APPARATUS FOR SAFELY STORING AND DISPENSING HAZARDOUS FLUENT MATERIALS

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ABSTRACT

An apparatus is provided for the safe dispensing of hazardous fluent materials which apparatus includes a valve mechanism which must be hand operated in a deliberate manner. The valve mechanism is so disposed with respect to the dispensing portion of the apparatus that an operator's hand substantially covers the dispensing portion of the apparatus while the valve is held open. In this manner, it is difficult, if not impossible, for an operator to place his mouth over the dispensing portion of the apparatus for oral ingestion while his hand is operating the valve mechanism.

6 Claims, 8 Drawing Figures
APPARATUS FOR SAFELY STORING AND DISPENSING HAZARDOUS FLUENT MATERIALS

BACKGROUND OF THE INVENTION

This invention relates to apparatus for storing and dispensing materials and more particularly relates to an apparatus for storing and safely dispensing hazardous fluent materials which apparatus requires delivery in the use thereof.

According to the National Safety Council, each year approximately 500,000 children under the age of 5 years old suffer from the oral ingestion of available toxic household fluent materials. While the majority of these victims survive their harrowing and unpleasant experience, approximately 2,400 people died in this country, in 1968, from poisoning due to the accidental ingestion of hazardous fluent material. Of these 2,400 fatalities, 300 were unsuspecting children.

The magnitude of the problem of accidental poisoning of children has been characterized by the Congress of the United States as a national emergency. During the first session of the 91st Congress, Senator Frank E. Moss (D-Utah) introduced an amendment to the Federal Hazardous Substances Act. This amendment, Bill S. 2162 and known as the Poison Prevention Packaging Act of 1969, provides that the Secretary of Health, Education and Welfare be given authority to require packages, for hazardous products, which packages children could not open.

OBJECTS AND SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved apparatus for storing and dispensing hazardous fluent materials which apparatus makes difficult, if not impossible, the direct oral ingestion of such hazardous materials.

It is another object of the present invention to provide an apparatus for dispensing hazardous fluent materials which apparatus is uncomplicated and inexpensive.

It is still another object of the present invention to provide an apparatus for dispensing hazardous fluent material which apparatus may be removed from within a used supporting container and reused in a different unused container.

It is yet another object of the present invention to provide an apparatus for storing and dispensing hazardous fluent material which apparatus is compact and may be incorporated in small containers.

It is a further object of the present invention to provide an improved apparatus for storing and dispensing hazardous fluent materials which apparatus solves many of the problems attending the use of existing storage and dispensing apparatus.

The objects of the present invention are carried out by providing a normally closed dispensing valve within a fluent material container. A spring biased plunger forms a portion of the valve and may be manually operated to open the valve. A handle member for opening the valve is so related and disposed with respect to a dispensing portion of the container that an operator’s hand holding the valve open, necessarily covers a substantial portion of the dispensing portion of the container so as to interfere with the direct oral ingestion of the material being dispensed.

BRIEF DESCRIPTION OF THE DRAWINGS

While the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification, two embodiments of the present invention are described in the following detailed description, which may best be understood when read in connection with the accompanying drawings in which:

FIG. 1 is a cut-away perspective view of one embodiment of the present invention shown in the dispensing position;
FIG. 2 is a sectional view of the dispensing valve of the apparatus of FIG. 1 taken along the longitudinal axis thereof, which valve is in the closed position;
FIG. 3 is a top plan view of the valve shown in FIG. 2;
FIG. 4 is a pictorial view illustrative of an operator attempting to orally ingest material retained within a container according to the present invention;
FIG. 5 is a sectional view of an alternative embodiment of the present invention taken along the longitudinal axis thereof and shown in the normally closed position;
FIG. 6 is a cut-away perspective view of the alternative embodiment of FIG. 5 and shown in the dispensing position;
FIG. 7 is a sectional view of the container portion of the apparatus shown in FIG. 5 taken along the longitudinal axis thereof; and
FIG. 8 is a top plan view of the container shown in FIG. 6.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to the drawings in which like numerals are used to indicate like parts throughout the various views thereof, FIG. 1 shows the preferred embodiment of the present invention as including a container 10 and a removable valve portion indicated generally as 12.

The container 10 may consist of any suitable material such as glass or clear plastic and is configured in an hour-glass shape having a lower material retaining portion 14, a neck portion 16, and a widened dispensing portion 18 for dispensing the fluent material 19 retained within the lower portion 14. The fluent material 19 may consist of liquid, powder, or the like. The lowest surface of the material retaining portion 14 is planar and forms the base upon which the container stands when stored during non-use.

The upper outer lip portion 21 of the widened dispensing portion 18 is formed with external threading 22 for engaging mating internal threads 24 formed on the inner lip portion of an outer cap 26 which may be used to keep the entire assembly air-tight. Of course, a snap-on cap may also be used.

The upper inner lip portion of the widened dispensing portion 18 and the inner wall of the neck portion 16 are formed with internal threads 28 and 30 for the threaded engagement of mating threads 32 and 34, respectively, formed on the upper and lower portions, respectively, of the valve 12.

Referring to FIG. 2, the valve 12 is shown as generally comprising a cylindrical body 36 having an upper planar wall 38, extending in the radial plane of the body 36 beyond the circumferential periphery defined by the cylindrical wall thereof. The outer, generally circular, periphery 40 of the upper planar wall 38 is formed with the annularly extending threads 32 which correspond with the threads 28 of the container 10 for mating engagement therewith. The lower portion 44 of the cylindrical valve body 36 is formed with the annularly extending threads 34 which matingly engages within the threading 30 formed annularly about the interior of the neck portion 16 of the container 10.

The lowest surface of the cylindrical valve body 36 is formed with a radially extending planar wall 48 which is co-extensive with the radial extension of the inner space defined by the circumference of the cylindrical wall of the valve body 36. A central aperture 50 is formed within the lower radially extending wall 48 of the valve body 36 for the passage of fluent material from the lower portion 14 of the container 10, through the neck portion 16, and into the dispensing portion 18 through apertures 58. The upper surface 52 of the lower radially extending wall 48 of the valve body 36 provides a valve seat for a valve plunger 54 which comprises a generally disk-like member extending in the radial plane of the cylindrical valve body 36.

A spring biasing means 56 is disposed within the valve body 36 and urges the valve plunger 54 into pressure contact with the valve seat surface 52 of the valve body 36. A plurality of the apertures 58 are arranged annularly about the cylindrical wall of the valve body 36 adjacent to and above an upper surface 60 of the valve plunger 52. The apertures 58 are, therefore, intermediate the axial ends of the cylindrical valve body 36. A cord, or the like, 62 is embedded within the plunger 54 and may be knotted at 63 to connect the valve plunger 54 with...
A dispensing valve member, indicated generally as numeral 128 is disposed within the cylindrical container 110 and includes a disk-like base portion 130. Threads 132 are formed on the outer periphery of the disk-like base portion 130 of the valve 128 and are operative to engage within threads 118 formed annularly about the inside surface 116 of the cylindrical wall 116 of the container 110. The disk-like base portion 130 of the valve 128 is formed with a central aperture 134 through which is passed a cord 136, or the like.

An upper, disk-like plunger member 138 is disposed at an upper end of the overall valve 128. The cord 136 is secured centrally to the plunger member 138 by any conventional fastening means such as passing the cord 136 through a central hole in the plunger 138 and tying a knot 140 in the terminal end of the cord 136 to prevent the slippage thereof through the central hole in the plunger 138. A biasing means such as a helical spring 142 is disposed between the plunger member 138 and the base portion 130 which is secured to the approximate axial mid-point of the container 110 by the mating engagement of container threadings 118 within base portion threading 132. In this operative position, the disk-like plunger 138 and disk-like base portion 130 both extend in radial planes of the cylindrical container 110 and are arranged parallel with each other. The second terminal end of the cord 136 passing through the central aperture 134 of the base portion 130 is further passed through a peg or small disk member 144 and is, itself, tied into a knot 146 to prevent the cord 136 from slipping back through the peg or disk member 144. The disk member 144, in turn, prevents the knotted second terminal end from slipping back through the central aperture 134 of the base portion 130 of the overall valve 128.

The outer periphery 139 of the plunger member 138 is sized to contact but to slide freely along the axial extension of the internal surface 120 of the cylindrical container 110. The helical spring 142 biases the plunger 138 and the valve base 130 axially away from each other so as to place the cord 136 in tension as the cord holds the two in fixed relationship. A fabric sheath 148 of nylon, or the like, may be disposed about the coils of the helical spring 142 to prevent a capsule 124 from entering the coil spring space as the capsule is manipulated into the bubble portion 114 of the cylindrical container 110 and, ultimately, from the bubble 114 to an upper dispensing portion 150 of the container as shown in FIG. 6.

The plunger member 138 of the overall valve 128 may be formed with a plurality of annularly spaced, axially extending bore holes 152 for the insertion of the springs 154 of a wrench-like tool 156 shown in FIG. 5. Annularly spaced recesses 158 may be formed in the upper surface of the base portion 130 of the valve 128 to retain the extended terminal ends of the springs 154 of the wrench 156. The recesses 158, should be axially aligned with the annularly spaced bore holes 152 of the plunger member 138 so that the springs 154 may be passed through the holes 152 to engage within recesses 158 to apply a torque force to the base member 130 so as to effect the threaded installation or removal of the overall valve 128 from the container 110. The threading 132 of the base member 130 is the only means for securing the valve 128 within the container 110 which arrangement provides for easy installation or removal of a valve 128 into or out from a container 110.

Referring now to FIG. 6 of the drawings, the overall apparatus of FIG. 5 is shown in a dispensing configuration. The plunger 138 has been forced axially downward against the biasing force of the helical spring 142 so as to define a passageway (illustrated by flow line 160) for a capsule 124 from within the bubble 114 to the dispensing portion 150 of the container 110. It should be recognized that, when an operator forces the plunger 138 down with his thumb or finger, his hand interferes with the placing of his mouth on the upper lip 160 of the container 110.

FIGS. 7 and 8 show the container 110 of the second embodiment of the present invention without the overall valve member 128 installed therein. An annular, radially outward

a ring handle 64 disposed above the upper planar wall 38 of the valve body 36. In order to preclude a child from using an instrument such as a pencil, or the like, for dispensing from the apparatus of FIGS. 1 and 2, the handle 64 may comprise a solid disk, or the like, which would normally require an operator to grab the handle with his hand and not permit the use of an instrument which would not substantially cover the dispensing lip 21 to interfere with an operator's attempt to place his mouth on the lip 21.

The upper planar wall 38 is formed with a central aperture 66 for passage of the cord 62 therethrough to the ring handle 64. The aperture 66 is sized so that the ring handle 64 cannot pass therethrough and the length of the cord 62 may be determined so that the plunger 54 is in pressure contact with the valve seat portion 52 of the valve body 36 when the ring handle is flush against the portion of the upper radial extending wall 38 defining the aperture 66.

Retaining recesses 68 are formed to extend axially and partially through the upper radially extending wall 38 of the valve body 36 and are utilized to receive the prongs 70 of a valve wrench 72 which may be used to threadingly engage or disengage the overall valve 12 into or out from the container 10. In this manner, the overall valve 12 may be removed from an empty container and mounted within a different filled container.

Phantom lines 74 indicate the position of the ring handle 64 when the valve is opened for the dispensing of material from the lower portion 14 of the container 10. Referring back to FIG. 1, the valve 12 is shown in the open position and the flow lines 76 show the path of a hazardous liquid passing from the container, through the valve 12 and into the widened dispensing portion 18.

FIG. 3 shows the upper radially extending wall 38 of the valve as comprising a generally circular disk-like member having an outer diameter, defined by radial edges 78, cut out therefrom for the passage of liquid from the upper portion 18 of the container 10 to a point external to the container.

FIG. 4 illustrates the relationship of the valve actuating ring handle 64 with the overall apparatus during use thereof. As can be seen, an operator's hand must necessarily cover the dispensing portion of the upper portion 18 of the container 10 so as to prevent the oral ingestion of any liquid contained therein. Of course, the dimension (X) of the cord 62, when the valve 12 is opened, must be such that an operator's hand is flush against the dispensing portion of the container when holding the valve open. The value of dimension (X) of the cord 62 may be approximately 1 inch to properly serve this function with the diameter of the circle defined by the lip 21 being about 2 inches.

DETAILED DESCRIPTION OF THE ALTERNATIVE EMBODIMENT

A second embodiment of the present invention is shown in FIGS. 5 through 8 and is directed to a safety container for dispensing primarily non-liquid frangible materials, such as pills, capsules and the like. Of course, a liquid could also be dispensed by apparatus according to the alternative embodiment.

Referring to FIG. 5, a cylindrical container 110 is shown having a planar base surface 112 for supporting the container during non-use. A bubble portion 114 is formed in the cylindrical wall 116 of the container 110. Internal threads 118 are formed annularly about the inside surface 120 of the cylindrical wall 116. The threads 118 are disposed at the approximate mid-point along the axis of the cylindrical container 110 and should extend to the area defined by the base portion 122 about the bubble 114 so that a capsule 124 retained in the lower portion 126 of the container 110 may enter the bubble 114 beneath the annular threads 118 and exit the bubble 114 from a point above the threads 118. This will be explained in more detail in connection with FIG. 6.

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projecting flange 164 may be formed on the upper lip portion 160 of the container 110. A resilient cap member 166 may be provided and formed with an internal annular recess 168 for receiving and retaining the annular flange 164 of the container 110. The cap 166 serves the purpose of maintaining the overall dispensing apparatus in an air-tight condition.

In operation, one must shake the container 110 so as to manipulate a capsule 124 into the bubble portion 114 thereof. After properly positioning the capsule 124 to within the bubble 114, one must press down on the plunger member 138 to displace the plunger axially downward until the path defined by the flow line 160 is opened from the bubble 114 to the dispensing portion 150 of the container 110 adjacent the lip 160. Being that the operator has his finger or thumb disposed in the container when the apparatus is in this dispensing configuration, it is difficult or even impossible for the operator to accidentally or intentionally put his mouth on the container lip 160 so as to orally ingest the capsule 124 or capsules so dispensed.

From all the foregoing detailed description, it can be seen that an apparatus has been herein described for safely dispensing hazardous fluent materials. The dispensing valve mechanism included in the apparatus is removable from the material container and may be reused. The apparatus is of an uncomplicated and inexpensive construction and requires one to act deliberately in attempting to dispense the material retained therein. The apparatus is compact and may be incorporated in small containers so as to be useable in a multiplicity of practical medical or non-medical applications. The principle and structure of the present invention may be embodied in household or industrial containers for such materials as lye, bleach or cleaning fluids and is not limited to medical applications.

While what has been described and shown herein is a preferred embodiment and an alternative embodiment of the present invention, it is, of course, understood that various modifications and changes may be made in these embodiments without departing from the invention and, therefore, it is intended to cover in the appended claims all such modifications and changes as may fall within the true spirit and scope of the present invention.

What I claim by Letters Patent of the United States is:

1. Apparatus for storing and dispensing fluent material comprising:

a container having first and second portions and an intermediate portion connecting said first and second portions;

said first portion being operable to retain fluent material;

a removable valve member extending from said intermediate portion into said second portion;

said valve member including a plunger housed within a cylindrical valve body;

said valve body presenting a valve seat at a first end thereof and a radially extending wall at a second end thereof;

said plunger being spring biased into seating engagement with said valve seat and displaceable therefrom by movement of a handle means connected with said plunger by a connecting means;

said radially extending wall projecting radially outwardly from said cylindrical valve body to engage an inner surface of said second portion of said container so as to support said valve body in co-axially spaced relationship with respect thereto;

internal threading being provided with said intermediate portion and said second portion of said container for mating engagement within external threading presented on said first end of said valve body and on a marginal edge of said radially extending wall, respectively; and

said radially extending wall and said cylindrical valve body being formed with aperture means, whereby a flowpath may be defined from said first portion of said container to a point remote therefrom in response to the movement of said plunger away from said valve seat, against said spring bias.

2. Apparatus according to claim 1 wherein said aperture means formed within said radially extending wall is sufficiently close to said handle means, wherein said connecting means is of such a length, and wherein the available stroke of said plunger is of such a magnitude that; the fingers of an operator pulling on said handle means would necessarily interfere with any attempt to place one's mouth over said aperture means;

whereby oral ingestion of the retained fluent material may be discouraged.

3. Apparatus according to claim 1 with the addition of stop means for limiting the movement of said finger gripping means.

4. Apparatus according to claim 1 wherein said valve member is formed with wrench receiving bore-holes;

whereby a wrench means may be inserted within said wrench receiving bore-holes and torque may be applied to said valve means to threadedly engage and disengage said valve means within said container means.

5. Apparatus for storing and dispensing fluent material comprising:

container means for retaining a fluent material;

outlet means for guiding outflow of fluent material as it is dispensed from within said container means;

a normally closed flowpath defined between said container means and said outlet means;

valve means disposed in said normally closed flowpath;

said valve means including a manually movable member;

said container means comprising a base portion and an upstanding side wall portion open at the top, and being formed with a generally radially extending bubble in the side wall portion, said bubble extending over only a portion of the height of said side wall portion;

said bubble forming a portion of said flowpath;

said movable member being disposed in said flowpath when in a normal position; and

said movable member being disposed with respect to said outlet means and the degree of allowable travel of said movable member being so limited with respect to the location of said outlet means, that the member of the body of an operator actuating said apparatus is necessarily adjacent a substantial portion of said outlet means while the member of a body is directly applying a force to said movable member;

whereby oral ingestion of said fluent material directly from said outlet means of said apparatus is interfered with.

6. Apparatus according to claim 5 wherein;

said movable member is biased in the normal position by spring means; and sheath means isolates said spring means from said flowpath.

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