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CONTAINER WITH CLOSURE HAVING A RETRACTABLE SPOUT

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FIG. 1.

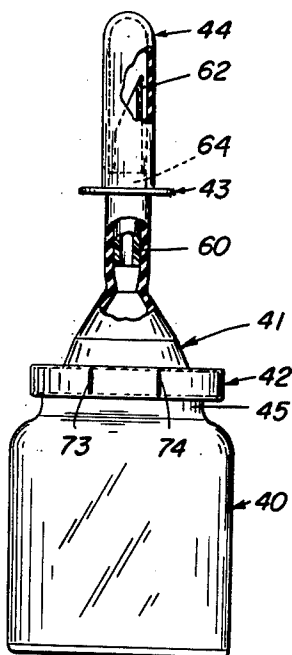


FIG. 2.

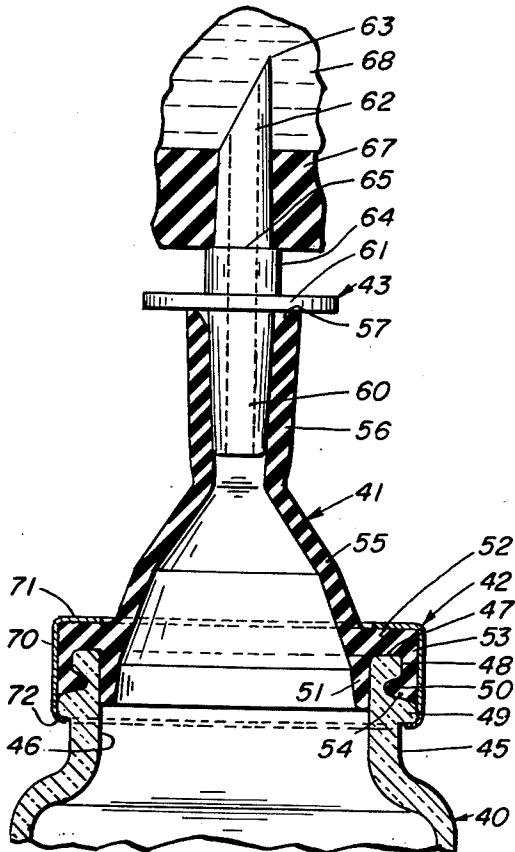
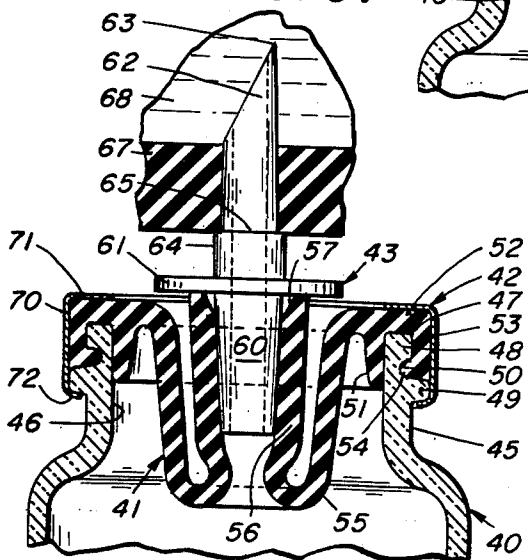


FIG. 3.



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CONTAINER WITH CLOSURE HAVING A RETRACTABLE SPOUT

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This invention relates to an improved container and closure, and particularly to a container and closure for additive materials which are to be mixed with bulk parenteral solutions.

Parenteral solutions are frequently injected into the body when it is desired to get a nutrient or medicament into the patient's body without delay, or to feed a patient who is not able to receive food by mouth. Many ingredients which would desirably be included in such solutions are unstable in solution. They are therefore added to the solution just before administration. A previous application, Serial No. 822,814, filed June 25, 1959, by Orville P. Nuffer, and assigned to the assignee of this application, discloses a container and closure for facilitating the addition of such ingredients to a parenteral solution container. This invention is concerned with improvements over the apparatus disclosed in the Nuffer application.

Additive containers of the type disclosed in the previous application have a rubber closure which serves as a pumping device to aseptically transfer solution from a parenteral solution container into the additive container, and, after the additive is dissolved, to transfer the solution and additive back to the parenteral solution container. If a large amount of additive material is involved, or if the additive material has only a limited solubility, a large additive container must be used. The deformable rubber closures of large containers, with openings greater than about 30 millimeters in diameter, are particularly difficult to attach to the container. The pumping operation deforms these closures to the extent that they may be pulled out of their retaining rings, especially if these rings are not crimped on very tightly. Separation of the closure from the additive container renders the unit unusable. Moreover, delay caused by the need to obtain another unit may have serious consequences since parenteral solutions are often administered under emergency conditions.

It is therefore an object of this invention to provide an improved additive container having a pumping closure which is more firmly attached to the container.

Another object of the invention is to provide an improved means of attaching the pumping closure to an additive container.

Further features and advantages of the invention will be apparent from the following specification and from the drawings in which:

FIGURE 1 is an elevation partially cut away, of a container embodying the invention;

FIGURE 2 is an enlarged fragmentary section, with portions shown in elevation, of the invention with the protector removed and the connector inserted into the stopper of a parenteral solution bottle; and

FIGURE 3 is a view similar to FIGURE 2 with the pumping portion of the closure deformed.

As shown in the drawings, the additive container includes a bottle 40 and a deformable pumping closure 41 attached thereto by a retaining ring 42. A connecting device 43 extends from the upper end of closure 41 and is adapted to be inserted into a stopper 67 of a bulk parenteral solution container 68. A protector 44 covers the end of connector 43.

Bottle 40 has a neck 45. The inner surface of neck 45 defines an opening or mouth 46. At the top, neck 45 terminates in a flat, horizontal surface 47. On the

circumferential surface, neck 45 has an outwardly projecting annular flange or rim 48. A second and larger annular flange 49 is spaced axially below rim 48 and an annular groove 50 is provided between rim 48 and flange 49. The groove is preferably round in cross-section as will be discussed subsequently.

Closure 41 has an inner skirt 51 fitting into the bottle mouth 46. A flange 52 projects outwardly from closure 41 and rests on the top 47 of the bottle neck. An outer skirt 53 extends downwardly from the outer extremity of flange 52 and telescopes over the outside of bottle neck 45. An annular bead 54 projects radially inwardly from skirt 53 and is adapted to fit into groove 50. Bead 54 projects inwardly from skirt 53 about 0.020 to 0.060 inch. A bead 0.030 inch thick has been found highly satisfactory. The shape of the bead preferably complements the shape of rim 48, flange 49 and groove 50 so that closure 41 is not unduly stretched or distorted during storage. To facilitate assembly, the edges of bead 54 contacting the bottle neck 45 are preferably rounded. A dome-shaped pumping portion 55 extends upwardly from flange 52, terminating in a tubular sleeve 56, having a tapered lead-in section 57.

Connecting member 43 has a manually engageable flange 61 and tubular end 60 telescoping into the closure sleeve 56. Above flange 61, connector 43 has an insertion tip 62, having a point 63. Point 63 and insertion tip 62 are adapted to pierce the diaphragm closing the outlet passage of stopper 67 of parenteral solution bottle 68 and to fit tightly within said passage. Adjacent flange 61, a protector hub 64 projects outwardly from insertion tip 62 and is adapted to receive protector 44. At the upper end, protector hub 64 has a shoulder 65 which limits movement of connector 43 into the passage of stopper 67. Retaining ring 42 has a cylindrical section 70 and a horizontal top flange 71 the latter fitting over stopper flange 52. The lower end of retaining ring 42 is rolled or formed around the flat horizontal surface on the underside of bottle flange 49 so as to form the bottom flange 72 holding ring 42 to bottle 40. Score lines 73, 74 may be provided to facilitate removal of retaining ring 42, if desired.

Thus, closure 41 is securely attached to bottle 40 by closure bead 54 which interlocks with the bottle rim 48 located on the circumferential surface of bottle neck 45. Cylindrical section 70 of retaining ring 42 has a fixed radius and prevents closure skirt 53 and closure bead 54 from moving radially outwardly. Preferably, the total thickness of skirt 53 and bead 54 is greater than the distance between bottle rim 48 and retaining ring 42.

In use, protector 44 is removed from insertion tip 62 and the insertion tip pushed through the diaphragm of stopper 67 into parenteral solution container 68. The two containers are then held with the parenteral solution container 68 inverted and above the additive container. The additive container is pushed upwardly, deforming closure 41 as shown in FIGURE 3, and expelling air from additive container 40 into container 68. The additive container is then lowered, expanding closure 41 and drawing solution from container 68 into the additive container.

After the additive ingredients in container 40 are dissolved, the containers are inverted so that additive container 40 is upside down and above container 68. Additive container 40 is then pushed down, deforming closure 41 and expelling solution containing the additive ingredients from container 40 into container 68. When all solution has been transferred to container 68, additive container 40 is removed, an administration set attached to container 68 and the solution administered to the patient.

While I have shown and described certain specific embodiments of my invention, it is understood that many

changes and modifications may be made without departing from the scope and spirit of the invention, as defined in the following claims.

I claim:

1. An additive container comprising: a bottle having a neck; an annular circumferential rim projecting outwardly from said neck; a closure attached to the bottle neck and having a collapsible, dome-shaped portion; a tubular connecting member extending from the dome-shaped portion; an annular flange projecting outwardly at the base of the dome-shaped portion and seated on the top of the bottle neck; a skirt extending from said flange over the outside of the bottle neck; an annular bead on said skirt extending radially inward below the bottle rim; a metal retaining ring telescoped over the outside of the skirt; a horizontal flange extending inwardly from the top of said ring and acting against the closure flange, urging said flange against the top of the bottle neck; an opening in the center of said horizontal flange, the dome-shaped closure portion and the connecting member extending through said opening; an annular container flange on the bottle neck below and spaced from the rim; and a flange at the lower extremity of said retaining ring extending below and around said closure flange.

2. An additive container comprising: a bottle having a neck; an annular circumferential rim projecting outwardly from said neck; an annular flange below said rim, spaced therefrom, and projecting outwardly from the neck radially beyond the extremity of the rim; a closure attached to the bottle neck and having a collapsible, dome-shaped portion; a tubular connecting member extending from the dome-shaped portion; an annular flange projecting outwardly at the base of the dome-shaped portion and seated on the top of the bottle neck; a skirt extending from said flange over the outside of the bottle neck; an annular bead on said skirt extending radially inward below the bottle rim; a metal retaining ring telescoped over the outside of the skirt and preventing radially outward displacement of said skirt and bead; a horizontal flange extending inwardly from the top of said ring and acting against the closure flange, urging said flange against the top of the bottle neck; an opening in the center of said horizontal flange, the dome-shaped closure portion and the connecting member extending through said opening; and a bottom flange on the retaining ring projecting radially inward along the underside of the bottle flange.

3. An additive container comprising: a bottle having a neck; an annular circumferential rim projecting out-

wardly from said neck; an annular flange below said rim, spaced therefrom, and projecting outwardly from the neck radially beyond the extremity of the rim; a closure attached to the bottle neck and having a collapsible, dome-shaped portion; an annular flange projecting outwardly at the base of the dome-shaped portion and seated on the top of the bottle neck; a skirt extending from said flange over the outside of the bottle neck; an annular bead on said skirt extending radially inward below the bottle rim; and a metal retaining ring having an annular portion telescoped over the outside of the skirt, a horizontal flange extending inwardly over the closure flange and holding said flange against the top of the bottle neck, and a bottom flange extending below and around the bottle flange, said ring substantially surrounding the outer surfaces of the closure skirt and flange to prevent removal from the bottle.

4. An additive container comprising: a bottle; a neck on said bottle, said neck providing an opening surrounded by a radial lip surface and having inner and outer circumferential surfaces; an annular rim projecting outwardly near the top of the outer circumferential neck surface; an annular flange below and spaced from said rim, and projecting outwardly from said outer neck surface radially beyond said rim; an annular groove on said outer neck surface between the rim and the flange; a closure attached to the bottle neck and having a collapsible dome-shaped portion; an annular closure flange projecting outwardly near the base of said dome-shaped portion and seated against the radial lip surface of the bottle; a closure skirt extending from the closure flange over the outside of the bottle neck; an annular bead on said skirt extending radially inwardly into the annular groove on the bottle neck; and a metal retaining ring holding the closure on the bottle, said ring having a flat annular portion acting against the top surface of the closure flange and holding said flange against the radial lip surface, a cylindrical portion telescoped around the closure skirt and holding said skirt against the outer neck surface, and a bottom flange portion extending below and around the lower surface of the bottle flange.

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