

- [54] RESEALABLE PACKAGE
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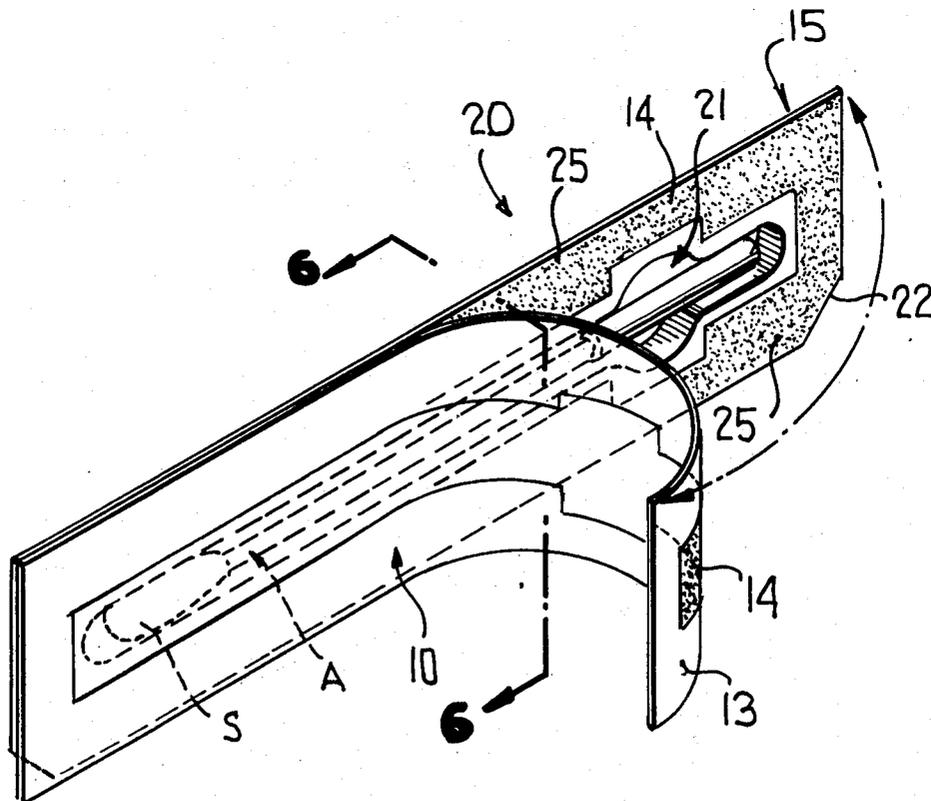
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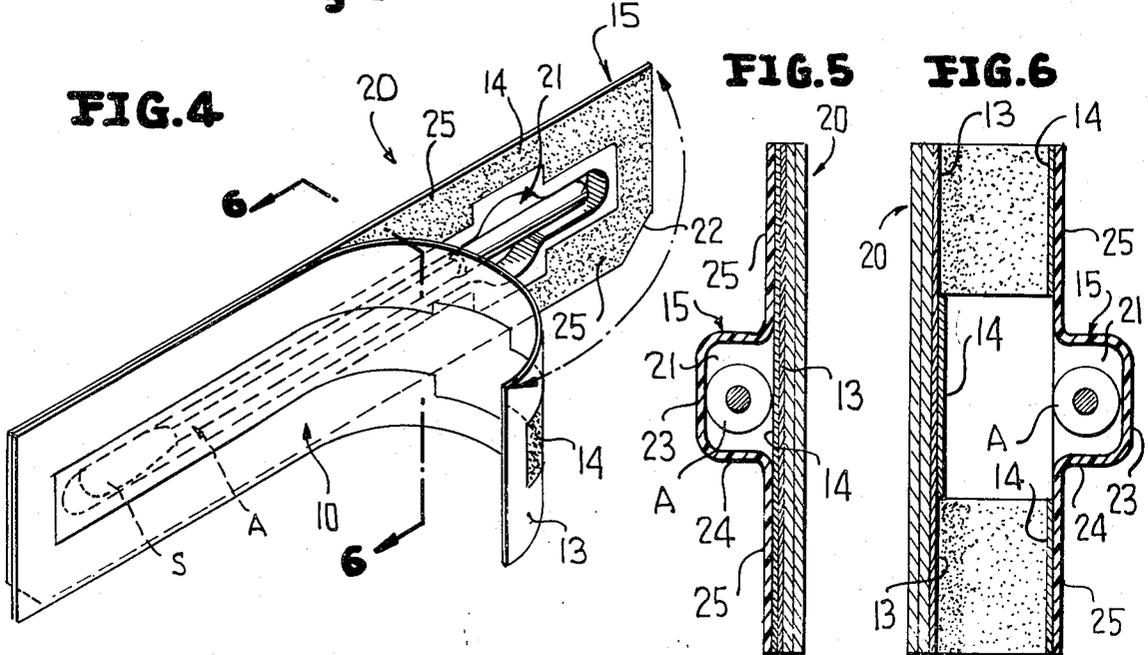
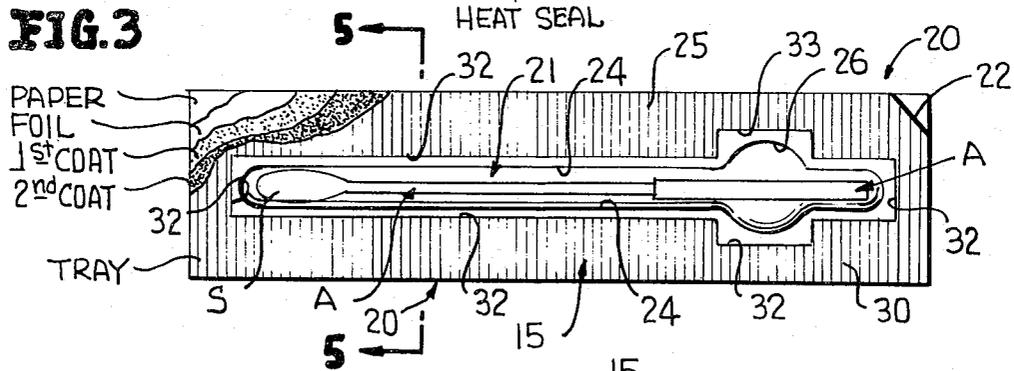
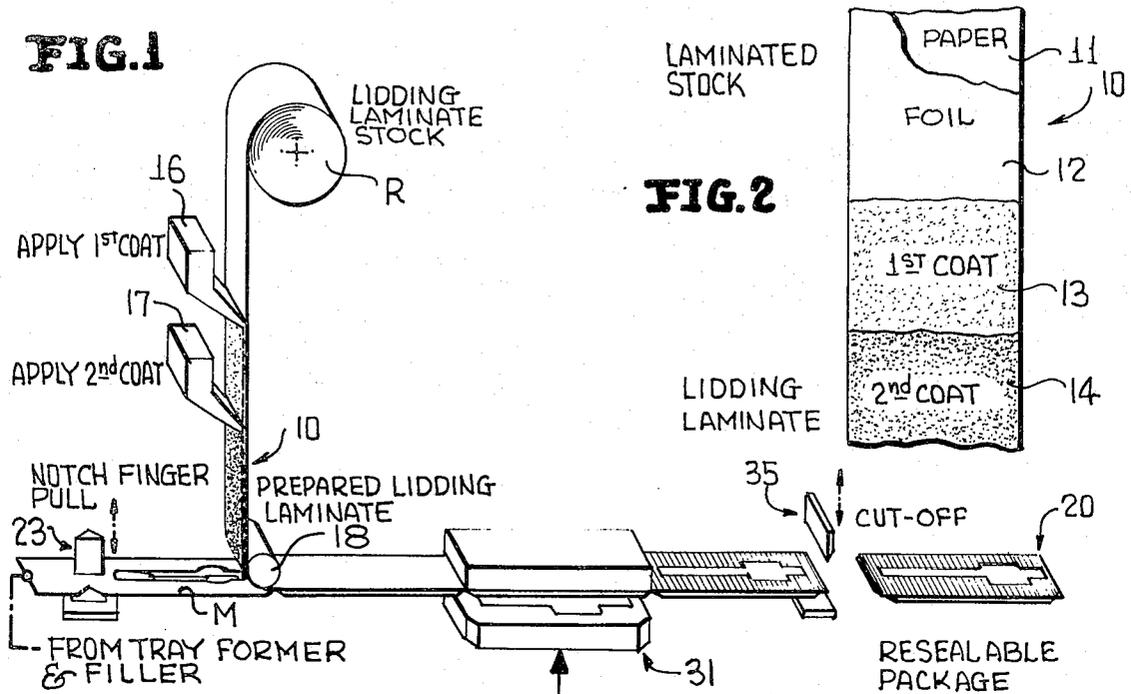
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[57] **ABSTRACT**

This disclosure relates to a resealable package particularly adapted for medical use comprising a formed tray having one or more cavities for receiving articles or materials and a flange area upon which rests a lid for closing the cavity or cavities, a first coating of pressure-sensitive adhesive covers substantially the entirety of the lid while a second coating of heat sealable material covers substantially the entirety of the first coating, the second coating being non-tacky and compatibly heat sealable to the material of the tray, a heat seal bonding the second coating of the lid to the flange area of the tray, and the bond strength of the heat seal being greater than the bond strength between the first and second coatings whereby the package is opened by delamination of the tray and lid at an interface between the coatings in the heat sealed area thus exposing the first coating for subsequent pressure resealing purposes.

8 Claims, 6 Drawing Figures





RESEALABLE PACKAGE

Resealable packages which are particularly adapted for medical purposes have come into prominence over the last several years for a myriad of purposes. As an example, a known bacteriological culture package consists of a shallow thermoformed tray having a number of cavities housing appropriate articles and being covered with a lid adhered to a flange area of the tray.

In this package three cavities of approximately three-eighths of an inch in depth are formed with a long and narrow of these serving as a receptacle for a cotton-tipped swab. At the "cotton end" the elongated cavity is joined to a second small cavity by a narrow opening with the second small cavity containing a tiny rupturable pouch of nutrient. In those packages where there is a third cavity it is used to contain microscope slides.

The total package with all cavities filled is sold to doctors, hospitals and the like. A physician uses the package by peeling down perhaps a third of the way, grasping the stem of the cotton-tipped swab, removing it from the package, picking the suspect fluid or culture on the cotton tip, applying a smear thereof on the microscope slide (which has been exposed by the partial opening of the package), reinserting the swab, reclosing the package due to its pressure-sensitive characteristics, and applying thumb pressure to the small cavity to rupture the pouch containing the nutrient which forces the nutrient through the narrow opening to the "contaminated" cotton tip thereby providing sufficient moisture and nutrient to keep any microorganisms alive for a matter of several days while the entire unit is mailed or sent to a biological laboratory.

At the biological laboratory a technician first peels the package sufficiently so that he might remove the microscope slide for study, and reseals the pouch. Subsequently the pouch is peeled down again so that the culture on the cotton swab may be transferred to a Petri dish and incubated for further study.

Although conventional packages of this and similar types are rather of an apparent first-glance simple construction, peelability and resealability are essential. Furthermore, no pressure-sensitive adhesive must be in any of the cavity areas that would tend to "pick" the cotton, dissolve the nutrient upon the small pouch being fractured or smear the microscope slide.

A simpler package might include but a single cavity for a single cotton-tipped or foam-tipped swab simply to maintain its aseptic condition. As an alternative, a plurality of such swabs can be contained in a single cavity of a package of this type and might also include a second cavity connected by a small opening to the tip end of the swabs. The small cavity would contain a pouch having an antiseptic such as iodine, and upon the fracture of the pouch the disinfectant would flow through the small opening and saturate the tips of the swabs for subsequent use. Just as in the first described package, the latter described packages also though essentially of a rather simple construction also require excellent peelability and resealability characteristics. Likewise, no pressure-sensitive adhesive should be in any of the cavities which would tend to pick the cotton, dissolve and/or dilute the disinfectant, or the like.

In keeping with the present invention there is provided a novel resealable package which has excellent peelability and resealability characteristics and precludes the presence of pressure-sensitive adhesive in

any of the cavity or cavities thereof, the package including a formed tray having a cavity or cavities bounded by a flange area with articles or materials housed within the cavities, a lid closing the cavities, a first coating of pressure-sensitive adhesive covering substantially the entirety of the lid, a second coating of heat-sealable material covering substantially the entirety of the first coating, the second coating being non-tacky and compatibly heat-sealable to the material of the tray, a heat-seal bonding the second coating of the lid to the flange area outboard of the cavities, and the bond strength of the heat-seal being greater than the bond strength between the first and second coatings whereby the package is opened by delamination of the tray and lid at an interface between the coatings in the heat sealed area thus exposing the first coating for subsequent pressure resealing.

A further object of this invention is to provide a novel package of the type heretofore described wherein the second coating is pigmented whereby upon the opening of the package any undesired exposure of the first coating to the cavity is immediately visually discernable.

In further keeping with this invention, there is provided a novel method of producing a resealable package of the type aforesaid wherein the lid is supplied from a roll as web having preapplied thereto the first and second coatings or, alternatively, the first and second coatings are applied to the web successively prior to the lid applying step.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claimed subject matter, and the several views illustrated in the accompanying drawing.

IN THE DRAWING

FIG. 1 is a highly schematic perspective view of one method of forming a reusable package of this invention, and illustrates the manner in which a thermoformed web having articles in cavities thereof is closed, heat-sealed and severed into individual packages.

FIG. 2 is a fragmentary perspective view of a portion of the web of FIG. 1, and illustrates the lidding laminate as being formed of paper, foil, a first coat of pressure-sensitive adhesive and a second coat of non-tacky heat-sealable material.

FIG. 3 is an enlarged view of the severed package of FIG. 1, and illustrates from top to bottom the cavity of the tray housing a swab, the second coat of heat-sealable material, the first coat of pressure-sensitive adhesive, the foil, and the paper.

FIG. 4 is a perspective view of the package of FIG. 3, and illustrates the manner in which the package is partially opened by delamination of the tray and lid at an interface between the first and second coatings in the heat-sealed area thereby exposing the first coating on the lid for subsequent pressure resealing.

FIG. 5 is an enlarged exaggerated sectional view taken generally along line 5-5 of FIG. 3, and illustrates from left-to-right the tray and its flange area with its cavity housing the swab, the first and second coatings with the first being heat-sealed to the flange area of the tray, and following is the foil and paper.

FIG. 6 is an enlarged fragmentary sectional view taken generally along line 6-6 of FIG. 4 and illustrates the manner in which the second coating in the heat-

sealed areas remains adhered to the flange area of the tray thus exposing the pressure-sensitive adhesive which remains carried by the lid for subsequent resealing purposes.

Reference is first made to FIG. 2 of the drawing which illustrates a web 10 of laminated material used for subsequent lidding or closing purposes. The web 10 includes a laminate of paper 11 and aluminum foil 12 upon the latter of which is a coating 13 of a first adhesive upon which is over-coated a coating 14 of a second adhesive. The paper 11 and the foil 12 may be, for example, 30lb/R surgical grade glassine adhesively laminated to 1 mil of aluminum foil. In order to gain more strength heavier paper may be employed or the paper 11 and foil 12 may be bonded to each other by a coating of polyethylene therebetween.

The first applied or first down coating 13 is a pressure-sensitive adhesive which may be applied in solution or as an emulsion, and may be of an acrylic or other synthetic base.

The second applied or second down coating 14 is compatible with and heat-sealable to the material from which is formed a tray 15 (FIG. 3). The second coating 14 may also be applied as a solvent or an emulsion and must be of a non-tacky nature. Preferably though not necessarily the second coating 14 is pigmented so that upon subsequent opening of the over-all package, which is generally designated by the reference numeral 20 in FIG. 3 and FIG. 4, any undesired exposure of the first coating 13 to or within a cavity of the tray is immediately visually discernable, as will be described more fully hereinafter.

Though the lidding material has been heretofore referred to as being made from paper and foil other combinations of materials are possible. Paper/adhesive/foil or paper/polyethylene/foil could certainly be commonly used lidding laminates and a "basic" (i.e., uncoated base) lidding material could be any of a wide variety of laminates or even plastic sheeting or heavy foil, the only requirements being that they have adequate barrier properties to protect the product packaged, that they have adequate heat resistance so as not to deform at the temperature-pressure conditions required to seal the lid to the tray, and that they have adequate tensile strength to allow them to be peeled from the tray without tearing. For example, a polyester(Mylar)/polyolefin laminate, a polyester/foil laminate, 10 mil vinyl sheeting, 3 mil aluminum foil and cellophane/poly/cellophane are examples of further materials that could be used for lidding stock.

Assuming that the tray 15 of the over-all package 20 is thermoformed cellulose ester material the second coating 14 may be any type of non-pressure sensitive acrylic adhesive. If the tray 15 of the over-all package is thermoformed, uncoated vinyl, the coating 14 may be PVDC emulsion. Likewise, if the tray 15 of the over-all package 20 is thermoformed polyethylene or polypropylene the coating 14 may be a Surlyn or an EVA emulsion.

The precoated web or lidding material 10 may be provided to a packager in roll form, which is most desirable. However, the uncoated laminate 10, 12 may be supplied in roll form only and in the latter case a web (unnumbered) thereof is withdrawn from a roll R and may have successively applied over the entirety of one surface thereof the successive first and second coatings 13, 14 by suitable conventional applicators 16, 17. The

resultant lidding material 10 is thereafter partially entrained about a guide roll 18 to cover a number of cavities 21 formed in a web of material M with each cavity 21 housing an article or material A, which in the embodiment of the invention illustrated and disclosed is a cotton-tipped swab S.

Upstream of the point at which the web 10 is applied to the material M, the latter is conventionally thermoformed to provide a plurality of the cavities 21 which are packaged with the articles S, and prior to or after the material M is notched, as at 22 in FIG. 3 by a conventional notching mechanism 23 (FIG. 1) to provide ease of opening, as will be described more fully hereinafter.

Preferably the tray 15 is formed of transparent material and the cavity 21 thereof is defined by a bottom wall 23, a peripheral wall 24 and a flange area 25 (FIG. 5). A portion 26 of any cavity 21 may be enlarged to provide an area for a person to grasp an end (unnumbered) of the swab S or other item incident to withdrawing the same from the cavity 21, as will be described more fully hereinafter.

After the web 10 has been applied to the material M a flange-area heat seal 30 (FIG. 3) is formed at a conventional heat-sealing station 31 (FIG. 1). The heat seal 30 entirely bounds and is slightly outboard of the periphery of the cavity or cavities 21 as defined by the peripheral wall 24 thereof. The inner outline 32 of the heat seal 30 is generally of a cross-shaped configuration with an enlarged portion 33 thereof being formed in the vicinity of the enlarged portion 26 of the cavity 21. The heat seal 30 bonds the second coating 14 of heat-sealable material of the web or lid 10 outboard of the peripheral wall 24 of the tray 15 to the flange area 25 thereof, in the manner best illustrated in FIG. 5. Moreover and importantly, the bond strength of the heat seal 30 (between the material of the flange area 25 and the second coating 14) is greater than the bond strength between the first pressure-sensitive adhesive 13 and the second coating 14. The importance of this will be discussed hereinafter relative to FIGS. 4 and 6. However, once the heat-sealing operation has been concluded a cutoff station 34 severs the thus laminated materials into the individual packages 20.

The package 20 is opened by grasping the exposed corner of the web or lid 10 adjacent the notch 22 and pulling the same in the manner readily apparent in FIGS. 4 and 6 to achieve a progressive peel back of the lid 10 in a direction toward the tip end of the swab S. Due to the relative bond strengths heretofore described the second coating 14 adheres to the flange area 25 of the tray 10 in the area of the heat-seal 30 (FIG. 6) due to the greater bond strength therebetween, as opposed to the bond strength between the second coating 14 and the first coating 13 in the same sealed area 30. Thus, as is best illustrated in FIG. 6, delamination between the lid and tray in the sealed area 30 takes place at an interface between the coatings 13, 14. However, in that area of the package which is not heat-sealed, the second coating 14 remains adhered to the first coating 13, as is clearly shown to the left in FIG. 6. Since the material 14 is non-tacky it will not pick the cotton or foam tip of the swab S when packaged (FIG. 5) and the latter will further not occur should the swab be returned to the cavity after use and the package resealed for subsequent mailing. The resealing is, of course, readily accomplished by simply reversing the peeling

operation of FIG. 4 which brings the now-exposed pressure-sensitive adhesive 13 in the area of the heat-seal 30 into contact with that portion of the second coating 14 which remain heat-sealed and adhered to the flange 25 in the flange area heat-sealed area 30.

It was earlier pointed out that the application of pigmentation to the second coating 14 was desirable to assure that no portion of the pressure-sensitive coating 13 is exposed to contaminate an article or articles in the cavity or cavities 21. For example, if for some reason a tiny spot or spots of the coating 14 delaminated from the coating 13 or were not properly laminated causing fissures or cracks these will be visible because there-through could be seen the first coating 13 if of a different color than the second coating 14 or the aluminum foil 12 if the first coating was clear and transparent. In either case the pigmentation of the second coating 14 assures that one can visibly discern if, for example, the cotton at the end of the swab S had been picked prior to opening the package or at any time thereafter. Moreover, if the tray 10 were provided with other cavities as, for example, for a pouch containing nutrient or a microscope slide, the function of the pigmentation of the second coating heretofore described would assure the absence of microscope smear or nutrient dissolvment.

In further accordance with this invention the tray 10 when provided with a plurality of cavities they be designed particularly for use in the packaging of pills. Today many pills are packaged in a thermoform tray having many cavities and a lidding stock is sealed over all. To retrieve the pills one by one the consumer either tears off a segment of the lid to open one cavity or pressure is applied to the base of the individual cavity and the pill is forced against the lidding stock which ruptures and allows the pill to be dispensed. Either way, by the time a tray of 28 to 30 pills (such as are used in the case of birth control) is half consumed a rather "ratty-looking" package remains. To further simplify pill dispensing and to maintain a neater package, the lid or lidding material of the present invention would be used over a multi-cavity tray, except that (either before or after coating) the lidding stock would be perforated both in the longitudinal and across-the-web direction (like a sheet of postage stamps) so that all perforations coincided with the flange area of the tray. Thus, for all practical purposes, each pill would end up with its own tiny lid which could readily be peeled off and discarded. In further keeping with this concept numerous notches or perforations would be provided in the flange area of the tray so that at least one corner of each individual lid ("postage stamp") would not be sealed down, thus providing a point at which peeling could be initiated.

In lieu of the forming/filling/sealing of the type depicted in FIG. 1 the invention may be practiced through the use of commercial equipment which applies lidding stock to individual trays (pre-formed individual trays). In this case the pre-formed trays are dropped into suitable cavities on a continuous belt that then carries the units past the filling station and to the point of automatic lidding. Such a machine would necessarily be used if injection molded, stamped or cast trays were used.

From the foregoing it is to be noted that in keeping with the present invention the package consists of two principal components: a formed or pre-formed tray with one or a plurality of cavities and a flange area and

an essentially flat lidding material with the lidding material being double-coated, the first down coating being pressure-sensitive in nature and applied from a solution or dispersion and with the second down coating being a non-tacky, thermoplastic material, also applied from a solution or dispersion, and which is compatible with the pressure-sensitive coating and is heat-sealable to the tray. The container or tray would therefore be a three-dimensional open-top container with one or more cavities with the open end of all cavities intersecting the same planar surface which constitutes the top of the tray and which top planar surface of flange area has adhered thereto the lid or lidding material.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in detail and arrangement of parts may be made without departing from the spirit and scope of this disclosure.

I claim:

1. A resealable package particularly adapted for medical use comprising a tray formed of a first material, said tray having at least one cavity, said cavity being defined by a bottom wall and a peripheral wall, said peripheral wall being completely bounded by a peripheral flange, at least one article housed within said cavity, a lid closing said cavity, a first coating of pressure-sensitive adhesive covering substantially the entirety of said lid, a second coating of heat sealable material covering substantially the entirety of said first coating, said second coating being non-tacky and compatibly heat sealable to the material of said tray, a heat seal area bonding said second coating of said lid outboard of said peripheral wall to said peripheral flange, a non-heat sealed area inboard of said heat sealed area, the bond strength in the area of said heat seal between said peripheral flange and said second coating as well as between said first and second coatings being greater than the bond strength in the area of said heat seal between said first coating and lid whereby upon relatively opening said lid and tray said first coating delaminates from said lid in the area of said heat seal and is retained upon said peripheral flange for subsequent pressure resealing with said lid, and the bond strength in said non-heat sealed area between said lid and first coating and between said first and second coatings being greater than the tear strength of said first and second coatings whereby both said first and second coatings in said non-heat sealed area are retained by said lid upon said relative opening of said lid and tray.

2. The resealable package as defined in claim 1 wherein said second coating is pigmented whereby upon said relative opening of said lid and tray any desired exposure of said first coating to said cavity is immediately visually discernable.

3. A method of producing a resealable package particularly adapted for medical use comprising the steps of forming a tray from a first material having at least one cavity defined by a bottom wall and a peripheral wall with the latter being completely bounded by a peripheral flange, housing an article or material within said cavity, providing a lid having a first coating of pressure-sensitive adhesive substantially entirely upon a first surface thereof and a second coating of heat sealable material substantially entirely upon said first coating with the second coating being non-tacky and compatibly heat sealable to the material of the tray, applying the lid upon the tray with the second coating against

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the peripheral flange, and heat seal bonding the second coating of the lid outboard of the peripheral wall to the peripheral flange such that the bond strength in the area of the heat seal between the peripheral flange and the second coating as well as between the first and second coatings is greater than the bond strength in the area of the heat seal between the first coating and lid whereby upon relatively opening the lid and tray the first coating delaminates from the lid in the area of the heat seal and is retained upon the peripheral flange for subsequent pressure of resealing with the lid, and the bond strength in an unsealed area inboard of the area of the heat seal between the lid and first coating and between the first and second coatings is greater than the tear strength of the first and second coatings whereby both the first and second coatings in the non-heat sealed area will be retained by the lid upon the relative opening of the lid and tray.

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4. The method as defined in claim 3 including the step of pigmenting said second coating prior to the heat sealing step.

5. The method as defined in claim 3 wherein said lid is supplied from a roll as a web having preapplied thereto said first and second coatings.

6. The method as defined in claim 3 wherein said lid is supplied from a roll as a web, and including the further step of applying said first and second coatings successively to said web prior to the lid applying step.

7. The method as defined in claim 4 wherein said lid is applied from a roll as a web having preapplied thereto said first and second coatings.

8. The method as defined in claim 4 wherein said lid is supplied from a roll as a web, and further including the step of applying said first and second coatings successively to said web prior to the lid applying step.

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