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3,410,434

SAFETY CONTAINER CONSTRUCTION

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2 Sheets-Sheet 1

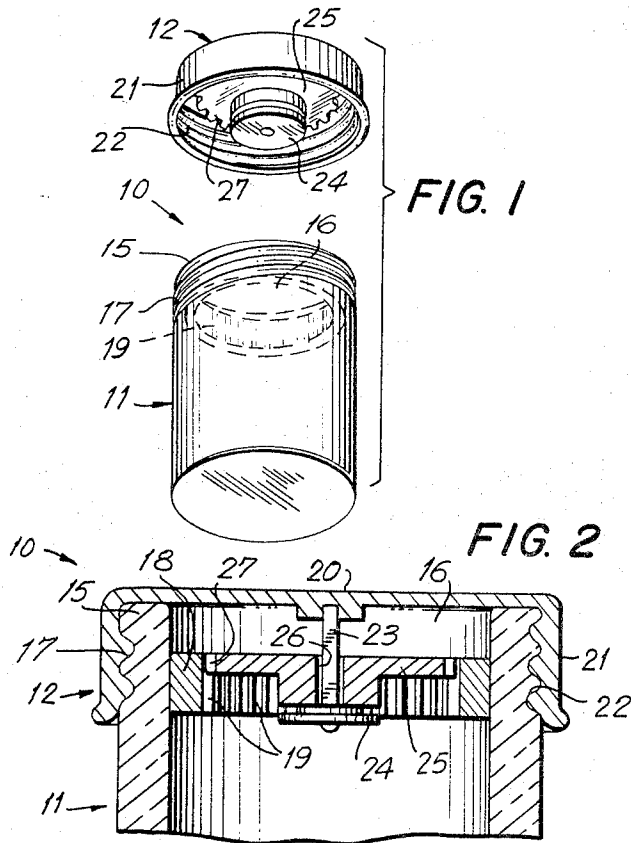


FIG. 4

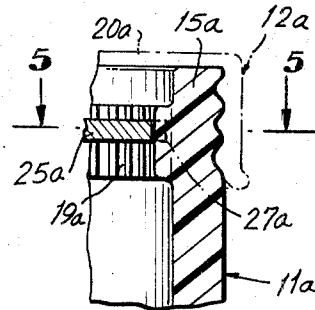


FIG. 3

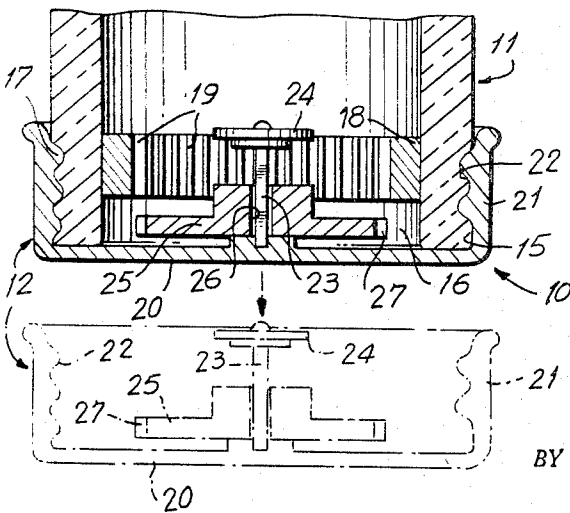
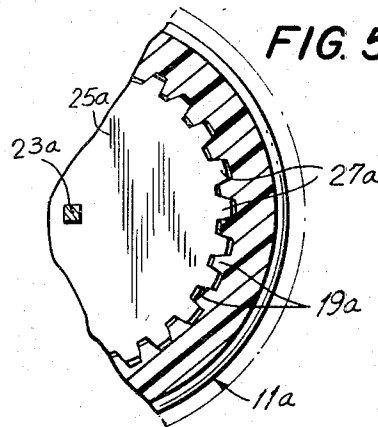


FIG. 5



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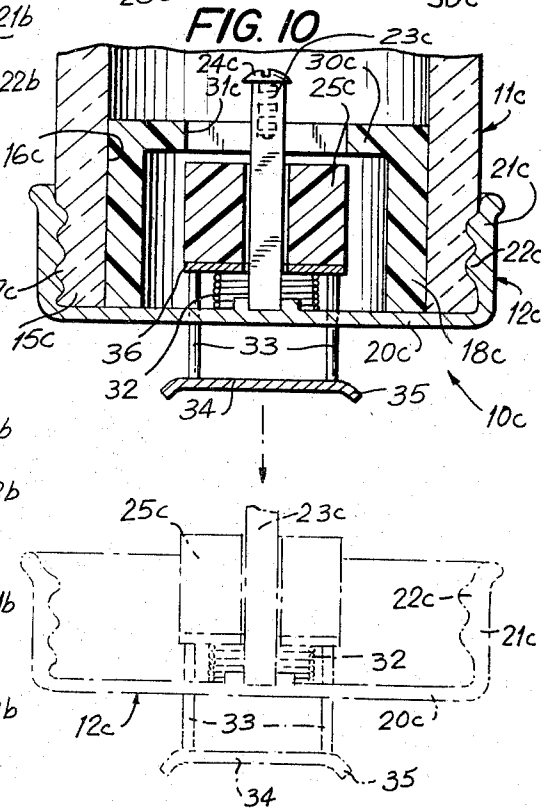
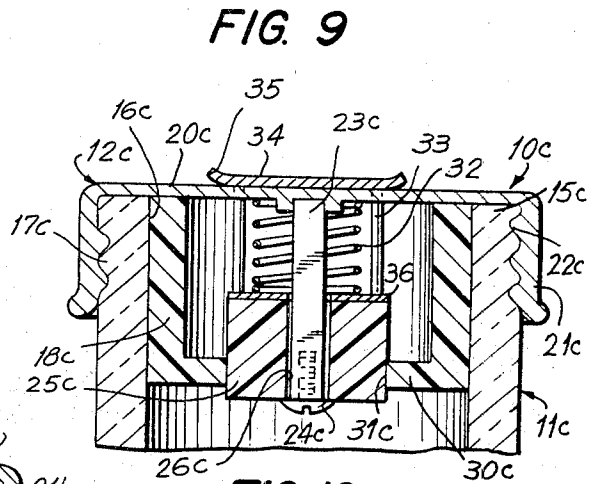
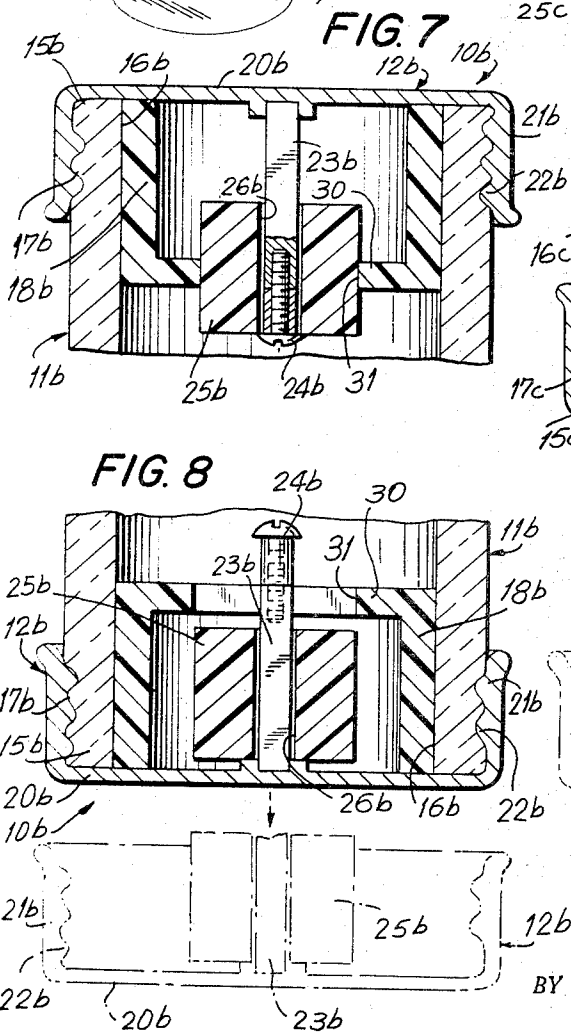
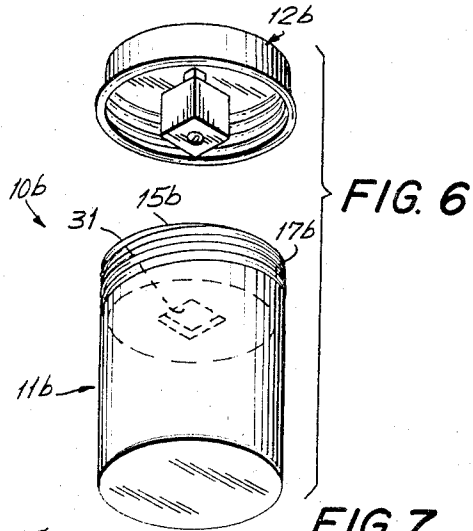
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ABSTRACT OF THE DISCLOSURE

A receptacle provided with slidable gravity-biased means adapted to retain the closure portion of the receptacle against rotation relative to the container portion of the receptacle. Upon inversion of the receptacle, the said means is biased by gravity downwardly, thereby permitting relative rotation of said closure to the container portion.

This invention relates generally to safety container constructions, and is especially concerned with containers having closures incapable of accidental or inadvertent removal or opening, as by small children.

As is well known to those versed in the art, considerable injury and loss of life is continually experienced by small children opening containers of medicine and other potentially dangerous contents. Such mishaps also occur frequently even by adults failing to exercise due caution, and in other unforeseen circumstances.

Accordingly, it is an important object of the present invention to provide a container construction, as for medicines and other potentially dangerous contents, wherein the container can only be opened by a prescribed procedure which is relatively simple, but inherently opposed to normal opening procedures, so as to be effectively safe and substantially foolproof against inadvertent and accidental opening.

It is another object of the present invention to provide a safety container construction of the type described which is extremely simple in structure, capable of economic mass production for use and sale at a reasonable cost, and which is durable and reliable throughout a long useful life.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIGURE 1 is a bottom perspective view illustrating a container construction of the present invention, with the container receptacle and closure in an open or exploded condition;

FIGURE 2 is a partial sectional elevational view illustrating the container of FIGURE 1 in its normal, closed condition;

FIGURE 3 is a partial sectional elevational view similar to FIGURE 2, but inverted and illustrating an operative condition of closure removal;

FIGURE 4 is a partial sectional view, of a smaller section, similar to FIGURE 2, but of slightly modified construction;

FIGURE 5 is a fragmentary horizontal sectional view taken generally along the line 5-5 of FIGURE 4;

FIGURE 6 is an exploded bottom perspective view illustrating a slightly modified container constructed in accordance with the teachings of the present invention;

FIGURE 7 is a partial sectional elevational view,

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similar to FIGURE 2, but illustrating the embodiment of FIGURE 6 in its normal, closed condition;

FIGURE 8 is a partial sectional elevational view, similar to FIGURE 3, but showing the embodiment of FIGURES 6 and 7 in an inverted condition for removal of the closure, the removed closure being illustrated in phantom;

FIGURE 9 is a partial sectional elevational view showing a further embodiment of the present invention in its normal, closed condition; and

FIGURE 10 is a partial sectional elevational view showing the embodiment of FIGURE 9 in an inverted condition, and illustrating the removal procedure, the removed closure being shown in phantom.

Referring now more particularly to the drawings, and specifically to FIGURE 1 thereof, a container is there generally designated 10, and includes a receptacle 11 and closure 12. The receptacle may be of any general type, being shown for purposes of illustration and without limiting intent as an open-top receptacle or jar having a mouth 15 provided with a thru opening 16 communicating between the interior and exterior of the receptacle. While the receptacle 11 is illustrated as of the general type employed for containing pharmaceuticals, it is, of course, understood that a wide variety of receptacles may be employed, without departing from the spirit of the present invention.

Circumferentially about the exterior of receptacle 11, say formed on the mouth 15, may be external screw threads 17. Internally of the receptacle mouth 15, conformably engaged therein may be an annular insert or ring 18 suitably fixed by any suitable means to the interior of the mouth. Internally on the annulus 18 there are provided a plurality of spaced, circumferentially arranged formations 19, say in the form of radially inwardly projecting digits or teeth. Thus, the formations 19 on the annulus 18 may combine therewith to define an internal ring gear suitably fixed internally of the receptacle mouth 15. The internal formations or teeth 19 project radially inward, and extend longitudinally of the annulus 18 and mouth 15, each formation or tooth advantageously being of constant cross-sectional configuration along its longitudinal extent.

The closure 12 may assume the form of a cap having a top wall 20 and a depending peripheral skirt 21. Internally of the peripheral skirt 21 are advantageously formed screw threads 22 configured for mating threaded engagement with the external mouth screw threads 17. Therefore, the cap 12, as thus far described, may be conventional and is removable from and replaceable on the receptacle mouth 15, for opening and closing the latter, being detachably secured thereto by threaded engagement between the mouth threads 17 and cap threads 22 upon relative rotation of the cap and receptacle when the cap is in closing relation with the mouth. While the receptacle mouth 15 has been illustrated and described as carrying external screw threads 17, and the cap 12 as carrying internal screw threads 22, it is appreciated that other suitable detachable connection means may be employed, if desired.

Fixedly carried by the cap top wall 20 and depending interiorly of the cap 12 centrally thereof is a noncircular rod or shaft 23. The shaft 23 thus projects coaxially through the annulus 18 when the closure 12 is in its closed condition of FIGURE 2. The shaft 23 may be of rectangular cross section, as shown, or of other non-circular cross-sectional configuration, if desired.

Carried on the depending or distal end of shaft 23 may be an enlargement or head 24, say defined by a generally circular washer fixed to the shaft end. Circumposed about the shaft 23 intermediate the end enlarge-

ment 24 and the closure wall 20 is a generally circular disc or wheel 25. That is, the disc or wheel 25 is provided with a central thru opening 26 of a noncircular configuration nonrotatably, but slidably receiving the shaft 23. The disc or wheel 25 is therefore freely shiftable longitudinally along the shaft 23, but not rotatable relative to the said shaft.

Provided in a circumferential array about the periphery of the disc or wheel 25 are a plurality of radially outwardly projecting tooth formations or digits 27. Thus, the wheel or disc 25 having radially outwardly projecting, circumferentially arranged teeth 27 assumes the general configuration of a spur gear.

In the illustrated condition of FIGURE 2, the toothed wheel 25 is gravitationally resting on the lower end enlargement or head 24 of shaft 23. In this condition, the teeth 27 of wheel 25 are in interdigital or interfitting meshing engagement with the radially inwardly projecting teeth or formations 19 of the annulus 18. The wheel 25, by this meshing engagement between formations 19 and 27, is held against rotation relative to the receptacle 11. As the closure or cap 12 cannot rotate relative to the wheel 25, the closure is thereby held in its closed relation with mouth 15 and in its threaded engagement with the mouth threads. Thus, in the normal upright or erect condition of the receptacle 11, the closure 12 in its closing relation cannot be removed therefrom.

However, upon inversion of the receptacle 11 to the condition shown in FIGURE 3, it will be apparent that the toothed wheel 25 shifts or falls gravitationally away from the shaft enlargement 24 toward the closure end wall 20 to remove the wheel teeth or formations 27 from their interfitting engagement with the mouth formations 19. Therefore, in this inverted condition of receptacle 11, the closure 12 may be rotated to screw or unscrew the threaded engagement between closure threads 22 and receptacle threads 17. That is, only by the simple, but unusual, act of inverting the receptacle 11 may the closure 12 be rotated relative to the receptacle, and thus only in this manner may the container be opened or closed by the removal or replacement of the closure. Such unusual or exceptional procedure would certainly require instruction or knowledge and prevent accidental or inadvertent opening of the receptacle, as by children or otherwise.

In the embodiment shown in FIGURES 4 and 5, the mouth 15a of receptacle 11a is provided internally thereof with an integral formation of circumferentially arranged, radially inwardly projecting formations or teeth 19a, as by molding during manufacture. Thus, the secondary operation of securing the insert 18 may be obviated.

The operation of the embodiment shown in FIGURES 4 and 5 may be substantially identical to that described hereinbefore in connection with FIGURES 1-3; a spur gear or wheel 25a being carried by a noncircular shaft 23a fixed to a closure or cap 12a and having its teeth or circumferentially arranged radially outwardly projecting formations 27a configured for interfitting engagement with the internal mouth formations or teeth 19a.

Referring now to the embodiment of FIGURES 6-8, a container is there generally designated 10b, and includes a receptacle 11b and a closure 12b. The receptacle may be of any suitable type, an open-top jar being illustrated as having a mouth 15b provided with a thru opening 16b communicating between the interior and exterior of the receptacle.

Circumferentially about the interior of the receptacle 11b, say on the mouth 15b, may be external screw threads 17b, while an annular fitting 18b may be conformably engaged in and fixed by any suitable means within the interior of the mouth. The fitting 18b may include a transverse wall 30 extending across the annular fitting and formed with a thru opening 31 of noncircular formation, say that of a square, as seen in FIGURE 6. Thus, the fitting 18b defines a receiver, as will appear more fully

hereinafter, with the opening 31 providing formations in the form of straight sides meeting at substantially right angles, or other suitable noncircular formation.

The closure 12b may be a cap, or other suitable closure, say having a top wall 20b and a depending peripheral skirt 21b, the latter provided with internal screw threads 22b for threaded engagement with the mouth screw threads 17b.

Depending fixedly from a central region of the cap top wall 20b is a noncircular rod or shaft 23b, for extension through the noncircular formation 31 when the cap is in its closed condition. Slidably circumposed about and carried by the shaft 23b may be an insert member 25b retained on the shaft by a shaft end enlargement or head 24b. The insert 25b may be of suitable noncircular formation for conforming engagement through the opening 31, in the instant embodiment being of generally rectangular or square formation.

The insert 25b is thus gravitationally, nonrotatably engageable downward into the opening 31 of fitting 18b in the normal, upright closed-cap condition of FIGURE 7 to positively prevent cap removal. Upon inversion of the container 10b, the insert formation 25b gravitationally shifts out of the receiver formation or opening 31, to the condition of FIGURE 8, in which condition the closure or cap 12b may be unscrewed from the receptacle 11b, as shown in phantom.

Of course, the receiver fitting 18b and its noncircular formation 31 may be formed integrally with the receptacle, if desired.

In the embodiment of FIGURE 9 there is shown a container generally designated 10c, which may include a receptacle 11c substantially identical to the receptacle 11b, and having a separate, fixedly secured, or integral internal receiver 18c which may also be substantially identical to the receiver 18b.

The closure 12c may include a cap having a top wall 20c and an internally threaded peripheral skirt 21c for mating threaded engagement with the external mouth thread 17c of receptacle 11c. Also, a noncircular rod or shaft 23c depends fixedly from a central region of closure top wall 20c through the noncircular formation or opening 31c of receiver 18c. An insert 25c, of noncircular formation, for conforming engagement within the receiver opening 31c, is carried by the shaft 23c and shiftable therealong between its position of FIGURE 9, and nonrotatably engaged in the opening 31c, and a position toward the closure 12c out of the opening 31c. An end enlargement 24c on the end of shaft 23c limits movement of insert formation 25c away from the closure 12c.

Interposed between the top wall 20c of cap 12c and the adjacent side of insert 25c is a coil compression spring 32 resiliently urging the insert formation 25c toward its extreme position of shifting movement against the head 24c. One or more tie members or rods 33 may extend from the insert formation 25c slidably through the cap top wall 20c, and are there connected to a finger-actuable pull member 34. The pull member 34 may be a generally disc-like plate having marginal edge portions 35 bent away from the cap top wall 20c, to provide finger-engagement portions. Thus, the pull member 34 may be manually engaged to retract the insert formation 25c upward out of the receiver formation 31c, thereby permitting relative unscrewing of the cap 12c from the receptacle 11c. This condition is illustrated in FIGURE 10, with the container inverted, but it is appreciated that the container need not be inverted for opening in this embodiment.

In another embodiment of this invention, referring also to FIGURES 9 and 10, the tie members or rods 33 may extend from a contact plate 36 interposed between the top wall 20c and the adjacent side of insert 25c. The rods 33 may extend, as in the prior embodiment, slideably through the cap top wall 20c and be there connected to the finger-actuable pull member 34. The pull member 34 may be substantially identical to that described in the preceding embodiment. Thus, the pull member 34 may be manually

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engaged to retract the contact plate 36 upward out of it's urging relationship against the adjacent side of insert 25c, thereby permitting the insert 25c, when the container is in the inverted position, illustrated in FIGURE 10, to shift gravitationally out of the opening 31c, in which condition the closure or cap 12c may be unscrewed from the receptacle 11c, as shown in phantom. It will be appreciated that this embodiment provides a double means of protection in that the container can be opened only by holding the container in the inverted position, and, by also manually engaging the pull member 34 to retract the contact plate 36. The container cannot be opened by merely inverting it nor by merely engaging the pull member 34.

From the foregoing, it is seen that the present invention provides a safety container construction which fully accomplishes its intended objects and is well adapted to meet practical conditions of manufacture, distribution and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A safety type container construction comprising a receptacle having a mouth; a closure for said receptacle movable toward and away from said mouth respectively into and out of closing relation therewith, means on said closure for detachable engagement with engaging means on said mouth of said closure and operable by relative rotation of said closure with respect to said receptacle, receptacle formations nonrotatably carried by said receptacle, and closure formations carried by said closure for axial shifting movement into and out of interfitting engagement with said receptacle formations, to releasably retain said closure against said relative rotation with respect to said receptacle, said closure formations being gravity-biased out of said interfitting engagement upon inversion of said receptacle and closure when said closure means are in detachable engagement with said mouth engaging means, thereby permitting relative rotation of the receptacle and the closure.

2. A container construction according to claim 1, said receptacle formations comprising a first circumferential arrangement of spaced radially projecting digits, and said closure formations comprising a second circumferential arrangement of spaced radially projecting digits shiftable into and out of interdigital relation with said first-mentioned digits.

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3. A container construction according to claim 1, said receptacle formations comprising a circumferential arrangement of spaced radially inwardly projecting teeth fixed to said mouth, and said closure formations comprising a wheel nonrotatably carried by said closure for shifting movement toward and away from the latter, and a circumferential arrangement of spaced radially outwardly projecting teeth fixed to said wheel for shifting movement therewith into and out of said interfitting relation with said inwardly projecting teeth.

4. A container construction according to claim 3, in combination with a noncircular shaft projecting from said closure, said wheel being nonrotatably circumposed about said shaft for shifting movement therealong.

5. A container construction according to claim 4, said closure comprising a cap, and said mouth and closure engaging means being external and internal, respectively.

6. A container construction according to claim 1, in combination with spring means resiliently urging said closure formations into said interfitting relation, and hand-actuable means for manually shifting said closure formations out of said interfitting relation.

7. A container construction according to claim 1, said receptacle formations defining a receiver of noncircular formation, and said closure formations defining an insert of noncircular formation conformably engageable in said receiver.

8. A container construction according to claim 1, in combination with spring means bearing against contact means, said contact means resiliently urging said closure formations into said interfitting relation, and hand-actuable means for manually shifting said contact means out of its normally urging relationship with said closure formations, thereby enabling said closure formations to be gravitationally shiftable into and out of said interfitting engagement upon erection and inversion of said receptacle and closure in said closing relation.

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