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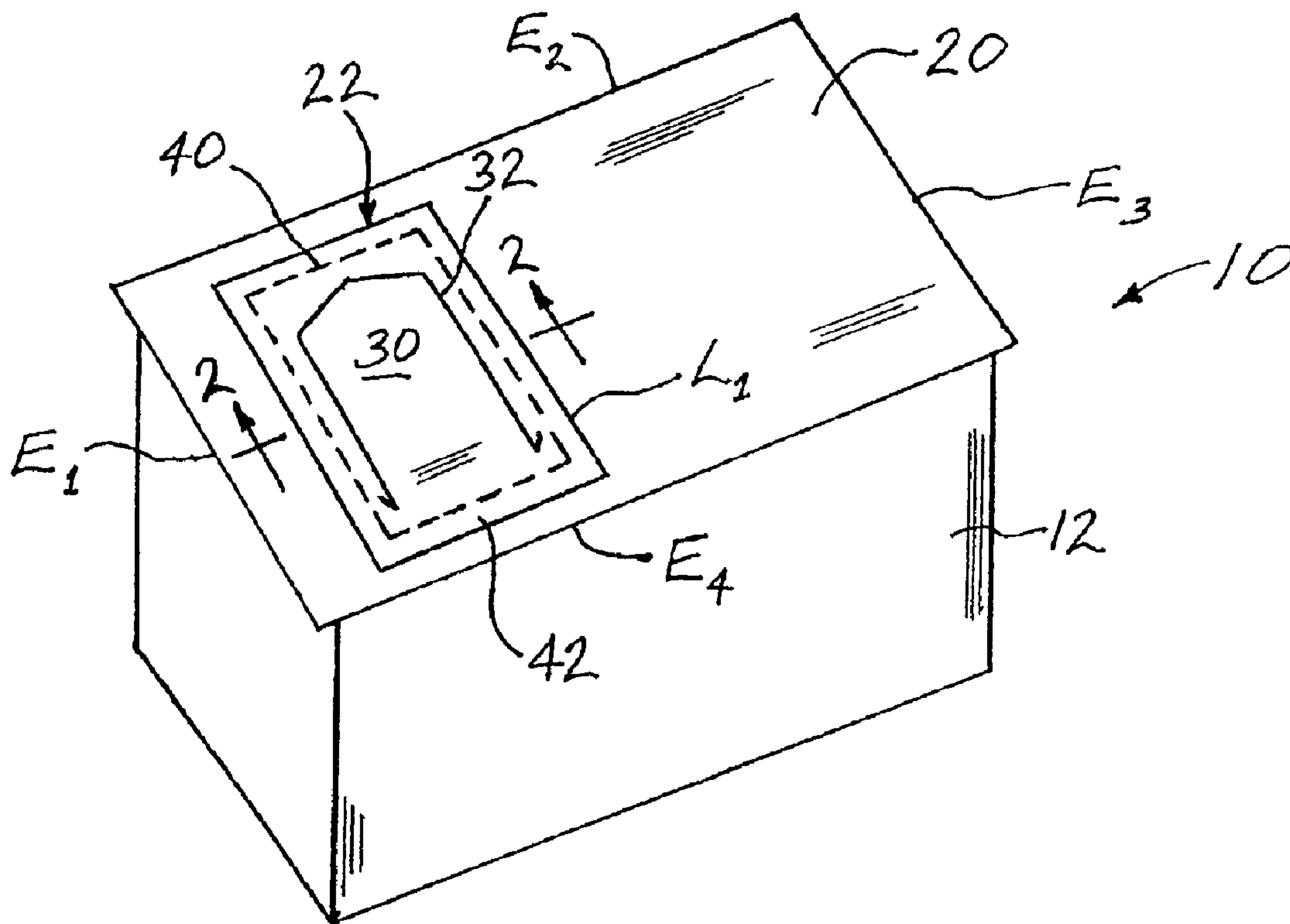
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(54) Title: PACKAGING MEMBRANE WITH BUILT-IN OPENING FEATURE



(57) Abrégé/Abstract:

A packaging membrane comprising a laminate of at least first and second layers, having a removable portion formed by substantially coincident first and second score lines, the first score line being formed in the first layer but not breaching the second layer, and the second score line being formed in the second layer but not breaching the first layer. Optionally, a third layer is disposed between the first and second layers, and the third layer is not breached by either score line. In the removable portion, an adhesive-free region is provided within which the first layer is not adhered to the underlying layer(s). An integral tab is defined in the first layer within the adhesive-free region, the tab being formed by a cut line in the first layer. The tab is located entirely inside the first and second score lines and does not project beyond any edge of the membrane.

ABSTRACT OF THE DISCLOSURE

A packaging membrane comprising a laminate of at least first and second layers, having a removable portion formed by substantially coincident first and second score lines, the first score line being formed in the first layer but not breaching the second layer, and the second score line being formed in the second layer but not breaching the first layer. Optionally, a third layer is disposed between the first and second layers, and the third layer is not breached by either score line. In the removable portion, an adhesive-free region is provided within which the first layer is not adhered to the underlying layer(s). An integral tab is defined in the first layer within the adhesive-free region, the tab being formed by a cut line in the first layer. The tab is located entirely inside the first and second score lines and does not project beyond any edge of the membrane.

PACKAGING MEMBRANE WITH BUILT-IN OPENING FEATURE

BACKGROUND OF THE INVENTION

The present disclosure relates generally to containers for products, and more particularly to containers formed at least in part by a flexible membrane material, and wherein the membrane defines an opening feature for creating an opening through the
5 membrane to gain access to the contents of the container.

Various types of such containers have been developed or proposed over the years, having a variety of opening features. Some such containers employ additional separately formed components such as labels or tabs affixed to the membrane to allow the consumer to grasp and pull the tab in order to sever the membrane along a preformed
10 line of weakness. The use of such separate components complicates the process of manufacturing the containers, as the components have to be procured, inventoried, fed into the manufacturing process, properly registered with the membranes to which they are attached, etc.

It is also known to provide a membrane with an integral tab that projects beyond
15 an edge of the membrane, or beyond an edge of a removable portion of the membrane, to facilitate grasping and pulling the membrane or removable portion thereof. Such projecting tabs can cause problems in automated handling of packages because they can get stuck on equipment and cause jams in the manufacturing line. In other cases, such a projecting integral tab is folded back onto the membrane so as not to project beyond the
20 edge of the membrane, but to keep the tab from unfolding it is frequently necessary to tack the tab down with a spot of adhesive or by other means. The tab folding and tacking operations further complicate the manufacturing process.

BRIEF SUMMARY OF THE DISCLOSURE

The present disclosure relates to a membrane for a container, in which the
25 membrane has an integral opening feature in the form of a removable portion that is at least partially removable from the remainder of the membrane. The membrane comprises a laminate of at least first and second layers adhesively laminated together. The removable portion is formed by substantially coincident first and second score lines, the first score line being formed in the first layer but not breaching the second layer, and

the second score line being formed in the second layer but not breaching the first layer. In one embodiment there is a third layer disposed between the first and second layers, and the third layer is not breached by either score line. The third layer can comprise an easily severable material such as aluminum foil or the like, which also serves as a barrier to the passage of moisture and gases through the membrane. The first and second layers can comprise polymer film materials and/or paper, or the like.

In the removable portion of the membrane, an adhesive-free region is provided within which the first layer is not adhered to the underlying layer(s). The adhesive-free region occupies less than the entire area of the removable portion. An integral tab is defined in the first layer within the adhesive-free region, the tab being formed by a cut line in the first layer. The tab is located entirely inside the bounds of the first and second score lines, and thus the tab does not project beyond any edge of the membrane. The tab can be lifted and pulled in order to sever the membrane along the score lines so as to at least partially remove the removable portion of the membrane and thereby gain access to the interior of the container through the resulting opening formed in the membrane. A coating of a release material can be disposed between a lower surface of the tab and an upper surface of the underlying layer to prevent the tab from sticking thereto, although in many cases no release material may be required.

In one embodiment, the score lines form a closed loop such that the removable portion is completely removable from the rest of the membrane.

In some embodiments, the membrane comprises a lid that is attached to a separately formed container to close an opening in the container.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

Having thus described the disclosure in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a perspective view of a container having a membrane lid in accordance with one embodiment of the invention;

FIG. 2 is a cross-sectional view through the membrane lid along line 2-2 in FIG. 1, with the layers of the membrane shown disproportionately thick for improved clarity of illustration;

FIG. 3 is a view similar to FIG. 2, showing another embodiment; and

FIG. 4 is a diagrammatic depiction of a process for making a membrane in accordance with one embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

The present invention now will be described more fully hereinafter with reference to the accompanying drawings in which some but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and
5 should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

A first embodiment of the invention is illustrated in FIGS. 1 and 2. FIG. 1 shows a container **10** comprising a container body **12** and a lid in the form of a membrane **20**
10 affixed to a surface of the container body covering an opening therein. The container body **12** can comprise any of various materials, constructions, and shapes. For example, the container body can be made of plastic, paper, metal, or combinations of two or more such materials. In the case of plastic, the container body can be made by molding (e.g., injection molding, blow molding, etc.), thermoforming, or the like. In the case of paper or
15 composites of paper with plastic and/or metal foil, the container body can be made by winding or wrapping layers of the materials about a suitable forming mandrel and adhering the layers together to form a tubular container body, a lower end of which can be closed with a separate closure (not shown). In the case of metal, the container body can be formed by drawing or die forming. The particular details of the container body and
20 its manufacture are not of particular importance to the invention.

The membrane **20** comprises a flexible laminate of at least two layers that are adhesively joined together. The layers are coextensive with each other, i.e., they have the same surface area and their respective edges are aligned such no edge of any layer extends beyond a corresponding edge of the other layer(s). The layers can comprise
25 various materials such as polymer film, metal foil, paper, or combinations thereof. Suitable examples of polymer films that can be employed include but are not limited to polyethylene, polypropylene, polyamide, polyester, and the like. The film can be oriented if desired. Metallized film (i.e., film having a vapor-deposited layer of non-oxidized metal such as aluminum) can be employed. Film coated with a ceramic layer such as silicon
30 oxide or aluminum oxide can be used.

The membrane **20** includes a removable portion **22** that can be at least partially removed from the remainder of the membrane in order to form an opening through the membrane into the interior of the container. The removable portion **22** is provided by scoring the layers of the membrane to create a line of weakness along which the
35 membrane can be severed.

More particularly, with reference to FIG. 2, in this embodiment the membrane 20 comprises a laminate of a first layer 24 and a second layer 26 laminated to the first layer by an adhesive layer 28. The removable portion 22 of the membrane is formed by scoring the first layer along a first score line L1. The first score line extends partially or
 5 entirely through the thickness of the first layer 24, but does not breach the second layer 26. The second layer is scored along a second score line L2 that extends partially or entirely through the thickness of the second layer 26 but does not breach the first layer 24. The score lines can be formed by mechanical means such as kiss cutting or by using a laser to score the layers. The first and second score lines L1 and L2 are substantially
 10 coincident in location with respect to directions in the plane of the laminate—that is, the first score line substantially directly overlies the second score line. When there is no intervening film or foil layer between the first and second layers as in the embodiment of FIG. 2, if desired the score lines can be slightly offset relative to each other in order to reduce the likelihood of premature inadvertent separation of the laminate along the score
 15 lines.

In order to facilitate grasping the removable portion 22 to sever it from the rest of the membrane, the membrane includes an integral tab 30 formed in the first layer 24. The tab is formed by a cut line 32 that extends entirely through the thickness of the first layer. The cut line 32 can have various shapes, a generally U-shaped cut line being
 20 shown in FIG. 1, so as to define a tab that has a free end at the closed end of the “U” and a fixed end at the open end of the “U”.

In order to allow the tab 30 to be lifted from the layer underlying it, the membrane 20 includes an adhesive-free region 40 that is within the bounds of the score lines L1,2. The adhesive layer 28 is absent in the adhesive-free region, and thus the layers 24, 26
 25 are not affixed to each other in this region. In the embodiment illustrated in FIGS. 1 and 2, the adhesive-free region 40 is spaced on all sides from the score lines defining the removable portion 22 of the membrane. Accordingly, between the edges of the adhesive-free region 40 and the edges of the removable portion 22 there is a marginal region 42 in which the layers 24, 26 are adhesively joined to each other, and this marginal region
 30 completely surrounds the adhesive-free region. The ends of the cut line 32 for the tab can lie in the adhesive-free region 40 as shown in FIG. 1, or alternatively can lie in the marginal region 42 where there is adhesive.

If desired or needed, a coating of a release material can be applied to the underside of the tab 30 or to the surface of the layer directly underlying the tab to prevent
 35 the tab from sticking to the underlying surface.

The membrane 20 in the embodiment of FIG. 1 is rectangular in shape, although other shapes can be used. The rectangular membrane 20 includes a first edge E1, a

second edge E2 that is perpendicular to the first edge, a third edge E3 that is perpendicular to the second edge and parallel to the first edge, and a fourth edge E4 that is perpendicular to the first and third edges and parallel to the second edge. In the illustrated embodiment, the removable portion 22 of the membrane is positioned closer to the first edge E1 than to the third edge E3, although other positions can be used. The pulling direction along which the tab 30 is pulled extends from the fourth edge E4 toward the second edge E2, and thus is generally parallel to the first and third edges and perpendicular to the second and fourth edges.

To open the container shown in FIG. 1, the user lifts the tab 30 and grasps it, and pulls the tab generally upwardly and in the pulling direction from the fourth edge E4 toward the second edge E2, which causes the membrane to sever beginning at the edge of the removable portion 22 adjacent the fixed end of the tab and proceeding around the score lines L1,2 toward the second edge E2. In the illustrated embodiment, the score lines form a closed loop such that the removable portion 22 comes entirely free of the rest of the membrane. Alternatively, the score lines could be configured to leave a portion of the removable portion still attached to the membrane, thus forming a flap. In any event, an opening is thereby created through the membrane into the container.

A second embodiment of the invention is depicted in FIG. 3. The membrane 120 of this embodiment is a three-layer laminate, whereas the membrane 20 of the previous embodiment is a two-layer laminate (the adhesive layer(s) not being counted in both cases). The membrane 120 includes a first layer 124, a second layer 126, and a third layer 129. The third layer is disposed between the first and second layers. The first and second layers 124, 126 each comprise a polymer film. The third layer 129 comprises a metal foil such as aluminum foil. An adhesive layer 125 is disposed between the first layer 124 and the third layer 129 for joining these layers together, and an adhesive layer 127 is disposed between the second layer 126 and the third layer 129 for joining these layers together.

In one embodiment, the first layer 124 can comprise a polyester film such as polyethylene terephthalate. The second layer 126 can comprise an oriented polypropylene (OPP) film. The OPP film is heat-sealable to a compatible heat seal material disposed on the container. Other heat-sealable films can also be used instead of OPP.

The first layer 124 and second layer 126 include respective first and second score lines L1 and L2 as in the previous embodiment for defining a removable portion 122 of the membrane. The first score line extends through the first layer 124 but does not breach the third layer 129. The second score line likewise extends through the second layer 126 but does not breach the third layer 129. A tab 130 is defined in the first layer

124 by a cut line 132. An adhesive-free region 140 is defined within the removable portion 122, in which the first layer 124 is not adhered to the third layer 129, and the tab 130 is located in the adhesive-free region.

5 The membrane 120 operates in a manner similar to the membrane 20 previously described. Pulling on the tab 130 causes the membrane to sever along the score lines. Although the foil layer 129 is not scored, the foil will easily sever when the plastic layers 124, 126 begin to sever. However, prior to being severed, the foil layer provides a good barrier against moisture and gases.

10 The membranes 20, 120 can be manufactured using a continuous web process in which continuous webs of the various layers are advanced through a series of stations at which various operations are performed on the webs and the webs are laminated together. For example, a manufacturing process for making the laminate 120 is depicted in FIG. 4. A continuous web of the second layer 126 is advanced from a supply roll thereof to an adhesive applicator 150 that applies a coating of the adhesive 127 to the
15 second layer. The web is then conveyed to a lamination station 160 where the second layer 126 is laminated to the third foil layer 129, which is advanced to the lamination station from its own supply roll, thus resulting in a laminate 170 of these two layers.

20 Either concurrently or non-concurrently with the formation of the laminate 170, a continuous web of the first layer 124 is advanced from a supply roll thereof to a tab-forming station at which a cutting mechanism 180 forms the cut lines defining the tabs in the first layer. The tab cut lines are formed in the laminate at fixed distance intervals along the length of the web such that a series of interconnected membrane lids can be formed from the continuous web. In the illustrated embodiment, the cutting mechanism 180 comprises a laser, but other cutting mechanisms can be used instead. Next, the first
25 layer is advanced to an adhesive applicator 190 that pattern-applies the adhesive 125 onto the first layer such that adhesive-free regions are left. The adhesive-free regions are in registration with the tab cut lines such that the tabs are located in the adhesive-free regions. The adhesive applicator 190 can comprise any suitable device capable of pattern-applying the adhesive, such as a gravure roll or the like. The first layer with the
30 adhesive thereon is then advanced to a lamination station 200 where the first layer is laminated with the laminate 170 comprising the second and third layers 126, 129.

Finally, the resulting laminate is advanced to a second scoring station 210 at which the second score lines are formed in the second layer 126 in registration with the tab cut lines and adhesive-free areas, and a first scoring station 220 at which the first
35 score lines are formed in the first layer 124 in registration with the second score lines. The scoring stations 210, 220 are illustrated as comprising lasers, but other scoring mechanisms can be used instead. The scoring stations 210, 220 are shown as being

separated by a distance in the web travel direction, but alternatively they can be located at the same place along the travel direction.

5 The order of operations shown in FIG. 4 can be altered. For example, the tab-forming station 180 can be located downstream of the lamination station 200, and one or both of the scoring stations 210, 220 can be located upstream of the tab-forming station. It is also possible for the tab-forming station 180 and the first scoring station 220 to be the same station such that the tab cut line and the first score line are formed in the first layer 124 substantially simultaneously. Other changes also can be made to the process.

10 Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed
15 herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

WHAT IS CLAIMED IS:

1. A membrane for forming at least a portion of a container for products, comprising:
a laminate comprising at least first and second layers laminated together by an adhesive, the first and second layers being coextensive;
5 a first score line formed in the first layer, the second layer being unbreached by the first score line;
a second score line formed in the second layer and located substantially coincident with the first score line, the first layer being unbreached by the second score line, the first and second score lines together delineating a removable portion of the
10 laminate that is at least partially removable from a remainder of the laminate for creating an opening through the membrane;
an adhesive-free region located in the removable portion of the laminate and occupying less than an entire area thereof, the first and second layers being unadhered to each other in the adhesive-free region; and
15 an integral tab formed in the first layer within the adhesive-free region, the tab being formed by a cut line extending through a thickness of the first layer, the tab being located entirely inside of the first and second score lines.
2. The membrane of claim 1, wherein the first and second score lines form a closed
20 loop such that the removable portion is completely removable from the remainder of the laminate.
3. The membrane of claim 2, wherein the membrane is rectangular having a first edge, a second edge perpendicular to the first edge, a third edge perpendicular to the second edge and parallel to the first edge, and a fourth edge perpendicular to the first and third edges and parallel to the second edge, and wherein the removable portion of the
25 laminate is spaced relatively close to the first edge and relatively far from the third edge.
4. The membrane of claim 3, wherein the second and fourth edges are longer than the first and third edges.
5. The membrane of claim 4, wherein the tab is oriented such that a pulling direction, in which the tab is pulled to detach the removable portion from the remainder of the
30 membrane, extends generally perpendicular to the second and fourth edges.

6. The membrane of claim 1, wherein a coating of a release material is disposed between a lower surface of the tab and an upper surface of the second layer underlying the tab to prevent the tab from sticking to the second layer.
7. A membrane for forming at least a portion of a container for products, comprising:
 5 a laminate comprising first, second, and third layers laminated together by adhesive, the layers being coextensive, the third layer disposed between the first and second layers;
 a first score line formed in the first layer, the second and third layers being unbreached by the first score line;
 10 a second score line formed in the second layer and located substantially coincident with the first score line, the first and third layers being unbreached by the second score line, the first and second score lines together delineating a removable portion of the laminate that is at least partially removable from a remainder of the laminate for creating an opening through the membrane;
 15 an adhesive-free region located in the removable portion of the laminate and occupying less than an entire area of the removable portion, the first and third layers being unadhered to each other in the adhesive-free region; and
 an integral tab formed in the first layer within the adhesive-free region.
8. The membrane of claim 7, wherein the first and second layers comprise polymer layers
 20 and the third layer comprises a metal foil layer.
9. The membrane of claim 8, wherein the first and second score lines form a closed loop such that the removable portion is completely removable from the remainder of the laminate.
10. The membrane of claim 8, wherein the membrane is rectangular having a first
 25 edge, a second edge perpendicular to the first edge, a third edge perpendicular to the second edge and parallel to the first edge, and a fourth edge perpendicular to the first and third edges and parallel to the second edge, and wherein the removable portion of the laminate is spaced relatively close to the first edge and relatively far from the third edge.
11. The membrane of claim 10, wherein the second and fourth edges are longer than
 30 the first and third edges.
12. The membrane of claim 11, wherein the tab is oriented such that a pulling direction, in which the tab is pulled to detach the removable portion from the remainder of the membrane, extends generally perpendicular to the second and fourth edges.

13. The membrane of claim 8, wherein a coating of a release material is disposed between a lower surface of the tab and an upper surface of the second layer underlying the tab to prevent the tab from sticking to the second layer.
14. The membrane of claim 8, wherein the tab is located entirely inside of the first and
5 second score lines.
15. The membrane of claim 1, wherein the membrane comprises a lid, and further comprising a separately formed container defining an opening, the lid being affixed to the container to cover the opening.
16. The membrane of claim 8, wherein the membrane comprises a lid, and further
10 comprising a separately formed container defining an opening, the lid being affixed to the container to cover the opening.

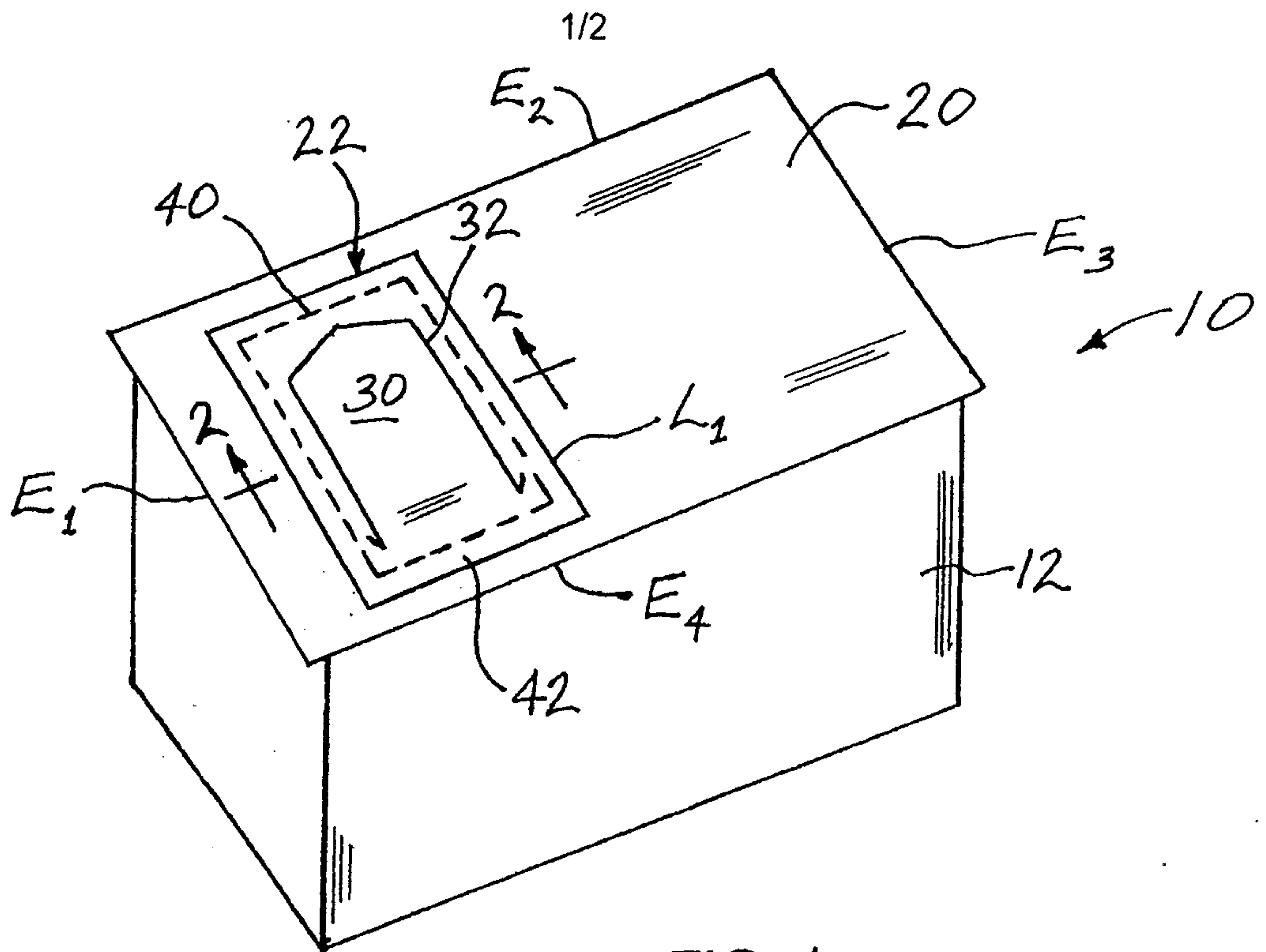


FIG. 1

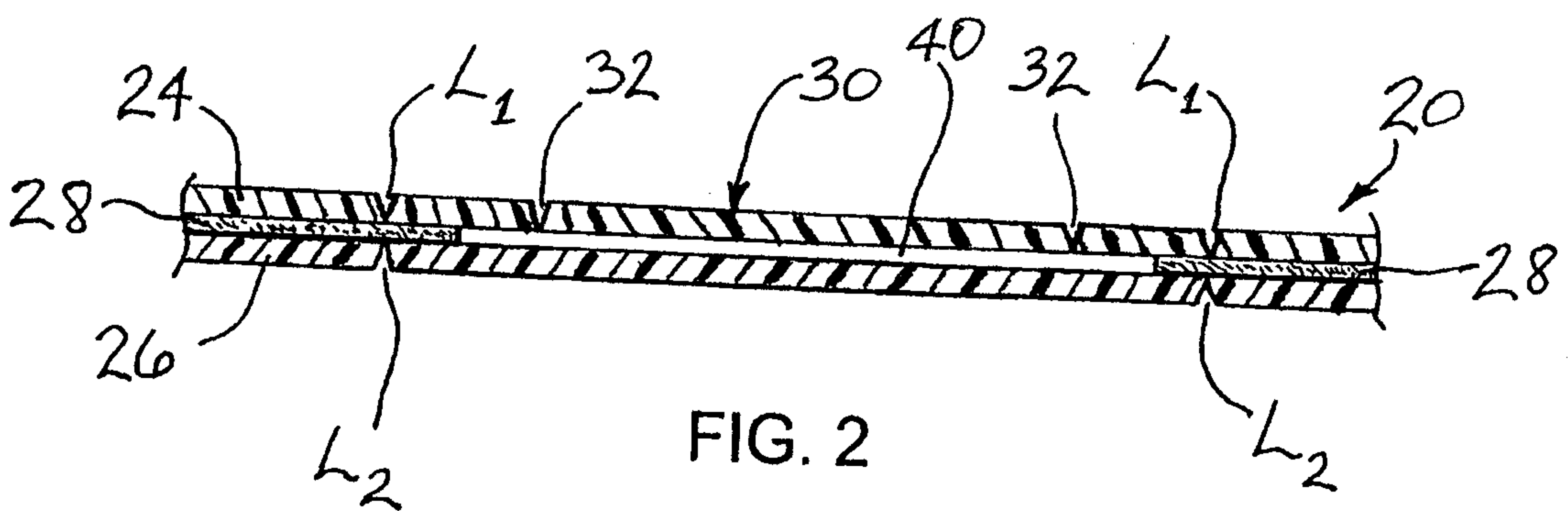


FIG. 2

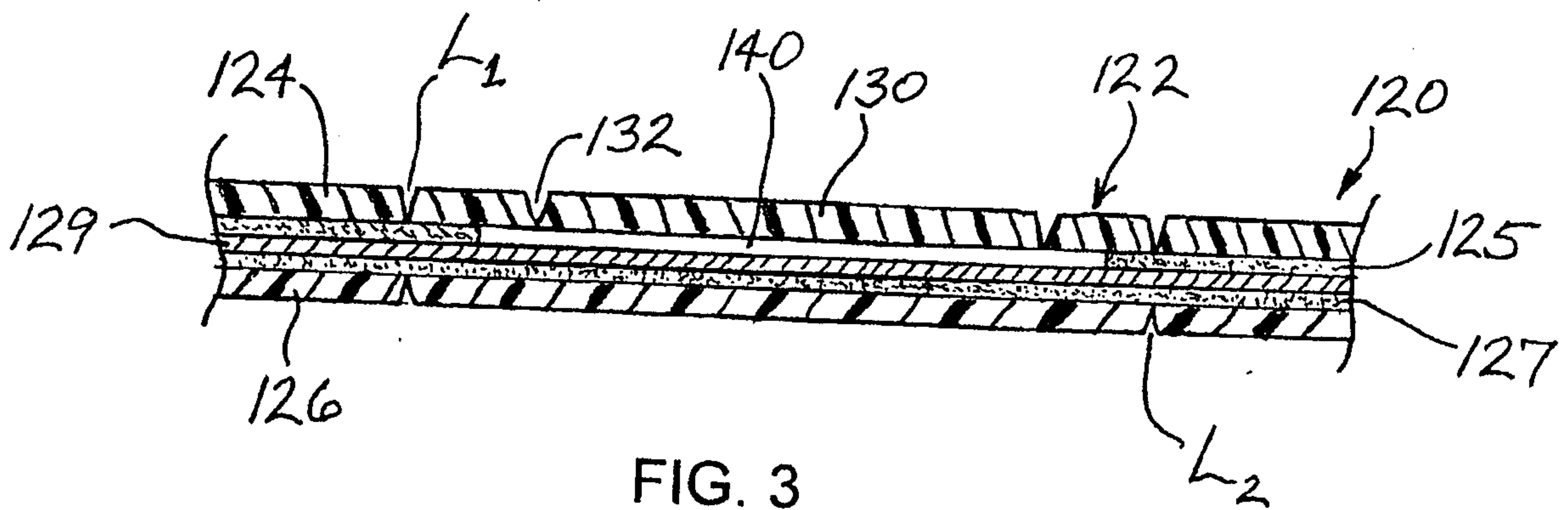


FIG. 3

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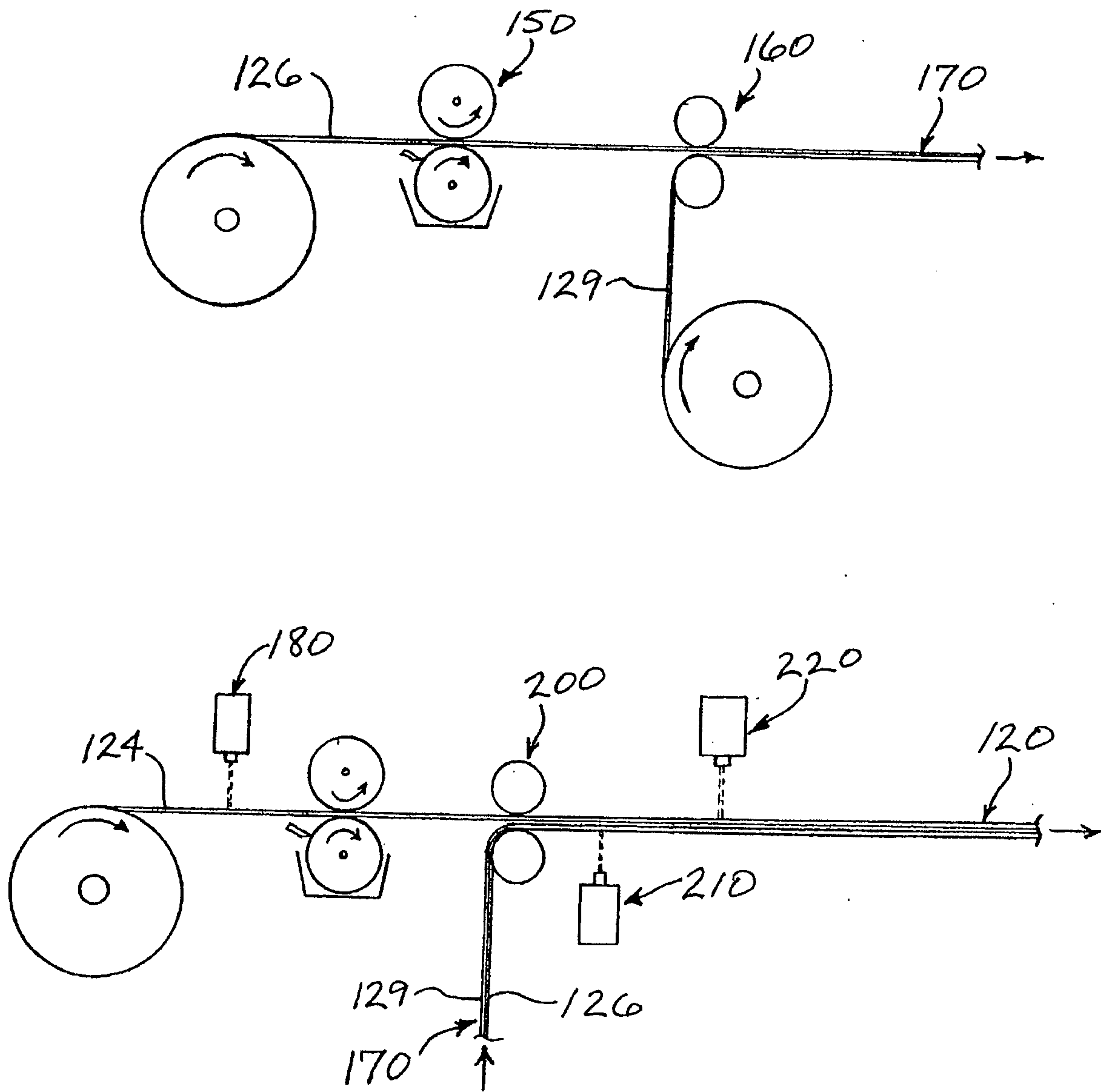


FIG. 4

