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(54) **BLISTER PACKAGE FOR ADHESIVE COMPOSITIONS**

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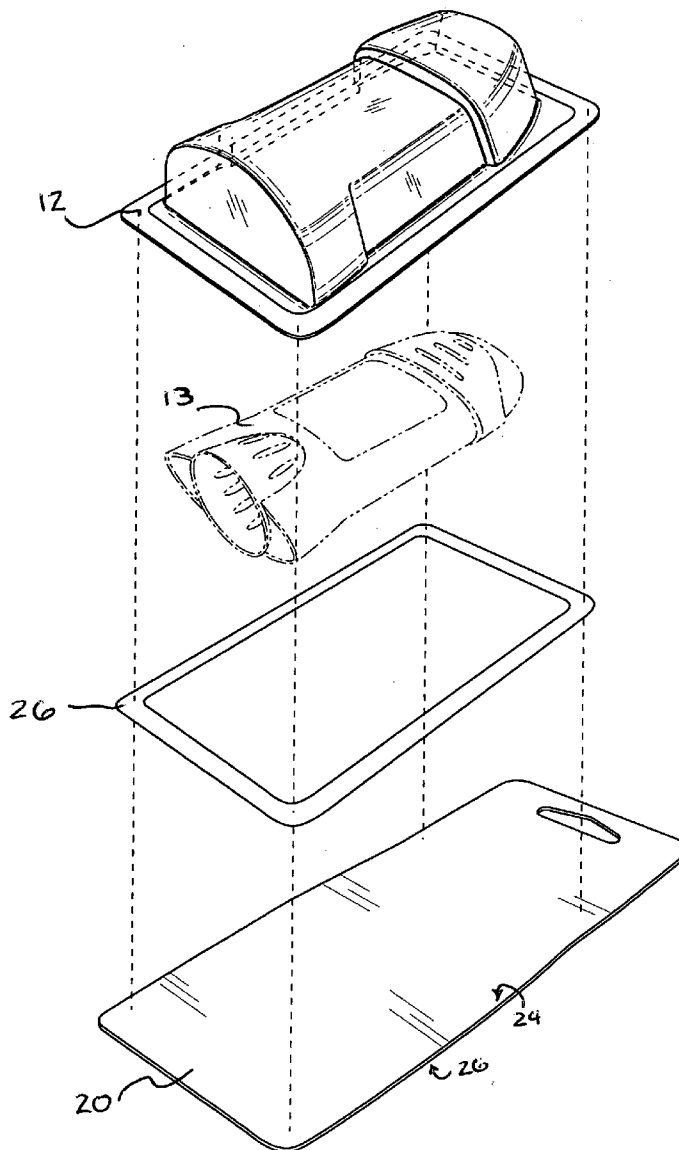
(57) **ABSTRACT**

There is disclosed a novel sandwich blister package for adhesive composition products and similar articles which generally experience short shelf lives due to exposure to air, vapors, and other environmental elements. The package comprises a plastic film blister having heat-formed cavities which contain the product; and a laminated blister card superimposed upon and sealed to the plastic film blister to form an air, water, and vapor-proof blister package assembly of a predetermined size and shape that significantly extends shelf life of the adhesive composition product.

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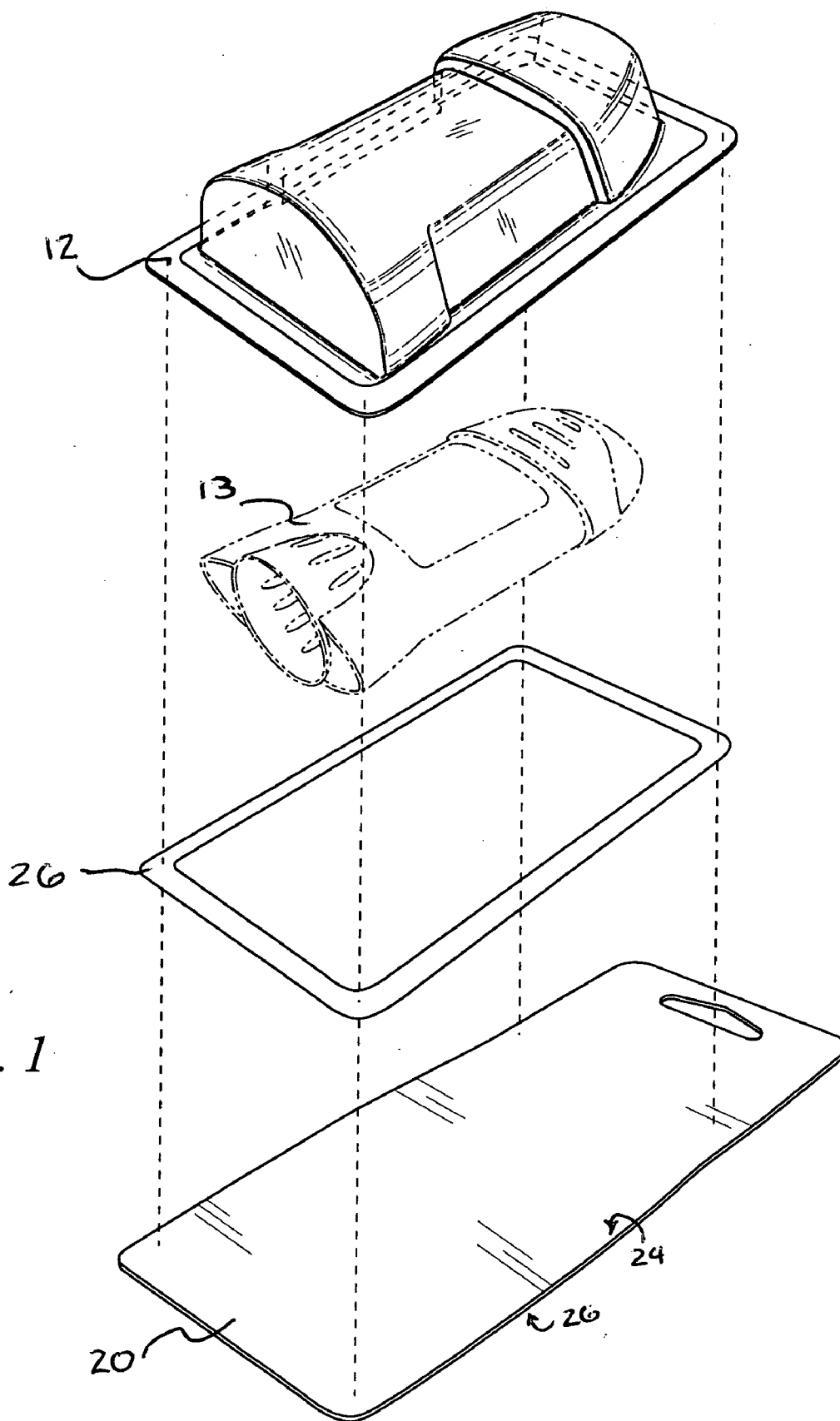


Fig. 1

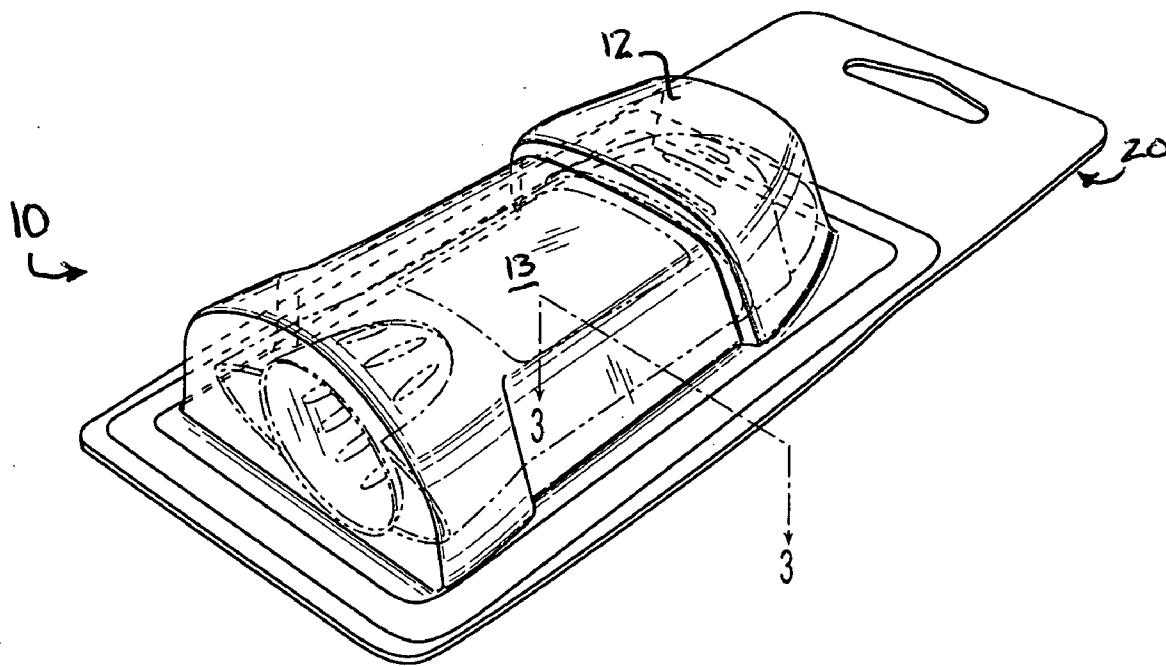


Fig. 2

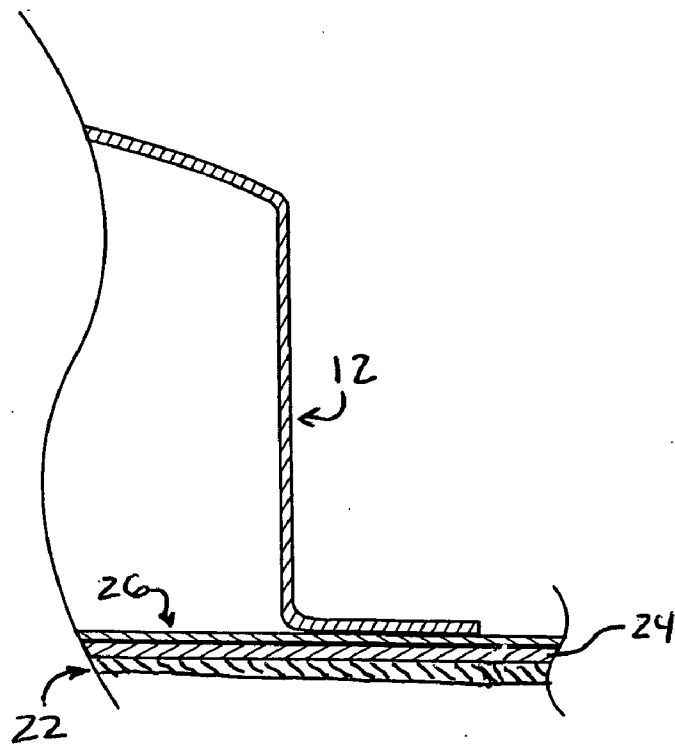


Fig. 3

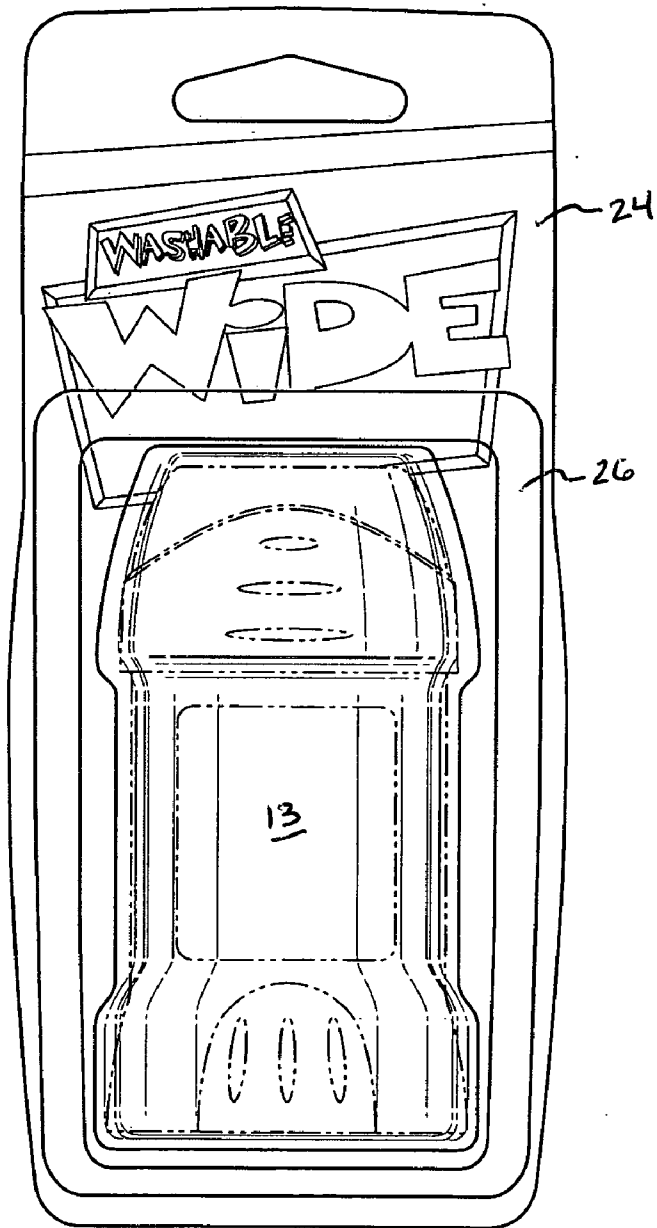


Fig. 4

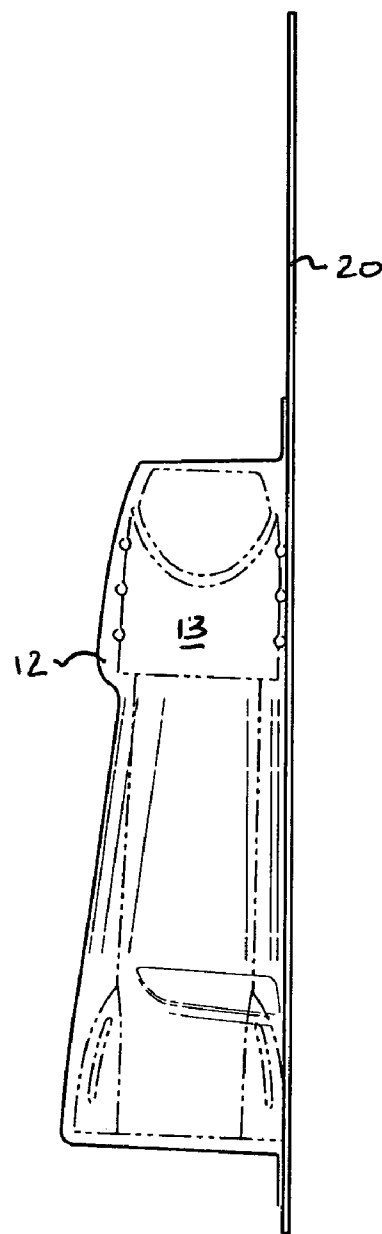


Fig. 5

BLISTER PACKAGE FOR ADHESIVE COMPOSITIONS

FIELD OF THE INVENTION

[0001] The present invention relates to packaging for storing and displaying glue sticks and other adhesive composition products, and more particularly to blister card packaging for storing and displaying such products while significantly increasing shelf life and product stability.

BACKGROUND OF THE INVENTION

[0002] Many adhesive products are provided in primary containers formed of plastics in order to provide a relatively stable, durable, and user-friendly package. In the case of glue sticks, the primary package is generally cylindrical, having a circular horizontal cross-sectional geometry ("round" glue sticks). More recently, glue sticks have been sold using a primary package having a horizontal cross-section that is generally oval or ovaloid. Such oval or ovaloid packages are often referred to as "wide" glue sticks since they impart a wider tip to the dispensed glue stick or other adhesive composition contained in the package. In the particular case of glue sticks, there exist both round cylindrical and wide stick primary plastic packaging that includes a lower closed portion having means for advancing the product out of an opposite dispensing opening, and a cap for covering the dispensing opening. In either case, the primary dispensing package is customarily made of high-density polyethylene ("HDPE").

[0003] With the development of wide stick packaging, it has been found that the shelf life of the wide stick product is shorter than for round glue sticks. It is believed that the wide stick containers more readily permit the passing of air to the adhesive product before, during, and after use of the product. Passing air to the product results in undesirable aging of the product, and eventually deteriorates the product to the point that desirable properties such as adhesion and ease of application are lost. Additionally, some adhesive compositions are hygroscopic making it necessary to protect them from moisture degradation so that they retain their usefulness over prolonged periods; i.e. shelf life stability, until they are consumed.

[0004] For the above reasons, it is desirable to prolong the shelf life of glue sticks, whether round or wide, as well as other adhesive compositions packaged in primary packaging that is susceptible to leakage and exposure to air.

[0005] It is further desirable to provide secondary packaging that protects the adhesive composition from exposure to air, gas and moisture due to failure of the primary packaging.

SUMMARY OF THE INVENTION

[0006] It has now been found that the shortcomings of the existing primary packaging for glue sticks and similar adhesive composition consumer products can be overcome by the novel sandwich blister package of the present invention. In general, the sandwich blister package of this invention comprises a plastic film blister having at least one heat-formed cavity, and a laminated blister card having a base layer and a foil layer overlying at least a portion of the base layer. Optionally, a sealing material forming a sealing

layer is overlaying at least a portion of the foil layer, the sealing layer disposed so as to receive and securely seal the blister against the foil layer. Preferably, the laminated blister card has a base layer of paperboard or corrugated paper, a foil layer comprising aluminum, and a sealing layer comprising polyethylene. In another embodiment, the foil layer includes graphics superimposed upon and sealed to the foil.

[0007] The invention further includes methods of using the plastic film sandwich blister package of the invention as a secondary package to reduce the loss of moisture from the adhesive composition resulting from the exposure of the primary container and its adhesive contents to air. As secondary benefit is that the blister isolates the primary package and contents from exposure to environmental conditions such as vapor humidity and liquid water. By isolating the product in a substantially airtight package, the present invention will significantly lengthen the useful shelf life of the product. In addition, the present invention provides a superior secondary package for display of the product for retail sale.

[0008] The plastic materials that can be used for the plastic film portion of the blister package of the invention are those which are resilient, heat formable and heat sealable such as polyvinyl chloride (PVC), polyvinylidene chloride, polyethylene, polypropylene, polyolefin, fluoroplastics, and combinations thereof. In one embodiment, PVC films having a thickness of from between about 0.005 inches to about 0.008 inches provide the desired packaging and processing properties for use in the sandwich blister package of the invention and are commercially available. Additionally, PVC films can be readily heated to form the cavities for receiving and retaining product, retain the integrity of the formed cavities after cooling, and are heat sealable.

[0009] The metal foil used in the foil layer of the invention generally has a thickness of from about between 0.003 to about 0.005 inches, and is also commercially available. The preferred type of metal foil is aluminum, although foils of other metals, as well as foil having multiple layers that include plastics or other reinforcing materials, may be used.

[0010] The sealing layer overlying the foil layer is comprised of a plastic or adhesive that is compatible with sealing to the blister. Where the blister is PVC, the preferred method of sealing is heat sealing, and accordingly, the sealing layer material includes PVC, polyethylene, or combinations thereof. The sealing material must provide a seal strong enough to cause a fiber tear of the paperboard when removed from the blister card. Preferably, the sealing layer applied to the foil layer is typically about 0.002 to about 0.020 inches thick.

[0011] Conventional packaging apparatus can be used to produce the sandwich blister package of the invention which generally comprises feeding a sheet of PVC plastic film over a heating plate having a plurality of spaced apertures formed therein; concurrently applying heat and vacuum to the PVC plastic sheet while it is held over the heating plate to vacuum form a plurality of spaced cavities in the PVC plastic sheet; advancing the PVC plastic sheet and filling the cavities with product; superimposing a sheet of blister card material comprising a base layer, a foil layer, and a sealing layer over the filled cavities; bonding the PVC plastic blister sheet to the sealing layer of the blister card, cutting the thusly bonded members to obtain separate blister cards of pre-set sizes, each containing a pre-determined quantity of product.

[0012] Other features and advantages of the present invention will be apparent from the following more detailed description of the preferred embodiment, taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The blister package of the invention and a method for producing it will become more clear from the ensuing description when considered together with the accompanying drawing wherein like reference numerals identify like parts and wherein:

[0014] **FIG. 1** is an exploded side elevation illustrating the elements of a single unit of the sandwich blister package of the invention;

[0015] **FIG. 2** is a side elevation of the single unit sandwich blister package of **FIG. 1**;

[0016] **FIG. 3** is a side cross-sectional view of the single unit blister package of **FIG. 1** taken along line 3-3 of **FIG. 2**;

[0017] **FIG. 4** is a top plan view of another embodiment of the sandwich blister package of the invention, showing a foil layer having text superimposed thereon; and

[0018] **FIG. 5** is a side perspective view of the single unit blister card of **FIG. 2**.

DETAILED DESCRIPTION OF THE INVENTION

[0019] In order to accomplish the objects of the invention, the present invention provides a secondary package that provides an airtight enclosure for an adhesive product that is contained in a primary package. As shown in the preferred embodiment illustrated in **FIG. 1**, the secondary package **10** is comprised of a plastic blister **12**, and a blister card **20**. The blister card **20** includes at least a base layer **22**, a foil layer **24** overlaying at least a portion of the base layer **22**, and a sealing layer **26** overlaying at least a portion of the foil layer **24**. The secondary package **10** is assembled as a sandwich wherein the blister **12** includes a cavity that generally corresponds to the size and shape of a product **30** such as an adhesive composition pre-packaged in a primary container. The blister **12** includes one or more cavities formed in the blister **12**, and a substantially flat perimeter portion **14** disposed for receiving and sealing against the blister card **20** to form a moisture/vapor/gas impervious secondary package. When the blister package **10** is fully assembled and sealed, the product **30** is thus protected from moisture/vapor/gas degradation until the blister package **10** is unsealed to remove the product **30** to be consumed.

[0020] As shown in **FIGS. 1-5**, the preferred embodiment of the blister package **10** is a moisture/vapor/gas impervious blister package **10** that comprises a blister **12** formed from a sheet of plastic material such as polyvinylchloride ("PVC"), nylon, or other resilient plastic. The blister **12** may be formed by any known means, but is preferably formed by heating PVC film in a blister-forming packaging machine as further described herein. The blister **12** is configured so as to closely conform to the shape and size of an adhesive composition product **13**, so as to minimize air content of the assembled package.

[0021] The blister card **20** is comprised of at least a base layer **22** and a foil layer **24**. The card **20** is preferably a three-ply card comprising a lower base layer **22**, a laminated foil layer **24** overlaying at least a portion of the base layer **22**, and a sealing layer **26** overlaying at least a portion of the foil layer **24**.

[0022] The foil layer **24** is preferably comprised of a foil metal such as aluminum, tin, or combinations thereof. Alternatively, the foil layer can include a plastic or resin such as polyester, whether in combination with a metal foil or in place of the metal foil. The foil layer **24** is preferably between about 0.01 millimeters and 0.02 millimeters thick. Such thin foils are known to be easily punctured and have a tendency to easily tear. Therefore, securely laminating the foil layer **24** to the base layer **22** helps to strengthen the foil layer so as to provide a continuous foil barrier on the top surface of the base layer material. Optionally, the foil layer **24** may be comprised of a second layer of a material laminated to the foil, wherein the second layer is a material that is tear-resistant and impervious to air. PVC, polyethylene, and polyester for example, can be used for this purpose, although other plastics will be known to those skilled in the art. In any case, the foil layer **24** imparts the desired moisture/vapor/gas barrier protection and is the layer overlaying the blister card base layer **22**.

[0023] The sealing layer **26** is preferably comprised of a heat-sealable plastic composition such as polyethylene, PVC, or other known heat-sealable plastic that is compatible with the flexible plastic film of the blister **12** and the foil layer **24** to form a permanent bond with both the blister **12** and the foil layer **24**. The sealing layer **26** is preferably applied to the foil layer **22** early in the packaging process since the resilient nature of the sealing layer **26** protects the aluminum foil ply and can prevent it from being torn or punctured during packaging.

[0024] **FIG. 1** shows an exploded view of a single unit sandwich blister package of the invention. The package comprises a PVC plastic blister **12** having a cavity heat formed therein for receiving and retaining a product **13**. A sealing layer **26** is superimposed upon and bonded to the top foil layer **24** of a blister card having a base layer **22**, the base layer **22** and foil layer **24** laminated to form a blister card **20**.

[0025] **FIG. 2** shows the assembled sandwich blister package of **FIG. 1**, wherein the substantially flat perimeter edges of the blister **12** have been heat sealed to the foil layer **24** of the blister card by heating the sealing layer **26** so that it bonds to the blister **12** and to the foil layer **24**. **FIG. 3** shows a close-up side cross-sectional view of the assembled, heat-sealed blister package **10** of **FIG. 2**. **FIG. 5** shows another side perspective view of the assembled package.

[0026] As shown in **FIG. 4**, the assembled package of **FIG. 2** can include graphics and text superimposed onto the foil layer **24** to form a package that is suitable for display without further modification. Graphics may include product names, ingredients, trademarks, and any other desirable artwork and text.

[0027] The present invention further includes an assembly line method that can be used to continuously produce completed blister packages of the invention. PVC film for the blister is continuously supplied in sheet form from a roll of PVC film and led over a hot plate having a plurality of

spaced apertures. The hot plate is kept at a temperature sufficient to heat the PVC sheet **10** so that it becomes softened and heat formable. When the PVC sheet has reached a softened, heat formable state (usually within about 2 seconds to about 6 seconds) vacuum is applied by conventional means to draw the softened PVC sheet film down into apertures to thereby form the cavities in the PVC sheet. The PVC sheet is then fed beneath a product supply means such as a product hopper where a product, such as a glue stick in a PVC primary package is deposited into each cavity. Sufficient distance from the cavity forming operation and the hopper is provided so that the cavities formed have time to cool, set and become integral. Usually, the cavities are set and cooled to maintain an integral self-supporting shape within about 2 seconds to about 6 seconds.

[0028] Downstream from hopper, a blister card comprised of a base layer, a foil layer laminated to the base layer, and a sealing layer overlaying the foil layer is provided to be superimposed over the PVC sheet carrying the product in the formed cavities. The blister card is then heat sealed to the PVC sheet **10** such as by means of heat sealing platen to obtain a sealed blister secondary package assembly. Conventional knife blades and other cutting means can then be used to cut the blister package assembly into individual blister cards of pre-set sizes. The fully assembled blister cards are then fed to downstream stations for packaging into bulk containers or tertiary packages such as display cases.

EXAMPLES

[0029] The inventors were able to evaluate a series of experimental blister packages, designated herein as the “S series” and the “L series”. The samples each included an Elmer’s round glue stick in its primary HDPE package, but with the cap removed, packaged into a secondary blister package. Each blister package included a glue stick laid on a blister card, with a plastic blister overlaying the glue stick and sealed to the blister card using a polyethylene sealing ring as the sealing layer. Each blister and card assembly was then heat sealed at temperatures of between about 240 to 300 degrees Fahrenheit for sufficient dwell time to activate the sealing layer and create an airtight and durable seal between the blister card and the blister.

[0030] Each “S” series blister card included a paperboard backing having a 0.003 to 0.005 inch thick foil layer of aluminum foil on the exposed (top surface for contacting the product and plastic blister).

[0031] By contrast, each “L” series package included a plastic blister overlay of the same composition as the “S” series, and paperboard backing identical to that of the “L” series, save for the absence of the foil top layer.

[0032] Each series of packages was then placed in a 50 degree Celcius oven for 2 weeks to measure the total package weight loss. The results are listed in the tables below. The displayed weight loss is a total weight loss that includes the entire package and product and therefore is not limited to the product itself—however, given the identical package components save for the foil lacking in the “L” series, the majority of the weight loss can indeed be attributed to moisture and volatiles loss from the product. Calculated percentage weight loss for the glue stick itself would therefore, of course, be much greater.

[0033] To clearly compare the results, the inventors have provided a ratio of the two weight loss values to measure the performance impact of the different foil metal layer. The “L” series, which lacked the foil layer, lost 11.77%, nearly four times (4x) as much weight (presumably mostly water) than the “S” series (2.83%).

S Series				
	Initial Wt (g)	Aged Weight (g)	Difference (g)	(%)
S-1	71.17	69.48	1.69	2.37
S-2	70.95	69.16	1.79	2.52
S-3	71.09	67.54	3.55	4.99
S-4	70.93	68.95	1.98	2.79
S-5	71.20	69.61	1.59	2.23
S-6	71.25	69.58	1.67	2.34
S-7	71.30	69.45	1.85	2.59

Average loss (%) = 2.83%

[0034]

L Series				
	Initial Wt (g)	Aged Weight (g)	Difference	(%)
L-1	72.98	65.01	7.97	10.92
L-2	72.79	64.08	8.74	12.01
L-3	72.53	64.28	8.25	11.37
L-4	72.08	63.09	8.99	12.47
L-5	72.29	63.55	8.74	12.09
L-6	72.06	63.42	8.64	11.99
L-7	72.51	64.12	8.39	11.57

Average loss (%) = 11.77%

[0035] The ratio of “L” average weight loss to “S” average weight loss as approximately 4.16:1. Clearly, the foil layer constitutes a significant improvement over the current secondary blister packaging for glue sticks. It is fully expected that further testing will show that the blister package of the preset invention will significantly improve the useful shelf life of the packaged glue stick products and similar adhesive composition products, and may triple the current shelf life of such products where the primary cause of product degradation is by moisture loss.

[0036] While the invention has been described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

1. A blister package for an adhesive composition product, said package comprising:

a blister card portion including a base layer and a foil layer laminated onto the base layer, the foil layer being of sufficient thickness to serve as an effective barrier to substantially prevent the transmission of air and moisture through the blister card; and

a blister portion having a substantially flat perimeter edge, said blister portion including at least one cavity containing an adhesive composition product packaged in a primary container; and

the blister card portion and the blister portion mated and sealed together to form a substantially airtight and water-resistant package.

2. A blister package according to claim 1 wherein the blister is comprised of a thin sheet of plastic material, and wherein the at least one cavity is formed in the blister prior to placing the product in the at least one cavity.

3. A blister package according to claim 2, wherein the thin sheet of plastic material is comprised of polyvinyl chloride, polyvinylidene chloride, polyethylene, polypropylene, polyolefin, fluoroplastics, and combinations thereof.

4. The blister package according to claim 3, wherein the thin sheet of plastic material is between about 0.005 inches and about 0.008 inches in thickness.

5. A blister package according to claim 1 wherein foil layer is comprised of material selected from the group consisting of aluminum, tin.

6. A blister package according to claim 5, wherein the thickness of the foil layer is in the range of from about 0.003 to about 0.005 inches.

7. A blister package according to claim 5, wherein the blister card further includes a sealing layer disposed on the exposed surface of the foil layer.

8. A blister package according to claim 7, wherein the sealing layer is disposed on at least the portion of the exposed surface of the foil layer that corresponds to the substantially flat perimeter edge of the blister when the blister and blister card are assembled.

9. A blister package according to claim 7, wherein the sealing layer is disposed on the entire exposed surface of the foil layer.

10. The blister package of claim 7 wherein the sealing layer is comprised of a heat-sealable plastic.

11. The blister package of claim 7 wherein the sealing layer is comprised of an adhesive material.

12. The blister package of claim 10 wherein the heat sealable plastic comprises polyethylene.

13. A blister package according to claim 1 wherein said foil layer further includes graphics superimposed on the exposed surface of the foil layer, and wherein said blister is comprised of transparent material such that the graphics superimposed on the exposed surface of the foil layer are visible through the blister.

14. A blister package according to claim 1 wherein the adhesive composition product is selected from the group consisting of round glue sticks and wide glue sticks.

15. A blister package for an adhesive stick material, said package comprising:

a blister card portion including a base layer and a foil layer laminated onto the base layer, the foil layer being comprised of aluminum of sufficient thickness to serve as an effective barrier to substantially prevent the transmission of air and moisture through the blister card;

a blister portion comprised of a transparent plastic material and having a substantially flat perimeter edge, said blister portion including at least one cavity containing an adhesive composition packaged in a primary container; and

the blister card portion and the blister portion mated and sealed together by a sealing layer disposed between the substantially flat perimeter edge of the blister and the foil layer to form a substantially airtight and water-resistant package.

16. A method of significantly prolonging the useful shelf life of an adhesive glue stick composition packaged in a primary container, the method comprised of the steps of

Providing a sheet of heat-formable plastic material;

Forming the sheet of heat-formable plastic material so as to create at least one cavity portion surrounded by a substantially flat perimeter edge portion;

Providing an adhesive composition product packaged in a primary container;

Placing the product into the at least one cavity;

Providing a blister card portion, the blister card portion comprised of a base layer having a substantially flat perimeter portion, a foil layer laminated over at least the substantially flat perimeter portion of the blister card;

Superimposing the blister card over the blister so that the substantially flat perimeter edge portion of the blister is mated to the foil layer overlying substantially flat perimeter portion of the blister card; and

Sealing the blister to the blister card to produce a substantially airtight secondary package that substantially increases the shelf life of the product.

17. The method of claim 16, wherein the step of providing an adhesive composition packaged in a primary container includes providing a glue stick packaged in a primary plastic dispensing container.

18. The method of claim 16, wherein the step of sealing includes providing a sealing layer disposed over the exposed surface of the foil layer.

19. The method of claim 18, wherein the step of providing a sealing layer includes providing a heat-sealable plastic material comprised of polyethylene.

20. The method of claim 19, wherein the step of providing a sealing layer includes providing an adhesive composition suited for permanently bonding the foil layer to the blister.

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