May 7, 1963 D. DE L. ROSEKRANS ET AL 3,088,634

TABLET RETAINER CAGE

Filed Jan. 27, 1960

FIG. 1.

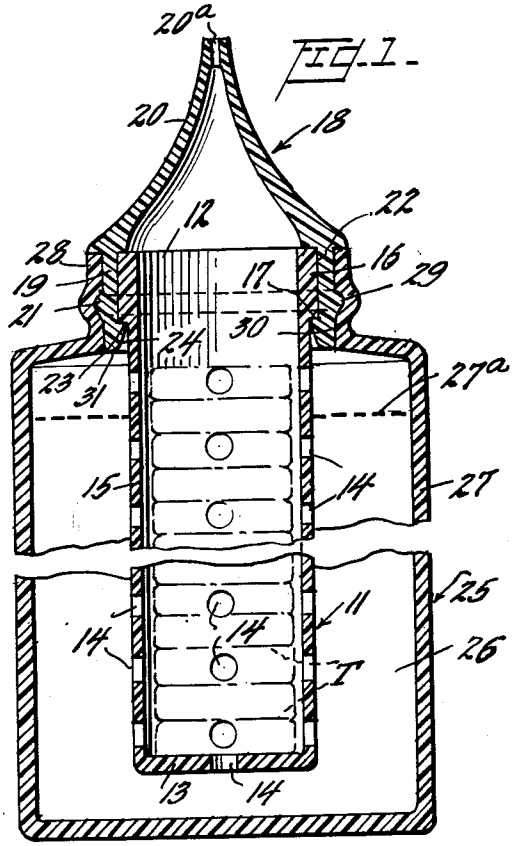


FIG. 2.

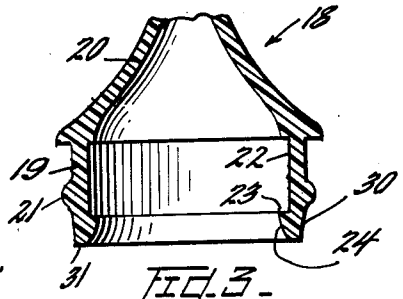


FIG. 3.

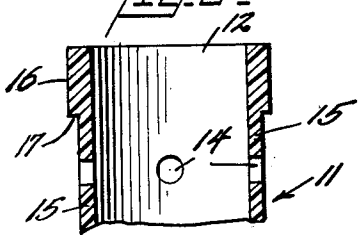


FIG. 4.

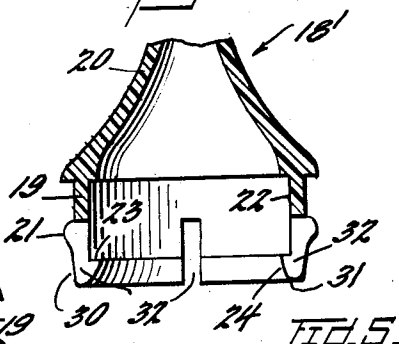


FIG. 5.

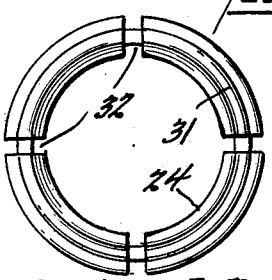


FIG. 6.

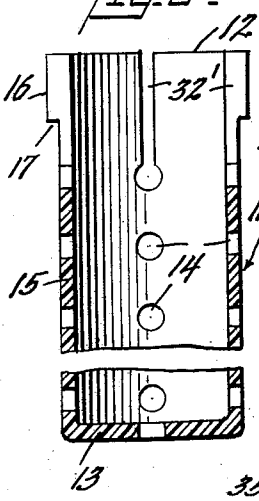
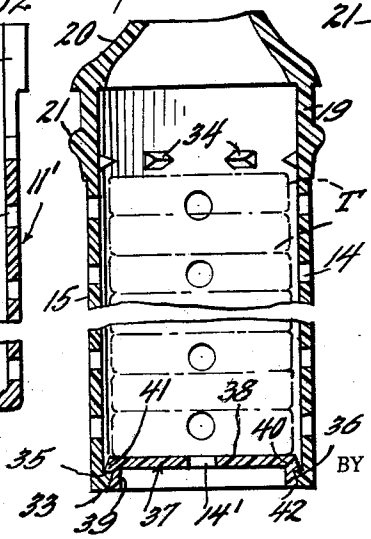


FIG. 7.



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TABLET RETAINER CAGE

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The present invention relates to a package for soluble tablets or pellets, and, more particularly, to a package for soluble tablets or pellets which are toxic or harmful if accidentally ingested by humans.

A common package for tablets, which migh be harmful if swallowed, especially by children, is a bottle having a screw-on cap. Although supposedly kept in places out of reach of children to assure that they are not exposed to the harmful contents, unfortunately such products occasionally fall into their hands. Since removal of a screw-on cap is child's play (literally) the use of this type of container for toxic ingredients presents a serious health problem both in the home and in retail storage.

The packaging of liquids which may be harmful or toxic if ingested in sufficient quantities also presents problems. Such products are frequently packaged in glass containers which are highly susceptible to breakage, and are expensive to ship and store in liquid form. Certain of such liquids may be easily compounded by dissolving tablets of a substance in a commonly available household solvent (such as water) thereby eliminating considerable expense in marketing operations. However, many manufacturers are reluctant to substitute tablets for the compounded solution since such tablets would expose the public to a more highly concentrated product, preferring to maintain the traditional techniques which are in many instances less economical.

It is an object of the present invention to obviate the above difficulties.

Another object of the present invention is to provide a convenient device adapted to aid in the production and dispensing of solutions of a standard or predetermined strength from tablets or pellets of the solute.

Briefly stated, in accordance with one aspect of this invention, the device comprises (1) a container, and (2) a cage which is adapted to contain tablets or pellets of the material to be dissolved in a liquid and which consists essentially of a neck portion for snug engagement within the finish of the container, a liquid dispensing spout extending outwardly from one end of the neck portion, and a perforated closed end cylinder attached to the other end of the neck portion and adapted to physically retain tablets of the substance while permitting communication between the substance and a liquid in which the cylinder portion is immersed.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the present invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a broken vertical section of the tablet-filled and assembled retainer cage elements mounted within a container;

FIGURE 2 is a fragmentary vertical section of the neck and spout portion of the tablet retainer cage;

FIGURE 3 is a fragmentary vertical section showing the locking portion of the perforated cylinder of FIGURE 1;

FIGURE 4 is a fragmentary vertical section of a modified form of a neck and spout portion similar to that shown in FIGURES 1 and 2;

FIGURE 5 is a bottom plan view of the modification of FIGURE 4;

FIGURE 6 is a broken vertical section of a modified form of a perforated cylinder; and

FIGURE 7 is a broken vertical section of another modification of the tablet retainer cage having an integral cylinder and neck and spout portion.

Referring to FIGS. 1 and 3 there is shown a perforated cylinder constituting a part of the tablet cage. The cylinder, which is indicated generally at **11**, is open at one end **12**, closed at the other end **13**, and has a plurality of perforations **14** extending through the sidewall **15** and end **13**. Locking portion **16** (adapted to engage within the neck of the spout illustrated) is slightly larger in outer diameter than sidewall **15**, to provide an annular shoulder **17** at their point of junction.

The neck and spout portion, generally referred to at **18** in FIGS. 1 and 2, has a cylindrical neck **19** integrally connected with a spout **20** of a general conoidal configuration and having an orifice **20***a* through its apex. An annular rib **21** is formed on the outer diameter of and encircling neck **19**, providing means for fastening the neck and spout portion **18** within finish **28** of the container **25** by being snapped in a corresponding groove **29** in finish **28**. Below the rib **21**, the outer surface portion **30** of the neck **19** is tapered inwardly as it approaches the open end **31** of the neck. The neck **19** has an annular recess **22** which is formed in the interior surface thereof and which preferably has a diameter slightly smaller than the outside diameter of locking portion **16** of the perforated cylinder **11**. The remainder of the interior surface of the neck **19** is in the form of an annular locking shoulder **23** which has an inside diameter approximately equal to the outside diameter of sidewall **15** and which has a lead-in surface **24** to facilitate assembly of the perforated cylinder **11** within neck and spout portion **18**. Lead-in surface **24** is shown in this embodiment to be tapered from a diameter (on the open end **31** of cylindrical neck **19**) which is slightly greater than the outside diameter of locking portion **16**, to the inside lip of locking shoulder **23**.

A container adapted to receive the assembled elements as shown in FIG. 1 is referred to generally at **25**. The container **25** defines an internal chamber **26** suitable for holding the proper quantity of a solvent and for use as a dissolving chamber. While the material from which container **25** is made may be any type which is not affected by the solvent or the solution formed therewith, in the preferred form the container walls **27** and finish **28** are made from a flexible plastic substance such as clear polyethylene or other transparent resilient or elastomeric material having similar characteristics. Such materials permit the walls **27** to be deformed to expel the solution as in the ordinary "squeeze bottle" type of container. Fill level indicating line **27***a* visible from the exterior shows the level of solvent necessary in chamber **26** in order to prepare a solution of predetermined strength upon dissolving the substance contained within the tablet container cage.

Finish **28** of container **25** has formed therein an annular groove **29** of approximately the same dimension as rib **21** of neck and spout portion **18**. The inside diameter of the finish **28** is preferably slightly smaller than the outer diameter of the upper portion of cylindrical neck **19** to be forced therein.

Tablets or pellets T are adapted to be placed within perforated cylinder **11** as shown with phantom lines in FIG. 1. The only size limitations regarding tablets T are that they must be small enough to fit within cylinder **11** and yet be large enough to prevent them from passing through perforations **14**. Machinery or methods of performing the cylinder loading operation are well known in the art and need not be described in connection herewith.

After the tablets T are loaded in perforated cylinder **11**, the cylinder and the neck and spout portion **18** are interlocked by telescoping the cylinder into the neck and spout portion and applying axial pressure to force locking portion **16** beyond locking shoulder **23** of neck **19**. In this connection it should be noted that in order to permit the cylinder **11** to snap into the neck and spout portion **18** either one or both of these must be temporarily deformed due to the interference (negative clearance) existing between the parts. The temporary deformation allows the interfering parts thereof to pass and to be positioned properly; thereafter the deformation is corrected by the resilient properties of the part or parts deformed. In the preferred embodiment, as shown in FIGS. 1–3, both the perforated cylinder **11** and the neck and spout portion **18** are made of a flexible plastic material such as polyethylene or any other material which has comparable resilient or elastomeric properties.

In the embodiment shown in FIGS. 4 and 5, the neck **19** of neck and spout portion **18'** has a plurality of slots **32** extending through the neck **19**. As shown, there are four equally spaced slots of substantially equal depth, each of which terminates at a point slightly above rib **21**, although their length may be varied according to the stiffness of the material comprising the neck and spout portion. Other features of this portion which are similar to those of that shown in FIG. 2 are similarly numbered. By providing these slots, it is possible to use a material of greater stiffness in portion **18'**.

FIGURE 6 illustrates a variation of the perforated cylinder of FIGS. 1 and 3, like numbers referring to like features. Note that perforated cylinder **11'** has been provided with a plurality of equally spaced slots **32'** each extending from the open end **12** to a perforation slightly below shoulder **17**. As in connection with portion **18'**, use of the slots permits the selection of a variety of materials having a broader spectrum of resilience.

It was mentioned previously that the preferred practice is to construct both cylinder and neck and spout portion from a resiliently or elastomerically flexible material. However, it is also feasible to use the cylinder **11** of FIGS. 1 and 3 with the neck and spout portion **18'** of FIGS. 4 and 5, or the neck and spout portion **18** of FIGS. 1 and 2 with the cylinder **11'** of FIG. 6, or the cylinder **11'** with the portion **18'**.

Regardless of the way in which the perforated cylinder is telescoped into the neck and spout portion, when the locking portion **16** enters recess **22**, the deformed member or members return, insofar as permitted by the dimensions of the mating surfaces, to a substantially undeformed condition causing shoulders **17** and **23** to be juxtaposed, thus locking the two members securely in position.

After the tablet retainer cage has been assembled as indicated above, it may be packaged in accordance with the use to be made of the cage and the tablet substance. For example, if the circulation of air is deleterious to the substance, the cage may be packaged within a packet or container to prevent this harmful effect. The cage may be packaged as a kit with the dispensing container shown in FIG. 1, or individually as a refill for the kit. If the solvent to be used with a kit is readily available in areas where the product is to be sold, then the cage may be inserted into an empty dispensing container, obviating use of added containers to prevent exposure of the substance to circulating air. It should be realized that the packaging and merchandising techniques may also vary with the type of solvent to be used and the use to which the resultant solution is placed.

A cross-sectional view of an assembled tablet retainer cage mounted in a container as it would be after the container is filled with a measured amount of solvent is found in FIG. 1. With the illustrated form of container such mounting is accomplished by inserting the cage into the container finish **28** cylinder end first, and applying force downwardly in the axial direction until rib **21** of neck **19** becomes locked within groove **29** on container finish **28**. Here again in the embodiment shown there is preferably some sort of temporary deformation of either or both members being assembled. The remarks made in connection with the materials or methods used in permitting engagement of the parts comprising the tablet retainer cage are equally applicable to the interlocking of the cage and container.

In use, the solvent passes through the perforations in the cylinder end of the cage assembly, contacting the tablets and dissolving the same. Thus, there is formed in the container a solution of predetermined strength, while simultaneously providing a spout to direct the flow of the solution when the container is squeezed. Obviously the spout could be provided with a stopper or other means for closing the spout passageway or orifice.

A modification in the construction of the tablet retainer cage is shown in FIG. 7. In this form, the cylinder and the neck and spout portion are integral and adapted to be filled through the end **33** of the foraminous cylinder. It will be observed that some of the features disclosed in connection with the device of FIGS. 1–3 are utilized in the integral unit; these features are similarly numbered and in the interest of brevity will not be rediscussed. In the interior of the neck **19** are a plurality of inwardly projecting lugs **34** lying in a circular path. The lugs **34** are adapted to prevent displacement of tablets T from the cylinder to the spout portion and to restrict shifting of the tablets which could result in tablet breakage. The end **33** of the cylinder portion has an annular locking shoulder **35** extending interiorly and a lead-in surface **36** tapered inwardly from the inside diameter of end **33** to the inside lip of shoulder **35**.

Bottom cap **37** is cylindrical and is provided with one end wall **38** which has a perforation **14'** extending therethrough. On the exterior of the sidewall **39** adjacent end wall **38** there is an outwardly flared surface **40** leading to an annular locking shoulder **41**. The cap and cylinder portion are both sized so as to permit the cap **37** to be inserted in lower end of the cylinder portion and snapped into locking position with the end wall **38** contiguous to the lowermost tablet placed in the cylinder, thus producing a closed end cylinder. In the locking position, cap **37** is telescoped within the lower portion of the cylinder with shoulder **41** abutting and resting upon shoulder **35** of the cylinder and with end **42** of sidewall **39** aligned with end **33** of the cylinder. After the tablet retainer cage of this embodiment has been filled and assembled, it may be used in the same way as described hereinbefore in connection with other embodiments. The previous comments respecting materials of construction and the temporary deformation of either or both members comprising the cage are equally applicable to this structure.

While this invention may be used in many ways, it is particularly advantageous to use it in connection with a substance to be dissolved in water since that solvent is found in virtually all households. The present invention finds use in working with bleaches, hair waving lotion, insecticides, weedkillers, fertilizers, and the like.

It will be understood that the various means of interlocking or attachment described hereinabove are preferred, but that other means could also be used. For example, the engagement may be by means of threads, or by heat sealing, or by a friction fit or the like.

Many modifications of the above invention may be used and it is not intended to hereby limit it to the particular embodiments shown or described. The terms used in describing the invention are used in their descriptive sense and not as terms of limitation, it being intended that all equivalents thereof be included within the scope of the appended claims.

What is claimed is:

1. A tablet retainer cage for dissolving a substance

in liquid, comprising a neck portion for snug engagement in an opening in a liquid container, a liquid dispensing spout attached to and extending outwardly from the top of said neck portion, and a closed end cylinder attached to and extending from the bottom of said neck portion, said cylinder containing in stacked relation a measured quantity of tablets of the substance to be dissolved, said neck portion having a plurality of inwardly projecting lugs lying in a circular path about its internal periphery, said lugs being adapted to restrain movement of said tablets within said cylinder, said cylinder being perforated throughout substantially its full length and periphery to provide communication between a liquid in which the cylinder portion is to be immersed and the substance to be dissolved.

2. In combination, a container for a liquid and a tablet retainer cage, said container having flexible side walls with markings thereon visible from the exterior indicating the proper level of fill for the liquid and having a finish providing an orifice in communication with the interior of the container, said tablet retainer cage being adapted to telescope within said orifice and comprising a neck portion having means thereon cooperable with means on said container finish to firmly engage the cage within said orifice, a liquid dispensing spout attached to and extending outwardly from said neck portion, and a closed end cylinder attached to and extending from the bottom of said neck portion into the interior of said container, said cylinder being perforated throughout substantially its full length and periphery, said cylinder containing a measured quantity of a substance in tableted form to be dissolved in a measured quantity of said liquid in said container, thereby preparing a solution of predetermined strength.

3. In combination, a container for a liquid and a tablet retainer cage, said container having flexible side walls and a finish providing an orifice in communication with the interior of the container, said container being adapted to receive a predetermined amount of a solvent, said tablet retainer cage being adapted to telescope within said orifice and comprising a neck portion having means thereon cooperable with means on said container finish to firmly engage the cage within said orifice, a liquid dispensing spout attached to and extending outwardly from said neck portion, and a closed end cylinder attached to and extending from the bottom of said neck portion into the interior of said container, said cylinder being perforated throughout substantially its full length and periphery, said cylinder containing a stack of tablets, said stack of tablets containing a measured quantity of a substance to be dissolved in said solvent to form a solution of predetermined strength, said tablets being substantially restrained from movement within said cylinder by restricting means attached to and extending radially inwardly from the interior wall of said neck portion at a point contiguous to the end of the stack of tablets most closely adjacent said neck portion.

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