United States Patent [19]

Buie

[11] **3,844,407**

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[54] **CHILD RESISTANT SAFETY CONTAINER**

[75] Inventor: **Robert E. Buie,** Salt Lake City, Utah

[73] Assignee: **Child-Resistant Packaging Corp.,** Washington, D.C.

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[52] **U.S. Cl.**.....**206/1.5,** 206/530, 220/8, 206/807; 215/9

[51] **Int. Cl.**..... **A45c 13/10,** A45c 13/18

[58] **Field of Search** 215/9, 44; 206/1.5, 42; 220/8

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Primary Examiner—George T. Hall
Attorney, Agent, or Firm—John E. Becker

[57] **ABSTRACT**

A lightweight, plastic two-part telescopic safety container or child resistant prescription type vial requiring a special technique to open, thus precluding small children from gaining undesirable access to the contents thereof. The inner and outer cylindrical containers each have a closed end disposed remotely opposite one another for preferably thumb and forefinger compression together against an internal combined locking and moisture-seal spring device. A pair of diametrically opposed lugs coact with a corresponding pair of diametrically opposed specially inclined bayonet type slotways and offset seats to constitute complemental locking means on the telescopic tubular container members. Aligning the lugs with the entry to the inclined slotways, followed by merely squeezing or compressing the container members by the thumb and forefinger at opposite ends, results in their effectively being relatively rotated and locked together with flush ends so that the inner container is inaccessible from the standpoint of not projecting from or being accessible for grasping with fingers and/or teeth and moving relative to the outer container member. Opening is effected by those aware of the special technique, by axially fully compressing the members, again as between the thumb and forefinger, and then imparting an unlocking relative rotation thereto by the other hand. The novel safety vial of this type provides a substantially complete moisture-proof seal by a combination of the resilient spring device at the inner end of the outer container member, and by a syringe-like telescopic fit of the inner and outer container members.

12 Claims, 13 Drawing Figures

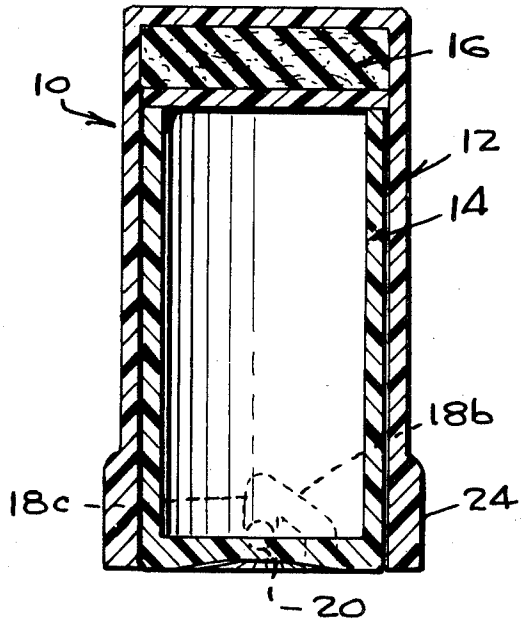


Fig-1

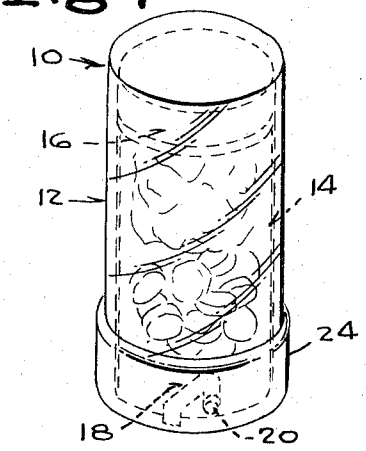


Fig-2

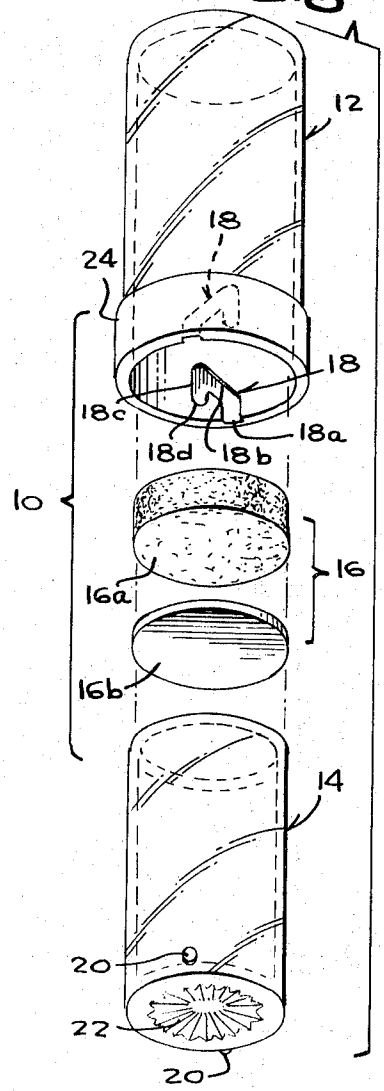


Fig-5

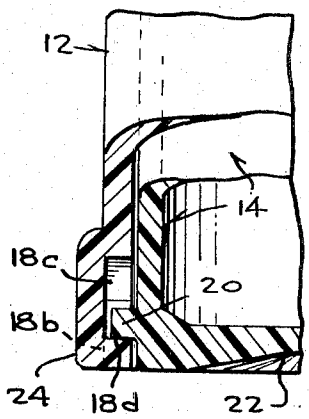


Fig-3

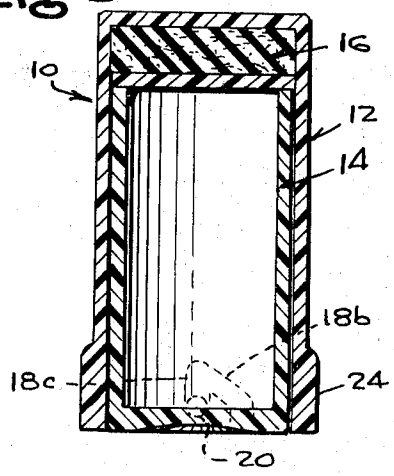


Fig-6

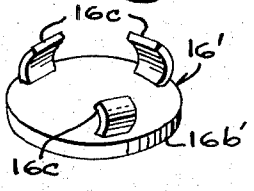


Fig-7

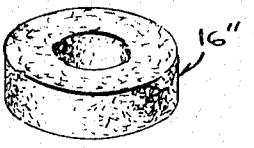


Fig-4

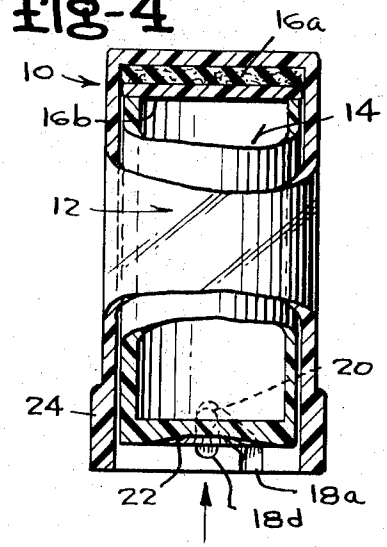


Fig-13

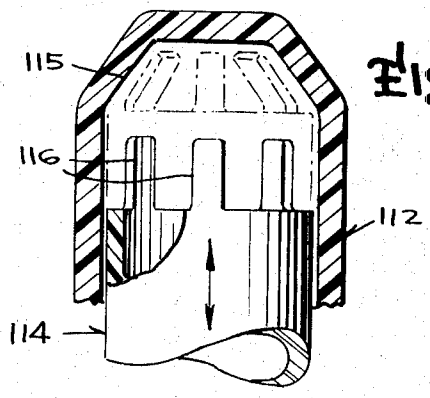


Fig-8

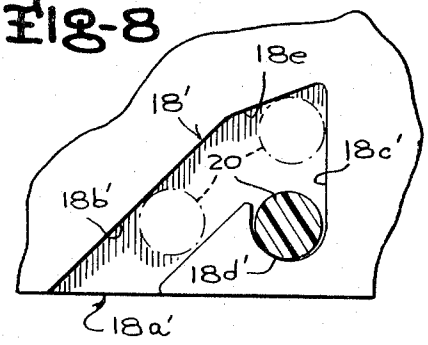


Fig-11

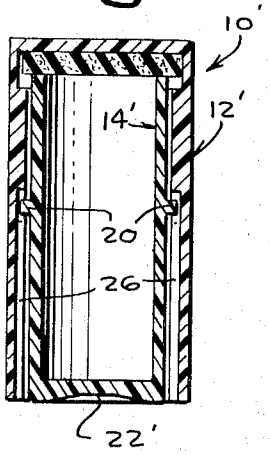


Fig-12

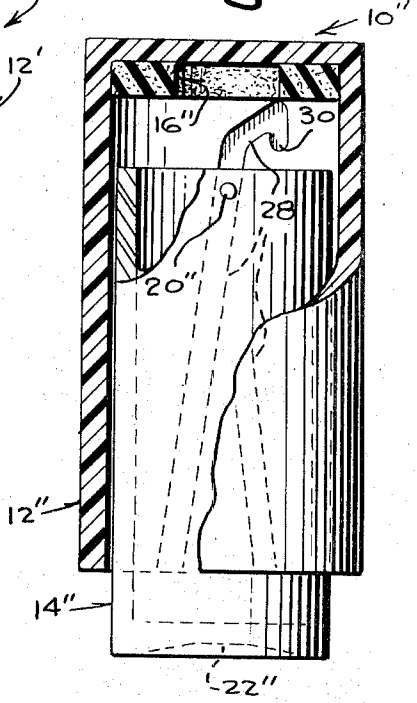


Fig-9

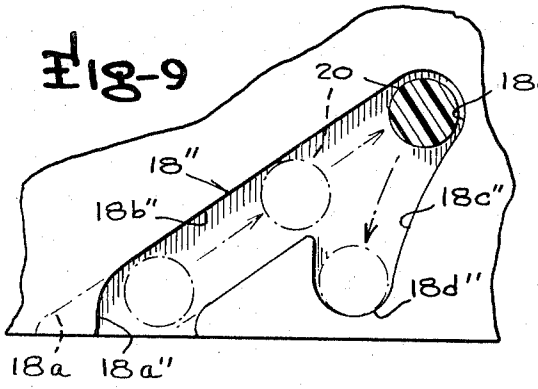
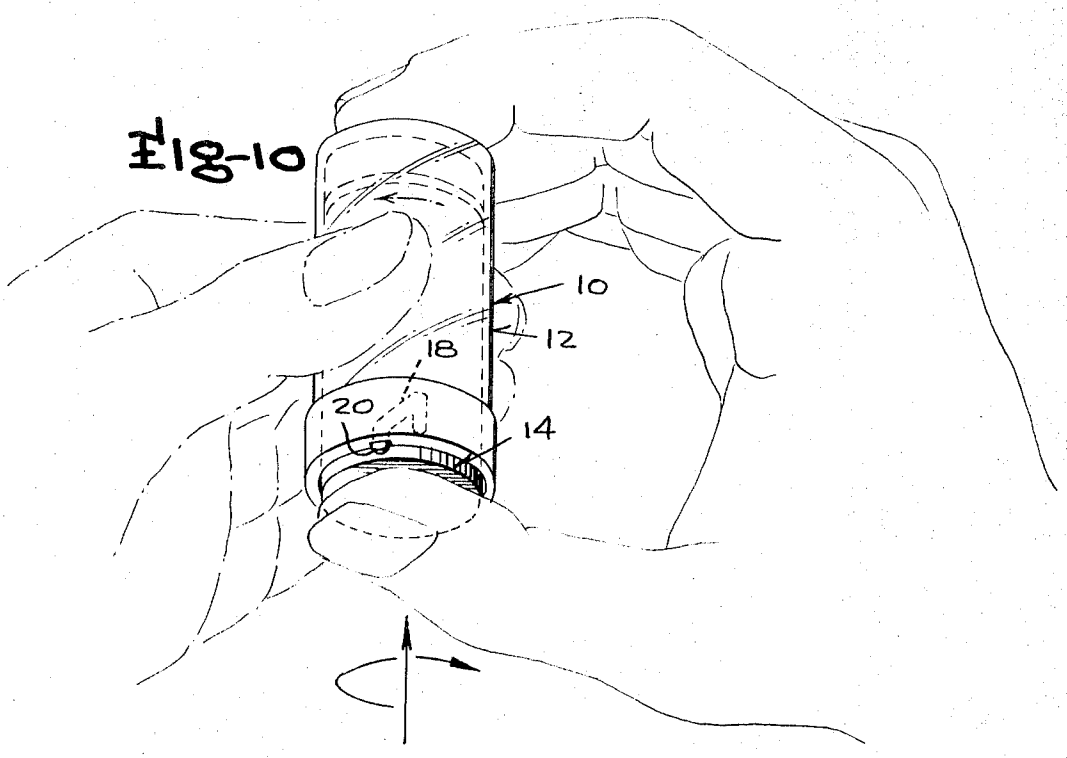


Fig-10



CHILD RESISTANT SAFETY CONTAINER

BACKGROUND OF THE INVENTION

It is well recognized that there is an ever present danger of death and serious internal injury to small children and infants, as well as to advanced elderly people, resulting from their gaining access to and ingesting different inherently or potentially dangerous medicaments and other substances which are commonly packaged in containers embodying relatively easy to manipulate screw-on or snap-on-and-off caps.

Recognition of the foregoing dangers has led to the passage of stronger legislation requiring such substances to be packaged in better safety containers having child resistant closures thereon. While many such safety containers and closures have been invented over the years, there still remains an urgent need for a much improved container of this type and particularly one which will provide a greater degree of safety attendant both the initial opening and also subsequent repeated useage of the safety vials or containers.

OBJECTIVES AND SUMMARY OF INVENTION

Accordingly,, it is a principal object ot this invention to provide a novel safety vial having the more currently requisite increased degree of safety attendant both the initial opening and subsequent reusage of the containers.

Another object is to provide an improved safety vial of the foregoing character which is fabricated of a lightweight plastic material, and by embodying telescopically cooperable tubular members in concentric spring-biased interlocking form provides a much more durable safety container effectively provided with dual walls.

Still another object is to provide a two-part safety vial of this character in which the inner container which houses the contents is completely telescopically hidden within the outer container sleeve and in a manner with the ends are substantially smooth and flush with one another whereby there is no projecting portions to grasp with either hands or teeth on the inner member thereby eliminating the more conventional relative rotation attempt of separation of the container components.

Yet another object is to provide novelly improved safety vial of this character which is fabricated of a non-transparent or pronounced opaque character particularly in the area of the complemental interengageable retaining means so as to reduce the prospect of a child being able to possible decipher the necessary technique required to open the vial.

A further object is to provide a vial type safety container which is essentially completely moisture proof, and which is achieved by internal compressible seal means together with a closely fitting syringe-like relationship of the telescopically related container members.

Yet a further object is to provide a vial type safety container of the described character which in one form embodies built-in resilient spring-biasing means integrally in conjunction with the outer and inner containers.

A still further object is to provide an improved safety vial or container of the childproof closure type which overcomes the disadvantages of undue complexity, cost

or unsatisfactory reliability attendant many of the previously evolved allegedly safety containers.

These and other objects and advantages are achieved by the provision of a two-part fully telescopic safety container or vial of which the inner and outer telescoping cylindrical members each have a closed end disposed remotely opposite one another. This facilitates sealingly closing the same preferably by the thumb and forefinger applied thereagainst to compress them together against the bias of an internally disposed resilient spring means which at least in one form serves as a combined moisture seal lock-effecting means. The telescopic members are provided with complementally interengaging locking means such as a pair of diametrically opposed lugs projecting at right angles to the axis of the container, and which lugs coact with a corresponding pair of specially inclined bayonet type slotways having acutely angled offset lug-retaining seats. The use of specially inclined camming slotways assures the imparting of a positive relative rotation of the container members attendant their being fully compressed together, whereupon they are then released to permit the lugs to drop or move into their respective seats responsive to the normal resiliency of the spring means disposed between the closed end of the outer cylindrical member and the open inner end of the inner cylindrical member.

To open the safety vial according to my special technique, it is only necessary to re-compress the telescoped members together against the spring biasing means, as with the thumb and forefinger of one hand, and to then impart relative rotation in an unlocking direction as by the thumb and fingers of the other hand. Poor prehensile strength and lack of knowledge of the special technique, together with no exposed parts to grasp, all contribute to precluding young children from being able to open the safety vial.

Other objects and advantages will become more apparent from the following detailed description taken in conjunction with the illustrative drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view of my improved safety vial in a fully closed condition;

FIG. **2** is a perspective view of my improved safety container shown in an exploded manner;

FIG. **3** is a vertical cross-sectional view of the fully assembled vial of FIGS. **1** and **2**;

FIG. **4** is a partial elevation and partial cross-sectional view, similar to FIG. **3**, but showing the inner and outer cylindrical members in a further inwardly telescoped manner compressing the internal sealing means;

FIG. **5** is an enlarged fragmentary detail view taken through a lug-retaining seat of one of the bayonet slots;

FIGS. **6** and **7** are perspective views of alternate forms of resilient spring devices adapted to be disposed within the inner end of the outermost cylindrical or cover member;

FIG. **8** is an enlarged semi-diagrammatic view of one form of the inclined slotway and lug;

FIG. **9** is a view similar to FIG. **7** illustrative of another form of the inclined slotway and lug coaction;

FIG. **10** is a perspective view of my improved vial or safety container depicting a preferred manner of reassembling the telescopic members;

FIGS. 11 and 12 are cross-sectional views of different modified embodiments of the safety container; and

FIG. 13 is a fragmentary cross-sectional view of still another modification embodying integrally formed spring-biasing means.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Refering in more detail to the drawings, the more preferred embodiment of my safety container, as per FIGS. 1–5 in its entirety is designated generally at 10, and embodies telescopically interfitting outer and inner cylindrical container members 12 and 14 respectively. Spring means 16 are interposed between the members to constitute at least part of a moisture seal means and also means for biasing the two members apart into a positive interlocked relationship. Each of the members is provided with a closed end and an open end, the closed ends being disposed remotely opposite one another in the assembled relationship. The releasable interlocking relationship of the members 12 and 14 is provided by coacting means including lugs and corresponding specially inclined slotways provided on the perspective members to form a modified kind of bayonet type connection, to be described in more detail hereinafter.

In the preferred form of FIGS. 1–5 the outer container member 12 is provided with a plurality of preferably two specially inclined slotways generally designated 18 which are equally spaced on the inner periphery of its open end. The inner cylindrical member 14 is provided with a corresponding pair of pin-type lugs 20 which project radially from the exterior periphery and near the closed end thereof. The diameter or cross-sectional dimension of the pins 20 are such as to closely approximate but provide for freely slidable movement within said slotways 18.

The inclined slotways 18 are unlike other more conventional rectangular shaped bayonet type closure slots with which I am aware. The inclined slotways 18 may be made in various forms, such as shown not only in FIGS. 2 and 3, but also as per FIGS. 8 and 9 to be described in more detail hereinafter. Slotways 18 of FIGS. 2 and 3 may comprise basically the entry end 18*a* of a uniformly inclined linear portion 18*b* which abruptly changes direction in an acute angularly offset but shorter linear portion 18*c* terminating in a pin or lug seat 18*d*. The pin lugs 20 cooperably coact with the slotways 18 when aligned therewith, and more specifically, upon axial pressure being applied to the opposite closed ends of the members 12 and 14, pins 20 cammingly ride up the inclined portions 18*b* in a manner which imparts relative rotation to the two members. Upon the complete telescopic compression of the inner member 14, as per FIG. 4, against the spring means 16 which is disposed at the inward closed end of outer cylindrical member 12, the inner member 14 and pins 20 thereof have rotated to a position opposite the pin seats 18*d* whereupon the compressive force is released and pins 20 are axially forced into the seats responsive to the reaction of the spring means 16.

The relative size and relationship of the slotways, pins and cylindrical container ends is such that the members freely slide both axially and rotatively relative to one another, and when in the interlocked closed condition, the closed end of the inner container member 14 is substantially flush with and does not project beyond the open skirt-like end of the outer member 12. The closed end of the inner tube 14 may be slightly dished and knurled or serrated if desired at 22, thereby providing better purchase for imparting relative rotation to the members, as shown in FIG. 10.

Reverting to the spring means 16, one acceptable form of which is shown clearly in FIG. 2, it is seen to comprise a compressible disc-like pad or member 16*a* fabricated of any suitable natural or artificial rubber-like material which will provide a proper degree of resiliency and compressibility to achieve the stated interaction of the components. Additionally at least one rigid disc member 16*b* is provided to lay adjacent the resilient member 16*a*, as shown, or it may be sandwiched between two such discs 16*b*. Their size is such as to fit with a loose friction fit so as to retain their desired position adjacent the inner closed end of the outer cylindrical member 12. The use of disc 16*b* assures a more uniform compression throughout the full area of the compressible member 16*a* when engaged just by the annular open lip or edge of member 14. If desired, the spring means components may be adhesively held in place. It is apparent that other spring means such as a resilient coiled or leaf spring means (not shown) may be substituted for the part 16*a*. Additionally a spring means 16′ of the type shown in FIG. 6 may be substituted. Such a spring means 16′ comprises a relatively rigid disc portion 16*b*′, corresponding to disc 16*b*, and a plurality of resilient or deflectable spring legs 16*c*. A further modified form of spring means 16″ is shown in FIG. 7, and may comprise an annular generally doughnut-shaped compressible member which is engaged by the annular lip or open end of cylindrical member 14.

The wall thickness of the respective cylindrical members 12 and 14 in this preferred form of FIGS. 1–5 is preferably generally uniform and equal with one another, except for the lower or open end of the outer container 12 in the area of the slotways 18. As readily seen in the drawings, and more particularly in the fragmentary enlarged cross-sectional view of FIG. 5, the wall thickness thereof is considerably increased to a sufficient extent to provide for a good operative depth of the slotways 18 which are formed therein. This additional wall thickness is manifested in the provision of the illustrated axially elongated collar-like portion 24. While the member 12 may be made of uniformly thick walls to avoid the formation of the collar 24, this would be needlessly wasteful of material. Moreover the collar 24 provides a harmless substitute for a grasp or hold area by children who may inadvertantly come into possession of the container. With no other projecting portion existing, it serves to hold their attention, thinking it is is a removable cap of some kind, until their interest wanes. By providing the aforementioned fully telescoped and flush end relation of the two container members, the inner cylindrical member containing the actual medicine or other potentially dangerous substance, is inaccessible from the point of being able to grasp and relatively twist the two members in an attempt to separate them.

To effect opening by adults or those who have been taught the special technique, there is only the need to apply sufficient axial pressure to compress the telescopic members together against the bias of the spring means 16, thereby retracting the retaining lugs from their angled seats, then impart slight relative rotation in

the unlocking direction to the two cylindrical container members as held generally at opposite axial ends preferably between the thumb and forefinger of one hand while rotating with the thumb and fingers of the other hand, such as the reverse as shown in FIG. 10. Upon release of the axially applied pressure during the latter rotation the spring device forces the inner container member to telescopically extend slightly apart from the outer container member enabling the two members to be readily separated for access to the medicine or other content therewithin. After reassembling the telescopic members with the lugs initiated in the slotways, a locked moisture-seal closing thereof may be effected by one hand. This is represented by the solid-line showing of one hand in FIG. 10, and is achievable by merely compressing opposite axial closed end portions of the members together by the thumb and forefinger whereupon the lugs ride up the inclined bayonet slotways. Simultaneously this action imparts relative rotation between the cylindrical members until the retaining lugs become disposed opposite their respective angularly offset seats whereupon release of the axial thumb and finger pressure results in the lugs being biased properly into their retaining seats.

MODIFIED SLOT MEANS

FIGS. 8 and 9 depict enlarged scale variations of the specially inclined slotway with the pin lug 20 being shown in various dotted and solid line positions of travel therein. Referring first to FIG. 8, the slotway is generally designated 18'. Primed reference numbers are used to designate portions thereof corresponding to those of the slotway 18 previously described. The primary difference between the first described form and that of FIG. 9 resides in the utilization of a non-uniformly inclined camming or bearing surface 18*b'*. As shown, the innermost portion 18*e* of surface 18*b'* changes its angle of inclination back toward the pin lug seats 18*d'*. This is designed to help better direct the lugs sufficiently over and somewhat closer to the lug seats and acutely angled lug-retaining slot portion 18*c'*. Therefore, it is apparent that during the smoothly occurring assembly movement of the members, upon release of the aforesaid axially applied pressure after complete compression, said lugs 20 them change course from their smooth inclined travel from along the modified angled bearing surface and are forced axially and positively into said seat portions.

Referring next to the slotway form of FIG. 9, generally corresponding portions of the slotway 18'' are designated by correspondingly doubled primed reference numbers. The basic difference of this form over that of the first-described form of FIGS. 1–5, is that the inclined bearing surface 18*b''* is extended at its innermost end 18*e''* somewhat beyond the seat portion 18*d''*. Also the acutely angled lug-retaining slot portion 18*c''* is modified to smoothly connect the remote innermost end 18*e''* with the deepest portion of the pin seat 18*d''*. The extended end 18*e''* and described modified portion 18*c''* help assure sufficient relative rotative movement of the cylindrical members so that the pins or lugs 20 will be biased smoothly into said seats notwithstanding any potential or inherent retrograde movement of the lugs which may tend to occur upon release of the axial compression of the telescoped members.

A further difference for the slotway 18'' may be the modified short axially directed entry portion 18*a''* which smoothly curves and blends into the inclined portion 18*b''*. This minor difference may better facilitate the entry of the pin type lugs 20. The previous form of the entry 18 as is shown in dotted line in FIG. 9 for a comparison with that of 18*a''*. It is apparent that the operation remains essentially the same for the containers embodying any of these modified slotways.

ALTERNATE MODIFICATIONS

FIGS. 11 and 12 depict modified embodiments 10' and 10'' wherein the components remain essentially the same except for the specific disposition of the pin lugs and slotways. In FIG. 11, the container assembly is generally designated 10' and the pin lugs 20' are shown disposed at approximately midway between the closed end 22' and the open end of the inner cylindrical container 14'. It follows that the slotways 26 necessarily extend a correspondingly further distance inwardly from the open end of the outer cylindrical member 12'.

FIG. 12 depicts the slotways 28 extended even further to reach pin seats 30 disposed near the inner closed end portion of the outer cylindrical member 12''. The pins 20'' are suitably disposed near the open end, rather than near the closed end, of the inner telescopic member 14''. The operation remains essentially the same as in the aforedescribed embodiments.

Still further variations contemplate reverse disposition of the pin lugs 20 onto the inside of the outer sleeve member 12, with attendant provision of the coacting slotways on the outer peripheral surface of the inner cylindrical member 14. In such an arrangement it would be more preferable to dispose the pins adjacent the closed inner end and seal/spring means, thereby requiring shorter overall length of the coacting slotways. Where non-transparent materials are used, indicia such as dots of contrasting color to the body material may be used to facilitate correct orientation of the pins and slotways, if necessary when disposed so completely hidden.

In conjunction with the aforeproposed syringe-like arrangement of the telescopic cylindrical members, it is contemplated that one or the other of the generally cylindrical members be slightly tapered or that the open end of the inner member be slightly tapered outwardly or flared to provide a closer sliding fit with the interior surface of the outer sleeve-like member. This, together with the tight fit of the resilient gasket-like spring means, would further assure a nearly moisture proof construction.

Proceeding to the further modification depicted in FIG. 13, this is a further more preferred modification than those of FIG. 11 and 12, and embodies spring biasing means integrally formed with, and thereby minimizing the overall container components to, the two telescoping cylindrical members.

As clearly shown the outer cylindrical container member is designated 112 and is provided with a generally conical or frusto-conical shaped inner combined side and end wall area 115. The inner cylindrical container member 114 is provided at its open free end with a plurality of longitudinally extend spring-like fingers 116. In one acceptable form, a plurality of 3 or more equally spaced fingers are utilized around the periph-

eral circumference of the open end of said container **114.**

The operation of these telescopically related members, which also embody any of the aforedescribed inclined slotways and pin arrangements, remains essentially the same. That is, responsive to the axially applied pressure to opposite externally closed ends of the two cylindrical members, the members telescope together with the spring-fingers **116** engaging against and being convergingly deformed along the conical surface **115,** as shown in dotted lines in FIG. **13.**

By use of properly proportioned spring fingers and conical camming or deforming surface, together with the use of a proper type of plastic-like material having appropriate deformable memory characteristics, it is apparent that the cylindrical container members can be properly spring-biased to resiliently load the modified inclined bayonet slot and pin type interlocking means thereof.

By provision of this FIG. **13** embodiment, the aforedescribed separate spring means, such as illustrated in FIGS. **2, 6** and **7** are eliminated thus restricting the assembly to truly two integral components.

It is apparent that the principle of operation of these contemplated modifications would remain essentially the same, and provide an equal or greater degree of safety or child resistancy as that of the first-described and more preferred embodiments.

From the foregoing detailed descriptions taken in conjunction with the illustrative drawing figures, it is apparent that a novelly improved safety container has been evolved which achieves all of the objectives and advantages set forth in the preamble and throughout the specification.

Further variations and modifications, such as the provision of perhaps three or more equally spaced lugs and slotways, may be made by those skilled in the art without departing from the spirit and scope of the described invention and as defined in the appended claims.

What is claimed is:

1. A safety type container for medicines and the like having child resistant closure means, comprising in combination:

a. an outer cylindrical container member having a longitudinal axis, a closed end and an open end transverse to said axis;

b. an inner cylindrical container member also having a corresponding longitudinal axis, a closed end and an open end, and being sized to closely telescopically fit both axially and rotatively within said outer container;

c. said container members adapted to fit together with their closed ends remotely opposite one another to form a completely closed container, and so that in closed assembly the closed end of the inner member is essentially flush with and does not project beyond the open end of said outer member;

d. said container members having resiliently biased complementally coacting interengaging locking means, including a pair of lugs spaced peripherally apart on one of said members and projecting radially from said axis, a corresponding pair of specially inclined bayonet type slotways spaced peripherally apart on the other of said members to operatively receive said lugs therein; said slotways having major linear portions and an open end constituting basic initial entry portions, each of said major linear portions disposed at a pronounced inclined angle relative to a line parallel to the longitudinal axis, said slotways further having lug-retaining seats offset therefrom and at an acute angle relative thereto and being oriented generally parallel to said axis; and

e. said container members and interengaging locking means being so constructed and related so as to effect both automatic and positive but releasable interlocking thereof responsive to the application and subsequent release of moderate axially applied pressure to the opposite closed ends of said container members.

2. A safety type container as defined in claim **1** wherein said lugs are disposed diametrically apart and adjacent to the closed end of said inner container member, and said complemental slots are correspondingly formed in the outer container member adjacent to its open end.

3. A safety type container as defined in claim **1** wherein said coacting interengaging locking means of paragraph (d) further include resilient spring like means disposed inwardly of and against the closed inner end of said outer container member for sealing engagement by said open end of said inner member; said resilient means constituting in part both moisture sealing means and means together with said inclined slotway for effecting said automatic and positive interlocking engagement of said interengaging locking means.

4. A safety type container as defined in claim **1** wherein said telescopically interfitting members are fabricated so that at least certain coacting portions thereof fit together and coact in a piston-like syringe manner to at least help moisture seal said container members.

5. A safety type container as defined in claim **1** wherein said inclined initial entry portions of said slotways adjoin a camming or bearing surface for said lug which surface near the innermost end changes its angle of inclination toward said lug seats to help direct said lugs sufficiently over said seats so that upon said release of said axially applied pressure during assembly thereof, said lugs are forced positively into said lug seat portions.

6. A safety type container as defined in claim **1,** wherein said inclined linear portions of said slotways constitute lug guiding and camming surfaces and include innermost portions which extend slightly beyond deepest portions of said lug seats so that upon said release of said axially applied pressure during closing assembly of said container members, said lugs will be biased into said seats notwithstanding certain potentially inherent retrograde movement of said lugs within said inclined portions of the slotways.

7. A safety type container as defined in claim **1** wherein said lugs and slotways are respectively disposed diametrically apart on said container members, and with said lugs disposed respectively on and near the open end of said inner container, and the seats of said slotways being near the closed end of said outer container.

8. A safety type container as defined in claim **1** wherein said lugs and slotways are respectively disposed diametrically apart on said members, and with said lugs disposed respectively on outer peripheral por-

tions of said inner container and at portions intermediate the ends thereof; and said slotways being correspondingly disposed on intermediate inner peripheral portions of said outer member.

9. A safety type container as defined in claim **1** wherein said container members are fabricated of a lightweight plastic material which is non-transparent at least in the area of said interlocking inclined slotways and lugs, to thereby reduce the likelihood of a child inadvertantly deciphering the required special technique to unlock and separate said container members.

10. In a safety container of the child resistant type embodying one-open-end telescopically interfitting inner and outer cylindrical members having their respective closed ends disposed remotely opposite one another, and embodying complemental interengaging locking means selectively movable axially and rotatively to operably interlock and releasably separate said members, the improvement in said interlocking means comprising in combination therewith

a. a pair of locking lugs spaced peripherally apart on one of said cylindrical members, said lugs projecting radially from a common central longitudinal axis of said container;

b. a corresponding pair of specially inclined bayonet type slotways spaced peripherally apart on and near the open end of said other member so as to operatively receive said lugs and for coaction therewith;

c. said slotways each having a major linear portion and an open end constituting an initial entry portion, each of said major linear portions disposed at an angle of pronounced inclination relative to a line parallel to said axis and relative to the transverse ends of said members, and further having lug-retaining-and-seat portions offset from an inner portion of and at an acute angle relative to said slotway for cooperative receipt of said lugs; and

d. said container members having resilient means interposed internally therebetween for resiliently spring-loading said members, and together with said interengaging locking means being so related as to effect both automatic and positive but releasable interlocking thereof responsive to the application and subsequent release of moderate axially applied pressure to said opposite closed ends of said container members.

11. A safety type container as defined in claim **1** wherein said coacting interengaging locking means of paragraph (d) further include complemental coacting biasing means including first means on the interior of said outer cylindrical container and adjacent the inner closed end thereof, and resiliently deformable second means on the open end of said inner cylindrical container.

12. A safety type container as defined in claim **11**, wherein said first means comprises a generally open conical shaped combined side and end wall surface which is open toward the open end of said outer container; and said resilient deformable second means include a plurality of longitudinally extended spring-finger members spaced around the circumferential periphery of said open end of said inner cylindrical container; said spring-finger members adapted to be resiliently convergingly deformed when forced against said conical side and end wall surface responsive to said axially applied pressure to thereby resiliently spring-load said container members when in the closed assembled condition.

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