

Nigro

[45] **Oct. 17, 1972**

- [52] **U.S. Cl.** 222/182, 222/402.12, 222/402.13,
222/402.21
- [51] **Int. Cl.****B65d 83/14**
- [58] **Field of Search** 222/182, 402.12, 402.13,
222/402.17, 402.21, 553, 402.22

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A pressurized dispensing package in which a container having a material discharge valve including a discharge aperture and a manually operable valve actuating surface is provided with a rotatable cover which has one or more wall structures, as required, to cover simultaneously both the discharge aperture and actuating surface, and structure defining one or more apertures for simultaneously exposing both. The container and cover include mutually engaging surfaces which limit the relative rotational movement of container and cover between two positions for alternating exposure and covering of the aperture and actuating surface for periods of use and non-use respectively, by rotating the cover in reverse directions. The mutually engaging surfaces are constructed to have portions co-circumferential of each other which abut one another during engagement.

11 Claims, 9 Drawing Figures

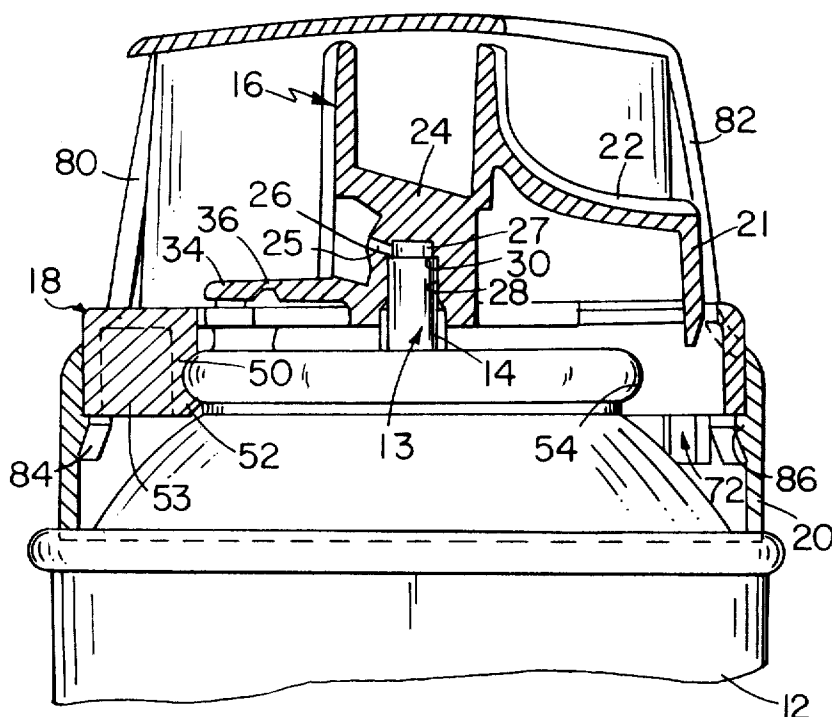


FIG. 1

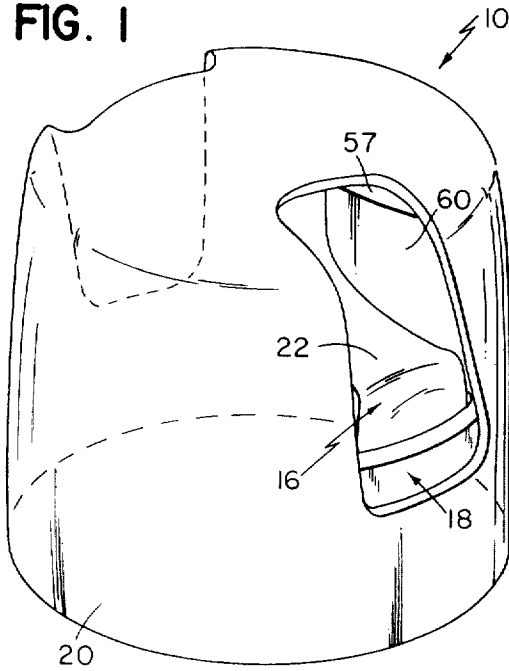


FIG. 2

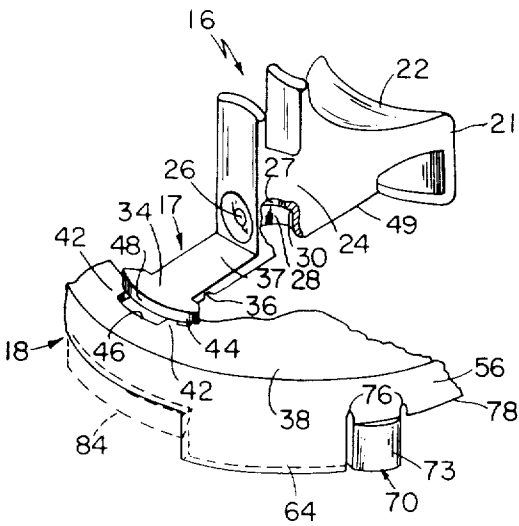
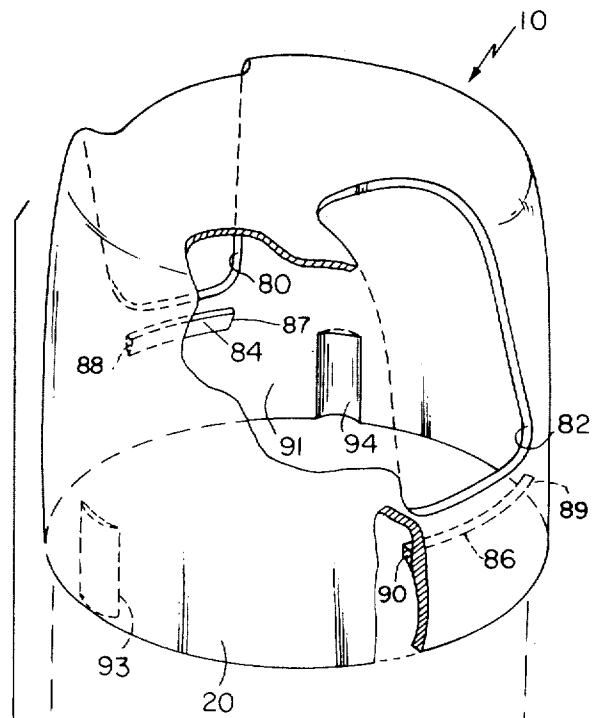


FIG. 3

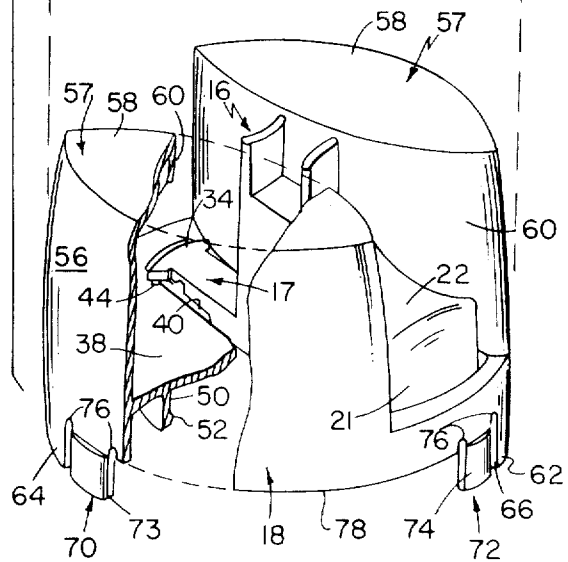


FIG. 5

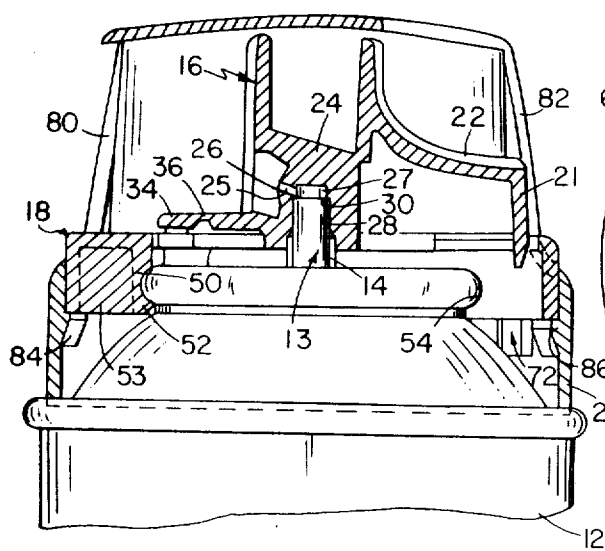


FIG. 4

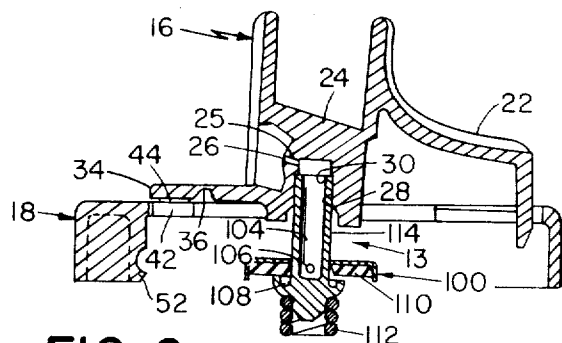
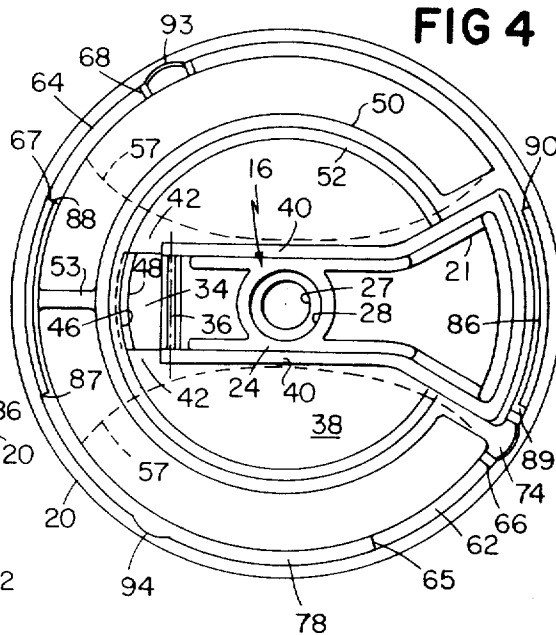


FIG. 6

FIG. 7

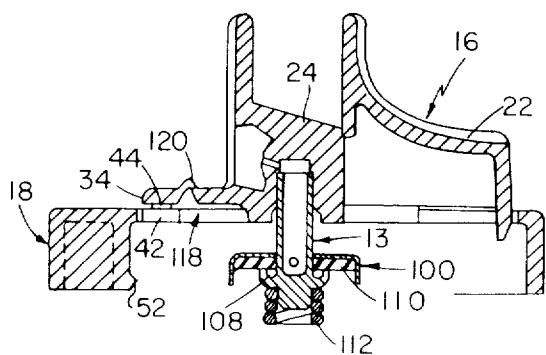
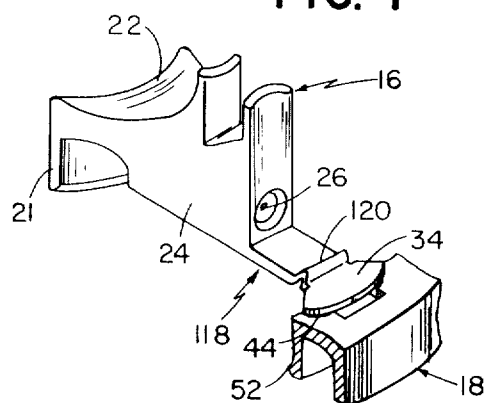


FIG. 8

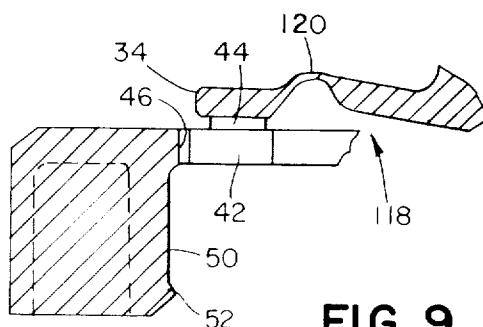


FIG. 9

DISPENSING CONTROL STRUCTURE FOR PRESSURIZED DISPENSING PACKAGE

SUMMARY OF INVENTION

This invention relates to pressurized dispensing packages, and particularly to assemblies for controlling discharge of material from such packages.

Valves for pressurized dispensing packages are typically actuated by pushing or tilting the valve toward the package, usually against a biasing spring. Such valves are simple, economical, and reliable, but are also inconvenient to operate, and must be covered for storage and shipment, and to prevent accidental discharge. It is therefore desirable to provide for the valve auxiliary structure which is easier to operate, establishes a desirable exit path for material from the container, reduces the irregularity of container configuration and protects the valve against accidental discharge; and yet which nonetheless does not interfere with the natural mode of operation of the valve.

It is an object of this invention to provide structures of reliable, durable, and easily assembled construction for protecting such valves against accidental discharge before and between periods of use, and still rendering the valve readily available for use in its natural operating mode.

It is also an object of this invention to provide reliable and durable structures for actuating tilt or push-type valves, which controls material discharge from the valve in a consistent, preselected flow path, and yet complements natural valve operation.

Another object is to provide combined valve actuating and protecting structures in a minimum number of readily assembled, easily formed (e.g., molded plastic) parts.

Another object is to provide novel and improved means for actuating tubular valve stems.

The invention features a pressurized dispensing package in which a container having a material discharge valve including a discharge aperture and a manually operable valve actuating surface is provided with a rotatable cover which has one or more wall structures, as required, to cover simultaneously both the discharge aperture and actuating surface, and structure defining one or more apertures for simultaneously exposing both. The container and cover include mutually engaging surfaces which limit the relative rotational movement of container and cover between two positions for alternating exposure and covering of the aperture and actuating surface for periods of use and non-use respectively, by rotating the cover in reverse directions. The mutually engaging surfaces are constructed to have portions co-circumferential of each other which abut one another during engagement.

In a preferred embodiment, one engaging surface is provided by a rib located on an interior wall of the cover which is sized and located to snap under the lower edge of a cylindrical wall integral with the container with a member secured thereto, to secure the cover onto the container; the rib has an end wall which engages with an end wall of a flange projecting from and beneath the same cylindrical container wall to limit rotation of the cover. Two ribs and two flanges are used to provide two sets of engaging surfaces, one set engaging to prevent further rotation when the cover is rotated to the open position, and the other set engaging

to prevent further rotation when the cover is rotated to the closed position. Advantageously, the ribs are of short arcuate extent and are located entirely directly beneath the openings in the cover. Thus, the cover may be molded first without the ribs, and the latter thereafter formed by implements reaching through the cover openings.

In lieu of, or, in the preferred embodiment, in addition to the rib-flange combination, there are provided additional pairs of relatively rotatable engaging surfaces in the form of a detent (e.g., in the interior wall of the cover) and a lug formed on a flexible tab (e.g., projecting from the same cylindrical wall as the flange) sized to be releasably trapped within the detent. Thus, not only is over-rotation prevented, but the cover is also locked against backward rotation. Therefore, positive closure is provided during periods of non-use, as well as positive exposure. The tab is made flexible so that it may slide along and reside at other portions of the detent-containing cover wall without breaking.

The invention also features an actuating assembly for dispensing materials from a pressurized dispensing package having a container and a conventional tubular valve stem of the type having an exit port through which material is discharged from the container, and which is operated by moving the valve in an axial or a transverse direction toward the container. The actuating assembly according to the invention comprises a base secured to the container, and defining an opening and a ledge adjacent the opening, an actuator lever disposed for movement in this opening, and actuator support structure. The actuator includes: a structure defining a discharge passage; mounting structure for securing the actuator to the valve stem so that this discharge passage extends between the exit port in the valve stem and atmosphere, and a surface for manually operating the actuator. The actuator support structure includes a fixed bridge structure disposed above the top surface of the base ledge, a rigid supporting member at either end of the bridge structure extending vertically downward from the bridge structure to the top surface of the ledge for securing the bridge structure to the base, and connecting structure linking the bridge structure and the actuator, and suspending the actuator over the base opening. The connecting structure includes a flexible hinge to define, with the bridge structure, a stationary pivot axis for the actuator, the hinge being constructed to provide the actuator with a pivotal mode of movement about said stationary pivot axis and a lateral mode of movement increasing the straight-line distance between the bridge structure and the actuator, thereby to permit the tubular valve stem to be operated in its natural operating mode.

In preferred embodiments, the hinge is defined by a reduced thickness strip across the connecting structure, and is stretchable (e.g., of a V-shaped cross-sectional area along the connecting structure) to provide the increased straight-line distance. In another embodiment, the hinge is a preflexed flexible loop which straightens to increase the straight-line distance between the bridge and the aforesaid discharge passage when the manual operating surface is depressed. The loop may be so formed as to be the stable configuration, such that it is flattened only under stress; thus, the lever will tend to return to the closed position.

Similarly, stretching of a V-shaped hinge will cause a stress which will be relieved only by returning the lever to the closed position. Thus, a cooperating return force is created across the lever during actuation, which together with the biasing spring normally associated with the tubular valve stem results in rapid, positive closing of the valve after pressure is withdrawn from the operating surface.

In the preferred embodiment, the valve actuating and valve protecting features are combined in a two-piece assembly in which the engaging surface of the container is located on the previously described base member of the actuating assembly (which also supports the valve actuator), and two spaced wall structures and two spaced apertures are provided in the cover so that both the discharge aperture and the manual operating surface of the actuator may be simultaneously opened or closed. The base may also include wall structure located between the discharge aperture and the manual operating surface, located to mask the apertures in the cover during periods of non-use; in addition the cover is provided with a top wall, such that the base wall and cover cooperate to enclose completely the actuator.

TECHNICAL DISCLOSURE

Other objects, features and advantages will appear to one skilled in the art from the following description of preferred embodiments of the present invention, taken together with the attached drawings thereof, in which:

FIG. 1 is a perspective view of an actuating assembly, including a cover, embodying the present invention;

FIG. 2 is an exploded view, partially broken away, of the embodiment of FIG. 1;

FIG. 3 is a perspective view, partially broken away, of the actuating structure of FIGS. 1 and 2, and a portion of a base connected thereto;

FIG. 4 is a bottom elevational view of the embodiment of FIG. 1;

FIG. 5 is a sectional view of the embodiment of FIG. 1, with an attached container and tubular valve stem both shown in full, and the actuating structure in the closed position;

FIG. 6 is a sectional view of a portion of FIG. 5, illustrating the actuating structure in the open position;

FIG. 7 is a perspective view of another actuating structure embodying the present invention;

FIG. 8 is a sectional view of the actuating structure of FIG. 7, together with a portion of the base and a tubular valve stem connected thereto, as in FIG. 6; and

FIG. 9 is an enlarged view of a portion of the structure shown in FIG. 8, with the actuating structure of FIG. 8 in the open position.

In FIGS. 1-6, there is shown an actuating assembly 10, for assembly to container 12, which includes a tubular valve stem 13. Actuating assembly 10 includes actuator 16, connecting structure 17, and base 18, and a cover 20 secured to base 18.

Referring to FIGS. 3 and 5, actuator 16 includes a flared operating portion 21 defining operating surface 22 and an intermediate mounting structure 24, having a discharge passage 25 between discharge aperture 26 and interior bore 27, and a counterbore 28 defining an annular shoulder 30. Connecting structure 17 includes a fixed bridge 34, an adjacent flexible hinge 36 having a V-shaped cross-sectional area; connecting strip 37 secures actuator 16 to hinge 36.

Base 18 includes a horizontal ledge 38 having a central opening 40 sized to follow an enlarged outline of actuating lever 16 up to bridge 34, and of reduced thickness adjacent thereto forming shoulders 42 to which bridge 34 is secured on rigid supporting posts 44. The front wall 46 of opening 40 is spaced from the front wall 48 of bridge 34 and the lower surface of strip 37 (as well as the lower surface 49 of actuator 16) is located above the upper surface of ledge 38, suspending actuator 16 above and within opening 40. Base 18 further has a cylindrical wall 50, terminating on either side of actuator 16, and having an inwardly projecting rib 52 sized to engage an annular lip 54 on container 12 to secure the base thereto. An outer cylindrical wall 56 forms one side of hollow ellipse shaped segments 57, which also include top walls 58 and interior walls 60 terminating at ledge 38. Supporting ribs 53 extended between wall 50 and wall 56.

Wall 56 has two arcuate flanges 62, 64 having radial end walls 65, 66, and 67, 68, respectively, and two tabular members 70, 72, each having a semi-cylindrical exterior surface 73, 74, respectively, and each made flexible by separation from end walls 66, 68, respectively, and by notches 76, which are cut into the major edge 78 of wall 56.

Dome-shaped cover 20 has apertures 80, 82, for exposing the discharge aperture and operating portions, respectively, of actuator 16. Two wedge-shaped ribs 84, 86, having radial end walls 87, 88 and 89, 90, respectively, are located on the interior surface 91 of cover 20, each rib extending along but not past the arcuate extent of the corresponding aperture. Detents 93, 94, formed in surface 91, are sized to receive therein a corresponding curved tab surface 73, 74, respectively, as shown in FIG. 4.

The spacing of ribs 84, 86, with respect to flanges 62, 64, is such that, when cover 20 is rotated to the open position (FIGS. 1 and 5), end wall 88 of rib 84 engages end wall 67 of flange 64, thereby preventing further rotation of the cover. End wall 89 of rib 86 remains slightly spaced from tab 74, but were, e.g., rib 84 to break, rib 86 could engage tab 74 as a secondary stop. In the same position, tab surface 73 is received into detent 93, to prevent backward rotation of the cover. To close the cover, it is rotated in a counterclockwise position from that shown in FIG. 4, tabs 70, 72 riding along, in slightly inwardly-flexed fashion, the interior wall 91 of cover 20, until end wall 87 of rib 84 engages end wall 65 of flange 62, end wall 90 of rib 86 remaining slightly spaced from tab 73, but available to engage upon only slight further rotation if required. Tab surface 74 is meanwhile received into detent 94, to prevent backward rotation of the cover, tab 70 remaining flexed with its surface 73 against the interior surface 91 of cover 20. Wall portions 56 of base 18 are sized to extend completely across apertures 80, 82 of cover 20 when the cover is rotated to the closed position. In the open position, no wall portion 56 blocks any part of apertures 80 and 82.

Actuator 16 is shown in FIG. 6 secured to a conventional tubular valve stem assembly 100, which delivers material from the interior of container 12, under pressure of compressed gas therein, through axial passage 104 of stem 13, connecting ports 106 (of which only one of the four radially spaced ports is shown) and annular chamber 108, which is opened across sealing

gasket 110 to material from the interior of the container, when tubular valve stem 13 is depressed, either axially, or slightly transversely (compare FIG. 6 with FIG. 8), against valve biasing spring 112. Valve stem 13 has its outer cylindrical surface 114 received in the counterbore 28 of mounting structure 24 and is held against annular shoulder 30 by biasing spring 112.

In operation, with the structure assembled as in FIGS. 5 and 6, and the cover rotated to the open position, applying a downward force to operating surface 22 of actuator 16 pivots the actuator about a stationary pivot axis adjacent bridge 34, formed by hinge 36. By virtue of the reduced cross-sectional area of hinge 36, the hinge is also able to stretch the lever in a direction generally perpendicular to the pivot axis, increasing the straightline distance between bridge 34 and actuator 16. This stretching, indicated by some flattening of the V-shape of hinge 36 in FIG. 6, accommodates the tendency of the actuator, secured to the valve stem, to pivot toward the bridge whereas the natural operating mode of the valve stem requires movement of the actuator with the valve stem away from the bridge. Thus, the natural operating mode of the tubular valve stem is followed. Moreover, upon releasing operating surface 22, the biasing force of both valve stem spring 112 and the tendency of hinge 36 to return to an unstretched state cooperate for positive rapid return of the valve stem to the closed position. When operating surface 22 is depressed sufficiently to open annular chamber 108 of valve stem 13, material flow is through a convenient, predetermined path defined by through ports 106, passage 104, discharge passage 25, and discharge aperture 26. Bridge 34, suspending the actuator 16 in and above opening 40, provides a constantly rigid connection between actuator 16 and base 18, without interfering with the actuating movement of the actuator through hinge 36.

In the embodiment of FIGS. 7 to 9, the base and tubular valve stem are identical to those shown in FIGS. 1 to 6, and connecting structure 118 is identical to connecting structure 17 except that V-shaped hinge 36 has been replaced by a preflexed loop hinge 120, which is, e.g., molded such that the loop tends to assume the closed position shown in FIG. 8. By flattening, in response to pressure applied to operating surface 22, as shown in FIG. 9, the loop accommodates the movement differential above described with reference to the stretching mode of operation of the embodiment of FIGS. 1-6, increasing the straightline distance between bridge 34 and actuator 16. Moreover, the preflexed configuration of loop 120 aids in positive return of the valve to the closed position, the tendency of the loop to reassume its pre-flexed state cooperating with biasing spring 112 for positive return movement of the actuator.

The actuators shown are of the spray-dispensing type, and are particularly useful for dispensing deodorants, antiperspirants, and the like. Passage 25 may be widened, or the flow directions therethrough changed for foam dispensing, all other parts of the assembly being utilizable therewith.

Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. In a pressurized dispensing package,

a container having a material discharge valve assembly including a discharge aperture and a manually operable valve actuating surface, and

a cover rotatable with respect to said container having wall structure adapted to cover simultaneously said discharge aperture and actuating surface in a first position, and structure defining open area adapted to expose simultaneously said discharge aperture and actuating surface in a second position,

said container and cover including two sets of mutually engaging surfaces for limiting relative rotational movement of said container and cover to movement between said first and second positions for alternately exposing and covering, by said open area-defining and wall structures, respectively, said discharge aperture and said actuating surface, by reverse relative rotations of said container and cover,

said engaging surfaces having portions located circumferentially of one another and abutting one another during engagement, one of said sets of engaging surfaces being located for resisting further relative rotational movement of said cover and container out of said first position, and the other of said sets of engaging surfaces being located for resisting further relative rotational movement of said cover and container out of said second position, each said set of engaging surfaces being defined by a detent member and an engaging lug member, at least one of said detent and lug members being flexible and said lug being disposed to be retained in said detent when said cover is rotated to the applicable one of said positions.

2. The package of claim 1 wherein each said lug is formed in the outer surface of a resilient axially extending tab located peripherally of said container, and each said detent is formed in an interior surface of said cover.

3. In a pressurized dispensing package,

a container having a material discharge valve assembly including a discharge aperture, a manually operable valve actuating surface, and structure providing a cylindrical wall having, projecting from its lower edge, two spaced arcuate flanges having end walls, and

a cover rotatable with respect to said container having wall structure adapted to cover simultaneously said discharge aperture and actuating surface in a first position, structure defining open area adapted to expose simultaneously said discharge aperture and actuating surface in a second position, and structure providing an interior surface including two spaced circumferentially extending ribs, each having an end wall,

said ribs being sized to snap under the lower edge of said cylindrical container wall structure to secure said cover to said container, and said rib end walls and said flange end walls being co-circumferentially located to engage for limiting relative rotation of said cover and container to movement between said first and second positions for alternately exposing and covering, by said open area-defining and wall structures, respectively, said discharge aperture and said actuating surface,

by reverse relative rotations of said container and cover.

4. In a pressurized dispensing package,

a container having a material discharge assembly including a discharge aperture, a manually operable valve actuating surface, and structure defining a cylindrical wall having two spaced arcuate projecting flanges,

and a cover rotatable with respect to said container having wall structure adapted to cover simultaneously said discharge aperture and said actuating surface in a first position, structure defining open area and adapted to expose simultaneously said discharge aperture and said actuating surface in a second position, and structure defining an interior surface including two circumferentially spaced and extending ribs, each having end walls, and two circumferentially spaced detents,

each said flange having first and second end walls, said first flange end walls located co-circumferentially with an end wall of one of said ribs for engagement therewith, the pairs of engaging end walls thus defined being located to limit rotational movement of said cover and container such that one pair of end walls are in engagement when said cover is relatively rotated to said first position and the other pair of end walls are in engagement when said cover is reversely relatively rotated to said second position,

two spaced tabular members having surfaces sized to be engaged in said detents, said tabular members flexibly secured to said cylindrical wall to be radially displaceable therefrom,

said detents and said tabular members being mutually located such that only one of said detents receives the surface of one of said tabular members when said cover is rotated to either of said positions, and said detents and said tabular members are mutually sized to releasably lock said cover and container in each of said positions.

5. In a pressurized dispensing package, a container having a material discharge valve assembly including a discharge aperture, a manually operable valve actuating surface, and a cylindrical wall having two spaced arcuate projecting flanges, each said flange having end walls,

a cover rotatable with respect to said container having wall structure providing first and second circumferentially extending walls disposed for covering simultaneously said discharge aperture and said actuating surface, respectively, and first and second circumferentially extending apertures located between said wall portions, and disposed for exposing, simultaneously, said discharge aperture and said actuating surface, respectively, and structure providing circumferentially extending interior surfaces located beneath said apertures, each said interior surface constructed to provide a circumferentially extending rib having opposite end walls both located within the circumferential extent of the corresponding aperture, and

said ribs sized to snap under the lower edge of said cylindrical container wall to secure said cover to said container, and said rib end walls and said flange end walls being co-circumferentially

located and engaging to limit relative rotation of said cover and container.

6. The package of claim 5 and further including structure providing walls located to mask the said apertures in said cover when said cover is in said first position, thereby to form a continuous circumferentially extending wall entirely surrounding said actuating surface.

7. A pressurized dispensing package comprising a container, a tubular valve stem for controlling material discharge from the container, said tubular valve stem having an exit port through which material is discharged, and being operated by manually moving the valve stem in at least one of an axial and transverse direction towards the container, an actuating member comprising

a base portion secured to the container and defining an opening, and

an actuator portion disposed for movement in said opening, said actuator portion including structure defining a discharge passage, coupling structure for securing said actuator portion to said tubular valve stem and having a seat for receiving the top of said valve stem so that said discharge passage extends between said valve stem exit port and atmosphere, an actuator operating surface laterally spaced from said coupling structure for manually operating said actuator, and actuator portion support structure laterally spaced from said coupling structure on the opposite side from said actuator operating surface and connecting said actuator portion to said base portion, said support structure including a rigid support portion and connecting structure, said support portion and said connecting structure being disposed below the plane of said valve stem seat and said connecting structure being disposed between said support portion and said coupling structure for suspending said actuator portion over said opening in said base portion, said connecting structure including a region of reduced thickness extending across the entire width of said connecting structure, said region of reduced thickness providing said actuator portion with a pivotal mode of movement relative to said rigid support portion, and a lateral mode of movement increasing the straightline distance between said rigid support portion and said coupling structure, thereby to permit said tubular valve stem to be operated in either a tilt operating mode or an axial operating mode, and

a cover rotatable with respect to said base portion, having structure providing first and second circumferentially extending walls adapted to cover simultaneously said discharge aperture and said operating surface, respectively, in a first position, and first and second circumferentially extending apertures located between said wall portions, and adapted to expose, simultaneously, said discharge passage and said operating surface, respectively, in a second position,

said base portion and cover including mutually engaging surfaces, located co-circumferentially of one another, for limiting relative rotational movement of said cover and said base portion to movement between said first and second positions for

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alternately exposing and covering, by said apertures and wall portions respectively, said discharge passage and said operating surface, by reverse relative rotation of said base portion and said cover.

8. The package of claim 7 wherein said actuating member includes structure providing walls located to mask the said apertures in said cover when said cover is in said first position, thereby to form a continuous circumferentially extending wall entirely surrounding said actuating portion.

9. The package of claim 8 wherein two sets of engaging surfaces are provided, one set located for resisting further relative rotational movement of said cover and said base portion out of said first position, and the other set located for resisting further relative rotational movement of said cover and said base portion out of said second position, each said set being defined by a detent member and an engaging lug member, at least one of said detent and lug members being flexible and said lug being disposed to be retained in said detent

when said cover is rotated to the applicable one of said positions.

10. The package of claim 9 wherein each said lug is formed in the outer surface of a resilient axially extending tab located peripherally of said base portion, and each said detent is formed in an interior surface of said cover.

11. The package of claim 10 wherein said cover has structure providing an interior surface including two spaced circumferentially extending ribs, each having an end wall, and said base portion has structure providing a cylindrical wall having, projecting from its lower edge, two spaced arcuate flanges having end walls, said ribs sized to snap under the lower edge of said cylindrical base portion wall to secure said cover to said base, and said rib end walls and said flange end walls being co-circumferentially located to engage for limiting relative rotation of said cover and base portion.

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