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W. N. MARTIN
CONTAINER CLOSURE
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2,752,060

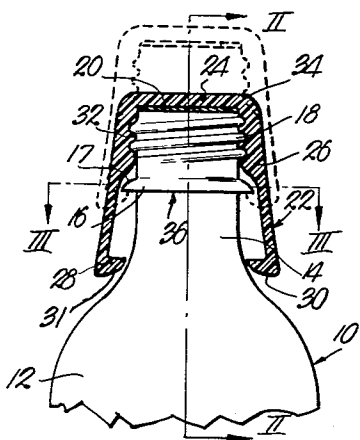


Fig. 1.

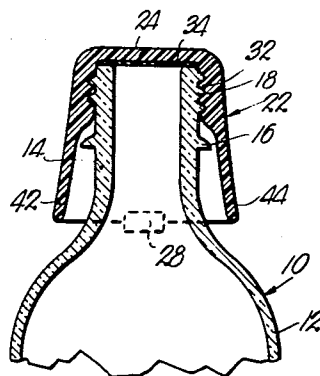


Fig. 2.

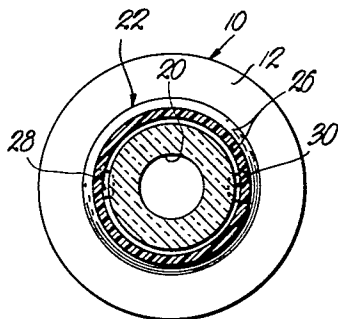


Fig. 3.

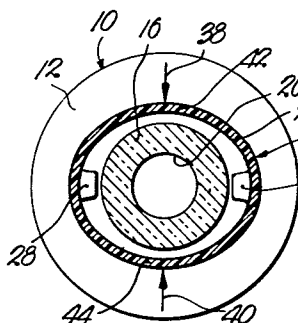


Fig. 4.

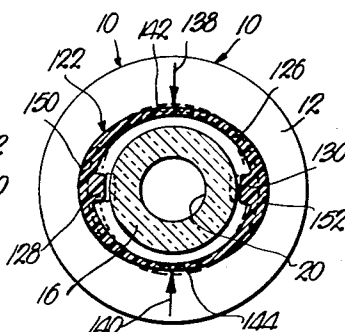


Fig. 5.

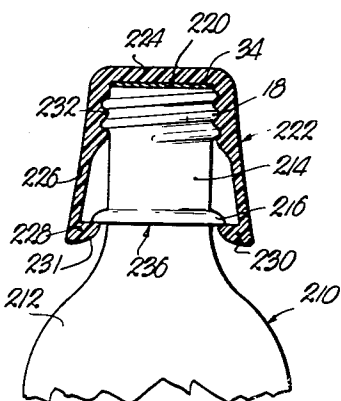


Fig. 6.

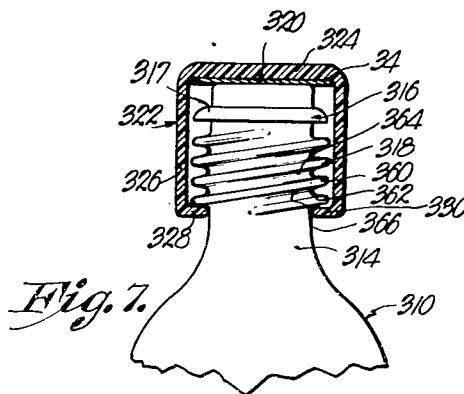


Fig. 7.

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CONTAINER CLOSURE

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5 Claims. (Cl. 215—41)

This invention relates generally to the field of containers and closures therefor, and more particularly, to an improved form of bottle and cap therefor.

Many serious and needless accidents have occurred through children gaining access to containers in which poisons, medicines, which are harmful when taken in improper dosage, and similar materials are packaged. The packaging of such materials in conventional containers having conventional closures makes it possible for children large enough to gain access to such packages but too small to recognize the consequences of consuming the materials contained therein to remove the conventional closures from the containers and to partake of the dangerous contents of the package. Other serious accidents frequently occur in which an adult inadvertently takes the wrong package or container from a shelf during the night when it is dark or simply due to insufficient attention and mistakenly consumes the harmful contents of a package or container other than that whose contents he intended to consume.

It is the primary object of this invention to provide an improved form of container therefor which overcomes all of the above-mentioned disadvantages and dangers, while still presenting structure which is convenient to manipulate for an adult intending to gain access to the contents of such container.

Another important object of the invention is to provide such container and closure structure therefor which includes means for positively preventing removal of the closure or cap from the container or bottle by either simple turning of the cap upon the bottle, or simple pulling of the cap relative to the bottle, or a combination of such forces, but which permits easy removal of the cap from the bottle upon first turning the cap relative to the bottle and then squeezing the cap to distort the same from its normal configuration in predetermined manner.

Another important object of this invention is to provide a container and a closure therefor which are adapted to resist the effects of vibration, jarring or the like during shipping or transportation and to remain locked in sealed condition despite the presence of such forces.

Still other important objects of this invention, including important details of construction, will be made clear or become apparent as the following description of the invention progresses. In the accompanying drawing:

Fig. 1 is a fragmentary view, partially in perspective and partially in cross section, showing a threaded bottle having one embodiment of the improved cap contemplated by this invention implaced thereon, the cap being also illustrated in dotted lines in the position it would assume immediately before removal by one versed in the manner of operating the structure;

Fig. 2 is a cross sectional view taken on line II—II of Fig. 1;

Fig. 3 is a cross sectional view taken on line III—III of Fig. 1 and showing the cap in the position same occupies when disposed as illustrated in solid lines in Fig. 1.

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Fig. 4 is a cross sectional view taken on line III—III of Fig. 1 showing the cap in substantially the position same occupies when disposed as illustrated in dotted lines in Fig. 1 but after same has been squeezed prior to removal.

Fig. 5 is a cross sectional view similar to that of Fig. 4 but illustrated a modified embodiment of cap with its position when in unsqueezed or normal configuration in dotted lines and its position after being squeezed in solid lines;

Fig. 6 is a fragmentary view, partially in perspective and partially in cross section, illustrating a modified form of bottle and cap; and

Fig. 7 is a fragmentary view, partially in perspective and partially in cross section, illustrating a second modified form of bottle and cap.

Referring now to Figs. 1, 2, 3 and 4, the numeral 10 generally designates a container or bottle having a main body 12 and an open-topped, elongated neck 14 provided with an outturned, annular shoulder or rim 16 intermediate its ends and a set of integral, external threads 18 formed between shoulder 16 and the open top (designated 20) of the neck 14 of bottle 10. A substantially frusto-conical, hollow closure or cap designated 22 is provided for bottle 10 and illustrated in place thereon in the drawing. Cap 22 has an end wall 24, a frusto-conical side wall 26 and a pair of intumed, opposed flanges or ribs 28 and 30 extending toward each other from side wall 26 at the open end of the latter in predetermined, spaced relationship from the end wall 24. The cap 22 is provided with a set of integral, internal threads 32 in side wall 26, adjacent end wall 24 and in predetermined, spaced relationship from flanges 28 and 30.

A circular gasket 34 is provided within cap 26 and is disposed upon the inner side of end wall 24 for sealing the open top 20 of bottle 10 when cap 22 is tightly implaced thereon.

Bottle 10 may, of course, be formed of any suitable material such as glass, metal or the like; cap 22 is preferably formed of a resilient plastic material, although certain metals could be used; and gasket 34 is preferably formed of paper, plastic or other material normally used in comparable applications. It is further noted that, as will hereinafter become apparent, the invention is by no means limited to containers having a configuration such as illustrated by the bottle 10; it being apparent that the principles of the invention would apply equally well to a container having a uniform diameter throughout its length except for the shoulder 16 and the threads 18; containers of such substantially cylindrical configuration are, of course, relatively common for use in the packaging of prescriptions and medicinal products.

Referring particularly to Figs. 2 and 3 and the position of the cap 22 as shown in solid lines in Fig. 1, it will be observed that with the threads 32 of cap 22 screwed fully upon the threads 18 of bottle 10, the flanges 28 and 30 will be spaced below shoulder 16 a distance sufficient to permit unscrewing of the cap 22 upon bottle 10 to a point of freeing threads 32 from threads 18 before the flanges 28 and 30 come in contact with the lowermost face (designated 36) of shoulder 16. It will, therefore, be clear that with this embodiment of the invention a child, for instance, could proceed toward the removal of cap 22 from bottle 10 through the process of unscrewing cap 22 from threads 18 of bottle 10; and then pulling the cap 22 relative to bottle 10 to the position indicated in dotted lines in Fig. 1. At this juncture, however, the flanges 28 and 30 will firmly abut against the face 36 of shoulder 16 to prevent further outward movement of the cap 22 and its removal from the bottle 10. This embodiment of the invention is, accordingly, well adapted for use with medicines and

other products of a granular or solidified nature, for example, aspirin.

In order to complete the removal of cap 22 from bottle 10 it is necessary for one understanding the functioning of the structure to exert opposite forces, as indicated by the arrows at 38 and 40 in Fig. 4, to squeeze the cap 22 at opposed zones (designated 42 and 44) of side wall 26 of cap 22, zones 42 and 44 being angularly displaced from the flanges 28 and 30 and substantially midway between the latter on the side wall 26. As illustrated in Fig. 4, the exertion of squeezing force as at 38 and 40 upon zones 42 and 44 of side wall 26 will distort the latter from its normal configuration of circular cross section to a configuration of elliptical cross section moving flanges 28 and 30 apart a distance sufficient to clear shoulder 16 of bottle 10. Obviously, after such squeezing the cap 22 can be lifted free of the bottle 10 to permit access to the open top 20 of bottle 10 for delivery of the contents of the latter therefrom. Upon releasing the squeezing forces 38 and 40 from cap 22, the latter will, by virtue of its resilient nature, return to its original configuration.

In replacing the cap 22 upon the bottle 10, the steps outlined for removal may be simply reversed, the side wall 26 of cap 22 being initially squeezed to move flanges 28 and 30 apart so that the cap 22 can be implaced upon bottle 10 with the flanges 28 and 30 between shoulder 16 and main body 12 of bottle 10, and the cap 22 may then be screwed upon bottle 10 until the engagement between threads 18 and 32 have moved the gasket 34 to a position tightly sealing the open top 20 of bottle 10. Preferably, however, the lower surfaces of flanges 28 and 30 are rounded as at 31 to permit simply snapping the flanges 28 and 30 over rim 16 without squeezing of cap 22, the upper surface 17 of rim 16 also being preferably rounded for this purpose.

Referring next to Fig. 5, parts numbered the same as in Figs. 1 to 4 inclusive will be understood to be the same, and parts having numbers exceeding those of parts illustrated in Figs. 1 to 4 inclusive by 100 will be understood to correspond generally to the latter. The embodiment of Fig. 5 contemplates a modified cap 122 of generally the same configuration as cap 22 previously described, except that the side wall 126 thereof is of greater thickness throughout the arcuate portions 150 and 152 thereof adjacent flanges 128 and 130 than the thickness of such side wall 126 at zones 142 and 144 thereof. This permits easier squeezing of zones 142 and 144 and, accordingly, easier distortion of wall 126 from its normal configuration to move flanges 128 and 130 apart, while at the same time strengthening the mounting for flanges 128 and 130. It may also be noted in Fig. 5 that the normal configuration of side wall 126 of cap 122 is such that the inner diameter between portions 150 and 152 is somewhat less than the inner diameter between zones 142 and 144. In other words, the cap 126 is normally of slightly elliptical cross section with the flanges 128 and 130 disposed on the minor axis and the zones 142 and 144 disposed on the major axis. As was the case with side wall 26 of cap 22, when the squeezing forces 138 and 140 are applied, cap 126 will distort to a configuration of elliptical cross section having the flanges 128 and 130 disposed on its major axis and moved apart to clear the shoulder 16. Such distorted configuration of the cap 126 is shown in solid lines in Fig. 5 while its normal configuration is illustrated in dotted lines.

Referring now to the modified embodiment of the invention illustrated in Fig. 6, parts numbered the same as in Figs. 1 to 4 inclusive will be understood to be the same, and parts having numbers exceeding those of parts illustrated in Figs. 1 to 4 inclusive by 200 will be understood to correspond generally to the latter. Bottle 210 has a neck 214 provided with external threads 18 and with an external, integral, annular shoulder 216, the

latter being spaced from threads 18 by a substantial distance greater than that utilized in the bottle 10 of Figs. 1 to 4 inclusive. The reason for such spacing of shoulder 216 a predetermined, substantial distance below threads 18 will shortly become apparent. A cap generally designated 222 may be essentially the same as either cap 22 or cap 122 above described. The side wall 226 of cap 222 is so dimensioned in the spacing of flanges 228 and 230 from end wall 224 that the flanges 228 and 230 just fit between shoulder or rim 216 and main body 212 of bottle 210 when the cap 222 is fully screwed upon the threads 18. This form of the invention is obviously well adapted for use with container 210 containing liquids, as well as with those containing solid materials, since the open top 220 of bottle 210 will be tightly sealed by gasket 34 when the flanges 228 and 230 are in their "locked" position beneath shoulder 216. It is also the embodiment of the invention best suited for use in preventing loosening of the cap 222 from the bottle 210 during shipping or transporting. The manner of operating this embodiment of the invention to remove cap 222 from bottle 210 is similar to that above described for the embodiment of Figs. 1 to 4 inclusive, except that the side wall 226 of cap 222 must be initially squeezed and maintained in squeezed condition while the cap 222 is being rotated sufficiently for flanges 228 and 230 to clear face 236 of rim 216. However, in replacing the cap 222 upon bottle 210 it is merely rotated until the threads 232 are fully screwed upon threads 18, whereupon by virtue of the rounding of flanges 228 and 230 as at 231, the flanges 228 and 230 will snap over shoulder 216 to engage the lower face 236 thereof for locking the cap 222 in place.

The embodiment illustrated and described in connection with Fig. 6 actually constitutes the preferred embodiment from an operational point of view. However, the embodiment illustrated in Figs. 1 to 4 inclusive is deemed important in view of the fact that conventional containers now in use and available are commonly provided with a shoulder 16 disposed essentially as illustrated and described in connection with the bottle 10; this permits the immediate use of this invention to receive the benefits thereof by simply supplying a cap or closure made in accordance with that described for cap 22. Although the change required for manufacturing containers in a form having a shoulder disposed as that at 216 on bottle 210 would be slight, it is to be understood that the invention may well find widest commercial application through the embodiment of Figs. 1 to 4 inclusive and that such eventuality is clearly contemplated. It may be pointed out that the necessity for some spacing of the flanges 228 and 230 from the threads 232 is due to the fact that the inner diameter of cap 222 adjacent the flanges 228 and 230 must be sufficient to permit squeezing of zones 42 and 44 toward each other without immediate engagement with the shoulder 16 or 216.

Referring now to the second modified form of the invention illustrated in Fig. 7, parts numbered the same as in Figs. 1 to 4 inclusive will be understood to be the same, and parts having numbers exceeding those of parts illustrated in Figs. 1 to 4 inclusive by 300 will be understood to correspond generally to the latter. The bottle 310 has a neck 314 provided with a set of double, external threads 318 including a pair of separate, raised, spiral lands 360 and 362 spaced from each other to present a pair of spaced, parallel, spiral thread grooves 364 and 366 therebetween. A shoulder or rim 316 is, in this instance, provided on neck 314 in closer proximity to the open top 320 thereof than threads 318, the rim 316 illustrated actually being atop the neck 314 adjacent the opening 320 of bottle 310. It may be noted that the outer diameter of rim 316 is either equal to or slightly smaller than the outer diameter of the threads 318. The modified cap 322 may, but need not be, and is not illustrated as being, frusto-conical in configuration. As

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shown, cap 322 is substantially cylindrical in form with a cylindrical side wall 326 having an end wall 324 closing one end thereof and opposed flanges or ribs 328 and 330 integrally formed at the extremity thereof opposite end wall 324. As will be clear from the drawing, the flange 328 is adapted to ride within groove 366 and the flange 330 is adapted to ride within groove 364 of the threads 318. The flanges 328 and 366 thus serve the same function as or in lieu of, the threads 32 and 232 provided in the other forms of the invention. In operating the embodiment of Fig. 7 to remove cap 322 from bottle 310, it will be clear that the cap 322 is first rotated to "unscrew" flanges 328 and 330 from threads 318, and then the side wall 326 is squeezed in the same manner as hereinabove described to move flanges 328 and 330 apart sufficiently to clear rim 316. In replacing the cap 322 on the bottle 310, the procedure may be simply reversed or the flanges 328 and 330 may simply be snapped over the rounded upper surface 317 of shoulder 316. It will be at once recognized that the form of the invention illustrated in Fig. 7 is ideally suited for use with existing containers provided with threads and a rim substantially comparable to threads 318 and rim 316 just described. An additional advantage of the embodiment of Fig. 7 will be perceived to reside in the fact that, although the engagement of flanges 328 and 330 with threads 318 can be utilized to screw the cap 322 tightly upon bottle 310 for sealing open top 320 by means of gasket 34, the cap 322 may be completely removed merely by initially squeezing the side wall 326 in the manner described and, similarly, the cap 322 can be quickly replaced by squeezing the side wall 326 and pressing the cap 322 upon the bottle 310 so far as same will go and then rotating the cap 322 as may be necessary to further tighten the same to the desired degree.

It will now be apparent that this invention is well adapted for accomplishing all of the objects set forth above by means of structure which is positive in operation, simple in construction and economical to manufacture. It will be readily appreciated that many minor changes, variations and modifications could be made from the exact structures disclosed for illustrative purposes without departing from the true spirit and intention of the invention. Accordingly, it is to be understood that the invention shall be deemed limited only within the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. Packaging structure comprising a container having

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a substantially cylindrical portion open at one extremity thereof and provided with an external, annular shoulder thereon, a part of said portion being provided with external threads; and a cap of resilient material threadably mounted on said threads of the portion, said cap having a tubular side wall, an end wall closing one extremity of the side wall and a pair of opposed, intumed flanges on the other extremity of the side wall, the distance between said flanges being less than the outer diameter of the shoulder when the cap is in its normal configuration, said cap being distortable from said normal configuration upon application of a squeezing force thereto to a temporary configuration disposing said flanges in positions spaced from each other a distance greater than said diameter of the shoulder, whereby the cap may be removed from closing disposition upon the container by the application of said force and rotation of the cap relative to the portion.

2. In the structure as set forth in claim 1, wherein said flanges are adapted to intermesh with said threads, and said shoulder is disposed on said portion between said threads and said one extremity of the portion.

3. In the structure as set forth in claim 1, wherein said threads on the portion are between said shoulder and said one extremity, and said cap is provided with internal threads thereon between said flanges and said end wall adapted to intermesh with said threads on the portion.

4. In the structure as set forth in claim 3, wherein said shoulder is spaced from said threads on the portion a predetermined distance such that said flanges abut against the shoulder oppositely to said threads on the portion when the cap is screwed to one limit of its extent of travel on the bottle disposing the cap in closing relationship to said one extremity of the portion.

5. In the structure as set forth in claim 3, wherein said flanges are spaced from said threads on the cap a distance at least equal to the distance between the extremity of said threads on said portion nearest said one extremity of the latter and the extremity of said shoulder furthest from said one extremity of said portion.

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