

April 14, 1964

L. I. VOLCKENING ET AL

3,128,920

DROP APPLICATOR PACKAGE

Filed Feb. 9, 1961

Fig. 1

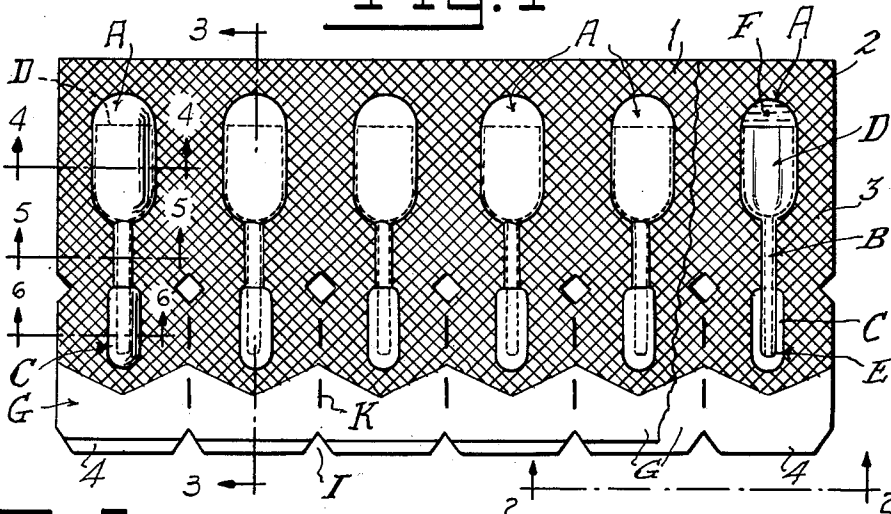


Fig. 3

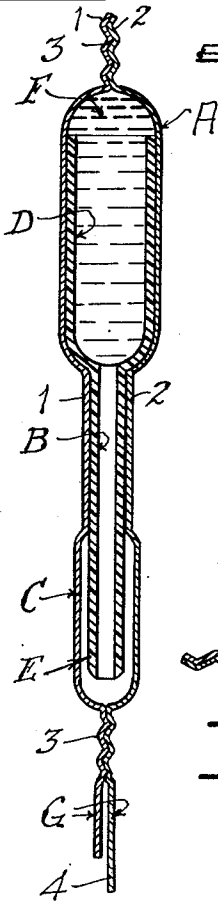


Fig. 2

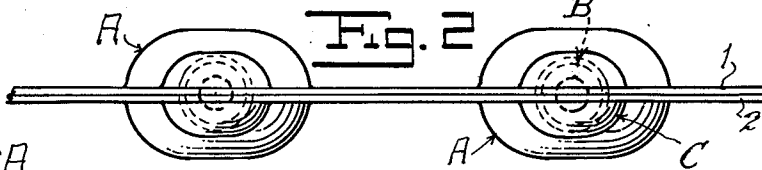


Fig. 4

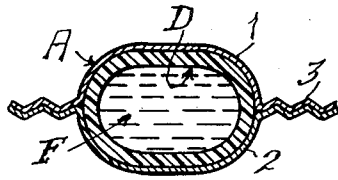


Fig. 5

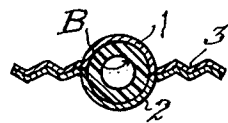


Fig. 6

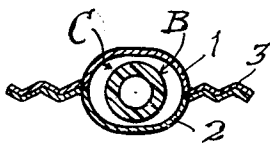
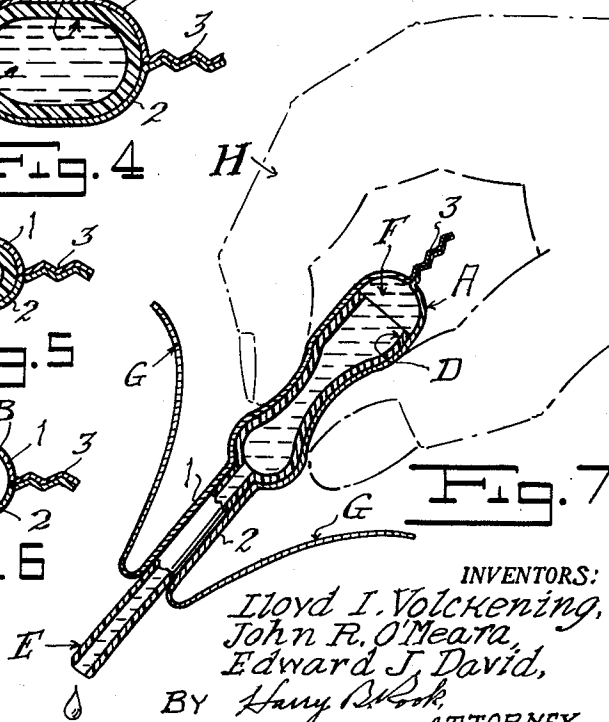


Fig. 7



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**DROP APPLICATOR PACKAGE**

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Filed Feb. 9, 1961, Ser. No. 88,090

2 Claims. (Cl. 222-215)

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

The invention especially contemplates a package of the type comprising at least two flexible layers or sheets of packaging material such as metal foil, Pliofilm, cellophane and the like sealed together tightly and permanently in zones forming and bounding between said layers a compartment containing a fluent commodity and also forming and bounding between said layers a restricted discharge passage for said compartment and providing a sealed closure for said compartment.

A primary object of the invention is to provide a package of this character which shall include a discharge tube forming a part of said discharge passage that is normally entirely sealed within the package in a sanitary and liquid-tight manner but one end portion of which can be easily and quickly exposed as a projection from the compartment for use in dispensing the fluent commodity.

Another object is to provide such a package which shall embody a novel and improved construction and combination of the two flexible layers of packaging material and a liquid dispensing tube wherein the tube shall be normally entirely encased by and sealed between said layers to prevent escape of the fluent commodity from the tube, but portions of the layers may be pulled apart with a peeling action so as to expose and open the end of the dispensing tube opposite the commodity-containing compartment so that the liquid can be dispensed or discharged through the tube by squeezing pressure applied to the walls of the compartment and the end of the tube can be utilized for applying or directing the liquid to the desired point, such as an eye or a nostril.

Still another object of the invention is to provide a package of this character which shall include novel and improved means for restraining the flexible walls of the compartment from accidental collapse under external pressure during handling and shipping of the package but which shall permit said walls to be flexed under squeezing pressure for the purpose of forcing the liquid from the compartment and shall then cause flexing or returning of the walls to their normal condition.

It is another object of the invention to form the discharge tube of a suitable inherently resiliently flexible material such as polyethylene and to provide an integral extension on one end of the tube projecting into the commodity-containing compartment to normally resiliently yieldingly hold the portions of the package layers that form the walls of the compartment in spaced apart and expanded condition under unintentional exterior pressure such as might occur during handling or shipping of the package but which shall permit one or both walls of the compartment to be deliberately compressed, squeezed or deformed for the purpose of forcing the fluent commodity from the compartment.

Other objects, advantages and results of the invention will be brought out by the following description in con-

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junction with the accompanying drawings in which—

FIGURE 1 is a plan view of a plurality or sheet of packages embodying the invention, with a portion of the packaging layers broken away for clearness in illustration;

5 FIGURE 2 is an enlarged fragmentary end elevation of the sheet of packages taken from the plane of the line 2-2 of FIGURE 1;

FIGURE 3 is an enlarged longitudinal vertical sectional view through one of the packages on the plane of the line 3-3 of FIGURE 1;

FIGURE 4 is an enlarged transverse vertical sectional view through the commodity-containing compartment of one of the packages on the plane of the line 4-4 of FIGURE 1;

15 FIGURE 5 is a similar view on the plane of the line 5-5 of FIGURE 1;

FIGURE 6 is a view like FIGURE 4 on the plane of the line 6-6 of FIGURE 1; and

FIGURE 7 is a vertical longitudinal sectional view through one of the packages in open condition and in use, the fingers of the user being shown in dot-and-dash lines.

Referring to the drawings, the package includes a flexible walled compartment A of any desired shape and dimensions and capable of retaining the desired fluent commodity such as liquid, vapor, paste or powder. The compartment has a restricted discharge tube B one end of which communicates with the compartment A and the other end of which is disposed in a cavity C in spaced relation with the walls of the cavity. The first-mentioned end of the discharge tube has an enlarged resilient integral bell-shaped portion D substantially corresponding in cross-section to the compartment A so as normally to yieldingly hold the flexible walls of the compartment against external pressure on the compartment walls but permit deliberate compression or squeezing of the compartment walls under external pressure for forcing the commodity from the compartment. The other end E of the discharge tube serves as an applicator and is normally sealed within the cavity C but can be exposed for permitting discharge of the commodity from the compartment and application thereof to the desired point, by separation or rupture of the walls of the cavity.

More specifically describing the package, it is shown as comprising at least two layers 1 and 2 of suitable packaging material such as metal foil, cellophane, Pliofilm, Saran or the like sealed together, preferably crimped, in zones as indicated at 3 to form and bound the compartment A and cavity C and to firmly seal the discharge tube B between the layers with the extension D enclosed in the compartment A and the discharge end portion E of the tube B in spaced relation to the walls of the cavity. When metal foil is used as the packaging material, it may have a thermoplastic or fusible coating so that the two layers can be thermoplastically sealed under heat and pressure as indicated at 3. Similarly cellophane or other materials may have a thermoplastic or fusible coating, and other materials such as Pliofilm that are inherently thermoplastic may be sealed together without the fusing coating. Obviously the portions of the layers in contact with the fluent commodity such as a liquid F, e.g., an eye treating liquid, must be inert, that is, must not affect or be affected by the commodity or permit seeping of the commodity through the layers.

65 Preferably the portions of the layers between the cavity C and one edge of the layers are unsealed and the edge portion 4 of one layer extends beyond the corresponding edge portion of the other layer so that the two layers can be conveniently gripped between the thumbs and index fingers of the hands of the user and pulled apart with a peeling action as shown in FIGURE 7 to open the cavity

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C and expose the end portion E of the discharge tube. Then when it is desired to discharge the commodity from the compartment A, external pressure may be applied to the walls of the compartment so as to positively displace the commodity from the compartment and through the discharge tube. As shown in FIGURE 7, this pressure can be conveniently applied by the thumb and index finger of the user of the package as indicated at H; and pressure may be applied either to cause the commodity to flow in a continuous stream or to emerge from the tube in drops as indicated in FIGURE 7. Upon release of the pressure from the walls of the compartment, the extension D of the discharge tube will resiliently expand or press the walls outwardly into their initial normal condition as shown in FIGURES 3 and 4, ready for ejection of more of the commodity if desired.

It will be observed that the applicator or discharge end portion E of the discharge tube B is maintained in a sanitary condition while the package remains closed and sealed, and in actual use, some of the commodity from the compartment A will enter the cavity C around the end portion E of the applicator so as to maintain it in good condition for use as an applicator to a tender surface, such as an eyelid. The tube B formed of a plastic or synthetic resinous composition such as polyethylene is smooth and relatively soft and flexible as compared with the better known medicine droppers having glass applicator tubes.

It will be understood by those skilled in the art that the packages may be formed and filled in any suitable manner, for example, as shown and described in the application of Edward J. David filed August 6, 1959, Serial No. 832,029 now U.S. Patent No. 3,038,246; and to expedite production of the packages, a plurality of packages are formed in a chain or long strip and the individual packages can be separated from the strip or sheet in any suitable manner. As shown in the drawings, the sheets or layers 1 and 2 are notched and weakened or scored as indicated at I and K, respectively, so that the layers can be easily torn between the packages.

While the now preferred embodiment of the invention has been illustrated and described for the purpose of explaining the principles of the invention, many modifications and changes can be made in the construction of the package and the discharge or applicator tube within the spirit and scope of the invention.

We claim:

1. An applicator package containing a fluent commodity, including two walls each comprising a unitary thin layer of thin flexible sheet material, and a relatively stiff discharge tube between them constantly open from end to end, said layers being sealed together and sealed in fluid-tight relation to said discharge tube intermediate

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the ends of the tube with portions of said layers normally in spaced relation to each other and providing a compartment containing said fluent commodity between said layers at one end portion of said tube, portions of said layers being sealed together in spaced enclosing relation to the other end portion of said tube throughout its circumference and beyond its extremity providing a cavity in which said end of the tube is located free of contact with said layers, the seal between the second-mentioned portions of said layers that form said cavity providing for separation of said portions from each other with a peeling action to expose the corresponding end of the tube, said discharge tube having a resiliently flexible bell-shaped extension in said compartment in contact with the inner surfaces of both of said walls throughout the major portion of said inner surfaces and yieldingly resisting movement of either of said walls inwardly of the compartment but permitting deliberate compression of the compartment walls under external pressure for forcing the commodity from the compartment and said extension also resiliently expanding said walls outwardly into their normal spaced apart relation upon release of such pressure.

2. An applicator package containing a fluent commodity, including two walls each comprising a unitary thin layer of thin flexible sheet material, and a relatively stiff discharge tube between them, said layers being sealed together and sealed in fluid-tight relation to said discharge tube intermediate the ends of the tube with portions of said layers normally in spaced relation to each other and providing a sealed compartment containing said fluent commodity between said layers at one end portion of said tube, other portions of said layers being sealed together in spaced enclosing relation to the other end portion of said tube throughout its circumference and beyond its extremity providing a sealed cavity in which the second-mentioned end portion of the tube is completely enclosed and sealed free of contact with said layers, the seal between the portions of said layers forming said cavity providing for separation of said portions of the layers from each other with a peeling action from one edge thereof to a point beyond the extremity of the discharge tube to expose the second-mentioned end portion of the tube.

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