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TAMPER-PROOF TOP CLOSURE FOR VALVED PRESSURE-LOADED
CONTAINERS
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FIG. 1

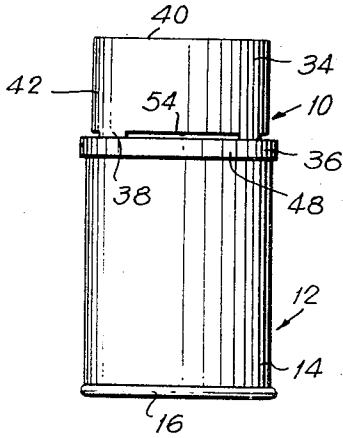


FIG. 2

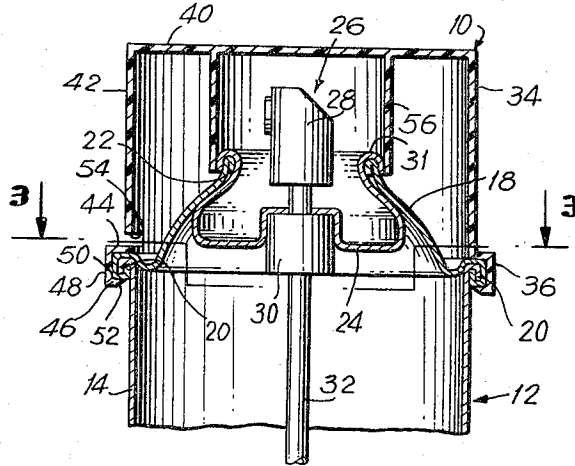


FIG. 3

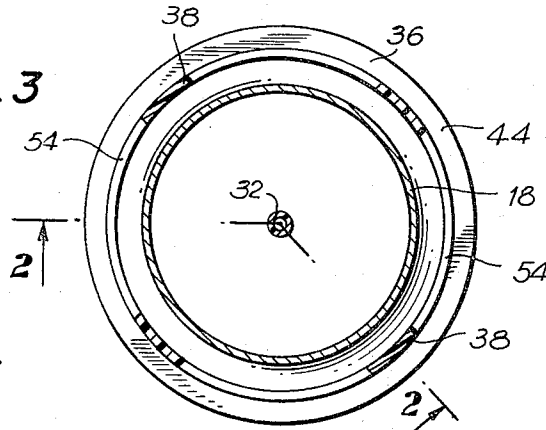


FIG. 5

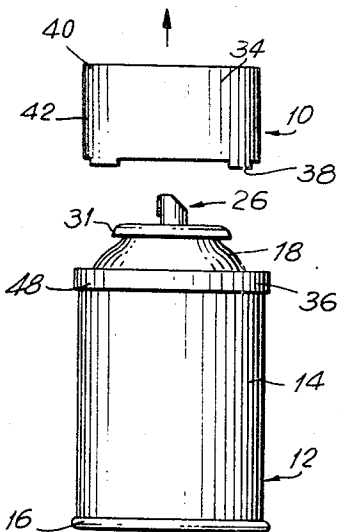
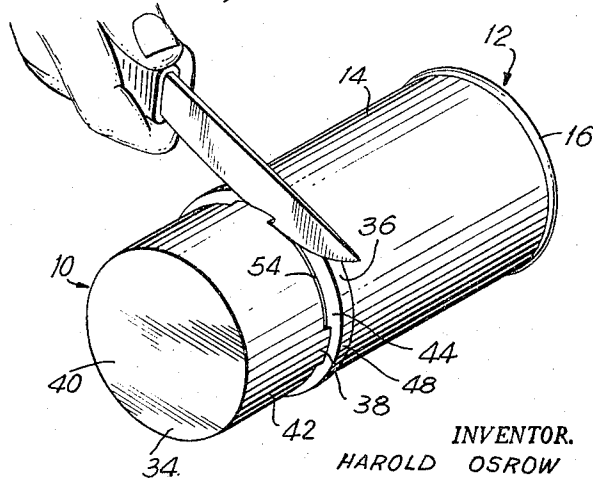


FIG. 4



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1

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TAMPER-PROOF TOP CLOSURE FOR VALVED PRESSURE-LOADED CONTAINERS

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This invention relates to a tamper-proof top closure for valved pressure-loaded containers.

It is the primary object of the invention to provide a new and improved tamper proof top closure for valved pressure loaded containers wherein the condition of the closure indicates whether or not the same has been removed while in a retail store and a portion of the contents of the container has been discharged.

It is a further object of the invention to provide a tamper proof top closure for valved pressure loaded containers of the character described having a portion thereof tightly secure, so as to be effectively permanently attached, to the container, a portion thereof adapted to be separated and removed from the container and a plurality of legs interconnecting these two portions, the legs being as strong as the other parts of the cap so that they cannot be broken without the use of tools, but, furthermore, being of such construction that they are severable by the use of a cutting instrument whereby persons bent on mischief, only with instruments and difficulty and not without detection can remove the closure, discharge the contents of the container, and then replace the closure.

It is still a further object of the invention to provide a tamper proof top closure for valved pressure loaded containers of the character described which is adapted to be opened by a household knife but which can not be opened by hand manipulation alone, which can be opened readily by persons with no mechanical skill such as housewives and which though requiring the use of a knife imposes no danger during the opening process.

It is another object of the invention to provide a tamper proof top closure for valved pressure loaded containers of the character described which is adapted to be formed as one integral piece by conventional molding techniques, which can be manufactured by mass production methods, which is attractive in appearance when in its final location as the closure for a container, and which will not appreciably increase the per unit price of such closures.

It is another object of the invention to provide a container and closure of the character described wherein the contents of the container is a specific color, for example a paint, that it is desired to readily identify, wherein the closure is molded from a plastic of the same color for retail shelf identification and wherein the portion of the closure that is tightly secured to the container is emplaced around the exterior of the chime that connects the top wall to the barrel of the container so that after removal and even loss of the top portion of the closure the remaining portion serves to identify the color of the paint.

Other objects of the invention in part will be obvious and in part will be pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangements of parts which will be exemplified in the tamper proof top closure hereinafter described and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings in which is shown one of the various possible embodiments of the invention,

FIG. 1 is a side elevational view of a tamper proof top closure located at and tightly secured to the top

2

of a pressure loaded valved container and before severance thereof;

FIG. 2 is an enlarged axial cross-sectional view of the closure and the top portion of the container, the same being taken substantially along the line 2-2 of FIG. 3;

FIG. 3 is a cross-sectional view taken perpendicular to the axis of the container and substantially along the line 3-3 of FIG. 2;

FIG. 4 is a view of the container and closure of FIG. 1 in the process of having the closure severed; and

FIG. 5 is a view similar to FIG. 1 but showing the closure separated from the container.

Referring now in detail to the drawings, the invention comprises a closure 10 tightly secured to a conventional valved pressurized container 12. The container will be briefly described for the purpose of completeness.

The container includes a cylindrical hollow elongated barrel 14 often made of sheet steel. The barrel has a bottom wall which is joined to the lower end of the barrel 14 by a chime 16. The container 12 further has a dome shaped annular top wall 18 which is joined at its outer periphery to the upper end of the barrel 14 by an outwardly and upwardly protruding closure-mounting chime 20. As will be subsequently more fully described, the upper chime is completely hidden from view by a ring portion of the top closure.

A circular ferrule 24 is located in a central opening of the top wall and carries a dispensing valve 26, which includes a dispensing head 28 above the top wall, a valve body 30 situated immediately below the head and below the ferrule, and an elongated siphon tube 32 which runs from the body to the bottom of the container. The valve is spring-biased to a closed condition and is opened by depression of the head by the fingers of the user. A chime 31 joins the ferrule to the top wall. As shown in FIG. 5 said chime 31 protrudes outwardly and upwardly from the opening in the top wall.

The container carries within the barrel any desirable liquid medium to be dispensed, as for example medications, paints or other finishing materials, soap, insecticide, or cosmetic preparations. The container also carries a gaseous volatile propellant kept under pressure which, when the valve is opened, dispenses the medium out through the valve.

The closure 10 of the invention is formed from any strong and durable, flexible, resilient plastic material soft enough, due to its flexibility, so that it can be cut by the cutting edge of a kitchen knife, e.g. a paring knife, applied under hand pressure. Plastics such as polyethylene, polypropylene, natural and synthetic rubber, polyvinylchloride and cellulose acetate butyrate are suitable for the materials of which the closure is fabricated.

The closure includes, as a first portion, a circular tubular cap 34, as a second portion, a ring 36 and, as a third portion axially oriented legs 38 interconnecting the aforesaid first and second portions.

The cap 34 has a flat top wall 40 which is circular in plan and which lies in a plane perpendicular to the axis of the barrel 14. The cap 34 further includes a cylindrical continuous side wall 42 which is in one piece with the top wall and which has a diameter substantially the same as the diameter of the barrel 14.

The ring 36 is located at the lower boundary of the closure 10 and includes a pair of opposed spaced generally parallel walls, viz, an upper wall 44 and a lower wall 46. An intermediate wall 48 connects the upper wall 44 and lower wall 46, and said three walls define on the inside of the ring, an inwardly facing circumferential groove 50 having a central axis coaxial with the axis of the barrel. The outermost upper chime 20 between the barrel and the top wall is effectively permanently seated in the groove 50 defined by the ring 36.

For ease of assembly, the lower wall 46 of the ring may have its lower inner corner chamfered as at 52 so that the ring can be more easily forced downwardly over the chime 20. The material of the ring is sufficiently flexible and resilient to permit the lower wall 46 to expand in order to slip over the chime and then snap back into place when said lower wall has cleared the bottom edge of the chime. The ring is thereby tightly secured to the chime so that it is extremely difficult, and impossible for persons of ordinary strength, to remove the ring from the chime; and, indeed, it is intended that the ring remain permanently in place around the chime. Optionally, the ring may be bonded to the chime as by the use of an appropriate adhesive, and other expedients may be employed to tightly secure the pressure ring to the chime, such as hot crimping, heat and pressure sealing.

The legs 38 are squat and broad so as not to be frangible and interconnect the cap 34 with the ring 36, it being appreciated that all of the three aforesaid components are molded as a single integral unit. The legs hold the cap and the ring in axially spaced relation. The thickness (radial dimension) of each of the legs is desirably uniform throughout and the same as the thickness of the side wall 42. The legs may be thinner in radial dimension than the side wall thickness, but preferably are not thicker. The legs are never made thin enough to be frangible, i.e. rupturable by manual manipulation of the closure. Further, the legs have a circumferential dimension which is a large number of times greater than the thickness of the legs, e.g. 4 to 20 times greater. The legs run in a direction parallel to the axis of the container and are alike. Moreover, the legs desirably are at the same radial distance from the axis of the container as is the side wall of the cap. As indicated previously the thickness and width (circumferential dimension) of the legs is sufficient so that they cannot be broken by manually twisting, pulling or flexing of the cap relative to the ring.

The legs are uniformly spaced apart by like circumferential slots 54. The slots pass through the side wall 42 and each has a circumferential length about three times the circumferential length of a leg 38. In a preferred form of the invention, there are four uniformly spaced legs, the centers of the legs being spaced 90° apart. There are consequently four slots, each leg being flanked by a pair of slots. It will be noted that when the closure is on the top of the container before the legs are severed, the legs and the slots lie in a plane immediately above the chime 20.

In commercial and suitable embodiments of the invention, the legs have a thickness of from between about 0.03 to 0.05", the legs are 1/2" in circumferential length, are 3/32" in axial height and the slots are 1 1/2" in circumferential dimension.

The closure 10 further includes an internal cylindrical skirt 56 having its top edge fixed to the interior surface of the top wall 40 and being coaxial with the axis of the closure 10. Desirably the skirt is molded in one piece with the remainder of the closure. The lower edge of the skirt 56 surrounds and frictionally engages the inner chime 31. The seating of the chime 31 within the lower end of the skirt 56 helps to stabilize the closure on the top of the container 12 prior to removal of the cap 34.

The container with the closure secured thereon is marketed in this condition through retail outlets. Appropriate advertising matter will be carried on the container to make the purchaser aware of the unique features of the closure. A person examining the closure can immediately visually perceive that the closure has not been opened, if this is in fact the condition of the closure. The assurance given by the unbroken condition of the closure makes the purchaser confident that no one has accidentally or intentionally discharged any part of the contents of the container. Thus the purchaser will have confidence both in the product and in the retail outlet at which the purchase is being made. Moreover, the

closure itself tends to discourage mischief because opening of the same requires the use of an instrument having a cutting edge, which the great majority of persons are not likely to have readily at hand. It may be added that a modest discouragement is often sufficient to stop unwanted tampering in retail outlets. If, for example, all that had to be done was to remove a cap and push a valve, many women might try a hair spray or a perfume. The necessity for obtaining and using a cutting instrument to open the closure of the invention effectively stops the great majority of such undesirable samplings, yet does not hinder the ready removal of the closure in the home or by the shop owner. Of course, there is also no way that the closure may be easily removed to circumvent the necessity of severing said legs.

Once the purchaser has seen that the closure is unruptured and that no one has tampered with the container and has purchased the same, he may quickly and easily open the container at home by severing each of the legs with the assistance of a cutting instrument having a cutting edge, as best shown in FIG. 4. Ordinary kitchen knives serve this function well. One convenient technique of opening the closure, which technique will be readily comprehended by purchasers, is to place the container with its cylindrical wall on a flat surface. Then the knife edge is applied to any one leg and stroked so as to slice the leg like a loaf of bread. Each leg is similarly sliced in turn. Once all of the legs are cut, the cap can be removed from the container, with the inner skirt 56 sliding off of the chime 31 (see FIG. 5). This of course exposes the dispensing head 28 for use. The ring remains permanently in place on the chime 20. When it is desired to replace the cap, the cap is located so that the inner skirt telescopes over the chime 31 and due to the frictional engagement therebetween the cap remains in place. When the closure is initially installed the lower edge of the inner skirt is spaced from the top wall 18 thereby permitting a deeper telescoping interconnection between the skirt 56 and the inner chime 31 if the cut legs are aligned with the slots 54 after severance of the legs.

If the container holds a quantity of a colored material such as paint, it is desirable in accordance with the invention to color the closure 10 the same as the color of the paint so that the closure identifies the paint. The ring, having been made in one piece with the other parts of the closure, is of course also the same color of the paint. Since the ring is permanently attached to the container even after the closure is severed, it serves as a permanent visual indication of the paint color, even if the cap is lost or misplaced or mixed up with the caps of other closures.

It thus will be seen that there is provided a tamper proof top closure for valved pressure loaded containers which achieves the several objects of this invention and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention and as various changes might be made in the embodiment set forth, it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In combination, a pressurized container and a tamper proof closure therefor, said container including a hollow barrel having a central axis, a bottom wall closing the lower end of the barrel and a top wall closing the upper end of the barrel, an annular outwardly and upwardly protruding chime coaxial with said axis and joining the outer periphery of the top wall to the upper end of the barrel, and a manually controllable dispensing valve having a dispensing head carried by and located centrally above the top wall, said closure comprising

(a) a hollow cap, the cap including a tubular wall of uniform radial thickness, a top wall closing the upper

- end of the tubular wall, the other end of the tubular wall being open,
- (b) a ring coaxial with the axis of the tubular wall and situated adjacent the lower end of the cap,
- (c) means tightly securing the ring to the chime with the external surface of the chime covered by the ring and the external surface of the ring being exposed,
- (d) a plurality of circumferentially spaced squat broad legs running parallel to the axis of the barrel, interconnecting the cap and the ring and retaining the cap and ring in axially spaced relation, each leg having a circumferential dimension several times greater than the thickness of the leg, each pair of circumferentially adjacent legs defining therebetween a circumferential through slot, and
- (e) the closure covering the dispensing valve and the top wall and being a one-piece integral unit formed from a flexible plastic whereby the legs are severable by the cutting edge of a household knife applied by hand pressure thereby to enable removal of the cap from the top of the container and exposure of the dispensing valve.
2. A combination as set forth in claim 1 wherein the top wall of the container includes an inner top chime coaxial with the axis of the container and the cap includes a cylindrical open-bottomed skirt frictionally engageable and telescopable about the inner chime.
3. A combination as set forth in claim 1 wherein the material of the closure is selected from the group consisting of polyethylene, polypropylene, natural and synthetic rubber, polyvinylchloride and cellulose acetate butyrate.

4. A combination as set forth in claim 1 wherein there are at least four like legs and four like slots, each leg being flanked by a different pair of slots.
5. A combination as set forth in claim 4 wherein the circumferential dimension of a leg is about $\frac{1}{3}$ of the circumferential dimension of a slot.
6. A combination as set forth in claim 1 wherein the container is adapted to hold colored material, and wherein the closure is of a color the same as the color of the colored material so that the ring permanently identifies the color of the material even when the cap is misplaced.
7. A combination as set forth in claim 1 wherein the legs are alike and each leg has a circumferential dimension of about four to twenty times its radial thickness.
8. A combination as set forth in claim 1 wherein the legs and the tubular wall lie at the same radius from the axis of the barrel and the legs have a radial thickness not greater than the thickness of the tubular wall.
9. A combination as set forth in claim 1 wherein each leg has at least a strip running the entire axial length of the leg having a radial thickness the same as the thickness of the tubular wall.

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