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2,937,392

ROLL-ON APPLICATOR

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FIG. 1.

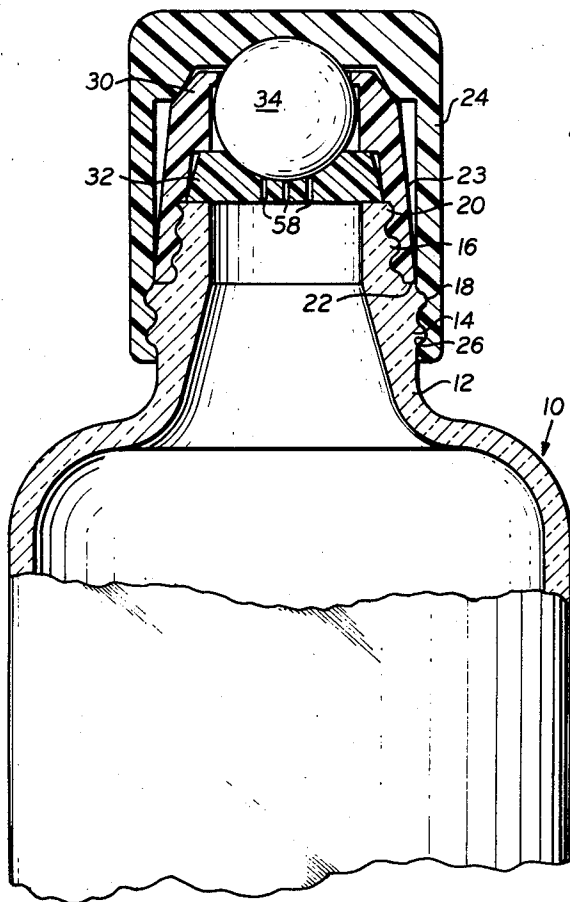


FIG. 2.

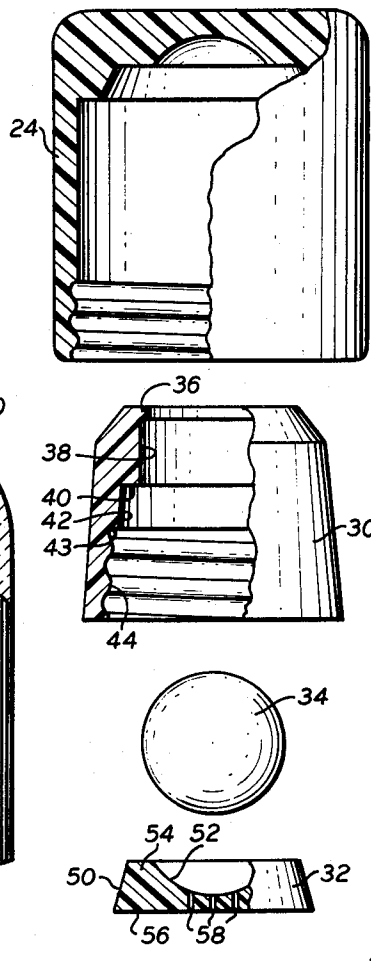
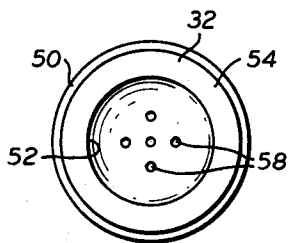


FIG. 3.



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1

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ROLL-ON APPLICATOR

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1 Claim. (Cl. 15—132.7)

This invention relates to a roll-on applicator for liquid inks, cosmetics, medicinal preparations, food products and other liquid substances. This application is a continuation-in-part of my co-pending patent application Serial No. 608,399, filed on September 6, 1956 and now abandoned.

Roll-on applicators are in common use today. They comprise a container for the liquid and a nozzle having a ball seat and a ball rotatably supported on said seat. To apply the liquid to a selected surface, all that need be done is to invert the container so that its nozzle faces downwardly and said container is then moved across said surface with its ball in rolling contact therewith. The ball becomes coated with the liquid contents of the container and it in turn then coats the selected surface with the same material.

This much is conventional and it involves certain disadvantages and drawbacks. For example, in most cases the container is specially made to receive the nozzle and in some cases the container and nozzle are integral with each other. It is not possible to apply the nozzle to standard containers and consequently any shortcomings in the special container would be reflected in the entire unit. Furthermore, it is well known that liquids vary in viscosity and other factors controlling their ability to flow freely through orifices of given dimensions. Consequently, special provision must be made to compensate for these various viscosities and other factors and this is not always possible or feasible in conventional designs. Moreover, conventional containers and nozzle constructions of this general type are usually very complicated in design and correspondingly costly to make. The structural variations required to adapt each unit to the requirements of various liquids involve radical structural changes which are both difficult and costly to effect.

One object of the present invention is the provision of a nozzle embodying a ball-shaped applicator, which may be mounted upon conventional containers. The nozzle is provided with internal screw threads which enable it to be screwed to a bottle or like container having an externally threaded neck. The nozzle is applied to said neck in precisely the same way as a conventional screw cap would be applied thereto. It is therefore possible to apply a nozzle made in accordance with this invention to any desired type of container having an externally threaded neck. For example, in certain cases it may be desirable to have a rigid container such as a bottle made of glass. In other cases it may be desirable to use a squeeze-type container made of plastics. But whatever the requirements of the container, such requirements may be met without regard to the nature or structure of the nozzle since the two are completely separate and independent of each other and are joined solely by means of their respective screw threads.

Another important object of this invention is the provision of interchangeable flow control or metering means to adapt the same nozzle to liquids of different viscosity and other flow factors or requirements. Briefly stated,

2

the present nozzle is provided with a removable and interchangeable ball seat, which constitutes the flow control or metering element of the assembly. This ball seat may be provided with one or more holes of any desired or required shape and dimensions. For example, a very thin liquid which flows exceedingly freely may require only a single small passageway through the ball seat. A thick, sluggish liquid may require a single aperture in the ball seat of relatively substantial proportions or a plurality of such apertures. The ball seat, in the present invention, is made, preferably, of plastic, and it may readily be punctured to specification. This may be done quickly and inexpensively either by the manufacturer or by the user, that is, the packer or bottler who fills the container.

Another object of the invention is the provision of a container for a nozzle of the kind above described, said container having a stepped externally threaded neck, the lower or base portion of the neck being relatively large and the upper or end portion of the neck being relatively small. The nozzle fits over the smaller portion of the neck and a cap fits over the larger portion thereof, thereby enclosing the nozzle.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is a fragmentary vertical section through a bottle having a stepped screw-threaded neck made in accordance with this invention, a nozzle also made in accordance with this invention mounted on said neck, and a cap mounted on the neck.

Fig. 2 is an exploded, partly sectional view, showing the several components which are mounted on the bottle in Fig. 1, showing each component separately.

Fig. 3 is a plan view of the ball seat which also constitutes the flow control or metering element.

Referring in the first instance to bottle 10, it will be observed that it is conventional in all respects below its neck 12 and it may be made of any suitable material such as glass or polyethylene or the like. The neck, however, is stepped to provide a lower or base portion 14 which is relatively large in diameter and an upper end portion 16 which is relatively small in diameter. External screw threads 18 are provided on the base portion of the neck 14 and external screw threads 20 are provided on its upper end portion 16. An annular shoulder 22 is provided between the two neck portions 14 and 16.

A cap 24 is provided with internal screw threads 26 and as Fig. 1 clearly shows, it is adapted to be mounted on the base portion 14 of the neck of the bottle with its screw threads 26 in engagement with the screw threads 18 on said base portion of the neck. The cap may be made of any suitable material, such as thermoplastic or thermosetting plastic and its dimensions should be such as to enable it to accommodate the nozzle assembly hereinafter described.

Turning now to the nozzle assembly, it will be observed that this assembly comprises a nozzle 30, a ball seat 32, and a ball 34. Nozzle 30 and ball seat 32 may be made of any suitable material, preferably plastic such as polyethylene. Ball 34 is made of metal, preferably stainless steel or steel plated with corrosion and rust resisting material, such as nickel, chromium and like metals. It is important that the ball be made truly spherical to relatively high tolerances corresponding to those of balls in ball bearing assemblies.

The nozzle 30 has a somewhat tapered shape, roughly that of a truncated cone whose upper smaller diameter is exceeded only slightly by its lower larger diameter. At its upper or dispensing end, the nozzle is provided with a radially inwardly extending annular lip 36 which constitutes the retaining ring for ball 34. Below said annular lip 36 is a cylindrical portion 38 which accom-

modates the ball 34. At its lower end, the cylindrical portion 38 terminates in the form of an annular shoulder 40 which faces downwardly. Below the annular shoulder is a somewhat tapered section 42 which is adapted to accommodate the ball seat 32. And below the tapered section 42 is a second annular shoulder 43 and below said second shoulder is the internally screw-threaded portion 44 which, as Fig. 1 clearly shows, is adapted to accommodate the upper screw-threaded end portion 16 of the bottle neck 12. It will be observed that annular shoulder 43 abuts lip 23 of the neck of the bottle when the nozzle is screwed thereto in order to provide a tight seal therewith.

Very little need be said regarding the ball 34, except that its diameter is exceeded only slightly by the inside diameter of cylindrical portion 38 of the nozzle, to permit of passage of liquid between the ball and said cylindrical portion. The inside diameter of annular lip 36 should be considerably smaller than the ball diameter to prevent the ball from falling through. It is desirable, within the latter limitation, that as much of the ball surface be exposed through the nozzle as possible since the exposed surface constitutes the contact area between the ball and the work.

The ball seat 32 is shaped, generally, in the form of a disc with a slightly tapered circumferential edge 50. It has a concave recess or socket 52 which is adapted to receive and seat the ball 34 as shown in Fig. 1. When the ball seat 32 is inserted into the nozzle 30, the top surface 54 of said ball seat abuts the annular shoulder 40 of the nozzle. This shoulder constitutes a stop member which limits the upward movement of the ball seat into the nozzle. Hence when the nozzle is screwed to a bottle, such as bottle 10, the lip 23 of said bottle will engage the bottom surface 56 of the ball seat and press the ball seat tightly against shoulder 40 of the nozzle. A liquid-tight seal is thereby provided between the ball seat and nozzle on the one hand and the bottle neck on the other hand.

Thus far, there would be no communication between the inside of the bottle and the ball. In some cases it may be desired to sell the entire assembly in precisely this form, utilizing the ball seat as a seal for the contents of the bottle. It would then be necessary for the ultimate user or consumer to puncture the ball seat with a pin or needle or like instrument in order to provide passage for the contents of the bottle to the ball. In most cases, however, the ball seat would be perforated before it reaches the ultimate consumer and this is illustrated by the five holes 58 shown in the drawing. These holes are formed in the central portion of the ball seat where the recess or socket 52 is formed. The precise number of these holes and their shape and size may vary, as above indicated, with the flow characteristics of the liquid to be dispensed, coupled with other factors and requirements such as the extent of flow desired. Also as above indicated, ball seat 32 is interchangeable with other ball seats of like nature and dimensions, so that a ball seat with relatively large openings 58 may be substituted for one with relatively small openings and vice versa. It will be observed in Fig. 1 of the drawing that when cap 24 is screwed to the neck of the bottle said cap abuts ball 34 and presses the ball against the ball seat 32. This causes the ball to close holes 58 extending through said ball seat and prevents leakage of the contents of

the bottle into the cap when the bottle happens to be placed in an inverted position as, for example, in a lady's handbag.

The foregoing is illustrative of a preferred form of this invention and it will be understood that this preferred form may be modified and other forms may be provided within the broad spirit of the invention and the broad scope of the claim.

I claim:

- 10 A roll-on applicator of the character described, comprising a container having a tubular neck portion through which the contents of the container may be dispensed, said tubular neck portion having external screw threads formed thereon and a peripheral lip at its upper free end,
- 15 a tubular tapered nozzle mounted on said neck portion, said tubular nozzle having internal screw threads which engage the external screw threads of the neck portion to tightly secure said nozzle to said neck portion, said nozzle being provided with an annular radially inwardly extending shoulder adjacent said internal screw threads which engages the lip of said neck portion to provide a tight seal therebetween, a second annular radially inwardly extending shoulder formed in said nozzle a spaced distance above said first mentioned annular shoulder, the interior of said nozzle tapering between said first and second shoulders, a generally disc-shaped tapered ball seat mounted in said nozzle between the lip of said neck portion and said second annular shoulder and being held in place between said lip and said second annular shoulder
- 20 when the nozzle is screwed tight to said neck portion by means of said inter-engaging external and internal screw threads, an annular radially inwardly extending flange formed at the upper end of said nozzle, and a ball rotatably mounted within said nozzle on said ball seat and retained in place by said annular flange, a portion of said ball projecting through the opening defined by said annular flange for engagement with a surface to which it is desired to apply the contents of said container, said ball seat having a concave recess formed therein receiving said ball and being provided with at least one opening formed therein providing communication between the inside of the container below said nozzle and said concave recess, the size of said opening being predetermined with reference to the flow characteristics of the contents
- 25 of said container to control the flow therethrough, an enlarged portion formed on the neck portion of said container below said external screw threads, additional screw threads formed on said enlarged portion, a tubular cap on said neck portion having internal screw threads engaging said additional screw threads and dimensioned to engage the top of said ball to press the same tightly into engagement with said ball seat, the inner wall of said cap being spaced from the tapered portion of said nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

1,977,414	Testa	Oct. 16, 1934
2,700,784	De Brock	Feb. 1, 1955
2,749,566	Thomas	June 12, 1956

FOREIGN PATENTS

169,585	Austria	Nov. 26, 1951
263,054	Switzerland	Nov. 1, 1949
805,545	Germany	May 21, 1951