

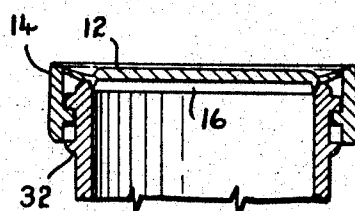
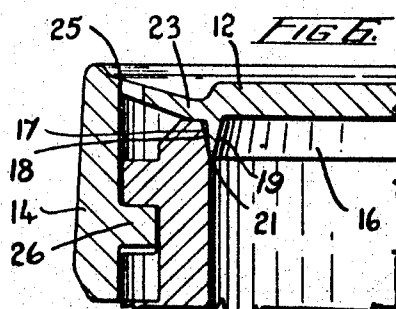
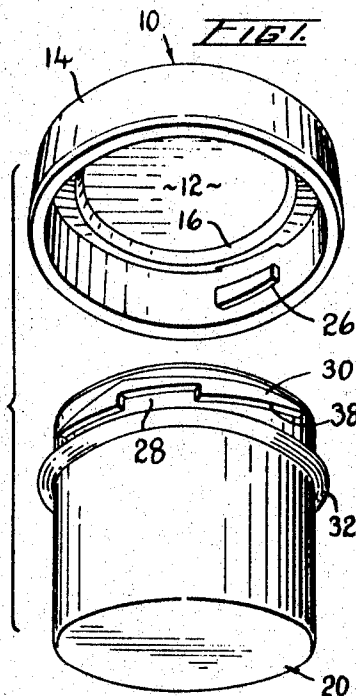
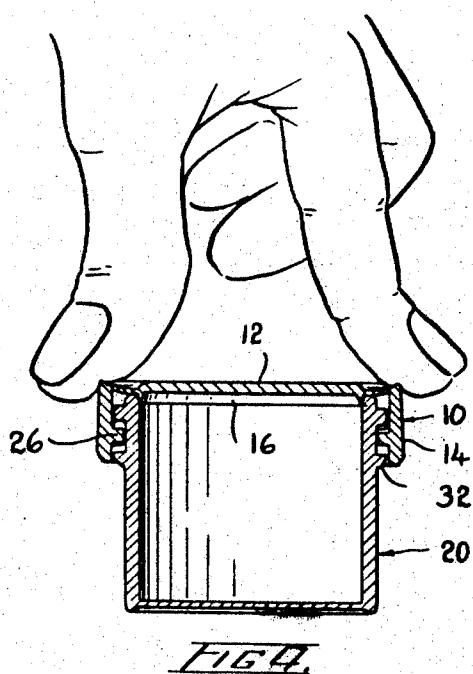
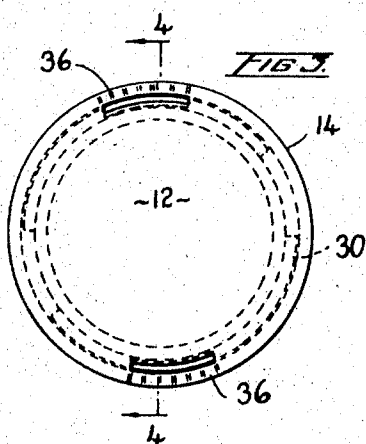
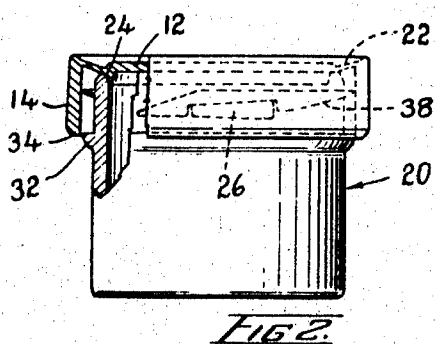
April 1, 1969

B. WEIGAND
SAFETY CLOSURE

3,435,975

Filed Oct. 30, 1967

Sheet 1 of 2



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Sheet 2 of 2

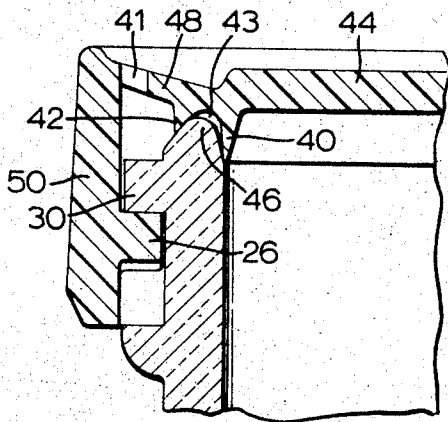


FIG. 7

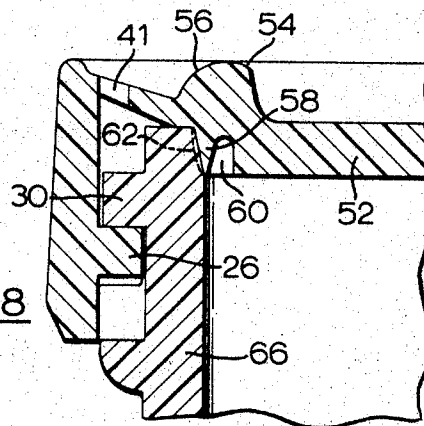


FIG. 8

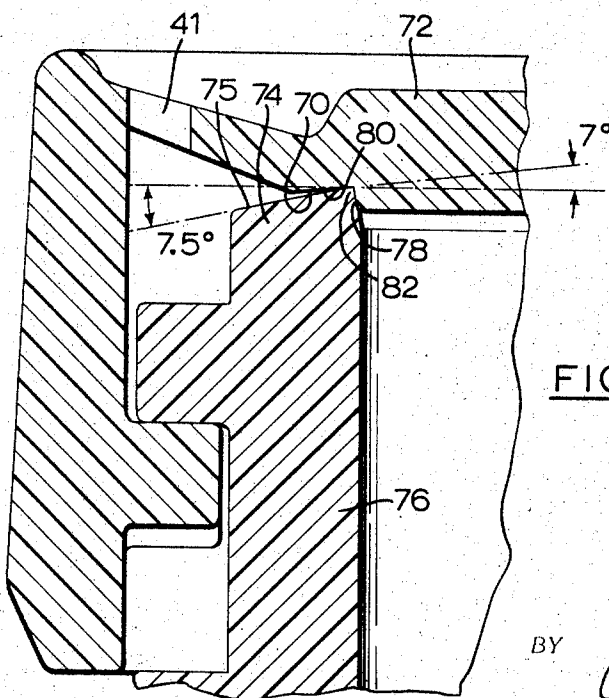


FIG. 9

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SAFETY CLOSURE

Bruno Weigand, Scarborough, Ontario, Canada, assignor to Tamper-Proof-Tops Industries Ltd., Toronto, Ontario, Canada, a corporation of Canada
Continuation-in-part of application Ser. No. 560,537, June 27, 1966. This application Oct. 30, 1967, Ser. No. 679,074

Int. Cl. B65d 41/06, 53/02; A61j 1/00

U.S. Cl. 215—9

10 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a safety closure for use with a container which consists of a rigid circular member having a peripheral skirt connected to the circular member by a flexible annular band. The skirt and annular band are adapted to extend radially beyond the abutting surfaces of the rigid circular member and container neck to permit the skirt to be displaced relative to the circular member about the abutting surfaces for disengagement of lugs carried by the skirt from recesses formed in the container neck prior to unscrewing of the closure.

Cross reference to related applications

This application is a continuation-in-part of application Ser. No. 560,537, filed June 27, 1966.

Background of the invention

This invention relates to safety closures and in particular is directed to closures for use with containers for medicinal, poisonous or harmful substances.

At present, it is usual practice to package medicines, such as aspirins or prescription pills, in glass bottles having a standard screw thread and a standard cap for sealing the bottle. These containers, however, suffer from the disadvantage of being easily opened and, should they happen to contain harmful substances, serious injury or even death could occur if the contents should be consumed without proper supervision when in the hands of a youngster who could without too much difficulty remove the standard cap. Many substances of this nature must also be stored in a vapour-tight container, and it is therefore standard practice at the moment to use a cap lined with a resilient material which is compressed when the top is tightly screwed on, to provide the necessary vapour seal.

There is a need, therefore, for a vapour-tight container closure having a locking mechanism designed to be opened by an adult, but to foil the efforts of a child to remove the top and thereby gain access to its contents.

Summary of the invention

I have discovered a novel container closure comprising a circular member having means formed on one side for tight-fitting abutment with a rim surface of a container opening, a peripheral skirt having locking means for engagement with said container, and a flexible annular band formed integral with the periphery of the circular member and extending radially outwardly from the circular member beyond the rim surface abutment means joined to the peripheral skirt, whereby disengagement of the locking means can be effected by displacement of the skirt relative to the circular member by flexure of the annular band about the container rim surface prior to rotation of the closure relative to the container.

It is therefore a principal object of the present invention to provide a container closure which can be readily opened by an adult but opened with difficulty by a child.

It is another object of the present invention to provide

a container closure adapted for use as a vapour seal and which eliminates the need for the insertion of any ancillary resilient material as a cap liner for sealing of a container.

And another object of the invention is the provision of a container closure which is simple and sturdy in construction and inexpensive to manufacture.

Brief description of the drawings

A further understanding of the invention may be gained by reference to the accompanying drawings, in which:

FIGURE 1 is a perspective view of an axially separated cap and container illustrating an embodiment of the present invention;

FIGURE 2 is an elevation, partly cut away, illustrating the cap and container shown in FIGURE 1 in their closed and locked relationship;

FIGURE 3 is a top view of the closure of the present invention;

FIGURE 4 is a sectional view on line 4—4 of FIGURE 3 illustrating the procedure for removal of the cap;

FIGURE 5 is a sectional view illustrating the container closure in locked position;

FIGURE 6 is an enlarged view of a portion of the section shown in FIGURE 5 illustrating the sealing abutment of the closure with the container in more detail.

FIGURE 7 is an enlarged view of a section of another embodiment of the closure of the present invention;

FIGURE 8 is an enlarged view of a section of a further embodiment of the closure of the invention; and

FIGURE 9 is an enlarged view of a still further embodiment of the closure of the invention.

Like reference characters refer to like parts throughout the description of the drawings.

With particular reference to FIGURES 1 and 2, the embodiment of the invention illustrated therein comprises a cap generally designated by the numeral 10 formed of a plastic material such as polypropylene, having a circular member 12 and a depending peripheral skirt 14. Extending from circular member 12 is a peripheral ridge 16 formed integral on one side thereof and adapted for tight fitting abutment with inner surfaces 18 of rim 24 of container 20 to provide a vapour seal therewith. While the outer circumferential surface 17 of the ridge 16 preferably is substantially normal to the plane of circular member 12, or may be slightly convex outwardly, the inner circumferential surface 19 of ridge 16 tapers, preferably at an angle of about 20 degrees from the normal to the plane of circular member 12, to intersect surface 17 to form edge 21. Inner surface 18 of rim 24 is bevelled outwardly at its extremity, preferably at an angle of about 10 degrees from the normal to the plane of the rim, to facilitate insertion of the ridge 16 into the mouth of the container and to provide a seat for the said ridge.

Skirt 14 is flexibly appended to circular member 12 by annular band 22 of reduced thickness to permit lateral displacement of skirt 14 relative to the plane of circular member 12, which is axial movement relative to the axis of container 20, as it pivots about the rim 24 of container 20. Annular band 22 is preferably inclined at an angle of about 30 degrees to the plane of circular member 12, in a direction away from container 20, to provide the proper amount of tension to maintain cap 10 in locked engagement with container 20 when in its operative position. As can be seen most clearly in FIGURE 6, band 22 may be reduced in thickness from point 23 to point 25 for the desired flexibility, a thickness of about 0.020 inch at point 23, reducing to 0.010 inch at point 25, proving satisfactory for most applications.

Diametrically opposed lugs 26 formed on the inside of skirt 14 are adapted for locking engagement within recesses 28 of climbing cams 30 formed on opposite sides

of the neck of the container. Openings 41 formed in band 22 coextensive with lugs 26 result from the moulding process, which is well known in the art. Said openings do not interfere with the utility of the invention as will become evident as the description proceeds. Ring 32 continuously formed around the circumference of container 20 is positioned to closely underlie rim 34 of skirt 14 to thwart the efforts of a child to pry or otherwise remove the cap by the insertion of a finger or an object under said rim 34.

Grooves 36 preferably are formed in the periphery of skirt 14 opposite each lug 26 to provide a finger grip for facilitating the removal of the safety cap, as illustrated in FIGURE 4.

In use, a user applies the cap to the container in precisely the same manner as applying a standard screw cap to a container having a standard thread. As shown in FIGURES 2, 5 and 6, when the cap is being applied to the container, lugs 26 formed on the cap skirt 14 engage climbing cams 30 formed on the container neck at about point 38, and as the cap is turned in a clockwise direction, relative to the container, cams 30 cause flexing of band 22 until lugs 26 become aligned with recesses 28 in climbing cams 30 at which point the resilient band 22 snaps the lugs into the said recesses thereby locking the cap in its closed position. As the cap is drawn into engagement with the container, edge 21 of ridge 16 or the outer side of said ridge if the outer side is convex will abut bevelled rim surface 18, forming a vapour-tight seal therebetween.

To remove the cap, as shown most clearly in FIGURE 4, it is necessary to grip the cap between thumb and forefinger at the positions designated by numeral 36, i.e. at the extreme periphery of the cap. Depression of skirt 14 at positions 36, i.e. axial displacement of the skirt towards the container, will flex band 22 about rim 24 of the container and thereby displace lugs 26 out of engagement with the shoulders formed by recesses 28 in climbing cam 30, permitting counter-clockwise turning of the cap for its removal.

FIGURE 7 illustrates an embodiment of the invention for use with vacuum sealed products wherein a pair of spaced, annular ridges 40, 42 are formed on the enclosed side of circular member 44. The rounded rim 46 of a glass container is received between ridges 40, 42 in tight-fitting abutment defining annular space 43 when the closure is twisted into its locked operative position as has been discussed hereinabove with reference to the embodiment of FIGURES 1-6.

In use, the contents of the container are heated after the closure has been locked in place and the increase in pressure within the space defined by the container with closure causes member 44 to move axially away from the container by the flexure of band 48, permitting air and steam to escape around skirt 50. Upon subsequent cooling of contents of the container and the provision of a partial vacuum therein, ridges 40, 42 reseal on rim 46 and effectively prevent the entry of air into the container. It will be evident that annular space 43 will likewise be under a partial vacuum to snug both ridges 40, 42 against rim 46 notwithstanding the partial vacuum within the container.

FIGURE 8 illustrates an embodiment of the invention wherein the plane of the central portion 52 of circular member 54 is offset laterally from the plane of the periphery 56 of member 54. An annular rib 58 is formed in member 54 by the formation of an annular recess 60, rib 58 preferably being convex outwardly as indicated by the broken line 62, to provide an effective vapour-seal with the inner bevelled surface 64 of neck 66 of a container.

FIGURE 9 illustrates another embodiment of the invention wherein an annular recess 70 formed on the enclosed side of circular member 72 is adapted to receive the bevelled rim 74 of container 76 in tight-fitting abutment when the cap is in its locked operative position. In

this embodiment recess 70 is generally V-shaped in cross-section having surface 78 substantially normal to the plane of member 72 and surface 80 at an angle of about 7° to the plane of member 72. Surface 75 of rim 74 of container 76 is bevelled at an angle of about 7.5° from the normal to the container wall such that abutment of the rim against the closure by insertion of rim edge 82 into recess 70 results in continuous sealing contact of the closure with the container rim.

Apart from the sealing means, the embodiments shown in FIGURES 7-9 function generally in the manner described above with reference to FIGURES 1-6.

It will be understood, of course, that modifications can be made in the preferred embodiment of the present invention as described hereinabove without departing from the scope and purview of the appended claims.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. A container closure comprising a circular member having means formed on one side for tight-fitting abutment with a rim surface of a container opening, a peripheral skirt having locking means for engagement with said container, and a flexible annular band formed integral with the periphery of the circular member and extending radially outwardly from the circular member beyond the rim surface abutment means joined to the peripheral skirt, whereby disengagement of the locking means can be effected by displacement of the skirt relative to the circular member by flexure of the annular band about the container rim surface prior to rotation of the closure relative to the container.

2. In a container closure as claimed in claim 1, said means for tight-fitting abutment with a rim surface of the container comprising an annular ridge.

3. In a container closure as claimed in claim 1, said means for tight-fitting abutment with a rim surface of the container comprising an annular recess adapted to receive a portion of the rim surface therein.

4. A container closure as claimed in claim 1 in which said annular band is diagonal to the plane of the circular member.

5. A container closure as claimed in claim 1 in which the peripheral skirt is thick and rigid relative to the flexible annular band.

6. A container closure as claimed in claim 5 in which said skirt locking means comprises a pair of diametrically opposed lugs formed on the inner surface of the skirt for engagement with recesses in a pair of climbing cams formed on the container.

7. In combination, a container having a cylindrical opening defining an annular rim surface, a pair of diametrically opposed climbing cams having recesses formed on the container in proximity to said opening, a container closure comprising a circular member having means formed on one side for tight-fitting abutment with the rim surface of the container opening, a peripheral skirt having a pair of diametrically opposed lugs formed on its inner surface adapted to engage said cam recesses, and a flexible annular band formed integral with the periphery of the circular member and extending radially outwardly from the circular member beyond rim surface abutment means to be joined to the peripheral skirt, whereby disengagement of lugs from the cam recesses can be effected by displacement of the skirt relative to the circular member by flexure of the annular band about the container rim surface prior to rotation of the closure relative to the container.

8. In a container closure as claimed in claim 7, said means for tight-fitting abutment with a rim surface of the container comprising an annular ridge.

9. In a container closure as claimed in claim 7, said means for tight-fitting abutment with a rim surface of the container comprising an annular recess adapted to receive a portion of the rim surface therein.

10. In a container and closure combination as claimed in claim 7, a circumferential ring formed on the con-

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tainer adjacent the cams for preventing forcible removal
of the container closure.

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GEORGE T. HALL, *Primary Examiner.*

U.S. Cl. X.R.

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