

May 6, 1958

L. L. LERNER
DISPENSER

2,833,448

Filed Aug. 31, 1954

2 Sheets-Sheet 1

Fig. 1

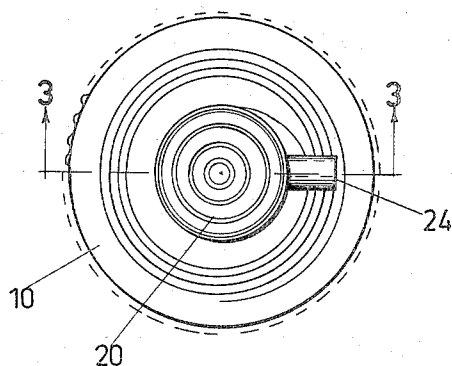


Fig. 2

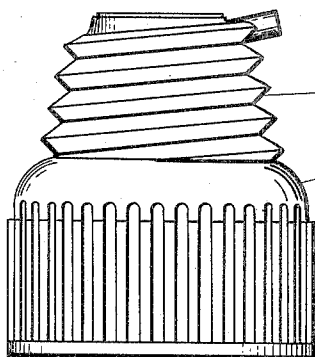


Fig. 3

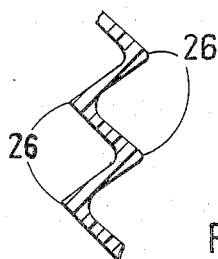
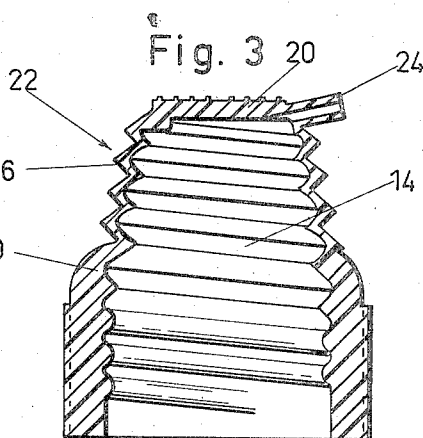


Fig. 4

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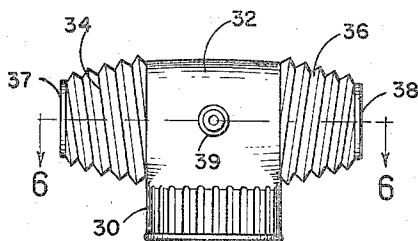


Fig. 5

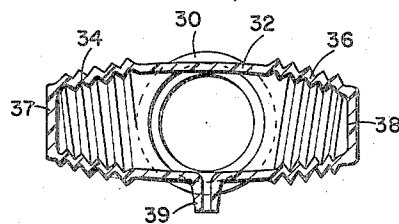


Fig. 6

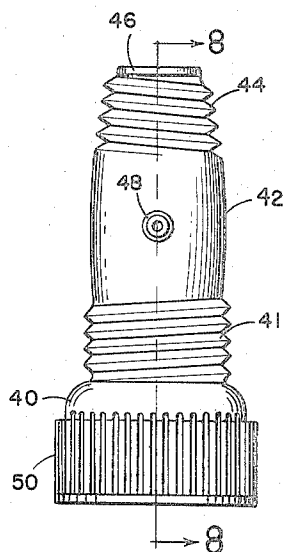


Fig. 7

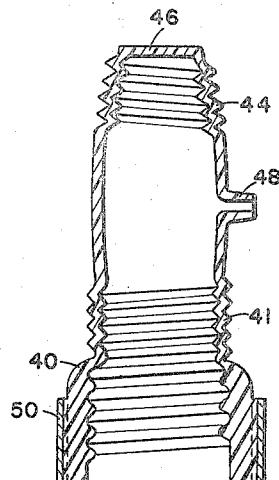


Fig. 8

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2,833,448

DISPENSER

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Application August 31, 1954, Serial No. 453,337

6 Claims. (Cl. 222—209)

This invention relates to a dispenser for fluid materials such as powders or viscous liquids and pertains more specifically to a dispenser for cosmetics such as hand lotions and the like.

One object of the present invention is to provide a dispenser simple in construction and fool-proof in operation which requires no adjustment during use.

Another object is to provide a dispenser having a compressible ejection chamber so designed that it is inherently stable during compression.

Still a further object is to provide a dispenser having a compressible ejection chamber having a flexible, resilient wall in the form of a helical bellows, so that the bending stress during compression or expansion is distributed along the length of the bellows.

An additional object is to provide a dispenser having a compressible ejection chamber of integral, one-piece, molded construction and having a flexible wall in the form of a helical bellows normally biased to an expanded position.

Other and further objects will be apparent from the drawing and from the description which follows.

In the drawings:

Fig. 1 is a plan view of one embodiment of the present invention;

Fig. 2 is a view in side elevation of the embodiment of Fig. 1;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is an enlarged broken away detail view showing the cross-sectional configuration of the bellows wall;

Fig. 5 is a view in side elevation of another embodiment of the invention;

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5;

Fig. 7 is a view in side elevation of still another embodiment of the invention; and

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 7.

In the embodiment shown in Figs. 1 to 3, the dispenser includes a screw cap 10 which is adapted to be threaded upon the neck of a conventional container such as a glass bottle, cap 10 having a central opening 14 through its top. Extending upwardly from the top of the cap and surrounding the opening 14 is a flexible, resilient wall 16 of generally circular cross-sectional configuration, the wall being in the form of a helical bellows and provided with an end closure 20 for its upper end. Wall member 16 and end closure 20 together define a compressible ejection chamber 22 having inlet opening 14 and provided adjacent its upper end with outlet 24. Ejection chamber 22 is generally of the shape of a truncated cone with outlet spout 24 terminating short of the outer periphery of cap 10, that is, the radial distance from the axis of the assembly to the outer end of spout 24 is less than the radial distance from the axis to the outer periphery of cap 10.

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As shown in the drawings, the dispenser is preferably of integral, one-piece, molded construction, either molded as one piece or in separate parts subsequently fused, welded, or cemented together to form an integral one-piece product. Any of the conventional rubbery or plastic materials may be employed in its fabrication, such as natural or synthetic rubber, vinyl plastics, polyethylene, and the like, vinyl plastics or polyethylene being preferred.

In operation, the container is inverted so that the contents flow into chamber 22. End closure 20 is then pushed toward cap 10 so as to compress chamber 22 and force the material outwardly through outlet spout 24. In the case of highly viscous liquids, it is found that the container may even be restored to upright condition before chamber 22 is compressed since the material flows so slowly that it remains within the chamber for an appreciable length of time after the container has been restored to upright position. Compression of chamber 22 provides a pumping action, forcing the contents outwardly through outlet passage 24, which may be of any desired size depending upon the rate of flow desired.

It has been found that the helical configuration of the bellows provides greatly improved stability for the chamber during compression and expansion, tending to prevent the chamber from tilting away from its axis. In addition, the helical configuration tends to distribute the bending stresses at the folds of the bellows uniformly along the length of the helix, so that each fold of the bellows is compressed to approximately the same extent. This feature is particularly important in the case of bellows which are molded from plastic material, since excessive bending of one or a few folds of the bellows would cause concentration of stress, tending to lead to cracking of the wall. In addition, the helical channel at the inner face of the wall promotes drainage of the material in the intervals between use of the device, thus minimizing caking of the material within the folds of the bellows.

Distribution of the bending stresses in the bellows wall can be further achieved by increasing the cross-sectional thickness of the wall at each fold 26 of the bellows, as shown best in Fig. 4. By molding the dispenser with the bellows in expanded position, as shown in the drawings, the inherent flexibility and resiliency of the rubbery or plastic material causes the bellows to be normally biased to the expanded position, no additional springs being required to restore the bellows to expanded position after compression.

The dispenser as described above is of extremely simple construction, having no parts which can get out of adjustment. If desired, however, inlet opening 14 may be provided with a check valve of any conventional construction and outlet opening 24 may also be provided with a check valve so as to achieve an even more positive pumping action upon compression.

In a second embodiment, shown in Figs. 5 and 6, internally threaded cap 30 is surmounted by a generally cylindrical transversely extending chamber 32 having a relatively rigid wall. This chamber communicates through the open top of cap 30 with the bottle or container on which cap 30 is mounted. Disposed at each end of the chamber and secured thereto is a compressible chamber 34, 36 in the form of a truncated cone having a flexible wall in the form of a helical bellows and having end closures 37, 38. Output spout 39 is mounted on rigid wall 32 and projects laterally therefrom.

The operation of this embodiment is similar to that of the first embodiment, the container with cap 30 secured in place being inverted to fill or partially fill chambers 32, 34, 36 with the liquid or powder to be dispensed. Chambers 34 and 36 are then compressed or collapsed by pressing on end closures 37, 38 to eject the material through outlet spout 39.

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In Figs. 7 and 8 is shown still another embodiment in which screw cap 40 is surmounted by a generally cylindrical chamber 41 having a flexible wall in the form of a helical bellows, chamber 41 communicating through its open lower end with the open top of cap 40. A generally cylindrical chamber 42 having a relatively rigid wall extends upwardly from chamber 41 in axial alignment therewith, chambers 41 and 42 being in communication with each other. Mounted on the upper end of chamber 42 is a second compressible chamber 44 in the shape of a truncated cone having a flexible wall in the form of a helical bellows and provided with end closure 46. Outlet spout 48 is mounted on the wall of chamber 42 and projects laterally therefrom. In order to provide additional rigidity for screw cap 40, a metallic reinforcing band or ring 50 is secured in place around its outer periphery. The operation of this embodiment is analogous to that of the first embodiment. This embodiment, like the first embodiment, may be made of integral, one-piece molded plastic construction, or may be assembled from a plurality of separate parts secured together.

Although specific embodiments of the invention have been herein described, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

I claim:

1. A dispenser for powders and viscous liquids comprising a screw cap adapted to be threaded on a bottle neck, said cap having an opening through its top, an ejection chamber mounted on said cap communicating therewith through said opening, said chamber having a flexible integral one-piece resilient wall member in the form of a continuous helical bellows biased to an expanded position by the inherent resiliency of said wall member, and an outlet aperture in the wall of said ejection chamber, the inner periphery of said bellows providing a continuous

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channel in the inner face of said chamber wall to promote drainage of the material to be dispensed from said chamber to the bottle after use of the dispenser.

2. A dispenser as defined in claim 1 in which the flexible resilient wall member defines a truncated conical chamber with its base directed toward said cap.

3. A dispenser as defined in claim 1 in which said ejection chamber includes a portion having a relatively rigid wall member.

4. A dispenser as defined in claim 1 in which said outlet aperture is located in said flexible resilient wall member.

5. A dispenser for powders and viscous liquids comprising a cap adapted to be removably attached to a bottle neck, said cap having an opening through its top, an ejection chamber mounted on said cap communicating therewith through said opening, said chamber having a flexible integral one-piece resilient wall member in the form of a continuous helical bellows biased to an expanded position by the inherent resiliency of said wall member, and an outlet aperture in the wall of said ejection chamber, the inner periphery of said bellows providing a continuous channel in the inner face of said chamber wall to promote drainage of the material to be dispensed from said chamber to the bottle after use of the dispenser.

6. A dispenser as defined in claim 5 in which said bellows wall is of thickened cross-section adjacent each fold of the bellows.

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