April 17, 1951 F. N. STOVER 2,549,258

FOAM MAKING AND DISPENSING MEANS

Filed July 30, 1948

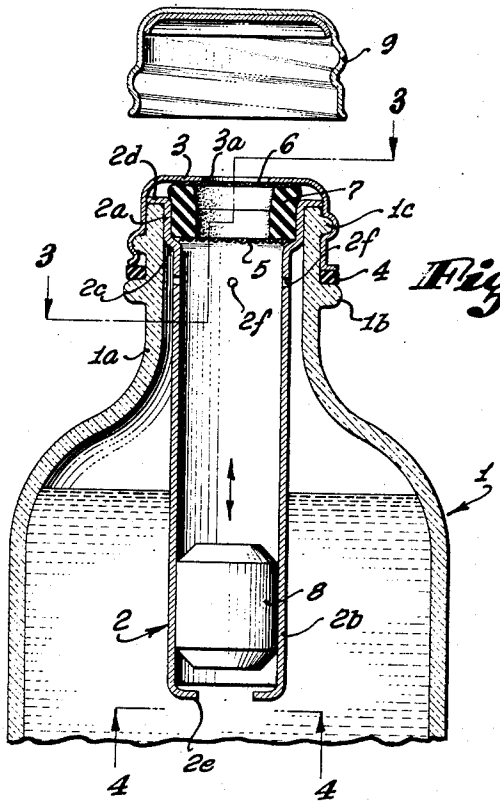


Fig. 1.

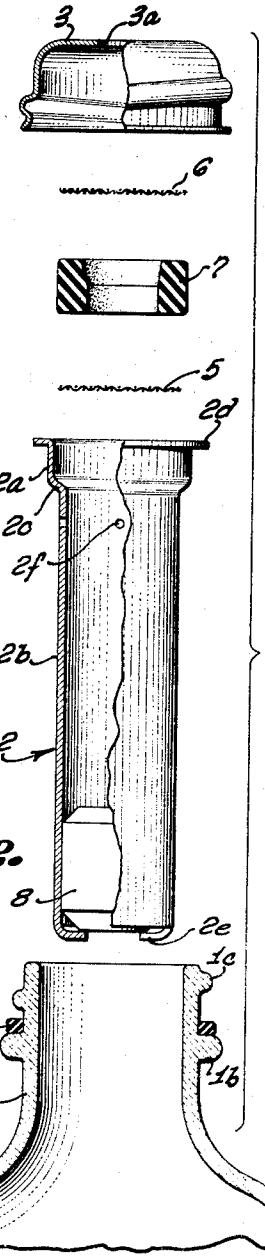


Fig. 2.

Fig. 3.

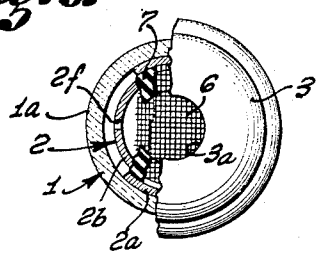
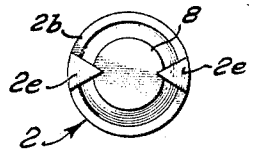


Fig. 4.



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FOAM MAKING AND DISPENSING MEANS

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2 Claims. (Cl. 261—24)

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My invention relates to a foam-making and dispensing means.

One of the principal objects of this invention is to provide a means of this class whereby liquid may be readily dispensed from a container and converted into foam as it is being dispensed.

Another important object of this invention is to provide a device which may be easily inserted into the neck of a bottle, or other container, and tightly secured thereto for converting to foam the liquid therein as it is dispensed therefrom.

An important object also of this invention is to provide a device of this class having simple means for pumping a small portion of the liquid from the container, and forcing it therefrom through means to aerate or convert it into foam.

A further important object of this invention is to provide simple and effective means for quickly aerating or converting the liquid into foam as it is being dispensed.

Still another important object of this invention is to provide a simple cap for closing the container over the means which secures the foam-making and dispensing means to the container.

With these and other objects in view, as will appear hereinafter, I have devised a foam-making and dispensing means having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail, and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a fragmentary sectional elevational view of the upper end of a container with my foam-making and dispensing means, in a preferred form, secured to the discharge or neck end thereof, the closing cap for the container being shown raised free of the discharge end thereof;

Fig. 2 is a partially exploded view of some of the elements of the container and foam-making and dispensing means, with the exception of the closing cap;

Fig. 3 is an enlarged transverse sectional view thereof, taken through 3—3 of Fig. 1; and,

Fig. 4 is an enlarged transverse view, taken at 4—4 of Fig. 1.

The container 1, shown in the drawings, to which my foam-making and dispensing means is applied, is an ordinary bottle having a neck 1^a with an annular flange 1^b, and an externally threaded portion 1^c outwardly from the flange.

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In this bottle is adapted to be contained a liquid to be dispensed, such as a liquid for cleaning purposes, and which is to be dispensed as a foam.

The means shown is a tube 2 having a large diameter outer portion 2^a, and a smaller diameter inner portion 2^b which is axially aligned with the former. An annular shoulder 2^c is formed between the smaller and larger diameter portions. The large diameter portion 2^a is made to fit the interior of the neck of the bottle, and a shoulder 2^d provided at the outer end of the larger diameter portion 2^a rests upon the end of the neck.

The tubular member 2 is secured in position by means of a cap 3 which fits the threads 1^c of the neck of the bottle. The inner end of the cap 3 is seated upon the flange 1^b, a gasket 4 being preferably interposed between the cap and the flange.

The foam-making means consists essentially of a pair of screens 5 and 6, the former being seated upon the annular shoulder 2^c while the latter is positioned substantially at or over the outer end of the tube. The screens are separated by a cylindrical or tubular spacer 7 which is made of rubber, or similar resilient material. The outer screen 6 is secured to the outer end of the spacer 7 or to the outer end of the tube by means of the head of the cap 3, as shown best in Fig. 1.

The head of the cap 3 is provided with a relatively large central perforation 3^a through which the foam is dispensed, after being formed within the chamber between the two screens.

In the small diameter portion of the tube is a free piston 8, which may freely reciprocate within the tubular portion 2^b as the bottle, or other container, is shaken. This piston is made of a relatively heavy material, preferably metal. The inner end of the tubular portion 2^b has a stop consisting of ears 2^e turned inwardly from the inner end of the tube. This stop limits the inward movement of the piston and supports the latter when the container is in upright position.

The wall of the tubular portion 2^b is provided with inlet means which may consist of one or more small perforations 2^f, these being located immediately below the inner screen 5.

To operate the dispenser, the container 1 is held in a hand of the operator in a nearly inverted position, that is, with the neck 1^a directed substantially downwardly. At this time the liquid, which must, of course, be of a viscous nature capable of producing foam when aerated, may flow into the tube 2 to force the piston 8 outwardly toward the inner screen 5. To create

and dispense the liquid in the nature of a foam, the container is merely shaken in an axial direction. During this reciprocation of the container, as the same is thrown violently forwardly in a downward direction the weighted piston 8 is propelled upwardly toward the end 2e of the tube 2.

At the start of this upward movement of the piston 8, the latter uncovers the small perforations 2f of the tube and a small amount of the viscous liquid enters the tube, this flow being augmented, at least to a slight degree, by a partial suction created within the tube due to displacement of the piston. At the same time a small volume of air is drawn into the tube through the fine mesh screens 5 and 6. This rapid intermingling of the liquid and air cause the liquid to be aerated or broken up into extremely minute particles which are, in effect, suspended in the air so that a foam is produced.

When the movement of the container is reversed so that it is propelled upwardly, the inertia imparted to the weighted piston 8 causes the latter to be forced rapidly downwardly. While it might be expected that during this movement of the piston the minute bubbles of the viscous liquid would be discharged from the tube 2 through its restricted perforations 2f, such is not the case since the foam seeks the path of least resistance, that is, in a downward axial direction. It will be apparent that during this movement of the piston the liquid in the container is also violently thrown toward the outlet end of the container so that it immediately covers the perforations 2f to provide a barrier for resisting outward flow of the foam through the perforations. It is thus seen that the foam is forced downwardly through the screen 5 and into the annular spacer 7 to displace foam previously formed and partially dispensed thereinto. During passage of the minute particles of the viscous liquid through the screens 5 and 6, the particles are further broken up so that when the foam finally oozes through the outlet opening 3a it is of an extremely light and fluffy nature.

A cap 9 has threads which fit the threads of the perforated cap 3, for closing the container.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. The combination with a container having a neck, of a tube having an outer portion fitting the interior of the neck and a smaller diameter portion extending axially inwardly therefrom into the container and forming an annular shoulder between the smaller and larger diameter portions, a screen supported on the shoulder, a tubular rubber spacer above the screen, a second screen at the outer end of the spacer, the wall of said tube having a small perforation inwardly from the shoulder, and a free plunger reciprocally mounted in the smaller diameter portion of the tube for drawing liquid from the container through the small perforation and forcing it through the screens.

2. The combination with a container having a neck, of a tube having an outer portion fitting the interior of the neck and a smaller diameter portion extending axially inwardly therefrom into the container and forming an annular shoulder between the smaller and larger diameter portions, a screen supported on the shoulder, a tubular rubber spacer above the screen, a second screen at the outer end of the tube and spacer, a perforated cap securing the second screen over the outer end of the tube and the tube to the outer end of the container, the wall of said tube having a small perforation inwardly from the shoulder, and a free plunger reciprocally mounted in the smaller diameter portion of the tube for drawing liquid from the container through the small perforation and forcing it through the screens.

FRED N. STOVER.

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