Aug. 19, 1969 J. HENCHERT 3,462,048

PLASTIC DISPENSING NOZZLE WITH CAPTIVE CAP

Original Filed Jan. 19, 1961 2 Sheets-Sheet 1

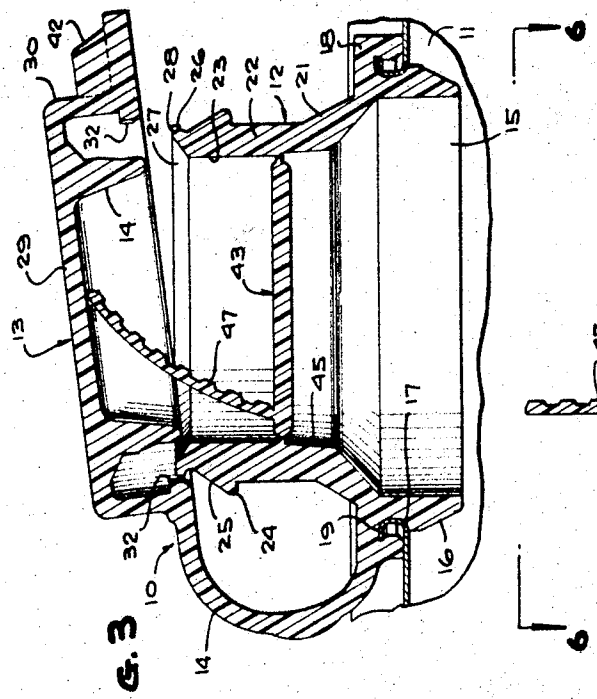


Fig. 3

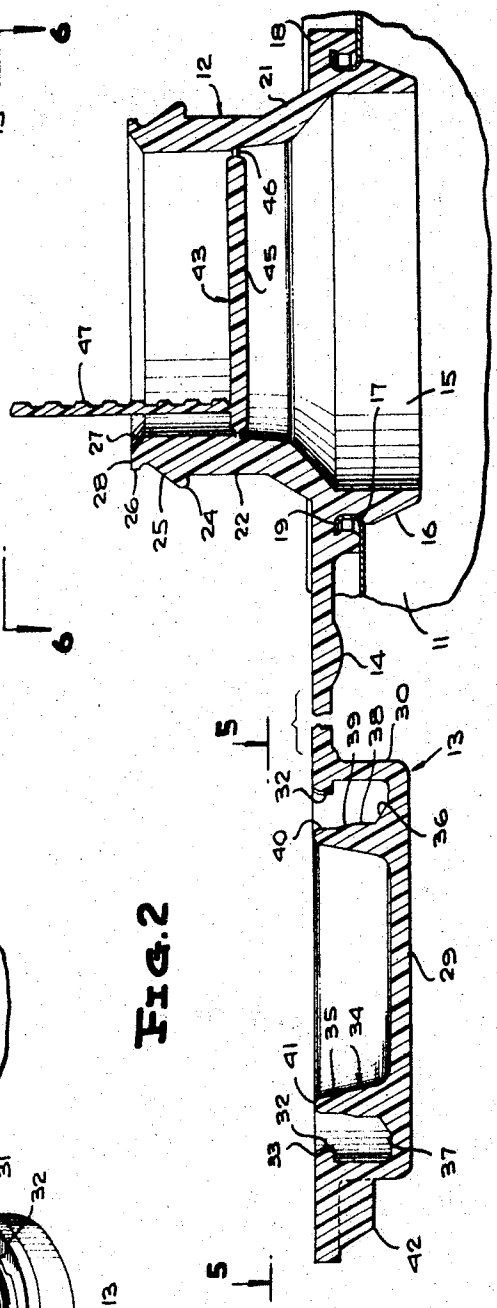


Fig. 2

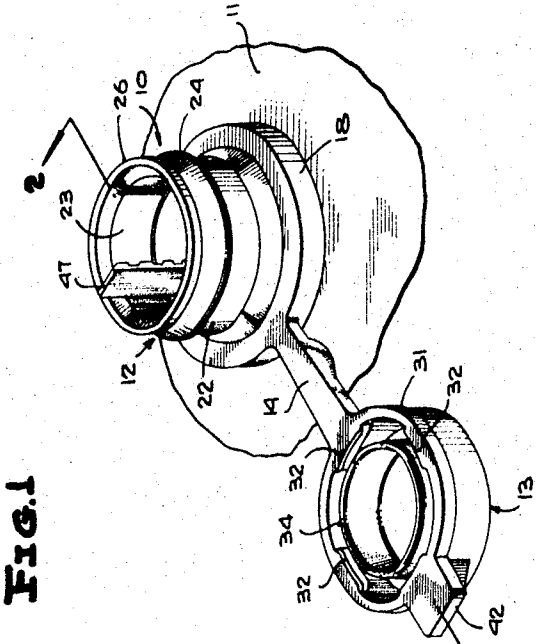


Fig. 1

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Original Filed Jan. 19, 1961 2 Sheets-Sheet 2

FIG. 4

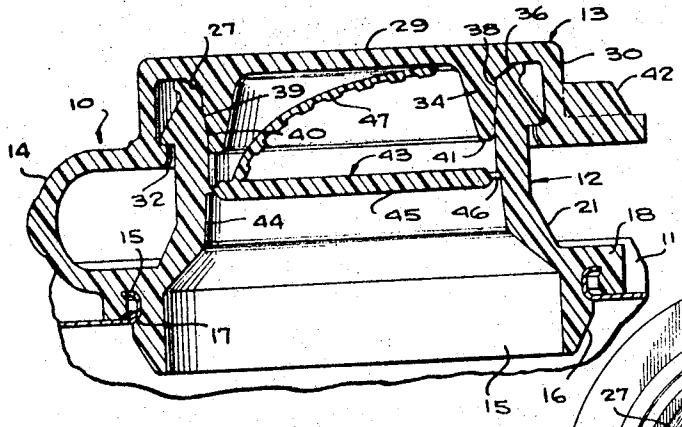


FIG. 7

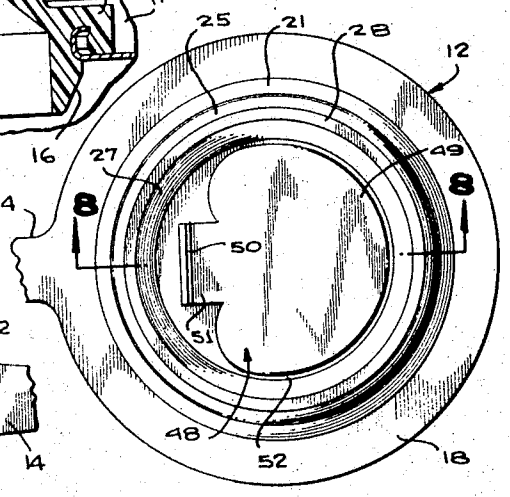


FIG. 5

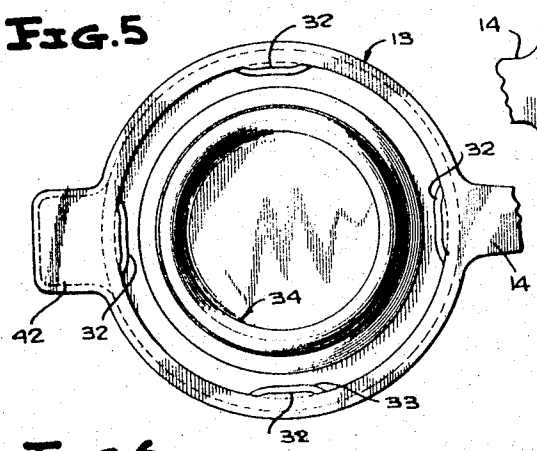


FIG. 8

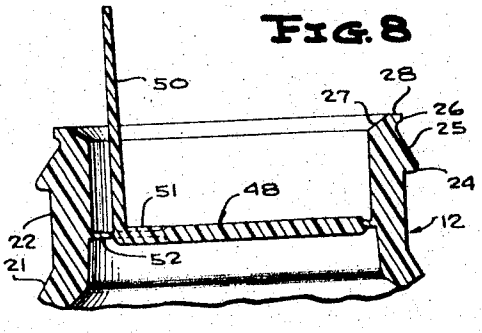
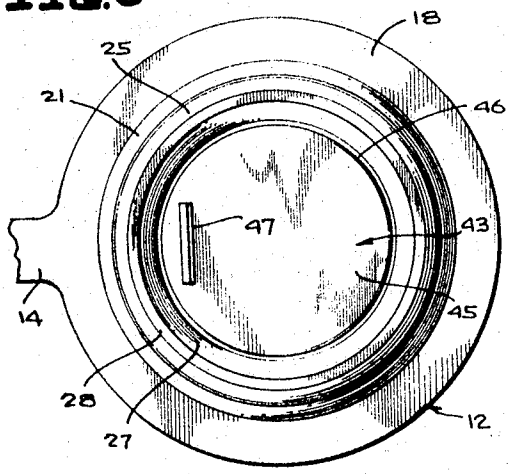


FIG. 6



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PLASTIC DISPENSING NOZZLE WITH CAPTIVE CAP

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Original application Jan. 19, 1961, Ser. No. 83,727, now Patent No. 3,282,477, dated Nov. 1, 1966. Divided and this application Mar. 30, 1966, Ser. No. 538,756

Int. Cl. B65d 47/08, 41/18, 51/20

U.S. Cl. 222—546 1 Claim

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a one-piece plastic dispensing nozzle having a captive cap. The principal feature of the disclosure has to do with the provision of a continuous locking rib on the exterior of the nozzle and forming the interior surface of the skirt of the cap with a plurality of circumferentially spaced locking ribs which are engageable beneath the locking rib of the nozzle to provide for the retention of the cap on the nozzle under normal conditions, and to permit the cap to be readily removed either during normal use or because of undesirably high pressures within the associated container.

This application is a division of my copending application Serial No. 83,727, filed Jan. 19, 1961, entitled Plastic Dispensing Nozzle with Removable Seal and Captive Cap, now Patent No. 3,282,477.

This invention relates in general to new and useful improvements in dispensing nozzles, and more particularly to a novel dispensing nozzle which is formed of plastic material and is provided with a captive cap.

An object of this invention is to provide a novel cap construction for a plastic dispensing nozzle wherein the cap is provided with a plug portion which projects down into the throat of the nozzle and forms a seal therewith, and the nozzle having an external locking ring which is engaged by a plurality of locking lugs on the cap to retain the cap in a nozzle sealing position, the holding power of the lugs on the cap being sufficient to normally retain the cap in place and at the same time being insufficient to retain the cap in place against greater-than-normal pressures within the container of which the nozzle is a part, whereby rupturing of the container due to the internal pressures is prevented.

A still further object of this invention is to provide a novel nozzle and cap construction wherein the cap is provided with a plug engageable into a throat of the nozzle and adapted to form a seal therewith to close the nozzle, the plug being upwardly flared with the upper portion of the plug being of a greater external diameter than the internal diameter of a corresponding portion of the throat, whereby when the cap is properly positioned on the nozzle, the plug will be wedged into the nozzle with a resultant deformation of the upper portion of the throat and the formation of a good seal between the throat of the nozzle and the plug of the cap.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claim and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view showing the nozzle which is the subject of this invention mounted on a container, the captive cap of the nozzle being illustrated in an open position.

FIGURE 2 is an enlarged vertical sectional view taken along the line 2—2 of FIGURE 1 and shows the specific cross section of both the nozzle and the closure cap.

FIGURE 3 is an enlarged fragmentary sectional view similar to FIGURE 2 and shows the closure cap in a position overlying the nozzle but short of being in sealing engagement therewith.

FIGURE 4 is an enlarged vertical sectional view taken through the nozzle assembly with the closure cap fully seated on the nozzle.

FIGURE 5 is a plan view on an enlarged scale showing the bottom of the cap and taken along the line 5—5 of FIGURE 2.

FIGURE 6 is a plan view of the nozzle taken on an enlarged scale along the line 6—6 of FIGURE 2.

FIGURE 7 is a plan view similar to FIGURE 6 showing the details of the nozzle provided with a modified form of sealing disc.

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

Referring now to the drawings in detail, it will be seen that the nozzle and closure cap assembly, which is the subject of this invention, is generally referred to by the numeral **10** and is illustrated in FIGURE 1 as being carried by a container **11**. The nozzle and closure cap assembly **10** includes a nozzle **12** and a closure cap **13** which is integrally connected to the nozzle **12** by means of a connecting strap **14**. The connecting strap **14** is of sufficient length to permit the closure cap to be swung to a position closing the nozzle **12**, as is shown in FIGURE 4 while permitting the closure cap **13** to be moved to an out-of-the-way position, as is shown in FIGURES 1 and 2.

The nozzle **12** includes a cylindrical lower portion **15** which has an upwardly flaring outer bottom portion **16** which terminates in an upwardly facing lip **17** which is lockable with the container to prevent withdrawal of the nozzle from the container, for example, the container **11**. The nozzle **12** has an annular flange **18** disposed above the lip **17**, and the annular flange **18** has a downwardly opening annular recess **19** therein immediately above the locking lip **17** for the reception of a flange of the container **11** to provide the necessary interlock between the nozzle **12** and the container flange.

The nozzle **12** tapers inwardly above the flange **18**, as at **21**, and then extends upwardly to define a generally cylindrical upper portion **22**. The upper portion **22** defines a pouring throat **23**.

The upper portion **22** is provided with an external locking rib **24** spaced below the upper end of the nozzle **11**, the locking rib **24** having a downwardly flaring upper camming surface **25**. The upper portion **22** terminates in an outwardly projecting dripless pouring lip **26**. The upper end of the throat **23** is outwardly flared as at **27** with the result that the upper end of the upper portion **22** defines a relatively narrow annular seat **28**.

The closure cap **13** includes a top wall **29** having a depending cylindrical skirt **30** which terminates at its lower end in an outwardly directed annular reinforcing flange **31**. The connecting strap **14** extends between the reinforcing flange **31** of the closure cap **13** and the flange **18** of the nozzle **12**. In order to releaseably retain the closure cap **13** in position closing the nozzle **12**, the skirt **30** of the closure cap **13** is provided at the lower end thereof with a plurality of circumferentially spaced locking lugs or ribs **32**. As is best shown in FIGURE 5, the locking lugs **32** are arranged with two of the locking lugs disposed along a diametrical line passing through the connecting strap **14** and the other two of the locking lugs being disposed along a second diametrical line extending at right angles to the first diametrical line. Also, best shown in FIGURE 5 is the general outline of each of the locking lugs wherein each locking lug has the main por-

tion thereof extending substantially normal to its respective diametrical line and the ends thereof curve outwardly towards the skirt **30**. Each locking lug **32** has an upwardly tapering undersurface **33** which cooperates with the camming surface **25** of the locking rib **24** to effect the snapping of the locking lugs **32** down over and beneath the locking rib **24**.

The closure cap **13** is provided with a hollow plug **34** which extends downwardly from the undersurface of the top wall **29** thereof. The plug **34** has a downwardly flaring inner surface **35** so that the general cross-section of a segment of the plug **34** is wedge shaped.

Each plug **34** has a downwardly tapering upper outer portion **36** which is spaced from the skirt **30** and together with the skirt **30** defines a seat **37** on the underside of the top wall **29** of the closure cap **13**. The plug **34** has an intermediate outer surface **38** which is generally cylindrical in outline and which terminates at the surface **36** along its upper boundary. The plug **34** also has a lower intermediate outer surface **39** which is downwardly tapered and which terminates in a cylindrical outer surface **40** of the plug **34**. The extreme lower end of the plug **34** is rounded as at **41**.

As is best shown in FIGURE 4, when the closure cap **13** is in place closing the nozzle **12**, the plug **34** is wedged down into the upper portion of the throat **23** of the nozzle upper portion **22** and forms a seal therewith. It is to be noted that since the diameter of the surface portion **38** of the plug **34** is normally greater than the internal diameter of the surface defining the throat **23**, when the closure cap **13** is positioned on the nozzle **12** and the plug **34** is forced into the throat **23**, there is a deformation of the material of the nozzle **12** to form the desired seal between the plug **34** and the throat **23**. It is also to be noted that the angle of the outwardly flared surface **27** of the nozzle with respect to the axis of the nozzle is greater than the angle of the surface **36** with respect to the axis of the nozzle, whereby the surfaces **27** and **36** do not contact, and in addition to the seal between the plug **34** and the throat **23**, a second seal is formed between the seats **28** and **37**.

It is to be understood that the holding power of the spaced locking lugs **32** is less than that of a continuous locking rib and by accurately determining the extents of the locking lugs **32**, the holding power thereof may be controlled. Thus, the closure cap **13** will be locked onto the nozzle **12** to retain the closure cap **13** in place against a predetermined pressure within the throat **23**, but permitting the releasing of the closure cap **13** with respect to the nozzle **12** to vent the nozzle **12** upon the pressure within the nozzle reaching a predetermined pressure to thereby prevent rupturing of the container **11**. Under normal conditions the closure cap **13** is removed from the nozzle **12** by means of a lifting tab **42** which extends outwardly from the flange **31** in diametrical relation to the connecting strap **14**.

The throat **23** of the nozzle **12** is initially closed and sealed by a sealing disc, generally referred to by the numeral **43**. At this time it is pointed out that the throat **23** has a lower portion **44** which is of a greater diameter than the diameter of the upper portion thereof. The sealing disc **43** is disposed at the intersection of the upper and lower portions of the throat **23**.

In the form of the sealing disc illustrated in FIGURES 2 through 6, the sealing disc **43** includes a relatively thick circular disk **45** and a thin marginal tear annulus **46** which surrounds the circular disk **45** and is integrally connected to the nozzle **12**. The sealing disc **43** may be readily removed from within the nozzle **12** by rupturing the same along the tear annulus **46**.

In order to facilitate the removal of the sealing disc **43**, there is provided a pull tab **47** which is connected to the upper surface of the circular disk **45** adjacent the tear annulus **46** and in alignment with the connecting strap **14**. When the nozzle **12** is initially formed, the pull tab **47** extends generally parallel to the axis of the nozzle **12** and is of a length to project a considerable distance above the top of the nozzle **12** to facilitate the grasping thereof to exert an upward pull thereon sufficient to rupture the tear annulus **46** and to effect the removal thereof.

Reference is now made to FIGURE 3 in particular wherein it will be seen that when the closure cap **13** is moved towards a position closing and sealing the nozzle **12**, the upper end of the pull tab **47** is received within the confines of the plug **34** with the upper end of the pull tab **47** engaging the underside of the top wall **29** of the closure cap **13**. As the closure cap **13** is continued to be moved towards its seated position on the nozzle **12**, the pull tab **47** is progressively bent or bowed, and when the closure cap **13** is fully seated on the nozzle **12** as is shown in FIGURE 4, a pull tab **47** is disposed entirely within the nozzle **12** and is retained therein by the closure cap **13**.

In the formation of the nozzle and closure cap assembly **10**, all of the above-described components are formed in one piece from a suitable resilient and deformable plastic, such as polyethylene. Thus the pull tab **47** is relatively resilient, and when the closure cap **13** is removed from the nozzle **12**, the pull tab **47** will spring upwardly from within the confines of the nozzle **12** to a position projecting upwardly above the upper end of the nozzle **12** where the pull tab **47** may be readily grasped between one's finfers and a pull exerted thereon to remove the sealing disc **43**. It will thus be apparent that the nozzle **12** is provided with means for effectively sealing the same so that the container **11** and the product contained therein may be delivered to the ultimate consumer untampered with, and any tampering with the contents of the container **11** will be indicated by the rupturing of the sealing disc **43**. At the same time, the nozzle **12** is so constructed whereby no special tool is required to effect the removal of the sealing disc **43** by the ultimate consumer.

Reference is now made to FIGURES 7 and 8 in particular wherein the nozzle **12** is illustrated as having a modified form of sealing disc, generally referred to by the numeral **48**. The sealing disc **48** has a thickened central portion **49** of an outline best illustrated in FIGURE 7. A pull tab **50** extends upwardly from the end of a narrow portion **51** of the thickened portion **49**. The sealing disc **48** also includes a relatively thin peripheral portion **52**, which is for the most part narrow, but widens out in the vicinity of the pull tab **50** and extends around the narrow portion **51** of the thickened portion **49**.

It will be apparent that the sealing disc **48** differs from the sealing disk **43** only in that the thickened portion **49**, in lieu of being in the form of a circular disk, as is the thickened portion **45** of the sealing disk **43**, has a quite different shape to provide for a greater area of the thin portion **52** in the vicinity of the pull tab **50**. Thus, the sealing disc **48** is more easily ruptured than the sealing disk **43** when a pull is exerted on the pull tab **50**.

I claim:

1. A resiliently deformable plastic dispensing nozzle assembly comprising a tubular nozzle having a pouring throat, a closure cap for said nozzle, said closure cap including a skirt having a generally cylindrical internal surface, said nozzle having an outer locking rib and said cap having a plurality of short circumferentially spaced locking rib means extending radially inwardly from said skirt internal surface and being engageable beneath said nozzle locking rib to normally retain said cap in a nozzle closing position and at the same time permitting the cap to become unseated in the event excessive pressures exist within the nozzle, said cap also having a hollow plug projecting into said pouring throat, said plug having a generally cylindrical lower portion and an upwardly flaring outer surface adjacent to said closure cap, said outer surface having a greater external diameter than the internal diameter of said cylindrical pouring throat, and said hollow plug being wedged within said nozzle and

expanding said pouring throat such that a seal is provided between said plug and said nozzle.

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