Oct. 12, 1954 J. T. EFFORD ET AL 2,691,466

FLUID DISPENSING PACKAGE WITH PROTECTED VALVE OPERATOR

Filed March 12, 1952

Fig. 1.

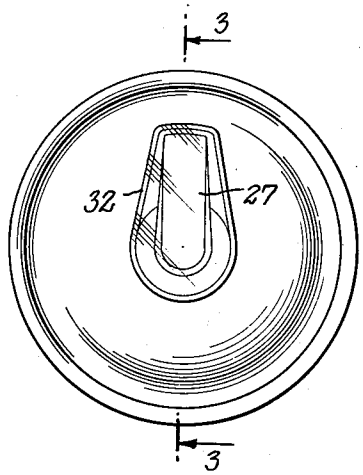


Fig. 2.

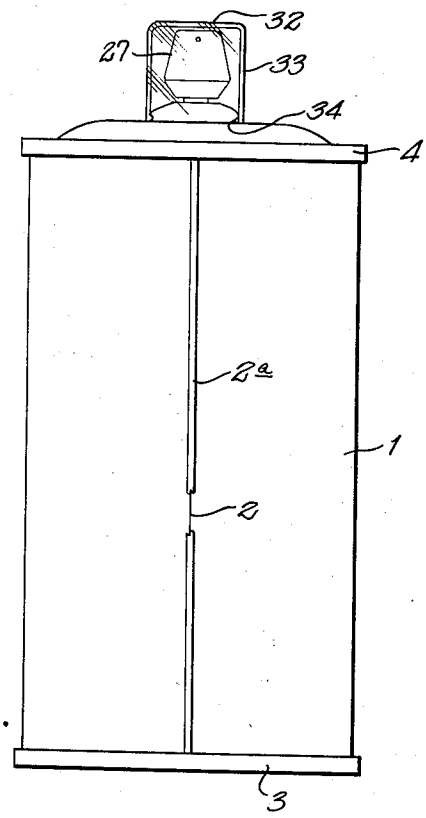
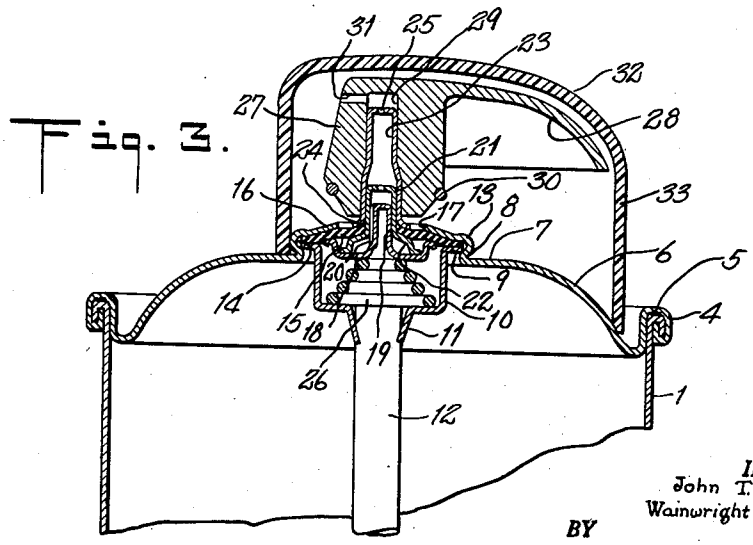


Fig. 3.



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FLUID DISPENSING PACKAGE WITH PROTECTED VALVE OPERATOR

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1 Claim. (Cl. 222—182)

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This invention relates to a dispensing package of the type including a container filled with a liquefied gas propellant for the material to be dispensed and with the container provided with a dispensing valve. The container and valve maintain the propellant under pressure and when the dispensing valve is operated the interior of the package is opened to atmospheric pressure so as to provide a spray of the material. At atmospheric pressure the propellant converts to gas or vapor phase. The container is of a handy size so that it may be held by one hand and the dispensing valve is arranged so that it may be manipulated by the user's finger so as to dispense the material.

The Loven and Efford Patent 2,582,262, issued January 15, 1952, discloses the construction of a package of the described type and which has been a commercial success for a number of years. This particular package has successfully met the severe requirements demanded of its type, exemplified by long shelf life required by the retailer, and the customer's demand for satisfactory dispensing action combined with a valve sealing or reclosing effect sufficiently positive to prevent loss of the packaged contents for long periods of time after initial use of the package.

The package construction of the Loven and Efford patent has produced the problem that the manufacturing cost prevents the sale of the package at a price competitive with cheaply constructed packages. Although cheap packages have not ben satisfactory from the standpoint of either the retailer or the ultimate user, their low selling price has attracted customers. Dissatisfaction with these cheap packages has begun to affect the good reputation previously enjoyed by the dispensing package disclosed by the mentioned patent.

One of the objects of the present invention is to improve on the package of the Loven and Efford patent so that without detracting from its functionality in any way, the manufacturing cost is reduced to a level more competitive with the cheap types. Another object is to reduce the cost of the Loven and Efford patent package without detracting from the appearance or saleability of the device.

A specific example of a package, incorporating the principles, construction and operation of the present invention, is disclosed hereinafter with the aid of the accompanying drawings in which:

Fig. 1 is a top view of the new package;

Fig. 2 is an elevation view of the new package; and

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Fig. 3 is a longitudinal cross section of the top portion of the package taken on the line 3—3 in Fig. 1.

The container includes a body 1 made of sheet metal, such as sheet steel, formed into a cylinder with a soldered side seam 2. The solder is shown at 2a. The body has a bottom with its periphery joined with the periphery of the bottom of the can body by a so-called rubber-sealed double seam 3 such as is commonly used in making tin cans. The resulting bottomed can body may be obtained in standard sizes inexpensively in large quantities from can manfacturers. The bottom, also, may be made of sheet steel.

In assembling the package the liquefied gas, under refrigeration adequate to keep it liquid, is charged into the can. Freon is a commonly used propellant. The material to be dispensed is dissolved in or mixed with the propellant. The top of the container is in the form of an assembly which may be applied by the package manufacturer in about the same fashion that a tin can top end is applied to a bottomed tin can body in the canning industry.

The above assembly includes a can top having a periphery 4 which is mechanically applied to the top of the can body by a rubber-sealed double lock seam 4 shown by Fig. 3. The sealing composition 5, which may or may not actually be rubber, makes a fluid tight joint. Inwardly from this periphery the can top curves upwardly and inwardly as a dome shape 6 and then levels off to provide a substantially flat top central surface 7.

This flat top surface 7 is used to mount the dispensing valve assembly, of the previously identified patent. This surface is reversely bent upwardy into a neck forming an annular outer recess 8. The valve assembly includes a peripheral part in the form of the outwardly extending flange 9 of a spring cup 10 having a bottom connection 11 in which a plastic standpipe 12 is clamped. The neck, being reversely bent outwardly at 13, forms an inner recess 14 receiving the flange 9. Above the flange is loaded a flexible plastic gasket or diaphragm 15, representing another peripheral part of the valve assembly. The recess 14 tightly confines or clamps the flange 9 and the periphery of the diaphragm 15 due to its constricting dimensions relative to these parts. The can top continues further inwardly from this neck at an upward inclination to provide a roof 16 surrounding a hole 17. The mentioned peripheral parts are, of course, clamped to the bottom of this top can end.

The stem elements of a valve stem assembly

project upwardly through the hole 17. The valve assembly includes a valve head comprising an upwardly facing cup 18 whose periphery seats against the bottom of the diaphragm 15 opposite to the roof 16 and a stem 19 that projects upwardly from the bottom of the cup and has a longitudinally extending flow passage 20. This stem 19 is press fitted into a valve stem sleeve 21 receiving the stem 19 and having a flange or shoulder 22 which engages beneath the central portion of the diaphragm 15, the latter having a hole through which the sleeve 21 extends. The valve stem is in the form of a relatively long tubular element 23 that is press fitted over the sleeve 21 and has a bottom end flange 24 pressing against the top of the diaphragm opposite to the flange or shoulder 22 so that the diaphragm is tightly clamped in a fluid tight manner by these parts. The various intertelescoped parts are made from sheet metal by eyelet machines and are hence termed eyelets in the metal forming art.

When the valve stem 23 is rocked the periphery of the valve head 18 is rocked from the bottom of the diaphragm 15 so that fluid can flow through the passage 20. The sleeve 21 is like an inverted cup extending above the stem 19 slightly and having a flow passage or orifice 24 in its bottom, and the upper end of the relatively long valve stem 23 is also like an inverted cup in the bottom of which is formed a hole or orifice 25. In this fashion a plurality of expansion chambers are provided with the dispensed material ultimately spraying through the passage 25.

A helical spiral spring 26 is positioned in the spring cup 10 with the large end of this spring bearing on the bottom of this cup and the small end of the spring bearing on the bottom of the valve head 18. This spring continuously biases the periphery of the cup-like valve head against the bottom of the diaphragm 15 and clamps the latter between this periphery and the roof 16.

It can now be seen that the can end and dispensing valve assembly form an integrated unit which may be made up in large quantities for application to the open tops of ordinary cylindrical cans having soldered side seams. When intended for food this type of can is known as a sanitary can. As previously indicated the charge for the package may be loaded in the empty cans and the can top assemblies, made as described, applied with the usual machinery used to make the rubber-sealed double seam joining the peripheries of the can body top and the can ends. Although ordinarily called a rubber seal it is to be understood that this term embraces any material that is elastic enough to form a fluid tight seal.

As described so far the new package provides all of the fundamental advantages of the described patent construction. The can end required may be stamped or drawn to form by the use of appropriate dies from can end stock, the body 1 being made from any suitable can body stock. Usually these materials are sheet steel in appropriate gages and the parts may be tinned or otherwise coated. The outside of the can body may be lithographed as required for advertising and trade purposes.

The dome shape 6 of the can end or top places the valve stem or nozzle 23 well up in the air where it is conspicuous and where it is easily accessible for rocking or tilting to effect the dispensing action. If the orifice or hole 25 is in the side of the valve stem, the dome shape provides for a proper spray action without interference by the top edge of the seam 4.

Note that the entire top of the can is formed by one single and integral piece of sheet material which not only completes the container enclosure but provides for mounting the complete valve assembly. No other parts are required. The cylindrical side seamed kind of can is the least expensive that can be obtained. The dome shape 6 of the can end makes this inexpensive type as acceptable to the trade as did the more expensive, drawn can body with its formed top used in the case of the Loven and Efford patent construction.

In this new device the valve stem 23 is provided with an operating lever in the form of a thick-walled tubular plastic block 27 from which an opened-bottom lever shell 28 integrally extends transversely. This block 27 has a bore 29 which is press fitted over the valve stem 23, the bottom end of the block having a split spring-wire ring 30 encircling it so as to keep the block tight on the valve stem. The block is preferably made throughout of plastic and many plastics are subject to the cold-flow phenomenon, this spring 30 applying a constant inward radial pressure so as to maintain tightness by taking advantage of this phenomenon. The bore 29 extends somewhat above the top of the valve stem 23 but is upwardly closed, and a side orifice 31 through the block opens the resulting chamber beyond the orifice 25 to the atmosphere. This orifice 31 is of small diameter and no metal nozzle element is used at this location. The orifice 31 points oppositely away from the lever 28 so that depression of the latter, rocking the valve stem 23, causes the spray to eject away from the user when the device is used in a normal manner.

A protective cover 32, preferably made of transparent plastic, is shaped to generally coincide with the shape of the block 27 and lever 28 in an oversize manner. This cover has a side wall or skirt 33 which extends from the top of the cover vertically downwardly to a bottom edge which is contoured to fit snugly on the domed can end. This bottom edge curves so as to fit the dome shape 6 where necessary.

In applying the protective cover 32 its bottom edge is coated with a suitable adhesive and the cover is then fitted into place so that its bottom edge adheres to the can end forming the top of the new device. Most adhesives require continual application of pressure to form a firm joint during this application. In the case of the present invention the two portions of the side wall 33 parallel to the lever 28 are spaced so that their bottom edges tightly encompass or hug the reversely formed annular part 13 of the neck of the can end or top, and the bottom ends of these walls are provided with inwardly extending protuberances 34 which clip or snap into the annular groove or recess 8 of this neck. All plastics are elastic to some degree and these protuberances keep the protective cover firmly anchored until the adhesive sets; subsequently the protuberances function to more firmly anchor the cover and relieve the adhesive from doing all of the work of holding the cover in place.

In the patent form previously described it was necessary commercially to apply adhesive tape around the sliding cap of that form to prevent inadvertent dispensing action during shipping and merchandising. The above described protective cover eliminates the need for this tape

expedient. Furthermore, since the protective cover is adhesively applied a prospective customer can tell immediately whether or not a package has been partially used, an unbroken adhesive seal clearly indicating an unused package. It is to be understood that the adhesive is rupturable by the user and that the cover protuberance may be pulled from the recess 8.

A further advantage of the new cover resides in its straight side walls 33 which form the cover into a structurally rigid unit or column respecting vertical pressure. When the new packages are packed in cartons, somewhat in the fashion of beer cans, the top of the carton may press on the covers 32 of the packages without causing any damage to the packages or operation of their dispensing valves. This strutting or column action is effective even though the plastic covers may be made with relatively thin walls. This strutting action prevails in spite of the dome shape 6 of the can end because the bottom edge of the cover is provided with a corresponding shape, the front wall portion of the cover engaging the can end's neck and being thus braced against backward cam action.

It can now be appreciated that the single sheet of material providing the top of the device not only is the complete end of the inexpensive cylindrical can and not only provides completely for mounting the valve assembly, but it also provides for mounting and laterally positioning the protective cover 32. Its dome shape provides good clearance for the spray orifice 31 when the device is in use and this dome shape in conjunction with the described neck further aids in positively locking the cover against shifting in the event of unusually rough treatment during shipping or merchandising.

It is to be noted that the cover 32 performs all of its functions even though the described operating lever is not applied to the package. In such an event the cover may be formed like a simple inverted cup with its lower edge gripping the neck throughout the latter's circumference. The flat surface 7 provides a good support in such instances which, incidentally, it also does in the case of the illustrated cover 32.

In the described patent device a drawn can body was used to provide an inwardly extending reduced integral top to which the valve assembly was applied by a separate cover wall of cup shape. In this new device the single one-piece can end

eliminates the need for shaping the can body. Insofar as is known, all dispensing packages of the kind described which heretofore used the ordinary cylindrical can having a soldered side seam, required a can end and, in addition, extra parts for installing the valve assembly or the use of soldering for installing the valve assembly. The need for solder or the extra parts is eliminated by the present invention.

We claim:

A dispensing package including a cylindrical can body, a can end for the top of said body and having a central hole, a sealed seam joining the peripheries of said can end and body top, a dispensing valve assembly including a valve stem projecting upwardly through and beyond said hole and peripheral valve parts beneath said can end, an operator applied to said stem above said can end and having a transversely extending lever, and a protective cover over said operator and its lever above said can end and having a side wall with a lower edge resting on the top surface of said can end, said can end being integral throughout and domed upwardly and inwardly from said double seam and having a central portion around said hole elevated substantially above the top level of said double seam, said central portion being reversely bent upwardly into a neck forming outer and inner annular grooves, said valve assembly peripheral parts being clamped tightly in said inner groove and said cover side wall having portions removably hugging said neck with inner protuberances removably inserted in said outer groove, said side wall being vertically straight and forming said cover into a structural column and the lower edge thereof being contoured to fit the top surface of said can end, and rupturable adhesive fastening this edge to said top surface.

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