United States Patent

[11] 3,623,623

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[54] **CHILDPROOF SAFETY PACKAGE**
16 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **215/9,** 215/31, 215/73
[51] **Int. Cl.** **B65d 55/02**
[50] **Field of Search** 215/9, 31, 73; 222/529, 542, 546, 551, 570

[56] **References Cited**

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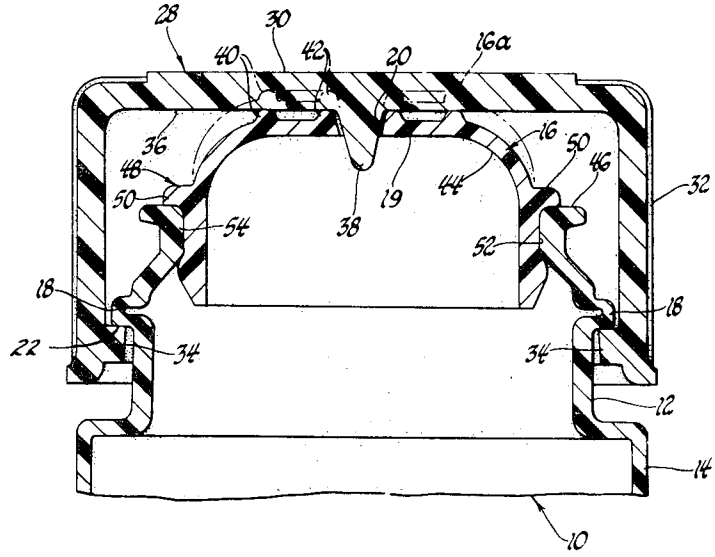
ABSTRACT: A childproof safety package including a container having a spring member secured thereto with a cap engaging portion surrounding the discharge opening of the container, the cap engaging portion being yieldable along the container axis. A plurality of container locking elements are located a fixed axial distance from the normal unstressed position of the cap engaging portion such that the cap engaging portion is resiliently yieldable toward the container locking elements from its normal position. A safety cap is mounted on the container having a plurality of cap locking elements engageable with a disengageable from the container locking elements by combined axial and rotative motion of the cap relative to the container, and the cap engaging portion of the spring member engages the inner surface of the end wall of the cap when the locking elements are engaged to bias the cap against axial movement from locked engagement with the container.



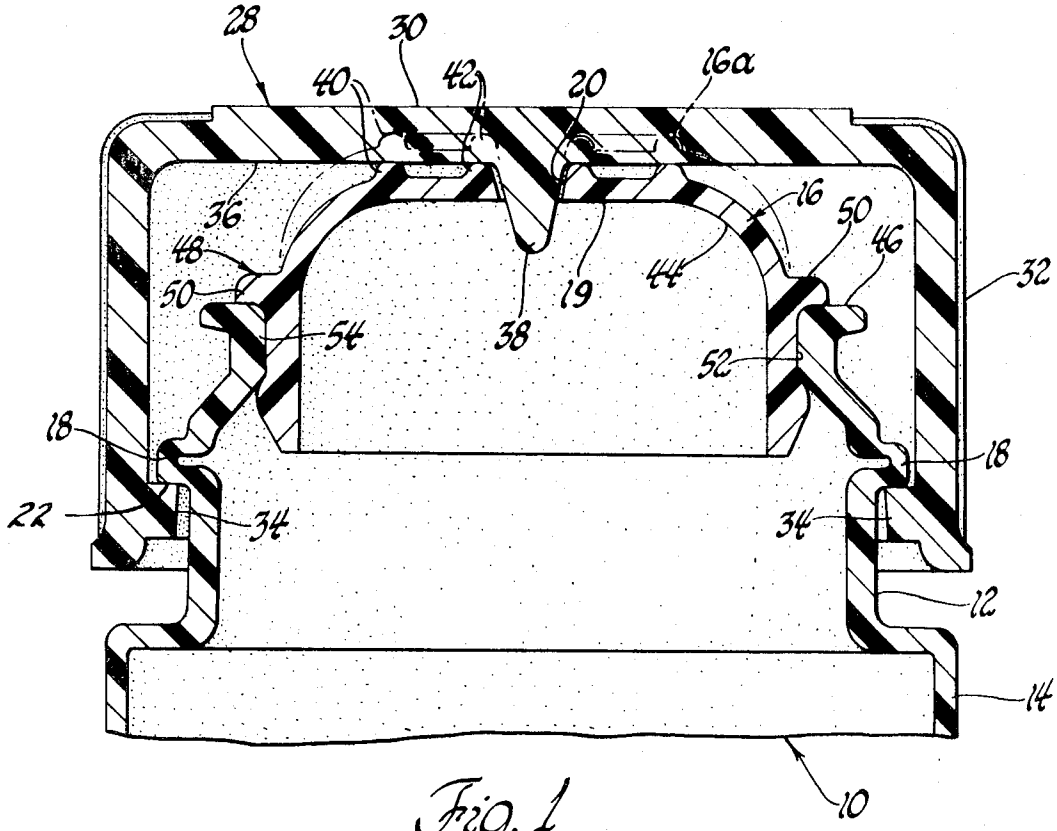


Fig. 1

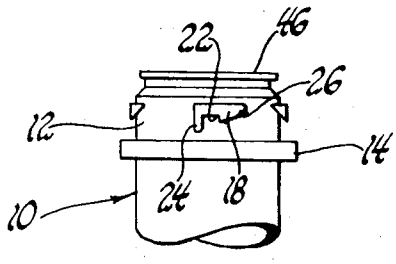


Fig. 2

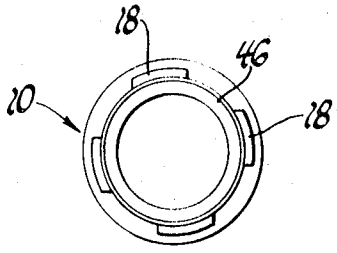


Fig. 3

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CHILDPROOF SAFETY PACKAGE

This invention relates generally to childproof safety packages and is particularly concerned with safety packages of the type having a cap that can be applied to and removed from its container only by combined axial and rotative motion.

The number of accidental poisonings resulting from young children having access to unsafe household products such as furniture polish, liquid cleansers, toiletries, insecticides and the like, together with the number of accidental drug poisonings, is rapidly approaching unacceptable proportions. Consequently, there has been a longstanding need for childproof safety packaging for such materials constructed in such a manner that it can be economically produced in large quantities by mass production techniques. To fulfill the criteria of a childproof safety package, a container and cap must be constructed in such a manner that the type of manipulation required to remove the cap from the container is one that a young child is incapable of performing. It has become increasingly apparent that most small children are capable of unscrewing a conventional screwcap from a container. However, it has also been found that a young child is incapable of manipulating a cap that is mounted on a container in such a manner that the cap must be pushed axially relative to the container and then rotated relative to the container in order to remove the cap from the container and provide access to the contents of the container.

Hedgewick U.S. Pat. No. 3,344,942 discloses a safety cap and container wherein a plurality of container-locking elements are spaced peripherally from each other on the outer wall of the mouth portion of the container for engagement with complementary cap-locking elements on the inner wall of the peripheral skirt projecting axially from the base of the cap. In the device disclosed in the Hedgewick patent, the cap and container-locking elements are of the type wherein the cap must be engaged with and disengaged from the container by combined axial and rotative motion of the cap relative to the container. When the cap is mounted on the container, the cap-locking elements are biased against disengagement from the container-locking elements by a spring member in the form of an integral annular web formed on the cap.

An object of this invention is to provide a childproof safety package of the type in which a cap may be interlocked with and disengaged from a container only by combined axial and rotative motion of the cap relative to the container wherein biasing means is carried by the container for resiliently maintaining the cap in interlocked engagement with the container.

Another object is to provide a childproof safety package particularly suitable for liquid household products such as furniture polish, liquid cleansers, toiletries, and insecticides wherein the discharge opening of the container is surrounded by a cap-engaging portion which is yieldable along the axis of the container so as to provide a biasing force to bias a cap into locked engagement with the container.

Still another object is to provide a childproof safety package for liquid products such as furniture polish wherein it is desirable for the liquid to be dispensed through a small orifice either by shaking the container with the cap removed, or by squeezing a pliable container to cause liquid to be squirted through the dispensing orifice.

A further object is to provide a one-piece molded plastic spring member suitable for use with childproof safety packages wherein the spring member can be fixedly mounted on a container in such a manner that the spring member engages the safety cap when applied to the container to bias the safety cap into locked engagement with the container.

A further object is to provide a one-piece molded plastic spring member for safety packages that can be mounted on a container so that liquid contents of the container can be dispensed through an orifice in the spring member, and wherein the spring member reacts between the container and a safety cap applied thereto to maintain the cap and container in locked engagement with each other.

The foregoing, and other objects, are achieved by the provision of a container having a spring member with a cap-engaging portion surrounding the discharge opening of the container, the cap-engaging portion being yieldable along the axis of the container from a normal, unstressed position. A plurality of container-locking elements are spaced peripherally from each other on the outer surface of the container and are located a fixed axial distance from the normal position of the cap-engaging portion of the spring member. When a cap having complementary cap-locking elements is engageable with and disengageable from the container-locking elements by combined axial and rotative motion, the cap-engaging of the spring member engages the end wall of the cap to bias the cap against disengagement from the container.

Other objects, advantages and features of the invention will become apparent from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a sectional view of safety-dispensing apparatus embodying the present invention;

FIG. 2 is an elevational view of the mouth portion of the container in the assembly of FIG. 1; and

FIG. 3 is a top plan view of the container of FIG. 2.

With reference to the drawings, a childproof safety package according to the present invention comprises a container **10** having a mouth portion **12** with a discharge opening **20** defined therein. The mouth portion **12** projects upwardly from a radially outwardly extending flange **14**. Spring means designated generally by reference numeral **16** is secured to the container and includes a cap-engaging portion **19** surrounding the discharge opening **20**. The cap-engaging portion **19** is yieldable along the axis of container **10** from a normal, unstressed position illustrated in phantom lines in FIG. **1** at **16***a*. A plurality of container-locking elements **18** are spaced peripherally from each other and are located a fixed axial distance from the normal position of the cap-engaging portion such that the cap-engaging portion **19** is resiliently yieldable toward the container-locking elements **18** from its normal position as indicated at **16***a*.

The container-locking elements **18** are of the type shown in the above-mentioned Hedgewick U.S. Pat. No. 3,344,942 and each includes a radially outwardly extending projection formed with a notch **22** formed between a stop portion **24** and a cam portion **26** (FIG. **2**).

The childproof safety package of FIG. **1** further includes a cap **28** having an end wall **30** with a peripheral skirt **32** projecting axially therefrom for receiving the mouth portion **12** of the container. Spaced peripherally from each other on the inner surface of the skirt portion **32** is a plurality of cap-locking elements **34** in the form of radially inwardly projecting lugs. The cap-locking elements **34** are engageable with and disengageable from the container-locking elements **18** by an axial motion of the cap relative to the container followed successively by a rotative motion of the cap relative to the container. To apply the cap to the container, the cap-locking elements **34** are aligned with the spaces between the container-locking elements **18** so that the locking lugs **34** engage the can surface of the cam portion **26** of the locking elements **18**. Upon rotation of the cap in the direction to move the cap-locking elements **34** toward the left in FIG. **2**, the cap-locking elements are cammed downwardly by the cam portion **26** until they engage the respective stop portion **24**, at which point the lugs **34** come into alignment with the respective notches **22**. Subsequent upward movement engages each cap-locking element **34** in a notch **22** to prevent relative rotation between the cap and container. The cap-engaging portion **19** of spring member **16** engages the inner surface **36** of the end wall **30** of the cap when the locking elements **18** and **34** are engaged, as shown in FIG. **1**, to bias the cap against axial movement from locked engagement with the container.

In the illustrated embodiment, the cap-engaging portion **19** overlies the mouth of the container, and the discharge opening **20** is in the form of a dispersing orifice formed in the cap-engaging portion **19**. Extending from the end wall of the cap into

the orifice is an integral axial projection 38 which acts to close the orifice 20 when the locking elements are engaged as well as to prevent clogging of the orifice. Annular sealing elements 40 and 42 surround the projection 38 and the orifice 20. The sealing elements are engaged between the opposed surfaces of the cap end wall 36 and the cap-engaging portion 19 of spring member 16. The annular sealing elements each comprise an axially projecting rib formed integrally on the cap-engaging portion 19.

Spring member 16 comprises a domelike body having a generally flat base portion which defines the cap-engaging portion 19, and yieldable means 44 supporting the base portion 19 in axially spaced relationship with respect to the container-locking elements 18. Base portion 19 is supported by the yieldable means 44 in its normal position as indicated in phantom lines at 16*a* in the unstressed condition of the yieldable means, and is biased to return to the normal position 16*a* upon flexure of the yieldable means 44 when the cap is placed on the container as shown in FIG. 1.

The yieldable means 44 comprises a generally spherical wall portion integral with and curved outwardly and axially from the base portion 19 for reacting between the container 10 and cap 28 to bias the cap toward locked engagement with the container. Hence, when the cap is placed on the container, the engagement of the inner surface 36 of the end wall 30 of the cap with the cap-engaging portion 19 of the spring member 16 tends to flatten out the spherical wall portion 44 as the cap-locking elements 34 move into engagement with the container-locking elements 18, and the tendency of wall portion 44 to return to its original, unstressed position maintains the cap-locking elements in engagement with the notches of the container-locking elements by resiliently resisting axial movement of the cap toward the container from the position shown in FIG. 1.

Container 10 is formed with an annular rim 46, and the spring member 16 is formed with a rim-engaging portion 48 for securing the spring member 16 to rim 46. The spherical wall portion 44 resiliently biases the rim-engaging portion 48 and cap-engaging portion 19 toward axially separated positions. The rim-engaging portion 48 includes a radially outwardly extending flange 50 for overlying the container rim 46, flange 50 forming the upper portion of an annular groove 52 formed in the spring member 16. Groove 52 receives a complementary radially inwardly projecting annular rib 54 formed on the container adjacent rim 46.

The orifice 20 is tapered inwardly from the outer surface of the cap-engaging portion 19, and the projection 38 is tapered complementary with the orifice 20 as shown in FIG. 1. Ribs 40 and 42 are biased into contact with the inner surface 36 of the cap end wall 30 to provide a liquid seal.

The spring member 16 is thus in the form of a one-piece, molded plastic, dome-shaped body having a base portion 19 with a centrally located discharge opening formed therein. An axially extending cylindrical mounting flange 48 has a diameter larger than the diameter of the base portion 19 for mounting the spring member on the rim 46 of the container, and a spherical wall portion 44 connects the periphery of the base portion 19 with the cylindrical mounting portion 48. The spherical wall portion 44 is curved axially and outwardly from the base portion to the mounting flange 48 and yieldably maintains the base portion and mounting flange in axially separated positions. The annular groove 52 formed on the mounting flange 48 is forced onto the annular projection 54 of the container to secure the spring member 16 to the container.

The cap is removed from the container by displacing the cap axially toward the rim 46 of the container until the cap-locking lugs 34 are completely disengaged from the notches 22 of the respective container-locking elements 18. The cap is then rotated to bring the cap-locking elements 34 out of registry with the container-locking elements and permit the cap-locking elements 34 to pass axially between the container-locking elements 18 as the cap is removed from the container. Liquid contents of the container 10 may then be dispensed through the orifice 20 either by shaking the container, or in the case of a pliable plastic construction for the container 10, liquid contents can be caused to squirt through the orifice 20 by squeezing the container. Spring member 16 thus serves both as a biasing means to maintain the safety cap 28 in locked engagement with the container, and also to provide a dispensing outlet for liquid contents.

Suitable materials for the spring member are polypropylene, polyethylene, polystyrene, and other plastics. The cap 28 may also be molded in one-piece from polypropylene, polystyrene, polyethylene and the like. The illustrated container may also be blow-molded of polystyrene, polypropylene polyethylene, or the like, although the cap and spring member may also be used with containers made of other materials.

While a specific example of the invention is illustrated in the accompanying drawings and described in the foregoing specification, it should be understood that the invention is not limited to the exact construction shown, and that various alternative constructions and arrangement of parts is possible without departing from the scope and spirit of the invention.

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

1. A childproof safety package including: a container having a mouth portion with a discharge opening defined therein; spring means secured to said container having a cap-engaging portion surrounding said opening, said cap-engaging portion being yieldable along the axis of said container from a normal, unstressed position; a plurality of container-locking elements on the container spaced peripherally from each other and located a fixed axial distance from the normal position of said cap-engaging portion such that said cap-engaging portion is resiliently yieldable toward said container-locking elements from its normal position; a cap having an end wall with a peripheral skirt projecting therefrom for receiving said mouth portion and a plurality of cap-locking elements spaced peripherally from each other on the inner surface of said skirt, said cap-locking elements being engageable with and disengageable from said container-locking elements by an axial motion of the cap relative to the container followed successively by a rotative motion of the cap relative to the container; said cap-engaging portion engaging the inner surface of the end wall of said cap when said locking elements are engaged to bias the cap against axial movement from locked engagement with the container; said spring means comprising a generally flat, annular base portion defining said cap-engaging portion; and yieldable means extending from the outer periphery of said base portion for supporting said base portion in axially spaced relationship with respect to said container-locking elements, said base portion being supported by said yieldable means in said normal position in the unstressed condition of said yieldable means, and being biased to return to said normal position upon flexure of said yieldable means; said yieldable means comprising a generally spherical wall portion integral with and curved outwardly and axially from said base portion for reacting between the container and cap to bias the cap toward locked engagement with the container.

2. A childproof safety package as claimed in claim 1 wherein said container is formed with an annular rim, and said spring means is formed with a rim-engaging portion for securing the spring means to said rim, said spherical wall portion resiliently biasing said rim-engaging portion and cap-engaging portion toward axially separated positions.

3. A childproof safety package as claimed in claim 2 wherein said cap-engaging portion overlies the mouth of the container, and wherein said opening comprises a dispensing orifice formed in said cap-engaging portion.

4. A childproof safety package as claimed in claim 3 wherein said orifice is tapered inwardly from the outer surface of said cap-engaging portion, and further including an integral projection extending axially from the end wall of said cap and received in said orifice, said projection being of complementary tapered configuration.

5. A childproof safety package as claimed in claim 4 further including at least one integral annular rib projecting axially from the outer surface of said rim-engaging portion to provide a seal between the cap-engaging portion and inner surface of the end wall of said cap.

6. A childproof safety package including: a container having a mouth portion with a discharge opening defined therein; spring means secured to said container having a cap-engaging portion surrounding said opening, said cap-engaging portion being yieldable along the axis of said container from a normal, unstressed position; and a plurality of container-locking elements on the container spaced peripherally from each other and located a fixed axial distance from the normal position of said cap-engaging portion such that said cap-engaging portion is resiliently yieldable toward said container-locking elements from its normal position; said spring means including a generally flat, annular base portion defining said cap-engaging portion; yieldable means extending axially from the outer periphery of said base portion for supporting said base portion in axially spaced relationship with respect to said container-locking elements, said base portion being supported in its normal position in the unstressed condition of said yieldable means; and said yieldable means comprising a generally spherical wall portion integral with and curved outwardly and axially from said base portion.

7. A childproof safety package as claimed in claim 6 wherein said container is formed with an annular rim, and said spring means is formed with a rim-engaging portion for securing the spring means to said rim, said spherical wall portion resiliently biasing said rim-engaging portion and base portion toward axially separated positions.

8. A childproof safety package including: a container having a mouth portion with a discharge opening defined therein; spring means secured to said container having a domelike body with a cap-engaging portion surrounding said opening, said cap-engaging portion being yieldable along the axis of said container from a normal, unstressed position; a plurality of container-locking elements on the container spaced peripherally from each other and located a fixed axial distance from the normal position of said cap-engaging portion such that said cap-engaging portion is resiliently yieldable toward said container-locking elements from its normal position; a cap having an end wall with a peripheral skirt projecting therefrom for receiving said mouth portion and a plurality of cap-locking elements spaced peripherally from each other on the inner surface of said skirt, said cap-locking elements being engageable with and disengageable from said container-locking elements by an axial motion of the cap relative to the container followed successively by a rotative motion of the cap relative to the container; said cap-engaging portion engaging the inner surface of the end wall of said cap when said locking elements are engaged to bias the cap against axial movement from locked engagement with the container; said opening comprising an orifice formed in said cap-engaging portion, and an integral axial projection extending from the end wall of said cap into said orifice to close the orifice at least when said locking elements are engaged.

9. A childproof safety package as claimed in claim 8 further including at least one annular sealing element surrounding said projection and orifice between the opposed surfaces of the cap end wall and cap-engaging portion.

10. A childproof safety package as claimed in claim 9 wherein said annular sealing element comprises an axially projecting rib formed integrally on said cap-engaging portion.

11. A childproof safety package including: a container having a mouth portion with a discharge opening defined therein; spring means secured to said container having a domelike body with a cap-engaging engaging portion surrounding said opening, said cap-engaging portion being yieldable along the axis of said container from a normal, unstressed position; a plurality of container-locking elements on the container spaced peripherally from each other and located a fixed axial distance from the normal position of said cap-engaging portion such that said cap-engaging portion is resiliently yieldable toward said container-locking elements from its normal position; a cap having an end wall with a peripheral skirt projecting therefrom for receiving said mouth portion and a plurality of cap-locking elements spaced peripherally from each other on the inner surface of said skirt, said cap-locking elements being engageable with and disengageable from said container-locking elements by an axial motion of the cap relative to the container followed successively by a rotative motion of the cap relative to the container; said cap-engaging portion engaging the inner surface of the end wall of said cap when said locking elements are engaged to bias the cap against axial movement from locked engagement with the container; said domelike body of said spring means comprising a generally flat, annular base portion defining said cap-engaging portion, and yieldable means extending from the outer periphery of said base portion toward said container from said cap end wall for supporting said base portion in axially spaced relationship with respect to said container-locking elements, said base portion being supported by said yieldable means and said normal position in the unstressed condition of said yieldable means, and being biased to return to said normal position upon flexure of said yieldable means.

12. A childproof safety package including: a container having a mouth portion with a discharge opening defined therein; spring means secured to said container having a domelike body with a cap-engaging portion surrounding said opening, said cap-engaging portion being yieldable along the axis of said container from a normal, unstressed position; a plurality of container-locking elements on the container spaced peripherally from each other and located a fixed axial distance from the normal position of said cap-engaging portion such that said cap-engaging portion is resiliently yieldable toward said container-locking elements from its normal position; said domelike body of said spring means including a generally flat, annular base portion defining said container-locking portion; and yieldable means extending axially from the outer periphery of said base portion toward said container from said cap end wall for supporting said base portion in axially spaced relationship with respect to said container-locking elements, said base portion being supported in its normal position in the unstressed condition of said yieldable means.

13. A one-piece molded plastic spring member for childproof safety packages comprising: a generally domelike body having a base portion with a centrally located discharge opening formed therein; an axially extending cylindrical mounting flange having a diameter larger than the diameter of said base portion for mounting said spring member on the rim of a container; and a spherical wall portion connecting the periphery of said base portion with said cylindrical mounting flange, said spherical wall portion being curved outwardly and axially from said base portion to said mounting flange and yieldably maintaining said base portion and mounting flange in axially separated positions.

14. A one-piece molded plastic spring member as claimed in claim 13 further including at least one annular sealing rib projecting axially from said base portion.

15. A one-piece molded plastic spring member as claimed in claim 13 further including an annular groove formed in said mounting flange for receiving a complementary annular projection on a container.

16. A childproof safety package comprising: a container having an annular rim; a spring member in the form of a one-piece generally dome-shaped body having a cap-engaging base portion overlying the mouth of the container, a dispensing orifice formed in said base portion of the central axis of said body, a cylindrical mounting portion securing said body to said annular rim, and a spherical wall portion extending from the periphery of said base portion to said mounting portion and yieldably supporting said base portion in a normal fixed axial position with respect to said rim when said spherical wall portion is unstressed; a plurality of container-locking elements spaced peripherally from each other on the container and

located a fixed axial distance from the normal position of said base portion such that said base portion is resiliently yieldable toward said container-locking elements from its normal position; a cap having an end wall with a peripheral skirt projecting therefrom and a plurality of cap-locking elements spaced peripherally from each other on the inner surface of said skirt, said cap-locking elements being engageable with and disengageable from said container-locking elements by an axial motion of the cap relative to said container followed successively by a rotative motion of the cap relative to said container, said base portion engaging the inner surface of the end wall of said cap when said locking elements are engaged to bias the cap against axial movement from locked engagement with the container.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,623,623 Dated November 30, 1971

Inventor(s) Lothar J. Bauer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 12 after "engaging" insert --portion--; line 58 "cam" should be --can--; line 74 "dispersing" should be --dispensing--. Column 5, line 3 "rim" should be --cap--; line 70 after "engaging" delete "engaging". Column 6, line 37 "container locking" should be --cap engaging--; line 45 "domelike" should be --dome-shaped--.

Signed and sealed this 13th day of June 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334