

Oct. 15, 1968

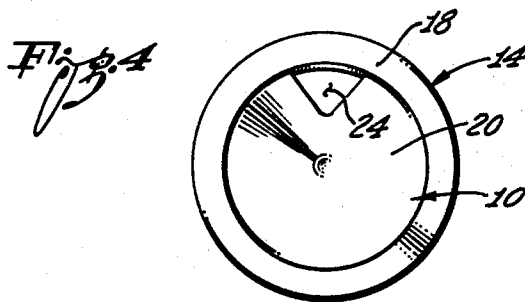
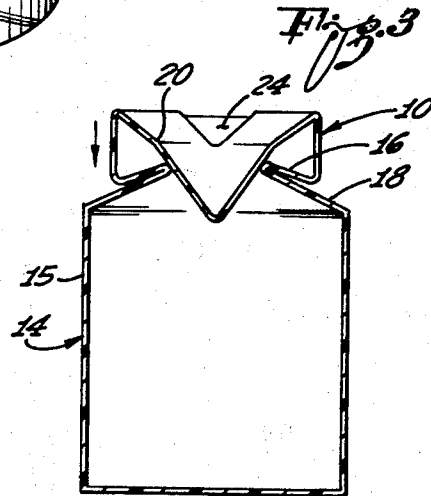
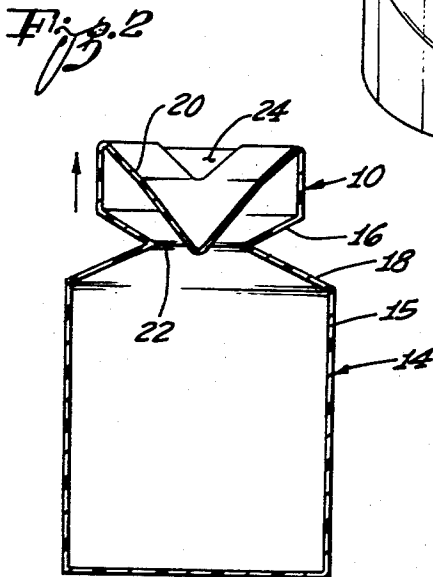
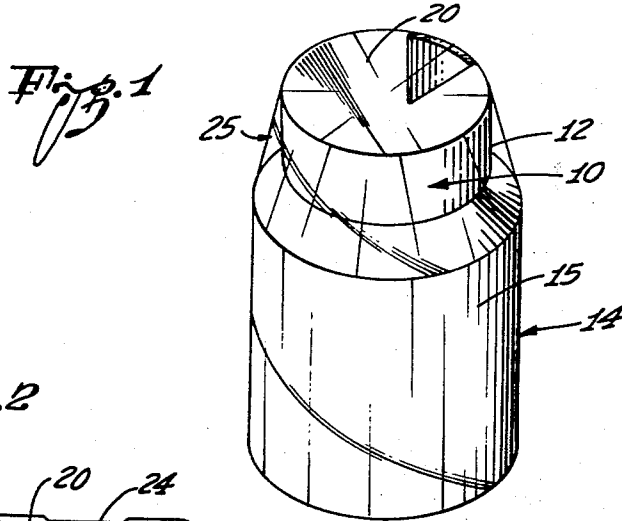
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3,405,849

SELF-CLOSING CONTAINER

Filed Jan. 12, 1967

3 Sheets-Sheet 1



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Fig. 5

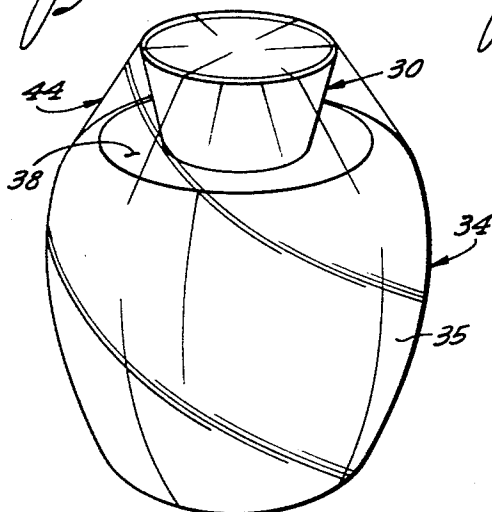


Fig. 6

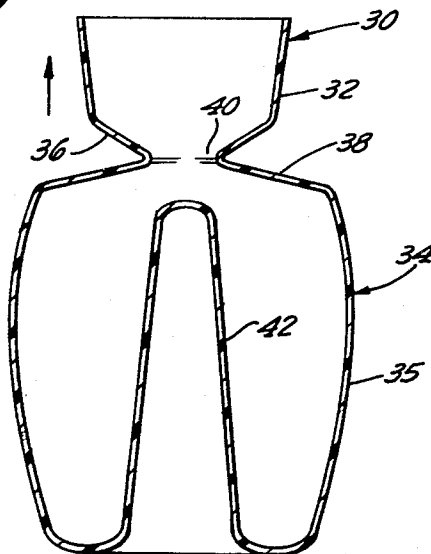


Fig. 8

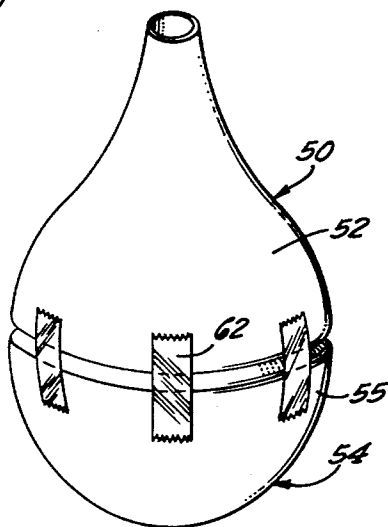
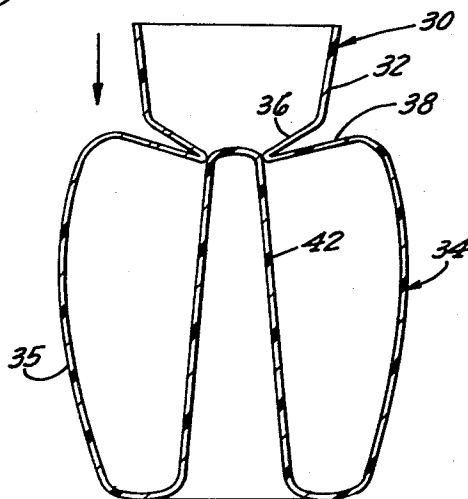


Fig. 7



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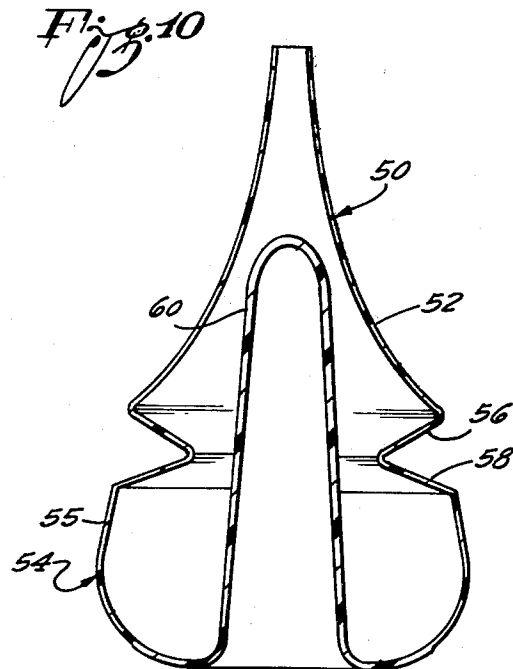
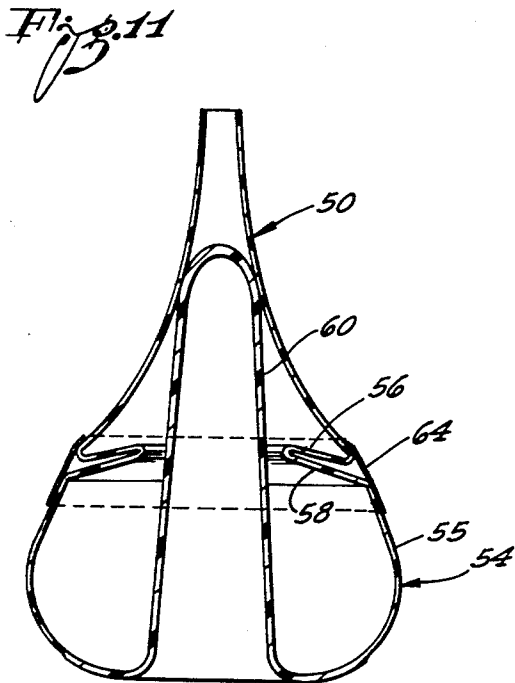
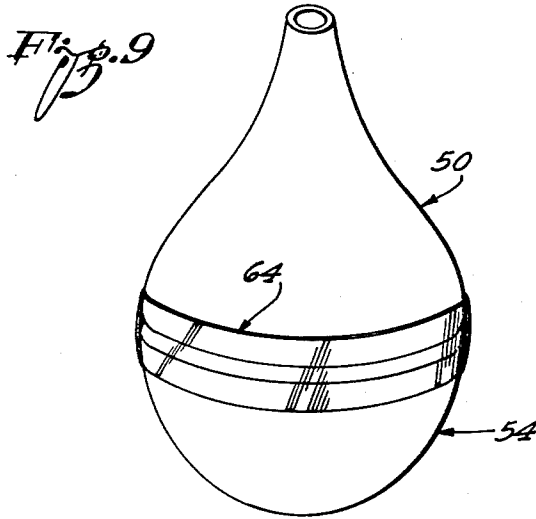
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SELF-CLOSING CONTAINER

3,405,849

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3 Sheets-Sheet 3



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3,405,849

SELF-CLOSING CONTAINER

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Filed Jan. 12, 1967, Ser. No. 608,891

20 Claims. (Cl. 222-498)

ABSTRACT OF THE DISCLOSURE

The invention relates to a self-closing container of the type in which upper and lower sections of the container are interconnected by a bistable joint which may be either manually expanded or manually contracted with a snap action, two portions of the container cooperating to close the container in response to the contraction of the joint. The snap-action joint comprises two conical circumferential walls of the container which are interconnected either by their larger diameter ends or by their smaller diameter ends, at least one of the two conical walls being reversible with a snap action.

Background of the invention

The invention relates to a self-closing container and pertains to class 222 of the Patent Office classification and subclasses thereof including subclasses 498 and 499.

The Moran Patent 3,260,425 issued July 12, 1966 discloses an upright container with an upper opening and with a snap-acting expansile joint, the joint comprising two circumferential conical walls each of the configuration of a truncated cone. The two conical walls are united with each other at their larger ends and one of the two conical walls is reversible with a snap-action. In the Moran disclosure, one side of the expansile joint which is the larger end of the lower conical wall is united with the upper end of the body proper of the container and the other side of the expansile joint, i.e. the larger end of the upper conical wall is unitary with a stopper element. At the contracted state of the joint the stopper element closes the upper end of the container body and at the expanded state of the joint the stopper is spaced upward from the upper end of the body. The ultimate purchaser forms a dispensing opening in the container by cutting away a portion of the expansile joint in the region of the juncture of the larger ends of the two circumferential conical walls.

Other less pertinent disclosures may be found in the following patents: Schlicksupp, 2,628,004; Lacher, 2,698,115; and Bross, 3,193,154.

One disadvantage of the container structure disclosed in the Moran patent is that the stopper cannot be depended upon to keep the container closed in a fluid-tight manner during the handling and shipping of the filled container prior to the ultimate use of the container for dispensing the material therein. For this reason no opening exists in the container wall until the user cuts away a portion of the container wall to form a dispensing opening. It is obviously highly desirable to avoid the necessity of the ultimate purchaser finding a proper tool to make the dispensing opening in the container wall.

A second disadvantage of the construction taught by the Moran patent is the removal of material of the expansile joint at the juncture of the two conical walls to form a dispensing opening. This removal of material at the juncture of the two conical walls necessarily weakens the snap-action and also weakens the container itself.

A third disadvantage is that since the body of the container is connected to the smaller end of the lower circumferential conical wall that makes up the lower half of

the expansile joint, the container must necessarily be restricted at its upper end to mate with the inside diameter of the lower circumferential conical wall and such restriction reduces the capacity of the container.

A fourth disadvantage is that the expansile joint of the Moran teaching flares radially outward. Thus the expansile joint forms a circumferential rib that increases the overall diameter of the container. The increases in the overall diameter of the container may be avoided by necking down the container in the region of the expansile joint but necking down the container has the result of still further reducing the capacity of the container.

The primary problem to which the present invention is directed is to eliminate all of the above mentioned disadvantages.

Summary of the invention

Broadly described, the above explained problem is solved in large part by interconnecting the smaller ends of the two circumferential conical walls of the joint instead of uniting the larger ends and in further part by fabricating the container with an upper outlet spaced away from the expansile joint.

By virtue of this concept, it is not necessary for the ultimate purchaser to cut away a portion of the container to provide a dispensing opening and it is not necessary to weaken the expansile joint by the presence of such a dispensing opening at the joint. It is further not necessary to select a material for the container that has the required resilient flexibility and at the same time is sufficiently frangible to permit severance by the ultimate purchaser.

Since the smaller ends of the two circumferential conical walls of the expansile joint are united with each other, the body of the container is connected to the larger end of one of the two conical walls. Thus it is not necessary to neck down the adjoining portion of the body of the container to match the limited diameter of the smaller end of a circumferential conical wall.

Since the smaller ends of the two circumferential conical walls of the expansile joint are interconnected, instead of the larger ends, the expansile joint is re-entrant, i.e. extends radially inward towards the interior of the container. Thus the expansile joint does not form a circumferential rib to increase the overall diameter of the container.

The invention further teaches that portions of the container on opposite sides of the expansile joint may be suitably initially temporarily interconnected to keep the expansile joint contracted for the purpose of keeping the container closed in an effective manner during handling and shipping of the filled container. One of the disclosed methods of releasably interconnecting the two portions of the container for this purpose is to bridge the expansile joint by means of sheet material that is adhesively bonded to the container on opposite sides of the joint. Another disclosed method of interconnecting the two portions of the container is to enclose the whole container in a shrunk envelope that keeps the container contracted, the envelope being of a character that may be easily manually ruptured and removed by the ultimate purchaser.

Brief description of the drawings

FIG. 1 is a perspective view of a first embodiment of the invention with the whole container enclosed in a shrunk plastic envelope for the purpose of handling and shipment prior to use of the container by the ultimate purchaser;

FIG. 2 is a longitudinal sectional view of the container with the plastic envelope removed and with the snap action joint expanded to open the container;

FIG. 3 is a view similar to FIG. 2 showing the joint contracted to close the container;

FIG. 4 is a plan view of the container on a smaller scale;

FIG. 5 is a perspective view of a second embodiment of the invention, the container being enclosed by a shrunk plastic envelope for the purpose of shipment;

FIG. 6 is a longitudinal sectional view of the container with the snap-action joint expanded to open the container;

FIG. 7 is a similar sectional view with the snap-action joint contracted to close the container;

FIG. 8 is a perspective view of a third embodiment of the invention with the two sections of the container interconnected by longitudinal adhesive strips to keep the container closed for handling and shipment;

FIG. 9 is a view similar to FIG. 8 showing how a single circumferential strip of adhesive tape may be employed to bridge the snap-action joint during shipment;

FIG. 10 is a longitudinal sectional view showing the snap-action joint expanded to open the container; and

FIG. 11 is a similar view showing the joint contracted to close the container.

Description of the preferred embodiments

The first embodiment of the invention shown in FIGS. 1-4 has an upper body section, generally designated 10, of somewhat reduced diameter with a circumferential wall 12 and has a larger lower body section, generally designated 14 with a circumferential wall 15. The two body sections are interconnected by an expansile snap-action joint comprising an upper conical wall 16 and a lower conical wall 18 each of which is of the general configuration of a truncated cone.

It is to be noted that the smaller diameter ends of the two conical walls 16 and 18 are unitary with each other, the large diameter end of the upper conical wall 16 being unitary with the upper circumferential wall 12 of the container and the larger diameter end of the lower conical wall 18 being unitary with the lower circumferential wall 14 of the container. Thus the two conical walls 16 and 18 form a joint which may be aptly described as reentrant since it extends radially inwardly.

At least one of the two conical walls 16 and 18 is suitably resiliently flexible for reversal with a snap-action to cause the reentrant joint to expand and contract with a snap action. In this instance the lower conical wall 18 resists deformation but the upper conical wall 16 is readily reversible between the two configurations shown in FIGS. 2 and 3. Thus the expansile joint formed by the two conical walls 16 and 18 is bistable in the sense that it tends to stay either fully contracted or fully expanded.

It is important to note that both of the circumferential walls 10 and 14 of the two body sections are of sufficient axial dimension to enable the user to grasp the two body sections by two hands respectively for the purpose of causing relative movement between the two body sections to expand or contract the snap-action joint. If the container is fully expanded as shown in FIG. 2 and manual force is applied progressively to move the two body sections 10 and 14 towards each other, the bistable joint initially resists the relative movement and then assists the relative movement with a snap action. On the other hand, with the bistable joint contracted as shown in FIG. 3 progressively applied manual force to separate the two body sections is initially resisted by the joint and then is assisted by the joint with a snap action.

To make the container self closing, the upper body section 10 has an axially reentrant end wall 20 in the form of an inverted cone which is shaped and dimensioned to cooperate with the circular opening 22 that is formed by the juncture of the two conical walls 16 and 18. Thus when the expansile joint is expanded as shown in FIG. 2 the conical wall 18 is spaced from the circular opening 22 to permit the contents of the container to be dispensed

through the opening. On the other hand, when the expansile joint is contracted as shown in FIG. 3 the conical end wall 20 seats in the circular opening 22 in a fluid-tight manner.

It is important to note that the conical end wall 20 seats in the opening 22 before the conical wall 16 reverses to its maximum potential extent, the seating of the conical end wall, in effect, interrupting the reversal of the conical wall 16. Thus the conical wall 16 serves as a spring means to apply continuous closing force to the end wall 20 when the container is closed.

The container shown in FIGS. 1-4 is provided with a dispensing opening which may be at any location above the circular opening 22 when the conical end wall 20 is seated in the circular opening. In this particular embodiment of the invention a V-shaped dispensing opening 24 is provided in the conical end wall 20.

It is apparent that the container may be readily opened or closed by simply grasping the two body sections 10 and 14 to move the body sections apart to open the container or to move the body sections towards each other to close the container. It is also apparent that the described container may be molded economically in two parts which parts may be suitably bonded together. For example, the line of division between the two molded parts may be at the juncture of the end wall 20 and the circumferential wall 10.

A feature of the preferred practice of the invention is the concept of releasably interconnecting the two body sections 10 and 14 to keep the filled container closed during handling and shipment prior to ultimate use of the container. In this particular practice of the invention the whole container is enclosed in a shrunk plastic envelope 25 that not only interconnects the two body sections to keep the snap-action joint contracted but also protects the whole container including the dispensing opening 24 and the inverted conical end wall 20 against dust and other foreign material. Such a shrunk plastic envelope may be easily ruptured and removed without the necessity of employing any special tool. Once the shrunk plastic envelope is removed the container may be readily opened and closed by manual manipulation.

The second embodiment of the container shown in FIGS. 5, 6 and 7 has an open upper body section 30 of slightly flared configuration with a circumferential wall 32 and has a larger lower body section 34 of somewhat bulbous configuration with a circumferential wall 35. The two body sections 30 and 34 are interconnected by a snap-action joint of the character heretofore described comprising an upper conical wall 36 and a lower conical wall 38. Here again, the two conical walls 36 and 38 are unitary with each other at their smaller ends to form a circular container opening 40. At least one of the two conical walls 36 and 38 is reversible, in this instance the lower conical wall 38 being reversible and the upper conical wall being non-reversible.

For the purpose of closing the circular opening 40 to seal the container when desired, the bottom wall of the container has an axially reentrant portion 42 that is preferably of tapered configuration to fit into the circular opening 40 with a wedging action. When the upper body section 30 is manually progressively forced downwardly from the open position of the container shown in FIG. 6, the joint contracts with a snap action to bring the circular opening 40 into sealing engagement with the reentrant portion 42 of the container as shown in FIG. 7. On the other hand with the container closed as shown in FIG. 7, progressive manual force applied to the two sections 30 and 34 to lift the upper section relative to the lower section causes the joint to assume its expanded state with a snap action. Here again, when the container is closed, the joint acts as a spring to maintain pressure contact between the opening 40 and the reentrant portion 42 of the container. Preferably a shrunk plastic envelope

44 encases the container to keep the container closed until the container reaches the ultimate purchaser.

The third embodiment of the container shown in FIGS. 8-11 comprises an upper body section 50 of tapered configuration with a circumferential wall 52 and a lower body section 54 with a circumferential wall 55, the two body sections being interconnected by an expansile joint comprising an upper wall 56 and a lower conical wall 58. The bottom wall of the container is formed with an axially reentrant portion 60 which wedges into the tapered upper body section 50 to close the container when the expansile joint is contracted as shown in FIG. 11. As may be seen by comparing FIGS. 10 and 11 the contraction of the expansile joint is accomplished by reversal of the upper conical wall 56 with a snap action and here again the expansile joint serves as spring means to provide sustained sealing pressure when the container is closed.

FIG. 8 shows how the upper and lower body sections 50 and 54 may be releasably interconnected by a circumferential series of short upright strips 62 of adhesive tape to keep the filled container closed during handling and shipment prior to the ultimate use of the container. The strips 62 may be sufficient frangible to be manually ruptured with ease or the strips may be coated with a pressure sensitive adhesive to permit the strips to be readily peeled off by the user.

FIGS. 9 and 11 show the means for releasably interconnecting the two body portions prior to the ultimate purchase of the container may comprise a circumferential tape 64. Preferably the tape 64 is of a well known type which is applied wet and which then shrinks as it dries, the shrinking action pulling the two body portions of the container towards each other for the purpose of firmly closing the container opening.

My description in specific detail of the selected embodiments of the invention in specific detail of the selected embodiments of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims. For example, both of the conical walls that make up an expansile joint may be reversible for expansion and contraction of the joint. It is also to be noted that some features of the invention may be combined with an expansile joint in which the larger ends of the two conical walls are unified with each other to make a joint that protrudes radially from the body of the container instead of extending inwardly towards the interior of the container.

I claim:

1. A self-closing container comprising:

an upright hollow body of flexible material forming a container with an upper opening, the hollow body being divided into an upper section and a lower section by an expansile joint, each of said sections having a circumferential wall, the upright hollow body and the expansile joint being of substantially uniform thickness,

said expansile joint comprising two conical walls of frusto-conical configuration, each conical wall having a larger end and a smaller end, two contiguous ends of the two conical walls being united with each other,

said two contiguous ends being like ends with respect to large and small,

the other two ends of the two conical walls being united with said circumferential walls of the upper and lower body sections, respectively,

at least a particular one of said two conical walls being reversible to move the upper body section downward relative to the lower body section with a snap action for contraction of the joint and alternately to move the upper body section upward relative to the lower body section with a snap action for expansion of the joint,

two portions of the container being shaped and di-

mensioned for mutual abutment to close the upper end of the container in response to the contraction of the joint and to open the upper end of the container in response to expansion of the joint, the particular one of the two conical walls being bistable at its downward and upward positions, without being artificially retained by any other portion of the hollow body, to provide for a retention of the particular one of the two conical walls in its downward and upward positions and to provide for a continued closing of the upper end of the container in the bottom position of the particular one of the two conical walls,

said circumferential walls of the two body sections respectively being of sufficient axial extent to permit the two sections to be grasped simultaneously by two hands for application of manual force to move the two sections relatively towards and away from each other to open and close the container.

2. A self-closing container as set forth in claim 1 in which one of said two portions of the container is an axially reentrant portion of the lower body section.

3. A self-locking container as set forth in claim 2 in which one of said two portions of the container is a tapered upper end of the upper body section and the other of the two portions is an axially reentrant portion of the lower body section.

4. A self-closing container comprising:

an upright hollow body of flexible material forming a container with an upper opening, the hollow body being divided into an upper section and a lower section by an expansile joint, each of said sections having a circumferential wall, the upright hollow body and the expansile joint being of substantially uniform thickness,

said expansile joint comprising two conical walls of frusto-conical configuration, each conical wall having a larger end and a smaller end, two contiguous ends of the two conical walls being united with each other,

said two contiguous ends being like ends with respect to large and small,

the other two ends of the two conical walls being united with said circumferential walls of the upper and lower body sections, respectively,

at least a particular one of said conical walls being reversible to move the upper body section downward relative to the lower body section with a snap action for contraction of the joint and alternately to move the upper body section upward relative to the lower body section with a snap action for expansion of the joint,

two portions of the container being shaped and dimensioned for mutual abutment to close the upper end of the container in response to the contraction of the joint and to open the upper end of the container in response to expansion of the joint,

the particular one of the two conical walls being bistable at its downward and upward positions, without being artificially retained by any other portion of the hollow body, to provide for a retention of the particular one of the two conical walls in its downward and upward positions and to provide for a continued closing of the upper end of the container in the bottom position of the particular one of the two conical walls,

said circumferential walls of the two body sections being of sufficient axial extent to permit the two sections to be grasped simultaneously by two hands for the application of manual force to move the two sections relatively towards and away from each other to open and close the container; and

means releasably interconnecting the two body sections of the container with the expansile joint in contracted state to keep the filled container closed during han-

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dling and shipment prior to ultimate use of the container.

5. A self-closing container as set forth in claim 4 in which said interconnecting means is made of sheet material and is adhesively bonded to the two body sections.

6. A self-closing container as set forth in claim 5 in which said sheet material is bonded to the two body sections by pressure-sensitive adhesive.

7. A self-closing container as set forth in claim 4 in which the two body sections are interconnected by an envelope of easily rupturable material enclosing the whole container.

8. A self-closing container comprising:

an upright hollow body of flexible material forming a container with an upper opening,

the hollow body being divided into an upper section and a lower section by an expansile reentrant joint, each of said sections having a circumferential wall, the hollow body and the expansile reentrant joint being of substantially uniform thickness,

said reentrant joint comprising an upper conical wall and a lower conical wall, each of the configuration of a truncated cone, said upper conical wall having its larger end uppermost and united with the circumferential wall of the upper body section,

said lower conical wall having its larger end lowermost and united with the circumferential wall of the lower container section,

the smaller ends of the two conical walls being united with each other,

at least one of said conical walls being reversible to move the upper body section downward relative to the lower body section with a snap action for contraction of the joint and alternately to move the upper body section upward relative to the lower body section with a snap action for expansion of the joint,

two portions of the container being shaped and dimensioned for mutual abutment to close the upper end of the container in response to the contraction of the joint with a snap action and to open the upper end of the container in response to expansion of the joint with a snap action,

the particular one of the two conical walls being bistable at its downward and upward positions, without being artificially retained by any other portion of the hollow body, to provide for a retension of the particular one of the two conical walls in its downward and upward positions and to provide for a continued closing of the upper end of the container in the bottom position of the particular one of the two conical walls,

said circumferential walls of the two body sections being of sufficient axial extent to permit the two sections to be grasped simultaneously by two hands for the application of manual force to move the two sections relatively towards and away from each other to open and close the container.

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9. A self-closing container as set forth in claim 8 in which one of said two portions of the container is at the juncture of the two conical walls.

10. A self-closing container as set forth in claim 8 in which one of said two portions of the container is an axially reentrant portion of one of said body sections of the container.

11. A self-closing container as set forth in claim 10 in which one of said two portions of the container is an axially reentrant portion of the bottom wall of the container.

12. The self-closing container set forth in claim 2 wherein the upper section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

13. The self-closing container set forth in claim 2 wherein the lower section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

14. The self-closing container set forth in claim 2 wherein the lower section engages the upper section in the contracted relationship of the expansile joint to close the upper portion of the container.

15. The self-closing container set forth in claim 4 wherein the upper section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

16. The self-closing container set forth in claim 4 wherein the lower section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

17. The self-closing container set forth in claim 4 wherein the lower section engages the upper section in the contracted relationship of the expansile joint to close the upper portion of the container.

18. The self-enclosing container set forth in claim 9 wherein the upper section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

19. The self-enclosing container set forth in claim 9 wherein the lower section engages the expansile joint in the contracted relationship of the expansile joint to close the upper portion of the container.

20. The self-enclosing container set forth in claim 9 wherein the lower section engages the upper section in the contracted relationship of the expansile joint to close the upper portion of the container.

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