My invention relates to improvements in closures for medicament dispensers disclosed in my Patents U. S. 2,616,422 and U. S. 2,546,754.

Included in the objects of my invention are:

First, to provide a medicament dispenser closure economical to manufacture, utilizing relatively inexpensive material, so that it may be disposable after a single use;

Second, to provide a simple single use closure for sealing a medicament dispenser permitting the dispenser to be stored containing medicament until ready for use;

Third, to provide a single use medicament dispenser closure permanently bonded to the dispenser, which is suitable for storage of a water or other volatile solvent base type medicament for long periods of time without substantial loss of water or other volatile solvent;

Fourth, to provide a medicament dispenser closure which is simple for the user to manipulate; and

Fifth, with the above, and other objects in view, as may be hereinafter referred to, reference is directed to the accompanying drawings in which:

Figure 1 is an enlarged elevational view of the medicament dispenser embodying the improved closure;

Figure 2 is an enlarged partially sectional longitudinal view showing one form of the cap portion of the closure in operational relationship with the remainder of the medicament dispenser;

Figure 3 is an enlarged frontal view of the cap portion of the closure shown in cross section in Figure 2;

Figure 4 is an enlarged frontal view of the cap portion of a further modification of the closure.

Figure 5 is an enlarged frontal view of the cap portion of still another modification of the closure.

Referring to Figure 1, a medicament dispenser is shown in which a rigid paper tubular member number 1 of substantially uniform cross section is shown in operational relationship to a telescoping paper tube 2, together with the improved cap 3, applied exteriorly to the end of the paper tube 1, and said cap 3 attached permanently to the tube 1 by the pressure-sensitive adhesive coated tape 5, the tape 5 being affixed to the exterior face of the cap 3 by the contiguous pressure sensitive adhesive coating 12.

An example of my improved closure is the cap 3 and film 4 bonded contiguously together by the pressure sensitive adhesive 12.

In reference to Figure 2, the rigid paper tubular form 1, is shown in operational relationship to the paper tube 2, in which the crimped end 13 compresses the crushable container 6. The cap 3 is affixed to the discharge end of the bag 6 and is heat-sealed bonded at the interface 11 to the fold of the bag 6 which exteriorly laps over the paper tube 1. The integrally sealed cap 3 and bag 6 are attached to the paper tube 1 by the overwrapped pressure sensitive tape 5. The medicament 9 is shown extruded through the orifice opening of which 7 is the incised edge of the orifice, forcing the flap 8 open. The flap 8 is connected to the remainder of the cap 3 at the hinge 10.

In Figure 3 the frontal view of cap 3 illustrated in Figure 2 is shown, wherein the flap 8 is forced by the incision 7 and contiguous to the adjacent portion of the cap face forming a closely fitting disc which is secured to the remainder of the cap 3 by the integral hinge 10.

In Figure 4 is shown a further modification of my closure where in the frontal view of the cap 14 are the incised cuts 15 forming the flaps 16.

In Figure 5 is shown a further modification of my closure in which the frontal view of the cap 17 is shown with the inscribed cut 18 forming the freely movable flaps 19.

Typically the cap 3 is about 0.02 inch wall thickness and the film 4 bonded to the cap 3 is about 0.015 inch thick and the pressure sensitive adhesive 12 adhering the film 4 to the cap 3 is about 0.001 inch thick. It is good commercial practice to make the cap 3 of an elastomeric material which can be heat sealed by standard means to the crushable bag 6 made of a polymeric material. In addition it may be desirable to provide an adhesive cement bonding the cap 3 to the bag 6 at the interface 11.

Since water alone, or in combination with alcohol, or other volatile solvents, is used as a fluid in medicinal compositions, it is desirable to select an elastomeric material capable of containing the volatile solvent without substantial loss over long periods of time of storage on the shelf. Examples of volatile solvent resistant elastomeric materials, which may be used to form the cap and crushable container, are: polyethylene, vinyl chloride-vinyl acetate copolymer, polypyrrolidone, polivinylidene chloride copolymers, nylon, polybutyl methacrylate, polyethylene-aluminum foil laminate, and other thermoplastic compositions of matter which are resistant to the penetration of the fluid placed in the crushable container.

In practice, the cap and the crushable container for a particular dispenser may be selected of materials which are capable of being heat sealed together at low temperatures.

The film 4 closing the orifice of the cap may be composed of the above listed materials, together with whatever additional films as aluminum foil, tin foil, neoprene rubber, synthetic rubbers and other materials which are capable of being bonded to the cap by a pressure sensitive adhesive base compounded of polyisobutylene, synthetic rubbers and the like. The pressure sensitive adhesive is selected from the class of adhesive resins to attack or solution by the volatile solvents contained in the medicament.

In commercial practice it is intended that the dispenser be filled at the factory, with the desired medicament being placed in the crushable container 6, the tightly fitting cap 3 is then placed over the discharge end of the bag which overlaps the exterior walls of the tubular member 1, the film 4, being previously bonded to the cap 3 by the pressure sensitive adhesive 12 before placing on the dispenser. The cap 3 is then heat sealed at the interface 11 to the end of the crushable container 6 overlapping the exterior end of the tubular member 1.

The applicator is made ready for use by grasping the edge of the film 4, which is purposely made a slightly larger diameter than the cap 3 to provide a tab, and removing the film 4. The dispenser is then inserted into the body cavity and the medicament 9 of the crushable container 6 are discharged into the body cavity through the orifice opening by the pressure of the plunger 2 on the container 6, the force of the medicament 9 moving aside the flap 8 on the hinge 10. In a similar manner, when the cap 14 of Figure 4 is attached to a dispenser, the previously secured film 4 may be removed from the frontal face of the cap. On pressure of the plunger 2 the medicament 9 is forced out of the crushable container 6 through the orifice provided by the opening of the flaps 16. In
a like manner, when the cap 17 is utilized, the film 4 which is previously secured to the frontal face of the cap 17 shown in Figure 5 is removed and the medicament 9 is again discharged through the orifice provided by the outwardly opening flaps 19.

Other shapes of orifice openings may be provided by suitable incisions in the face of a cap of flexible material, to provide flaps which in storage are held in the plane of the described frontal cap face by a suitable film bonded to the frontal face of the closure by a pressure sensitive adhesive. In addition, the film may be affixed to the cap by a wax or rubber base coating which may be stripped off at the time it is desired to use the dispenser.

Additionally, the integrally bonded cap and crushable hollow container combination may be directly heat sealed to the external paper tube, instead of taping the combination onto the tube. For example, the discharge end of the paper tube may be coated with a polyethylene-water base emulsion, dried, then heat sealed to a cap and crushable hollow container combination made of polyethylene. Alternatively, an adhesive may be used to bond the cap and container combination to the paper tube.

Having now described and illustrated one form of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts hereby described and shown.

I claim:

1. In a closure for a container discharge end: an elastomeric cap heat sealed to the container discharge end, incisions in the cap face providing a plurality of contiguous flaps therein; a tape means, securing the cap to the container; a pressure sensitive adhesive layer on the frontal face of the cap; and a film secured to the pressure sensitive adhesive layer.

2. In a closure for a container discharge end: an elastomeric cap, incisions in the cap face providing a plurality of contiguous flaps therein; a tape means, securing the cap to the container; a pressure sensitive adhesive layer on the frontal face of the cap; and a film secured to the pressure sensitive adhesive layer.

3. A single use medicament dispenser comprising: a crushable hollow container closed at one end and having a discharge end and located at one end of the dispenser; a closure permanently secured to the discharge end of the crushable hollow container by a flexible cap means, incisions in the cap face providing a plurality of contiguous flaps therein, a pressure sensitive adhesive layer on the frontal face of the cap and a film secured to the pressure sensitive adhesive layer.

4. A single use medicament dispenser comprising: a crushable hollow container closed at one end having a discharge end and located at one end of the dispenser; a closure permanently bonded to the discharge end of the crushable hollow container; said closure comprising an elastomeric cap, the frontal face thereof plurally intersectingly incised to provide multiple contiguous flaps therein, a pressure sensitive adhesive layer on the frontal face of the cap, and a removable film secured to the pressure sensitive adhesive layer.

5. A single use medicament dispenser comprising: a crushable hollow container closed at one end having a discharge end and located in one end of the dispenser; a closure permanently bonded to the discharge end of the crushable hollow container; said closure comprising a flexible cap, the frontal face of the cap provided with contiguous flexible flaps secured to a removable film by a bonding means; and means securing said closure and container together.

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