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CONTAINER AND DEVICE FOR RECHARGING AND DISCHARGING THE
FLUID INTO ANOTHER CONTAINER
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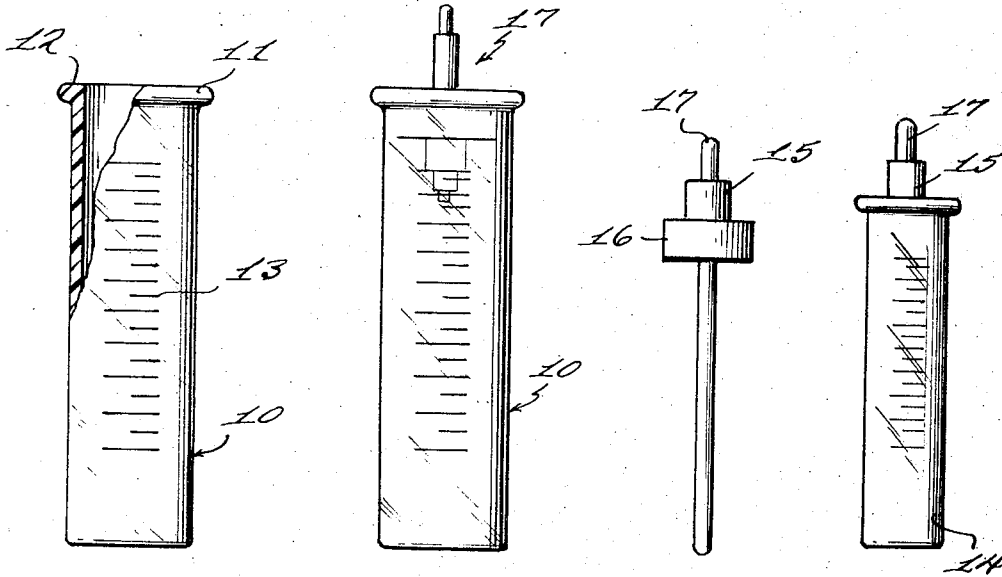


Fig. 1

Fig. 2

Fig. 3

Fig. 4

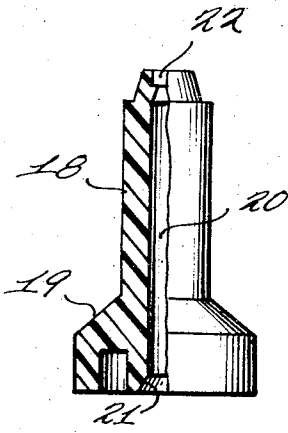


Fig. 5

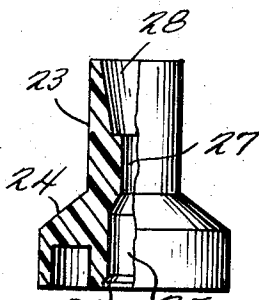


Fig. 6

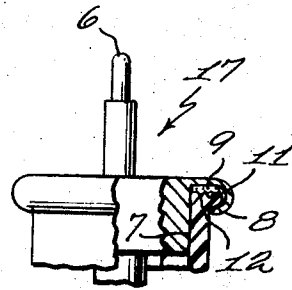


Fig. 7

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FLUID OR LIQUID GAS SPRAY ASSEMBLED WITH TRANSPARENT GRADUATED CONTAINER AND DEVICE FOR RECHARGING AND DISCHARGING THE FLUID INTO ANOTHER CONTAINER

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The present invention concerns a fluid or liquid gas sprayer having a perfectly transparent graduated body which makes it possible to follow easily the variations in volume of the sprayer's contents, as well as a special device adapted for easy assembly on the sprayer when the contents of the container are to be discharged into another container, or for recharging the first-mentioned container, wherein the device enables the discharging or recharging of the container to be performed quickly and easily. The use of aerosol-type valves, which are very well-known, is foreseen for this sprayer.

Such containers, provided with valves for spraying, are nowadays used in such a wide range of applications—from the charging of cigarette-lighters to wax-, perfume-, lacquer-, etc., sprays—that it is needless to refer even briefly to the relative systems of mounting the valves. It should be pointed out, however, that in practice there are spraying valves of substantially two well-defined dimensions as regards the spraying mouth of the container, with the valve being suitable for use with a relatively high pressure, and made with a material, shape and thickness chosen so as to be suitable for the containers. The spraying mouths of these containers correspond to the dimensions of these two valve types, even though the body of the container, depending on the material used, may have differing transverse dimensions, i.e. the containers may differ greatly in volume and, above all, transverse dimensions, but will have mouths of such transverse dimensions that valves of the two characteristic dimensions and generally with the same system of mounting can be used.

Presently, metallic containers are predominantly used, particularly in the case of containers of larger dimensions. In a container of smaller dimensions, provided with a smaller valve, the use of a synthetic material, with a general indication of the internal volume of liquid contained, has been attempted. However, with metallic materials it will be impossible to control the volume of liquid in the container; and in the case of the synthetic material presently used for some applications, the opacity of the material is very great and the transparency of the material against a light source is very slight. Moreover, the disadvantage of the synthetic material will worsen with use, as opacity will increase and consequently transparency will diminish.

The present invention aims, first of all, at obviating such disadvantages, as the transparency of the container is of the greatest importance, particularly in certain uses of it. The inventor has therefore conceived the use of a synthetic material having a practically complete transparency, the use of which, for the purpose in question, is better warranted by the complete sealing capacity of the material itself, in addition to that of the valve, which may be utilized to adequately seal the container for the pressure-conditions anticipated within the container due to the particular liquid contained.

A further object of the present invention is to provide the container manufactured by compression moulding of cellulose acetate in a cylindrical mould with a plain or slightly concave bottom and with an edge at the open end projecting slightly outwardly at a right angle to the

sidewall of the container, its upper annular face having annular grooves for the fitting and better sealing of a gasket. A further object is to simplify the application of normal valve forms for such containers, as the interior of the metallic portion of the valve retains its cylindrical shape, whereas it will be sufficient, for pressure sealing, to fold the valve's edge on the edge provided on the container.

A further object of the present invention is to provide two devices for making application of the sprayer for its intended purpose both better and easier. These devices are two members of resilient material, one of which permits an easy and convenient discharge of the liquid gas from its container into another container, particularly into the container of a cigarette-lighter, if the container is destined to hold a liquid for this object, while the other permits an easy and convenient discharge of the liquid gas from container, by feeding a liquid gas from a feeding container. In both cases, the characteristic transparency of the container of the invention, and the volumetric graduation on its cylindrical surface, render its use much more practical and satisfying.

The preferred forms of the present invention are containers having the valve with a greater diameter, and the valve with a smaller diameter.

The preferred dimensions of the invention are indicated in the following specification and in the accompanying drawings:

FIG. 1 is an elevational, partially sectional view, of a container of this invention, of the kind with a large valve, as it appears after its press-moulding.

FIG. 2 is an elevational view of the spraying device in its final form, after application of a normal large valve to the container of FIG. 1.

FIG. 3 is an elevational view of a normal valve, assembled and before its mounting on a container spraying mouth of smaller dimensions.

FIG. 4 is an elevational view of a smaller container of the present invention, presenting its final form, fitted with its valve.

FIG. 5 is an enlarged, elevational, partially sectional view of a complementary member to be fitted on the upper end of the valve stem, comprising the device for discharge from the container in FIG. 2 into another container, e.g., into a cigarette-lighter.

FIG. 6 is an enlarged elevational, partially sectional view of a complementary member to be fitted on the upper end of the valve stem, comprising the device for recharging the first container from a feeding container.

FIG. 7 is an enlarged elevational view partially in section of the valve stem and the upper portion of the cylindrical container body.

As above stated, the container of the spraying device of the present invention has, in FIG. 1, a substantially cylindrical body 10 with an inner diameter, including its mouth, of 1 inch, conforming to the dimension of the corresponding valve in normal use. In the figure may be seen the upper end with edge or flange 11 folded at a right angle outwardly with respect to the cylinder's axis, its upper face having annular grooves 12; the whole unit is manufactured by pressure moulding. The body may be considered perfectly transparent and vitreous, and consists of cellulose acetate, whose compact conformation assures the perfect sealing of the body itself, even under the normal pressure conditions suggested for this form of container in its intended use. The gasket 9 and the seal of the metallic edge 8 of the valve on the edge 11 of the container complete the sealing of the functional spraying container or generally the sealing of the discharging and recharging features of this container under the pressure conditions desired.

In addition to the complete transparency conceived for the cylindrical body of this container, a volumetric graduation 13 will be seen. The liquid contained is perfectly visible to the operator, who will thus be able to follow the variations of volume during discharging and recharging operations.

As above mentioned, an advantage of this form of container, if only from the point of view of the cost of the die for the application of the valve, is the fact that the external vertical surface of the valve is only forced, in this case, against the cylindrical inner surface 7 of the container; that is, there are not, as in the usual containers, transverse annular grooves, concentric to the axis of the container, to make the seal between the valve and the container more sure.

The dimensions selected for the container of the present invention are the following: Total length of the container, from the external surface of the upper edge to the lower end of the bottom, 105 mm.; inner diameter at the upper end (corresponding to the valve in commerce) 1 inch; thickness at the upper end about 2 mm. The cylinder is axially tapered towards the bottom, with a sufficient tapering for moulding purposes.

It is clear that, for normal conditions of use as an aerosol sprayer, the valve is complete with its usual members 6, suited to the purpose of the sprayer and forming part of the valve itself.

When the spray has smaller containers (FIG. 4), the composition is the same as that previously considered (cellulose acetate) with manufacturing characteristics similar to the former's; the shape is the same as that of FIG. 1, maintaining substantially its proportions. In this case, the length of the body is 70 mm.; the outer diameter is 17 mm., the thickness of the body 14 of cellulose acetate is about 1 mm. The corresponding valve 15 (FIG. 3) has a cylindrical portion 16, relative to the seal, of an external diameter of about 21.3 mm. The cylindrical body 14 of this container is also naturally provided with a slightly conical tapering towards the bottom, because of the necessary stamping operation.

The devices comprising the complementary members of FIGURES 5 and 6, to be fitted on the end of the valve stem 17, are, as mentioned, used for the discharging of the liquid contained into another container, particularly into that of a cigarette-lighter, and for recharging the first container from a feeding container. Member 18 of FIGURE 5 is made of a resilient material, with its external shape particularly adapted for the necessities of manufacturing, but with an internal shape adapted for mounting the device on the container, with the device being slightly forced or locked on to the valve stem 17 by means of its axial bore 20 having at its lower end 21 a flaring portion and with the device also permitting spraying from a suitably enlarged portion 22 at the opposite end of the same member. Its resiliency, its sealing or locking capacity and its good adaptation for fitting on the stem 17 and into the bore of the container to be charged, assure the practical usefulness of this object, particularly for cigarette-lighters. The perfect transparency of the cylindrical body 10 or 14 of the container and its relative graduation allow the operator to carry out the operation under the best possible conditions.

The other complementary member 23 of FIGURE 6, which, as mentioned, serves for the recharging of the container 10 or 14 from a feeding container, has a body 24 with its lower part shaped somewhat like to that of member 19, and adapted, by means of bore 25 provided

with a flaring portion 26 at its lower end, for fitting or locking on valve stem 17, whether for a large valve (FIG. 2) or for a small valve (FIGURES 3 and 4). A conical bore 28, coaxial with bore 25, serves as a housing for the valve stem of the feeding container, and the axial bore portion 27 serves to connect 25 and 28. As a practical consequence, when recharge of container 10 or 14 is desired, this complementary member 23 is mounted on the relative valve stem, and the valve stem of the feeding container is then introduced into bore 28. By compression of the feeding container on that member, the two containers are connected and the passage of the fluid from the feeding container to the container 10 or 14 is established; this passage may be easily controlled in containers of the present invention, because of their transparency and the graduations applied on their cylindrical surfaces. Any possible momentary balance of pressure between the two containers, with a corresponding blocking of the passage of the fluid or liquid gas, may be instantly eliminated by discharging lightly only the sprayer which is to be charged, and by then resuming the former operation of compression and of connection between the feeding container and the spraying container of the present invention.

I claim:

1. A sprayer for pressurized fluids and liquid gases comprising: an injection-moulded perfectly transparent hollow body of cellulose acetate, said body having a bottom wall, said body having a cylindrical side wall extending from said bottom wall, said side wall having a smooth interior surface and having graduations thereon for indicating the volume of the liquid at any given time, said body having an open upper end with a flange projecting outwardly at a right angle from said upper end, said flange having an upper surface provided with a plurality of concentric grooves, a valve having a lower cylindrical portion which extends into the body and engages the smooth interior side wall of the body, said valve having a sealing gasket engaging the concentric grooves of said flange, said valve having an outer circumferential edge folded over said flange and securing said valve to the body with the sealing gasket and the edge sealing the valve to the body, and said valve having a resilient complementary member removably mounted thereon for activating the valve.

2. The sprayer of claim 1 wherein the resilient member has a coaxial central bore with a lower flaring portion that fits over and engages the valve stem and an upper portion provided with an outlet for spraying.

3. The sprayer of claim 1 wherein the resilient member has a coaxial central bore with a lower portion that fits over and engages the valve stem and an upper conical portion adapted to receive a valve stem of a feeding container.

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