

[54] **ACCESS LIMITING CLOSURE FOR CONTAINERS**

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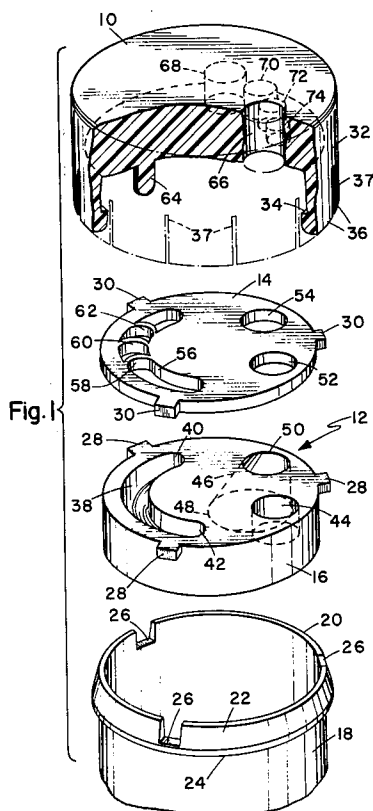
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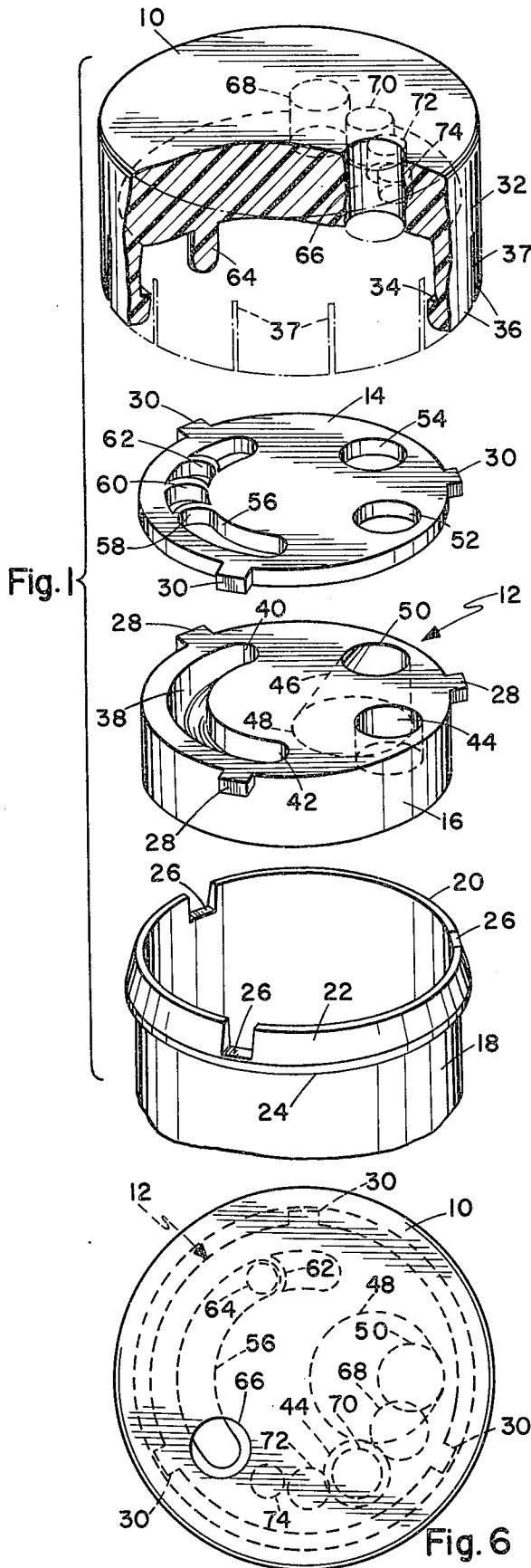
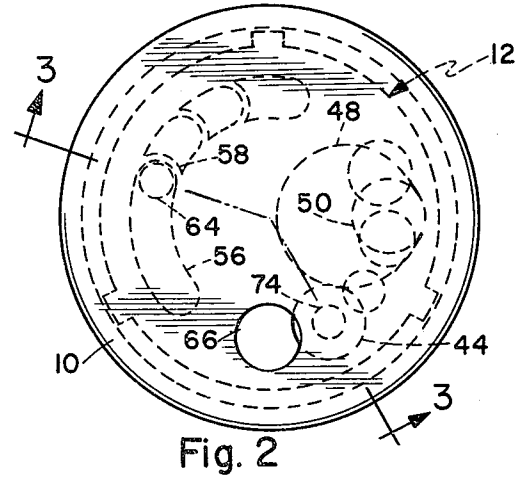
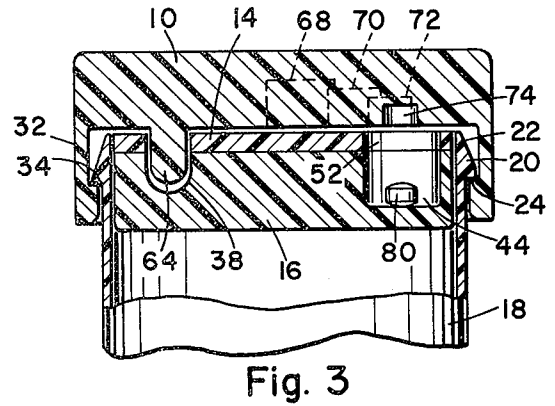
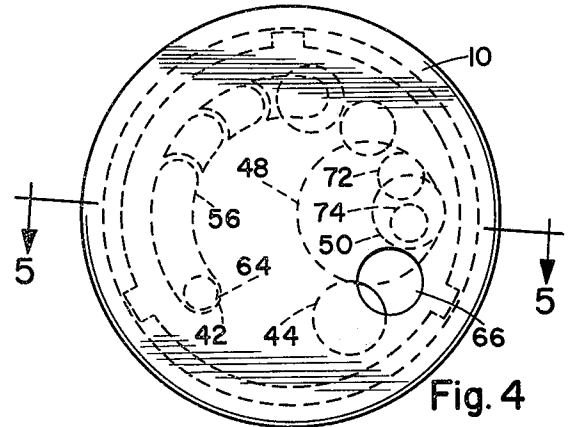
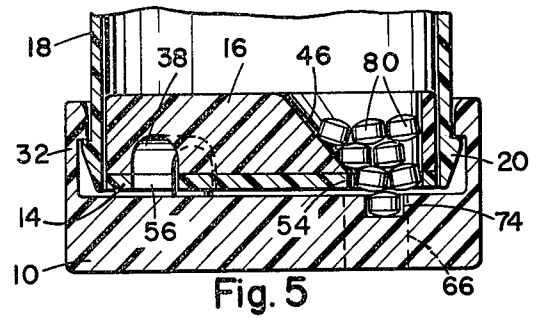
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ABSTRACT

The closure includes a rotatable cap locked onto the container by a resilient skirt. The arc of rotation is limited by an insert in the opening of the container. The insert also includes a funnel for directing the pills or other substance to be dispensed from the container and to a transfer chamber in the rotatable cap. The pill is moved from the transfer chamber to a holding chamber in the insert at an aligned location determined by the end limits of the arc of rotation. The dispensing orifice is aligned with the holding chamber by the opposite extreme of the arc of rotation. The cap is provided with transfer pockets graduated in size to accommodate various sizes of pills. To accommodate these various pill sizes, the rotation limiting means in the insert is provided with removable stops to properly align the correct size transfer chamber over the holding chamber. Only a single capsule or other dispensed substance may be obtained for each dispensing cycle, thus reducing the possibility of obtaining an excess quantity of pills. The container must be inverted twice during the dispensing cycle combined with proper sequencing of the cap rotation, thereby making it difficult for an infant to inadvertently operate the device.

6 Claims, 6 Drawing Figures





ACCESS LIMITING CLOSURE FOR CONTAINERS

BACKGROUND OF THE INVENTION

Annually there are many persons who are injured or killed as a result of hazardous substances being dispensed from containers. For example, in the dispensing of potentially dangerous drugs, there are a significant number of accidents caused by the user inadvertently obtaining an excessive dosage of the drug or by voluntarily and impulsively taking an excessive dosage. A similarly unacceptable high number of injuries and deaths are experienced by infants who obtain access to contents of medicine or poison containers and in the absence of adult supervision take lethal dosages of these substances.

Many dispensing closures or dispensing containers for hazardous substances have been proposed to alleviate this danger of injury. Of the closure designs typically provided a majority are not capable both of limiting the quantity of substance dispensed in a single dispensing cycle to a small unit of the substance and also being of the type that are difficult or impossible to operate by youngsters. Further, many of the prior art dispensing containers may be easily subverted by an adult intent upon taking a large dosage of a drug under emotional distress or similar circumstances.

These prior art dispenser designs which have attempted to provide for single unit dosages and to prevent subversion of the mechanism while at the same time discouraging the successful operation of closure by youngsters, have been excessively complicated and expensive to manufacture. Frequently such designs employ springs as an integral part of the mechanism and thereby become less reliable than devices not so dependent.

It is therefore desirable to have a closure which may be utilized in connection with the storage and dispensing of hazardous substances which will permit the dispensing of a controlled quantity or single unit of the substance during each dispensing cycle and which requires the intelligence and ability to read instructions, or follow diagrams, that is possessed by relatively mature persons and further is not easily subverted by force. It is especially to be desired that such a device is provided without resort to excessively complex mechanisms or a large number of parts.

SUMMARY OF THE INVENTION

An exemplary embodiment of the invention utilizes a rotatable cap means which is positioned adjacent to an insert received in the opening for the container. A plurality of orifices and chambers in the cap and insert must be aligned in successive rotations of the cap and inversions of the container to cause a pill or other packaged substance to be dispensed from the container.

The insert includes a channel which cooperates with a pin in a rotatable cap member to limit the arc of rotation for the cap member. The cap member also includes a transfer chamber. The transfer chamber receives a pill through a guiding funnel in the insert. Thus, the first step in dispensing the pill is to align the guiding funnel with the transfer chamber. This may be accomplished by marks on the cap of the member or may be accomplished by inverting the chamber and rotating the cap until a pill drops into the transfer chamber. The channel provides an abutment at opposite ends of the channel to provide limit stops. One of these

limit stops aligns the transfer chamber in the cap with a holding chamber in the insert. Therefore, if the transfer chamber is rotated out of alignment with the dispensing orifice to that extreme of rotation of the cap, the transfer chamber will be aligned with the holding chamber, and with the return of the bottle to its upright position the pill will drop into the holding chamber. The cap may then be rotated to the opposite extreme of rotation with the pin coming to rest against the opposite end of the channel. In this position the holding chamber is aligned with a dispensing orifice in the cap and therefore when the container is again inverted the pill will drop from the holding chamber through the dispensing orifice and is available for use.

The cap is formed of resilient material and includes a depending skirt portion which is sized to overlie the exterior of the container. Locking surfaces on the depending skirt are positioned to cooperate with corresponding surfaces on the container so that when the cap is forced onto the container, inclined surfaces cause the resilient skirt to slide over and snap cooperating locking surfaces into engagement. Once positioned on the container, the cap is difficult to remove without destruction of the container, thereby discouraging subversion of the mechanism.

The closure may accommodate a range of sizes of dispensed substance without resort to the use of different component parts. A plurality of transfer chambers are provided to cover the range of product size anticipated. For a particular product size only a single product will fit within the appropriate transfer chamber. Alignment of only the proper transfer chamber with the holding chamber is insured by a plurality of removable stops in the channel. For this purpose it may be desirable to manufacture the insert in two parts with the removable stops being in a disc portion removal being by breaking away a stop to permit the pin member in the cap portion to travel further down the channel and align transfer chambers of increasing size with the holding chamber.

It is therefore an object of the invention to provide a new and improved access limiting closure for containers.

It is another object of the invention to provide a new and improved access limiting closure for containers that may not easily be operated by infants.

It is another object of the invention to provide a new and improved access limiting closure for containers that prevent the dispensing of more than a unit dosage with each dispensing cycle.

It is another object of the invention to provide a new and improved access limiting closure for containers that may not easily be subverted by the user.

It is another object of the invention to provide a new and improved access limiting closure for containers which is relatively low in cost and easy to manufacture.

It is another object of the invention to provide a new and improved access limiting closure for containers that can accommodate a range of size for the substance to be dispensed.

It is another object of the invention to provide a new and improved access limiting closure for containers that facilitate the transfer of substance from the container to the dispensing mechanism.

It is another object of the invention to provide a new and improved access limiting closure for containers

which is applicable to a wide range of hazardous substance types.

Other objects and many pendent advantages of the invention will become more apparent upon a reading of the following description together with the drawings in which like reference numerals refer to like parts throughout and in which:

FIG. 1 is an exploded perspective view of the cap and container assembly.

FIG. 2 is a top view of the assembly with a selected transfer chamber aligned to a drop a pill into the holding chamber.

FIG. 3 is a sectional view taken on line 3—3 of FIG. 2.

FIG. 4 is a top plan view with the cap turned to the initial loading position.

FIG. 5 is a sectional view taken on line 5—5 of FIG. 4.

FIG. 6 is a top plan view with the cap rotated to an alternative transfer position.

Referring now to the drawings there is illustrated a rotatable cap 10 in association with an insert 12. In the instant embodiment, the insert 12 is comprised of an insert body portion 16 and an insert disc 14. The insert 12 and cap 10 are utilized in association with a container 18. Container includes a locking portion 20. Portion 20 includes a bayonet cross section with a sloping surface 22 and locking surface 24. The locking portion is penetrated in three positions by index slots 26. The insert body 16 and disc 14 are received within the opening of the container and positioned by index tabs 28 and 30 to hold the insert against rotation and prevent it from movement into the container.

The cap member 10 is received on the container by forcing it over the sloping surfaces 22 so that the depending skirt portion 32 is expanded to cause the locking surface 34 to engage the corresponding locking surface 24 on the container. The depending skirt 32 is comprised of a plurality of segments 36 separated by slots 37 to provide the requisite flexibility.

While it is possible to manufacture the various parts of the assembly from a number of known materials, the use of polypropylene is preferred as it has been found to have both the necessary resiliency and strength to lock the cap member onto the container and prevent its removal, as well as preventing any of the other operations of the device from being subverted by the application of excessive force.

The body portion 16 of the insert includes a channel 38 having abutment end portions 40 and 42. This channel is a sector or a circle. In the preferred embodiment, the sector covers approximately 120° of arc. The insert body portion also includes a holding chamber 44 formed in its upper surface and a guiding means or funnel 46. The funnel has an enlarged opening 48 on the interior surface of the body portion and a reduced diameter opening 50 on the exterior portion of the insert body 16.

The index disc is locked into rotational alignment with the insert body 16 so that the aperture 62 is aligned with the opening of the holding chamber 44, and the aperture 54 is aligned with the reduced diameter opening 50 of the funnel 46. Similarly, the slot 56 is aligned to overlie the channel 38. Slot 56 includes frangible membranes 58, 60, and 62 which form removable abutments to replace the abutment 40 for purposes which will be described more fully hereinafter.

A depending pin member 64 on cap number 10 is sized to ride within the slot 56 and channel 38 in the disc 14 and insert body 16, but to contact the opposite ends of the channel 42 and 40 or alternatively to contact the membranes 58, 60 or 62. Thus, the arc of rotation possible for the cap member 10 is determined by the arc between the abutment and 42 of the channel 38 of the first installed abutment of either the membranes 58, 60 and 62 or the end 40. Also formed within the cap member are a series of transfer chambers 68, 70, 72 and 74 corresponding in rotational space to the spacings between the abutment membranes 58, 60, 62 and 40. The transfer chambers are configured to receive a single unit of a variety of substances. For example, when used for dispensing medicine capsules the chambers would be made to have an increased depth so that a single capsule would be accommodated endwise.

Final dispensing of substance within the container 18 is through a dispensing orifice 66 through the cap member. Orifice 66 is sized to take the largest of the pills or other contents intended for dispensing with the assembly and is rotationally positioned within the cap member so as to be aligned with the holding chamber 44 when the pin 64 is substantially in abutment with the end abutment 42.

OPERATION

In use, as in a pharmacy, the container 18 would be filled with a plurality of the substances to be dispensed, such as pills 80. After filling, the insert body 16, and disc 14, would be placed in the opening of container 18 with the index tabs 28 and 40 being received in slots 26. For the pill size 80 illustrated in FIGS. 3 and 5, representative of the smallest pills capable of being in the assembly of the preferred embodiment, all of the frangible membranes 58, 60 and 62 would be left in place. Therefore, as is illustrated in FIG. 2 with the cap rotated to position the pin 64 against the membrane 58, transfer chamber 74 would be aligned with the holding chamber 44.

After the inserts are positioned in the opening of the container 18, the cap is pressed over the sloping surfaces 22 and snaps into place, as is illustrated in FIG. 3. Thereafter, when the container is in the hands of the consumer, and it is desired to dispense a pill, the user will operate the cap member in the following manner.

Initial cap positioning may be determined by index marks on the cap and container so as to align the funnel 46 with the transfer chamber 68. Alternatively, it is possible simply to invert the container to the orientation illustrated in FIG. 5 and then to rotate the cap to the full extent of its travel thereby causing a pill to drop into the transfer chamber 74 through funnel 46. While the container is retained in the inverted position, the cap member is then rotated to the extreme of rotational travel permitted, causing the pin 64 to contact the end 42 of channel 38, thereby aligning the transfer chamber 74 with the holding chamber 44, such as is illustrated in FIGS. 2 and 3. After this alignment has been obtained, the container may be rotated to the upright position illustrated in FIG. 3, whereupon the pill 80 will drop from the transfer chamber 74 to the holding chamber 44. The rotatable cap member is then turned to the opposite extreme of travel wherein the pin 64 contacts the end 42 of the channel 38 as is illustrated in FIG. 4. This orientation of the cap member causes

the dispensing orifice to align with the holding chamber 44 whereupon it is possible to invert the container and cause the pill 80 to drop from the holding chamber through the dispensing orifice 66 into the user's hand to be available for use.

Where it is desirable to dispense larger pills such as a pill that would just fit within the confines of transfer chamber 70, the pharmacist would remove the membranes 58 and 60 so that the limit of rotation for the cap would be determined by membrane 62, and in this extreme of rotation of the transfer chamber 70 would be aligned with the holding chamber 44.

In an alternative configuration for the invention, the ends of the channel 38 are rotationally offset from that required for precise alignment of the transferred chamber and holding chamber, and the holding chamber and dispensing orifice, so that should this position be inadvertently obtained such as by an infant manipulating the cap, it would still be impossible to obtain the dispensing of a pill. Printed instructions direct the user to rotate the cap member until reaching the stop and then to back off the cap for a short distance. An offset of from four to six degrees has been found to be advantageous in the practice of the invention as this offset is sufficient to prevent inadvertent dispensing, and yet adult users find that this offset is easily obtainable and repeatable.

The operation of the closure is facilitated by the use of the offset funnel 46. By providing an enlarged opening 48 which accommodates a plurality of pills 80 and a displaced or offset diameter opening 50, the weight of pills on the pills closest to the transfer chamber is so oriented that maximum force is directed to that pill in substantial alignment with the orifice. This direction of the force facilitates the gravitational dispensing of a single pill into the transfer chamber and reduces jamming.

Having described my invention, I now claim.

1. A closure for limiting access to a potentially hazardous substance in a container by limiting the quantity of said substance that can be dispensed in a single dispensing cycle and by requiring the user to be capable of following a series of instructions, wherein the improvement comprises:

rotatable cap means for limited rotational movement on said container,
the underside of said rotatable cap means having a transfer chamber sized to receive said substance,
insert means in the opening of said container,
said insert means having guiding means guiding said

substance from said container through said insert means and into said transfer chamber after a first inversion of said container,

said insert means additionally having holding chamber means in its upper surface for receiving said substance from said transfer chamber after the return of said chamber to an upright position,
said transfer chamber being movable by rotation of said cap into alignment with said holding chamber means,

said rotatable cap means further having a dispensing orifice that is movable into alignment with said holding chamber for dispensing said substance from said holding chamber means and through said rotatable cap means.

2. The closure of claim 1 wherein:

said cap means is maintained on said container by a segmented resilient depending skirt engaging a locking projection on said container.

3. The closure of claim 1 wherein:

said guiding means comprises a funnel bore in said insert means,

said funnel bore having an enlarged opening into said container and a reduced diameter opening onto said cap means,

the central axis of said enlarged opening offset from the central axis of said reduced diameter opening and,

a portion of the sides of said funnel bore being substantially parallel to the long axis of said container.

4. The closure of claim 1 wherein;

said insert means further comprises a channel in the upper surface of said insert cooperating with a depending pin on said cap means for limiting rotation of said cap relative to said container,

said channel providing a first abutment to substantially align said transfer chamber with said holding chamber and a second abutment to substantially align said holding chamber with said dispensing orifice.

5. The closure of claim 4 wherein:

said channel includes a plurality of removable index stops to permit a selected transfer chamber to be aligned with said holding chamber.

6. The closure of claim 4 wherein:

said channel produces alignment after said pin is rotated out of contact with at least one of said abutments.

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