

Feb. 6, 1962

E. H. E. THORNTON

3,019,931

RECEPTACLES WITH POSITIVE LOCKING CLOSURES

Filed Dec. 3, 1959.

3 Sheets-Sheet 1

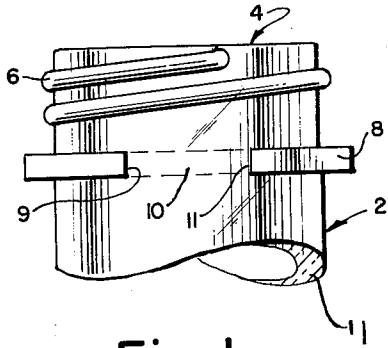


Fig. 1

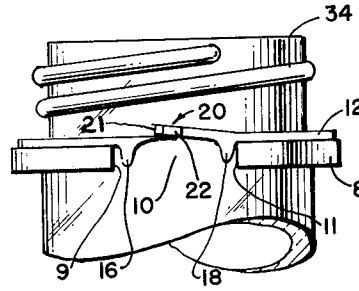


Fig. 2

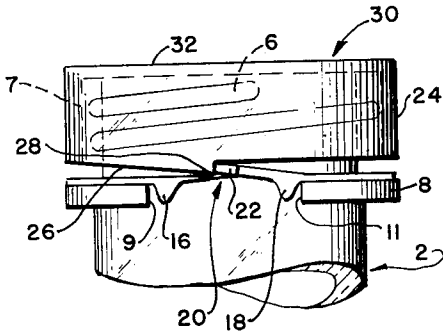


Fig. 3

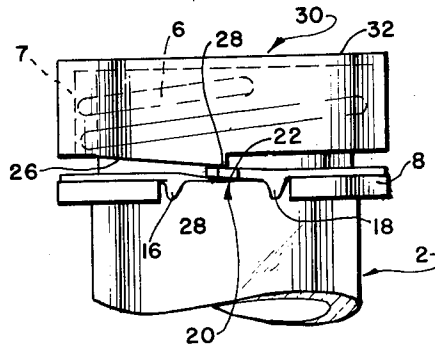


Fig. 4

INVENTOR

ELBERT H. E. THORNTON

BY

Samuel J. Davidson

ATTORNEY

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E. H. E. THORNTON

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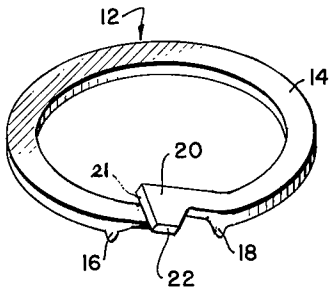


Fig. 5

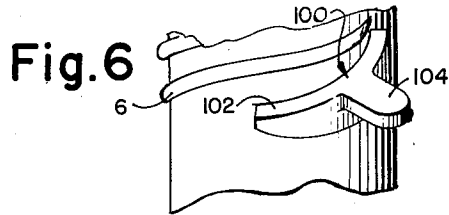


Fig. 6

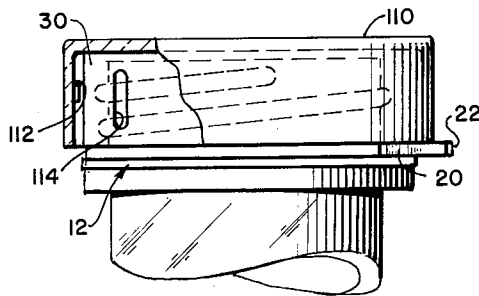


Fig. 9

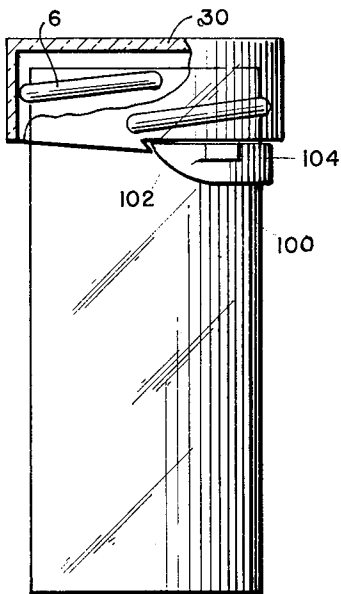


Fig. 7

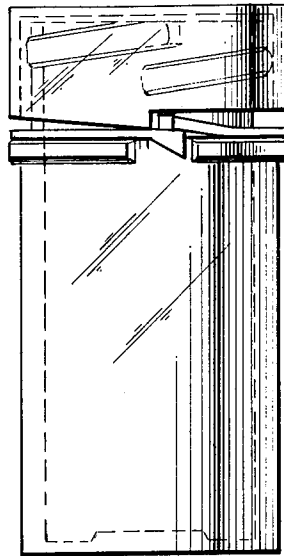


Fig. 8

INVENTOR

ELBERT H. E. THORNTON

BY

Samuel A. Davidson

ATTORNEY

Feb. 6, 1962

E. H. E. THORNTON

3,019,931

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Fig. 12

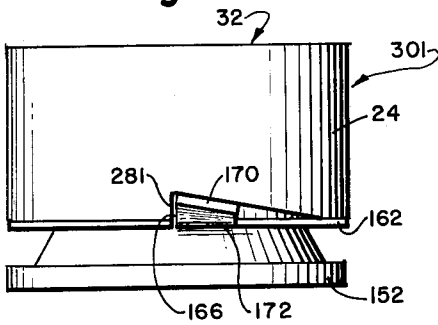


Fig. 11

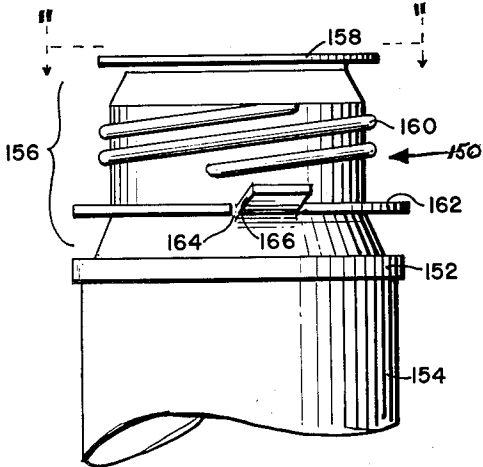
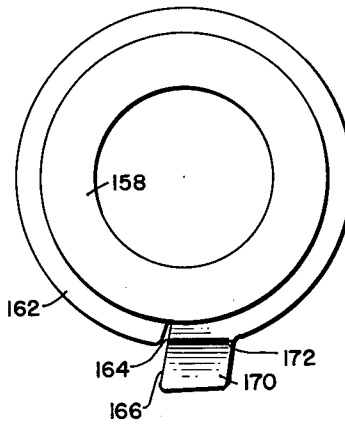


Fig. 10

INVENTOR

ELBERT H. E. THORNTON

BY *Samuel A. Davidson*

ATTORNEY

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3,019,931

RECEPTACLES WITH POSITIVE LOCKING CLOSURES

Elbert H. E. Thornton, 5000 N. Dotsy Ave., Odessa, Tex.
Filed Dec. 3, 1959, Ser. No. 857,017
16 Claims. (Cl. 215-9)

This invention relates to improvements in containers provided with detachable closures wherein the containers and closures are so constructed that they carry cooperating means whereby the closures can be securely affixed to the containers so as to form sealed receptacles.

Such class of containers is commonly used for medications and other dangerous materials such as poisons so that it becomes highly desirable to provide some means to prevent removal of the closure from the container, by unauthorized persons such as small children. This factor has previously been recognized by various persons as is evident from a review of prior patents. However, notwithstanding the considerable volume of prior art on the subject, and the fact that much time has been devoted to finding a satisfactory solution to the problem, no suggestion has heretofore been presented which is completely practical.

Prior patentees have provided safety receptacles in which trick screw arrangements are used, and/or arrangements in which the expense of fabrication is excessive due to the exactness of dimension required for proper operation. A review of the art discloses three broad types of safety closure arrangements for use with containers of the class to which the present invention relates.

The first type includes devices wherein the means for securing the closure to the container is constructed with a maze of stops so that rotation of the closure to various degrees and in reversing directions is required to uncouple the closure from the container. Designs of this type provide no positive lock, and are expensive to fabricate.

The second type of structure suggested by the prior art includes devices where cooperating threads or other securing means on the closure and container are modified to provide for locking. Structures of this type are also expensive to fabricate. Moreover, they do not provide for tight sealing engagement between closure and container and/or do not provide for positive locking engagement between closure and container.

The third general type of safety closure heretofore contemplated incorporates two connected shell elements which can be brought into engagement when removal of the closure from the container is to be effected. This type of structure is particularly expensive to fabricate and requires considerable manipulation ability to effect removal of the closure. Also, no positive locking is achieved with this type.

The types of closures heretofore suggested were expensive to fabricate because new equipment, such as molds, had to be specially constructed to produce the article, and new and special assembly techniques had to be developed. Mold adaptations were not simple, but were complex due to the necessity of providing exact and complicated cavities. Moreover, not one of the prior art units provided a positive locking arrangement nor did they in many instances allow for a tight seal between the closure and the container.

Accordingly, a primary object of the present invention is to provide a new type of safety receptacle which can be easily produced with existing equipment and which requires no assembly developments.

Further objects of the present invention are (1) to provide a safety receptacle wherein a positive lock is produced between the container and closure, and (2) to provide a safety receptacle in accordance with the above ob-

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jects wherein a tight seal between container and closure can at all times be maintained.

Yet another object of this invention is to provide a safety receptacle in accordance with the objects previously set forth which receptacle can be assembled in most part from existing components with only slight modification thereto, or which can be fabricated as two new component structures adapted to cooperate with one another.

A still further important object of this invention is to provide a safety receptacle having a positive lock arrangement which can be easily applied to plastic spouts, plastic blow bottles, and/or other types of plastic container components now being widely produced by manufacturers in the plastics industry. In accordance with this object, a more specific object of the invention is to provide such a positive locking arrangement having components which can be easily molded with the other plastic components of the containing means to which the invention is applied.

From the foregoing objects of the invention, it should be apparent that a still further important object of the invention is not only to provide a safety receptacle having a positive locking means, which receptacle can be easily assembled from only slightly modified existing container components, but also to provide a safety receptacle which can be easily molded by known techniques with only slight modification to existing molding equipment.

More specifically, an important object of the present invention is to provide a safety receptacle wherein a wedge means or wedging abutment operable externally of the container is provided, and wherein notch means or another abutment carried by the closure cooperates with the wedge means or wedging abutment to prevent removal of the closure from the container unless the wedge means or wedging abutment is operated.

Another, and still further specific object of the invention is to provide a ring which can be utilized with only slightly modified existing containers and closures to accomplish positive locking between the containers and associated closures.

Briefly, and in its simplest aspects, the invention provides a safety receptacle comprising the following combination of elements: (1) a containing means having an open end; (2) stationary wedge means carried by the containing means and spaced from the open end of the containing means; (3) external means for depressing the wedge means; (4) a closure for the containing means having a crown portion and a skirt portion, the skirt portion carrying an abutment adapted to cooperate with the wedge means to prevent removal of the closure from the containing means unless the means for depressing the wedge means is operated; and (5) cooperating means on said container and said skirt portion of said closure for tightening said closure on said container.

The invention will be better understood, and objects other than those specifically recited hereinabove will become apparent, when consideration is given to the following detailed description of the exemplary embodiments of the invention. Such exemplary embodiments are presented in the annexed drawings, wherein:

FIGURE 1 is a side view of the mouth of an ordinary container which has been modified in accordance with the teachings of this invention;

FIGURE 2 presents a side view of the container mouth shown in FIGURE 1 on which a ring constructed according to the invention has been placed;

FIGURE 3 is a side view of the container mouth and the ring shown in FIGURE 2, but further presenting a closure constructed according to the invention in locked position on the container;

FIGURE 4 is similar to FIGURE 3, but shows the closure of FIGURE 3 in the position assumed immediately prior to locking;

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FIGURE 5 is a perspective view of the ring shown in FIGURES 2, 3 and 4;

FIGURE 6 presents a side view of a container constructed in accordance with the invention wherein the wedge means is integral with the container;

FIGURE 7 is a side view, partially in section, showing a complete receptacle, having the features shown in detail in FIGURE 6;

FIGURE 8 is a side view of a complete receptacle provided by this invention having components which are only slightly modified existing structures;

FIGURE 9 is a side view partially in section presenting a modified embodiment of the invention wherein an outer shell cap is provided for effecting unlocking of the closure;

FIGURE 10 is a side view of a container mouth or spout provided with a wedge means in accordance with the teachings of this invention which wedge means can be molded with the container mouth;

FIGURE 11 is a plan view of the container mouth shown in FIGURE 10, such view being taken on the line 11—11 of FIGURE 10; and

FIGURE 12 is a side view of the container mouth shown in FIGURES 10 and 11 having disposed thereon a closure constructed in accordance with this invention.

By referring now to the drawings, and in particular FIGURE 1, it will be noted that the numeral 2 designates the mouth of a container 1 which has an open end 4, and threads 6 provided adjacent the open end. Disposed below the threads 6 is a bead 8 which extends around the mouth and which has an interruption 10 therein. Although an ordinary screw thread type container mouth has been presented in FIGURE 1, it should be understood that the mating means thereon need not be a spiral thread such as that designated by numeral 6, but may be any type of mating means which will cooperate with an associated closure adapted to be tightened on the container mouth.

According to the preferred embodiment of the invention, a ring 12 is placed over the open end 4 of the mouth 2, and lowered thereover such that the ring 12 rests on bead 8 as shown in FIGURE 2. The ring 12, as best shown in FIGURE 5, comprises a flat body portion 14, two spaced depending legs 16 and 18 projecting below the body portion 14, a wedge portion 20 projecting above the body portion, and an extension or tab 22 coupled with the wedge portion 20 and projecting laterally outward from the body portion.

When the ring 12 is placed on the bead 8, legs 16 and 18 extend into bead interruption 10 and abut the end faces 9 and 11 respectively of the bead.

The ring 12 may be made from any suitable material which has resiliency, such as, for example, metal, rubber or plastic. However, in accordance with the preferred embodiment of the invention, the ring is formed from a plastic material such as, for example, polyethylene which can be easily and cheaply molded.

The particular requirements of the resiliency of the ring 12, and the function served by such ring, will become apparent after consideration is given to FIGURE 3 of the drawings. In FIGURE 3, a closure 30 which as shown is a slightly modified ordinary cap, is screwed onto the mouth 2 of the container. The closure consists of a crown portion 32 and a skirt portion 24 which depends from the crown portion and terminates at edge 26. The edge 26 is formed so as to have a notch or abutment 28 therein. Preferably, the face of notch 28 is beveled at an acute angle with reference to edge 26 so as to cooperate with the bevel on the wedge portion 20. The wedge portion 20 is preferably beveled at the same acute angle with respect to the face of ring 12 as the angle of bevel of notch 28 with respect to edge 26. The notch and wedge faces thus can be placed in abutting relation. However, as will become apparent hereinafter, notch 28 does not always abut the beveled face 21 of wedge 20 when the closure is tightened upon the container.

The phantom lines of FIGURE 3 show the projections

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7 on closure 30 which cooperate with threads 6 carried by the container mouth 2 so that the closure may be screwed onto the mouth. Although an ordinary screw cap construction has been shown, it should be understood that any suitable type of cooperating means on closure and container may be used for tightening the closure on the container without departing from the scope and spirit of the invention. At the same time, it must be remembered that an important feature of the invention is to provide a safety receptacle which can be made in substantial part from only slightly modified existing structures.

Having set forth the elements of the invention, and the exemplary configurations thereof, attention can now be directed to operation of the invention. After the ring 12 has been placed upon bead 8 as shown in FIGURE 2, the closure 30 is placed over the mouth 2 of the container and tightened down upon the mouth. In the construction shown, the closure or cap 30 is screwed down on the mouth of the container, the internal threads 7 on the cap cooperating with the external threads 6 on the container.

As the closure 30 is tightened down on the container, the notch 28 passes over the wedge portion 20 and as a result, the wedge is depressed as shown in FIGURE 4. The interruption in bead 8 allows for such depression. The legs 16 and 18 depending from the ring abut faces 9 and 11 of bead 8 and serve as means to prevent rotation of the ring 12 on the bead 8.

Once the notch 26 has passed over the wedge portion, the wedge portion springs back to its normal position and the closure can be further tightened upon the mouth of the container if necessary so as to effect a tight seal between the underside of the crown portion 32 and the lip 34 of the container mouth. If desired a cushion liner of any well-known type may be placed inside the closure juxtaposed the underside of the crown portion 32 to effect a tight seal.

Once the closure has been tightened upon the container mouth, and the notch 28 has passed over the wedge portion 20 of the ring, the closure is positively locked on the container. It cannot be removed by rotation of the closure, since notch 28 will abut the wedge, and further rotation is prevented. The legs 16 and 18 prevent rotation of the ring, and in turn, through wedge 20 prevent rotation of the closure.

However, if it is desired to remove the closure, tab 22 can be depressed, and this results in depression of the wedge 20. That is to say, the tab 22 serves as means to depress or operate the wedge means so that the notch 28 can pass thereover and the closure can be unscrewed from the container.

As shown in the drawings, the notch 28 in the closure is formed as a sloping projection depending from the terminal edge of the closure. Although such construction is preferred, it should be understood that various shapes of notches may be utilized without departing from the scope and spirit of the invention. The notch, however, must be shaped so as to abut the wedge to prevent removal of the closure unless the wedge means is depressed.

A notch having a flat vertical face abutting a flat vertical face of the wedge portion is one example of a modified shape which may be used. The important factor is that the notch and wedge cooperate to provide a positive lock.

The term "notch" as used in this specification and the appended claims refers to any abutment which cooperates with an associated wedge or abutment to provide for locking. Thus, the notch 28 can be appropriately designated as a first abutment carried by the closure and the wedge means 20 can appropriately be designated as a second abutment carried on or by the container.

Although a primary object of the invention is to provide a locking structure which is easily used on existing structures, it should be apparent from the foregoing discussion that the invention can be applied to a specially

formed container whereby the wedge means, and means for depressing the wedge means, are integral with the container. FIGURE 6 presents a side view of a container so formed.

In FIGURE 6 the cooperating means on container and closure, or threads 6 and 7, are the same as with other figures. The wedge, however, takes the form of a projection 100 extending outward from the body of the container and having a wedge portion 102 and a tab portion 104. The wedge portion is preferably formed as an integral part of the container, however, as will be apparent to ordinary mechanics in the art, any suitable means may be used for attaching the wedge 102 and tab, or means for depressing the wedge 104 to the container. The wedge portion must be free to be depressed, and thus the rear portion only of the projection 100 is rigid with the container. Operation of this embodiment of the invention is the same as with the embodiment of FIGURES 1-4. The closure is positively locked on the container once tightened upon the mouth thereof, until such time as the tab 104 is depressed to depress the wedge portion so that the notch on the cap can be rotated therepast for removal of the closure from the container.

Notwithstanding the fact that only one wedge portion or wedge abutment and cooperating notch or abutment have been presented with each complete receptacle discussed hereinabove, it should be apparent that more than one set of abutments may be provided on any given receptacle. For example, the bead of FIGURES 1-4 can be interrupted in several places, and wedge portions can be provided on the ring above each interruption. One set of legs 16, 13 will suffice to prevent rotation of the ring, however, duplicate sets of legs may be incorporated if desired. An interruption in the bead for each wedge portion is necessary because the wedge portions need be depressable.

Another modification which may be desirable in certain instances is the provision of an outer shell over the closure so arranged that pressure on the outer shell results in depression of any tabs which operate wedges. Such construction is schematically illustrated in FIGURE 9 wherein the outer shell is designated by numeral 110. The terminal edge 111 of the outer shell is so disposed that such edge abuts the tab 22 and thus depression of the shell results in depression of the wedge 20.

The outer shell is coupled to the closure 30 by any suitable means such as lugs 112 which project into vertical recesses 114 in the closure 30. This allows for vertical adjustment of the shell 110, and at the same time provides for tightening of the closure 30 on the container. The particular means used for coupling the outer shell to the closure is not part of the present invention, and it should be understood that the invention only contemplates, according to this modification, the provision of some coupling means which allows for vertical adjustment of the shell, and tightening of closure 30 on the container mouth.

A further modified form of the present invention is shown in FIGURES 10-12. This additional embodiment is particularly adapted for use in connection with plastic pouring spouts and blown plastic containers. For purposes of illustration, a spout adapted to be used on the open end of a tin can is presented in FIGURE 10. However, it should be understood that the instant embodiment may be applied to the mouth of any suitable container.

The spout is generally designated by the numeral 150, and comprises a lower skirt portion 152 adapted to peripherally engage the end of a can 154, a central neck portion 156, and a terminal lip 158. The neck portion 156, as shown, carries threads 160, but as explained hereinabove, any suitable cooperating means may be used on container and closure for tightening the closure

on the container without departing from the scope and spirit of the invention.

The neck portion 156 carries a peripheral bead 162 below the threads 160. This bead is interrupted, as at point 164, and the end 166 thereof is turned up to form a wedge means or abutment. As shown in FIGURE 11, the wedge means or abutment carries a radially extending tab or projection 170 which serves as a means for depressing the wedge means or wedge abutment generally designated by numeral 172.

The bead 162, interruption 164 therein, wedge means 172 and tab 170 may be all formed in a single molding process together with the spout. The bead and wedge means can be integral with the spout along the radius of jointure of the spout with bead and wedge means since tab 170 will depress the wedge means downwardly so as to free the same from engagement with a notch in an associated closure, as will be evident after consideration is given to FIGURE 12.

In FIGURE 12, a closure 301 having a notch 281 in the terminal edge of closure skirt 24 is shown locked on the spout 150. To remove the closure 301, one must depress the tab 170 and thereby the wedge means or abutment 172 so that the notch 281 clears the abutment and the closure can be unscrewed from the spout.

From the foregoing, it should be apparent that operation of the embodiment of FIGURES 10-12 is essentially the same as operation of the other embodiments of the invention. It should also be apparent that if desired, the wedge means 172 and tab 170 alone can be coupled to the spout or container mouth, and the peripheral bead 162 can be eliminated.

In instances where it is found desirable to provide a double thread on the container mouth, two notches, spaced apart by 180°, should be provided on the closure skirt. However, it is only necessary to provide a single wedge means or wedging abutment carried by the container mouth. When a double thread is provided on the container mouth, there are two starting points at which there is initial mating engagement between the threads on the mouth of the container and on the cap or closure. Thus, two notches, spaced 180° apart, should be provided so that one of the notches will cooperate with the single wedge means to positively lock the closure on the container.

Also, in certain instances it may be found desirable to provide multiple notches on the closure, and multiple wedging abutments and associated tabs on the container mouth. In such instances, as suggested above, the structure of FIGURE 9 is particularly suitable since depression of the shell 110, a single operation, results in depression of all tabs and thereby a release of all locks.

From the foregoing discussion it should be apparent that the objects set forth at the outset have been achieved. A positive lock between container and closure has been provided; the closure may be tightened to any desired extent upon the container without interference from the locking means; and the structures are inexpensive to fabricate and may be utilized with only slightly modified existing components, or may be applied to the newer plastic container components by simple molding techniques. Modifications other than those suggested above will become apparent to those of ordinary skill in the art, and therefore it is intended that the invention only be limited as defined in the appended claims.

I claim:

1. A safety receptacle comprising the combination of a container having an open mouth portion; a closure for said container having a cylindrical skirt portion; cooperating means on said mouth portion and said skirt portion for tightening said closure into sealing relation with the opening in said mouth portion; wedge means carried by said mouth portion; depressible means coupled to said wedge means for depressing said wedge means; and at least substantially indestructible abutment means car-

ried by said skirt portion and cooperating with said wedge means, said abutment means being adapted to pass over and by said wedge means whereby said closure can be fully tightened into sealing relation with the opening in said mouth portion, but thereafter said closure cannot be removed from said mouth portion unless said means for depressing said wedge means is operated.

2. A safety receptacle as defined in claim 1 wherein said abutment means encompasses only part of the periphery of said skirt portion and comprises at least one notch formed in said skirt portion.

3. A safety receptacle as defined in claim 2 wherein said means for depressing said wedge means comprises a tab projecting laterally from said wedge means and extending outwardly beyond said skirt portion.

4. A safety receptacle comprising the combination defined in claim 1 wherein said container is provided with a bead having an interruption therein, and wherein said combination further includes a ring carried by said mouth portion, said ring having said wedge means, said means for depressing said wedge means, and retaining means cooperating with said interruption disposed thereon.

5. A safety receptacle comprising the combination defined in claim 1 and further including a bead integral with said mouth portion, said bead having integrally formed therewith said wedge means, and said means for depressing said wedge means.

6. A safety receptacle comprising the combination defined in claim 5 wherein said bead has an interruption therein, and wherein the edge of said bead adjacent said interruption is turned upward toward the opening in said mouth portion and forms said wedge means.

7. A safety receptacle comprising the combination defined in claim 1, and further including a shell at least partially encasing said closure, said shell cooperating with said means for depressing said wedge means whereby depression of said shell results in depression of said wedge means.

8. A safety receptacle comprising in combination a containing means having an open end, said containing means being provided with an external circumferential bead spaced from said open end and having an interruption therein, and retaining means disposed between said open end and said bead; a ring disposed on said bead, said ring carrying wedge means normally projecting above the surface of said ring and means for depressing said wedge means; said ring carrying an abutment cooperating with said interruption for preventing turning movement of said ring relative to said containing means; and a closure for said containing means having a crown portion and a skirt portion having a terminal edge, said skirt portion having retaining means adapted to cooperate with the retaining means on said containing means whereby said closure can be tightened and retained on said containing means, said skirt having a notch in said terminal edge thereof, said notch cooperating with said wedge means to prevent removal of said closure unless said means for depressing said wedge is operated.

9. A safety receptacle as defined in claim 8 wherein said abutment means cooperating with said interruption for preventing turning movement of said ring comprises legs depending from said ring and extending into said interruption.

10. A safety receptacle as defined in claim 9 wherein said ring, said wedge means and said legs are parts of a unitary structure.

11. A safety receptacle comprising the combination of a container having an open mouth portion; a closure for said container having a cylindrical skirt portion; cooperating means on said mouth portion and said skirt

portion for tightening said closure into sealing relation with the opening in said mouth portion, a projection carried by said mouth portion, said projection having one side abutting said mouth portion and having at least one end of said side affixed to said mouth portion, whereby the other end of said projection is depressable, a tab extending radially outward from said projection for depressing said projection, and abutment means carried by said skirt portion and cooperating with said other end of said projection, whereby when said closure is tightened into sealing relation with the opening in said mouth portion, said closure cannot be removed from said mouth portion unless pressure is applied to said tab for depressing said other end of said projection.

12. A lock ring adapted for use with container closure carrying an abutment, said lock ring comprising a flat ring shape body portion having two faces, a pair of spaced legs projecting from one face of said body portion, a depressable wedge shape projection carried on the other face of said body portion, and a tab projecting radially outward from said wedge shape projection.

13. A container mouth having means for tightening an associated closure thereon, at least substantially indestructible depressable wedge means formed integrally with and projecting radially outward from said mouth, and tab means formed integrally with said wedge means for depressing said wedge means, said tab means projecting radially outward from said wedge means.

14. A lock ring adapted for use with container closures carrying an abutment, said lock ring comprising a flat ring-shape body portion having two faces, an abutment projecting from one face of said body portion, a depressable wedge-shape projection carried on the other face of said body portion, and a tab projecting radially outward from said wedge-shape projection.

15. A safety receptacle comprising the combination of a container having an open mouth portion and a bead integral with said mouth portion; a closure for said container having a cylindrical skirt portion; cooperating means on said mouth portion and said skirt portion for tightening said closure into sealing relation with the opening in said mouth portion; wedge means formed integrally with said bead and carried by said mouth portion in spaced relation to the opening therein, means coupled to said wedge means for depressing said wedge means, said means coupled to said wedge means being integrally formed with said bead and said wedge means; an at least substantially indestructible abutment means carried by said skirt portion and cooperating with said wedge means whereby when said closure is tightened into sealing relation with the opening in said mouth portion, said closure cannot be removed from said mouth portion unless said means for depressing said wedge means is operated.

16. A safety receptacle comprising the combination defined in claim 15 wherein said bead has an interruption therein, and wherein the edge of said bead adjacent said interruption is turned upward toward the opening in said mouth portion and forms said wedge means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,747,205	White	Feb. 18, 1930
2,045,388	Guthrie	June 23, 1936
2,104,236	Mermer	Jan. 4, 1938
2,153,427	Fleisch et al.	Apr. 4, 1939
2,414,420	Sebell	Jan. 14, 1947
2,462,689	Stretz	Feb. 22, 1949
2,827,193	Martin	Mar. 18, 1958