

[54] TAMPERPROOF CLOSURE FOR CONTAINERS

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[21] Appl. No.: 172,436

[57] ABSTRACT

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|               |                    |           |
|---------------|--------------------|-----------|
| Aug. 20, 1970 | Great Britain..... | 40,079/70 |
| Nov. 10, 1970 | Great Britain..... | 53,460/70 |
| Feb. 1, 1971  | Great Britain..... | 3,634/71  |

In order to prevent ready access or accidental opening of containers, the closure cap is formed with a plurality of projections or ridges which are of unequal circumferential length and are spaced apart by unequal circumferential distances. As the cap is fitted to the containers the projections pass through corresponding slots formed on the wall of the container. Thereafter the cap is rotated to a random position to prevent ready access. An independently rotatable locking ring having similar slots may be provided for greater security.

[52] U.S. Cl. .... 215/9, 215/95, 215/44

[51] Int. Cl. .... A61j 1/00, B65d 55/02

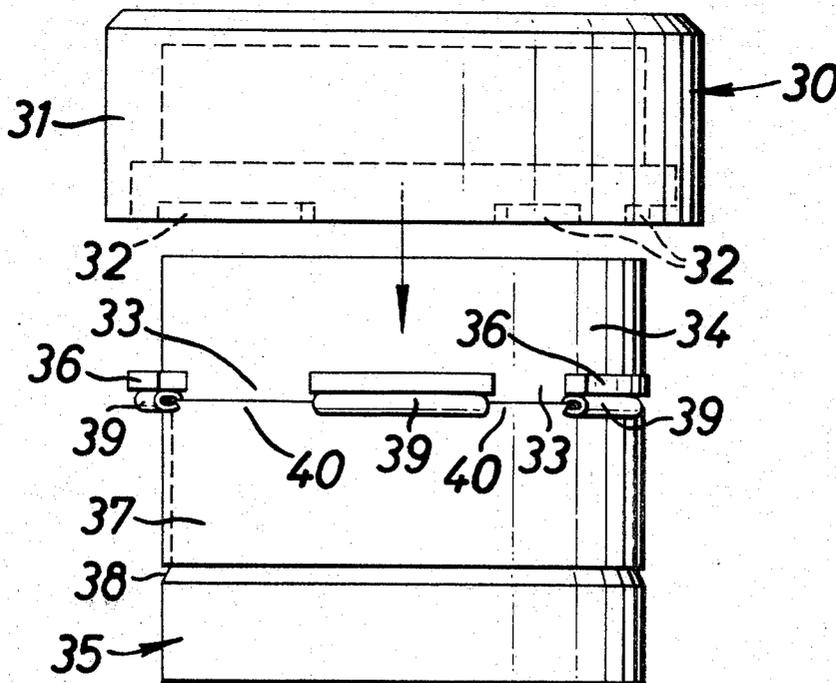
[58] Field of Search .... 215/9, 95, 42, 44, 215/46 A; 220/40, 55 AN

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4 Claims, 15 Drawing Figures



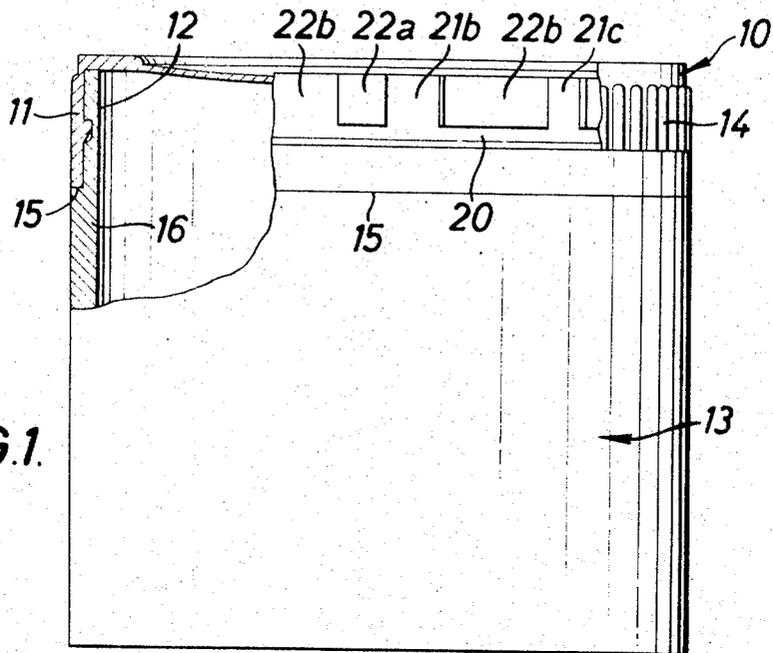


FIG. 1.

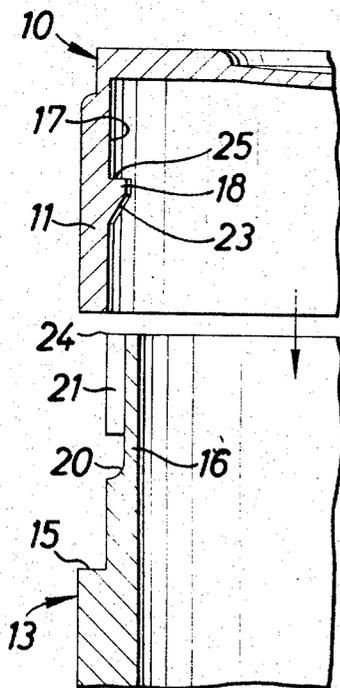


FIG. 2.

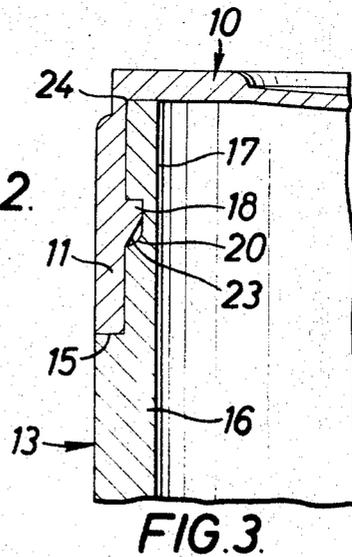
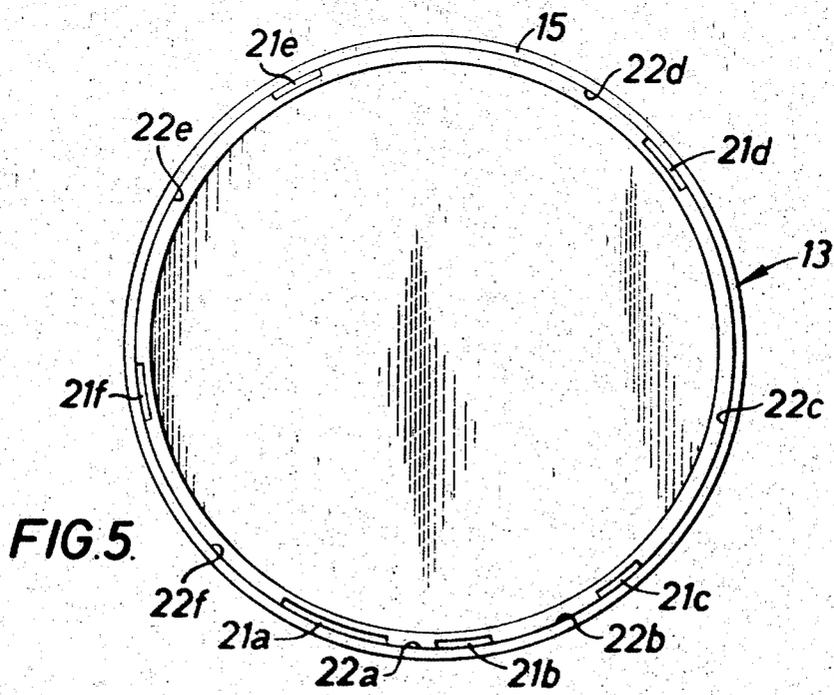
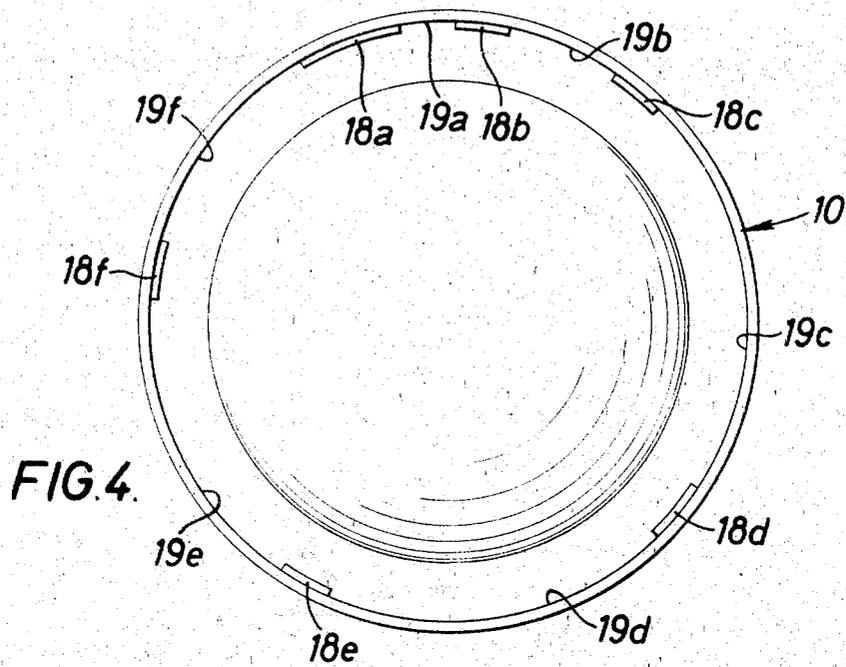


FIG. 3.



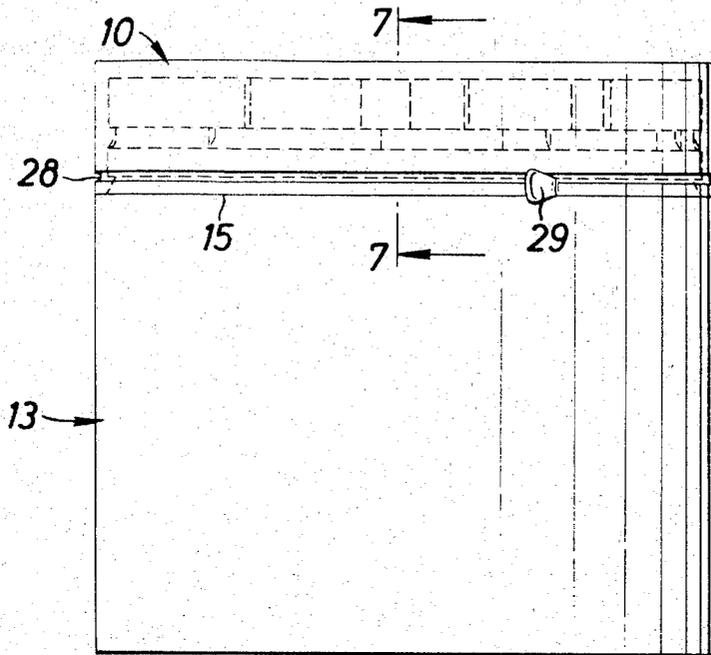


FIG. 6.

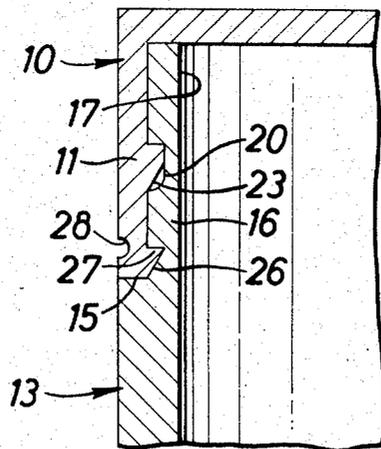
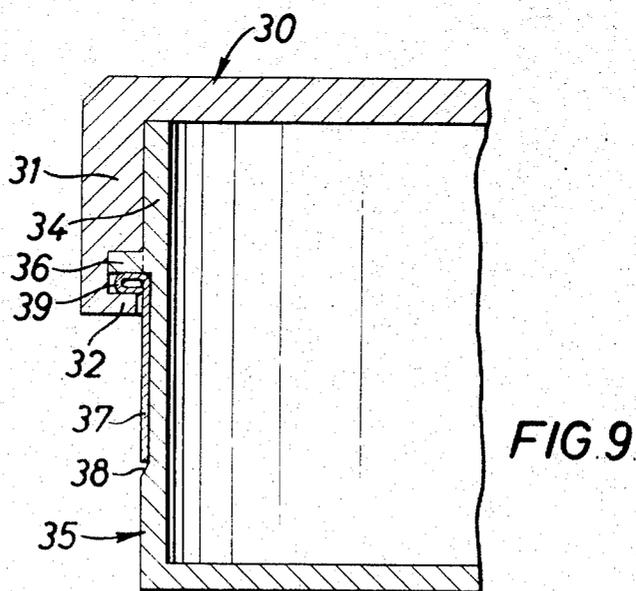
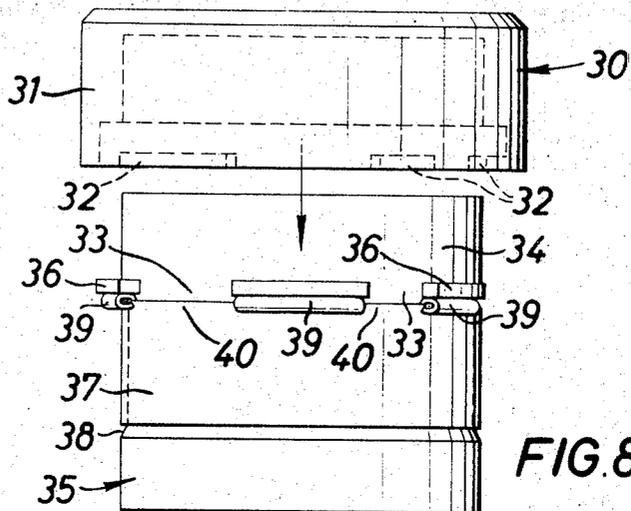


FIG. 7.



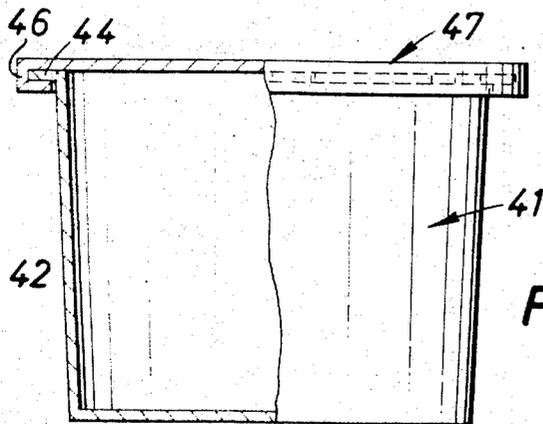


FIG. 10.

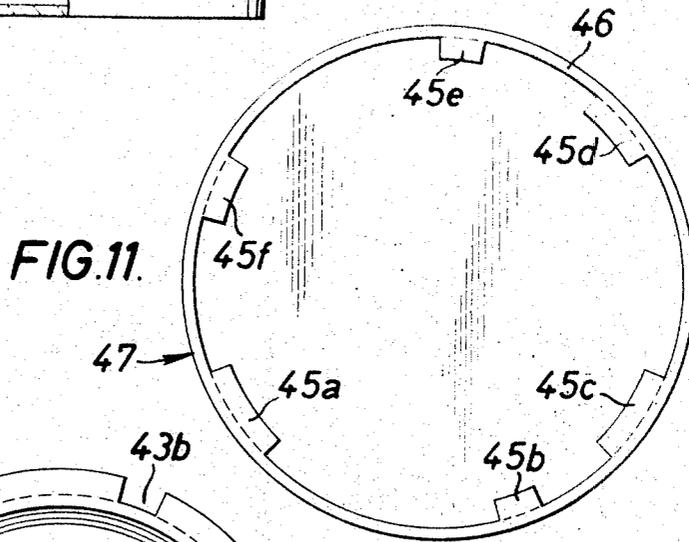


FIG. 11.

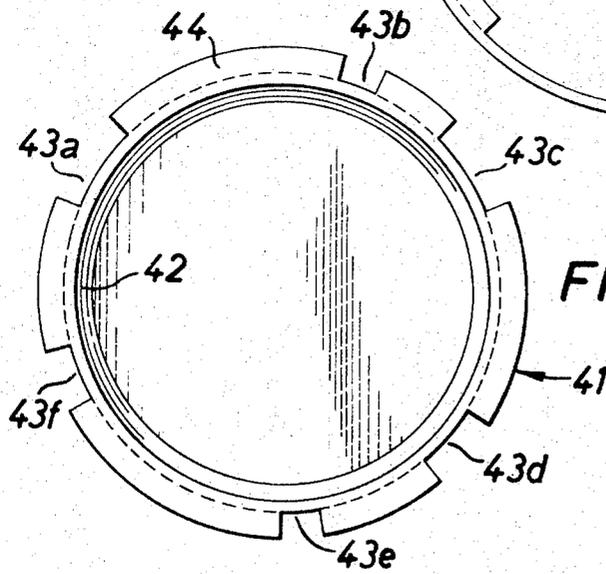
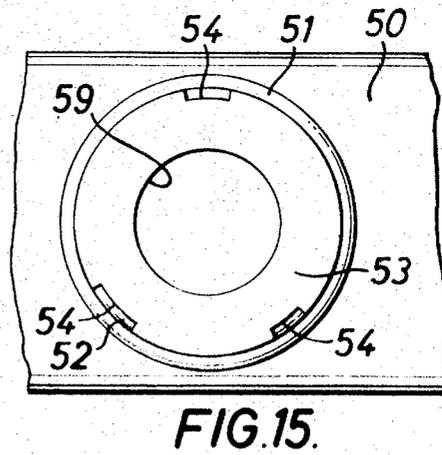
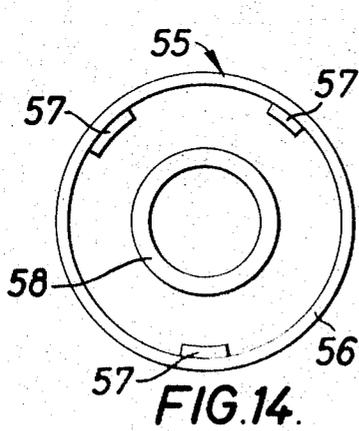
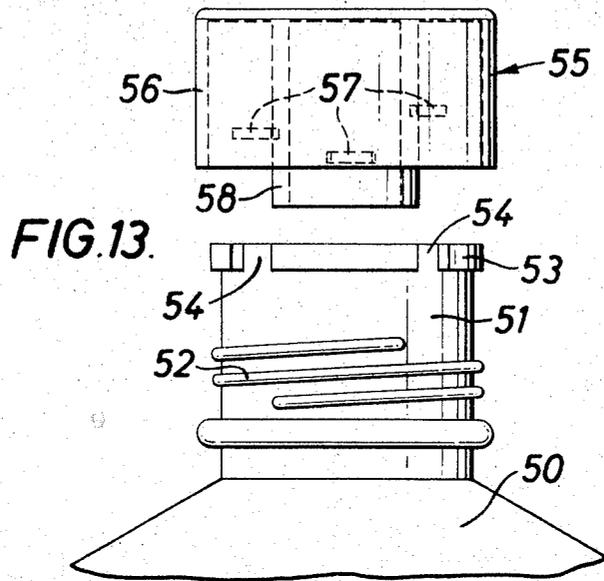


FIG. 12.



## TAMPERPROOF CLOSURE FOR CONTAINERS

This invention relates to tamperproof closures for preventing ready access or accidental opening of containers such as jars, bottles and the like. In particular, but not exclusively, the invention is concerned with the provision of an improved tamperproof closure for preventing young children opening containers such as those containing pharmaceutical products.

In the following description the closure member will be referred to as being fitted to a container which will generally comprise a jar or bottle. It will, however, be understood that the term "container" is intended to have a much wider application in that the invention is applicable to any removable lid, plate or closure member when fitted to a supporting structure.

In its broadest aspect the invention provides a tamperproof closure for a container as herein defined, wherein said closure (or container) is formed around its periphery with a plurality of spaced projections or ridges which are of unequal circumferential lengths and spaced apart by unequal circumferential distances, and said container is provided with a locking ring which is rotatable relatively to said closure and is formed around its periphery with a plurality of projections or ridges forming therebetween a plurality of spaced slots, which slots have a circumferential length and are so positioned on said locking ring as to permit the passage therethrough, as said closure is engaged on said container, of said ridges or projections on said closure when said closure cap is located in a predetermined rotational position relative to said locking ring, said closure cap being rotated thereafter from said predetermined position to prevent ready removal of said closure.

It is to be understood that the essential feature of the invention is the provision of projections or ridges on the closure (or container) which are of unequal length and which are spaced apart by unequal circumferential distances around the closure. Such an arrangement ensures that the closure can only be removed from the container when the closure is located in only one position in relation to the container thus preventing any ready access or accidental opening of the container.

In a preferred embodiment of the invention the locking ring is formed as an integral part of the container wall. In order to provide greater security, however, a second locking ring may be provided rotatable relatively to both the closure and the container, the second locking ring being provided with slots corresponding to those on the container wall.

In order to indicate unauthorised opening of the container the closure may be provided with a tear-off strip having an annular projection engageable with an annular groove in the wall of the container.

The invention is also applicable for use with screw-threaded containers and in one such embodiment the projections or ridges on the closure are located in different planes transverse to the container axis.

The preferred embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a side elevation partly in section of one embodiment according to the invention,

FIG. 2 is a detail view in section showing the fitting of the closure to the container of the embodiment shown in FIG. 1,

FIG. 3 is a detail view in section showing the closure when fitted to the container,

FIG. 4 is an underneath plan view of the closure,

FIG. 5 is a plan view of the container,

FIG. 6 is a side elevation of a modification of the embodiment of FIGS. 1 to 5 which includes a tear-off strip to indicate unauthorised opening of the container,

FIG. 7 is a sectional view on the line 7-7 of FIG. 6,

FIG. 8 is a side elevation of a second embodiment of the invention incorporating a second independently movable locking ring,

FIG. 9 is a detail view in section of the embodiment of FIG. 8 showing the closure cap fitted to the container,

FIG. 10 is a side elevation partly in section of a third embodiment of the invention,

FIG. 11 is an underneath plan view of the closure of the embodiment of FIG. 10,

FIG. 12 is a plan view of the container of the embodiment of FIG. 10,

FIG. 13 is a side elevation of a fourth embodiment of the invention which incorporates a threaded connection between the closure and the container,

FIG. 14 is an underneath plan view of the closure of the embodiment of FIG. 13, and

FIG. 15 is a plan view of the container of the embodiment of FIG. 13.

Referring now to the embodiment of the invention as shown in FIGS. 1 to 5 of the drawings, the closure is in the form of a cap 10 made of a plastics or other suitable material and which is formed with an annular skirt portion 11 for fitting over the mouth 12 of a suitable container 13 which is also made of a plastics or other suitable material. To facilitate rotation and removal of the cap 10 the outer surface of the skirt portion 11 is formed with ridges or like projections 14.

As shown more clearly in FIGS. 2 and 3 of the drawings, the skirt portion 11 abuts a shoulder 15 formed on the wall 16 of the container 13 when fitted to the container so as to provide a smooth exterior surface.

The inner surface 17 of the skirt portion 11 of the cap 10 is formed with a plurality of circumferentially extending projections or ridges 18 which are shown more clearly in FIG. 4 of the drawings by the reference numerals 18a to 18f. The projections 18a to 18f are all of unequal circumferential length and they are spaced apart by distances indicated by the reference numerals 19a to 19f which are also of unequal circumferential length.

The outer surface of the wall 16 of the container 13 is formed with an annular groove 20. The outer surface of the wall 16 above the annular groove 20 is provided with a plurality of slots 21a to 21f which extend axially from the groove 20 to the mouth of the container. As shown in FIG. 5, the circumferential length of the slots 21a to 21f corresponds with the circumferential length of the projections 18a to 18f on the cap 10, the slots being angularly positioned and spaced apart by distances 22a to 22f which also correspond to the distances 19a to 19f between the projections on the cap 10.

It will be appreciated that the cap 10 in one angular position relative to the container 13 can be axially fitted thereon by the passage of its projections 18 through the corresponding slots 21 on the container. When the lower edge of the skirt portion 11 of the cap 10 engages

the shoulder 15 on the container, the projections 18 are positioned in the groove 16. The cap 10 is then rotated to a random position so as to prevent any ready removal of the cap from the container.

To facilitate direct fitting of the cap 10 on the container 13 the projections 18 are formed with an inclined lower surface 23 which thereby rides over the corner edge 24 of the container when fitted if the cap is not in the correct angular position. To prevent similar removal of the cap 10 the upper edge 25 of the projections 18 presents a flat horizontal surface.

Referring now to FIGS. 6 and 7 of the drawings, a modification is shown of the embodiment of FIGS. 1 to 5. It will be seen that the wall 16 of the container 13 is formed with a second annular slot 26 which is engaged by an annular projection 27 formed on the inner surface of the lower end of the skirt portion 11 of the cap 10. As before, the lower surface of the projection 17 is inclined so as to allow the push fit engagement of the annular projection 27 in the annular groove 26. The skirt portion 11 of the cap 10 is formed with an annular score or weakening line 28 and the portion of the skirt 11 below the line 28 is provided with a tag 29 to enable this part of the skirt portion to be removed as a tear-off strip or band. The modified embodiment of FIGS. 6 and 7 thereby provides a pilferproof container as the removal of the skirt portion below the line 28 will indicate unauthorised removal of the closure.

Referring now to FIGS. 8 and 9 of the drawings, a container and closure cap is shown which provides for greater security to prevent ready access to the container.

As before, the cap 30 has a depending skirt portion 31 provided around its inner periphery with a plurality of spaced projections 32, the projections being, as before, of unequal circumferential length and spaced apart by unequal circumferential distances.

Corresponding slots 33 are provided on the outer wall 34 of the container 35 by means of a plurality of spaced projections 36 which are formed on and extend outwardly from the wall of the container.

As shown in FIG. 8, the cap 30 is engaged on the container 35 by axial movement so that in the correct angular position the projections 32 engage and pass through the corresponding slots 33 on the wall of the container. Thereafter the cap 30 is rotated to a random position relative to the container.

To provide for greater security the container is provided with a second locking arrangement in the form of an annular ring 37 mounted on the container 35 for rotation independently thereto about the container axis. The ring 37 may be held against axial movement by a shoulder or ridge 38 on the container and the top edge of the locking ring is formed with circumferential projections 39 which correspond to the projections 36 on the container so as to provide similar spaces or slots 40.

To effect fitting of the closure 30 on the container the projections 36 and 39 must therefore be in line by correct rotation of the locking ring 37. After fitting of the cap 30 the cap is rotated to a random position and thereafter the locking ring 37 is also rotated relative to both the cap and the container to a random position which effects greater security.

To facilitate removal of the cap, code signs or other indications may be marked on the cap, container and locking ring.

Referring now to FIGS. 10 to 12 of the drawings, a simplified embodiment is shown in which both the container and cap can be easily manufactured by moulding techniques. The container 41 has inclined side walls 42 and, as shown more clearly in FIG. 12, the slots 43a to 43f are formed in a flange 44 projecting outwardly from the top edge or mouth of the container so as to receive the corresponding projections 45a to 45f formed along the inner surface of the periphery of the skirt portion 46 of the cap 47.

A fourth embodiment of the invention is shown in FIGS. 13 to 15 of the drawings and illustrates the application of the invention to a screw top container. The container comprises a bottle 50 having a neck 51 provided with the usual screw threads 52. The neck 51 is formed at its top edge with an outwardly projecting flange 53 which is slotted as in the previous embodiment to provide spaces 54. The cap 55 has a skirt portion 56, the inner surface of which is provided with a plurality of spaced inwardly extending projections 57.

The projections 57 are spaced around the inner periphery of the skirt portion 56 in a random manner and are of unequal circumferential length. The projections 57, however, in this embodiment are located in different planes transverse to the axis of the container and in effect provide a broken screw thread on the inner periphery of the cap 55.

The closure cap 55 is axially located on the container, as before, and after passage of all the projections 57 through the corresponding slots 54, the cap 55 is rotationally engaged on the threaded portion 52 as in the manner of a screw top container.

Sufficient space is provided between the top end of the threads 52 and the flange 53 to ensure that the cap 55 is not positioned opposite the appropriate slots 54 when the cap leaves the screw threads. Furthermore, in order to prevent removal of the cap 55 by pivotal movement of the cap which might be possible due to its length, an inner projection 58 is provided which fits snugly within the mouth 59 of the neck 51 of the container.

I claim:

1. A tamper-proof container having cylindrical side wall portions, a bottom, and an open mouth portion, a cylindrical closure member including a depending cylindrical skirt portion and a top portion, said skirt portion, in the applied position of said closure, being telescoped over said side wall portion of said container adjacent said mouth, a first series of spaced projections of unequal circumferential length on the inner face of said skirt extending toward the side wall portions of said container, the spaces between said projections defining axially directed slots, a second series of projections extending outwardly from the side wall portions of said container and defining axially directed slots therebetween, an annular collar rotatably mounted on and fixed against axial movement relative to said container, a third plurality of projections on said collar of the same circumferential extent and spacing as said projections of said second series and defining slots therebetween, said third plurality of projections being retatable into registry with the projections of said second series, the slots and projections of the second and third series, in the registering position thereof, being coordinated with the slots and projections of said first series, to permit the passage of said first series of projections axially past the projections of said second and third series at

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a predetermined relatively rotated position of said closure and said container, whereby removal of said closure from said container may be effected only when the projections of said second and third series are in said registering position and said closure and container are in said predetermined rotated position.

2. The apparatus of claim 1 wherein said collar is rotatably mounted in an annular groove formed on the exterior of said container.

3. A tamper-proof closure and container combination comprising a closure formed about its periphery with a skirt having a single series of spaced, inwardly directed projections, said projections having their upper faces disposed in a common plane, the projections being of unequal circumferential length and spaced apart by unequal circumferential distances, said container including a locking ring rotatable relative to said closure, said ring being formed about its periphery with a single series of projections having their under faces disposed in a common plane, said projections of said locking ring forming therebetween a plurality of

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spaced slots, the slots of said locking ring having a circumferential length and positioning relative to said ring to permit the passage therethrough of said projections of said closure as said closure is shifted axially onto said container when said closure is located in a predetermined rotational position relative to said locking ring, the upper faces of said projections of said closure and the under surface of said projections of said container being in co-planar alignment in the assembled position of said parts, said closure and container being separable by relative axial movement when said slots are disposed in registry with said projections.

4. A tamper-proof closure in accordance with claim 3 wherein said projections include complementary cam faces positioned to interengage in the course of axial movement of said closure onto said container, whereby said closure and container may be assembled, notwithstanding the projections of said closure and container are in registry.

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