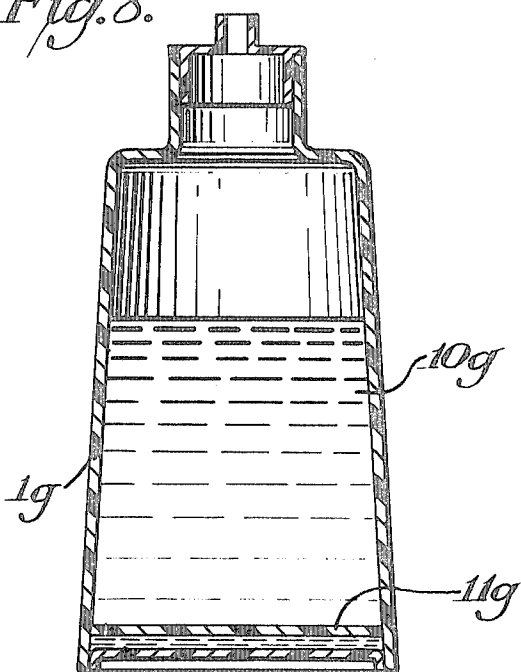


Fig. 8.



CONTAINER FOR SUBSTANCE INCORPORATING VOLATILES

BACKGROUND OF THE INVENTION.

The invention relates to a container for the long term storage of substances, which must retain a necessary concentration of volatile constituents throughout storage, especially for such substances, which—after filling into the container—have a certain concentration of these volatile constituents pass out through the walls of the container during storage.

In the case of various substances, destined for the long term storage, such as drugs, scents, food stuffs, luxuries (i.e. tea, coffee, chocolate, etc.), etc. it is known that the volatile elements contained in these substances—especially aromatizing agents and volatile oils—escape through the walls of the container or through the areas near the closure of the container, and thus finally make the stored product worthless. To avoid this disadvantage, for instance, expensive packaging, in form of tightly sealed glass or metal containers, is used. If plastic bottles are used—even if only for a limited storage time—a very expensive process which requires much work, is necessary, namely the lacquering of the inner walls of the container. Polyethylene with a very low wall thickness is used for many different purposes, and so that such containers may be squeezed in order to take out the contents; thus, either a direct ejection or atomization by means of a suitable spray nozzle device is achieved. When packaging of nose spray, for instance, the above mentioned difficulties arise, because the stored product shows a substantial loss of the effective volatile substances even after only relatively short storage time due to the low wall thickness, which is necessary for such use.

SUMMARY.

This invention solves the problem of developing a container for the long term storage of substances containing volatile elements by a simple procedure, which does not require expensive preparation of the container walls or selection of certain materials for the container or methods of closing the container. It is characterized as follows: a depot element is provided on the inside of the container which supplies the liquid in the container with the volatile parts. The expression depot element herein means a storage element providing a sustained slow release of a volatile substance over a substantial period of time. The depot element may advantageously be sized amply enough to supply volatile constituents sufficient to make up for the loss thereof occurring during storage. In accordance with this general basic rule these containers may be manufactured in different forms of technical realization, materials and closures and for all purposes because the continuous accepted loss of volatile elements, is steadily replaced from the depot. Furthermore, the depot element may also be used to supply the contents of the container with the desired volatile constituents up to the end of the storage and useful life of the container.

The application of the invention especially relates to plastic bottles with a low wall thickness, above all polyethylene bottles, which contain liquid substances with volatile oils and/or aromatizing agents.

The depot element may best be produced in the form of additional containers or in form of fusions, i.e. as a mixture of the volatile parts with formative substances which may be melted and hardened again without impairing the volatile parts, e.g. mixtures of volatile parts and waxes, resins, fats, natural and/or synthetic polymers with a volatiles content up to 50 percent of the weight. During such utilization, the melts may be poured into the container and solidified in a thick layer on the wall or the bottom of the container. Furthermore it is possible to provide inserted parts of the bottle, for instance the dip tube of the spray device, with such a coating or to provide an additional container which is prefabricated outside of the main container. As a further development of the idea, the depot elements, made out of the above mentioned fu-

sions, may be produced in form of balls, granules, cylinders, etc. and then be placed into the container, either loose or fixed at the inner walls. The amount of substances contained in the depot element or the share of melts may under certain circumstances be dimensioned so amply that the container may be refilled with the substance to be dispensed.

If additional containers are used instead of depot elements made out of fusions or similar mixtures which maintain their form, the material and thickness of the wall have to be designed for the planned duration of effectiveness and storing time. Such additional containers may also best be produced in form of balls, cylinders, pockets, or inner parts. Further developing this invention, parts of the wall of the main container may be provided with suitable permeability for storing the volatile parts and may thus be used as the depot element. In this instance, either a pocket or a hollow space in the wall of the container, possibly accessible from the outside, is conceivable and during the manufacturing process volatile oils and/or aromatizing agents—volatile parts—may be poured into them. After that, the hollow spaces are sealed. For certain purposes it may, however, be useful to produce the depot element out of two or more single parts in form of a partition wall between the bottom and the rest of the container; in such a case the inner part of this wall may be produced from the same material as the container or as a separate inserted part of different material with a permeability adapted to suit the required service.

Moreover, holding elements may be adjusted to the inner wall of the container, which can hold depot elements in the form of additional containers or hardened, molded parts. In this regard, a simple mushroom-shaped, one-piece holding element may be effectively provided at the inside of the container, upon which tubular depot elements may be affixed.

Moreover, it may possibly be advantageous, if the depot element is produced in such a way that it can also supply the gaseous atmosphere in the container. For this purpose, the depot element—in accordance with the prescribed position in the container—may be situated at least partly outside of the liquid contents of the container.

Several depot elements for various volatile parts may also be provided within one container; in this case the volatile parts in the depots are dimensioned correspondingly larger.

This specific development, according to the above explanations, seems to be suitable for various forms of containers, especially for bottles. In the same way, containers in form of boxes may also be provided with a depot element.

Thus substances with volatile parts may be stored for a long time in inexpensive, easily producible containers; thereby the original composition is preserved almost unimpaired, and the desired concentration of volatile parts is maintained throughout use of the stored substance.

BRIEF DESCRIPTION OF THE DRAWING

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a cross-sectional view in elevation of a poured form of this invention;

FIG. 2 is a cross-sectional view in elevation of a loose granular form of this invention;

FIG. 3 is a cross-sectional view in elevation of a loose spherical form of this invention;

FIG. 4 is a cross-sectional view in elevation of an inserted and affixed form of this invention;

FIG. 5 is a cross-sectional view in elevation of an annular dip tube form of this invention;

FIG. 6 is a cross-sectional view in elevation of an elongated form of this invention extending above and below the liquid.

FIG. 7 is a cross-sectional view in elevation of a hollow internal container form of this invention; and

FIG. 8 is a cross-sectional view in elevation of a partitioned form of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 a fusion 2 was poured into a bottle-shaped container 1 as depot element, which covers the bottom and fits close to the inner walls of the container at the bottom. This melt 2 partly consists of wax, to which the corresponding volatile parts were added in a molten state of the fusion.

In FIG. 2 the depot element is formed by a number of granules 3a, which float on the surface of the liquid 10a which is to be aromatized.

FIG. 3 shows the bottle-shaped container 1b with a ball-shaped molded piece 4b as depot element, which may be produced as a melt mixture without coating or as additional container with filling.

In FIG. 4 is shown at the bottom inside of the bottle-shaped container 1a a mushroom-shaped holder 5c on top of which a tube 6c is affixed as depot element. This tube 6c may be either a hardened, molded piece with no outer coating or an additional container closed at the annular ends.

As to the bottle-shaped container 1d in FIG. 5, dip-tube 7d has been provided with a coating 8d in form of a thick-walled hollow cylinder, which forms the depot element.

FIG. 6 shows bottle-shaped container 1e with an additional container 9e as depot element, which has been filled with the volatile parts (e.g. volatile oils). After that the additional container 9e was sealed at the front ends. Its wall thickness is dimensioned according to the intended duration of effectiveness and storing time for replacing the volatile parts in the bottle-shaped container 1e once or several times. Since the additional container is also partly situated above the surface of the liquid, the gaseous space above the liquid 10e is also supplied with volatile parts. FIG. 7 shows as depot element a truncated conical piece 12f, secured to the bottom of the bottle-shaped container 1f which may either be fabricated as one piece of the same material as the wall or which may be fastened to the bottom of the container as an inserted piece of a different material. The volatile parts are filled into the interior of the truncated conical piece 12f, and after that this piece is sealed by suitable closure means.

In FIG. 8 a partition wall 11g of the same material or of one different from that of the container wall is placed above the bottom of the container 1g, whereby a hollow space forms between the bottom and the wall 11g, which may be filled with the parts for volatile replacement. Thus the whole surface of

the partition wall works as depot element, causing an advantageous exchange between depot element and liquid 10g, due to the substantial size of the diffusion or permeable surface.

I claim:

1. A container for retaining a substance maintaining a necessary amount of volatile constituent throughout storage and useful life comprising a main container for said substance, said main container being permeable to said volatile constituent whereby said substance becomes depleted of said volatile constituent, a depot element for sustained slow release of said volatile constituent, said depot element being relatively small relative to said main container and being inserted therewithin, said depot element comprising a combination of said volatile constituent with a sealing material, said sealing material being capable of substantially retaining said volatile constituent stored therewithin but permitting a slow release thereof whereby said necessary amount of volatile constituent is retained within said container over a substantial period of storage or use, said depot element comprising a hollow container of said sealing material, said volatile constituent being disposed within said hollow container, said main container including a dip tube, said depot element comprising an elongated hollow cylinder, and said hollow cylinder comprising said dip tube.

2. A container for retaining a substance maintaining a necessary amount of volatile constituent throughout storage and useful life comprising a main container for said substance, said main container being permeable to said volatile constituent whereby said substance becomes depleted of said volatile constituent, a depot element for sustained slow release of said volatile constituent, said depot element being relatively small relative to said main container and being inserted therewithin, said depot element comprising a combination of said volatile constituent with a sealing material, said sealing material being capable of substantially retaining said volatile constituent stored therewithin but permitting a slow release thereof whereby said necessary amount of volatile constituent is retained within said container over a substantial period of storage or use, a retaining element being disposed within said main container, said depot element being affixed upon said retaining element, said retaining element comprising a knobbed shaft, said depot element including an aperture slightly smaller than said knob in the relaxed condition of said depot element, and said knob being inserted within said aperture.

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