

Aug. 25, 1964

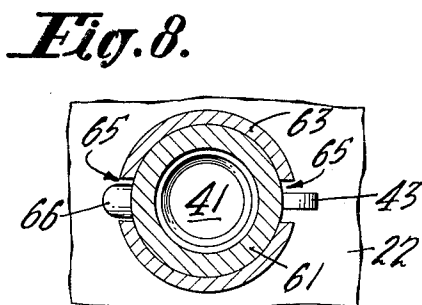
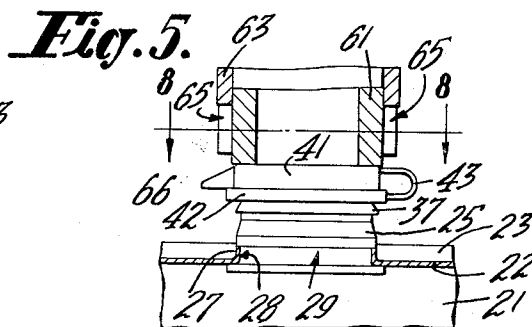
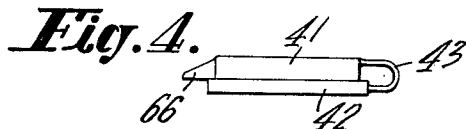
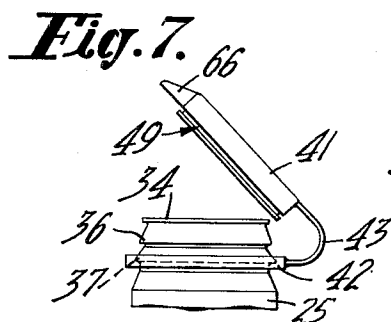
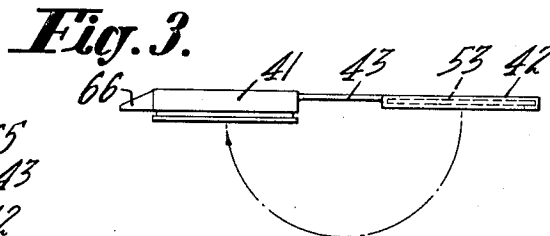
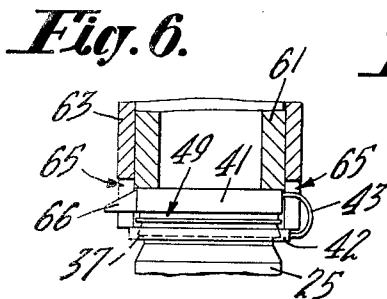
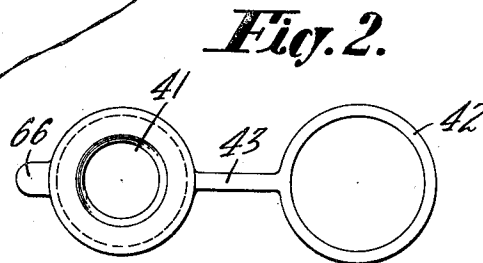
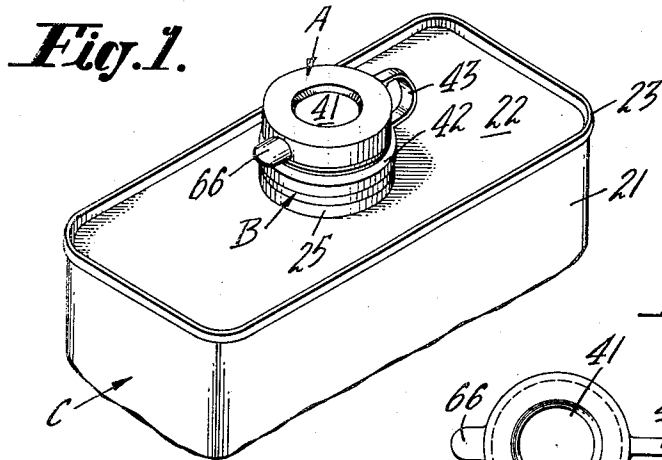
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3,145,872

CAPTIVE CAP FOR CONTAINER

Filed Oct. 7, 1960

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 9.

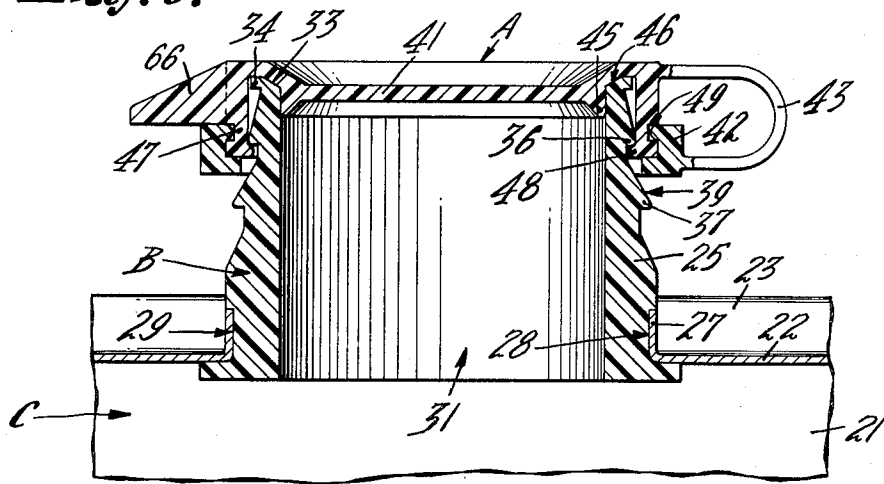
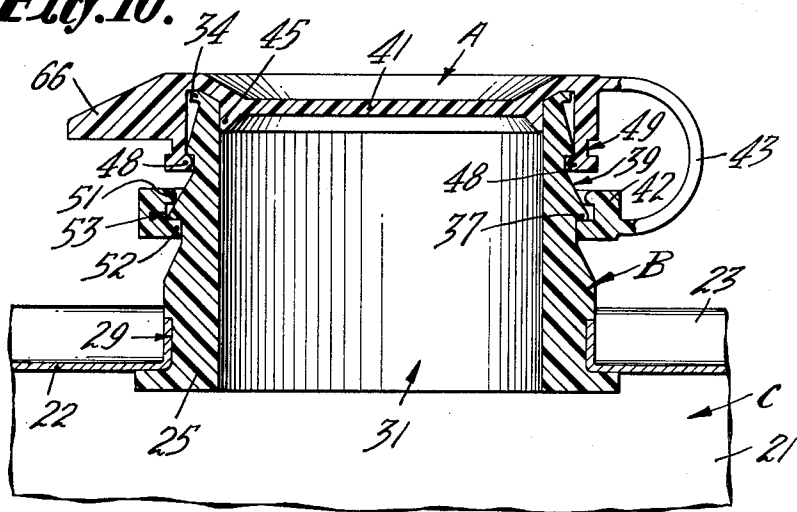


Fig. 10.



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3,145,872

CAPTIVE CAP FOR CONTAINER

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3 Claims. (Cl. 220-60)

The present invention relates to containers having dispensing nozzles and the like and has particular reference to a captive cap for sealing the nozzle and a method of applying the cap to the nozzle.

Many captive caps have been devised for sealing container nozzles and many ways have been devised for holding them captive. One of the most practical cap constructions is a cap made of plastic material which is provided with an integral holding ring which is snapped onto the container nozzle, the holding ring being connected to the cap by an integral strap which initially projects radially from the periphery of the cap so that the holding ring is spaced laterally of the cap. As a result, these caps are difficult to handle and apply to container nozzles by automatic machinery, since complicated indexing procedures are required.

The instant invention contemplates a nozzle sealing cap having an attached holding ring, the cap and the ring preferably being made from one piece of plastic material and formed so that the holding ring may be readily hinged into position against the cap and temporarily locked in such a position to provide a unitary structure that may be easily handled in automatic machinery and readily applied to the nozzle. The sealing cap preferably is of the type that snaps over the top of the nozzle to seal the nozzle mouth. When the cap is in this nozzle sealing position the holding ring is readily separated from the cap and pushed down along the nozzle to a position where it frictionally embraces the nozzle which action thereby ties the cap to the nozzle in a manner which permits the cap independent and free movement relative to the nozzle so that it may be readily removed for dispensing purposes and replaced as a reclosure, while still held captive against loss.

An object of the invention is to provide a captive cap and associated means for holding it captive on a container nozzle, which are simple in construction and economical to produce and which may be assembled as a unitary structure so that it may be handled by automatic machinery and applied to the container nozzle as a unit.

Another object is to provide such a captive cap unit wherein the holding means may be readily separated from the cap after the unit is applied to a nozzle and the holding means moved into nozzle embracing position to hold the cap captive against loss while permitting the cap free movement for nozzle opening and closing purposes.

Another object is the provision of a method of applying such a captive cap unit to a container nozzle.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIGURE 1 is a perspective view of the top portion of a container having a dispensing nozzle sealed by a captive cap embodying the instant invention and applied by method steps included in the instant invention, the lower portion of the container being broken away;

FIG. 2 is an enlarged plan view of the captive cap unit shown in FIG. 1;

FIG. 3 is an elevational view of the cap unit shown in FIG. 2, the view indicating how the portion of the

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unit at the right is hinged into position against the portion at the left to produce an assembled unit;

FIG. 4 is an elevational view of the assembled unit;

FIGS. 5 and 6 are elevational views of the cap unit and the nozzle, and portions of applying devices shown in section, with FIG. 5 showing how the cap is applied to the nozzle and with FIG. 6 showing how the holding portion of the unit is separated from the cap and secured to the nozzle;

FIG. 7 is an elevational view of the upper portion of the nozzle with the cap in an open position and held captive against loss;

FIG. 8 is a horizontal section as taken substantially along the lines 8-8 in FIG. 5;

FIG. 9 is an enlarged sectional view of the nozzle and the applied cap unit as shown in FIG. 5; and

FIG. 10 is a view similar to FIG. 9 and showing the applied cap unit in the position shown in FIG. 6.

As a preferred and exemplary embodiment of the instant invention, the drawings disclose a captive cap A (FIG. 1) for a dispensing nozzle B of a container C. The container C may be of any form and construction; the container shown in the drawings being of rectangular shape and having a sheet metal body 21 with a flat top end closure 22 secured thereto in a suitable end seam 23.

The dispensing nozzle B may be made of any suitable material such as metal or plastic, the nozzle shown in the drawings being made of a plastic material and comprising a cylindrical body 25 (FIGS. 9 and 10) the lower end of which is secured to the container top closure 22 in any suitable manner. By way of example, the drawings show the nozzle body 25 secured to the container top closure 22 by means of a short up-turned neck 27 formed on the container top closure surrounding an opening 28 in the closure, the neck 27 being crimped into an annular groove 29 formed in the nozzle body adjacent its lower end.

A cylindrical bore 31 extending entirely through the nozzle body 25 communicates with the interior of the container C to provide for dispensing the container contents.

The upper end of the nozzle body 25, surrounding its dispensing mouth is preferably provided with an inwardly beveled sealing seat 33 (FIGS. 9 and 10) surrounded by an outwardly projecting sharp-edged annular no-drip pouring lip or rim 34. Immediately below the pouring rim 34, the nozzle body 25 preferably is formed with a pair of spaced and parallel annular locking beads or shoulders 36, 37, which project beyond the outer face of the nozzle body for the captive cap A. The upper shoulder 36 is a cap retaining shoulder and is provided with an outwardly tapered section 38 which slopes outwardly and downwardly from the nozzle body immediately under the pouring rim 34 to the outer terminal edge of the shoulder 36.

The lower shoulder 37 is a holding ring shoulder and is spaced below the cap retaining shoulder 36 and is larger in diameter, extending outwardly beyond the cap retaining shoulder 36. This holding ring shoulder 37 is provided with an outwardly tapered section 39 which extends downwardly and outwardly from under the cap retaining shoulder 36 to the outer terminal edge of the shoulder 37. These shoulders 36, 37 serve to hold the cap A in sealing position on the upper end of the nozzle body 25 and to lock it in captivity as will now be explained.

The captive cap A preferably is made of a resilient or flexible plastic material and comprises a cap portion 41 (FIGS. 2, 3, 9 and 10) and a holding ring portion 42 hingedly and permanently secured to the cap portion 41 by a strap or hinge portion 43. This captive cap A preferably is made of one piece of material so that the cap portion 41, the holding ring portion 42 and the hinge portion 43 are integral parts.

The cap portion 41 preferably is provided with a depending centering ring 45 (FIGS. 9 and 10) which is of a diameter substantially equal to the inside diameter of the bore 31 of the nozzle body 25 for cooperation therewith when the cap is in sealing position on the nozzle as shown in FIG. 9. Surrounding this centering ring 45, the cap is formed with an annular tapered sealing seat 46 corresponding to and for cooperation with the beveled sealing seat 33 on the nozzle body 25.

Adjacent the sealing seat 46, the cap portion 41 is formed with a depending annular skirt 47 which surrounds the nozzle body 25 when the cap is on the nozzle as shown in FIG. 9. The skirt 47 terminates at its lower edge in an inwardly projecting locking ledge or bead 43 for engagement under the cap retaining shoulder 36 of the nozzle body 25 when the cap is on the nozzle as shown in FIG. 9. The outer face of the skirt 47 is provided with an annular groove 49 and adjacent shoulder for the holding ring 42 as will be explained.

The holding ring 42 is provided with an internal bore of sufficient diameter to frictionally engage the skirt 47 of the cap 41 and to further frictionally embrace the outer face of the nozzle body 25 for purposes to be hereinafter explained. Preferably the bore of the holding ring is of stepped formation so as to provide a pair of adjacent ring sections 51, 52 of different internal diameters and separated by an annular groove 53 to form a pair of vertically spaced locking shoulders. The ring section 51 is the larger diameter bore and is proportioned to provide a snap fit into the annular groove 49 of the cap skirt 47. Similarly the ring section 52 is the smaller diameter bore and is proportioned to provide a snap fit under the holding ring shoulder 37 as shown in FIG. 10.

In order to efficiently handle the captive cap A in automatic machinery and apply it to the nozzle B the holding ring 42 is hinged into position under the cap portion 41 in the manner shown in FIG. 3 and then pressed against the cap portion to snap the ring section 51 into the annular groove 49 of the cap section as shown in FIGS. 4 and 9. This temporarily locks the holding ring 42 onto the cap portion 41 and results in the unitary cap structure hereinbefore mentioned. In this assembled relation of the holding ring 42 with the cap portion 41, the ring and the cap are in axially disposed relation so that the unit structure may be readily handled and easily applied to the nozzle B.

The method of applying the cap 41 and its holding ring 42 is as follows: After supplying the captive cap A and the nozzle B, the holding ring 42 is temporarily assembled with the cap portion 41 as described above. The resulting unitary structure as shown in FIG. 4 is then deposited on the nozzle B with the centering ring 45 of the cap portion 41 located in the bore 31 of the nozzle body 25 and the sealing seat 46 of the cap axially aligned with the sealing seat 33 on the nozzle body. In this position of the cap 41 the cap skirt 47 surrounds the upper end of the nozzle body and rests on the tapered portion 38 of the upper shoulder 36.

With the cap unit A thus loosely seated on the upper end of the nozzle body 25, the next step is to attach it to the nozzle and to secure it in a captive condition. This is effected by axial pressure exerted against the cap portion 41 and also against the holding ring 42, either simultaneously or in sequence. The pressure against the cap portion 41 forces the cap portion down onto the upper end of the nozzle body 25, seating the sealing seat 46 of the cap portion into sealing engagement with the sealing seat 33 of the nozzle body and also forcing the locking bead 48 on the cap skirt 47 downwardly along the tapered section 38 of the nozzle body until it snaps under the nozzle shoulder 36. This action seals the dispensing mouth of the nozzle and locks the cap 41 on the nozzle against inadvertent displacement as shown in FIG. 9.

This pressure application of the cap unit to the nozzle

may be effected in any suitable manner. By way of example, FIG. 5 of the drawings illustrates one form of apparatus for effecting this step, which apparatus includes a tubular pressure head 61 which is vertically reciprocated in any suitable manner. The head 61 engages and presses against the cap portion 41 along an annular area in vertical alignment with the wall of the nozzle body 25 and thus exerts a direct pressure on the cap to seat it as described above.

Simultaneously with this action or immediately following it, as desired, an axial or vertical pressure is exerted on the holding ring 42. This pressure forces the holding ring downwardly and in so doing forces the ring section 51 out of the annular groove 49 of the cap portion 41 and thereby separates or releases the holding ring 42 from its temporarily locked position on the cap portion. After thus releasing the holding ring 42, continued pressure pushes the ring down along the outside of the nozzle body 25 into engagement with and along the tapered section 39 of the nozzle until the ring section 52 snaps under the shoulder 37 as shown in FIGS. 6 and 10. This locks the holding ring 42 on the nozzle against displacement therefrom.

To effect this release and locking in place of the holding ring 42, the apparatus shown in the drawings, by way of example, illustrates an annular pressure sleeve 63 (FIGS. 5 and 6) which surrounds the pressure head 61, and which is vertically reciprocable in any suitable manner, independently of the pressure head 61. The lower end of the sleeve moves down around the cap portion 41 and engages against the holding ring 42 as shown in FIG. 6. Slots or cut-outs 65 (FIGS. 6 and 8) in the sleeve 63 is provided to clear the cap hinge portion 43 and a cap opening tab 66 formed on the cap portion 41.

Thus with the holding ring 42 locked in position under the shoulder 37 on the nozzle body 25, the cap portion 41 is connected permanently to the holding ring 42 by the hinge portion 43, is permanently held captive against loss and yet may be readily removed from its sealing position on the nozzle B by a pull on the tab 66 and may be readily returned to sealing position as a reclosure, without becoming detached from the container.

Although the drawings show the holding ring 42 locked on the nozzle body by means of a snap fit under the locking shoulder 37, it is contemplated that a mere friction fit of the ring on a collar section of the nozzle may be desirable in some cases.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and will be apparent that various changes may be made in the form, construction and arrangement of the parts and that changes may be made in the steps of the method described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A captive closure and nozzle assembly for a container comprising,
 - a nozzle having vertically spaced external locking beads with the upper bead of lesser diameter than the lower bead,
 - a closure including a cap and an annular holding ring permanently hingedly secured thereto,
 - said cap having a depending annular skirt provided with locking shoulders on both the interior and exterior peripheries thereof,
 - said holding ring having a pair of vertically spaced inwardly facing locking shoulders with the upper shoulder of greater diameter than the lower shoulder,
 - said ring upper shoulder being detachably interengageable with said cap skirt exterior shoulder to facilitate

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unit handling of said closure prior to and during application thereof to said nozzle, said cap skirt interior shoulder being detachably interengageable with said upper nozzle bead to dispose said cap in sealing relation to said nozzle, and said ring lower shoulder being lockingly interengageable with said greater diameter lower nozzle bead when said ring upper shoulder is detached from said cap skirt exterior shoulder following engagement of said cap skirt interior shoulder with said upper nozzle bead, to thereby lock said closure to said nozzle and prevent loss thereof.

2. A captive closure and nozzle for a container, said nozzle having axially spaced upper and lower closure retaining beads thereon,

15 said closure including a cap having an annular depending skirt provided with locking shoulder means thereon detachably securing said cap to said upper nozzle bead in sealing relation to said nozzle,

20 said closure further including a holding ring loosely hingedly secured to said cap,

said holding ring having a pair of vertically spaced upper and lower resilient locking shoulders,

25 said upper shoulder being detachably interengageable with said cap shoulder means to facilitate unit handling of said closure prior to and during application

thereof to said nozzle, said upper shoulder providing for resilient detachment of said ring from said cap by separating pressure applied to said ring in an axial direction away from said cap,

5 said lower shoulder interlocking said ring with said lower nozzle bead in vertically spaced relation to said cap when said ring and said cap are detached from one another.

3. The captive closure and nozzle assembly of claim 2 wherein said holding ring is provided with portions extending laterally beyond the periphery of said cap to define unobstructed upwardly facing surfaces against which said ring-and-cap separating pressure is directed.

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