PRESS-TOPTYPE CHILD-RESISTANT CLOSURE

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References Cited
UNITED STATES PATENTS
3,484,216 12/1969 Turner.......................... 220/60 A
3,672,528 6/1972 Faulstich........................ 215/46 A

ABSTRACT
So-called "press-top" child-resistant closures have been constructed utilizing a bowed top and a peripheral skirt including holding means arranged so that upon pressure being applied to the center of the top, the skirt will expand so as to be capable of passing over a retaining structure on a bottle neck engaged with the holding means on the skirt. Inadvertent opening of these closures during the stacking can be prevented by using with them a ring of material extending around the skirt and serving to prevent expansion of the skirt upon pressure being applied to the center of the top. Preferably the ring of material is in the form of a tear-off strip which indicates whether or not a container has previously been opened.

1 Claim, 5 Drawing Figures
PRESS-TOP TYPE CHILD-RESISTANT CLOSURE

CROSS-REFERENCE TO RELATED APPLICATIONS:


BACKGROUND OF THE INVENTION:

The term “child-resistant closure” can be and is defined in a number of ways. In general, this term is utilized to designate any closure which is sufficiently difficult to open so that it cannot be readily opened by comparatively young children or by individuals of other than a normal mental capacity. A number of types of such closures have been proposed and developed; they have frequently been referred to as “safety closures.” An understanding of the present invention does not require a detailed analysis of all of the various different types and styles of closures in this field since the invention itself pertains only to so-called “press-top” closures.

These press-top child resistant closures are normally constructed so as to have a top which is intended to be located across the end of a container neck and a peripheral skirt attached to the top so as to normally extend around such a neck. The skirt utilized in such a closure normally carries what may be regarded as a “holding means” such as a groove or a flange intended to engage cooperating holding or retaining means on such a neck. The parts in such a closure are formed so that as pressure is applied to the center of the top a type of leverage effect is achieved expanding the skirt and disengaging the holding means from the cooperating means on the neck so that the closure itself may be removed from a container neck.

Usually such closures are formed with the top domed more or less like a common oil can bottom so that such a top will serve as a metastable diaphragm which will tend to return to its initial configuration after the pressure applied to it is released. Although as shown by the British Pat. No. 697,583 published Sept. 23, 1953 entitled, “Improvements in or Relating to Containers and Closures Therefor,” it is possible to form press-top closures out of metal, at this time it is more conventional to form such closures out of a deformable material such as a common, somewhat resilient polymer composition such as a polyolefin—especially linear polyethylene. Closures which can be formed of such materials are indicated in the French Pat. No. 1,463,789 delivered Nov. 21, 1966 and in the U.S. Pat. No. 3,484,016 issued Dec. 16, 1959 entitled, “Container and Closure.”

With these and various related press-top closures certain problems have been encountered. A major one of these problems concerns the danger of closures as indicated inadvertently being partially opened after being applied to a container by a manufacturer. Such partial opening can be the result of different items. It can occur whenever pressure is applied to the top of a press-top closure. To a degree the danger of such partial opening is related to a need to insure a customer that a container has not been opened prior to the customer acquiring such a container so that the customer will be assured that the contents of the container will be as when the container was packaged.

BRIEF SUMMARY OF THE INVENTION:

A broad objective of the present invention is to provide new and improved press-top type child-resistant closures. More specifically, however, the invention is intended to provide closures of this type which solve the problem of inadvertent closure opening indicated in the preceding discussion and which also solve the problem of a customer being able to determine whether or not a container using a press-top type closure has previously been opened. Other objectives of this invention are to provide closures as indicated which may be inexpensively produced at a minimal cost, which may be applied to containers by manufacturers with a comparatively minimal amount of difficulty, and which may be easily and conveniently utilized by an ultimate consumer.

In accordance with this invention these and various other related objectives of the invention which will be apparent from a detailed consideration of the remainder of this specification are achieved by providing in a press-top type of safety closure as indicated having a top, a peripheral skirt and holding means spaced from the top on the skirt, the improvement which comprises:

a ring of material extending around the periphery of the skirt which serves to prevent expansion of the skirt when pressure is applied to the center of the top unless and until it is removed from the skirt. Preferably the ring is formed as hereinafter indicated so that it may be conveniently removed and so that it will give a visual indication as to whether the closure has been opened after it has been initially applied to a container.

BRIEF DESCRIPTION OF THE DRAWING:

Further details of the invention as well as many specific advantages of it will be apparent from a detailed consideration of the remainder of this specification, the appended claims and the accompanying drawing in which:

FIG. 1 is an isometric view of a closure of this invention in place upon a container neck;

FIG. 2 is a cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view corresponding to FIG. 2 showing this closure after a ring as herein described has been removed from it and as this closure is being opened; and

FIGS. 4 and 5 are enlarged, fragmentary, cross-sectional views in which parts of the closure shown in FIG. 2 are illustrated in greater detail than in FIG. 2.

The press-top closure shown in the accompanying drawing is a presently preferred embodiment or form of a structure utilizing the essentially intangible concepts of this invention. These concepts may be embodied within other somewhat differently designed and somewhat differently appearing closures through the use or exercise of routine engineering skill in the closure field. The concepts of the invention which can be utilized in such varied and different manners are summarized by the appended claims forming a part of this disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

In the drawing there is shown a closure 10 in accordance with this invention of a so-called “press-top” variety formed as an integral unit of a material such as
polyethylene having resilient properties. It includes a top 12 which is adapted to be pressed at its center 14 towards a container neck 16 so as to expand a peripheral, generally cylindrical skirt 18 in such a manner that an internal bead 20 within this skirt 18 is moved outwardly from a groove 22 surrounding the neck 16 so that the closure 10 can be removed from this neck 16.

In this structure the bead 20 may be considered as a holding means which engages a cooperating means—the groove 22—on the neck 16 in order to secure the closure 10 against inadvertent or accidental movement off of this neck 16. If desired, the groove 22 may be considered as a retaining means or as another holding means. Preferably the fit between the bead 20 and the groove 22 is a close, tight fit so that a seal is formed between the neck 16 and the closure 10 along a continuous line or area around the periphery of the neck 16. If desired, the bead 20 may be on the neck 16 and the groove 22 may be on the closure 10. Other equivalent mating, holding or retaining structures may be used.

Preferably the top 12 is of a generally domed shaped configuration corresponding to a degree to the shape of the bowed bottom in a conventional oil can. This top 12 is of a metastable character in that it has a normal configuration as indicated in FIGS. 1 and 2 of the drawing and in that it may be deformed to an over center type position as indicated in FIG. 3 when force is applied to the center 14 of the top 12 so as to tend to move this center 14 generally towards the neck 16. During such movement flexure occurs within the top 12. Such flexure may be conveniently controlled by forming within this top 12 a circular groove 26 so that the material in the top 12 will bend adjacent to this groove 26 when pressure is applied to the center 14. In effect, the groove 26 makes a circular area or line of the top 12 more flexible than other regions of this top 12 so that bending will occur adjacent to this groove 26.

Preferably the top 12 includes a dependent annular flange 28 which is concentric with the groove 26 and with the skirt 18. This flange 28 is intended to abut against the end of the neck 16 so as to accomplish several functions. When the closure 10 is in place, this flange 28 is held by the bead 20 engaging the groove 22 so that it bears against this end 30 in such a way as to form a seal. This is important in guarding against the possibility of leakage. The flange 28 also serves essentially as a fulcrum about which the top 12 will bend when pressure is applied to the center 14.

When pressure is applied in this manner the top 12 will tend to achieve a reverse bow from its original position and the skirt 18 will tend to be pulled upwardly as shown in FIG. 3. As this occurs there is a tendency for the bead 20 to be popped out of the groove 22 in such a manner that the entire closure 10 can be lifted off of the neck 16 as pressure is continued on the center 14. If the flange 28 is not used the top 12 will tend to bend or flex where it contacts the end of the neck 16.

It is believed that it will be apparent from the preceding that if pressure was applied to the center 14 of the closure 10 as during handling or stacking of a container having the neck 16 that there would be a tendency for this closure 10 to open. In accordance with this invention this possibility is alleviated by forming as an integral part of the closure 10 a range 34 of the same material as is used in the closure 10. In the embodiment of the invention shown this ring 34 consists of a strip 36 of material having two adjacent ends 38 joined by a thin line 40 of this material.

This line 40 is sufficiently thin so that it is capable of being easily severed or franged by the application of mechanical force. Such force may be conveniently developed by engaging tab or handle 42 formed integrally with the strip 36. If desired this tab 42 can be omitted and the strip 36 may be directly engaged so as to be pulled off. As it is pulled, force will also be applied to sever the strip 36 along the line 40 and along another line 44 extending completely around the periphery of the skirt 18. This line 44 is of the same character as the previously described line 40.

With this structure the ring 34 acts much as a tire rim of an old-fashioned wagon wheel in preventing the parts of this wheel from coming apart. It serves to reinforce the skirt 18 against bending or deformation so that an amount of force such as might be applied to the top 12 during handling, stacking or the like will not be adequate to deform both the strip 36 and the skirt 18. However, an ultimate user may pull on the tab 42 so as to detach this strip 36. This will then enable the skirt 18 to expand as indicated with a moderate amount of force such as normally would be applied to the top 12 to open it in fact applied to its center 14.

It will be apparent from this that the strip 36 is an indication as to whether or not the closure 10 has ever been opened after being installed on a container neck. This is considered quite important in indicating to a customer or a user that the contents of a container are intact and as they were when packaged. The most satisfactory reinforcement against enlargement of the skirt 18 is achieved when the strip 36 is slightly larger than this skirt 18 and is located so that at least part of the strip 36 surrounds part of the skirt 18.

If desired, the strip 36 may be provided with an internal groove 46 corresponding to the groove 42 which is adapted to mate against an external flange like bead 48 corresponding to the bead 20 previously described so as to form a further, additional seal and so as to securely hold the closure 10 in place prior to the initial use of this closure 10. Although it is not considered necessary, it is possible to form the bead 48 so that it extends beneath the skirt 18 so as to make it comparatively difficult for the skirt 18 to be engaged manually in such a manner that the closure 10 can be removed from a container by essentially brute force after the strip 36 has been severed.

It is believed that it is apparent from the above that the ring 34 does not serve the same function as locking rings used with various types of other safety closures than the press-top type of closure illustrated. This ring 34 is not formed or installed as a separate part, but initially is an integral part of the closure 10. This makes for convenience of manufacture and assembly. In addition, however, the ring 34 does not control the opening of the closure 10 in the sense that locking rings regulate or govern the opening of prior safety closures of a different type.

Such closures are intended to be directly removed from a container upon manipulation of a locking ring. In the closure 10 pressure must be applied in a unique way—at the center of the closure top 12—after the sequence of the removal of the ring 34 is accomplished. This is considered to be significant in making this closure 10 of a "child-resistant" character so that it can effectively be utilized with a degree of safety.
The basic structure of the closure 10—i.e., all of the structure of the closure 10 above the strip 36 and the line 44—may be modified in a number of ways which do not affect the basis "press-top" type of opening action described. Thus, for example, if desired this closure 10 can be formed so as to include on the top 12 a flange extending from this top 12 directly above the flange 28 as described in the aforesaid Hazard application entitled "Press-Top Child Resistant Closure". Similarly, various different sealing structures designed to mate with or be used with a container neck may be used in conjunction with the closure 10.

I claim:

1. In a closure having a top and an integral peripheral skirt, said skirt including holding means spaced from said top, said closure being adapted to be used over the end of a container neck with said top covering the end of said neck and said skirt fitting around said neck so that said holding means engages cooperating means on the exterior of said neck to prevent removal from said closure from said neck, said top being capable of being pressed at its center towards said neck in order to cause flexure in said closure resulting in expansion of said skirt and in said holding means being released from said cooperating means so that said closure can be removed from said neck, the improvement which comprises:

a ring of material extending around the periphery of said skirt, said ring of material serving to prevent expansion of said skirt upon pressure being applied to the center of said top in order to prevent said holding means from being released from said cooperating means,

said ring of material is integral with said skirt and extends beneath said skirt away from said top,

said ring of material includes a second holding means designed to engage other cooperating means on the exterior of said neck so as to securely hold said closure against removal from said neck prior to said ring being severed from said neck,

said ring of material comprises a strip of material extending around the periphery of said strip and joined to said skirt, said strip having adjacent ends adjacent to said strip, said ends being joined together and said strip being joined to said skirt by easily severed thin lines of material,

said ring of material being capable of being removed from said skirt when said top is pressed at its center towards said neck so that after removal of said ring said closure can be removed from said neck.

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