May 6, 1969 S. PRUSSIN ETAL 3,442,424

MULTIPLE COMPARTMENT COLLAPSIBLE TUBES

Filed Aug. 31, 1967 Sheet 1 of 3

FIG. 2.

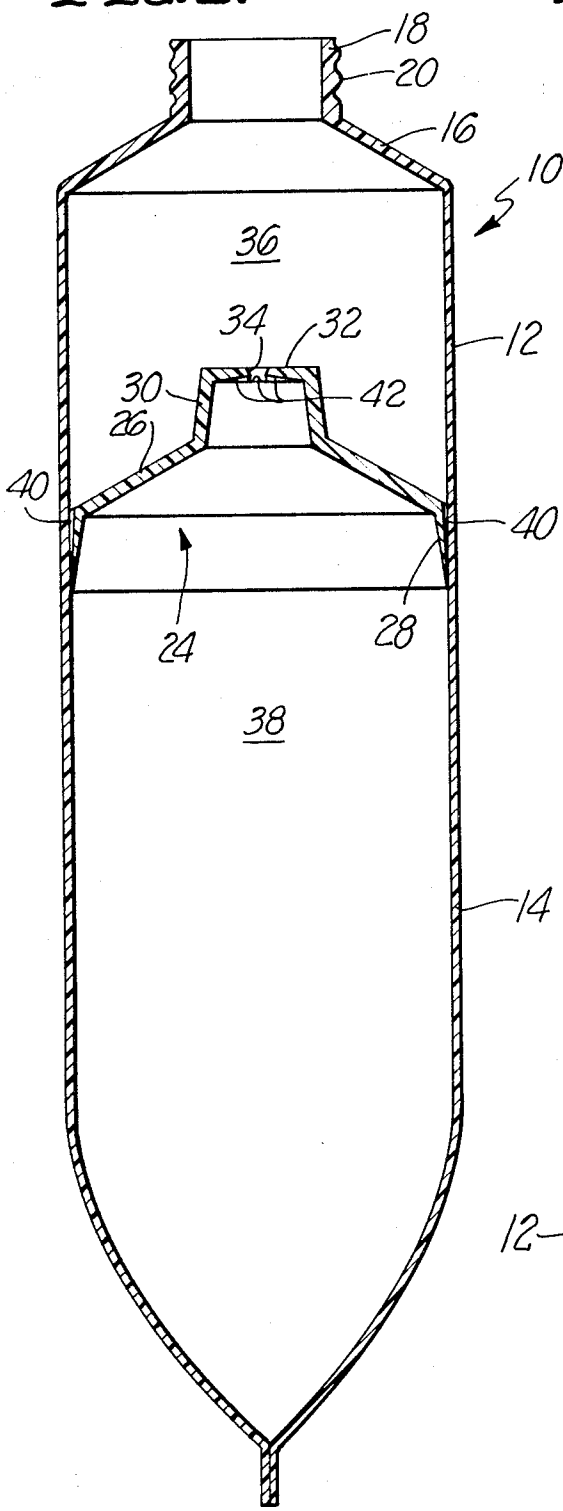


FIG. 1.

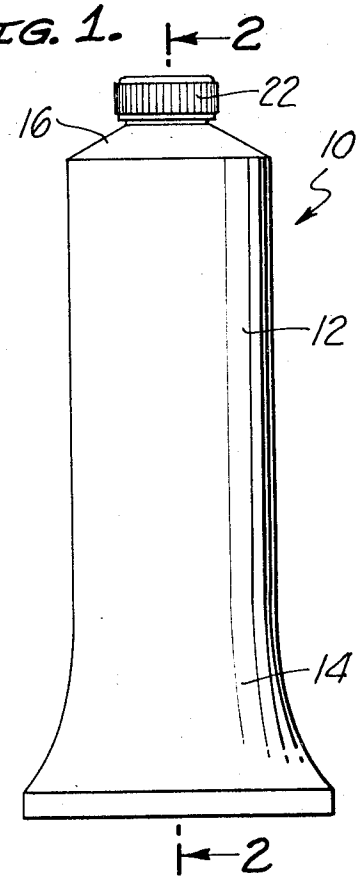
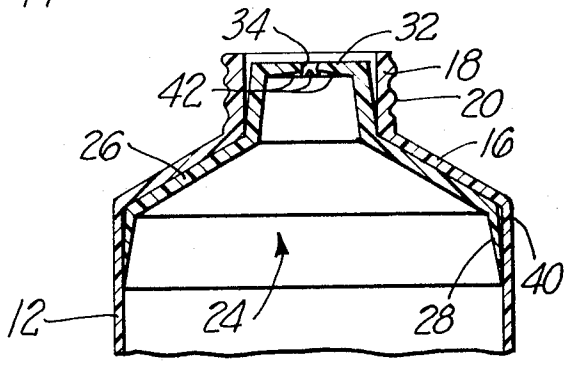


FIG. 3.



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FIG. 4.

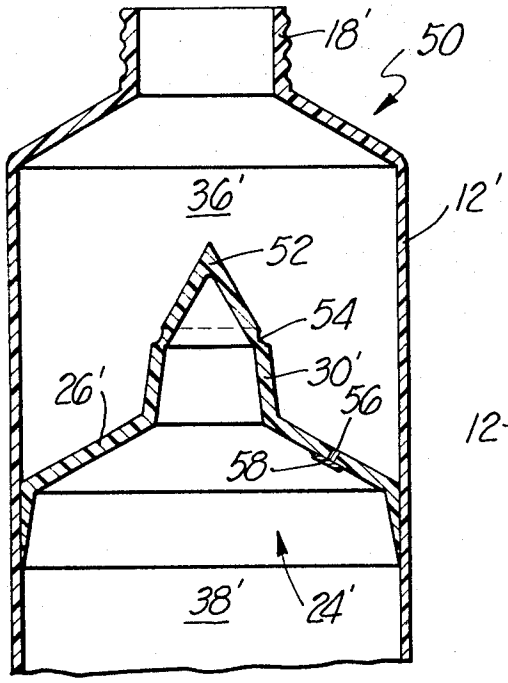


FIG. 5.

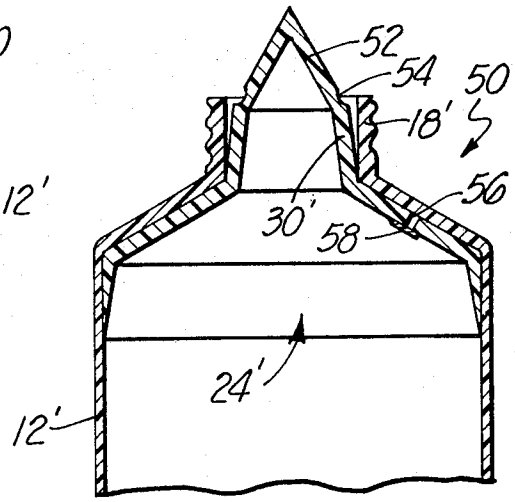


FIG. 6.

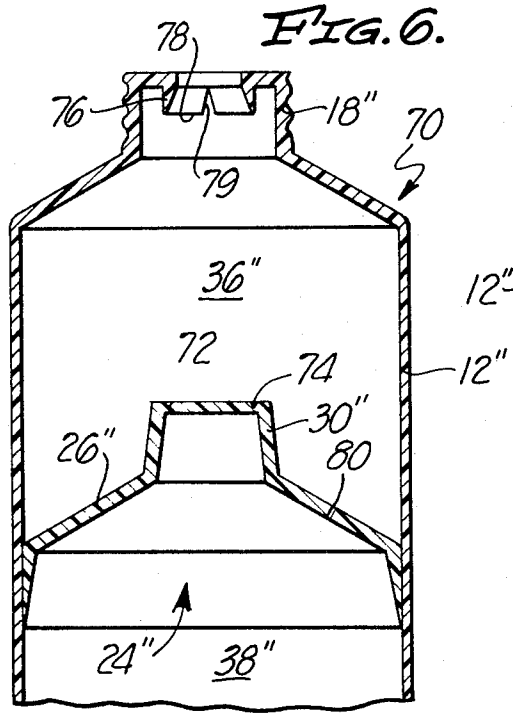
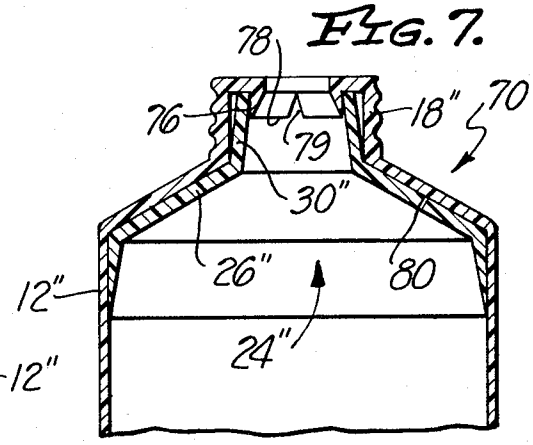


FIG. 7.



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FIG. 10.

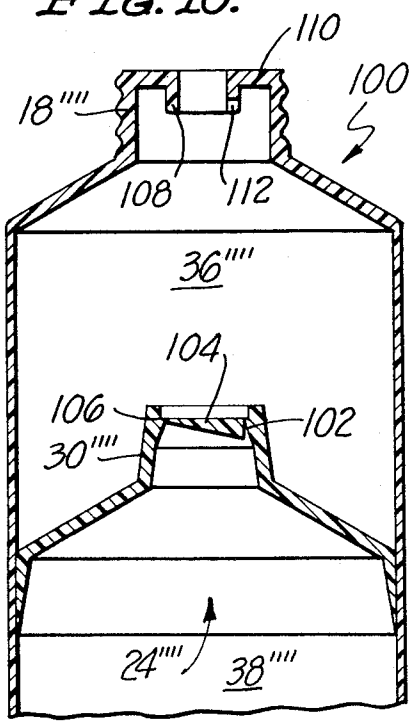


FIG. 11.

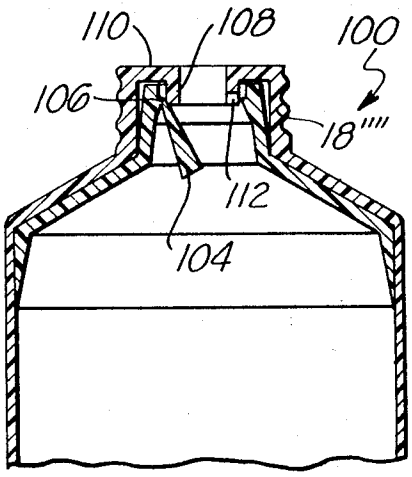


FIG. 8.

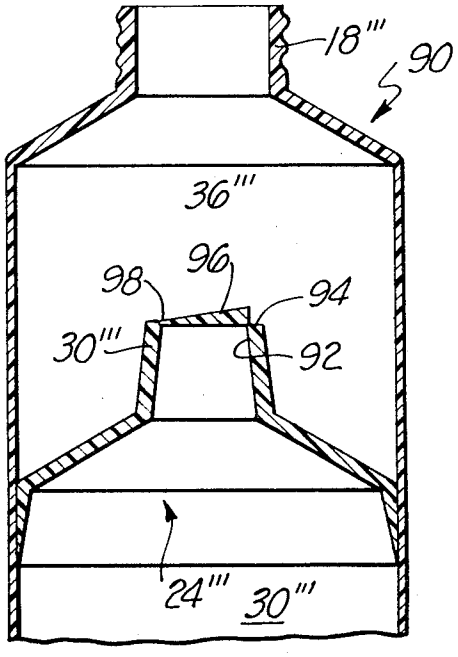
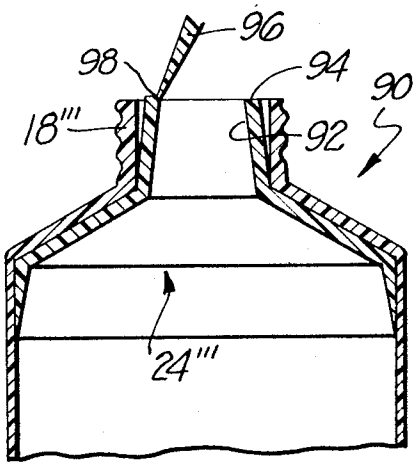


FIG. 9.



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MULTIPLE COMPARTMENT COLLAPSIBLE TUBES

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U.S. Cl. 222—81 31 Claims

ABSTRACT OF THE DISCLOSURE

A collapsible tube is disclosed which has an internal piston dividing the tube into two compartments. The piston is capable of being moved towards the discharge end of the tube. Means are provided for discharging material through the piston and through the discharge end of the tube from the compartment on the side of the piston remote from this discharge end.

Background of the invention

Collapsible tubes are commonly used for shipping and dispensing a wide variety of different diverse products. As such tubes are commonly constructed they can only be used in conjunction with a single product. Occasionally tubes have been formed which are capable of being used in simultaneously dispensing two different compositions. Tubes of these types, while advantageous for many purposes, cannot be satisfactorily used in certain comparatively specialized situations.

As an example of such a situation it is sometimes considered desirable to dispense from a single tube a first composition and then to subsequently dispense from the same tube a second, different composition. In cases such as this it is normally desired to prevent intermingling of the two different compositions to as great an extent as may be reasonably necessary, depending upon the compositions.

Such two compositions may be closely related in character. Thus, the first could be a sun tan composition containing one or more agents designated to screen certain radiation and the second could be a similar sun tan lotion omitting or reducing these screening agents and perhaps including other different ingredients designed to treat skin which has previously been exposed to the sun's rays. Similarly, such a first composition could be a dentifrice having certain characteristics and the second composition could be a dentifrice having different properties than the first designed to be used after the first composition.

Such two compositions may also be entirely dissimilar in character. Thus, for example, the first composition could be one part of a two-part adhesive and the second composition could be the second part of the same adhesive, designed to catalyze the action of the first. In other cases the first composition could be intended to accomplish some particular function, and the second composition could be of a nature to accomplish some distinctly different function. Thus, the first could be a shampoo and the second a rinse composition, or the first could be a shaving cream and the second an after shave lotion. Many other different unit type applications may be advantageous.

Common collapsible tubes such as are referred to in the preceding cannot be used so as to sequentially dispense two different compositions. There is a need for tubes which can be used for this purpose with different types of materials such as the various types of materials broadly indicated in the preceding discussion.

Brief summary of the invention

A broad object of the present invention is to provide new multiple compartment collapsible tubes which are intended to fulfill this need. Another object of the present invention is to provide multiple compartment collapsible tubes which can be easily and conveniently manufactured and assembled at a comparatively nominal cost.

A further object of this invention is to provide tubes of this type with which various degrees of segregation of two different compositions or materials may be obtained as may be necessary depending upon the nature of these materials on compositions. Particularly with certain embodiments of the invention an object of this invention is to provide multiple compartment collapsible tubes which effectively separate two or more different materials or compositions so that there is no reasonable chance of these materials intermingling.

In accordance with this invention these and other various related objectives of the invention are achieved by providing a collapsible tube having a discharge end provided with a discharge opening and a normally closed end with the improvement comprising a piston located within the tube so as to separate the tube into separate compartments, this piston being capable of being moved within the tube from an initial position intermediate the tube ends to a final position in which it fits closely against the discharge end of the tube, this piston carrying means for discharging material from the compartment remote from the discharge end of the tube through the piston and through the discharge opening when the piston is in the final position indicated. Also preferably means are provided for allowing the passage of air past the piston during the insertion of the piston within the tube during assembly. If desired, one or more other similar pistons can be located within the first mentioned piston.

Brief description of the drawings

The actual character and construction of collapsible tubes falling within the scope of this invention is indicated in the following detailed description. This description is based upon the accompanying drawings in which:

FIG. 1 is a side elevational view of a complete double compartment collapsible tube of this invention;

FIG. 2 is a cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a partial cross-sectional view corresponding to FIG. 2 showing this tube in use;

FIG. 4 is a cross-sectional view similar to FIG. 2 of a modified form or embodiment of a tube of this invention;

FIG. 5 is a partial cross-sectional view corresponding to FIG. 3 showing this modified tube of this invention in use;

FIG. 6 is a cross-sectional view corresponding to FIG. 2 of a further modified form or embodiment of a tube of this invention;

FIG. 7 is a cross-sectional view corresponding to FIG. 3 of this further modified tube of this invention;

FIG. 8 is a cross-sectional view corresponding to FIG. 2 of a still further modified form or embodiment of a tube of this invention;

FIG. 9 is a cross-sectional view corresponding to FIG. 3 of this still further modified tube of this invention;

FIG. 10 is a cross-sectional view corresponding to FIG. 2 of another embodiment or form of a collapsible tube of this invention; and

FIG. 11 is a cross-sectional view corresponding to FIG. 3 of another tube of this invention.

Detailed description of the preferred embodiments

In the initial three figures of the drawing there is shown a complete double compartment collapsible tube 10

of this invention. All of the parts of this complete tube **10** may be conveniently formed by known techniques from various known polymer compositions such as polyethylene, polypropylene, various vinyl compositions or the like. This complete tube **10** includes a conventional tube **12** having a uniform cross-sectional configuration throughout the principal portion of its length. One end **14** of the tube **12** is preferably closed in accordance with conventional practice. The other end **16** of the tube **12** may be termed a discharge end. It may be formed in conventional manner so as to have a hollow extending neck **18** provided with external threads **20** for use in attaching a cap **22** to the complete tube **10**. The neck **18** serves as a discharge opening for the compelte tube **10**.

Within the interior of the tube **12** there is located a piston **24**. This piston **24** has a piston head or wall **26** which extends completely across the interior of the tube **12**. This head or wall **26** carries a dependent, somewhat resilient skirt **28** fitting against the interior of the tube **12** and serving to stabilize the entire piston **24** so that it will not become cocked or bent within the tube **12** during normal use. The head or wall **26** carries a slightly tapered neck **30** closed by another wall **32** having at least one centrally located opening **34**.

The piston **24** is constructed so that it can be moved from a normal, initial position as shown in FIG. 2 intermediate the ends **14** and **16** to a final position as shown in FIG. 3. It will be noted that the head or wall **26** is preferably shaped so as to fit closely against the interior of the end **16** in the position shown in FIG. 3. It will also noted that the neck **30** is dimensioned so as to fit closely within the interior of the neck **18**. The slight taper on this neck **30** prevents it from operating as a valve closure when the piston **26** is moved into this final position and the neck **30** enters the neck **18**. With this construction when the piston **24** is in the final position virtually no material can remain in a first compartment **36** of the complete tube **10**, and the tube may be used for discharging material from a second compartment **38** within this tube. These two compartments are in effect defined by the piston **24** separating the interior of the tube **12** into them.

As the complete tube **10** is normally filled the end **14** is open and the end **16** is closed by the cap **22**. At this point a first fluid type of material may be located within the tube **12** against the end **16** through the end **14**. The piston **24** may be then inserted. In order to avoid the possibility of air being entrapped within the tube **12** as the piston **24** is inserted in this manner it is considered preferable to use at least one air venting means in conjunction with the piston **24**.

The particular venting means used in the complete tube **10** comprises a series of small grooves **40** located on the periphery of the skirt **28** opposite of the interior of the tube **12**. These grooves **40** are preferably of such dimension that they will permit the passage of air, but are sufficiently small so that under normal conditions materials such as may be used within the compartments **36** and **38** will not pass through them because of surface tension and other related phenomena. Other venting means as are subsequently described in connection with other embodiments of the invention may be substituted for the grooves **40** in the complete tube **10**.

After the complete tube **10** has been filled with a first material and the piston **24** has been inserted within the tube **12** a second fluid type of material may be located through the end **14** against the piston **24**. This end **14** may then be sealed in accordance with conventional practice. The complete tube **10** is then ready for shipment, storage and/or use. The opening **34** is preferably made sufficiently small so that there is substantially no chance of significant intermingling of the materials within the two compartments **36** and **38** during such storage.

When the complete tube **10** is to be used, the cap **22** is, of course, removed. Pressure is then applied to the tube **12** adjacent the end **14**. This pressure will be transmitted by

the material within the compartment **38** to the piston **24** and thence transmitted to the material within the compartment **36**, causing the latter to be discharged through the neck **18**. As the compartment **36** is exhausted the piston **24** will move towards the end **16**. When the material within the compartment **36** has been discharged in this manner, the piston **24** will fit against the end **16** as indicated in FIG. 3 so that there is very little or substantially none of the material which was within the compartment **36** remaining within the complete tube **10**. At this point the compartment **36** is nonexistent.

As further pressure is applied to tube **12** the material within the compartment **38** will be discharged from the complete tube **10** through the opening **34**. If desired, small radial grooves **42** extending outwardly from the opening **34** may be located in the wall **32** which will tend to break open as this pressure is applied since there is no material in back of the wall **32** tending to impede such breaking as this discharge from the compartment **38** continues. Such breaking will, of course, enlarged the opening **34**, making it easier to discharge material from within the compartment **38**.

The various embodiments of complete multiple compartment collapsible tubes shown in the subsequent FIGURES 4 to 11 of the drawing are in many respects identical or substantially identical to the complete tube **10** previously described. In the interest of brevity those parts of these other complete tubes which are the same or substantially the same as corresponding parts of the complete tube **10** are not separately described herein, and are indicated both in this specification and in the accompanying drawings by primes of the numerals previously used to designate such parts.

In FIGS. 4 and 5 of the drawings there is shown a modified form or embodimentof a complete multiple compartment collapsible tube **50** of this invention which corresponds closely to the complete tube **10** previously described. In this complete tube **50** the wall and the opening **34** used in the complete tube **10** are replaced by a conical wall **52** separated from the neck **30'** by a small groove **54** extending completely around the neck **30**. This construction is designed so that when the compartment **36'** is exhausted as indicated by FIG. 5 the wall **52** extends from the neck **18'** as indicated in FIG. 5. In this position the wall **52** may easily be severed as, for example, by the use of a knife or a similar instrument along the groove **54** permitting material from within the compartment **38'** to be ejected from the complete tube **50**.

For certain applications it may be preferable to use within the complete tube **50** at least one air venting means corresponding to the grooves **40** previously described. With this embodiment of the invention such air venting means includes a small opening **56** located within the wall or head **26'**. This opening **56** is normally covered by a small resilient flap **58** attached to the wall **26'** within the skirt **38'**. With this construction the opening **56** acts in conjunction with the flap **58** essentially as a check valve, permitting the flow of air from the compartment **36'** through the piston **24'** as the piston **24'** is inserted within the tube **12'**.

The manner of assembly of the complete tube **50** and its use are substantially identical with the manner of assembly and use of the complete tube **10** previously indicated except that with this embodiment of the invention the wall **52** must be severed. With this embodiment the groove **54** may be made sufficiently deep so that upon pressure being applied to the tube **12'** in order to remove material from within the compartment **38'** the pressure alone will serve to break the wall **52** away from the piston **24'**.

In FIGS. 6 and 7 of the drawings there is illustrated a further modified form or embodiment of a complete multiple compartment collapsible tube **70** of this invention. In this embodiment the wall **32** used in the complete tube **10** is replaced by another wall **72** of imper-

forate character. This wall **72** may be surrounded by a small groove **74** attaching it to the neck **30''**. In essence this wall **72** is intended to serve as a frangible diaphragm which is intended to be broken with contact with a sharp ring **76** attached to and inwardly spaced from the neck **18''**. It will be noted that the edge **78** of this spring **76** is pointed towards the wall **72**.

The complete tube **70** is designed to be used in the same general manner as the tube **10**. In its use, however, there is one difference. As material is exhausted from within the compartment **36''** movement of the piston **24''** forces the wall **72** against the edge of the ring **76**. This in turn causes the wall **72** to be severed from the neck **30''**. Preferably the ring **76** is provided with a small notch **79** designed to eliminate entrapment of material from within the first compartment **36''** between the ring **76** and the neck **18''** as the piston **24''** is moved to a final position as shown in FIG. 7 since such entrapment might make it difficult to move the wall **72** into a position where it would be severed by the ring **76**.

When it is desired to utilize air venting means with the piston **24''** in the complete tube **70** any of the air venting means described in connection with any of the preceding emboidments of this invention can be employed. In this embodiment of the invention the air venting means comprises a small hole **80** located within the head or wall **26''** of the piston **24''**. Preferably this hole **80** is just large enough so as to permit passage of air, and yet is small enough so as to prohibit or minimize the passage through it of any material used in the complete tube **70** as a result of surface tension or other related phenomena.

The complete tube **70** is assembled in substantially the same manner as the various other complete tubes of this invention previously described. When it is used and the piston **24''** is brought to a final position as indicated in FIG. 7 the edge **78** of the ring **76** engages the wall **72** in about the area of the groove **74** so as to sever this wall from the complete piston **24''**. This permits material to be discharged from the compartment **38''** through the neck **18''**.

A still further form or embodiment of a complete double compartment collapsible tube **90** of the present invention is illustrated in FIGS. 8 and 9 of the drawings. With this construction the wall **34** of the complete tube **10** is replaced by a comparatively large opening **92** having a continuous shoulder **94** located around its periphery. A small flapper **96** adapted to seat against this shoulder is attached to the neck **30'''** of the piston **24'''** by a small flexible tab **98**.

With this construction the flapper **96** acts essentially as a check valve in connection with the shoulder **94** around the opening **92**, preventing material movement past the piston **24'''** from the compartment **36'''** into the compartment **38'''**. However, when the piston **24'''** is moved to a so-called final position as indicated in FIG. 9 and there is no pressure against the flapper **96** exerted by material within the compartment **36'''** this flapper **96** will automatically open as pressure is applied to the compartment **38'''** so as to permit material from within this latter compartment to be discharged through the neck **18'''**.

The complete tube **90** is assembled and used in substantially the same manner as the various complete tubes **10**, **50** and **70** previously described. As it is assembled, and as it is used material within the compartment **36'''** exerts a pressure on a small flapper **96** keeping it in the closed position as illustrated in FIG. 8. However, this flapper **96** may be easily moved as described to an open position when the piston **24'''** is in a final position as shown in FIG. 9. Although no air venting means are shown in connection with the complete tube **90** any of the air venting means described in connection with the complete tubes **10**, **50** and **70** can be employed in connection with this still further modified form or embodiment of the invention.

Another embodiment or form of a complete multiple compartment collapsible tube **100** of the present invention is shown in FIGS. 10 and 11. In this complete tube **100** the neck **30''''** of the piston **24''''** is modified so as to dispense with the wall **32** used in the complete tube **10**. This wall **32** is replaced by a valve structure including an annular flange **102** located interiorly within the neck **30''''** and by a small flap **104** positioned within this neck **30''''**. The flap **104** may be connected to the interior of the neck **30''''** by a small flexible tab **106**.

In the complete tube **100** this flap **104** is adapted to be pushed to an open position as shown in FIG. 11 by contact with a small annular ring **108** supported by an annular washer-like wall **110** mounted on the neck **18''''**. In order to prevent any possibility of material accumulating between this ring **108** and the neck **18** so as to prevent the piston **24''''** from being moved to a final position as shown in FIG. 11 a small notch **112** is located within the ring. It will be noted that the ring **108** is dimensioned so as to extend into the neck **30''''** a sufficient distance to clearly displace the flap **104** when the piston **24''''** is located in a final position as shown in FIG. 11. This, of course, has the effect of opening what is described herein as a valve means.

The complete tube **100** is, of course, very closely related to the various tubes **10**, **50**, **60** and **90** previously described. It is assembled and used in substantially the same manner as any of these other tubes. When it is used and the piston **24''''** is moved to a final position material can be dispensed directly from the compartment **38''''**. Although no venting means such as are described in connection with the complete tubes **10**, **50** and **70** are illustrated in connection with the tube **100** it is to be understood that any of the venting means previously indicated in connection with these other tubes if desired be used as tube **100**.

From the aforegoing description those skilled in the art to which this invention pertains will realize that all of the various different complete tubes described may be easily and conveniently manufactured and assembled. They will also realize that these tubes may be easily used in sequentially dispensing two different compositions. In the interest of brevity and so as to conserve on the drawings required to illustrate the present invention the various different venting means capable of being interchanged with one another have not been illustrated in connection with each individual embodiment or form of a complete tube of this invention.

Those skilled in the art will readily realize that any of the venting means described can be used with any of the embodiments of complete tubes of this invention. They will further realize that a number of other different changes may be made in the embodiments or forms illustrated through the exercise of routine engineering skill. As an example of such a change or modification any of the complete tubes described can be constructed so as to utilize more than one piston of the type indicated, the pistons "nesting" so that the materials separated by them are sequentially dispensed. For these reasons this invention is to be considered as being limited solely by the appended claims forming a part of this disclosure.

We claim:

1. A collapsible tube having a discharge end provided with a discharge opening and a normally closed end wherein the improvement comprises:

a piston located within said tube between the ends thereof so as to separate said tube into separate compartments which are capable of holding different materials,

said piston being capable of being moved along the length of said tube to a final position in which said piston fits closely against said discharge end, and

means for discharging material from the compartment remote from said discharge end through said piston and said discharge opening when said piston is in

said final position, said means for discharging being located on said piston.

2. A collapsible tube as claimed in claim 1 including air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

3. A collapsible tube as claimed in claim 2 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

4. A collapsible tube as claimed in claim 2 wherein said air vent means comprises check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end, said check valve means being formed so as to be normally held closed by any material confined within the compartment remote from said discharge end.

5. A collapsible tube as claimed in claim 2 wherein said air vent means comprises a hole located within said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

6. A collapsible tube as claimed in claim 1 wherein said means for dispensing comprises an opening in said piston, said opening being located in said piston so as to be adjacent to said discharge opening when said piston is in said final position.

7. A collapsible tube as claimed in claim 6 including air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

8. A collapsible tube as claimed in claim 7 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

9. A collapsible tube as claimed in claim 7 wherein said air vent means comprises check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end, said check valve means being formed so as to be normally held closed by any material confined within the compartment remote from said discharge end.

10. A collapsible tube as claimed in claim 7 wherein said air vent means comprises a hole located within said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

11. A collapsible tube as claimed in claim 1 wherein said means for discharging comprises a wall means located on said piston, said wall means being adapted to be severed from said piston when said piston is in said final position.

12. A collapsible tube as claimed in claim 11 including

air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

13. A collapsible tube as claimed inclaim 12 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

14. A collapsible tube as claimed in claim 12 wherein said air vent means comprises check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end, said check valve means being formed so as to normally held closed by any material confined within the compartment remote from said discharge end.

15. A collapsible tube as claimed in claim 12 wherein said air vent means comprises a hole located within said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

16. A collapsible tube as claimed in claim 11 wherein said wall means projects from said tube through said discharge opening when said piston is in said final position.

17. A collapsible tube as claimed in claim 1 wherein said means for discharging comprises a diaphragm means located on said piston and including

means for severing said diaphragm means by engagement therewith located on said discharge end, said means for severing engaging said diaphragm means so as to severe said diaphragm means wherein said piston is moved to said final position.

18. A collapsible tube as claimed in claim 17 including air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

19. A collapsible tube as claimed in claim 18 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

20. A collapsible tube as claimed in claim 18 wherein said air vent means comprises check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end, said check valve means being formed so as to be normally held closed by any material confined within the compartment remote from said discharge end.

21. A collapsible tube as claimed in claim 18 wherein

said air vent means comprises a hole located within said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

22. A collapsible tube as claimed in claim 1 wherein said means for discharging comprises valve means located upon said piston so as to be located adjacent said discharge opening when said piston is in said final position and including

means for engaging said valve means when said piston is in said final position so as to open said valve means when said piston is in said final position.

23. A collapsible tube as claimed in claim 22 including air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

24. A collapsible tube as claimed in claim 23 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

25. A collapsible tube as claimed in claim 23 wherein said air vent means comprising check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end, said check valve means being formed so as to be normally held closed by any material confined within the compartment remote from said discharge end.

26. A collapsible tube as claimed in claim 23 wherein said air vent means comprises a hole located within

said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

27. A collapsible tube as claimed in claim 1 wherein said means for discharging comprises check valve means located on said piston so as to be adjacent to said discharge opening when said piston is in said final position, said check valve means permitting material to flow from within the compartment remote from said discharge opening through said piston.

28. A collapsible tube as claimed in claim 27 including air vent means for permitting air to escape past said piston when said piston is inserted into said tube through said normally closed end.

29. A collapsible tube as claimed in claim 28 wherein said air vent means are grooves located between said piston and the interior of said tube, said grooves being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

30. A collapsible tube as claimed in claim 28 wherein said air vent means comprises check valve means located on said piston, said check valve means permitting air to pass through said piston as said piston is inserted into said tube towards said discharge end,

said check valve means being formed so as to be normally held closed by any material confined within the compartment remote from said discharge end.

31. A collapsible tube as claimed in claim 28 wherein said air vent means comprises a hole located within said piston so as to communicate between the sides thereof, said hole being sufficiently small to prevent the passage of material located within said compartments between the sides of said piston.

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222—541, 389, 136, 94; 128—272, 260

U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,442,424 May 6, 1969

Sam Prussin et al.

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

Column 3, line 30, after "It" insert -- be --. Column 5, line 7, "spring 76" should read -- ring 76 --. Column 6, line 35, after "tubes" insert -- can --. Column 7, line 72, "wherein" should read -- between --. Column 8, line 2, after "to" insert -- be --; line 21, "severe" should read -- sever --.

Signed and sealed this 21st day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents