

Description

The present invention relates to a dispenser package for, for example, flowable products.

Various attempts have heretofore been made to provide a dispenser package in which a flowable product may be packaged in the quantity normally required for a single use, and from which such flowable material may be dispensed. Two familiar examples of previous attempts to make such dispenser packages are: cuplike containers made of a plastics or plastics coated material with covers made of plastics material, foil or laminates of each, and envelope packages (pouches) made of relatively thin plastics material or combinations of laminated plastics materials and sometimes foil.

The first type of container mentioned above is most frequently used to package and dispense cream, jelly, salad dressing and products of similar viscosity. The cover is sealed to the rim of the container and covers the open top. In order to have access to the contents of this container, the container itself must be grasped firmly in one hand while the cover is removed with the other hand. Opposing forces must be applied to sever the cover from the rim, which often causes a variety of accidents. One typical problem is that the cover may tear and although the remaining cover can be removed, it usually results in getting some of the product on the user's fingers or, if left in place, hampers access to the contents. Alternatively, the cover may suddenly tear away from the container rim causing the user to spill, splash or squirt the contents, often on himself or others. Since these containers must be lightweight to be economical, the vessel walls collapse under the pressure exerted upon them by the user. On moving vehicles such as aircraft, trains or automobiles, the chances of spill, splash or squirting are obviously compounded.

The other common type of package previously mentioned, the pouch made of relatively thin plastic material, foil or laminates of each, suffers similar faults. These packages are most frequently encountered as containers for ketchup, mustard, other condiments, homecare preparations such as hair conditions, dyes and creams, et al. In order to have access to the contents, the pouch must be held in one hand while a tearing motion and force are applied by the other hand. As with the plastics containers, creating the initial tear to break the envelope's seal is often very difficult. Moreover, once the initial tear is created, the laminated foil or plastics material not only often tears in an uncontrolled fashion, but the holding pressure exerted by one of the user's hands often forces the contents out of the envelope not only before the user is ready to apply the contents, but even before the tearing motion is complete. Opening is generally so difficult that the pouch is often opened by biting the edge of the pouch.

Another disadvantage of the two types of dispenser packages just discussed is the fact that the

user must, in each instance, use both hands to open the container.

United States Patent No. 3,986,640 to Samford Redmond (hereinafter referred to as the 640 patent) discloses a dispenser package which represents a marked improvement over the foregoing prior package structures in that it accomplishes efficient dispensing of a predetermined quantity of the contents with a one-handed motion and without presenting the opening difficulties previously associated with opening by removal of a cover or tearing of an envelope or pouch. Briefly, in the 640 patent, the flowable product is contained within a pouch defined by a flexible sheet material and a sheet of relatively stiff material. The flexible sheet material and the sheet of relatively stiff material (or a combination of the relatively stiff material and an additional barrier layer adhered onto at least one side of the relatively stiff material) are each impervious to the flowable product. A predetermined fault line or cut pattern is scored into the sheet of relatively stiff material such that the stiff material will rupture on the fault line or cut pattern when stress is placed upon the sheet of stiff material. In the 640 patent, the relatively stiff material was scored with a variety of cut patterns to create at least one opening and a tongue, the simplest of which was a straight line cut across the centre of the package. In use, the sheet of stiff material is bent into a "V" shape, rupturing the fault line or cut pattern which is located in the vertex of the angle formed by the sides of the "V". The enclosed pouch ruptures along the fault line or cut pattern. Rupturing the plastics material at the cut pattern creates a predictably irregular edge with a number of peaks or tongues as well as at least one opening through which the flowable substance is forced upon compression of the flexible side by the relatively stiff sides of the "V" as they are brought together. Advantageously, both the bending and squeezing motions can be performed by the use of only one hand.

While the structure of the 640 patent has been and continues to be commercially successful, it has been found that it may be substantially improved for certain uses. For example, it is often required that the stiff side of the dispenser package be made of a very tough high barrier plastics material or, where the relatively stiff side is constructed of inexpensive, low barrier plastics material, have other high barrier materials such as for example, foil or saran, etc., laminated to at least one of its sides to prevent for example, evaporation, leakage, loss of aroma, etc., from the flowable substance contained within. This lamination greatly enhances the barrier properties of the material.

In addition, there are common flowable substances which are corrosive or otherwise active against certain barrier materials, creating specialized packaging and containment requirements. These specialized requirements may simply mean using a thicker or tougher and more expensive material or may involve construction of

special multilaminate barriers which are not affected by a particular chemically active flowable substance. By way of example only, iodine is one such flowable substance with specialized packaging requirements. Iodine must be kept in a well sealed container in order to preserve its shelf life, but iodine corrodes some of the most effective and available barrier materials, such as foil. Experimentation has shown that an appropriate barrier for iodine can be constructed by laminating foil to the relatively stiff and inexpensive material, polystyrene, and then by coating or laminating a layer of saran to the foil. Although this construction creates a very good barrier, the resultant stiff side and barrier combination is very tough and consequently very difficult to rupture. When the structure disclosed in the 640 patent is constructed using such a specialized barrier, it has been found that the bending action often develops insufficient force to rupture the barrier material. Instead, what often happens is that the relatively stiff surface breaks as intended but the barrier layer(s) fails to rupture.

All of the above prior packaging alternatives suffer from a further deficiency in that upon opening, the contents are often dispensed in a generally non-directed stream of flow. The contents of the cuplike plastics containers are meant to be poured or scooped out. Upon squeezing of the envelope-type package, its contents are squeezed out in a direction and an amount which depends on whatever tear opening is created. This usually creates a sloppy oozing of the flowable substance out of the envelope. Finally, although the structure described in the 640 patent performs much better than the previously discussed alternatives in this respect, the flow through the various openings created in the relatively stiff side is not always specifically directed by the openings when the package is bent into a "V".

A package is disclosed in DE-A-2751078 in which two pockets are connected by a channel across which extends a rupture line on a flat side of the package. US-A-2956710 discloses a package having a single storage pocket from which extends a tapered spout for dispensing the contents of the pocket. The size of the outlet to this tapered spout is determined by the location of a scoring line which extends across the spout.

An object of this invention is to provide a new and improved dispenser package for flowable products.

Another object of this invention is to provide new and improved means for rupturing tough materials or combinations thereof upon their being bent into a "V" shape.

A further object of an embodiment of this invention is to provide a new and improved dispenser package which improves prior dispenser packages in that containment of flowable products in that it is capable of rupturing one or more relatively strong layers of film or barrier material with the use of only one hand.

A still further object of an embodiment of this

invention is to provide, in a new and improved dispenser, packaging which improves prior dispenser packages in the containment of flowable products, means for both greatly increasing and concentrating the stress applied to the relatively stiff side to thereby ensure rupture of even relatively tough materials or laminates with a bending action developed by the use of only one hand.

Another object of an embodiment of the present invention is to provide a new and improved dispenser package for flowable products which expels the contents in a highly directed stream upon opening.

A further object of an embodiment of the present invention is to provide a new and improved dispenser package of sufficient structure integrity to contain flowable substances under pressure and yet which may be opened and the contents dispensed in a highly directed flow by the use of only one hand.

Another object of an embodiment of the present invention is to provide new and improved package for flowable products which is also dripless after having been opened.

According to the present invention there is provided a dispensing package for a flowable substance comprising a relatively stiff substantially flat sheet and a flexible sheet secured to one face of said flat sheet, said flexible sheet forming a pocket adjacent said one face of said flat sheet for containing a flowable substance, said flat sheet having a weakened portion of predetermined length, whereby upon bending said flat sheet into a "V" about an axis extending along said weakened portion so that the arms of said "V" encapture said pocket, said weakened portion ruptures to create at least one opening through which said flowable substance is dispensed (as known from US-A-3986,640) characterised by protrusion means displacing at least a portion of said weakened portion out of the plane of said flat sheet in a direction away from said one face for substantially maximally increasing the stress in said flat sheet at the displaced portion of said weakened portion, said protrusion means having a configuration which is substantially symmetrical on either side of said weakened portion and in which a point of greatest displacement is located substantially on said weakened portion, whereby upon said bending said weakened portion initially ruptures at the locus of said protrusion means to create said at least one opening through which said flowable substance is dispensed in a directed flow.

Briefly described, embodiments of the present invention are directed to a new and improved dispenser package for flowable products which may be opened by one hand in a manner to cause controlled rupturing of tough, high barrier packaging materials, which provides a highly directed flow of the substance being dispensed and possesses the additional characteristics of being dripless after having been opened.

In accordance with a preferred embodiment of the present invention, the dispenser package

comprises a relatively stiff flat side constructed of a tough high barrier material or a laminate including at least one tough, high barrier layer secured to at least one surface thereof, a flexible arched-side secured to the surface of the relatively stiff side to form an enclosed pouch between the flexible arched side and the relatively stiff side, a cut pattern or fault line or other fault area scored or otherwise formed into the relatively stiff side, generally along the transverse centre line of that surface, at least one formed dimple or other protrusion, preferably of elongate pyramidal shape, positioned along the fault line.

As used herein, the term "fault line" is intended to encompass the aforesaid alternatives of a cut pattern, a single straight line extending across a portion or all of the relatively stiff flat side or a fault area formed by weakening means other than by a scored continuous line.

In the preferred pyramidal shape, the narrow diagonal axis of the elongate pyramid is preferably in the same line as the fault line. Alternatively, the pyramidal shape may be a polygon having any number of sides. Also alternatively, the protrusion may be conical. For less tough stiff side materials, the dimple may be of other shapes, such as frusto-conical, hemispherical, domed, or oblong, with a variety of cross-sections and ends.

In use, the relatively stiff dimpled side of the preferred embodiment of the present invention is bent in half between the thumb and digit fingers, forming a "V" shape with the relatively soft-pouch side compressed between the arms of the "V".

It will be understood that the formation of the dimple or other protrusion in the planar surface of the relatively stiff side serves substantially to increase the structural strength of the stiff side material at the dimple. At the same time, the provision of the dimple or other protrusion has the effect of moving the initial point of rupture out of the plane of the relatively stiff side so that, upon folding the ends of the relatively stiff side together about a pivot point in the plane of the relatively stiff side to form a "V", increased leverage is imparted to the crown or outermost portion of the dimple or other protrusion. These factors result in greatly increased rupture forces along the protruding fault line so that even a very tough, high barrier material will break upon folding of the relatively stiff side into a "V" shape. Thus, the very tough, high barrier plastics materials which might normally resist rupture with the rupture forces developed upon folding the ends of the relatively fault stiff side of the 640 patent package into a "V" shape where no protrusion exists have been found to rupture when a protrusion is formed along the fault line. The provision of a dimple or other protrusion while imparting increased structural strength to the relatively stiff side material at the protrusion also serves to stiffen the material. This effect, in combination with the increased leverage at the crown of the dimple causes the aforesaid folding motion of the package into a "V" to develop

sufficient forces along the protruding fault line to rupture or snap the material, causing it to break open.

In addition to shifting the rupture point out of the plane of the relatively stiff side, the pointed pyramidal shape of a preferred embodiment further concentrates the aforementioned rupture forces substantially at a point, further intensifying the ability of the dispenser package to rupture the tough plastics materials and foil combinations needed to contain many substances.

It will be seen from the foregoing that the pointed pyramidal shape concentrates the rupture forces at its apex in a manner somewhat analogous to light being focused by a lens.

Thus, in sum: (1) dimpling of the relatively stiff side along the fault line strengthens and stiffens the relatively stiff side at the dimple; (2) dimpling shifts the rupture point out of the plane of the relatively stiff side, resulting in greatly increased leverage being imparted to the rupture forces and, hence, increased stress along the fault line; (3) dimpling creates a highly controlled opening permitting increased control of the flow of the contents from the package, as well as its direction, when opened; and (4) utilizing a cone or pyramidally shaped dimple with an apex concentrates the already increased rupturing forces substantially at a point, to thereby further increase the stress generated along the fault line.

As the arms of the "V", comprised of the relatively stiff side, are brought together, the relatively soft sides are compressed, forcing the flowable substance through the opening created by rupturing the package at the dimple or other protrusion.

It will be seen that multiplying the number of dimples or protrusions will have a variety of effects, either simply multiplying the number of openings or in some cases causing the material between the dimples or protrusions also to rupture, creating a single large opening.

In an embodiment of the invention creating a single large opening, a sponge-like material may advantageously be secured within the pouch in such a fashion that it projects through the opening when the relatively stiff surface is bent into a "V". In this provision, part of the sponge-like material remains within the pouch while a centre portion projects through the opening. It will be seen that this embodiment of the invention is advantageous for dispensing substances of low viscosity without dripping or running, and also is excellent for use as a swab for medical and other applications. One example of such a use is to provide a sponge applicator for dispensing iodine to the locus of a wound.

In a further unexpectedly advantageous alternative embodiment of the present invention, it has been found that the dispenser package, when constructed of tough materials, whether laminate or homogeneous, is capable of containing and dispensing flowable substances under pressure at least of the order of 10 to 20 psi (68.95 to 137.90 KPa) (gauge pressure). As here

embodied, the flexible side of the pouch takes a capsule shape upon becoming pressurized, while the remaining structure is similar to that previously described. The pressurized contents, which may be package at reduced or no pressure by filling and sealing the capsule at a low temperature such as 10°F to 20°F (-12.22°C to -6.67°C) are accessed using generally the same bending motion as previously described. As the ends of the flexible capsule are brought toward each other, the dimple or other protrusion or protrusions develop sufficient stress to rupture the barrier materials of the tough relatively stiff side of the package, whereupon the pressurized contents quickly flow out of the capsule in a highly directed stream.

Thus, as one advantage of the present invention, it was unexpectedly found that tough materials capable of retaining gases under pressure may be used for the package and, when opened, the stress increasing structure results in a highly directed flow of the contained substance through a localized opening. This highly directed flow is created by forcing the flowable substance through the small, localized opening under the considerable pressure generated by the compressed gas in conjunction with the squeezing action of the relatively stiff sides of the "V" upon the pouch containing the flowable substance.

As a further unexpected advantage of the present invention, it has also been found that when the relatively stiff side of the package is constructed of a resilient material, such as polystyrene, it has a tendency to return towards its pre-opened position or, in effect, a less acute angled "V". As a consequence of this action, the flow of the contained flowable substance stops and the substance is drawn back by vacuum action, hence, the opened package does not drip or ooze.

Embodiments of the present invention will now be described by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a view in elevation of a dispenser package constructed in accordance with a preferred embodiment of the present invention, shown in its pre-opened condition;

FIGURE 2 is a plan view of the dispenser package construction of Figure 1, showing a generally elongated pyramidal shaped protrusion extending from the relatively stiff side thereof, the short diagonal axis of which lying along a fault line;

FIGURE 2A is an enlarged schematic view of the relatively stiff side of the dispenser package construction of Figure 1, the view illustrating the focus of the rupture forces at the apex of the pyramidal shaped protrusion;

FIGURE 2B is an enlarged perspective view similar to Figure 2A illustrating the ruptured apex of the pyramidal shaped protrusion;

FIGURE 2C is an enlarged perspective view similar to Figure 2A illustrating the ruptured apex of the pyramidal shaped protrusion where the fault line extends across substantially only the

upwardly extending sides and apex of the protrusion;

FIGURE 3 is a perspective view of Figure 1;

FIGURE 4 is a view in elevation of the dispenser package construction of Figure 1, in an opened condition, bent into a "V" shaped configuration, illustrating a direction stream of contents being expelled from the package;

FIGURE 5 is a perspective view of the dispenser package construction of Figure 1, the view illustrating the relatively stiff side of the package in the opened condition shown in Figure 4;

FIGURE 6 is a plan view of an alternative embodiment of the invention to that shown in Figure 1, in which a plurality of protrusions of elongate pyramidal shape extend from the relatively stiff side of the dispenser package;

FIGURES 7A and 7B are perspective views of further alternative embodiments of the invention to that shown in Figure 1, Figure 7A illustrating a domed protrusion and Figure 7B illustrating an elongate pyramidal protrusion formed so that its long diagonal axis is on the fault line;

FIGURES 7C, 7D and 7E are fragmentary schematic views of still further alternative embodiments of the shape of the protrusion, Figure 7C illustrating a conical shape, Figure 7D, illustrating a frusto-conical shape and Figure 7E illustrating a four-sided pyramid where the diagonal axes connecting the corners of the base are of equal length;

FIGURE 8 is a view in elevation, partly fragmentary, of another alternative embodiment of the present invention, in which the dispenser package construction of Figure 1 contains an internal applicator formed from a sponge-like material having a compressed centre portion adapted to project from the package upon opening;

FIGURE 9 is a view in elevation, partly fragmentary, of the alternative embodiment of the invention shown in Figure 8 in an opened condition, bent into a "V" shaped configuration and having a portion of the sponge-like material protruding from the opening;

FIGURES 10 and 11 are plan views of other alternative embodiments of the present invention showing an internal sponge member positioned adjacent the inside surface of the relatively stiff side, Figure 10 showing a single fault line extending across only a portion of the relatively stiff side, terminating at each end in a V-shaped score and Figure 11 showing an elongate protrusion extending longitudinally of the fault line;

FIGURE 12 is a perspective view of yet another alternative embodiment in accordance with the present invention, wherein the flexible side is generally cylindrical in shape and the package is constructed so as to hold the contents under pressure; and

FIGURE 13 is a plan view of the embodiment shown in Figure 12, illustrating the relatively stiff side thereof in its pre-opened condition.

A first preferred embodiment of a dispenser package constructed in accordance with the present invention is shown in Figures 1 to 5 and

indicated generally by reference numeral 10. As here embodied package 10 includes a relatively stiff side 12 having a sealant/barrier layer 14 suitably bonded to the inner surface 16 thereof, so that side 12 and the sealant/barrier layer 14 are rendered integral with one another. A flexible side 18 is also suitably integrally bonded to the outer perimeter of side 12, 14, advantageously formed by conventional means, such as vacuum forming, pressure forming, mechanical forming or combinations thereof.

The bonds between relatively stiff side 12, barrier layer 14 and flexible side 18 can be formed by conventional means, such as welding, heat sealing, or adhesive or cohesive bonding, depending upon the particular properties of the materials used and the flowable substance to be contained.

Advantageously, and as preferably embodied, relatively stiff side 12 is made of polystyrene or polyester or a copolymer thereof, sealant/barrier layer 14 comprises a saran and foil laminate, and flexible side 18 is formed from any suitable flexible plastics sheeting commonly used for wrapping, such as for example, vinyl. Alternatively, sealant-barrier layer 14 may comprise a laminate of foil and vinyl or foil alone, depending upon the nature of the contents to be contained. A particularly tough, high barrier construction comprises saran laminated on each side with polyethylene (sold by Dow Chemical Co. under the trade mark "Saranex") as the sealant/barrier layer 14 laminated onto polystyrene or polyester, forming relatively stiff side 12.

It will be understood to those of ordinary skill in the art that the bonds formed between materials 12, 14 and 18 can be obtained by the conventional means previously described, again depending upon the nature of the flowable substance being contained.

It will be seen from the foregoing that the structure shown in Figures 1-5 forms an enclosed pouch 22 between flexible side 18 and sealant/barrier layer 14 in which the flowable substance is contained and from which the flowable substance is dispensed.

As best seen in Figures 2-3, relatively stiff side 12 of dispenser package 10 is provided with a fault line 24 preferably scored on the outer surface thereof facing away from enclosed pouch 22. Alternatively, as previously mentioned, it will be understood that the present invention is not limited to a linear fault pattern, but rather, the term "fault line" is intended to encompass various fault patterns or areas which may be employed to obtain particular desired results.

A protrusion 26 is formed along fault line 24, projecting outwardly from the outer surface of relatively stiff side 12. As here embodied, protrusion 26 is preferably formed in the shape of an elongate pyramid having diagonal axes connecting the corners of the base of unequal length, with the short diagonal axis on the fault line 24. Although the present invention is not limited to any particular size, it has been found that projec-

tion of protrusion 26 to a distance d (see Figure 1) of approximately one-sixteenth ($1/16$) of one inch (1.5875 mm) from the outer surface of relatively stiff side 12 operates satisfactorily where the thickness of the stiff side 12 is on the order of approximately 10 to 12 mils (0.254 to 0.305 mm).

It will be seen from the foregoing, and particularly Figures 2A, 2B, 4 and 5, that fault line 24 acts as a guide for controlled fracturing of relatively stiff side 12 as package 10 is bent into a "V" shape about an axis parallel to the fracture along fault line 24. Thus, as relatively stiff side 12 is bent into a "V" shaped configuration, stress is concentrated at the apex 28 of protrusion 26 by leverage attributable to the distance of the apex 28 from the bending axis. In effect, an axis along the inner surface of relatively stiff side 12 acts as a fulcrum for developing leveraging power, and consequently increased stress, at apex 28. It has been unexpectedly found that the aforesaid concentrated stress causes apex 28 to fracture with sufficient force to simultaneously rupture that portion of sealant/barrier 14 which is in direct contact with protrusion 26 and integral therewith, forming an exit aperture 30.

Concurrent with the fracture of apex 28 and protrusion 26, fault line 24 also fractures. However, as pointed out earlier, when the sealant/barrier layer 14 is formed of a tough, high barrier construction the stress exerted along fault line 24 during fracture is not sufficient to rupture the sealant/barrier layer 14 juxtaposed thereto which serves to hinge stiff side 12 together after fracture of protrusion 26. Thus, as the two side halves 12A, 12B of relatively stiff side 12 are forced toward a parallel and overlapping position, the side halves 12A, 12B cooperate with flexible side 18 to force the contained flowable substance through exit aperture 30. Since the sealant/barrier layer 14 has not ruptured along fault line 24 except along protrusion 26, exit aperture 30 is the only opening from which the contained flowable substance can exit.

It will be apparent from the foregoing that the localized opening created at exit aperture 30 creates a highly directed stream of the flowable substance as the rigid side halves 12A, 12B act cooperatively with flexible side 18 to expel the contents from pouch 22. The highly directed stream is created by forcing the flowable substance through a relatively small opening under relatively considerable pressure.

It will be understood that the same effect as just described may be obtained by forming the fault line 24 substantially only across protrusion 26, as shown in Figure 2C. Alternatively, fault line 24 may extend beyond protrusion 26 but not to the edge of the package.

It has been unexpectedly found that after some or all of the flowable substance has been removed from pouch 22, rigid halves 12A, 12B have a tendency to return toward their pre-opened position, assuming a "V" shape which is of a less acute angle than during dispensing. Simultaneous and consequent to the return of

relatively stiff side 12 toward its original position, pouch 22 is partially re-expanded, creating an influx at exit aperture 30. The simultaneous return of halves 12A, 12B toward their pre-opened position and influx through aperture 30 tend to cause any flowable substance remaining in the area of exit aperture 30 to be sucked back into pouch 22 and thereafter terminates any further outward flow. Thus, it will be seen that such a package of the present invention also has the unusual and desirable advantage that it does not drip or ooze after dispensing only a part of the contents. Of course, dispensing of the remaining portion of the flowable substance can be recommenced when desired.

In Figure 6 an alternative embodiment of the dispenser package construction is shown to that of Figures 1 to 5, wherein a plurality of protrusions 26 are formed along fault line 24, so as to provide additional leverage for rupturing sealant/barrier 14 and multiple exit apertures.

It will be understood that construction of relatively stiff side 12 with protrusions 26 may be advantageous even when no extra sealant/barrier layer 14 is required and such construction is within the scope of the present invention. As previously described in connection with the use of a localized fault line, such a construction may be particularly desirable in dispensing low viscosity flowable substances such as water, cream or alcohol in a highly directed stream from a dripless package. Such flowable substances do not require a special sealant barrier layer and yet are appropriate substances for a dispenser having the other advantages of the present invention.

Figures 7A and 7B illustrate alternative embodiments for the shape of the protrusion extending from the relatively stiff side 12 of a dispenser package constructed in accordance with an embodiment of the invention. In Figure 7A protrusion 40 is generally rounded or dome-like in shape. Fault line 24 bisects domed protrusion 40 along its curved sides and across the centre of its top surface 42. Figure 7B shows an elongate pyramidal protrusion 50 similar to that shown in Figures 1 to 5 at 26 positioned such that fault line 24 bisects the protrusion 50 along its long axis.

Still further alternative embodiments of the shape for the protrusion are illustrated in Figures 7C to 7E. Thus Figure 7C shows a conical protrusion 52 bisected by fault line 24; Figure 7D a frusto-conical protrusion 54 bisected by fault line 24, and Figure 7E, a pyramid 56 having a four-sided base where the diagonal axes connecting the corners of the base are of equal length, bisected by fault line 24 on one diagonal axis. As previously discussed, it will be seen that the structure of Figures 7C and 7E concentrate the rupturing forces substantially at a point for maximum stress and rupturability.

A further modification of the dispenser package of Figures 1 to 5 is shown in Figures 8 and 9 wherein liquid applicator means are provided within a pouch 22 for applying the contents of the package to the desired use. To that end, as here

embodied, a sponge 65 or other suitable absorbent or sponge-like material is secured within pouch 22 directly behind hollow protrusion 26 and score line 24. Advantageously, sponge 65 is formed with a projecting centre portion 66 which is compressed within package 10 in its pre-opened condition. Figure 9 shows a dispenser package 10 and sponge 65 in use. Thus, when relatively stiff side 12 is bent into a V-shaped configuration, exit aperture 30 is formed by the fracture of protrusion 26 and the rupture of sealant/barrier layer 14 (if one is used). Simultaneously with the formation of exit aperture 30, the compressed portion 66 of sponge 65 is released through exit aperture 30. The remainder of sponge 65 remains within pouch 22 during use to absorb and transport, in the manner of a wick, the flowable substance to the portion 66 of sponge 65 protruding from exit aperture 30.

Other alternative embodiments constructed in accordance with the invention are illustrated in Figures 10 and 11. Thus, in Figure 10 a dispenser package 10 is illustrated which is constructed such that a sponge 70 or other suitable absorbent or sponge-like material is positioned within a pouch 22 directly behind a fault line 72. As here embodied, fault line 72 extends only partially across the relatively stiff side 12 of package 10, each end of which terminates in a diverging V-shaped fault line 74. It will be seen that as here embodied upon bending of the ends of relatively stiff side 12, rupture of fault line 72, 74 creates a relatively wide, slot-like opening through which sponge 70 or the like may easily protrude for swabbing, scrubbing or the like.

The dispenser package of Figure 11 is constructed similar to that of Figure 10, except that an elongate protrusion 80 is also formed longitudinally of fault lines 72, 74. As here embodied, protrusion 80 is preferably triangularly shaped in cross section terminating along a linear apex 82. It will of course be understood from the foregoing that provision of protrusion 80 along fault line 72 more effectively facilitates both rupture of a sealant/barrier layer 14 provided on the inner surface of stiff side 12 and also facilitates projection of sponge 70 by creating a continuous exit aperture.

A further embodiment of a dispenser package constructed in accordance with the present invention is illustrated in Figures 12 and 13, indicated generally by reference numeral 100. As here embodied, package 100 includes a relatively stiff side 12 having secured thereto a suitable sealant/barrier layer 14, as previously described but preferably comprising either a foil and saran or a foil and vinyl laminate, as well as fault line 24 and protrusion 26. As here embodied, however, a flexible side 118 is preferably generally cylindrically shaped and has symmetrical domed ends 120. Advantageously, flexible side 118 is vacuum formed from a suitable plastics material, and is suitably bonded to 12, 14, so as to have sufficient structural integrity to contain flowable substances under pressure.

Thus, it has been unexpectedly found that the use of protrusion 26 to generate sufficient force to rupture such strong and durable sealant/barrier materials as saran and vinyl has the added unexpected advantage that the dispenser package construction of the invention permits flowable substances to be held under pressure, enabling usage for such substances as shaving cream, whipped cream and pie frostings. Countless other packaging uses will be understood to persons of ordinary skill in the commercial packaging industry.

It has been found that the foregoing material will satisfactorily withstand pressure up to of the order of at least 10 to 20 psi (68.95 to 137.90 KPa) (gauge pressure), which is sufficient for many commercial packaging uses.

Advantageously, the contents of dispenser package 100 may be placed into the packages at a low temperature, on the order of between 10°F and 20°F (-12.22°C and -6.67°C), to reduce or eliminate the pressure exerted upon the construction materials during packaging. Of course, if the container is to be filled at a low temperature a heat sealing process cannot be used to bond flexible side 118 to relatively stiff side 12 and sealant/barrier layer 14. Similarly, if an aerosol propellant is desired to be used which is flammable, a heat sealing process would be inappropriate. In these situations, a suitable adhesive or cohesive material should be utilized, as previously disclosed or other welding means such as ultrasonics or radio frequency.

To the extent not already indicated, it also will be understood by those of ordinary skill in the art that any one of the various specific embodiments herein described and illustrated may be further modified to incorporate features shown in other of the specific embodiments, as desired.

Claims

1. A dispensing package for a flowable substance comprising a relatively stiff substantially flat sheet (12) and a flexible sheet (18, 118) secured to one face of said flat sheet (12), said flexible sheet forming a pocket (22) adjacent said one face of said flat sheet (12) for containing a flowable substance, said flat sheet having a weakened portion (24, 72) of predetermined length, whereby upon bending said flat sheet into a "V" about an axis extending along said weakened portion so that the arms of said "V" encapture said pocket (22), said weakened portion ruptures to create at least one opening (30) through which said flowable substance is dispensed, characterized by protrusion means (26, 40, 50, 52, 54, 56) displacing at least a portion of said weakened portion out of the plane of said flat sheet in a direction away from said one face for substantially maximally increasing the stress in said flat sheet at the displaced portion of said weakened portion; said protrusion means having a configuration which is substantially symmetrical on either side of said weakened portion and in

which a point of greatest displacement is located substantially on said weakened portion, whereby upon said bending said weakened portion initially ruptures at the locus of said protrusion means to create said at least one opening (30) through which said flowable substance is dispensed in a directed flow.

2. A dispensing package as claimed in claim 1 wherein said package is internally pressurized.

3. A dispensing package as claimed in claim 1 or 2, comprising a plurality of said protrusion means (26) spaced apart along said weakened portion.

4. A dispensing package as claimed in claim 3 wherein said plurality of said protrusion means (26) are spaced sufficiently close together to cause said weakened portion (24) to tear between each of said plurality of openings so as to create at least one opening of increased width along said weakened portion.

5. A dispensing package as claimed in any preceding claim wherein said protrusion means (40) has a generally rounded, dome-like configuration.

6. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means (54) is a frusto-conical shape.

7. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means is oblong.

8. A dispensing package as claimed in any of claims 1 to 4 wherein protrusion means comprises a pyramidal configuration, said weakened portion being displaced from said relatively stiff flat sheet material across the apex (28) of said pyramidal configuration.

9. A dispensing package as claimed in claim 8, wherein said pyramidal configuration is four-sided and the diagonal axes connecting the corners of the base are of unequal length, the shorter axis extending substantially along said weakened portion (24) so that said weakened portion is displaced across the apex of said pyramidal configuration along said shorter axis.

10. A dispensing package as claimed in claim 8, wherein said pyramidal configuration is four-sided and the diagonal axes connecting the corners of the base are of unequal length, the longer axis extending substantially along said weakened portion (24) so that said weakened portion is displaced across the apex of said pyramidal configuration along said longer axis.

11. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means (52) have a conical configuration, and said weakened portion (24) substantially bisects said conical configuration.

12. A dispensing package as claimed in any preceding claim including an absorbent material (65, 70) saturated with said flowable substance which is adapted to protrude from said package (10, 100) through said at least one opening to form a swab for use in the application of said flowable substance.

13. A dispensing package as claimed in claim



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Thus, it has been unexpectedly found that the use of protrusion 26 to generate sufficient force to rupture such strong and durable sealant/barrier materials as saran and vinyl has the added unexpected advantage that the dispenser package construction of the invention permits flowable substances to be held under pressure, enabling usage for such substances as shaving cream, whipped cream and pie frostings. Countless other packaging uses will be understood to persons of ordinary skill in the commercial packaging industry.

It has been found that the foregoing material will satisfactorily withstand pressure up to of the order of at least 10 to 20 psi (68.95 to 137.90 KPa) (gauge pressure), which is sufficient for many commercial packaging uses.

Advantageously, the contents of dispenser package 100 may be placed into the packages at a low temperature, on the order of between 10°F and 20°F (-12.22°C and -6.67°C), to reduce or eliminate the pressure exerted upon the construction materials during packaging. Of course, if the container is to be filled at a low temperature a heat sealing process cannot be used to bond flexible side 118 to relatively stiff side 12 and sealant/barrier layer 14. Similarly, if an aerosol propellant is desired to be used which is flammable, a heat sealing process would be inappropriate. In these situations, a suitable adhesive or cohesive material should be utilized, as previously disclosed or other welding means such as ultrasonics or radio frequency.

To the extent not already indicated, it also will be understood by those of ordinary skill in the art that any one of the various specific embodiments herein described and illustrated may be further modified to incorporate features shown in other of the specific embodiments, as desired.

Claims

1. A dispensing package for a flowable substance comprising a relatively stiff substantially flat sheet (12) and a flexible sheet (18, 118) secured to one face of said flat sheet (12), said flexible sheet forming a pocket (22) adjacent said one face of said flat sheet (12) for containing a flowable substance, said flat sheet having a weakened portion (24, 72) of predetermined length, whereby upon bending said flat sheet into a "V" about an axis extending along said weakened portion so that the arms of said "V" encapture said pocket (22), said weakened portion ruptures to create at least one opening (30) through which said flowable substance is dispensed, characterized by protrusion means (26, 40, 50, 52, 54, 56) displacing at least a portion of said weakened portion out of the plane of said flat sheet in a direction away from said one face for substantially maximally increasing the stress in said flat sheet at the displaced portion of said weakened portion, said protrusion means having a configuration which is substantially symmetrical on either side of said weakened portion and in

which a point of greatest displacement is located substantially on said weakened portion, whereby upon said bending said weakened portion initially ruptures at the locus of said protrusion means to create said at least one opening (30) through which said flowable substance is dispensed in a directed flow.

2. A dispensing package as claimed in claim 1 wherein said package is internally pressurized.

3. A dispensing package as claimed in claim 1 or 2, comprising a plurality of said protrusion means (26) spaced apart along said weakened portion.

4. A dispensing package as claimed in claim 3 wherein said plurality of said protrusion means (26) are spaced sufficiently close together to cause said weakened portion (24) to tear between each of said plurality of openings so as to create at least one opening of increased width along said weakened portion.

5. A dispensing package as claimed in any preceding claim wherein said protrusion means (40) has a generally rounded, dome-like configuration.

6. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means (54) is a frusto-conical shape.

7. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means is oblong.

8. A dispensing package as claimed in any of claims 1 to 4 wherein protrusion means comprises a pyramidal configuration, said weakened portion being displaced from said relatively stiff flat sheet material across the apex (28) of said pyramidal configuration.

9. A dispensing package as claimed in claim 8, wherein said pyramidal configuration is four-sided and the diagonal axes connecting the corners of the base are of unequal length, the shorter axis extending substantially along said weakened portion (24) so that said weakened portion is displaced across the apex of said pyramidal configuration along said shorter axis.

10. A dispensing package as claimed in claim 8, wherein said pyramidal configuration is four-sided and the diagonal axes connecting the corners of the base are of unequal length, the longer axis extending substantially along said weakened portion (24) so that said weakened portion is displaced across the apex of said pyramidal configuration along said longer axis.

11. A dispensing package as claimed in any of claims 1 to 4 wherein said protrusion means (52) have a conical configuration, and said weakened portion (24) substantially bisects said conical configuration.

12. A dispensing package as claimed in any preceding claim including an absorbent material (65, 70) saturated with said flowable substance which is adapted to protrude from said package (10, 100) through said at least one opening to form a swab for use in the application of said flowable substance.

13. A dispensing package as claimed in claim

12, wherein said absorbent material comprises a sponge (65) having a projecting portion (66) which is compressed within said package immediately adjacent said protrusion means whereby when said at least one opening is created said projecting portion (66) of the sponge is released through said opening to form said swab.

14. A dispensing package as claimed in any preceding claim, wherein said relatively stiff flat sheet includes a foil barrier material.

15. A dispensing package as claimed in any preceding claim, wherein said relatively stiff sheet includes a plastics barrier material.

Patentansprüche

1. Ausgabebehälter für fließfähiges Gut mit einem relativ steifen, im wesentlichen ebenen Blatt (12) und einem an einer Fläche dieses ebenen Blattes (12) befestigten, biegsamen Blatt (18, 118), das im Bereich dieser einen Fläche des ebenen Blattes (12) eine Tasche (22) zur Aufnahme eines fließfähigen Gutes bildet, wobei das ebene Blatt einen geschwächten Bereich (24, 72) von vorbestimmter Länge besitzt, so daß beim Biegen des ebenen Blattes um eine sich längs des geschwächten Teils erstreckende Achse in eine V-Form, deren Schenkel die Tasche (22) umgeben, der geschwächte Bereich unter Bildung mindestens einer Öffnung (30) aufreißt, durch die hindurch das fließfähige Gut ausgegeben wird, gekennzeichnet durch vorspringende Mittel (26, 40, 50, 52, 54, 56), die mindestens einen Teil des geschwächten Bereiches aus der Ebene des ebenen Blattes heraus in einer von der genannten einen Fläche wegführenden Richtung vordrängen und dadurch die Spannung in dem ebenen Blatt an der verdrängten Stelle des geschwächten Bereiches auf ein Maximum erhöhen, wobei die vorspringenden Mittel eine auf beiden Seiten des geschwächten Bereiches im wesentlichen symmetrische Form haben und eine am weitesten verdrängte Stelle sich im wesentlichen in dem geschwächten Bereich befindet, so daß bei dem genannten Biegen der geschwächte Bereich im wesentlichen am Ort der vorspringenden Mittel unter Bildung der mindestens einen Öffnung (30) aufreißt, durch die hindurch das fließfähige Gut in einem gerichteten Strom ausgegeben wird.

2. Ausgabebehälter nach Anspruch 1, dadurch gekennzeichnet, daß der Behälter unter einem Innendruck steht.

3. Ausgabebehälter nach Anspruch 1 oder 2 mit einer Mehrzahl der vorspringenden Mittel (26), die längs des geschwächten Bereiches in Abständen voneinander angeordnet sind.

4. Ausgabebehälter nach Anspruch 3, dadurch gekennzeichnet, daß die in einer Mehrzahl vorgesehenen vorspringenden Mittel (26) so nahe beieinander angeordnet sind, daß sie bewirken, daß der geschwächte Bereich (24) zwischen jeweils zweien der in einer Mehrzahl vorgesehenen Öffnungen aufreißt und dadurch längs des geschwächten Bereiches mindestens eine breitere Öffnung gebildet wird.

5. Ausgabebehälter nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die vorspringenden Mittel (40) allgemein eine gerundete kuppelartige Form haben.

6. Ausgabebehälter nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die vorspringenden Mittel (54) einen Kegelstumpf bilden.

7. Ausgabebehälter nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die vorspringenden Mittel (54) länglich sind.

8. Ausgabebehälter nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die vorspringenden Mittel eine Pyramide bilden und daß der geschwächte Bereich von dem relativ steifem, ebenen Blatt weg quer über die Spitze (28) der Pyramide verdrängt wird.

9. Ausgabebehälter nach Anspruch 8, dadurch gekennzeichnet, daß die Pyramide vierseitig ist, daß die die Ecken der Basis verbindenden diagonalen Achsen ungleich lang sind, und daß sich die kürzere Achse im wesentlichen längs des geschwächten Bereiches (24) erstreckt, so daß dieser längs der genannten kürzeren Achse quer über die Spitze der Pyramide verdrängt wird.

10. Ausgabebehälter nach Anspruch 8, dadurch gekennzeichnet, daß die Pyramide vierseitig ist, daß die die Ecken der Basis verbindenden diagonalen Achsen ungleich lang sind, und daß sich die im wesentlichen längs des geschwächten Bereiches (24) erstreckt, so daß dieser längs der genannten kürzeren Achse quer über die Spitze der Pyramide verdrängt wird.

11. Ausgabebehälter nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die vorspringenden Mittel (52) einen Kegel bilden und der geschwächte Bereich (24) diesen Kegel im wesentlichen halbiert.

12. Ausgabebehälter nach einem der vorhergehenden Ansprüche mit einem mit dem fließfähigen Gut gesättigten, saugfähigen Material (65, 70), das geeignet ist, durch die mindestens eine Öffnung hindurch aus dem Behälter (10, 100) vorzustehen und einen Bausch für das Auftragen des fließfähigen Gutes zu bilden.

13. Ausgabebehälter nach Anspruch 12, dadurch gekennzeichnet, daß das saugfähige Material mindestens teilweise aus einem Schwamm (65) besteht, der einen vorspringenden Teil (66) besitzt, der in nächster Nähe der vorspringenden Mittel in dem Behälter zusammengedrückt ist, so daß bei der Bildung der mindestens einen Öffnung der vorspringende Teil (66) des Schwammes freigegeben wird und unter Bildung des Bausches durch die Öffnung austreten kann.

14. Ausgabebehälter nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das relativ steife, ebene Blatt mindestens teilweise aus einer Sperrfolie besteht.

15. Ausgabebehälter nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das relativ steife Blatt mindestens teilweise aus einer Kunststoffsperrfolie besteht.



* C L N S *

Revendications

1. Un emballage distributeur pour substance fluide, comprenant une feuille (12) sensiblement plate relativement rigide et une feuille (18, 118) souple fixée sur une face de ladite feuille plate (12), ladite feuille souple formant une poche (22) adjacente à ladite face de ladite feuille plate (12) en vue de contenir une substance fluide, ladite feuille plate présentant une partie affaiblie (24, 72) de longueur prédéterminée, de sorte que lorsqu'on plie ladite feuille plate en "V" autour d'un axe qui s'étend le long de ladite partie affaiblie pour que les branches dudit "V" se referment sur ladite poche, ladite partie affaiblie se rompt pour créer au moins une ouverture (30) à travers laquelle ladite substance fluide est distribuée, caractérisé par des moyens formant saillie (26, 40, 50, 52, 54, 56) qui déplacent au moins une partie de ladite partie affaiblie en dehors du plan de ladite feuille plate dans une direction qui s'écarte de ladite face pour augmenter la contrainte sensiblement au maximum dans ladite feuille plate dans la partie déplacée de ladite partie affaiblie, ledit moyen formant saillie ayant une configuration sensiblement symétrique de chaque côté de ladite partie affaiblie et dans lequel un point de plus grand déplacement est situé sensiblement sur ladite partie affaiblie, de sorte que lors de ce pliage ladite partie affaiblie se rompt d'abord à l'endroit dudit moyen formant saillie pour créer au moins une ouverture (30) à travers laquelle ladite substance fluide est distribuée sous forme d'un écoulement dirigé.

2. Un emballage distributeur selon la revendication 1, qui est placé sous une pression interne.

3. Un emballage distributeur selon la revendication 1 ou 2, comprenant un ensemble desdits moyens formant saillie (26) espacés les uns des autres le long de ladite partie affaiblie.

4. Un emballage distributeur selon la revendication 3, dans lequel ledit ensemble desdits moyens 26 formant saillie sont placés suffisamment près les uns des autres pour contraindre ladite partie affaiblie (24) à se déchirer entre chacune des ouvertures dudit ensemble de façon à créer au moins une seule ouverture de largeur accrue le long de ladite partie affaiblie.

5. Un emballage distributeur selon l'une quelconque des revendications précédentes dans lequel ledit moyen formant saillie (40) a une configuration de form générale arrondie analogue à un dôme.

6. Un emballage distributeur selon l'une quelconque des revendications 1 à 4, dans lequel ledit moyen formant saillie (54) est de forme tronconique.

7. Un emballage distributeur selon l'une quelconque des revendications 1 à 4, dans lequel ledit moyen formant saillie est oblong.

8. Un emballage distributeur selon l'une quelconque des revendications 1 à 4, dans lequel le moyen formant saillie possède une configuration pyramidale, ladite partie affaiblie étant placée à l'écart de ladite feuille plate relativement rigide à travers le sommet (28) de ladite configuration pyramidale.

9. Un emballage distributeur selon la revendication 8, dans lequel ladite configuration pyramidale est à quatre côtés et dans laquelle les axes diagonaux reliant les angles de la base sont de longueur inégale, le plus petit axe s'étendant sensiblement le long de ladite partie affaiblie (24) de telle sorte que ladite partie affaiblie est déplacée à travers le sommet de ladite configuration pyramidale le long dudit axe plus court.

10. Un emballage distributeur selon la revendication 8, dans lequel ladite configuration pyramidale est à quatre côtés et dans lequel les axes diagonaux reliant les angles de la base sont de longueur inégale, l'axe le plus long s'étendant sensiblement le long de ladite partie affaiblie (24) de telle sorte que ladite partie affaiblie est déplacée à travers le sommet de ladite configuration pyramidale le long dudit axe plus long.

11. Un emballage distributeur selon l'une quelconque des revendications 1 à 4, dans lequel les moyens formant saillie (52) ont une configuration conique et dans lequel ladite partie affaiblie (24) divise ladite configuration conique en deux parties égales.

12. Un emballage distributeur selon l'une quelconque des revendications précédentes, incluant une matière absorbante (65, 70) saturée de ladite substance fluide qui est adaptée pour faire saillie hors dudit emballage (10, 100) à travers ladite ouverture au moins unique pour former un tampon destiné à être utilisé pour l'application de ladite substance fluide.

13. Un emballage distributeur selon la revendication 12, dans lequel ledit matériau absorbant comprend un éponge (65) comportant une partie (66) faisant saillie qui est comprimée à l'intérieur dudit emballage à proximité immédiate dudit moyen formant saillie de sorte que, lorsque au moins une ouverture est créée, ladite partie formant saillie (66) de l'éponge étant libérée à travers ladite ouverture pour former ledit tampon lorsque ladite ouverture au moins unique est créée.

14. Un emballage distributeur selon l'une quelconque des revendications précédentes, dans lequel ladite feuille plate relativement rigide comprend un matériau d'étanchéité en feuille métallique.

15. Un emballage distributeur selon l'une quelconque des revendications précédentes, dans lequel ladite feuille relativement rigide comprend un matériau d'étanchéité en matière plastique.



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