

Fig-5-

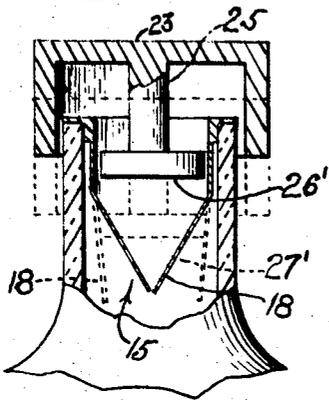


Fig-6-

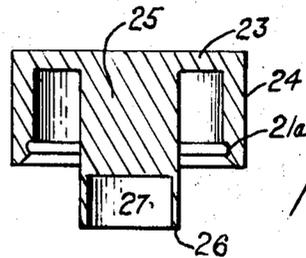


Fig-1-

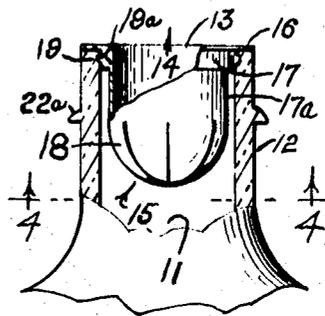


Fig-2-

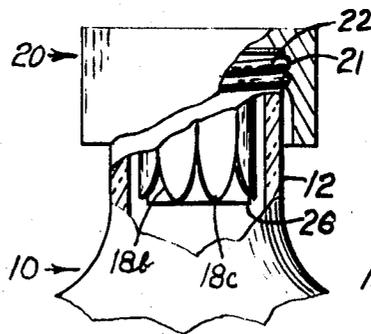


Fig-3-

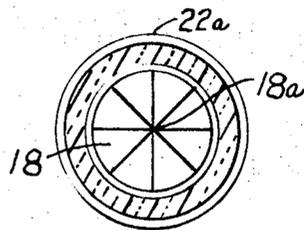


Fig-4-

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### SAFETY CLOSURE EFFECTIVE BOTH IN THE CAPPED AND UNCAPPED STATE OF THE CONTAINER

This invention generally relates to containers and closures therefor. More specifically, it relates to a closure safety device which is effective both in the capped and uncapped state of the container and provides, especially for the very young children, a positive deterrent to easy accessibility to harmful substances packaged in containers.

How to prevent children from having easy access to harmful products stored in containers poses a very serious problem which many inventors have tried to solve, and, to this end, many safety closure devices have been designed. Usually, each provides some form of interlocking mechanical arrangement between cap and container.

However, these prior devices have numerous disadvantages. Some are much too mechanically complicated, others too expensive, but most may be categorized as impractical. In common, however, they all have two very serious disadvantages: When securing one of these prior safety caps onto a container diligent attention is required to insure that the locking means thereof is properly and effectively engaged, otherwise it forfeits, obviously, whatever safety value it may have. But by far, the most serious disadvantage of prior safety closures is that none, to my knowledge, provide for such contingencies in which, due to mental strain, physical pain, or forgetfulness, the user of a container inadvertently leaves it in an uncapped state. Such an open container falling into the hands of a young, unattended child would be most dangerous; for, if undetected, an immature child quickly could swallow the entire lethal contents stored therein.

Therefore, the present invention provides a safety closure device that is effective both in the capped and uncapped state of the container.

An object of the invention is to provide a closure or trap formation secured within the confines of the neck of the container which effectively closes the neck discharge passage to prevent passage of substance therethrough whenever the cap is unscrewed or removed from the neck.

Another object of the invention is that the cap and container must be properly manipulated in order to extract material from the container.

Another object of the invention provides that only a predetermined amount of substance (such as a prescribed amount of medicine in granular or solidified nature, for example aspirins, etc. may be extracted from the container with each proper manipulation of the cap and container.

Another object of the invention provides the inherent safety of the time factor; to withdraw a given portion of substance from the container requires the repetitive act of proper steps—all time-consuming.

And another object of the invention is that it permits retention of the desirable features of the presently used caps and containers without adding measurably to the present cost by its incorporation therein.

Other objects will appear hereinafter. In the accompanying drawings:

FIG. 1 is a vertical section of the cap.

FIG. 2 is an elevation of an uncapped container, partially in section, showing the neck trap formation in its normally closed position.

FIG. 3 is a view similar to FIG. 2, but with the closure cap in sealing position and the trap formation in open position.

FIG. 4 is a view taken in the direction of the arrows on line 4—4 of FIG. 2.

FIG. 5 is a vertical section of the cap showing a modified form of the invention comprising an additional safety structure.

FIG. 6 generally is a vertical section of another modification of the invention. Referring to the drawings a typical receptacle is shown partially and identified generally at 10; the material thereof may be glass or any suitable plastic material. The receptacle 10 is provided with the usual chamber 11 and an

upwardly extending neck part 12 which has an outlet or discharge end 13 and a discharge passage 14 leading therefrom to the chamber 11.

As seen in FIGS. 2, 3 and 6, a resilient closure or trap formation, generally designated at 15, is suitably fixed or secured within the discharge passage 14 so as to be spaced from the neck outlet 13 and interposed between the latter and the chamber 11. The trap 15, which is in the form of a slit resilient diaphragm, may be fabricated from any suitable resilient material such as plastic or rubber. In its preferred form, the trap 15 is like a thimble with an open end and a rounded bottom. Preferably, the upper open end thereof is formed with a peripheral flange 16 which has depending therefrom an annular collar formation 17 and annular wall 17a of reduced diameter and the lower portion of the latter having a plurality of resilient fingers 18 extending radially toward a common center or axis of said discharge passage 14 which is coextensive with the longitudinal axis of the receptacle so as to close the discharge passage to provide therein a normally closed barrier against discharge of substance such as articles of a given size from the chamber 11, whenever the receptacle 10 is in an uncapped state as seen in FIG. 2. The trap 15 may be secured within the confines of the neck 11 by the frictional fit, or by mating snap-means formed on said neck and trap parts, such as at 19 and 19a, respectively.

The closure cap, generally designated at 20, may be formed from any suitable material, preferably plastic, and as noted, it may be screwable to and from sealing position on neck 12 by the usual intermeshing thread means on said neck and cap parts, such as at 21 and 22, or the cap may be applied onto said neck by mere axial motion thereunto being removably secured thereon by interfitting snap-lock means formed on said cap and neck, such as at 21a and 22a, respectively. The cap 20 has the usual end wall 23 from which depends cylindrical wall or skirt 24 and in coaxial relationship thereto, preferably integral with said end wall 23, is inner depending formation or plug extension 25 which is arranged for passage into and from the neck discharge passage 14, whereby, on cap closing motion, the end surface 26 of the formation 25 operatively engages the upper surfaces of the trap fingers 18 and acts to displace or distort the said trap fingers 18 from a normally closed position of FIG. 2 to the open position seen in FIG. 3.

As noted in FIG. 1, there is provided in the free end of plug extension 25 a cavity or cup 27 and the open end thereof projects just beyond the free ends 18c of the fingers 18 when the cap 20 is in its closed position on neck 12 as seen in FIG. 3, whereby, on inversion of the receptacle 10, substance (not shown) from the chamber 11 will pass or gravitate therefrom into said cup 27 to be held or captured therein for subsequent discharge therefrom on removal of the cap 20 from the neck.

In the modification of FIG. 6, however, the cup 27 is eliminated, and also the trap 15 is formed with the fingers 18 thereof having a longer taper or V-shape than the structure shown in FIG. 1. The formation 25 is provided with an end surface 26' and the peripheral edge thereof engages the fingers 18 in a manner just previously described to open the trap 15, and as is shown in dotted lines in FIG. 6, when the cap 20 is in closed position on the neck, the end surface 26' is spaced from the free ends 18c of the fingers 18 so as to provide between the latter and the end surface 26' a substance-receiving space 27' which forms a means to hold or capture therein a fixed portion of the substance from chamber 11 for subsequent discharge therefrom in a manner aforesaid. It will be obvious that the substance-receiving cup 27 (FIG. 1) and the substance-receiving space 27' (FIG. 6) may be dimensioned to suit, whereby a given or predetermined amount of substance will gravitate therein for subsequent discharge therefrom on each proper manipulation of cap and receptacle.

The modification illustrated in FIG. 5 constitutes the preferred embodiment of the invention; the structure thereof is advantageous, especially when extreme safety is desired to prevent the very young children from having easy access to

lethal substances of containers. The additional safety feature comprises a stud or stem portion 25' 172 depending from the end wall 23 of the cap 20, and includes a cup part providing a cylindrical portion 125 having a bore 29 therethrough adapted for sliding reception of the stem portion 25', and as noted, the cylindrical portion 125 is axially movable on said stem portion being extendable to an operative position shown in dotted lines and retractable to an inoperative position shown in solid lines. Obviously, to extract substance from the receptacle 10, the cylindrical portion 125 must be extended to its operative position in order for the end surface 26 thereof to have sufficient longitudinal length to effectively engage and open the trap 15 on cap closing motion. The said portions 125 and 25' are provided with suitable detent formations 30 and 31, respectively, for releasably locking said portions together in the said extended operative position. To facilitate the interengagement of the lock means 30 and 31, the stem 25' also has an open end longitudinal slot 32 permitting a greater degree of flexure thereto.

With reference to the structure of FIGS. 1 to 4 inclusive, the invention works as follows: On application of the cap 20 onto the neck 12 the cap formation 25 enters the neck passage 14, and on advancing motion of the cap to sealing position on said neck, the end surface 26 of the formation 25 engages the upper surface of the resilient fingers 18 forcing or distorting them to an open position as seen in FIG. 3 wherein the end surface 26 just projects beyond the free ends of the fingers 18. On inversion of the receptacle 10 a portion of the substance of the supply chamber 11 will gravitate into the cup 27 for subsequent discharge therefrom on removal of the cap from the receptacle, at which time the fingers 18 are released also from the restraining force of the formation 25 to reassume their normally closed position in discharge passage 14, as seen in FIG. 2, whereby said trap 15 again blocks passage of material through the said discharge passage 14 when the receptacle is in an uncapped state.

Thus, it is apparent that the present invention provides, especially for the young children, an effective deterrent to easy accessibility to harmful substances of containers. The safety closure means is most effective both in the capped and uncapped state of the container.

It is understood that the invention may be modified somewhat, but, nevertheless, fall within the scope of the appended claims.

I claim:

1. A dispenser of articles of given size which are potentially hazardous for children, comprising a receptacle for holding a supply of articles and having an open discharge end; a cap closable on and removable from said discharge end and having a plug extension with a cupped end, of which the cup is of a size to hold a certain number of articles and is open to the interior of the receptacle when the cap is closed; and a resilient transverse diaphragm in said receptacle, said diaphragm being slit and normally resiliently closed at the slit against the passage of an article therethrough, and said plug extension provides a depending stem on said cap, and a cup part having said cupped end and an apertured bottom slidably received with its aperture on said stem for movement into retracted and extended positions thereon, as well as means to releasably lock said cup part to said stem in said extended position, with said cupped end of said cup part in said extended position resiliently spreading said diaphragm open at the slit, on closure of the cap, sufficiently to confine escape of articles from the supply into the cup on inversion of the receptacle, and the diaphragm responding in resilient closure at the slit to retraction of said cupped end therefrom.

2. A dispenser as in claim 1, wherein said locking means provides interengageable detent formations on said stem and cup part, and said stem is longitudinally slotted for resilient engagement and disengagement of said detent formations.

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