July 27, 1943. S. D. SWIHART 2,325,209

DROPPER STOPPER

Filed July 8, 1940

Fig. 1.

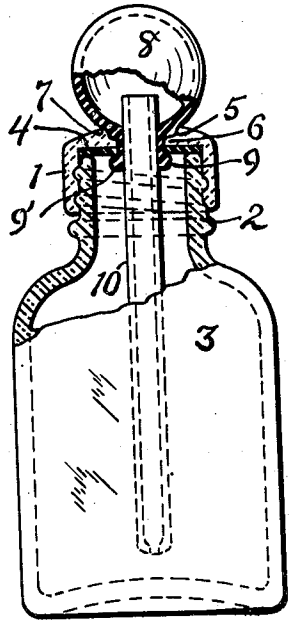


Fig. 2.

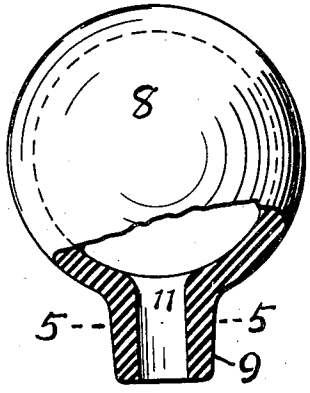


Fig. 3.

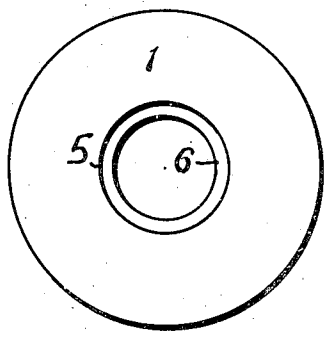


Fig. 5.

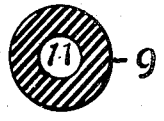


Fig. 4.



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DROPPER STOPPER

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Application July 8, 1940, Serial No. 344,337

5 Claims. (Cl. 221—148)

This invention relates to improvements in a dropper stopper for use in withdrawing small quantities of liquid from a container and to close the container.

Ordinarily, dropper stoppers having a rubber bulb, a glass dropper tube and a bottle cap connected together become broken, or the bulb is easily ruptured around its neck which renders its operation ineffective, and frequently the joint between the tube and the bulb becomes loose, or the joint between the neck of the bulb and the bottle cap becomes defective and therefore causes failure of the device to seal the bottle hermetically when the stopper is applied to the bottle neck.

An object of the present invention is to construct the parts of a dropper stopper so that tight joints are made between the neck of the bulb and the dropper tube, and between the bulb, the bottle cap and the liner thereby to hold all of the parts permanently together in a substantial manner.

Other objects and advantages of the invention appear in the following description.

An illustrative embodiment of the invention is shown in the accompanying drawing, in which—

Fig. 1 is a front elevational view of a bottle provided with a dropper stopper in which the invention is incorporated, a portion thereof being broken away and in section;

Fig. 2 is a front elevational view of the bulb used in the dropper stopper structure, a portion thereof being broken away;

Fig. 3 is a top plan view of the bottle cap used in the structure;

Fig. 4 is a transverse sectional view of the dropper tube; and

Fig. 5 is a transverse sectional view through the neck of the bulb approximately on the line 5—5 of Fig. 2.

Figs. 2, 3, 4 and 5 are drawn upon an enlarged scale.

The illustrative embodiment of the invention consists of a bottle cap 1 preferably threaded onto the neck 2 of a bottle 3. The cap is provided with a liner or gasket 4 disposed within its upper end, and has an axial outwardly flaring opening 5 so made as to provide a radial internal flange 6 surrounding the inner end of the opening and an annular shoulder 7 surrounding the upper end thereof to provide a seat.

A hollow flexible rubber bulb 8 having a neck 9 is secured in connection with a glass stopper tube 10, the bottle cap 1 and the liner 4, by first inserting the neck through the opening 5 in the top of the cap and the liner and subsequently inserting the upper end of the tube through the bore 11 of the neck. The external diameter of the neck 9 of the bulb is proportionately greater than the opening through the flange 6 in the bottle cap, and the bore 11 through the neck is proportionately smaller than the external diameter of the dropper tube 10. Thus, upon insertion of the tube through the bore of the neck, the wall thereof is expanded outwardly and compressed against the surrounding walls of the cap and the liner, and the lower end of the neck re-assumes its natural thickness below the liner so that a retaining head 9′ is thereby formed which prevents the neck from being withdrawn upwardly from its position in the openings of the bottle cap and liner, while the upper end portion of the neck is pressed outwardly over the flange 6 in the cap against the shoulder 7. This has the effect of locking the bulb in a firmly seated position in the cap thereby preventing the bulb from wobbling or becoming bent over and cracked. The pressure of the neck inward around the tube and outward against the wall of the opening in the bottle cap and liner is such as to hold all of the parts firmly together and particularly to keep the bulb lodged in its seat.

In the drawing, the illustrations, Figs. 2 and 4, show the relative sizes of the neck of the bulb and the dropper tube before assemblage of the parts, and Figs. 3 and 5 show the relative sizes of the neck of the bulb and the opening in the bottle cap before insertion of the neck through the opening, the external diameter of the neck being preferably as great or greater than that of the opening in the cap. After the parts are finally assembled in the manner set forth the dropper stopper constitutes a firm structure made up of parts that substantially resists displacement as well as disassemblage which inures to the life of its usefulness.

Variations from the particular construction above disclosed may readily be made by exercise of engineering skill without departure from the spirit or scope of the invention, and the following claims are intended to be inclusive of such variations.

What I claim is:

1. A dropper stopper for a container constituted of a cap provided with a liner therein and adapted to have connection with a container to close same, said cap having an outwardly flaring seat and opening concentric therewith, a compressible bulb having a neck extending through said opening, the external diameter of said neck being initially as great or greater than the open-

ing of the cap and liner, and a dropper tube the external diameter of which is greater than the initial bore of said neck so the parts when assembled are locked together and the bulb is held seated.

2. A dropper stopper for a container constituted of a cap for closing said container provided with an outwardly flaring seat and opening concentric therewith, a compressible bulb having a neck extending through said opening, the external diameter of said neck being initially as great or greater than said opening, and a dropper tube the external diameter of which is greater than the initial bore of said neck so the parts when assembled are locked together and the bulb is held seated.

3. A dropper stopper for a container constituted of a cap for closing said container and having an axial outwardly flaring seat in its top and an opening concentric therewith, a liner disposed within the cap having an opening therein alined with said opening, a compressible bulb having a neck provided with an axial opening extending therethrough, said neck extending through the cap and liner and protruding to a point beyond said liner, and a dropper tube extending axially through said opening and being of greater external diameter than the initial diameter of said opening so the protruding end of the neck is expanded beneath the liner and the parts when assembled are locked together.

4. A dropper stopper for a container consisting of a cap for closing the container and provided with an opening extending through its top, there being a radial internal flange at the lower end of said opening and a shoulder encircling the top thereof, a compressible bulb seated on said shoulder and having a hollow neck protruding through said opening, and a dropper tube positioned with one portion extending in the neck and being so proportioned as to compress the neck between the tube and the surrounding wall of the opening and to expand the protruding portion of said neck wherefore to lock the bulb and cap together.

5. A dropper stopper for a container constituted of a cap for closing said container, having an axial opening and surrounding seat in its top, a compressible bulb having a neck provided with an axial bore extending therethrough, said neck initially extending loosely through the opening in said cap with its lower end protruding, and a dropper tube extending axially through the bore of the neck past said opening, the size of the tube being larger than the normal bore of said neck so that when the bulb, cap and tube are assembled, the protruding end of the neck is expanded radially outward to form a head, wherefore the assembled parts are locked together.

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