United States Patent

Leopoldi et al.

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[54] **DIAL-ACTUATED SAFETY CAP**

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[52] **U.S. Cl.** **215/9,** 70/232, 215/98

[51] **Int. Cl.** **B65d 55/14**

[58] **Field of Search** 215/9, 98; 70/163, 165, 167, 70/232, 312

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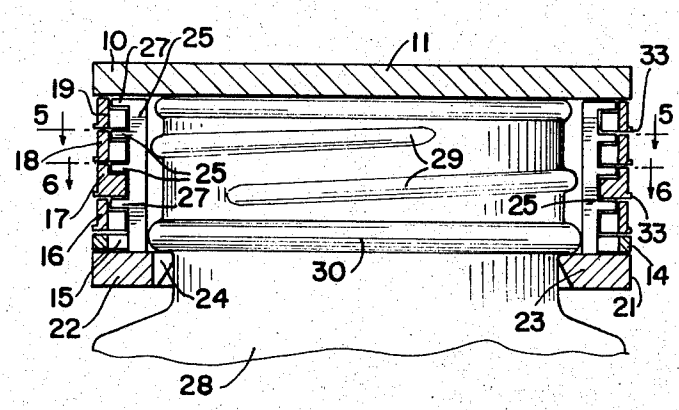
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[57] **ABSTRACT**

A safety cap for a container or bottle which must be dialed to register a release position by manipulating multiple parts to coincide at the release position and thereby enable the cap to be opened or removed and comprising an assembly adapted for installation on a screw top container or bottle as the primary closure or as a safety closure in association with a screw cap on the bottle.

13 Claims, 10 Drawing Figures



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SHEET 1 OF 2

FIG. 2

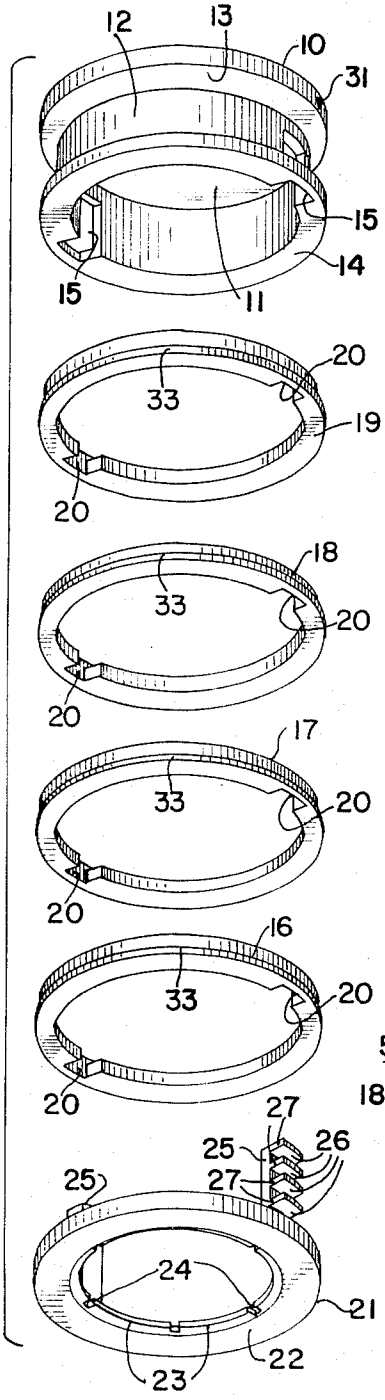


FIG. 1

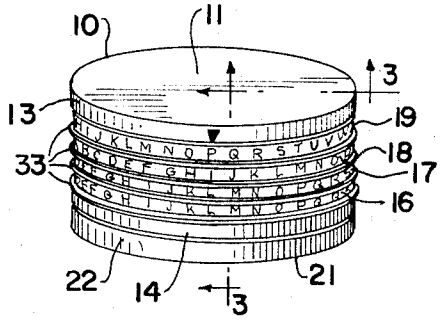


FIG. 3

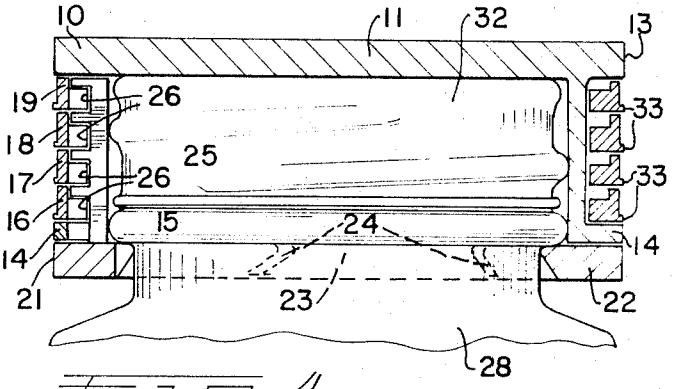
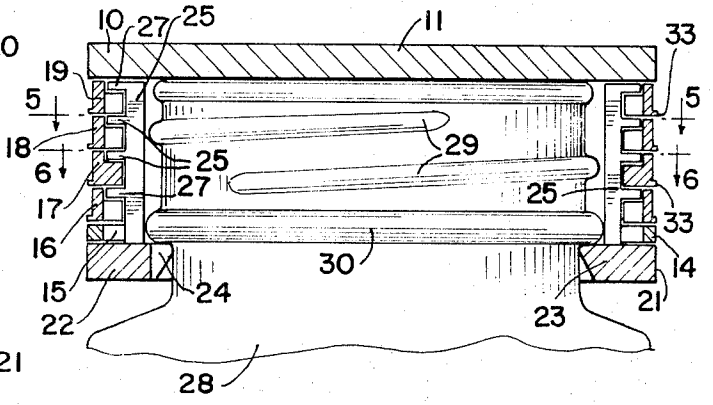


FIG. 4



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FIG. 5

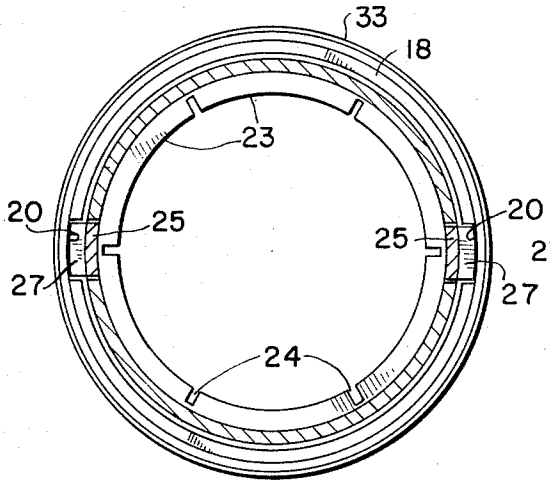


FIG. 6

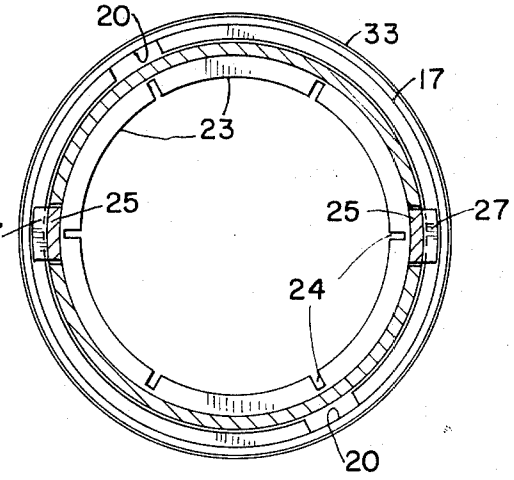


FIG. 7

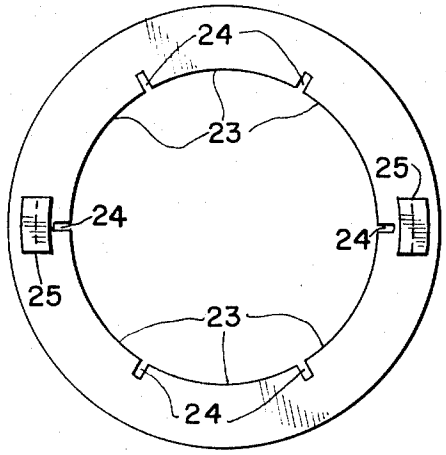


FIG. 9

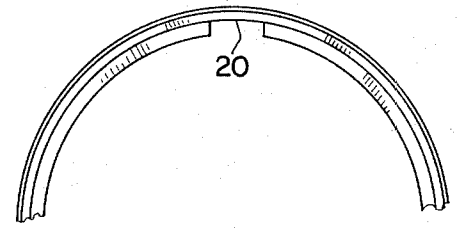
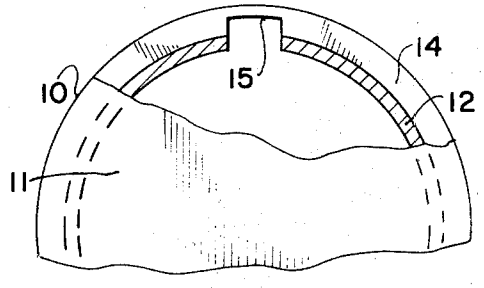


FIG. 10



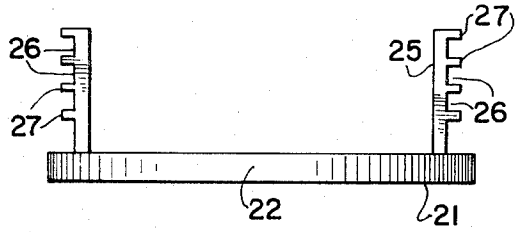


FIG. 8

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DIAL-ACTUATED SAFETY CAP

BACKGROUND OF THE INVENTION

The invention is related especially to use with bottles utilized in the dispensing of various drug preparations including pills and capsules as well as liquid, particularly prescription formulas where it is desirable that access to such bottles be prevented by other than the intended user and particularly excluding children from the ability to readily open a bottle containing what might comprise a dangerous drug or a poison. The drug industry has long felt the need for some means that would safely preclude small children or senile persons or those who may be retarded from readily opening a simple screw top container or bottle containing dangerous drugs or preparations prescribed for a particular person. The present invention answers this need and provides a safety cap for such containers which requires a level of intelligence and understanding necessary to the skill required to operate the intricately arranged parts in a manner to obtain release of the cap whereby any person not possessing the knowledge will encounter difficulty and delay in arriving at the positioning of the parts to enable removal of the cap.

OBJECTS OF THE INVENTION

It is the primary object of this invention to provide a safety cap for drug containers.

Another object of the invention is to provide a safety cap for use on standard screw top containers.

A further object of the invention is the provision of a safety cap for use as a primary closure for a container or in association with a standard screw cap to prevent removal of the screw cap without first releasing the safety cap.

Still another object of the invention is the provision of a safety cap for containers which includes a plurality of parts which must be dialed to coincide at a particular position to release the cap.

A still further object of the invention includes the provision of a locking part adapted to be snapped over the usual collar on standard screw type containers and a removable cap containing a plurality of movable elements which must be dialed to a coincidental position for removing the cap from the locking part.

Another object of the invention is the provision of a dial-operated safety cap for drug containers including multiple operating parts which must be moved to a coincident position where an indication is given that the cap is then removable.

Yet another object of the invention is to provide a safety locking cap for standard screw top containers having a snap ring for engagement over the usual seat or collar on such containers and a plurality of upstanding locking parts adapted to interengage with a removable cap assembly comprised of a cap and a plurality of locking rings rotatable on the cap to coincident positions releasing the interengaging relationship of the cap assembly with the upstanding locking parts whereby the cap and ring assembly may be removed.

DESCRIPTION OF THE DRAWINGS

The foregoing and other objects of the invention are attained by the removable locking cap assembly illustrated in the accompanying drawings wherein;

FIG. 1 is a general perspective view of the dial-actuated safety cap assembly;

FIG. 2 is a perspective view of the several parts of the safety cap assembly shown in exploded relationship;

FIG. 3 is a sectional view through the safety cap assembly taken at the ninety degree angle indicated by the line 3—3 of FIG. 1;

FIG. 4 is a cross-sectional view through the safety cap assembly showing one of the dial rings in locking relationship to the upstanding locking tabs on the snap ring;

FIGS. 5 and 6 are plan sectional views taken respectively on the lines 5—5 and 6—6 of FIG. 4 showing the dial rings in FIG. 5 in the coincident release position and in FIG. 6 in a locked position relative to the locking tabs;

FIGS. 7 and 8 are plan and elevational views respectively of the snap ring clearly revealing the upstanding locking tab members; and

FIGS. 9 and 10 are fragmentary plan views of a dial ring and the cap member with parts broken away clearly showing the relief areas which cooperate with the locking tabs to release the cap.

SUMMARY OF THE INVENTION

The removable locking cap of this invention comprises an assemblage of interrelated parts designed to operate in a manner whereby the parts interengage to lock the cap and certain of the parts must be manipulated into coincident positions to release the cap relative to a cooperating part. The assemblage includes a snap ring having multiple upstanding locking parts adapted for ready mounting on the neck of standard containers. The associated removable cap is provided with an annular recess containing a plurality of continuous rings rotatably mounted in the recess between top and bottom outstanding flanges. The rings on the cap and the upstanding locking parts on the snap ring interengage in any but one coincident position of the rings to lock the cap and the cap is released only when all of the rings occupy the coincident position whereupon the cap and ring assembly can be removed from the locking parts on the snap ring mounted on a container. An important feature of the inventive concept comprises the dialing of the locking rings to the coincident position for releasing the cap. All of the parts of the assemblage are made of a non-metallic material, preferably a suitable plastic, for ready fabrication and economical manufacture.

DESCRIPTIONS OF PREFERRED EMBODIMENT

The invention is disclosed as applied to a safety cap having four rotatable dial rings on the cap but the number of such rings may be varied and therefore, while the disclosure reveals a preferred form of the invention, the arrangement may be modified to incorporate dial operating rings in such number as may be preferred and depending upon the degree of operating intricacy desired to be necessary to the manipulation of the safety closure before it is released for opening. The device may be very simple and utilize but one dial ring, whereupon the cap could be readily releasable upon the movement of the one operating part but the multiple ring installation is preferred inasmuch as such rings can then each include indicia which when all of the

rings are moved to the coincident release position, can be utilized to indicate that the assembly is in position to release the cap. To accomplish this the indicia on the several rings at the coincident position can be made to spell a word vertically by using one letter on each ring over the total number of rings such as "O" "P" "E" "N" or "P" "I" "L" "L" whereby to indicate that the cap is released and ready to be opened.

In the drawings illustrating the safety closure as proposed to be used in practice all of the several parts comprising the assembly are made from a non-metallic material and preferably a suitable plastic whereby the various parts may be assembled without difficulty by flexing the pieces to snap them into their operative relationship. A cap piece **10** is provided with a top cover **11** and vertical side wall **12** disposed inwardly of the perimeter of the top wall **11** whereby to provide and outstanding top flange **13**. At the lower extremity of the vertical wall **12** an outstanding bottom flange **14** is disposed in complementary opposed relation to the outstanding top flange **13** whereby to define with the vertical wall an annular recess adapted to receive the dial rings. The bottom flange **14** and the vertical wall **12** are cut out at diagonally opposite locations as at **15** as best seen in FIG. **2**.

The dial rings **16**, **17**, **18**, and **19** are all substantially identical and are mounted directly one over the other in the recessed area of cap **10**. The dial rings each have diagonally opposite relief areas **20** which, of course, are spaced on each ring to register with the cut-outs **15** in the bottom flange **14** of the cap member **10**. The dial rings are rotatable in the cap recessed area about the vertical wall **12** between the top and bottom outstanding flanges **13** and **14** and may be turned to place the relief areas **20** in any position relative to the cut-outs **15**, either in register therewith, or out of register. As best shown in FIG. **1**, the individual dial rings **16**, **17**, **18**, and **19** are provided with indicia, which may comprise all of the letters of the alphabet arranged around each ring or symbols or other indicators to be matched at the release position. As shown, the several rings are freely rotatable on the cap member **10** but, if desired, click stop positions for each ring may be provided at any number of locations around the cap member.

A snap ring **21** completes the safety cap assembly and is best disclosed in FIGS. **2**, **7**, and **8**. This snap ring includes an annular base flange member **22** having a plurality of inwardly directed container engaging portions **23** separated by inwardly opening radially disposed slots **24** which enable the ring readily to be snapped over the neck of a container. Upstanding locking tabs **25** are provided on the snap ring at diagonally spaced locations corresponding with the positions of the cut-outs **15** in the bottom flange **14** of the cap and the side wall **12** as well as the relief areas **20** in the inner periphery of each of the dial rings **16**, **17**, **18**, and **19**. These locking tabs each have four grooves **26** each accommodating one of the dial rings. The grooves **26** open outwardly and are defined by flanges **27** which overlie the respective rings **16**, **17**, **18**, and **19** to lock the cap **10** on a container. It will be noted that the dial rings are of less height at their inner periphery than on their outer face. These inner portions are thereby adapted to be received in the respective grooves **26** under the flange **27** locking each ring, and thereby the cap **10**, when the relief cut-outs **20** are not in register with the locking tabs **25**. The full height outer periphery of each of the assembled rings on the cap affords a substantially aligned outer surface of the several rings as indicated in FIGS. **1**, **3**, and **4** and serves also to conceal the upstanding locking tabs **25** on the snap ring so that the cap assembly when installed on a container presents a pleasing appearance. The dial rings **17**, **18**, and **19**, as indicated in FIGS. **3** and **4**, are each positioned on the outstanding flanges **27** on the locking tabs **25** at diagonally opposite sides of the cap assembly while the lowermost dial ring **16** rides on the outstanding bottom flange **14** of the cap member **10**. The dial rings, as assembled on the cap **10**, all fit more or less precisely and between the points engaged by the tab flanges **27** might be said to comprise a mutually supporting, smooth running assembly wherein any one or more of the dial rings can be freely rotated about the recessed wall **12** of the cap member to manipulate the rings to their coincident release position or to any other position locking the cap assembly with respect to the upstanding tab locks **25** and the container upon which the snap ring **21** is mounted either directly or in conjunction with a screw cap.

The cap assembly is shown in FIG. **4** as applied in the form of a primary closure on a standard form of container **28**. The neck portion of this container is provided with screw threads **29** and the usual sealing shoulder **30**. The snap ring **21** of this invention is designed to be applied to the container **28** by fitting over the shoulder **30** so that the inner peripheral members **23** engage under the shoulder and securely hold the snap ring in place. The radial slots **24** between the neck engaging portions **23** enable the ring **21** readily to be snapped over the shoulder **30** and yet provides a tight fitting attachment. It will be noted in this figure that dial rings **16**, **18**, and **19** are disposed with their relief areas **20** in registry with the tabs **25** but the dial ring **17** is out of registry. Thus, the cap assembly is retained on the container. All of the four dial rings must be turned to the position with their respective relief areas **20** disposed in registry with the locking tabs **25** in order to unlock the cap assembly for removal. So long as any dial ring is disposed with its relief areas out of registry with the locking tabs the cap assembly cannot be removed.

If desired a five or six letter word might be utilized at the coincident release position by including appropriate letters on the face of the top flange **13** and/or the bottom flange **14** of the cap member **10** at this location whereby to line up with the four letters of the rotating rings to spell the desired word and indicate the release condition.

At the left hand side of FIG. **3** all of the four dial rings are shown with their respective relief areas **20** in registry with the locking tab **25**. It will readily be seen that the cap assembly thus can be removed from the locking tabs since the cut-out **15** in the bottom flange **14** also is aligned with the tabs **25**. It will be noted in FIGS. **3** and **4** that the upstanding tabs **25** extend upwardly into the side wall cut-outs **15** so that the tabs are disposed within the thickness defined by the inner and outer surfaces of vertical wall **12** and only the flanges **27** project outwardly beyond the outer face of this wall. The grooves **26** are thereby positioned to receive the

several dial rings for rotation about the wall **12** and the tabs **25**. At the right hand side of FIG. **3** the rings **16**, **17**, **18**, and **19** are shown as confined between the top and bottom flanges **13** and **14** on the cap **10** at a location remote from the position of coincidence with the upstanding tabs **25** of all of the relief openings **20** and the cut-out **15** in bottom cap flange **14**.

The cap assembly of FIG. **1** is shown with all of the dial rings rotated to the coincident position for release and removal of the cap **10**. It will be noted that the several rings have been rotated so that the indicia on the rings, when read vertically, spells the word PILL at the coincident release position. This might be the word OPEN, if preferred, as the indication that the locking assembly is in the coincident release position. The top flange **13** of the cap member is provided with a marker **31** for readily locating the coincident release position when dialing the rings **16**, **17**, **18**, and **19** to remove the cap from the container. This can be located at diagonally opposite points on the face of the flange.

The cap assembly shown applied in FIG. **4** as the primary safety closure for the container **28** may also be used to provide a safety closure or attachment for the standard screw cap used on containers of this type. As shown in FIG. **3**, it will be seen that the safety closure of this invention can be applied over the screw cap and obtain the same benefits as when used directly as the sealing closure for this container. Here the screw cap **32** has been turned onto the threads **29** of the container **28** and is held safely in place by the overlying safety cap assembly until the safety cap is first released and removed whereupon the cap **32** may readily be unscrewed. In this type of application the snap ring **21** is placed over the shoulder seal **30** as before and the cap **32** is screwed on to the neck of the container inside the two upstanding locking tabs **25** so that the safety cap assembly can then be applied in the same manner as previously. It will be noted that the screw cap **32** engages the upper side of the shoulder **30** in sealing relation while the inwardly directed securing members **23** of the snap ring are engaged under the shoulder. Thus when the safety cap assembly is applied over the locking tabs and secured by rotation of the dial rings **16**, **17**, **18**, and **19**, the under surface of safety cap top wall **11** bears on the top of the screw cap and effectively prevents its removal until after the cap **10** is taken off.

Attention should be directed to FIGS. **5** and **6** which clearly show coincident positioning of the dial rings and their locked positions respectively. In FIG. **5** the dial rings are indicated as all being disposed in position with their relief areas **20** coincident with the locking tabs **25** whereby it can readily be recognized that the cap assembly, with the locking dial rings thus disposed, can be lifted off of the locking tabs **25** inasmuch as the outstanding flanges **27** are disposed within the relief areas **20**. However, in FIG. **6** the relief areas **20** are turned to positions beyond the locking tabs out of registry therewith and whereby the flanges **27** overlie solid portions of the dial rings so that it is not possible to remove the safety cap. The conditions illustrated here will apply whether the safety cap is utilized as the primary closure as in FIG. **4** or as a safety securement for a screw cap application as in FIG. **3**. The outstanding rim **33** at the bottom edge of each of the dial rings **16**, **17**, **18**, and **19**, and which may be knurled, if desired, makes for ready manipulation of individual ring members when rotating them to lock the cap or to move the relief cut-outs **20** to the position coincident with the locking tabs **25** for releasing the cap.

From the foregoing it will be seen that there has been provided a dial actuated closure for containers used for dangerous drugs, or possibly poison, which requires an intricate manipulation of interengaging locking parts to release the closure and wherein the degree of intricacy of the operating mechanism may be simple or complex by variations in the number of operating parts incorporated in the assembly. The closure is adaptable to use in combination with standard screw tops or may be used directly as the sole closure for containers of this type and is applicable to standard containers. The device offords a safe means of restricting the use of dangerous drugs to the person for whom prescribed and reduces the possibility of accidental consumption of injurious chemicals or the like, by other than intended users.

The embodiments in which an exclusive property or privilege is claimed are defined as follows:

1. A safety closure for standard screw top containers comprising a snap ring mounted on the neck of a container, said snap ring having a plurality of upstanding locking tabs spaced at equal intervals about the ring, a removable cap engaged over said locking tabs, an outwardly opening annular recess within the periphery of said cap, and a continuous locking ring rotatably mounted in said recess, said locking tabs engaged over said locking ring to secure said cap, and said locking ring having relief areas coincident with said locking tabs in one relative position of such ring whereby to release said cap.

2. The safety closure of claim **1** wherein said removable cap has a plurality of annular continuous locking rings in said annular recess, and said locking tabs having means engaged over the respective locking rings to secure the cap, said locking rings each having relief areas coincident with the locking tabs in one relative position of such rings whereby when all of the locking rings are in said relative position the cap is released.

3. The safety closure of claim **2** wherein the several locking rings include indicia whereby the coincidental release position of the rings may be dialed by bringing certain indicia into registry.

4. The safety closure of claim **1** wherein said locking cap is provided with two annular continuous locking rings in said recess, said locking tabs each having two recesses respectively for receiving said locking rings, and said locking rings each having relief areas coincident with locking tabs in one relative position of the locking rings.

5. The safety closure of claim **4** wherein the locking rings each include indicia whereby the coincidental release position of such rings may be dialed by bringing certain indicia into registry.

6. The safety closure of claim **1** wherein the locking cap is provided with three continuous locking rings in said recess, said locking tabs each having three grooves for receiving said locking rings, and said locking rings each having relief areas coincident with the locking tabs in one relative position of the locking rings.

7. The safety closure of claim 6 wherein the locking rings each include indicia whereby the coincidental release position of such rings may be dialed by bringing certain indicia into registry.

8. The safety closure of claim 1 wherein the locking cap has four continuous locking rings in said recess, said locking tabs each having four grooves for receiving said locking rings, and said locking rings each having relief areas coincident with the locking tabs in one position of the several locking rings relative to the locking tabs whereby any one of the locking rings having its relief areas displaced from said one position will lock the cap and all such rings must have their relief areas coincident with the tabs to release the cap.

9. The safety closure of claim 8 wherein the locking rings each include indicia whereby the coincidental release position may be dialed by bringing certain indicia on the several locking rings into registry.

10. The safety closure of claim 9 wherein said locking tabs are disposed diametrically opposite to each other.

11. The safety closure of claim 1 wherein said snap ring has a plurality of inwardly open radially disposed slots providing relatively flexible container-engaging-portions therebetween whereby to facilitate application and fitting of the snap ring on the neck of the container.

12. The safety closure of claim 1 wherein said upstanding locking tabs extend into cut-outs in said cap in the area of said annular recess whereby at least a portion of each locking tab is disposed substantially flush with the surface of the recess.

13. The safety closure of claim 12 wherein the cut-outs in the cap extend into a bottom flange on the cap whereby to provide clearance over portions of the locking tabs upon removing the cap.

* * * * *