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BOTTLE CAP LOCK STRUCTURE

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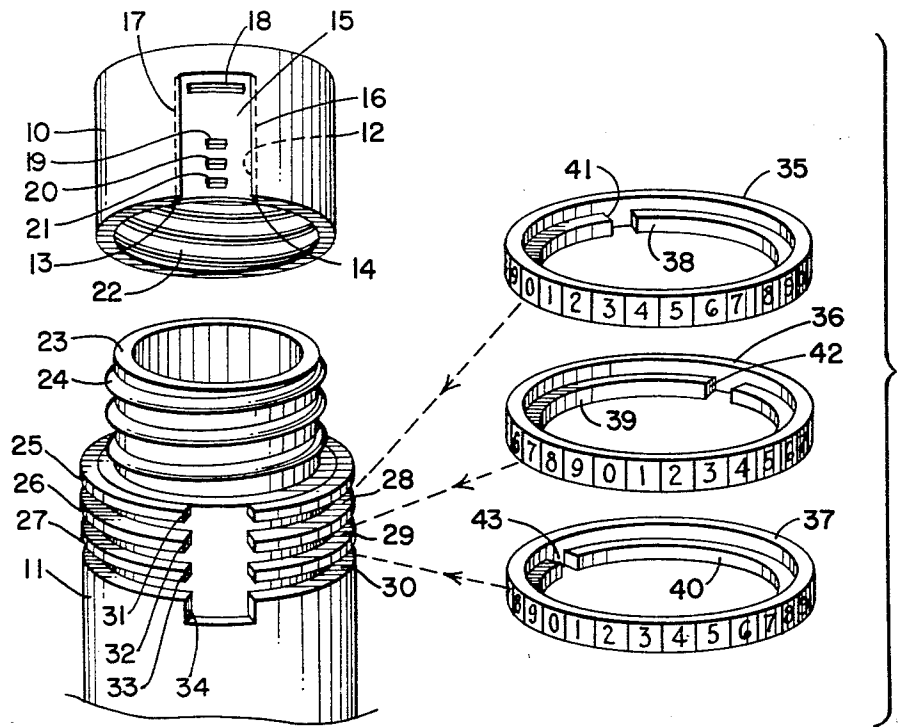


FIG. 1

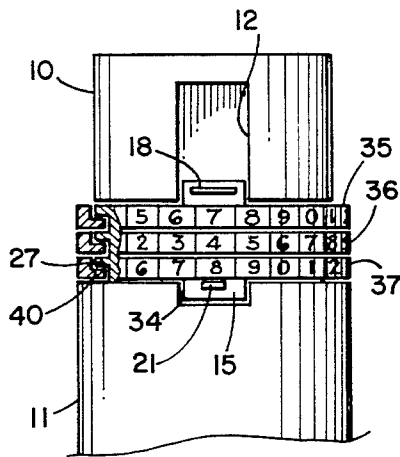


FIG. 2

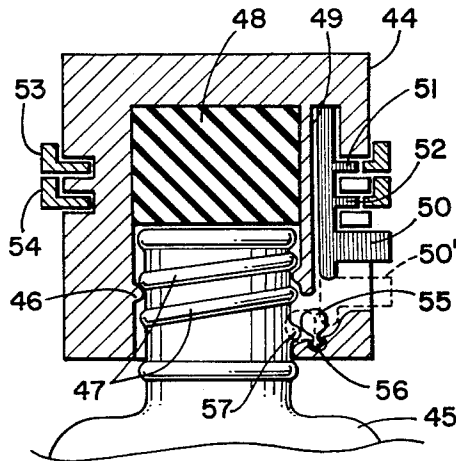


FIG. 3

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BOTTLE CAP LOCK STRUCTURE

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ABSTRACT OF THE DISCLOSURE

Locking caps for medicine bottles are provided in the form of a combination lock. The cap has a slide member which can move up or down between two positions. The slide member in turn includes projections arranged to cooperate with combination rings revolvably mounted to surround the slide member when the cap is threaded on the bottle. The various rings each include an internal inwardly directed flange which overlies the respective projections of the slide member and blocks movement of the slide member from a lowermost position to an up position. Each of these flanges includes a notch such that revolving of the various combination rings to given positions will align the notches, the notches being dimensioned to pass the projections. The slide member is then free to be moved upwardly. The lower end of the slide member is arranged to abut or lock into a notch in the bottle or to cam against the bottle neck in such a manner that the cap is prevented from unthreading when the slide member is in its lowermost position. It is necessary to align the notches of the combination rings to permit upward sliding of the slide member before the cap can be removed.

The invention relates generally to bottle caps and more particularly to an improved bottle cap lock structure for locking to a bottle, such as a medicine bottle, to prevent unauthorized opening of the bottle.

Many different designs for locking a bottle cap on a bottle have been provided heretofore. In some instances, a simple lock and key may be employed and in other cases a force fit of the cap on the bottle is used. The purpose in each instance is to prevent children from gaining access to the bottle which may contain medicines or poisons. In the case of actual key-operated locks, there is always the problem of having the key available in order that an adult may gain access to the bottle in an emergency. In the case of force fit tight caps, oftentimes it is difficult for even an adult to remove the cap without hurting his or her fingernails or possibly even damaging the bottle and cap. If the force fit type cap is loosened somewhat to facilitate removal, there then results the possibility of a child removing the cap.

With the foregoing considerations in mind, it is a primary object of this invention to provide an improved bottle cap lock structure wherein the foregoing problems are overcome.

More particularly, it is an object to provide a bottle cap lock structure wherein a positive locking of the cap to the bottle is realized and yet wherein no key or any auxiliary equipment is required to enable an adult to easily remove the cap.

Another object is to provide a bottle cap lock structure meeting the foregoing object in which it is not possible for a small child to remove the cap unless such child has a degree of intelligence approaching that of an older person. In this case, the person would be sufficiently intelligent to fully understand the contents of the bottle and no danger would ensue.

Another object is to provide a bottle cap structure per se which may be readily locked to conventional bottle neck screw threads in a manner meeting all of the foregoing objects to the end that the cap itself may be pro-

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vided as a separate item for use with conventional bottles.

Briefly, these and many other objects and advantages of this invention are attained by providing a bottle cap threadedly receivable on a bottle neck. The cap includes a slide member arranged to move in a direction parallel to the axis of the cap to a given position such that it will block unthreading of the cap. Combination rings are provided surrounding the slide member when in its locking position, these combination rings cooperating with means on the slide member to prevent sliding movement of the slide member unless the combination rings are revolved to given positions in accordance with a predetermined combination. In this respect, the combination rings are provided with external symbols or numbers, certain ones of which must be aligned in order to release the slide member.

By the foregoing arrangement, there is provided a simple combination lock for the bottle cap which may readily be operated by an adult but which would normally be difficult for a child to operate. The result is that the bottle cap is securely locked on the bottle in a positive manner so that children are safe from the contents of the bottle and yet the cap may be readily removed by an adult or older child capable of understanding the combination.

In one embodiment of the invention, the combination rings are formed about the bottle itself below the threads, this portion of the bottle including a lower notch for receiving the lower end of the slide member after the cap is screwed into position. The lower end of the slide member received within the notch on the bottle prevents unthreading of the cap and the slide member itself is held in its lowermost position by the combination rings.

In another embodiment, the combination rings are revolvably mounted on the cap itself and the slide member arranged to abut against the lower end of the thread on the bottle neck when the cap is secured on the bottle and the slide member is in its lowermost position.

In each of the foregoing embodiments, it is necessary to align the combination rings in accord with a specific combination in order to permit upward movement of the slide member to release the cap.

A better understanding of the invention will be had by now referring to the accompanying drawings, in which:

FIGURE 1 is a perspective view of the basic components of a first embodiment of the bottle cap lock structure showing some of the components separated in order to clearly illustrate the invention;

FIGURE 2 is a fragmentary, front, elevational view of the bottle cap locking structure of FIGURE 1 in assembled position with the cap locked to the bottle; and,

FIGURE 3 is a partial cross-section of a second embodiment of the bottle cap lock structure.

Referring first to FIGURE 1, there is shown a bottle cap 10 for cooperation with a bottle 11. As shown, the cap 10 includes a slot 12 preferably undercut to define grooves 13 and 14 for receiving a slide member 15. The slide member 15 includes reduced thickness side flanges 16 and 17 receivable in the undercut grooves 14 and 13, respectively, to guide the slide member in up and down sliding movement parallel to the axis of the cap.

The face of the slide member includes a finger-operating projection 18 and three locking projections 19, 20, and 21 extending radially outwardly therefrom. The interior of the cap 10 is threaded as indicated at 22.

Referring now to the bottle 11, the neck of the bottle is illustrated at 23 and includes external threads 24 for cooperation with the threads 22 of the cap. Below the neck there are provided annular lands or flanges 25, 26, and 27 defining therebetween grooves 28, 29, and 30. The lands themselves are discontinuous to provide gaps such as indicated at 31, 32, and 33 dimensioned to permit the

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slide member 15 of the cap to slide down between the lands. Below these ends of the annular lands there is provided a notch 34 constituting an abutment means arranged to receive the extreme lower end of the slide member 15 when the cap 10 is threaded onto the bottle and aligned such that the slide member 15 can pass through the gaps in the lands.

The structure is completed by three combination rings indicated to the right of the structure at 35, 36, and 37. These rings include internal inwardly radially directed flanges 38, 39, and 40, each of these flanges including a single notch such as indicated at 41, 42, and 43 respectively. By providing the notches on the internal flanges as described, they are not visible from the exterior.

The respective flanges 38, 39, and 40 are dimensioned to be received within the grooves 28, 29, and 30 on the bottle structure 11 so that the three combination rings may be revolvably mounted therein.

The assembly of the cap and rings is illustrated in FIGURE 2. The various notches in the rings are dimensioned to pass the various projections 19, 20 and 21 of the slide member 15 on the cap. However, it will be evident that with the slide member 15 in its lowermost position as illustrated in FIGURE 2, the various projections will normally underlie the respective flanges of the combination rings and will be blocked from upward movement unless the particular notch associated with the flange happens to lie directly above a projection.

From the foregoing brief description, the operation of the embodiment of FIGURES 1 and 2 will be clear. Initially, the various combination rings illustrated in FIGURE 1 are assembled within the annular grooves 28, 29, and 30 of the bottle 11 during manufacture. The bottle is closed by simply threading the cap 10 onto the bottle neck. After complete threading, the design is such that the slide member 15 will be disposed in vertical alignment with the lower notch 34 in the bottle. The various combination rings are then revolved until the notches 41, 42, and 43 are in vertical alignment with the slide member. In this position, the projections 19, 20, and 21 are free to pass downwardly through the notches so that the slide member may assume the position illustrated in FIGURE 2. The various combination rings may then be individually revolved to different positions such that the flanges 38, 39, and 40 respectively overlie the notches 19, 20, and 21 thereby locking the slide member 15 in its lowermost position. In this position, the lower end of the slide member is received in the notch 34 and it will thus be evident that the cap 10 cannot be unthreaded since the notch 34 blocks or abuts against the lower end of the slide member preventing counterclockwise rotation of the cap 10.

As will be evident from FIGURES 1 and 2, the various combination rings are provided with external symbols such as numbers printed about their outer peripheries. Certain given numbers are juxtaposed the corresponding internal notch of the ring, these given numbers defining the combination. Thus, when an adult wishes to remove the cap 10 it is only necessary to align the three numbers of the combination. When the rings are positioned to place these numbers in vertical alignment with the slide member, the various notches will also be in alignment such that the slide member 15 may be moved upwardly and the cap then readily unthreaded.

If desired, the combination rings 35, 36, and 37 may be of different colors.

It will also be evident from the foregoing that without knowledge of the combination, the probabilities of a child being able to remove the cap are extremely remote. On the other hand, if a child is of sufficient intelligence to understand the combination and properly align the combination rings to enable removal of the cap he is generally of sufficient intelligence to understand any harmful medicines that might be contained in the bottle and thus will not be placed in jeopardy.

Referring now to FIGURE 3, there is shown a second

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embodiment of the invention wherein the combination rings rather than being revolvably mounted about the bottle itself are revolvably mounted on the cap. In this embodiment, the design is such that the cap may be employed with any conventional bottle having conventional bottle threads so that the cap itself can be sold as a separate item.

Thus, referring to FIGURE 3, the cap is illustrated at 44 in position on a bottle 45. The cap 44 includes internal threads one of which is shown at 46 for cooperation with bottle neck threads 47. The upper interior portion of the cap 44 may include a rubber substance 48 providing a seal.

Within the sidewall of the cap 44 there is provided a guide cavity 49 receiving a side block 50 having radially outwardly directed projections 51 and 52. These projections are arranged to cooperate with suitable notches in combination rings 53 and 54, the embodiment of FIGURE 3 only employing two such rings rather than three. In the particular position of the slide member of FIGURE 3, it will be evident that the projections 51 and 52 are received in the notches of the combination rings 53 and 54. When the slide member 50 is moved to its lowermost position or dotted line position and the rings revolved, the projections 51 and 52 will underlie the radially inwardly extending flange portions of the combination rings 53 and 54 so that the slide member 50 is locked in its lowermost position.

As in the case of the embodiment of FIGURES 1 and 2, there are provided cooperating abutment means for preventing unthreading of the cap 44 when the slide member 50 is in its lowermost position. In FIGURE 3, this takes the form of a cam member 55 coupled to the cap as at 56 such that it may move between the solid and dotted line positions shown. The camming member 55 is positioned to be engaged by the lower end of the slide member when the slide member is moved to its dotted line position and thence cammed against the extreme end of the thread 47 as at 57. The cap is thereby locked against unthreading.

The operation of the cap 44 will be evident from the foregoing. Initially, the slide 50 is in its up position as shown in solid lines wherein the projections 51 and 52 are received within the notches of the inwardly directed flanges of the combination rings 53 and 54. In this position, the combination rings 53 and 54 are aligned in accord with the given combination.

The cap 44 may then be threaded on the bottle neck threads 47 and when completely threaded, the slide member 50 is urged downwardly to the dotted line position 50'. This action cams the camming member 55 against the end of the thread 57 thereby preventing unthreading of the bottle. The combination rings 53 and 54 are then rotated such that their respective inwardly directed flanges overlie the projections 51 and 52 and thus block upward movement of the slide 50.

To remove the cap, it is thus necessary that a person know the proper external symbols on the combination rings 53 and 54 which, when placed in vertical alignment, properly positions the notches in the rings such that the projections 51 and 52 may pass therethrough and permit raising of the slide member 50. When the slide member 50 is raised to the solid line position, the cap 44 may be unthreaded, the end of the thread 57 simply camming the cam member 55 back to the solid line position illustrated.

The embodiment of FIGURE 3 has the advantage in that the lock structure is wholly contained within the cap such that the cap may be used with many conventional type bottle threads and thus may be sold as a separate item.

From the foregoing description, it will be evident that the present invention has provided a greatly improved bottle cap lock structure wherein all of the various objects set forth heretofore are fully realized.

What is claimed is:

1. A bottle cap lock structure comprising, in combination: a bottle cap having internal threads for threading onto the external threads of a bottle neck, said cap including a locking slide member mounted in a side of the cap for up and down sliding movement parallel to the axis of said cap, said slide member having radially outwardly extending locking projections; combination rings corresponding in number to the number of locking projections surrounding said slide member with said projections extending beneath corresponding rings when said cap is threaded on said neck and said slide member is moved to its lowermost position to thereby block upward movement of said slide member, each of said rings including one internal notch of dimensions to permit passage of a corresponding locking projection when the ring is circumferentially revolved to position its notch immediately above the corresponding locking projection underlying the ring so that said slide member is free to move upwardly when said combination rings are all positioned to place their notches in vertical alignment above said locking projections respectively; and abutment means on said bottle cooperating with said slide member such that when said slide member is in said lowermost position, said cap is blocked against unthreading movement from said bottle neck.

2. A structure according to claim 1, in which said combination rings each include an inwardly directed flange within which the notch is formed such that said notch is not visible from the outside of the ring, each ring having combination symbols on its outer peripheral surface, a given symbol being juxtaposed the internal notch so that said notches may be aligned by revolving said rings until the given symbols associated with the rings are in alignment with respect to said slide block.

3. A structure according to claim 1, in which said rings are revolvably mounted about said bottle below said external threads of said neck, said abutment means comprising a receiving notch formed in said bottle in a position to receive the lower end of said slide member when said cap is threaded on said bottle and said slide member is in said lowermost position.

4. A structure according to claim 1, in which said rings are revolvably mounted about said cap, said abutment means being defined by the lowermost external thread end of said external threads on said bottle neck and in which there is provided a movable cam member carried by said cap and positioned to be engaged and cammed against said thread end by the lower end of said slide member when said cap is threaded on said bottle and said slide member is in said lowermost position.

5. A bottle cap lock structure comprising, in combination: a bottle cap having internal threads for threading onto the external threads of a bottle neck, said cap including a locking slide member mounted in a side of the cap for up and down sliding movement parallel to the axis of said cap, said slide member having at least one radially outwardly extending locking projection; at least one combination ring surrounding said slide member with said projection extending beneath said ring when said cap is threaded on said neck and said slide member is moved to its lowermost position to thereby block upward movement of said slide member, said ring including one internal notch of dimensions to permit passage of said locking projection when the ring is circumferentially revolved to position its notch immediately above the locking projection underlying the ring so that said slide member is free to move upwardly when said combination ring is positioned to place its notch in vertical alignment above said locking projection; and abutment means on said bottle cooperating with said slide member such that when said slide member is in said lowermost position, said cap is blocked against unthreading movement from said bottle neck.

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