# United States Patent

[11] 3,581,940



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[21] Appl. No. **774,803**
[22] Filed **Nov. 12, 1968**
[45] Patented **June 1, 1971**



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## [54] MULTIPLE COMPARTMENT DISPENSER CONTAINER WITH CHECK VALVES

**7 Claims, 13 Drawing Figs.**


[52] **U.S. Cl.** ..... **222/94**
[51] **Int. Cl.** ..... **B65d 35/22**
[50] **Field of Search** ..... 222/94, 103, 136, 145, 213, 494, 402.11, 546; 137/512.5, 605—607; 251/350, 354



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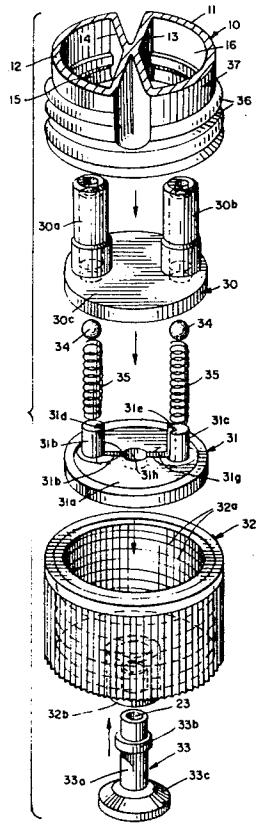
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**ABSTRACT:** The invention relates to a dispenser container for separate storage and proportioned mixed dispensing of two interacting fluid components. The combination comprises a tubular container of flexible material (plastic or plastic laminate preferred) having central wall means providing two collapsible longitudinally extending compartments. The container is constructed and arranged so as to produce substantially equal internal pressures in both compartments whenever it is grasped by a hand. The outer walls of the container compartments are simultaneously and equally collapsed toward a central plane, thereby correspondingly reducing the volume of both compartments and creating equal internal pressures therein. The container tapers from the outlet end toward the closure end which is preferably sealed along a transverse line lying substantially in the longitudinal plane toward which the outer walls collapse. Preferably the compartments have approximate cross sections of half ellipses with the inner wall means generally coinciding with the major axes and the minor axes progressively shortening from the outlet end to the closure end. Separate ports are provided for each compartment at the outlet end of the container and outlet check valves control the outflow through these ports. A dispenser cap is received over the outlet end of the container enclosing the ports and valve means. The cap provides an intermixing passage communicating with both the port means at its inner end when the valves are open and its outer end with a dispensing outlet; and; intermediately, means are preferably provided for promoting through intermixing of the two fluids being dispensed.

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FIG. 1

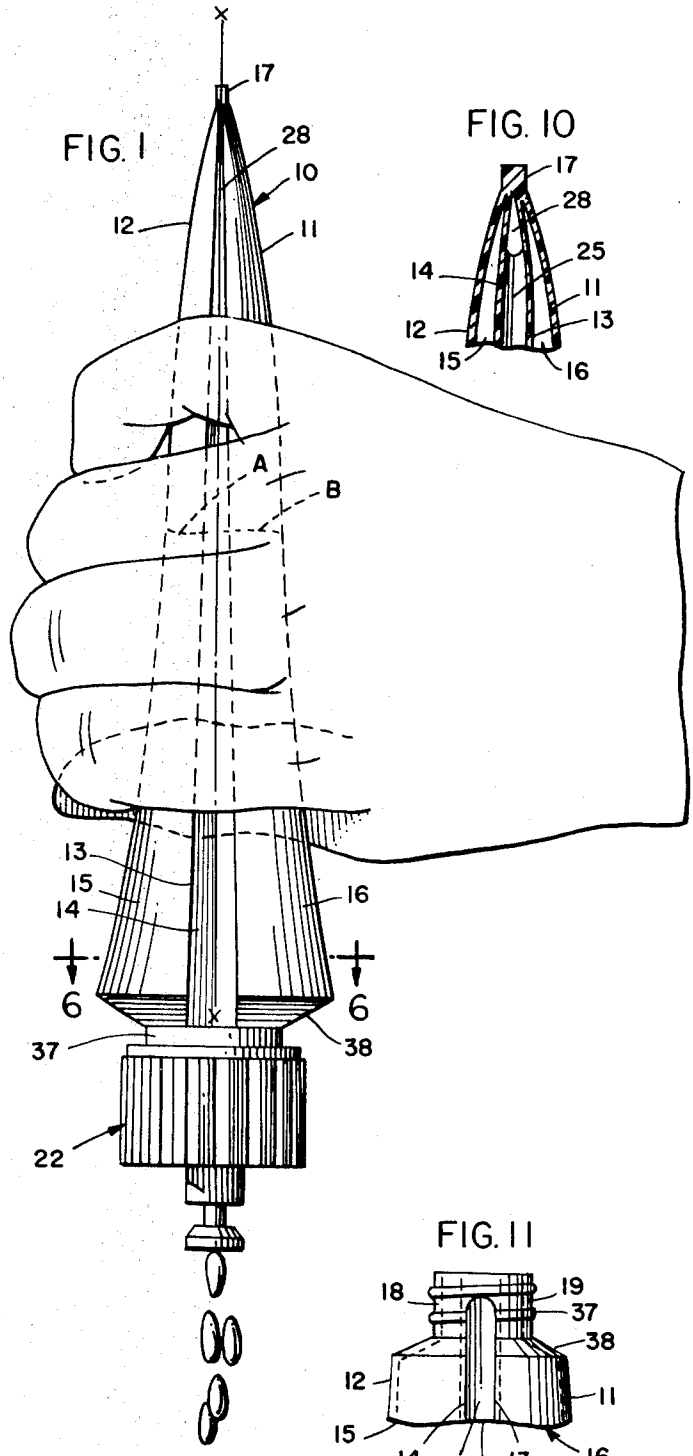



FIG. 10




FIG. 2

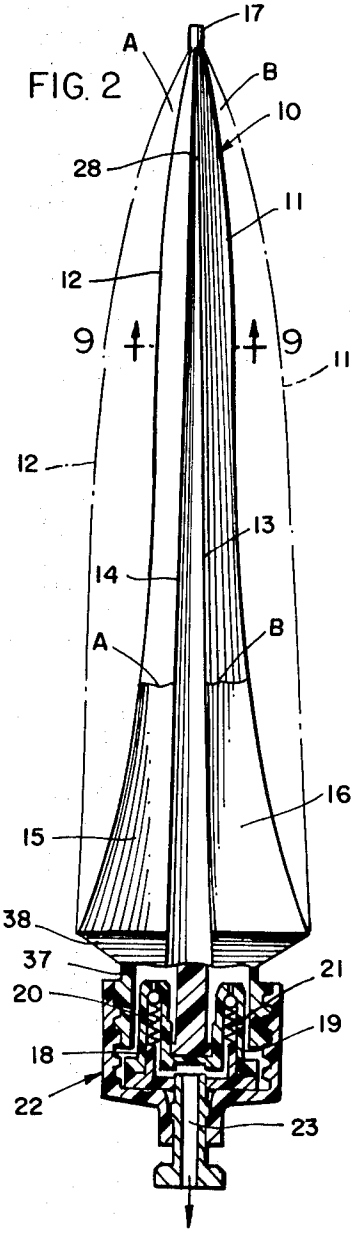
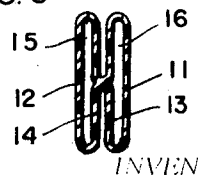



FIG. 11




FIG. 9




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FIG. 4

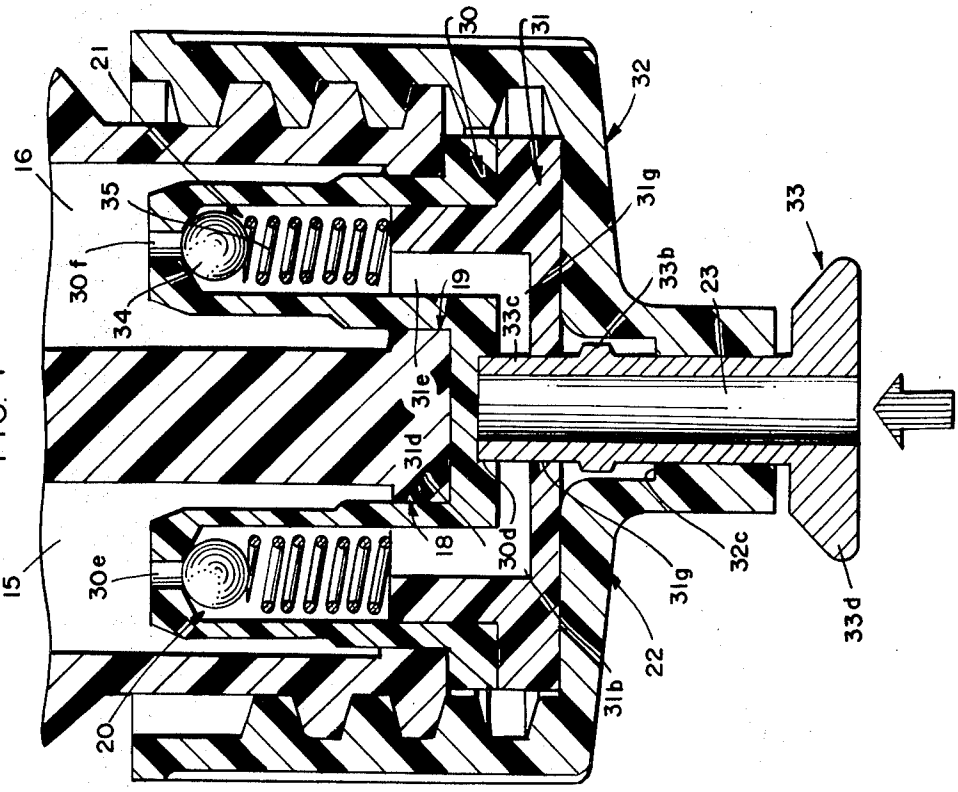
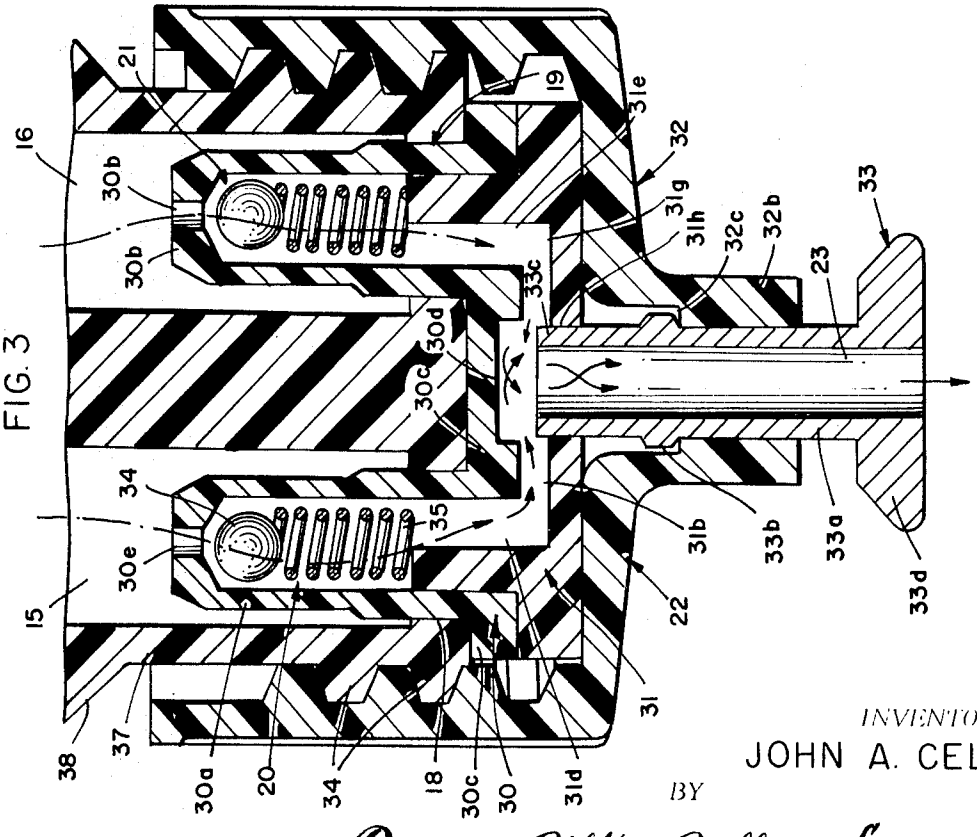



FIG. 3




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FIG. 5

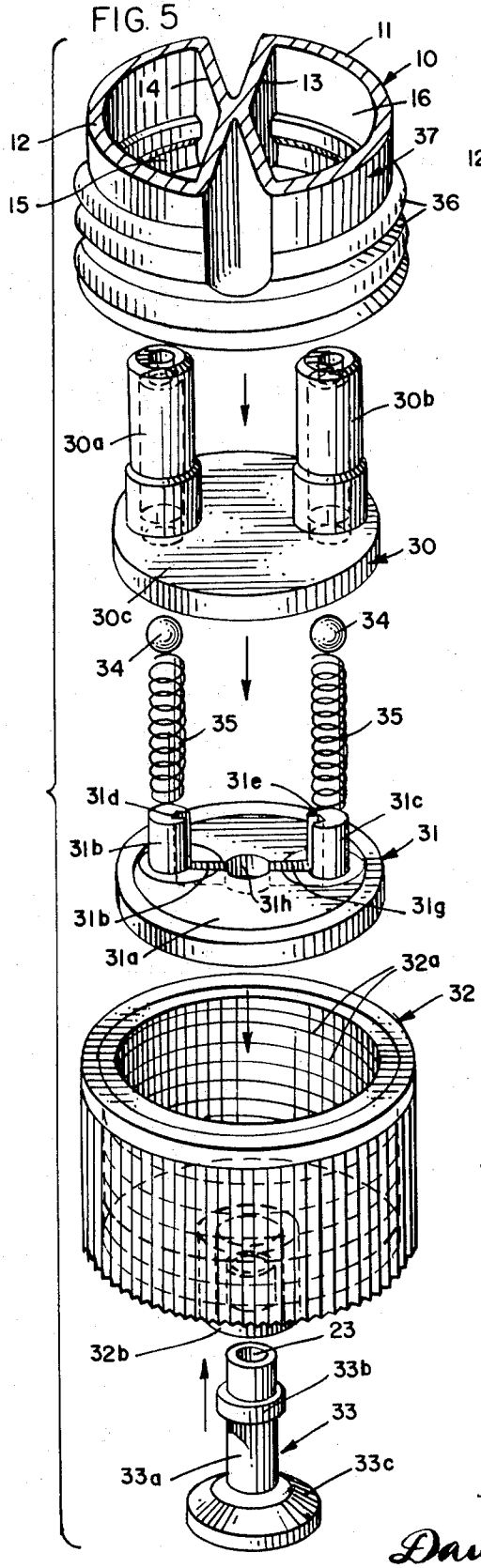



FIG. 6

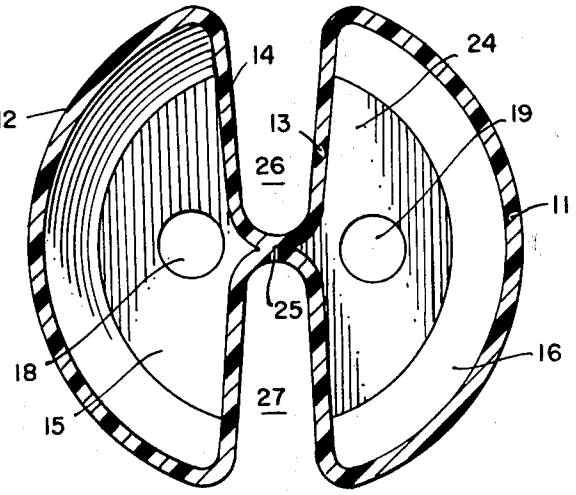



FIG. 7

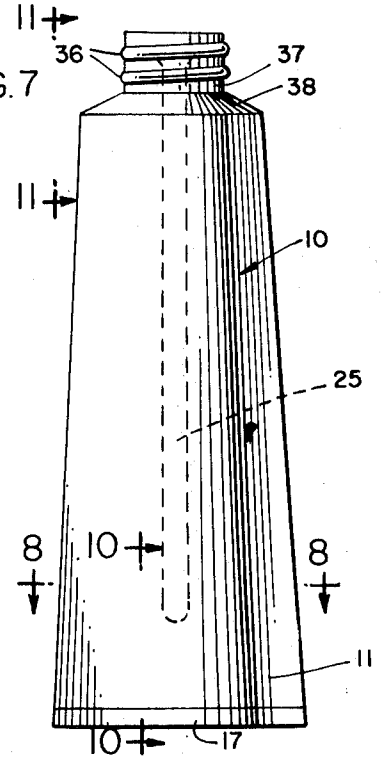
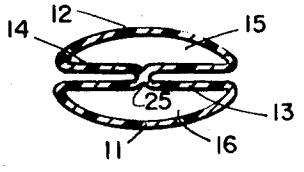



FIG. 8




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FIG. 12

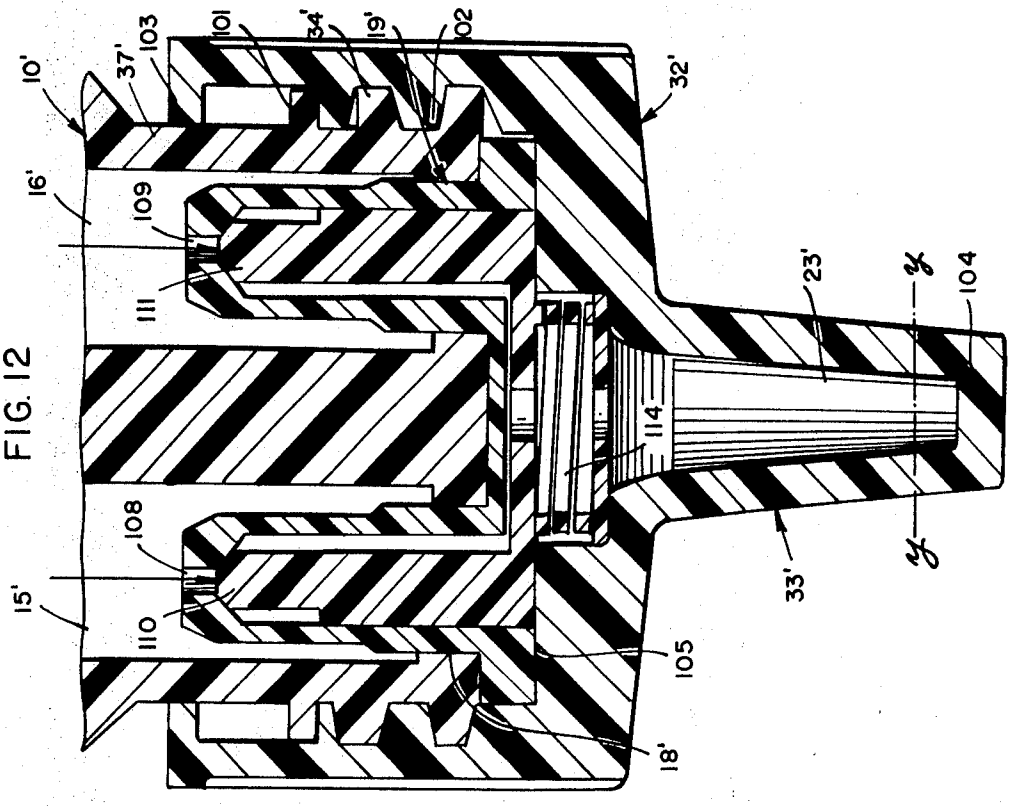
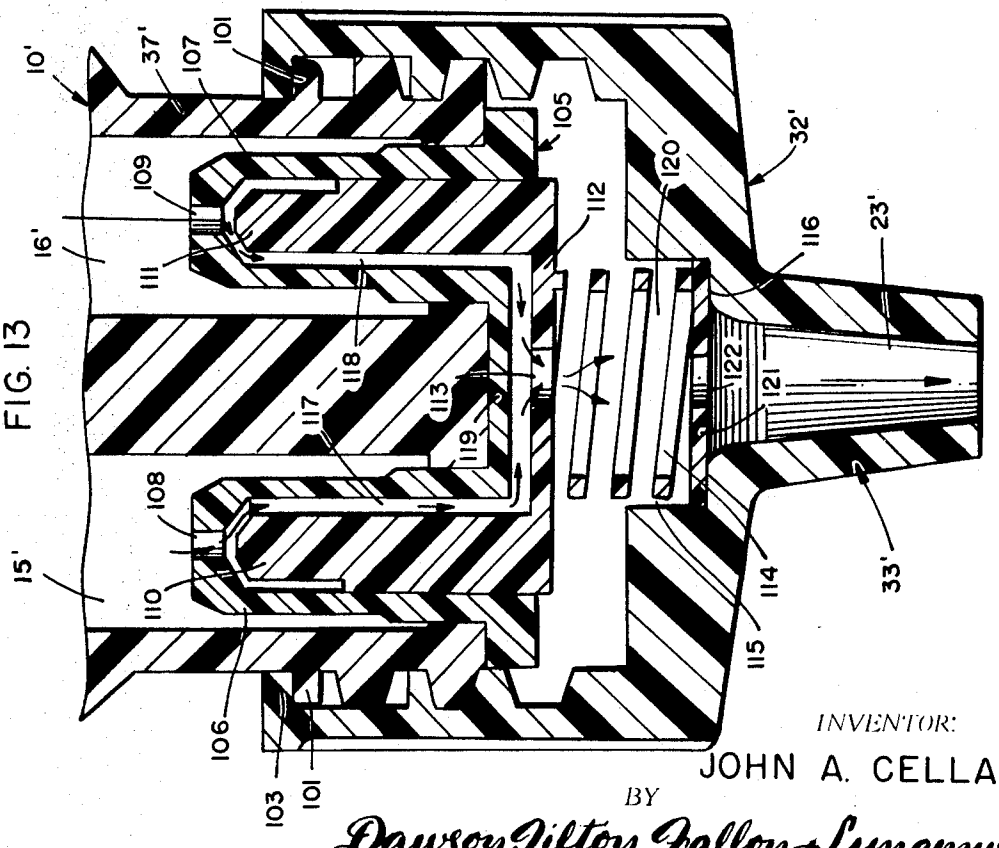



FIG. 13




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# MULTIPLE COMPARTMENT DISPENSER CONTAINER WITH CHECK VALVES

## BACKGROUND

In the packaging of cosmetic and pharmaceutical products, there are products which comprise two interacting fluid components, which must be packaged separately, and then mixed by the user to prepare the preparation for application. For example, hair color preparations include a leuco-dye in one solution and the oxidant in the other solution or fluid mixture. These fluid components are packaged in separate containers. While these containers can be sized so that normally the entire contents of both containers are used for a single dyeing of the hair, it is necessary for such preparations to be tested on the skin of the user for allergic reaction prior to actual use. In making such a "patch" test, it is therefore necessary to break the seal on both containers, mix a small quantity of the fluids, and apply the mixture to the skin. Also, it has been desired to package dual component hair color preparations in larger size containers, which can then be used for several successive dyeing applications.

In the packaging and dispensing of two interacting fluid components, a number of design problems have been encountered. Partial dispensing of the fluids should be achieved while positively preventing backflow and interacting of the components within the storage compartments, and at the same time providing for uniformly mixed outflow of the components during a dispensing operation. Moreover, a simple method of manually dispensing the components is desirable, and the method should be capable of providing a substantially uniform proportioning and intermixing of the components as they are dispensed by an ordinary user. Other important requirements are that the containers should be relatively inexpensive to manufacture, assemble, and fill, while at the same time achieving the objectives just stated. Still another objective is that the stored liquids be usable in increments, and that the dispensing of all increments from the first to the last shall continue to be on a substantially uniform proportioned basis. A related problem is that the fluid components, which may be expensive, should be completely dispensable, and the dispensing of the last increment should not result in any failure of the package to properly mix and interact the components.

## THE DRAWINGS

The novel dispenser container of this invention is shown in illustrative embodiments in the accompanying drawings, in which

FIG. 1 is a perspective view of the dispenser container embodying the features of the present invention, the container being shown in use position with the hand of the user in a suitable position for dispensing a proportioned, interacted mixture of two fluid components;

FIG. 2 is a view similar to FIG. 1 with the cap and dispensing end portion of the container broken away to show the internal construction, the appearance of the container when full being indicated by the broken lines, while the solid lines show the container in partially dispensed condition;

FIG. 3 is an enlarged sectional detail view of the dispensing end of the dispenser container of FIGS. 1 and 2, as the components would appear when used for dispensing the two intermixed liquids;

FIG. 4 is a view similar to FIG. 3, except that the components are shown in the relation that they would have when the container is not being used for dispensing;

FIG. 5 is an exploded perspective view of the components of the dispensing end of the container;

FIC. 6 is a transverse sectional view taken on line 6–6 of FIG. 1 and looking toward the dispensing end of the container;

FIG. 7 is a reduced scale elevational view of the two compartment tube;

FIG. 8 is a sectional view of the tube taken on line 8–8 of FIG. 7;



FIG. 9 is a transverse sectional view of the two compartment container taken on line 9–9 of FIG. 2 showing the compartments in partially collapsed condition;

FIG. 10 is a fragmentary sectional view of the closure end of the two compartment container taken on line 10–10 of FIG. 7;

FIG. 11 is a fragmentary detailed view of the dispensing end of the two compartment container looking in the direction indicated by the line 11–11 in FIG. 7;

FIG. 12 is an enlarged sectional view of a modified form of the dispensing end of the container, the components being shown in a closed and sealed condition; and

FIG. 13 is a view similar to FIG. 9 showing the components of the modified construction in a open condition for intermixed dispensing.

## DETAILED DESCRIPTION

Looking first at FIGS. 1 and 2, there is shown a dispenser container designed for separate storage and dispensing of two interacting liquid components. Because of the constructional features of the present invention, the combination is capable of providing on demand substantially uniform dispensing of both liquid components in any desired increments, and the components are dispensed as a proportioned reacting mixture, while avoiding backflow and reacting of the components within the storage compartments of the container. The problems and difficulties described above have been substantially overcome.

The dispenser container of FIGS. 1 and 2 includes an elongated tube or tubular container means designated generally by the number 10. Container means 10 is formed of flexible material such as plastic or a plastic laminate and provides opposite outer walls 11 and 12. Central wall means 13, 14 divides the container 10 into two longitudinally extending compartments 15 and 16, which preferably, and in the embodiments shown, are of substantially equal volume.

The dual compartmented container tube 10 is dimensioned to be grasped by one hand, for example, as shown in FIG. 1, for simultaneously and substantially uniformly collapsing the outer wall 11, 12 and the central wall means 13, 14 toward a central longitudinal plane substantially bisecting the container, as indicated by a line $x$–$x$ in FIG. 1. With this construction, the squeezing pressure applied to the outer walls 11, 12 when the container is grasped by the hand, for example, between the palm and fingers, the volume of the compartments 15 and 16 can be correspondingly reduced to achieve substantially uniform dispensing of both liquid components.

As shown more clearly in FIG. 2, the tubular container 10 has an outlet end and a closure end, the closure end being shown at the top and the outlet end at the bottom, as the unit is preferably held for dispensing. It will also be noted, as shown in both FIGS. 1 and 2, that the container means 10 tapers from the lower or outlet end toward the upper or closure end so that the compartments 15, 16 progressively reduce in cross section toward the closure end, or stated otherwise, progressively enlarge in cross section toward the outlet end.

The tapering and cross-sectional shape of the tube elements which provide the compartments or chambers 15, 16 can be seen more clearly by comparing the cross section of FIG. 6 with the cross section of FIG. 8. These cross sections show the tubular elements substantially as they would appear in expanded condition, the section of FIG. 6 being taken adjacent the outlet end, where the section of FIG. 8 is taken adjacent the closure end. As can be seen, the compartments 15, 16 have approximate cross sections of half ellipses, the outer walls 11, 12, respectively, forming the outer boundary of each half of the ellipse, while the inner walls 13, 14, generally coincide with the major axes of the ellipse. When considered from this standpoint, it can be seen that the minor axes, or more accurately the half of the minor axes within each of the compartments (15, 16), progressively shortens from the outlet end to the closure end of the compartments, the half minor axes becoming zero at the sealing juncture 17. The arcuate outer

walls 11, 12 are readily collapsible against the relatively straight or flat inner walls 13, 14. Thus, this particular cross-sectional shape and the tapering of the generally ellipsoidal two compartment container contributes to the desired uniformity of collapsing, creating equal pressures within each of the compartments (15, 16), as well as equal reductions in compartment volumes. Both of the tube elements can be simultaneously compressed by the grasp of a single hand, as shown in FIG. 1. When substantially fully collapsed, the outer walls 11 and 12 closely approach the inner walls 13, 14 and become substantially parallel thereto, as shown more clearly in FIG. 9.

At the closure end, the outer walls 11, 12 and the central wall means, 13, 14 are brought together and united along a transverse line, as indicated at 17. In the embodiment shown, and preferably, the transverse closure seam 17 lies in substantially the same longitudinal plane toward which the outer walls collapse as the container is squeezed. A 90°rotation of the closure line 17 has been found less desirable. If the closure line 17 is perpendicular to the plane *x–x* toward which the walls 11, 12 collapse, there is much greater likelihood of the dispensing from the respective compartment 15, 16 being unequal and variable. In general, therefore, closure line 17 is preferably oriented so as to be generally parallel to the central longitudinal plane of the container toward which the outer walls are collapsed.

As indicated in FIG. 2, and shown more clearly in FIGS. 3 and 4, the outlet end of the container provides outlet port or port means 18, 19 which separately communicate with the compartments. As shown, the port 18 communicates with the compartment 15, while the port 19 communicates with the compartment 16. Outlet check valve means, designated generally by the numbers 20 and 21, are associated with each of the port means. As shown, the check valve means 20 controls the port 18 and includes spring means for biasing the valve to close the port when the container 10 is under ordinary atmospheric pressure while permitting the ports to open when the compartment 15 is exposed to pressure by the grasp of a hand. The outlet check valve 21 is of similar construction and similarily controls the port 19 for compartment 16. It will be appreciated that the design of the check valves 21 is not critical, provided they perform their intended function of permitting dispensing of the fluids under pressure, while effectively precluding backflow.

A dispenser cap or cap means, designated generally by the number 22, is received on the outlet end of the tubular container 10 enclosing the port means 18, 19 and the valve means 20, 21. The cap 22 provides a common passage or passage means 23 communicating at its inner end (the upper end as shown in FIG. 2) with both of the port means 18, 19 when they are opened by the valve means 20, 21. As will subsequently be explained in greater detail, the passage means 23 preferably includes flow-interrupting means, such as baffle or orifice means, for promoting intermixing of the two fluids, the object being to achieve a turbulent, intermixing type of flow, rather than a smooth or laminar flow.

In accomplishing the objectives of the present invention, it is preferred to form the entire tubular container 10 as an integral unit from a thermoplastic material such as polyethylene or polypropylene. Advantageously, container 10 can be formed by blow molding with the closure ends of the compartments being left open. The appearance of the container at this stage is shown more clearly in FIG. 6. As there shown, the outlet end of the container is closed by a horizontally extending disc portion 24, which provides the outlet ports 18 and 19. The compartment 15 is provided between the arcuate or semicircular wall 12 and the central generally straight wall portion 14. Similarily, the compartment 16 is defined by the outer curved wall 11 and the inner relatively straight wall 13. The walls 13 and 14 near their transverse center are connected by an integral rib 25, which facilitates the blow molding of the dual compartment container. If desired, the adjacent surfaces of the central wall means 13, 14 can be partially or completely united to define a composite central wall. With other types of molding, such as extrusion molding, the container 10 might be formed with the central wall means comprising a single integral partition, but this is not required to achieve the objectives of the present invention, and, in fact, the construction shown in FIG. 6 has certain advantages.

The groovelike openings 26 and 27 between the walls 13 and 14 can be reduced in size and partially closed when the closure end of the tube is sealed. This is the construction shown in FIGS. 1 and 2 where the closure line 17 is formed by a heat seal, which fuses and unites the portion of walls 11, 12, 13 and 14 immediately adjacent the closure end of the container. Typically, the closure line 17 will extend along a straight transverse line, as shown in FIG. 7. FIG. 7 differs from the construction of FIGS. 1 and 2, however, in that the outer corners, respectively, between the walls 12, 14 and 11, 13 are brought together and heat sealed or fused to form the longitudinally extending flanges 28, 29, as shown in FIGS. 7 and 8. While the heat seals 28, 29 improve the appearance of the container, they are not essential for the purpose of the present invention, and can be omitted, the container being used in the form shown in FIGS. 1 and 2. With the construction of FIGS. 7 and 8, the central wall members 13, 14, are in effect one unitary partition wall, but with either the construction of FIGS. 7 and 8 or that of FIGS. 1 and 2, there is provided central wall means which divides the container into the two compartments 15 and 16, and the outer and central walls are collapsible toward the longitudinal central plane, such as the plane *x–x*.

Reference is now made particularly to FIGS. 3, 4 and 5, as showing more clearly the individual components which provide the outlet check valve 20, 21, the cap 22, and the passage 23. The components of the cap assembly, as shown in the exploded view of FIG. 5, can be molded from a suitable plastic, such as a poly vinyl plastic or vinyl-acetate copolymer plastic. This includes the valve housing insert 30, the cooperating spring retainer 31, the cover 32, and the outlet spout 33. The ball valves 34 and the springs 35 can be formed of metal, such as steel. The assembly of these components is shown more clearly in FIGS. 3 and 4.

The member 30 provides two tubular extensions 30*a*, 30*b* which extends through the port 18, 19, and provides housings for the balls and springs 35. The horizontal disc portion 30*c* fits against the container disc portion 24, these parts being held together by a press fit.

The member 31 includes a horizontal disc portion 31*a* from which project pin portions 31*b* and 31*c*, which retain the springs 35 in the assembly, as shown in FIGS. 3 and 4. Pin portion 31*b*, 31*c* are provided respectively with channels or grooves 31*d*, 31*e* which communicate respectively with cross channels 31*f*, and 31*g*. In the center of disc portion 31*a* is provided an opening 31*h* the sidewalls of which are in communication with the cross channels 31*f* and 31*g*. The disc portions 30*c* and 31*a* can be sealed together by heat fusion, or can be connected by a press fit.

In the embodiment shown, the cover 32 is provided with internal threads 32*a* which cooperate with the external threads 36 on neck portion 37 of the container. However, cover 32 can be permanently attached to the container, with the other components assembled substantially as shown in FIGS. 3 and 4, or can be attached in other suitable ways.

The embodiment shown, cover 32 also provides a spout portion 32*b*, which slidably receives the tubular portion 33*a* of spout member 33, the intermediate portion of the spout provides an annular boss or lug 33*b*, which can be snapped into spout portion 32*b* over the annular ledge 32*c*, while thereafter being retained therein for movement between the open position shown in FIG. 3 and the closed position shown in FIG. 4. The purpose of this operation will be subsequently explained.

The disc portion 30*c* provides a circular recess 3*d* for receiving the inner end of tubular section 33*a*, as shown in FIG. 4. In this position, the inner end portion of spout section 33*a* closes and effectively seals the crossflow channels 31*f* and 31*g*.

When the elements are in open position, as shown in FIG. 3, the inner end 33*c* of spout 33*a* projects into the crossflow passages 31*f*, 31*g*, thereby tending to interrupt the flow and forcing the fluids to enter the recess 33*d*, reverse direction and intermix, and then flow outwardly through the passage 23, as indicated by the arrows in FIG. 3. A turbulent intermixing of flow is desirable to promote thorough intermixing of the two fluids being dispensed, and therefore it is desirable to provide flow-interrupting or baffle means for promoting the intermixing.

## OPERATION

In the operation of the dispenser container, two interacting liquids (which can be suspensions and emulsions as well as solutions) are prepared at suitable concentrations for equal volume mixing and dispensing. One of the liquids, such as leuco-dye for hair, is filled into one of the compartments, such as the compartment 15 before the end closure 17 is formed, as is the other liquid, such as an activating oxidant solution, which may be filled into the compartment 16. The heat sealed end closure is then formed, as previously described, so that the compartments decrease in cross section from the outlet end of the closure end, and the closure line extends in a plane, which preferably is approximately the same as the plane centrally bisecting the container between the compartments and running generally parallel to the inner compartment walls, 14 and 15. The rib 25, which connects the walls 13, 14 along the longitudinal center line of the container, preferably terminates at a spaced distance from the transverse union line 17, leaving a space 28, as shown more clearly in FIG. 10. The rib connection 25 can extend continuously from space 28 up to and into the neck portion 38, as shown in FIG. 11.

For shipment and storage, it is preferred to provide manually operable means for selectively preventing accidental opening of the outlet check valves. As shown in FIGS. 3 and 4, the inner end of the common passage 23 through the outlet spout 33 communicates with the port means 18, 19 through separate passage extensions 31*f*, 31*d* and 31*g*, 31*e*. Manually operable means, comprising the slidable spout member 33, is provided for selectively closing the outer ends of the passage extensions, namely, the crossflow passages 31*f* and 31*g*. As shown, the inner end of spout portion 31*g* can be moved across the passages 31*f*, 31*g* and inserted into the recess 30*d*, thereby effectively closing the crossflow passages and preventing communication between the compartment 15, 16 and the outflow passage 23.

Preparatory to dispensing operation, spout 33 can be grasped by the button end portion 33*d* and pulled outwardly to the position shown in FIG. 3, which opens the passage 23 to crossflow channels 31*f* and 31*g*. The dispenser container is then inverted so that the liquid components in the compartments 15 and 16, such as the components A and B as indicated in FIGS. 1 and 2, run down toward the outlet end. In this position, the container tube 10 can be grasped with one hand, for example in the manner indicated in FIG. 1, and substantially equal force applied to squeeze the outer walls 11 and 12 toward the inner walls 13, 14, and toward the center line *x*–*x*. The result of this squeezing action is to simultaneously open the outlet check valves 20, 21 by depression of the balls 34 against the springs 35, as shown more clearly in FIG. 3. This permits the two fluids to flow downwardly and merge in the common passage 23, as indicated by the outflow arrows in FIG. 3. As previously explained, the inner end portion 33*c* of outlet spout 33 serves as a flow-interrupting or baffle means, which directs the fluids into the recess 30*d*, thereby causing them to intermix and reverse direction before flowing outwardly through the passage 23. As soon as the squeezing pressure is relaxed, the balls 34 will return to their seated positions as shown in FIG. 4, closing the valve ports 30*e*, 30 *f*, and preventing any backflow which might contaminate the solution within one of the compartments 15, 16.

It has been found that the dispensing operation is assisted where the dispensing end of the container provides a relatively rigid neck portion 37 surrounding the port means 20, 21. Also, it is preferred that neck portion 37 be connected to tube 10 by an outwardly extending annular shoulder or shoulder means 38. shoulder portion 38 enlarges the compartments at the dispensing end of the container and tends to prevent the outer walls 11, 12 from collapsing against the central wall means 13, 14 adjacent the port means 20, 21.

With the construction shown, the compartments 15 and 16 are completely sealed by the container means 10 except for the port means 18 and 19. The operation of the outlet check valves 20, 21, which close as soon as a squeezing pressure is discontinued against the walls 11, 12, is such as to maintain a partial vacuum within the compartments 15 and 16 between incremental dispensing of the liquids. This can cause the outer walls 11 and 12 to be held in partially depressed or collapsed condition against the remaining liquid in each compartment.

In FIG. 1, compartments 15, 16 are shown approximately half filled with the liquids A, B, indicating that a portion of the liquids has been previously dispensed. When fully charged as in the initial formation of the package, the outermost portions of outer walls 11 and 12 may occupy positions somewhat as shown in the dotted lines of FIG. 2. As the dispensing continues, they will tend to press in against the remaining liquid, as indicated by the solid lines in FIG. 2, where the liquids A and B have been reduced to about one third the maximum volume of the compartments 15 and 16. In the section of FIG. 9, the appearance of the compartment walls when substantially fully collapsed is indicated, the level of the liquids A and B, being below the section line 9–9 as shown in FIG. 2.

The shoulder portion 36 holds the dispensing end of the compartments open for drainage collection of the last portions of the liquid, while the container can be milked downwardly by hand pressure to dispense the last liquid increments while still maintaining relatively uniform intermixing.

## MODIFICATIONS

It will be understood that the specific embodiment just described is intended for purposes of illustration, and that certain of the constructional features can be varied while still achieving the same functions and results. For example, the tube elements forming the compartments 15 and 16 can be originally manufactured as separate components, being united in the area of the neck portion 17 to achieve an assembled construction substantially as previously described. It will be appreciated that the closure ends of the tube elements will be united through the formation of the heat-fusion line or juncture, as previously described with respect to the fusion seal 17. With such a construction, it will not be necessary to provide any additional connection between the inner adjacent walls of the compartments, such as the rib 25. This can be completely omitted, which will permit the adjacent walls, such as the walls 13, 14 to lie substantially against each other in the assembled package. The general cross-sectional configuration and taper of the compartments will be as previously described.

It will also be understood that the outlet check valve means and dispenser cap assembly can be varied while still providing the same method of functioning and accomplishing the same general results. For example, such a modification is illustrated in FIGS. 12 and 13. Looking first at FIG. 12, which shows the assembly in closed and sealed condition, the container means 10′ defines the compartments 15′, and 16′ and provides the outlet port means 18′, 19′. The exterior of the container neck portion 37′ is provided with threads 34′, and also with an annular stop flange 101. The cover 32′ includes internal threads 102 which cooperate with the threads 34, and also an annular stop flange 103, which cooperates with the stop 101. In the assembly of the parts, flange portion 103 is sufficiently flexible to permit it to be snapped over the flange 101, permitting the threads 34′, 102 to engage, so that the cap can be screwed down on the neck 37′ to the position shown in FIG. 12. The

cap 32' also includes an outlet spout 33' surrounding an outlet passage 23'.

Prior to initial use, the outer end of spout 33' can provide a sealed portion 104, which can be cut or snipped off to open the passage 23', as indicated by the line y–y in FIG. 12. The appearance of the assembly in open condition is shown in FIG. 13.

The member 105 provides two tubular extensions 106, 107, which respectively extend through the ports 18', 19' and provide the apertures 108, 109 which are respectively controlled by the valve pins 110, 111. In the illustration given, the valve pins 110, 111 are integrally connected by a disc-shaped member 112 which provides a central port 113. It will be understood that the pins 110, 111 are slidable within the tubular extensions 106, 107, the closed position being shown in FIG. 12 and the open position in FIG. 13. Spring biasing of the valve pins 110, 111 to closed position is provided by spring member 114. In the illustration given, spring 114 is formed integrally with the pins 110, 111 and the disc connector 112. This composite member can be molded from a suitable thermoplastic, such as polyethylene or polypropylene, as can the other components. The outer end of spring 114 can be received within a recess 115 provided by cap 32' at the inner end of passage 23, the outer end of the recess being defined by an annular shoulder 116.

The inner sides of pins 110, 111 are respectively provided with longitudinally extending flow channels 117, 118. Thus, when the container 10' is grasped with a hand to create pressure within the compartments 15', and 16', the valve pins 110, 111 move off of their respective seats, opening the apertures 108, 109. The liquids then flow through the apertures and the channels 117, 118 to the port 113 passing between the adjacent surfaces of disc 112 and a central disc-shaped portion 119 of insert 105, as shown in FIG. 13. The opposing flows of the fluids or liquids will cause intermixing, and this intermixing will continue as the liquids or fluids pass through the port 13. The space 120 which contains the spring 114 can function as a mixing chamber. The intermixing of the fluids can be further improved by providing flow-restricting means for interrupting the flow of the liquids and retaining them within the chamber 120 until thoroughly mixed. In the illustration given, a disc 121 is supported on shoulder 116 immediately outward of the spring 114 and provides a central restricted orifice 122. The intermixed fluids pass through the orifice 122, after a short residence time in mixing chamber 120, and flow outwardly through passage 23' of spout 33'.

When it is desired to close the dispenser container, the cap is screwed on to the container threads to the position shown in FIG. 12 where the valve pins 110, 111 are positively held in seated relation to close the apertures 108, 109. In this position, the spring 114 can be substantially fully compressed, as shown in FIG. 12. When it is desired to reopen the container, the cap is moved outwardly on the threads to the position shown in FIG. 13, where the cap flange 103 engages the stop flange 101. As will be noted, in the closed condition, the total passage volume between the apertures 108, 109 and the outer end of spout 33' is greatly reduced, as compared with the open condition of FIG. 13. In closing the cap, a substantial portion of the intermixed fluids will thereby be forced out of the spout 33. At the same time, all backflow is prevented by the action of the valve pins 110, 111.

I claim:

1. A dispenser container, comprising in combination:

a. container means formed of plastic material and providing two substantially separate tubes of equal size each having an arcuate flexible outer wall and a generally flat central wall enclosing a longitudinally extending compartment,

said tubes being arranged side-by-side with said inner walls in adjacent facing relation and said outer walls oppositely disposed,

said tubes being dimensioned to be manually grasped for simultaneously and substantially uniformly collapsing the said outer walls of said tubes toward said inner walls to reduce the volume of said compartments,

said tubes having adjacent outlet ends and adjacent closure ends and tapering from said outlet ends toward said closure ends so that said compartments progressively reduce in cross section toward said closure ends,

said outer and inner walls being brought together and united at said closure ends, rib means connecting said inner walls along the longitudinal centerline of said tubular container means but terminating at a spaced distance from said closure ends,

said outlet end providing outlet port means separately communicating with said compartments;

b. outlet check valve means associated with each of said port means biased to close said parts when said container means is under ordinary atmospheric pressure while permitting said ports to open when said container means is manually collapsed; and

c. dispenser cap mean received on the outlet end of said container means enclosing said port means and said valve means,

said cap means providing common passage means communicating at its inner end with both of said port means when opened by said valve means and at its outer end with a dispensing outlet.

2. The dispenser container of claim 1 wherein said compartments have approximate cross sections of half ellipses with said inner walls generally coinciding with the major axes thereof, and the minor axes of said half-ellipsoidal compartments progressively shortening from said outlet end to said closure ends, and wherein said container means is formed of a thermoplastic material, said closure ends being heat-fused together along a transverse line lying in the longitudinal plane toward which said outer wall collapses.

3. A two-compartment tubular container formed of plastic material and providing two substantially separate tubes of equal size each having an arcuate flexible outer wall and a generally flat central wall enclosing a longitudinally extending compartment, said tubes being arranged side-by-side with said inner walls in adjacent facing relation and said outer walls oppositely disposed, said tubes being dimensioned to be manually grasped for simultaneously and substantially uniformly collapsing the said outer walls of said tubes toward said inner walls to reduce the volume of said compartments, said tubes having adjacent outlet ends, and adjacent closure ends and tapering from said outlet ends toward said closure ends so that said compartments progressively reduce in cross section toward closure ends, said outer and inner walls being brought together and united at said closure ends, rib means connecting said inner walls along the longitudinal centerline of said tubular container but terminating at a spaced distance from the said closure ends, and said outlet end providing outlet port means separately communicating with said compartments.

4. The container of claim 3 wherein said compartments have approximate cross sections of half ellipses and the minor axes of said half-ellipsoidal compartments progressively shortening from said outlet end to said closure ends, and wherein said container is formed of a thermoplastic material, said closure ends being heat-fused together along a transverse line lying in a longitudinal plane toward which said outer wall collapses.

5. A dispenser container comprising in combination:

a. tubular container means formed of flexible plastic material providing opposite outer walls and central wall means dividing said container means into two collapsible longitudinally extending compartments,

said container means having an outlet end and a closure end,

said outlet end providing outlet port means separately communicating with said compartments,

said container means being dimensioned to be grasped by one hand for simultaneously collapsing the said outer walls of said container means toward said central wall means,

said central wall means comprising two wall members each separately providing an inner wall for one of said compartments,

said outer walls and inner walls being brought together and united at said closure end along a transverse line lying approximately in said longitudinal plane toward which said outer walls collapse,

said outer walls and said inner walls being integrally formed, and integral rib means connecting said inner walls along the longitudinal centerline of said tubular container means, said rib means terminating at a spaced distance from the said transverse union line of said closure end;

b. outlet check valve means associated with each of said port means effective to close said ports when said container means is under ordinary atmospheric pressure while permitting said ports to open when said container means is collapsed by the grasp of a hand; and

c. dispenser cap means received on the outlet end of said container means enclosing said port means and said valve means,

said cap means providing intermixing passage means communicating at its inner end with both of said port means when said valve means are open and at its outer end with a dispensing outlet.

6. A dispenser container, comprising in combination:

a. container means formed of plastic material and providing two substantially separate tubes of equal size each having an arcuate flexible outer wall and a generally flat inner wall enclosing a longitudinally extending compartment,

said tubes being arranged side-by-side with said inner walls in adjacent facing relation and said outer walls oppositely disposed,

said inner walls being laterally spaced apart and having their central portions integrally connected by rib means extending along the longitudinal centerline of said container means,

said tubes being dimensioned to be manually grasped for simultaneously and substantially uniformly collapsing the said outer walls of said tubes toward said inner walls to reduce the volume of said compartments,

said tubes having adjacent outlet ends and adjacent closure ends and tapering from said outlet ends toward closure ends so that said compartments progressively reduce in cross section toward said closure ends,

said outer and inner walls being brought together and heat-fused at said closure ends along a transverse line running generally parallel to the planes of said inner walls,

said outlet end providing outlet port means separately communicating with said compartments;

b. outlet check valve means associated with each of said port means biased to close said parts when said container means is under ordinary atmospheric pressure while permitting said ports to open when said container means is manually collapsed; and

c. dispenser cap means received on the outlet end of said container means enclosing said port means and said valve means,

said cap means providing common passage means communicating at its inner end with both of said port means when opened by said valve means and at its outer end with a dispensing outlet.

7. The dispenser container of claim 6 wherein said compartments have approximate cross sections of half ellipses with said inner walls being generally parallel to the major axes thereof, and the minor axes of said half-ellipsoidal compartments progressively shortening from said outlet end to said closure ends, and wherein said container means is integrally formed of a thermoplastic material.