ABSTRACT OF THE DISCLOSURE

A container is provided with a closure member which is difficult for a child to remove, the open neck portion of the container and the closure member being threaded. The threads of the container are interrupted along a line parallel with the axis of the open neck portion and the closure member is fitted with a vertical pin within the internal periphery of the closure member. This pin serves to prevent rotation of the closure member, thus locking it. To remove the closure cap, one must first adjust the pin so that it no longer prevents rotation of the closure member, then unscrew the closure member.

This invention relates to containers and closures thereof.

Many substances for domestic use are potentially dangerous to children. For example, many medicines would be dangerous if taken by children, as would many cleaning materials. These substances normally are stored in containers, and it is necessary to keep these containers in places inaccessible to children. When such a substance is being used, however, it usually is necessary for an adult to watch that children do not obtain access to the substance in the container. Should the person be unexpectedly called away, as for example when the telephone or doorbell rings, a child may be left alone with the container and inadvertently do himself some harm. By means of the present invention there is provided a container and a closure cap therefor which can easily be opened and closed by an adult, but which is quite difficult, perhaps even impossible, for a child to open, so that if a child is left with such a closed container he is unlikely to be able to open it. The closure and container which are the subject of this invention are not restricted to use in conjunction with substances which are potentially dangerous to children, but may be used in conjunction with other substances as well. They may be used both for liquids and solids.

According to the present invention, there is provided a locking tamper-resistant vial comprising the combination of a closure member and a container with a cylindrical open neck portion said neck portion having external threads, said external threads being interrupted along a line parallel with the axis of said open neck portion, said closure member having internal threads adapted to receive and engage the external threads of said open neck portion, said closure member containing as a vertical insert within the internal periphery thereof a pin, said pin adapted to fit snugly against the adjacent surface of said closure member and against the unthreaded portion of the otherwise threaded surface of the neck portion and when in locked position to prevent rotation of said closure member.

The invention is based in part on the observation that while young children may be capable of unscrewing a cap from a container, the requirement that some additional step be performed will be a sufficient obstacle as to prevent the child from removing a closure cap from a container. The very fact that two separate manipulations are required is in itself a considerable problem for a child, and the additional fact that two such manipulations must be performed in order and in a particular manner renders the combined closure member and container a safe repository for medicines and the like where children must be reckoned with.

These and other advantages of the invention may be readily understood by reference to the accompanying drawings in which:

FIG. 1 is a side view of the cylindrical open neck portion of a container, showing the vertical interruption of the threads of that portion.

FIG. 2 is a perspective view of the same open neck portion.

FIG. 3 is a vertical sectional view of the open neck portion of such a container onto which a closure cap has been screwed.

FIG. 4 is a fragmentary horizontal sectional view of a closure cap showing an alternative oval shape, rather than the usual circular shape.

FIG. 5 shows a locking pin.

FIG. 6 is a vertical sectional view which shows the pin of FIG. 5 inserted into a closure cap which is screwed on to the open neck portion of a container.

FIG. 7 shows a locking pin similar to that of FIG. 5 except that it is adapted to be pushed rather than pulled into unlocked position.

FIG. 8 is a vertical sectional view which shows the locking pin of FIG. 7 inserted into a closure cap which has been screwed on to the open neck portion of the container.

FIG. 9 is a vertical sectional view which shows a third type of locking pin inserted into a closure cap which has been screwed onto the open neck portion of a container.

FIG. 10 is a vertical sectional view which shows still another type of locking pin inserted into a closure cap which has been screwed onto a container.

FIG. 11 shows a fifth type of locking pin, differing from that shown in FIG. 10 merely in that it is intended to be pushed rather than pulled into unlocking position. Referring to FIG. 6, it will be seen that the base of any cross-sectional shape, i.e., square, circular, etc., it being necessary only that the portion 2 thereof which is adjacent the unthreaded portion 3 of the otherwise threaded surface 4 of the neck portion be of such configuration as to interfere with such threaded surface to prevent rotation of the cap 5. It may, for example, be of arcuate shape conforming to the arc of the circular cap and presenting a maximum area of contact with the unthreaded portion of the container neck. As shown in the drawing the locking portion of the pin traverses only a part of the threaded area of the container; it may extend over even less of the threaded area, it being necessary only that it interfere with one of the threads to secure an effective locking result, and on the other hand, it may extend across the entire threaded area of the container. As shown, the pin extends beyond the locking portion in the form of a narrower leg 6 which acts to stabilize the pin in locking position. To unlock the cap the pin must be lifted until it no longer interferes with the rotation of the cap. The lifting of the pin is facilitated by providing a small depressed area 7 in the top surface 8 of the cap surrounding the opening 9 into which the pin fits. Also, the pin is fitted with two retention lugs 10 and 11 spaced apart which fit into corresponding recesses 12, 13 and 14 in the interior surface of the opening 9 into which the pin fits. There are three such recesses into which these retention lugs may fit and these are spaced vertically at such intervals that the lower two of them will hold the pin in locking position whereas the upper two of them will hold the pin in unlocked position.

The locations of the opening in the cap into which the pin fits and of the unthreaded portion of the container.
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necks are such that they meet when the cap is screwed tightly onto the container neck.

Thus, to lock the cap of FIG. 6 one merely screws it on to the container neck, then inserts the locking pin as far as it will go. To unlock it, one withdraws it at least until the retention lugs engage the top two corresponding recesses.

Referring to FIG. 8, it will be noted that the pin 15 is essentially the same as that shown in FIG. 6 except that the pin must be pushed up from the bottom 16 to put it in unlocked position. This permits a more orderly appearance of the top surface of the cap since it is unnecessary to provide means, e.g., a screw slot in the pin or a depressed area in the cap surrounding the pin, for rotating the pin from the top. As before, the pin is maintained in locked and unlocked positions by means of retention lugs and corresponding recesses.

Referring to FIG. 9, it will be seen that the pin 17 is so constructed as to remain within the cap at all times, it being unnecessary to remove it to unlock the cap. A portion 18 of the circumference of the lower part of the pin is threaded and the pin is rotatable within the cap, so that when the threads of the pin are presented to the container, the container is free to rotate with respect to the cap. As shown, the pin is in unlocked position. On the other hand, when the threaded portion of the pin is faced in the opposite direction, the pin acts to obstruct rotation by interfering with the threads of the container, i.e., the pin, in this position, can fit only with the unthreaded portion of the container surface. Rotation of the pin may be effected by means of a graspable protrusion from the top surface thereof, or a screw slot in the otherwise flat top surface. The drawing shows an arc slot 19 which will accommodate a coin. A turn limit lug 20 comprising a portion of the top surface of the pin is free to rotate through an arc of 180 degrees in a recess 21 in the top surface of the container. In one extreme position of rotation the pin locks the cap whereas in the opposite extreme position it is in unlocking position. The pin is held in place with respect to vertical movement by means of a circumferential lug 22 which fits into a corresponding circumferential recess 23 within the cap.

Referring to FIG. 10, the pin in this instance is lifted from its locked position and then turned to unlocked position. It will be noted that the pin is partially threaded at its lower extremity 24, the threaded portion being engageable with the threaded portion 25 of the container and when so engaged permitting rotation of the cap with respect to the container. Otherwise, i.e., when not so engaged, the unthreaded lower portion 26 of the pin fits only with the unthreaded portion 27 of the container and prevents rotation of the cap with respect to the container by obstructing the threads of the container. The pin is shown in locked position. To unlock the cap the pin must be lifted at least until the uppermost thread of the pin is engageable with the uppermost thread of the container, and then turned so as to effect such engagement. A vertical turn limit lug 28 extending from the top of the pin downwardly fits into a corresponding recess 29 within the cap and limits rotation of the pin when it is in locked position. The extent to which the pin is lifted to unlock the cap is determined by the length of the downwardly extending turn limit lug and the pin must be lifted until the turn limit lug can be freed from the above recess. When it is so freed, then the pin is rotated so as to present the lower threads of the pin to the threads of the container; usually the extent of rotation is 180 degrees and is controlled by a turn limit lug stop. The pin is held in place by retention lugs which fit into corresponding retention lug recesses.

FIG. 11 shows a pin similar to that shown in FIG. 10 except that the pin must be pushed upward to an unlocked position, rather than be lifted up.

The container, cap and pin may be fabricated from glass, plastic, metal or the like, although plastic is preferred for reasons of economy and durability. The forms shown in the drawings are preferred, but it will be obvious to those skilled in the art that operative variations are possible and these are contemplated as being within the scope of the invention.

1. A locking tamper-resistant vial comprising the combination of a closure member and a container with a cylindrical open neck portion said neck portion having external threads, said external threads being interrupted along a line parallel with the axis of said open neck portion, said closure member having internal threads adapted to receive and engage the external threads of said open neck portion, said closure member containing as a vertical insert within the internal periphery thereof a pin, said pin adapted to fit snugly against the adjacent surface of said closure member and against the unthreaded portion of the otherwise threaded surface of the neck portion and when in locked position to prevent rotation of said closure member.

2. The locking tamper-resistant vial of claim 1 wherein a portion of the lower surface area of the pin is threaded.

3. The locking tamper-resistant vial of claim 1 wherein the pin is of circular cross section.

4. The locking tamper-proof vial of claim 1 wherein the pin is of accurate cross section.

5. The locking tamper-proof vial of claim 1 wherein the lower portion of the pin extends below the lower surface of the cap so that the pin is thereby adapted to be pushed into an unlocking position.

6. The locking tamper-proof vial of claim 1 wherein the pin while in locked position is prevented from rotating by a turn limit lug which fits into a vertical recess in the closure member.

References Cited

UNITED STATES PATENTS

3,376,992 4/1968 Klapp --------------- 215—9

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