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Boxer et al.

[11] **3,860,133**

[45] **Jan. 14, 1975**

[54] **SAFETY CAP**

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[73] Assignees: **James D. Pauls; Robert R. Burton; Warren M. Menaker; James Smith; Owen J. Ooms; Eli C. Frank,** ; part interest to each

[22] Filed: **Jan. 26, 1973**

[21] Appl. No.: **327,220**

[52] **U.S. Cl.**..... **215/206,** 215/223, 215/224

[51] **Int. Cl.** **B65d 55/02,** B65d 85/56, A61j 1/00

[58] **Field of Search** ..... 215/9, 41, 46 R, 206, 224, 215/223

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Attorney, Agent, or Firm—Shoemaker and Mattare

[57] **ABSTRACT**

A safety cap for containers of dangerous products whereby the cap is locked onto the container by cooperating parts on the cap and container and cannot be removed from the container until the cap is in a proper orientation with respect to the container.

11 Claims, 11 Drawing Figures

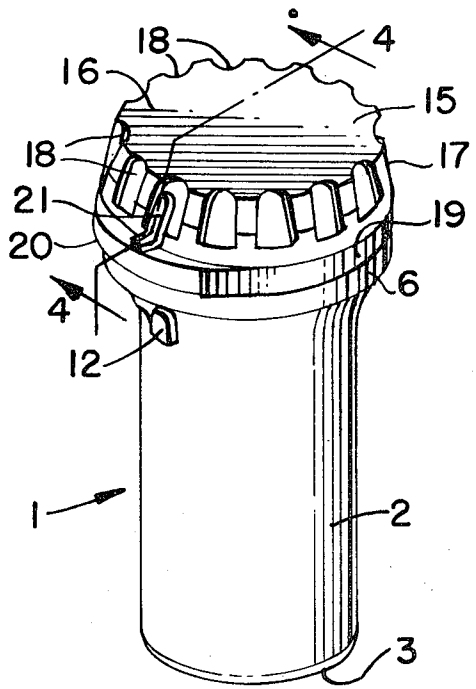


FIG. 1.

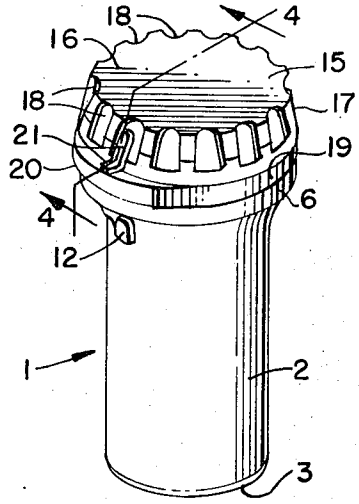


FIG. 2.

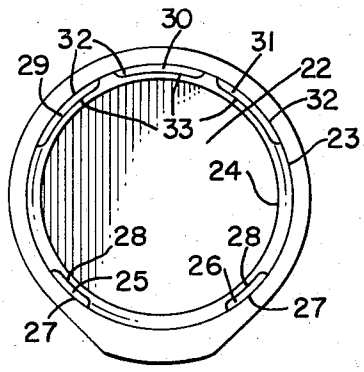


FIG. 3.

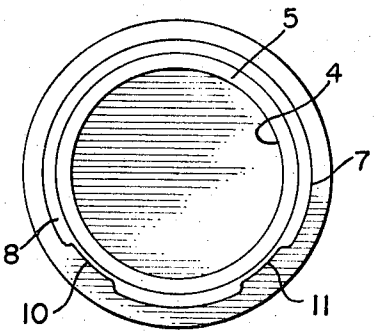


FIG. 4.

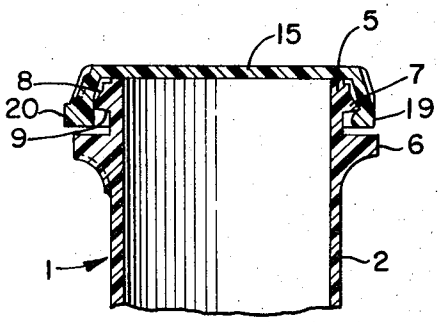


FIG. 5.

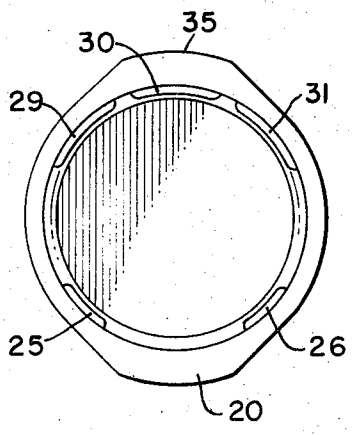


FIG. 6.

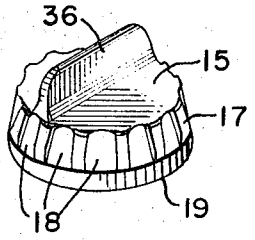


FIG. 7.

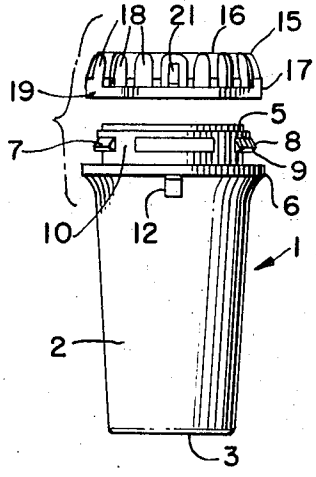


FIG. 8.

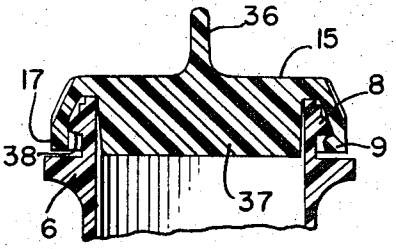


FIG. 9.

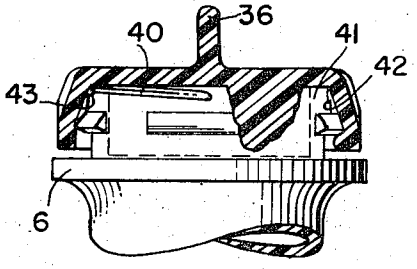


FIG. 10.

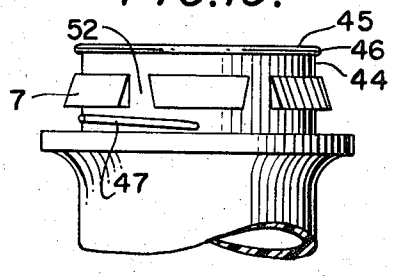
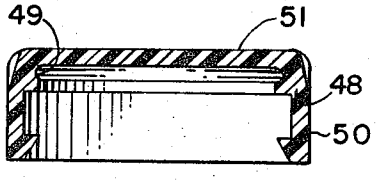


FIG. 11.



SAFETY CAP

BACKGROUND OF THE INVENTION

Containers of dangerous products such as medicines, drugs, poisons, etc. have been packaged in containers having easily removable closures. Such containers when found by small children have been opened by them, and the contents taken internally to their discomfort or death.

This invention relates to interengaging of the cap or cover with the container so that a small child cannot remove the cap or cover from the container.

Government regulations now require that all dangerous products be packaged with a locked cap or cover on the container. The cap or cover must withstand a number of trials by machine without losing the locking qualities and must not be opened by a small child in an infinite number of tries either by hand, tooth or a tool without breaking the container.

It is therefor an object of the invention to produce a cap or cover so interengaged with the container that it can only be removed by manipulation of the cap or cover to a proper orientation with respect to the container.

A further object is to place a locking lug or lugs on the interior of the cap or cover which must be so placed with respect to the container that the lug or lugs will pass through a slot or slots in a rib formed on the neck of the container.

Another object is to place other lugs on the interior of the cap or cover which are opposite to the aforementioned lug or lugs that will aid in the locking of the cap or cover to the container and will act as a fulcrum in the removing of the cap or cover from the container. The additional lugs also aid in holding a vacuum in the container when originally sealed as is required in the packaging of some products.

A still further object is to provide a further sealing means in the cap or cover and on the container which will interengage upon motion of the cap or cover and the cap or cover having a means thereon to aid in the unsealing of the cap or cover before moving the cap or cover into the oriented position for removal from the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevational view of the cap or cover as applied to a container;

FIG. **2** is a plan view of the cap or cover looking at the inside thereof;

FIG. **3** is a top plan view of the container;

FIG. **4** is a cross-sectional view taken on line **4—4** of FIG. **1**;

FIG. **5** is a plan view of a modified form of the cap or cover;

FIG. **6** is an elevational view of a further modified form of the cap or cover;

FIG. **7** is an exploded view of the cap or cover and container;

FIG. **8** is a cross-sectional similar to FIG. **4** but showing a further modified form of the cap or cover;

FIG. **9** is an elevational view partly in cross-sectional view of another modified form of the cap or cover and the container;

FIG. **10** is a part elevational view of a modified form of the container, and

FIG. **11** is a cross-sectional view of still another modified form of the cap or cover.

DETAILED DESCRIPTION OF THE INVENTION

A container for dangerous products, liquid or solid is designated generally at **1.** The container although shown as relatively small and of a round configuration may be larger in size and of other configurations. The container is provided with side walls **2,** a bottom wall **3** and an open top **4** and a rim **5** surrounding the open top. Near the open top **4** the side walls have an outwardly extending flange or tooth ring **6.** Adjacent the open top **4** and between the open top and the tooth ring **6** is an outwardly extending rib **7.** The rib is provided with an angled upper surface **8,** which extends outwardly and downwardly with respect to the rim **5,** and a substantially planar lower surface **9** extending from the end of the upper surface **8** inwardly to the side walls. The rib **7** has two slots **10** and **11** cut therein with the entire rib removed at the slots. Except for the slots, the rib is continuous around the container. Although two slots are shown, the rib may contain only one slot. Carried by the tooth ring **6** is an indicating means **12** which may be in the form of an arrow or other marking, the purpose of which will be set forth later.

Received on and covering the open end of the container **1** is a cap or cover **15,** having an upper wall or top portion **16** and a skirt or depending wall portion **17.** The skirt **17** flares outwardly and downwardly with respect to the upper wall and is provided with equispaced flutes **18.** The cap or cover **15** is made of a flexible plastic material and this, together with the flared skirt provides flexibility in the removal from and application to the container. The skirt **17** also has a lower ring **19** having at one portion an outwardly extending tab **20.** Extending upwardly in one of the flutes **18** is an indicating means **21** terminating in the approximate center of the tab in the form of a pointed bar.

The upper wall **16** of the cap has an inner surface **22** which is substantially planar throughout its extent. There may be a very narrow planar ring **23** adjacent the inner surface **24** of the skirt **17,** the ring sealingly engaging the rim **5** when the cap is in closed position on the container. The inner surface **24** has thereon in one semi-circular portion two locking lugs **25** and **26** in circumferentially spaced relation to each other and extending radially inwardly therefrom a distance substantially equal to the thickness of the skirt. Said lugs are near respective opposite ends of the tab **20** where the ends of the tab merge into the skirt. The spacing of the locking lugs is the same as the spacing of the slots **10** and **11** in the rib on the container and each locking lug has a planar upper surface **27** and a downwardly and outwardly extending angled lower surface **28.** There may be only one locking lug which would be positioned substantially in the diametric center of the tab **20.** Also carried on the inner surface of the skirt **17** and within the other semi-circular portion thereof are three camming lugs **29, 30** and **31,** each of said camming lugs having a planar lower surface **32** and an angled upper surface **33** similar to the shape of the locking lugs **25** and **26.** The remainder of the inner surface of the skirt between the camming lugs and the locking lugs and between the locking lugs being substantially a plane surface. The camming lugs **29, 30** and **31** engage the lower surface of the rib **7** when the cap or cover is in locked or closed position on the container and aid in sealing

the container and maintaining any vacuum therein when required. The camming lugs also act as fulcrum points when the cap or cover is in proper position for removal from the container by engagement with the rib upon the pivotal action of the cap or cover during the action of removal. While there has been shown three camming lugs, two or more may be used and so sized and spaced that they remain in the other semi-circular portion of the skirt.

Removal of the cap or cover from the container is accomplished by rotating the cap or cover relative to the container until the indicating means **21** on the cap or cover is aligned with the indicating means **12** on the container at which time the locking lugs **25** and **26** are aligned with the slots **10** and **11.** The locking lugs will pass through the slots when the tab **20** is raised upwardly and with the pivotal and fulcrum action of the camming lugs **29, 30** and **31** the cap or cover will be easily removed. The cap or cover may be applied to the container in any position by first placing one of the semi-circular portions of the cap or cover under the rib on the container and then forcing the other semi-circular portion over the rib whereupon the lugs in the other semi-circular portion will pass over the rib with a snap action.

The flared skirt of the cap or cover extends outwardly to a point wherein it substantially covers the tooth ring with only the tab extending beyond the tooth ring. The rim **19** of the skirt is also in contact with the upper surface of the tooth ring so that the cap or cover cannot be forced from its closing position by engagement or prying under the rim with the teeth or any instrument or tool except when the locking lugs are aligned with the slots in the rib.

In some instances the cap or cover may be difficult to turn with respect to the container to align the locking lugs with the slots in the rib. To alleviate this problem another tab **35** is provided which is diametrically opposite to the tab **20.** Thus, lateral pressure against each tab will easily aid in turning the cap or cover. The extra tab, however, will not aid in the removal of the cap or cover from the container. The indicating means **21** will only be on the tab **20.**

Another aid in the turning of the cap or cover is shown in FIG. **6** wherein a bar **36** is provided on the top of the cap or cover. The bar **36** may be molded to or affixed diametrically across the cap or cover and grasped between the thumb and forefinger for turning movement.

The cap or cover may be modified as shown in FIG. **8** wherein a thick inner plug **37** is provided on the inside of the cap or cover. The plug is of a size sufficient to pass within the wall of the container and be in engagement therewith. A recess **38** is between the plug **37** and the skirt **17** to allow the insertion of the upper end of the container and the rib **7.** The locking lugs **25** and **26** and the camming lugs **29, 30, 31** are also on the inner side of the skirt. The plug aids in sealing the container to prevent contamination of the contents and to provide a good seal.

A further modification of the cap or cover and the container is shown in FIG. **9,** wherein the container is provided with a thread member **40** adjacent the top **41** thereof. The inner wall **42** of the skirt is provided with a complementary thread member **43** engageable with the thread member **40** after the lugs have been engaged with the rib and upon further turning movement of the cap or cover will draw the cap or cover downwardly upon the container to effect a tighter seal. In an opening operation the cap or cover must be turned to first release the thread engagement and then place the locking lugs with the slots before removal of the cap or cover as described heretofore. The cap or cover as shown in FIG. **9** may have the plug **37** therein or may be plain as shown in FIG. **4.**

The container may be further modified as shown in FIG. **10,** wherein the upper end of the container **44** is extended with the upper end or rim **45** having an outstanding bead **46** therearound. The container may have a thread member **47** under the rib **7** and the lower part of the skirt may have a complementary thread member thereon or may use one of the lugs as a thread member. The rib **7** may have the slot therein in the form of an inverted keystone as shown in **52.** The wider base of the slot will aid in causing the locking lug to pass into the slot upon the opening operation. The lug is of an annular extent to just pass through the upper end of the slot requiring some force on the part of the operator.

The cap or cover shown in FIG. **11** may be used with the container shown in FIG. **10.** The cap or cover **48** is provided with a semi-circular, in cross-section, recess **49** on the upper part of the skirt **50** adjacent the point of juncture of the skirt and the top **51,** and which will receive the bead **46** when the cap or cover is forced downwardly onto the container to effect the seal thereof. The cap **48** of FIG. **11** is provided with the locking and camming lugs as previously described in connection with the other figures.

The invention herein shown and described is for illustration and description only and any and all structures and changes which fall within the metes and bounds of the claims herein are intended to be covered thereby.

What is claimed is:

1. A safety cap and container combination, comprising a container having a closed bottom, a side wall, and an open upper end, a radially outwardly extending circumferential locking rib on the side wall adjacent the open upper end thereof, said rib having a substantially planar bottom surface and an inwardly tapered upper surface and having at least one notch therethrough; said cap comprising a top portion having a depending peripherally continuous skirt with an inner surface and an open bottom end, at least two circumferentially extending radially inwardly projecting camming lugs on the inner surface of the skirt at the open bottom thereof and closely circumferentially spaced apart in one half circular portion of the skirt, said camming lugs having substantially planar lower surfaces substantially in the plane of the open bottom end of the skirt and outwardly tapered upper surfaces and said lugs having a radial thickness substantially equal to the skirt wall thickness, and at least one circumferentially extending radially inwardly projecting locking lug on the inner surface of the skirt at the open bottom end thereof in the other half circular portion of the skirt and opposite the camming lugs and substantially coplanar therewith, said locking lug having a circumferential extent substantially the same as said notch and registerable with the notch in one position of the cap so as to pass therethrough to release the cap from the container, said locking lug and camming lugs cooperably engaged with the lower surface of said locking rib in all other positions of the cap to lock the cap to the container, said camming lugs engageable with the locking rib to define

a fulcrum about which the cap is pivoted when the locking lug is removed through said notch to remove the cap from the container, and said plurality of camming lugs and the locking lug and locking rib cooperating to effect a vacuum-tight seal of the cap on the container.

2. A safety cover and container combination comprising a flexible cover member having a top portion and a depending peripherally continuous wall portion, the wall portion having an interior surface, the interior surface having at least one radially inwardly projecting locking lug thereon in one half circular portion thereof extending inwardly from the wall portion at the lower end thereof a distance substantially equal to the thickness of the wall portion and having a substantially planar upper surface and an angled lower surface, the interior surface also having a plurality of radially inwardly projecting camming lugs in the other half circular portion thereof and opposite the locking lug, the container having a mouth portion, an outwardly projecting circumferential rib on the mouth portion adjacent an upper end thereof, the rib being substantially continuous with at least one slot formed in one part thereof, the rib having a substantially planar lower surface and an angled upper surface, the locking lug and the camming lugs engaging the lower surface of the rib to tightly hold the cover on the container, and the camming lugs engaging the lower surface of the rib to aid in the application and removal of the cover from the container, the angled surfaces of the locking lug and rib allowing the lug and rib to frictionally slide past each other in placement of the cover on the container in any position due to the flexibility of the cover, the substantially planar surface and thickness of the locking lug preventing removal of the cover from the container except when the locking lug is positioned in registry with the slot in the rib for removal therethrough, and indicating means on the cover and container indicating the adjacency of the locking lug and slot when in alignment.

3. A safety cover and container combination as in claim **2,** wherein the locking lug is so sized as to just pass through the slot, and the camming lugs are larger than the slot.

4. A safety cover and container combination as in claim **2,** wherein there are two locking lugs and three camming lugs on the interior surface of the wall portion and two slots in the rib, the locking lugs and the slots being spaced apart equal distances.

5. A safety cover and container combination as in claim **2,** wherein gripping means are provided on the cover to aid in rotating the cover relative to the container to obtain the adjacency of the locking lug and the slot.

6. A safety cover and container combination as in claim **2,** wherein the interior surface and the container each have complementary thread members thereon aiding in the sealing of the container.

7. A safety cover and container combination as in claim **2,** wherein the interior of the cover has a plug extending downwardly therein of a size to engage the inner wall of the container mouth to seal the container.

8. A safety cover and container combination as in claim **2,** wherein the mouth of the container has an outwardly extending bead thereon at the open end of the mouth and the cover has a groove formed therein at the juncture of the wall portion and the top to receive the bead and aid in sealing the container.

9. A safety cover and container combination as in claim **2,** wherein the slot in the rib is of an inverted keystone configuration.

10. A safety cover and container combination as in claim **3,** wherein the interior surface is substantially smooth and continuous except for the locking lugs and camming lugs, all lugs having the same inward radial extent.

11. A safety cover and container combination as in claim **2,** wherein there are two locking lugs and three camming lugs on the interior surface each having the same inward radial extent, the locking lugs being smaller in annular extent than the camming lugs and of a size substantially the same as the width of the slots, and additional complementary means are provided on the interior surface and the container aiding in the sealing of the container.

* * * * *