June 20, 1967 R. C. LAMPE 3,325,844

END CLOSURE ARRANGEMENT FOR DISPENSING FOAMABLE LIQUIDS

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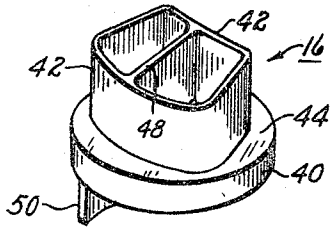
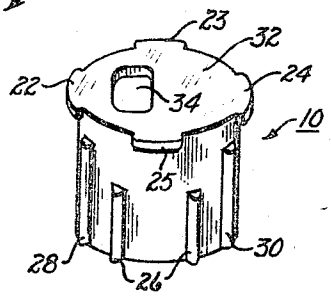


Fig. 1



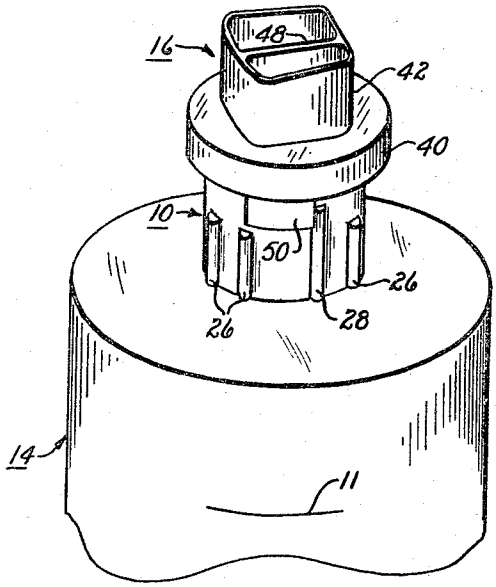
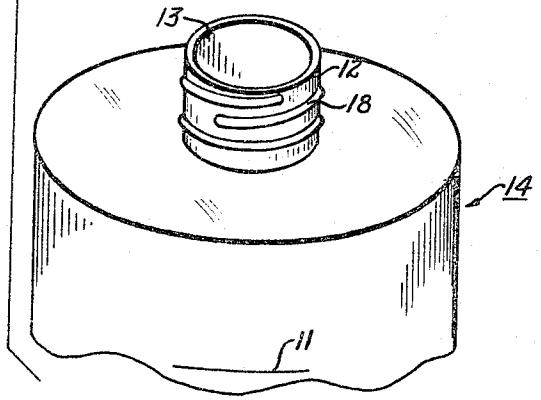


Fig. 2



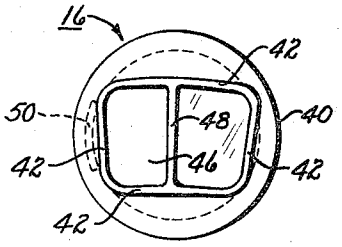


Fig. 5

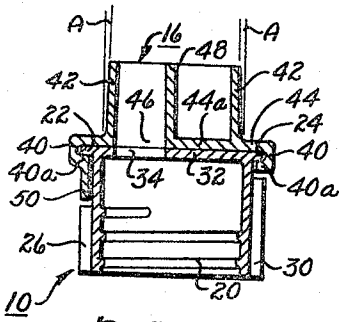


Fig. 3

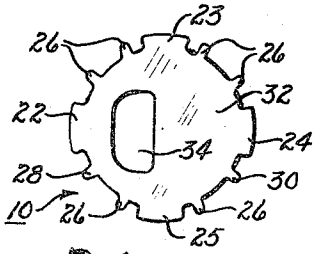


Fig. 4

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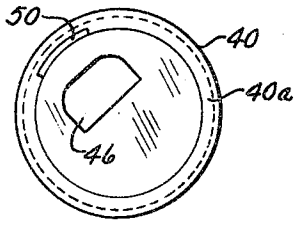


Fig. 6

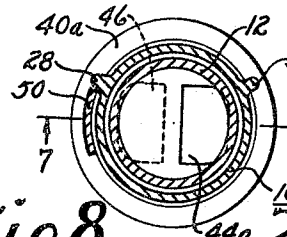


Fig. 8

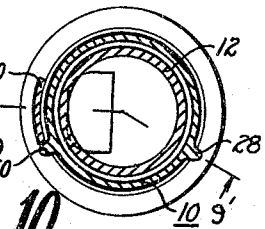


Fig. 10

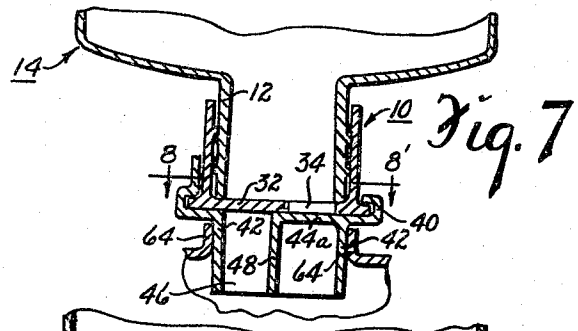


Fig. 7

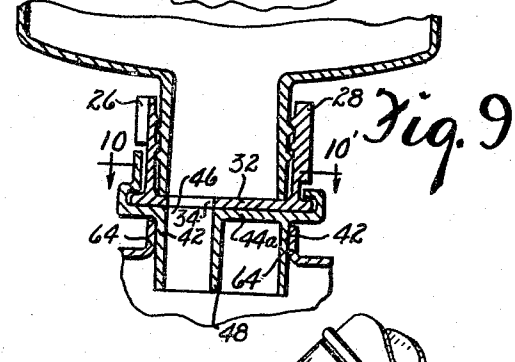


Fig. 9

Fig. 14

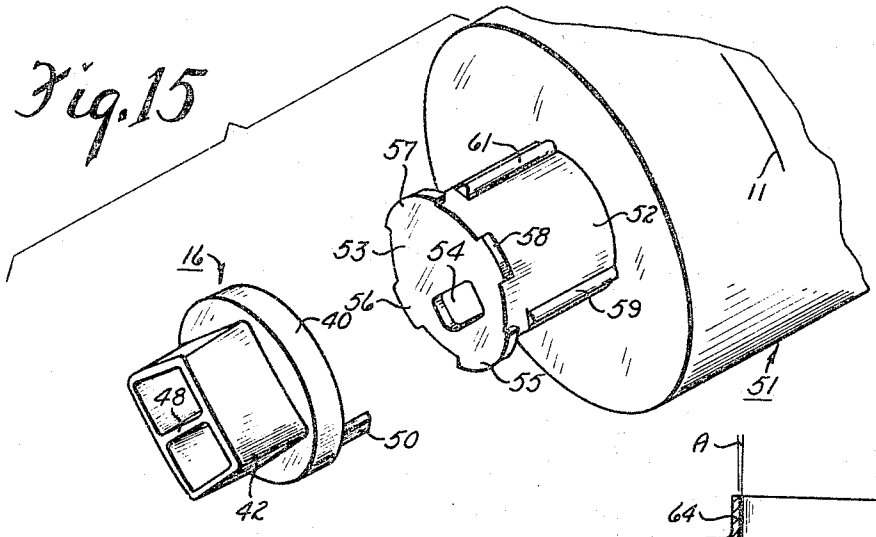
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END CLOSURE ARRANGEMENT FOR DISPENSING FOAMABLE LIQUIDS

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Fig. 15



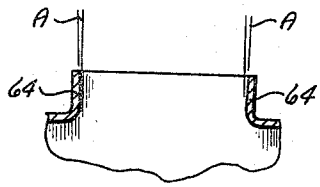
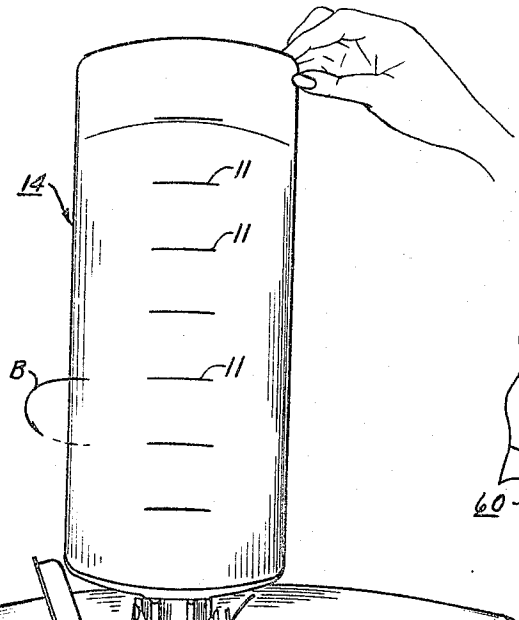


Fig. 12



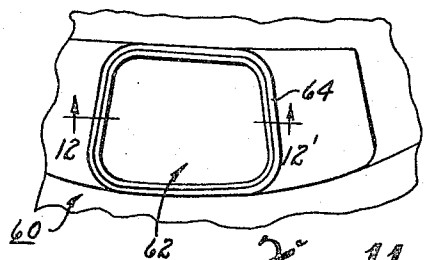


Fig. 11

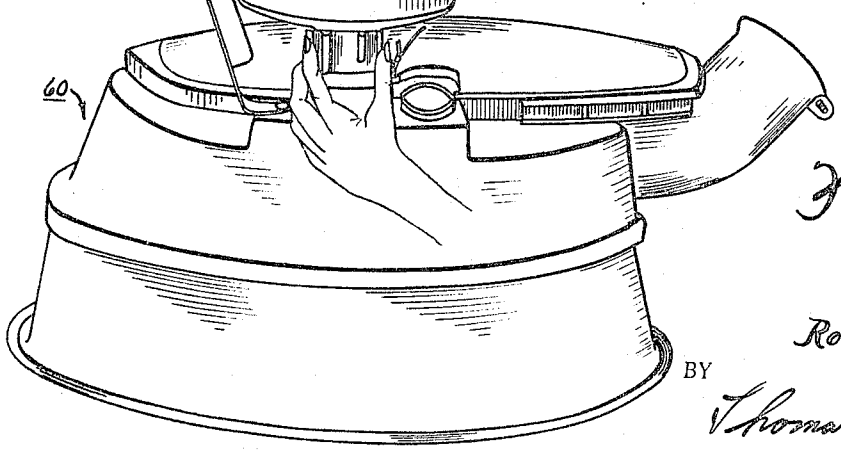


Fig. 13

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Fig. 16

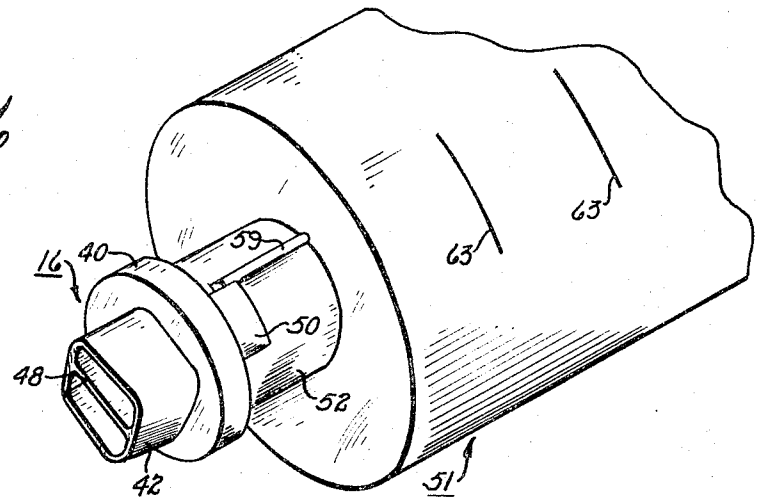


Fig. 17

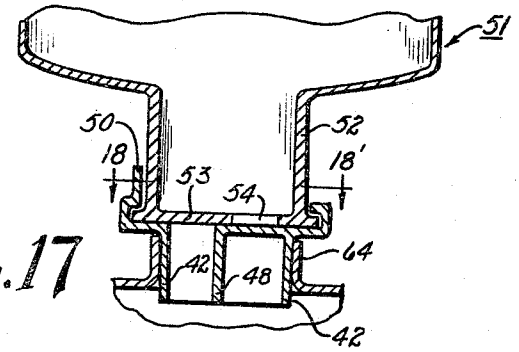


Fig. 18

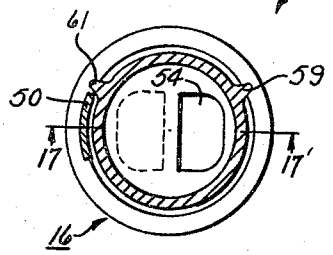


Fig. 19

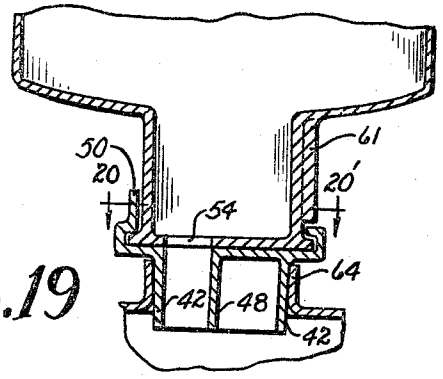
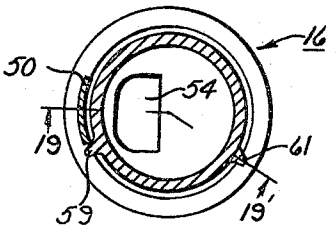


Fig. 20



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United States Patent Office 3,325,844 Patented June 20, 1967

3,325,844

END CLOSURE ARRANGEMENT FOR DISPENSING FOAMABLE LIQUIDS

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Filed July 27, 1964, Ser. No. 385,163
4 Claims. (Cl. 15—50)

This invention pertains, in general, to the dispensing of liquids which foam profusely when agitated or otherwise aerated, such as rug washing detergents, or rug shampoos, as they are often called; and, in particular, to an end closure arrangement including a pouring spout and a valve for enabling the transfer of foamable liquid from a bottle, or like container, to another container with which the pouring spout effects a seal so that foam generated during the transfer will be confined within the bottle and the container rather than allowed to escape from the container to cause a messy condition and waste of foam and liquid.

For the reasons set forth in greater detail in U.S. Patent No. 3,121,896 (granted Feb. 25, 1964, to Oliver L. Allen et al.) the use of a foaming liquid detergent for shampooing rugs is much preferred over a non-foaming liquid detergent. Briefly, if liquid detergent is applied directly to the rug, an excessive wetting of the rug occurs and after it dries it often is discolored as a result of the excessive wetting. However, if a detergent in foam form is applied to the rug very little wetting of the rug occurs and when it has dried very little or no discoloration appears.

While the rug washer disclosed in the Allen et al. patent, hereinbefore identified, performs the rug shampooing function very well, it has been discovered that the use of a foamable liquid detergent therein presents a serious problem. As a measured quantity of the foamable liquid detergent is poured from its bottle through the rug washer's inlet port into a detergent holding reservoir in the rug washer there occurs a profuse foaming of the liquid due to the agitation and aeration of the liquid while it is being poured. Often, the foam generated backs up out of the reservoir through the inlet port and onto the outer surface of the rug washer. Often, too, the foam on the top surface of the rug washer runs down the sides of the rug washer and onto the floor surface or rug creating a messy condition which usually must be cleaned up immediately. In addition, there occurs a needless waste of the liquid and foam.

One object of the present invention is to enable the transfer of foamable liquid from a bottle to a container, such as a rug washer's reservoir, while preventing the foam generated during the transfer from escaping from either the bottle or the reservoir.

In accordance with the present invention there is provided an end closure arrangement which, according to one illustrative embodiment thereof, is comprised of: an internally threaded cap which is intended to be screw connected in the conventional way to the externally threaded neck of a bottle containing a foamable liquid detergent; and a spout which is fitted over the top surface of the cap. The top surface of the cap is closed, except for an eccentrically located aperture therethrough. Also, that surface portion of the spout which is in face to face abutment with the cap's top surface is also closed, except for a similar eccentrically located aperture. In addition, the spout is contoured so that it fits within the rug washer's inlet port in sealed relation therewith. The apertured top surface of the cap and the apertured surface of the spout which is in face to face abutment with the cap's top surface define a valve. This valve is open when both of the eccentrically located apertures are in register and the valve is closed when the top surface of the cap covers the spout's aperture and the surface of the spout, likewise, covers the cap's aperture.

Assuming that the valve is closed initially it is intended that the rug washer's reservoir be filled with the foamable liquid detergent in the following manner:

The bottle is inverted and the spout is inserted in the rug washer's inlet port in sealed relation therewith. The conforming shapes of the spout and inlet port are non-circular so that the spout which is fitted over the cap cannot be rotated or turned relative to the rug washer while the spout is within the inlet port. In order to open the valve and allow the foamable liquid to flow through the spout into the reservoir, the inverted bottle and its cap are rotated as a unit relative to the stationary spout until the cap's aperture comes into register with the spout's aperture. After a measured quantity of the foamable liquid has been dispensed, the bottle and its cap are rotated as a unit in the reverse direction relative to the stationary spout until the valve closes.

Thus, with such an end closure arrangement a sealed transfer of the foamable liquid from the bottle to the rug washer's reservoir is enabled and the foam generated during the transfer will be confined within the reservoir and bottle. It cannot escape therefrom to cause the mess and waste hereinbefore described.

In accordance with a second embodiment of the invention the separate cap is eliminated and the neck of the bottle is so constructed that its top surface is closed, except for an eccentrically located aperture therethrough which communicates with the interior of the bottle. A spout like that hereinbefore described is fitted over the top surface of the bottle's neck. Thus, the apertured top surface of the bottle's neck and the apertured spout define a valve. The end closure arrangement according to the second embodiment is intended to be used in the same manner to fill the rug washer's reservoir as hereinbefore described with reference to the first embodiment.

Further objects as well as the many features and advantages of the invention will become apparent from the following description when considered in conjunction with the accompanying drawings in which:

FIG. 1 is an exploded perspective view showing a spout and cap which form a first embodiment of the subject end closure for a bottle containing a foamable liquid detergent;

FIG. 2 is a perspective view showing the spout and cap assembled on the neck of the bottle;

FIG. 3 is a vertical section of the spout and cap as assembled;

FIG. 4 is a plan view showing the top of the cap;

FIG. 5 is a plan view showing the top of the spout;

FIG. 6 is a view of the bottom of the spout of FIG. 5;

FIG. 7 is a sectional view, taken along section line 7–7′ in FIG. 8, showing the bottle and its assembled end closure inverted and inserted in the inlet port of the rug washer with the end closure's valve in a closed condition;

FIG. 8 is a sectional view taken along the section line 8–8′ in FIG. 7;

FIG. 9 is a sectional view like FIG. 7, taken along section line 9–9′ in FIG. 10, with the exception that the end closure's valve is open to permit a foamable liquid to enter the rug washer's reservoir through the reservoir's inlet port;

FIG. 10 is a sectional view taken along the section line 10–10′ in FIG. 9;

FIG. 11 is a plan view showing the shape of the rug washer's inlet port;

FIG. 12 is a section view taken along line 12—12 in FIG. 11;

FIG. 13 is a perspective view showing the inverted

bottle and end closure with the spout portion thereof arranged within the inlet port of the rug washer just prior to rotating the bottle and cap to open the end closure's valve;

FIG. 14 is a vertical section through the arrangement shown at FIG. 13;

FIG. 15 is an exploded perspective view of a second embodiment of the invention;

FIG. 16 is a perspective view showing the various parts of the second embodiment of FIG. 15 in their assembled condition;

FIG. 17 is a sectional view taken along section line **17—17** of FIG. 18 showing the assembly of FIG. 16 as inverted with the spout portion thereof inserted in the inlet port of the rug washer with the valve mechanism closed;

FIG. 18 is a sectional view taken along the section line **18—18** of FIG. 17;

FIG. 19 is a sectional view taken along section line **19—19** of FIG. 20 showing the assembly of FIG. 16 as inverted with the spout portion thereof within the rug washer's inlet port with the valve mechanism thereof in an open condition to permit the foamable liquid in the bottle to enter the rug washer's reservoir; and,

FIG. 20 is a sectional view taken along the section line **20—20** of FIG. 19.

A first embodiment of the subject end closure is shown in the exploded perspective view at FIG. 1. The end closure is comprised of a cap **10** and a spout **16**. The cap **10** and spout **16** are to be assembled with a bottle, designated generally by the reference number **14**, for containing a foamable liquid detergent, such as a rug shampoo. The bottle **14** is a conventional bottle having a neck **12** with an opening **13** in the top thereof which communicates with the interior of the bottle. On the outer periphery of the neck **12** there is provided a projecting spiral thread **18**. The bottle **14** is preferably formed from a transparent or somewhat transparent material, such as glass or polyethylene so that the level of the liquid therein may be observed.

The cap **10** may be molded from a relatively hard material, such as Bakelite or a hard melamine plastic. The cap **10** is of a generally cylindrical shape and it has, as shown at FIG. 3, an internal spiral groove **20** which receives the projecting spiral thread **18** when the cap is screwed onto the neck of the bottle. The cap is provided with a roof **32** which has a relatively flat outer surface through which an aperture **34** is provided, the aperture **34** being eccentrically located with respect to the center of the roof **32** as indicated at FIGS. 1, 3 and 4. Four ledges **22**, **23**, **24** and **25** integral with the roof **32** extend outwardly from the roof **32**. These ledges serve to retain the spout **16** when it is fitted over the cap **10** as shown at FIG. 3.

In the outer periphery of the cap **10** there is formed a plurality of projecting ribs **26**. As will become clear from the discussion hereinafter appearing, these ribs **26** enable the cap **10** to be firmly grasped by a person's fingers during the liquid dispensing operation. Also formed in the cap's outer periphery are two outwardly projecting stop members **28** and **30** which serve to limit the angle through which the cap **10** and bottle **14** may be rotated relative to the spout **16**. The stop members **28** and **30** will, as explained hereinafter, abut against another stop member **50**, or tab, provided on the spout **16**.

The other part of the end closure according to the first embodiment is the pouring spout **16** which is molded from a material that is softer and more flexible than the material from which the cap **10** is made. For example, the spout **16** may be molded from polyethylene or the like. The spout **16** has a skirt **40** which extends downwardly from a floor portion **44**; the skirt **40** having an inwardly turned ledge **40***a* as indicated at FIG. 3. Since the spout **16**, as well as the skirt **40** and ledge **40***a* are of

relatively soft material, it can easily be temporarily deformed and forced over the ledges **22**, **23**, **24** and **25** of the cap, as indicated at FIG. 3, so that when assembled the ledge **40***a* is under the ledges **22–25** with the ledges **22–25**, in turn, being under the floor portion **44** of the spout. As a result, the spout **16** is securely retained on the top of the cap **10** and relative rotation between the cap and spout is permitted in the manner hereinafter described.

Extending upwardly from the floor portion **44** is a wall **42** which defines a four wall enclosure or duct. As indicated at FIG. 3 the upwardly extending wall **42** tapers inwardly by a small angle A so that it can enter and make sealed contact with the complimentary tapering wall **64** which defines the inlet port **62** of the rug washer **60** (FIGS. 11 and 12). The rug washer **60** is fully described in the Allen et al. patent, hereinbefore identified. Within the four wall enclosure defined by wall **42** there is a reinforcing wall **48** which is integral with the wall **42** and a floor **44***a* which is within the four wall enclosure. As indicated in the drawing the reinforcing wall **48** divides the four wall enclosure into two compartments. The reinforcing wall **48** serves two purposes: First, it provides lateral rigidity for the four wall enclosure, preventing buckling of the wall **42** away from the inlet port's wall **64** when the four wall enclosure is inserted into the rug washer's inlet port **62** (FIGS. 7 and 9), thereby ensuring a sealed fitting of the wall **42** with the wall **64**. Second, it serves to prevent buckling or curling of the floor **44***a* and thus prevent leakage of the liquid detergent between the floor **44***a* and the roof **32**.

When the spout **16** is fitted over the cap **10** there is defined a valve mechanism. That is, the cap's roof **32** and its eccentrically located aperture **34** and the spout's floor **44***a* and its eccentrically located aperture **46** define the valve. The valve is closed when the spout's floor **44***a* covers the cap's aperture **34** as shown in FIG. 7; and the valve is open when both of the eccentrically located apertures **34** and **46** are aligned, in the way hereinafter described, so that they are in register as shown in FIGS. 3 and 9.

FIGS. 7–10, 13 and 14 illustrate the manner in which the liquid is dispensed from the bottle **14** into the reservoir **68** of the rug washer **60**. First, it is assumed that the valve mechanism, hereinbefore described, is closed and the bottle **14** is inverted as shown at FIGS. 7, 9, 13 and 14. When inverted, the wall **42** of the spout **16** is inserted into the rug washer's inlet port **62** in sealed relationship therewith. The wall **64** encompassing the inlet port **62** is, as shown at FIG. 12, outwardly tapered as indicated by the angle A to receive the inwardly tapering wall **42** of the spout **16** so that the outside surface of the wall **42** can make intimate contact with the inside surface of the wall **64** to provide the aforementioned seal. In order to open the valve to bring the apertures **34** and **46** into registry, the bottle **14** together with its cap **10** is rotated in a clockwise direction as indicated by the arrow B in FIG. 13. In so doing the projecting stop members **28** and **30** are rotated through a little more than 180°. When the valve is closed these stop members **28** and **30** are in the position shown in FIG. 8. However, after rotation, as may be appreciated from FIG. 10, the projecting stop member **30** abuts the tab member **50** to prevent further rotation thereof. Thus the aperture **34** is rotated into registry with the aperture **46**, as shown at FIGS. 9 and 10 to permit the foamable liquid to enter reservoir **68**. Since the bottle **14** is at least somewhat transparent the falling level of the liquid may be viewed with reference to the graduation marks, such as **11** (see FIG. 13) until a predetermined amount of liquid is dispensed. After the predetermined amount of liquid has been dispensed, the bottle **14** together with the cap **10** are rotated in a counterclockwise direction to return the bottle **14** and its cap **10** to the position shown at FIGS. 7 and 9. It is to be noted that during the opening and closing of the valve the spout **16** remains stationary and only the bottle **14** together with its cap **10** are rotated. Furthermore, when

the bottle is rotated together with its cap in a clockwise direction to open the valve, the threads **18** on the bottle's neck tend to tighten in the threaded groove **20** of the bottle cap. Thus, the cap **10** rotates in unison with the bottle. However, when the bottle and cap are rotated counter-clockwise to reclose the valve there is some tendency to unscrew the bottle from the cap. However, this may be prevented by grasping the projections **26** with the left hand as shown at FIG. 13 to ensure counter-clockwise rotation of the bottle **14** and the cap **10** in unison so that the bottle will not become unscrewed from the cap **10**.

Since the liquid will tend to foam as it is being dispensed into the reservoir **68** the foam will be confined within the reservoir or within the bottle **14**, and foam generated in the reservoir may be displaced therefrom into the bottle by the liquid flowing into the reservoir from the bottle. Upon closure of the valve the foam then in the reservoir will be confined to remain therein, and in order to prevent this foam from backing up out of the inlet port **62** after the bottle and spout have been removed, a cap **66** provided on the rug washer **60** may be immediately closed, thus limiting any foam that does escape from the inlet port **62** to a negligible amount.

The second embodiment of the invention is illustrated at FIGS. 15–20. As shown there is employed a spout **16** of the same kind as is employed in the first embodiment. However, a bottle **51** is used which has a neck **52** that is modiffied so that a cap, such as the cap **10** of the first embodiment, may be eliminated. As shown the neck **52** has a relatively flat surfaced roof **53** in which there is an eccentrically located aperture **54**. Extending outwardly from the roof **53** are the four ledges **55**, **56**, **57** and **58** which serve the same purpose as the ledges **22–25** in the first embodiment. The neck **52** also includes two projecting stop members **59** and **61** which serve the same purpose as the projecting stop members **28** and **30** on the cap **10** of the first embodiment. Since the spout **16** is formed from a relatively soft flexible material, such as polyethylene it may easily be fitted over the ledges **55–58** as suggested in FIG. 16, wherein the spout **16** is shown assembled on the neck **52** of the bottle. FIGS. 17 and 19 show in more detail how the inwardly turned ledge **40***a* is situated relative to the projecting ledges.

The manner of dispensing the foamable liquid from the bottle **51** is the same as that hereinbefore described with reference to the first embodiment. The bottle **51** with its spout **16** is inverted and inserted into the inlet port **62** of the rug washer in sealed relationship therewith. Initially the valve which is defined by the eccentrically located aperture **54** in the roof **53** and the eccentrically located aperture **46** in the floor of **44***a* is closed as shown in FIG. 17. In order to open the valve to the position shown at FIGS. 19 and 20 such that the apertures **54** and **34** are in registry the bottle **51** is rotated in a clockwise direction. With the valve open a predetermined amount of liquid may with the aid of the graduation marks **63** (FIG. 16) be dispensed into the reservoir **68**. After this predetermined amount of liquid has been deposited in the reservoir the valve mechanism may be returned to the closed position as indicated at FIGS. 17 and 18 by rotating the bottle in a counter-clockwise direction. Again it is to be noted that only the bottle **51** and its integral neck portion **52** are rotated during the opening and closure of the valve, the spout **16** being held stationary within the inlet port **62**. Again as in the first embodiment the projecting stop members **59** and **61** by virtue of their abutment against the tab **50** will limit the rotation of the bottle. Since there is no threaded connection between the bottle neck and any other element, there is no danger of unscrewing the bottle so that all that need be done is to rotate the bottle.

Since the liquid tends to foam as it is dispensed into the reservoir **68** this foam will be confined either within the reservoir itself or within the bottle **51**. Upon closure of the valve the foam in the liquid in the reservoir will be confined within the reservoir. After the valve has been closed, the bottle together with its spout **16** may be removed and the cap **66** quickly closed thus limiting the amount of foamable liquid that does escape from the inlet port **62** to a negligible amount.

While there has been shown and described two more or less specific embodiments of the invention this has been done for purpose of illustration only and is not to be considered as limiting the scope of the invention, which is to be determined from the appended claims.

What is claimed is:

1. An article of manufacture, for dispensing flowable material into a reservoir through an inlet port on the reservoir, comprising: a container for the flowable material having a neck, said neck having a top portion that is closed except for an eccentrically located aperture therethrough which communicates with the container's interior; wall means defining a spout, said spout having a floor portion which is closed except for an eccentrically located aperture therethrough, an inner wall within said spout extending from said floor portion and contacting said wall means to form a pair of ducts within said spout one of which is in communication with said aperture in said floor portion, means for rotatably connecting said spout and said neck so that in one relative position of said spout and neck said floor portion is in face-to-face abutment with said top portion whereby said floor portion closes said aperture in said top portion and said top portion closes said aperture in said floor portion; said inner wall reinforcing said wall means defining said spout against buckling and reinforcing said floor portion against buckling; said wall means defining said spout being configured for insertion into the inlet port of said reservoir in sealed relationship therewith; said container and associated neck being rotatable into a second position relative to said spout in which the aperture in said top portion of said neck is in registry with the aperture in said floor portion of said spout.

2. The article of manufacture according to claim **1** wherein said inner wall is coextensive with said wall means defining said spout.

3. An article of manufacture according to claim **1** with the addition of stop means having associated parts connected with said neck and spout for limiting rotation thereof between said one position and said second position.

4. The article of manufacture according to claim **3** in combination with a rug shampooing apparatus having said inlet port and reservoir; said inlet port and said spout having a generally rectangular configuration.

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