July 16, 1968 D. W. DONOVAN 3,392,871

CONTAINER WITH OPENING MEANS

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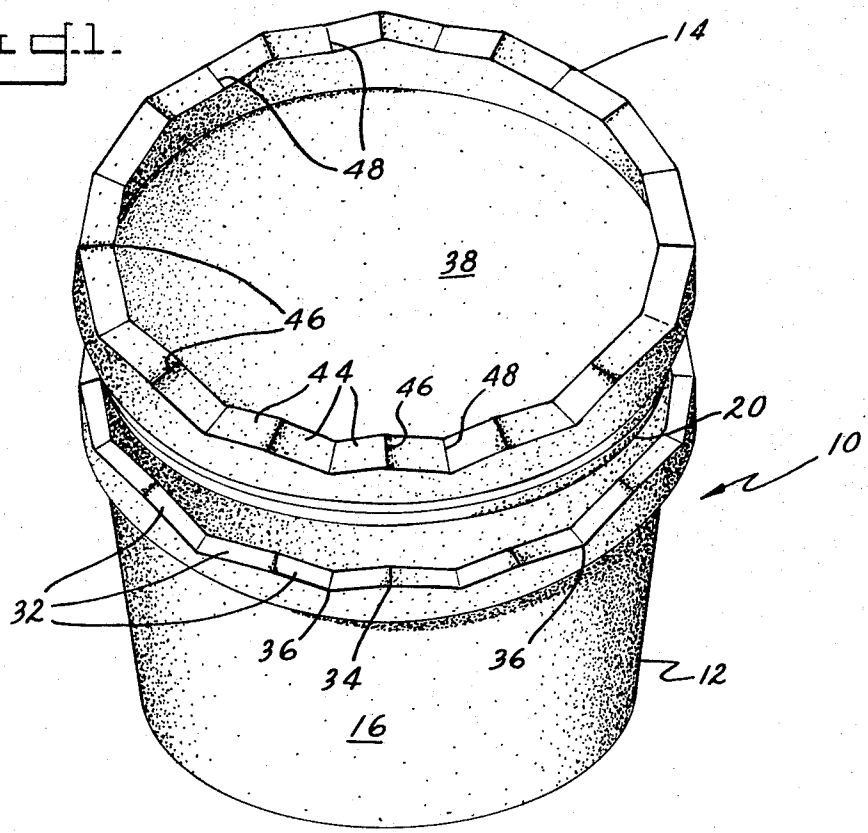
Fig. 1.



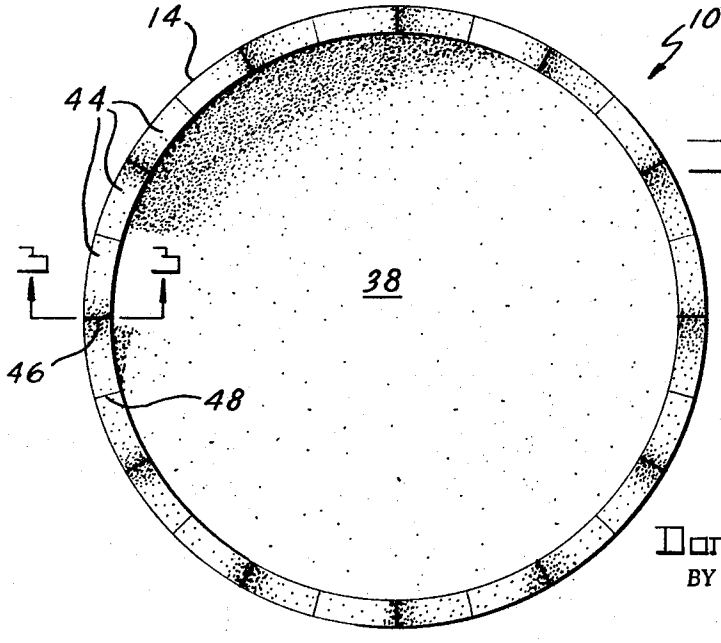


Fig. 2.

INVENTOR.
Donald W. Donovan
BY Robert J. Doherty
Attorney

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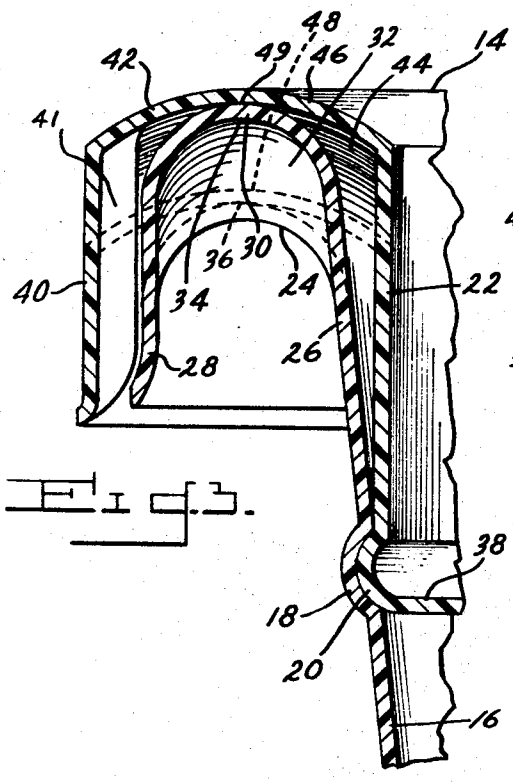

Fig. 3.

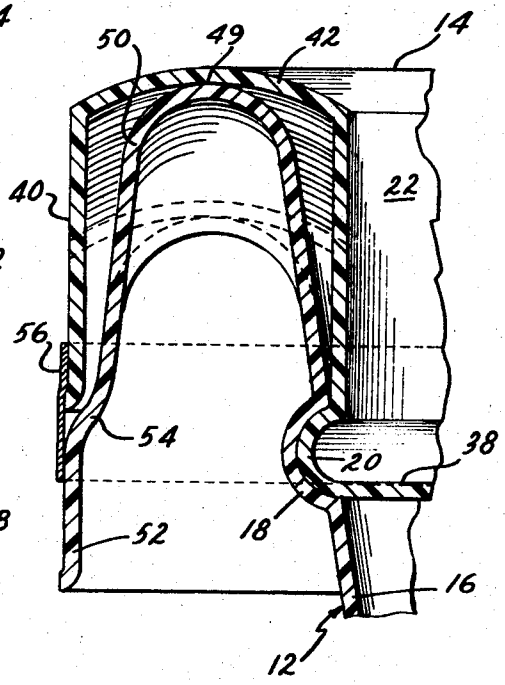

Fig. 4.

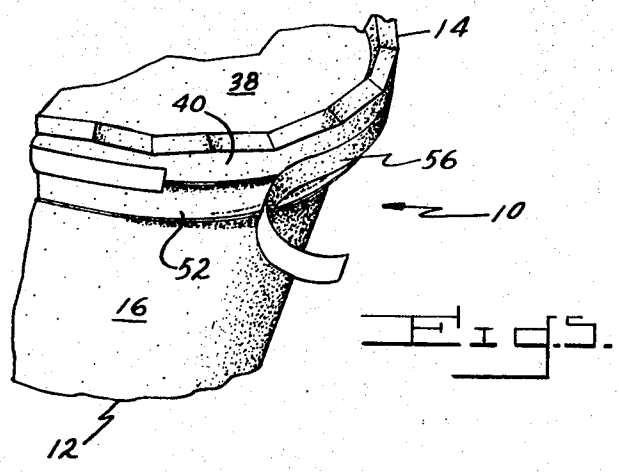

Fig. 5.

INVENTOR.
Donald W. Donovan
BY Robert J. Doherty
Attorney

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3,392,871

CONTAINER WITH OPENING MEANS

Donald W. Donovan, Glastonbury, Conn., assignor to Monsanto Company, St. Louis, Mo., a corporation of Delaware

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7 Claims. (Cl. 220—47)

ABSTRACT OF THE DISCLOSURE

This invention relates to a package comprising a container having an open end and a closure for sealing fitment thereinto, wherein the upper peripheral portions and the container rim are provided with a plurality of interconnected inclined planes for camming engagement with a similarly shaped series of inclined planes formed on the underside of the closure adapted to overlay said container rim portions so that a partial twisting of the closure relative to the container forces the closure upwardly into an open position.

Background of the invention

This invention relates in general to a package consisting of a container and a closure therefor, and more particularly relates to a container and closure member which sealingly engage each other in a manner so as to provide a seal therebetween, wherein particular means are provided whereby the closure may be longitudinally removed from the container for ease in access to the contents contained therein.

Containers of this general type are known and commonly include a container member having an internal groove adjacent the top opening thereof which is engaged by a portion of a lid or closure member so that the container and closure member are in sealing engagement with each other in the vicinity of this groove. Opening of such a commonly constructed container commonly presents problems in that it is easily possible to force such aforementioned holding means into tighter locking engagement while attempting to disengage the closure from the side wall of the container. Such is possible in those cases wherein a closure is canted or misaligned in regard to the open end of the container or wherein one attempts to pry open a portion of the closure rim in an area wherein the force of holding means is unequally distributed or in overly tight engagement.

Other containers of the aforementioned general structure are known wherein no positive holding means are provided between the closure member and the container portion thereof. In such constructions, it is quite easy and undesirable from the merchandising standpoint, especially when the containers are utilized in packaging foodstuff materials, that a prospective purchaser may easily pry up or otherwise uncover a segment or portion of the closure from the container to view the contents contained therewithin. It should also be understood that even packages provided with positive sealing or locking means are often undesirably subject to covert inspection.

It is thus desirable in prior art devices of this general type to provide means by which the ultimate consumer can readily, by observing the package, be able to determine quickly whether or not the closure has been previously opened or removed from its container. A desirable way and assuring such a speedy observation is by the provision of a tearable strip of material provided across the interface of the closure and container at a convenient and observable location. Thus, continuous or discontinuous applications of rupturable members have been provided, as may be evidenced by the use of the shrink-fit application of a tear strip around annular surfaces of packages to be so protected. Such a plastic strip may or may not be provided with a weakened portion to facilitate its removal in gaining access to the closure portion of the package so as to lift such from the container. The problem, however, associated with the use of such a tear-strip means with known container constructions is these constructions fail to present transition portions between the closure and container body whereupon such a tear strip may be applied with ease and mechanical certainty and also be readily observable.

Summary of the invention

It is thus the object of the present invention to overcome the above elicited shortcomings of prior art constructions and to present a novel package construction wherein the closure portion thereof may be more readily removed from the container under desirable opening conditions and alternatively difficult to remove under less than desirable opening conditions.

It is a further object of the invention to provide a package comprising a container and closure therefor wherein it is inconvenient and/or difficult to expose the contents of the container by solely lifting a portion or segment of the cover rather than removing the closure entirely.

It is still a further object of the present invention to provide a package comprising a container and closure therefor wherein the closure may be readily removed therefrom under desirable opening conditions and wherein provision is made for centrally orientating the closure within the periphery of the container so as to prevent the undesirable canting or wedging of such during opening procedures whereby the closure is lifted from the open end of the container.

These and other advantages of the present invention over those of the prior art are the final objects of this invention and are accomplished by the provision of a package comprising a container and closure therefor wherein the upper peripheral surfaces of the container are provided with a series of interconnected inclined surfaces formed on the under surface of the overlying portions of the container closure whereby a relative twisting of the closure in regard to the container will cammingly engage the interposed surfaces thereof so as to alternatively move the closure axially towards and away from the open end of the container. In this manner, then, the present invention presents a package of an easily formable structure which overcomes the above indicated disadvantages of prior art devices as well as presenting a package of readily discernible and straight-forward operation.

Various other objects, features and advantages of the invention will appear from a consideration of the following drawings and written description.

Description of the drawings

In the drawings and in the accompanying description, preferred embodiments of the present invention are shown and described but it is understood that the drawings and accompanying description are of the purpose of illustration and do not limit the invention as defined by the appended claims.

In the drawings, FIGURE 1 is a perspective view of the package of the present invention showing the closure and container thereof in partially exploded open position,

FIGURE 2 is a plan view thereof,

FIGURE 3 is a cross-sectional view taken along the line 3—3 of FIGURE 2 and shows in particular the relationship between the closure and the container open end,

FIGURE 4 is a container and closure construction similar to that shown in FIGURES 1–3 wherein a lower

wall portion of the container lip has been outwardly extended so as to adjoin an outwardly extending portion the outer closure wall so as to present surfaces for the attachment of a tear-strip as shown, and

FIGURE 5 is a partial perspective view of a portion of the container modification shown in FIGURE 4 of the drawings wherein the tear-strip has been partially moved therefrom.

Description of the preferred embodiments

Referring to the drawings and more particularly to FIGURE 1 thereof, a package **10** comprising a container **12** and a lid or a closure **14** are shown in partially assembled relation. The container comprises a generally cylindrical member having a bottom wall (not shown), upwardly tapered sidewalls **16** which sidewalls terminate in an open end of the container. The sidewalls **16** of the container are further provided with an annular groove **18** adapted for receipt of a circumferential bead **20** outwardly extending from the inner sidewall **22** of closure **14**. The sidewalls **16** upwardly terminate in a reverse curved lip portion **24**. This lip portion **24** is generally of an inverted U-shape and comprises an inner wall portion **26** and an outer wall portion **28** spaced therefrom and connected thereto by a connecting wall portion **30**.

As best shown in FIGURES 2 and 3 of the drawings, the top of the container lip portion **24** is shaped so as to define a series of interconnected upwardly orientated inclined surfaces **32** which serve to form a proportionate number of alternating peaks **34** and troughs **36**.

The closure **14** is in turn provided with a base wall **38** and an outer closure sidewall **40** spaced from the previously recited inner sidewall **22**. Also, as shown in FIGURE 3, the outer closure sidewall may be provided with inwardly recessed decorative flutes which further serve to orientate the closure **14** to the container lip **24**. A connecting wall **42** serves to join the inner and outer walls **22**, and **40** respectively. Connecting wall **42** is further defined so as to exhibit a series of interconnected downwardly orientated inclined surfaces **44** to respectively terminate in alternating peaks **46** and troughs **48**.

The relationship between the downwardly orientated inclined surfaces **44** of the closure and the upwardly orientated inclined surfaces **32** of the container is best brought out by reference to FIGURE 3 of the drawings. Referring thereto, it should be brought out at this time that due to the difference in curvature of the connecting walls **42** and **30** of the closure and container respectively that the inclined surfaces **32** and **44** are substantially in low frictional line contact with each other as indicated by reference numeral **49**. Such line contact between the inclined surfaces **32**, **44** assures a minimum effort for twist moving the closure axially relative to the container for opening or removing the same therefrom. This relative twisting motion of the closure in regard to the container cammingly engages the opposed inclined surfaces **32** and **44** so as to force the closure to ride longitudinally upward and simultaneously out of holding engagement therebetween brought about by the cooperating engagement of the bead **20** within the groove **18**. It has been found that with materials commonly utilized, e.g. a container portion formed of a relatively stiff rubber modified styrene (butadiene-styrene) sheet material and a closure portion formed of a biaxially orientated styrene sheet material that trough and peak combinations spaced 30° apart about the periphery of the container is adequate so that a relative turn of the container in regard to the closure of vice versa of only 15° accomplishes the desired opening movement.

It should be noted that opening movement of the container of the present invention preferably requires a generally level base upon which to rest the container while performing such opening operation. Accordingly, under such normal conditions of opening, this twisting is quite facile, and while holding the relative surfaces **32**, **44** in camming engagement that this novel construction of the present container renders it, on the other hand, quite difficult to obtain access to the product contained within the package when attempting to do so under less than desirable or abnormal circumstances such as would be generally found at the point of purchase of such foodstuff and related packaged products. The degree of mating engagement or tightness between the closure and container with this novel construction can be accordingly increased and make it further more difficult to covertly gain access to the product by outwardly prying the closure away from the top lip portion of the container in but one segment thereof. The cooperation of the inclined surfaces with each other further serves to centrally align the closure with regard to the container open end so as to prevent a canting or wedging of the closure within the container open end, the likelihood of such action being increased under an undesirable opening environment when the closure and container fitting tolerances are decreased as above.

It should be pointed out at this time that any holding means may be utilized to secure the closure upon or within the open end wall of the container and is not limited to the specific bead and groove means herein disclosed. Thus, a construction where alternating areas of high and low frictional engagement or other desirable sealing and/or locking engagement of the closure with regard to the open end of the container is brought about may be herein utilized. It is, however, particularly significant that the centering action brought about by the coaction of the inclined surfaces **32** and **44** serves to facilitate the upward longitudinal movement of the closure in regard to the container with all such locking means contemplated.

In those applications where the locking or holding means is omitted or wherein such does not transmit a positive feel to one opening and closing the package, it is particularly desirable to provide the inclined surfaces **32** and **44** with a relatively sharp definition to assure the transmission of such opening and closing feel when a peak of the closure is respectively positioned in engagement with a trough **36** or peak **34** of the container top lip portion. Such a sharp definition further assures a more positive axial motion between the closure and the container whereby the closure tends to sharply ride up and down the surfaces **32**.

Turning now to FIGURE 4 of the drawings in particular, a modification of the invention is therein shown wherein a container lip portion of modified construction presents a first upper wall segment **50**, a second lower wall segment **52** which is offset therefrom and adjacent to a connecting portion **54** which joins the two above aforementioned segments together. The configuration of the overlying portion of the closure is structured so as to present outer sidewall **40** thereof as a generally continuing surface with the lower outwardly offset portion **52** of the container lip. Thus, it should be evident from FIGURE 4 of the drawings that the terminus of the outer wall portion **40** adjoins the connecting portion **54** and is proximate thereto. Thus, a generally continuing surface is presented, interrupted only by the slight spacing between the terminus of the outer sidewall **40** and the interconnecting wall portion **54**.

This generally continuing surface thus not only provides the base upon which a tear strip **56** may be appropriately positioned but further discourages the covert opening of the package by a prospective purchaser. It may be seen that little or no outwardly offset closure portion for access to one's finger is presented and accordingly extreme difficulty is encountered should one attempt to covertly gain access to the contents of the container by prying up one segment of the closure. Accordingly, the container of the present invention is thus particularly adapted for opening under normally desirable cir-

cumstances and to present opening difficulty under normally undesirable circumstances.

The tear strip **56** is preferably formed of resinous film such as polyethylene or polyvinyl chloride may be adapted for the shrink engagement to the outer walls of the closure and container as depicted. The tear strip **56** may further be provided with weakened areas such as by indentation or scoring so as to facilitate the removal of such as partially depicted in FIGURE 5 of the drawings.

It should be understood that modifications and variations may be effected without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:

1. A package comprising a container and a closure therefor, said container having side walls terminating in a lip portion adjacent to and defining an open end thereof, said closure member comprising an end wall adapted to be disposed within said container for closing off the open end thereof, a side wall portion extending upwardly from said end wall and terminating in a reverse curved portion for overlaying said lip portion, said container and closure being further provided with holding means so as to retain said closure within said container open end when said package is in closed position, the top of said container lip portion defining a series of interconnected upwardly orientated inclined surfaces of generally equal slope and exhibiting alternating peaks and troughs, said closure reverse curved portion defining a series of interconnected downwardly orientated inclined surfaces of generally equal slope and exhibiting alternating peaks and troughs, said first and second named inclined surfaces being in interposed relative positions to each other when said package is in a closed position and whereby relative rotation of the closure to the container cammingly engages said inclined surfaces with each other so as to free said holding means while upwardly moving said closure relative to said container from an initial closed position to an open position at the upper extent of said relative movement.

2. The structure as set forth in claim **1** wherein said container lip portion is of a reverse curved configuration presenting a downwardly orientated outer wall portion having a first upper wall segment and a second lower wall segment outwardly offset from said first wall segment adjacent their connecting portion and wherein said closure reverse curved portion which overlays said container lip portion presents a downwardly orientated outer wall portion terminating proximate to said second wall segment and adjacent said connecting portion.

3. The structure as set forth in claim **1** wherein said container lip portion is of a reverse curved generally inverted U-shaped configuration presenting a downwardly orientated outer wall portion having a first upper wall segment and a second lower wall segment outwardly offset from said first wall segment adjacent their connecting portion and wherein said closure reverse curved portion which overlays said container lip portion presents a downwardly orientated outer wall portion terminating in adjoining spaced relationship to said second wall segment and adjacent said connecting portion and a tear strip attached to and spanning the juncture of said second wall segment and said closure outer wall portion.

4. The structure as set forth in claim **1** wherein said series of trough and peak combinations are spaced 30° apart about the periphery of said container lip portion and said closure reverse curved portion.

5. The structure as set forth in claim **1** wherein said container lip portion is of a reverse curved generally inverted U-shaped configuration and wherein said closure reverse curved portion which overlays the base connecting wall portion of said U-shaped configuration is also of a generally inverted U-shaped configuration and presents a connecting wall surface of a slope flatter than that of the connecting wall portion of said container lip portion, said first and second inclined surfaces thus being substantially in low frictional circumferential line contact engagement with each other.

6. The structure as set forth in claim **2** wherein said first and second inclined surfaces are substantially in low frictional circumferential line contact engagement with each other.

7. The structure as set forth in claim **1** wherein the series of interconnected inclined surfaces are spaced in 30° intervals about their respective portions.

References Cited

UNITED STATES PATENTS

3,231,078	1/1966	Balocca et al.	220—47 XR
3,335,901	8/1967	Edwards	220—60
3,351,227	11/1967	Collie	220—60

THERON E. CONDON, *Primary Examiner.*

G. T. HALL, *Assistant Examiner.*