May 18, 1965 L. I. VOLCKENING 3,184,121

PACKAGE WITH SELF SEALING CLOSURE

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Fig. 1

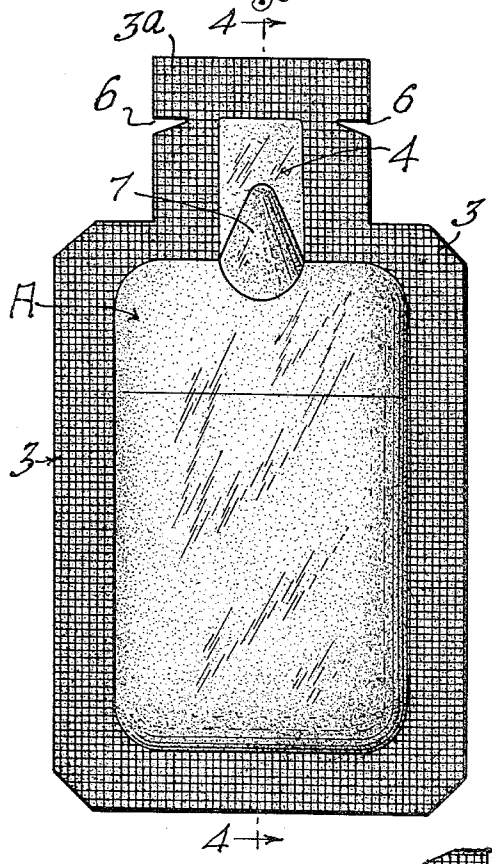


Fig. 2

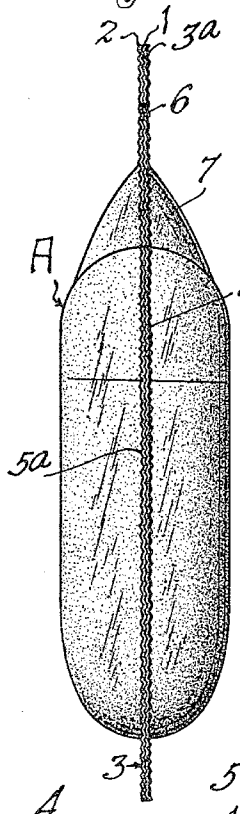


Fig. 4

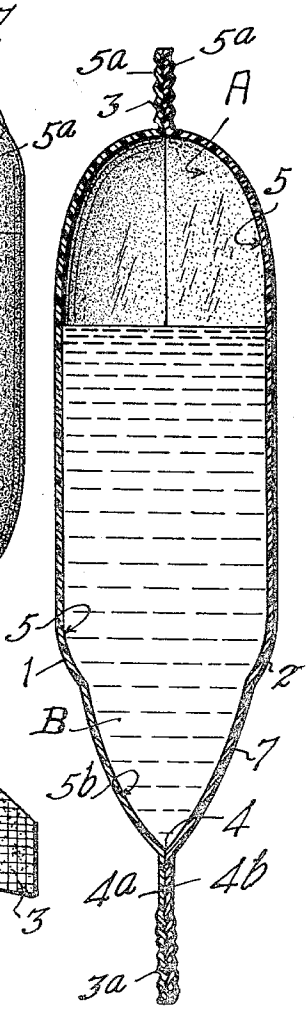


Fig. 1A

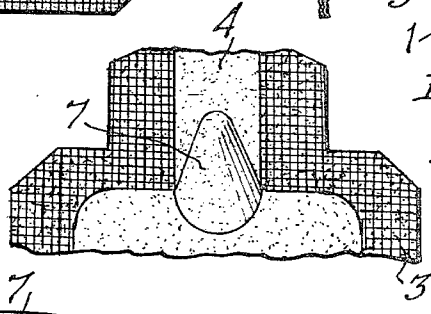
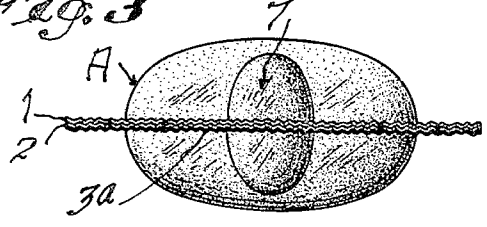


Fig. 3

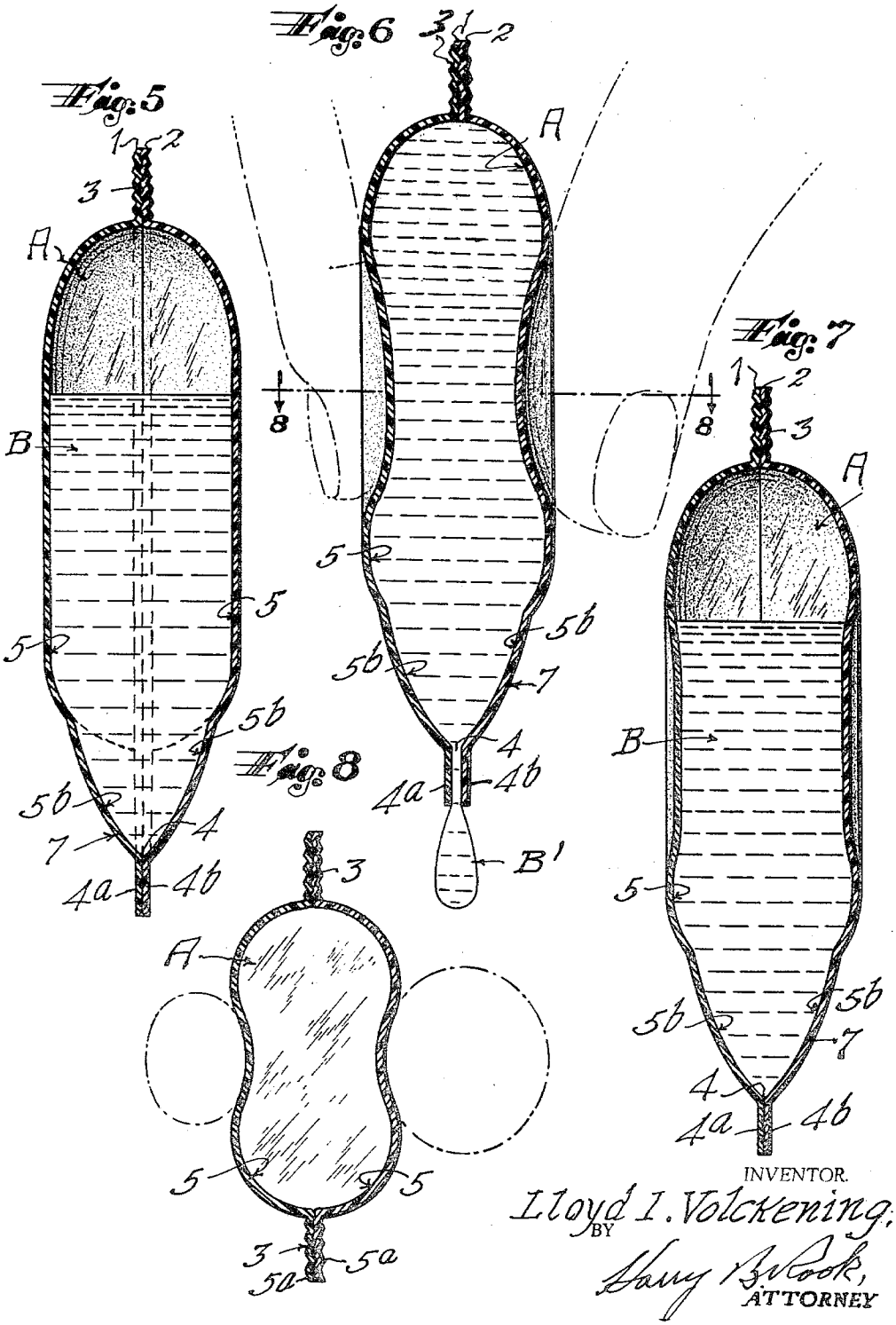


INVENTOR.
Lloyd I. Volckening,
BY
Harry B. Cook,
ATTORNEY

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PACKAGE WITH SELF SEALING CLOSURE

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INVENTOR.
Lloyd I. Volckening.
BY
Harry B. Cook,
ATTORNEY

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PACKAGE WITH SELF SEALING CLOSURE

Lloyd I. Volckening, Glen Ridge, N.J., assignor to Ivers-Lee Company, Newark, N.J., a corporation of Delaware

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1 Claim. (Cl. 222—213)

This invention relates in general to packages for dispensing liquids and other fluent substances or commodities, for example, eye drops, nose drops, iodine, cod liver oil or the like, and more particularly the invention contemplates a combined package for the fluent commodity and means for applying the commodity from the package to, for example, an eye or nostril, or for dispensing the commodity at the will of the user, either as a stream or in drops.

A primary object of the invention is to provide such a package having a discharge passage that is openable upon application of pressure to the walls of the package at the will of the user and is automatically closable and substantially air-tight after each discharge of the fluent commodity so that the package can be used several times while maintaining the fluent commodity in sanitary condition, and the possibilty of the escape of the fluent commodity from the package between the uses of the package shall be reduced to a minimum.

The invention especially contemplates a package of the type comprising at least two flexible layers or sheets of package material such as a metal foil or laminated sheets of cellulose acetate and polyethylene, or other suitable synthetic plastic material permanently sealed together in zones forming and bounding between the layers a commodity containing compartment having resilient self-sustaining walls with an elongated discharge passage openable between the layers, and another object of the invention is to provide such a package embodying a novel and improved construction wherein the discharge passage shall be openable upon application of pressure exteriorly to the portions of the layers forming the walls of the compartment and shall be automatically closed upon release of such pressure.

Further objects are to provide a package of this character wherein the portions of the layers forming the side walls of the discharge passage are unsealed and have a normal tendency to move into contact with each other to close the passage, and said portions of the layers are also automatically drawn into contact with each other by the partial vacuum or suction formed in the compartment upon resilient movement of the walls of the compartment away from each other after release from the walls of pressure applied to the walls to discharge a portion of the fluent commodity; and to provide a package of this nature so constructed that the discharge passage is initially positively sealed to protect the commodity for long periods of time against contamination and escape from the package, for example, during transportation and on the shelves of a store.

Still another object of the invention is to provide a package of the character hereinbefore described wherein the portions of the layers forming the walls of the discharge passage and the portions of the layers forming the compartment walls, shall have associated therewith in a novel and improved manner, means for directing the fluent commodity from the compartment to a predetermined zone of the discharge passage, thereby to insure the application of an adequate pressure to the walls of the discharge passage at the proper point to obtain the optimum discharge of the fluent commodity.

Other objects, advantages and results of the invention

will be brought out with the following description in conjunction with the acompanying drawings in which—

FIGURE 1 is a front elevational view of a complete and sealed package embodying the invention, showing the discharge passage extending upwardly;

FIGURE 1A is a fragmentary front elevational view of the discharge end of the package with the initial discharge passage sealing extensions removed for dispensing of the fluent commodity through the passage;

FIGURE 2 is a side elevation of the package;

FIGURE 3 is an elevational view of the discharge end of the package;

FIGURE 4 is an enlarged central vertical sectional view approximately on the plane of the line 4—4 in FIGURE 1 with the package inverted;

FIGURE 5 is a view similar to FIGURE 4 showing the package with the initial sealing extensions for the discharge passage removed as shown in FIGURE 1A;

FIGURE 6 is a view similar to FIGURE 5 showing the manner of pressing the compartment walls toward each other for dispensing the fluent commodity from the compartment through the discharge passage;

FIGURE 7 is like FIGURE 6 but showing the package with the walls moved away from each other upon release of the pressure on the walls and with the discharge passage closed; and

FIGURE 8 is a horizontal sectional view on the plane of the line 8—8 of FIGURE 6.

Specifically describing the invention the package is shown as formed of two identical sections which comprise the respective layers 1 and 2 of a suitable material such as hereinbefore described, sealed together in zones 3 that form and bound between them a commodity containing compartment A and an elongated discharge passage 4 the extremity of which is normally tightly and permanently sealed by a sealing zone 3*a* that constitutes an extension and continuation of the zone 3. Preferably, the portions of the layers forming the walls of the compartment A are self-sustaining but resilient so as to provide for momentary pressing of said walls toward each other to force some of the fluent commodity designated B, through the discharge passage and for subsequent resilient movement of said walls away from each other and toward their original condition. The portions 4*a* and 4*b* of the layers forming the discharge passage are unsealed and free for limited movement away from and into contact with each other upon application of pressure to the walls of the compartment exteriorly thereof and upon release of said pressure from said walls, respectively.

The package may be formed in any suitable manner. For example, as described in the copending application of Stephen A. Van Mil, Jr. and Joseph L. Arcudi Serial No. 218,006 filed August 20, 1962, the two layers 1 and 2 can be molded to preform complemental main recesses 5 with flange portions 5*a* projecting from the boundries of the recesses. Initially these portions 5*a* of the layers bounding the recesses are sealed together in the zones 3 so as to partially form the compartment and leave the remaining portions of the layers unsealed to provide a filling opening for the deposit of a commodity B, such as liquid, into the compartment, and after the filling operation the unsealed portions are sealed to close the filling opening, and to form the discharge passage 4 and the sealing extensions 3*a* to complete the package.

In use of the package, the sealing extensions 3*a* at the outer or discharge end of the discharge passage 4 are removed along a tear line extending across and through the portions 4*a* and 4*b* of the layers forming the walls of the discharge passage as shown in FIGURES 1*a* and 5. If the material of which the layers are formed is not tearable, the layers may be cut by suitable means such as shears,

and guide notches **6** may be formed in the flange portions **5***a* to facilitate the tearing or cutting operations.

After the sealing extensions **3** have been removed so that the outer or discharge end of the discharge passage **4** is exposed between the layers as shown in FIGURE 1A, the package is inverted as shown in FIGURE 5, and pressure is applied to the walls of the compartment exteriorly thereof, as by the thumb and index finger of the user's end, as shown in FIGURE 6, so that the pressure thus created on the fluent commodity forces the commodity through the discharge passage **4**, thereby opening the passage as best shown in FIGURE 6 to permit either drops B′ or a stream of the commodity to be dispensed, as desired, and and dependent upon the pressure applied to the compartment walls. It will be noted that during the application of the pressure to the compartment walls the walls are moved toward each other and to some extent deformed from their original condition shown in FIGURE 5, and when the pressure on the compartment walls is released, said walls move away from each other and toward their original condition, as shown in FIGURE 7, thereby creating a suction or partial vacuum in the compartment that draws the walls **4***a* and **4***b* of the discharge passage into tight compartment sealing contact with each other. Thus the possibility of unintended escape of the commodity from the compartment is reduced to a minimum and the commodity is maintained in sanitary condition and protected from contact with the ambient atmosphere. Therefore, the package can be opened and used several times with a minimum of possibility of contamination or escape of the commodity between uses.

It is desirable to provide means for concentrating and directing flow of the fluent commodity from the compartment into the discharge passage in a narrow stream so as to facilitate the spreading apart of the walls of the discharge passage under the pressure of the commodity being discharged. For example, each layer **1** and **2** may be formed with a tapered extension recess **5***a* the smaller end of which is directed toward the outer end of the corresponding wall **4***a* or **4***b* of the discharge passage as best shown in FIGURE 1, and when the two layers are sealed together, said extension recesses form between them what is in effect a nozzle **7** whose walls are rigid relative to wall portions **4***a* and **4***b*. The inner ends of the extension recesses, that is, the ends that merge into the recess **5** are disposed close to the sealing zone **3** so that the portions of the passage walls **4***a* and **4***b* between the extension recesses **5***a* and the sealing zone **3** are relatively unyielding, whereby the flow of the commodity is concentrated in the nozzle provided by the extension recesses **5***a* and the stream of the commodity issues from the smaller end of the nozzle between the discharge passage walls **4***a* and **4***b* intermediate the width of the passage. This results in a concentration of the pressure of the out-flowing commodity in a narrow zone which facilitates the ejection of the commodity under adequate pressure and in a small stream or in drops.

It will be understood by those skilled in the art that the layers **1** and **2** of the package material may be secured together with a fluid tight joint in any suitable manner, preferably by heat sealing. Where the layers are to be heat sealed, the contacting surfaces of the layers of materials, will be, of course either inherently fusible or coated with a fusible film; for example, where the layers are formed of laminated sheets of cellulose acetate and a heat sealable material, for example a vinyl compound or polyethylene, the fusible films will be in contact with each other and sealed together to make the package. It will also be understood that in addition to the sealed zones being substantially fluid tight, the layers **1** and **2** will also be substantially impervious so as to prevent an ingress of ambient air into the package and egress or evaporation of the commodity from the package through the packaging material.

I claim:

A package for a fluent commodity comprising at least two layers of thin flexible material of uniform thickness sealed together in zones forming and bounding between them a commodity-containing compartment and an elongated discharge passage therefor having opposed flat walls openable between the layers to provide an outlet at one end, the portions of said layers forming the walls of said compartment being self-sustaining but resilient providing for momentary pressing of said walls toward each other to force some of said commodity through said discharge passage and for subsequent resilient movement of said walls away from each other and toward their original condition, the portions of said layers forming the flat walls of said discharge passage being flexible and of uniform thickness and free for limited movement away from and into contact with each other upon application of pressure to the walls of the compartment exteriorly thereof and upon release of said pressure from said walls, respectively, to permit flow of the commodity out of the compartment through said outlet and to seal the outlet and discharge passage by action of partial vacuum in the compartment, respectively, said layers having been preformed with identical main recesses and with tapered extension recesses, said main recess of each layer being complemental to the main recess of the other layer forming said compartment and each extension recess being complemental to the other extension recess forming a tapered relatively rigid-walled nozzle whose larger end communicates with said compartment and whose smaller end terminates between said flat walls of the discharge passage intermediate the length and width of said discharge passage, the outlet end of said discharge passage being initially sealed by extensions of said layers sealed together beyond said outlet end, said extensions being removable along a tear line extending across said discharge passage outwardly of said nozzle to expose said outlet between the edges of said flat walls of said discharge passage for subsequent discharge of the commodity.

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LOUIS J. DEMBO, *Primary Examiner.*