

[54] **FOIL FOR CLOSING EASILY OPENABLE PACKAGES**

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[58] Field of Search..... **229/51 D, 51 ST, 229/51 WB, 51 TS, 51 TC, 7 R; 220/53, 51; 215/46 A; 222/541**

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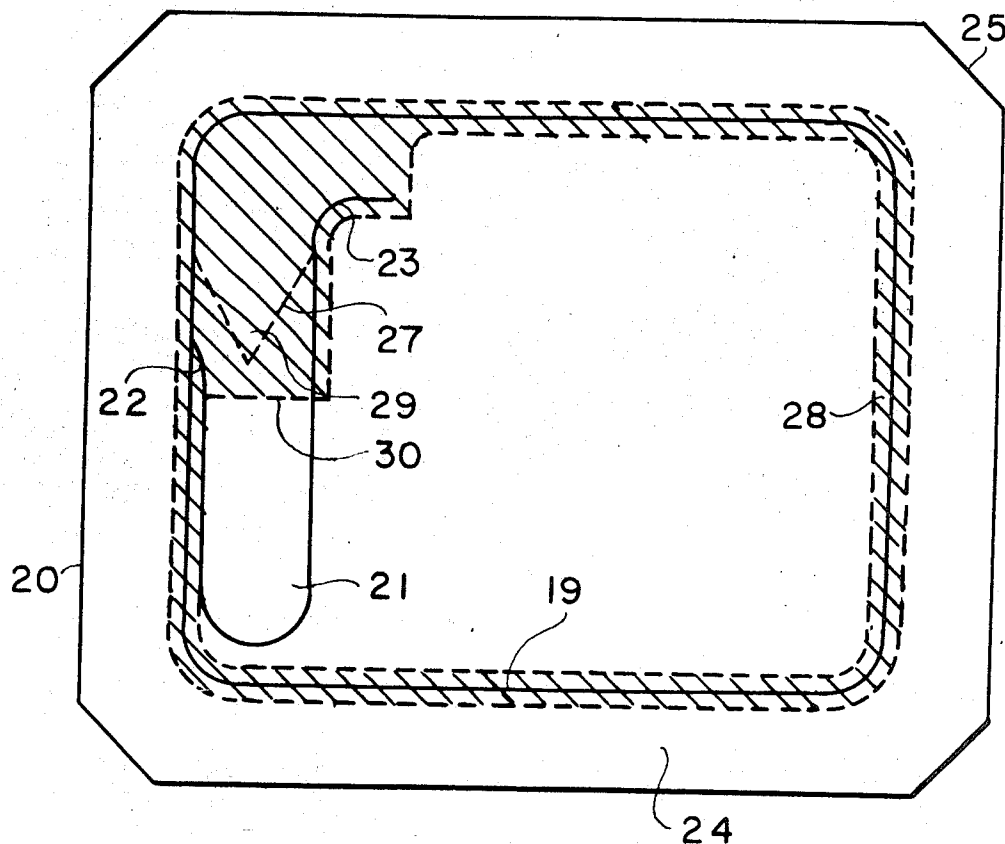
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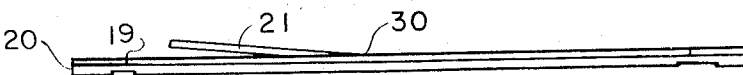
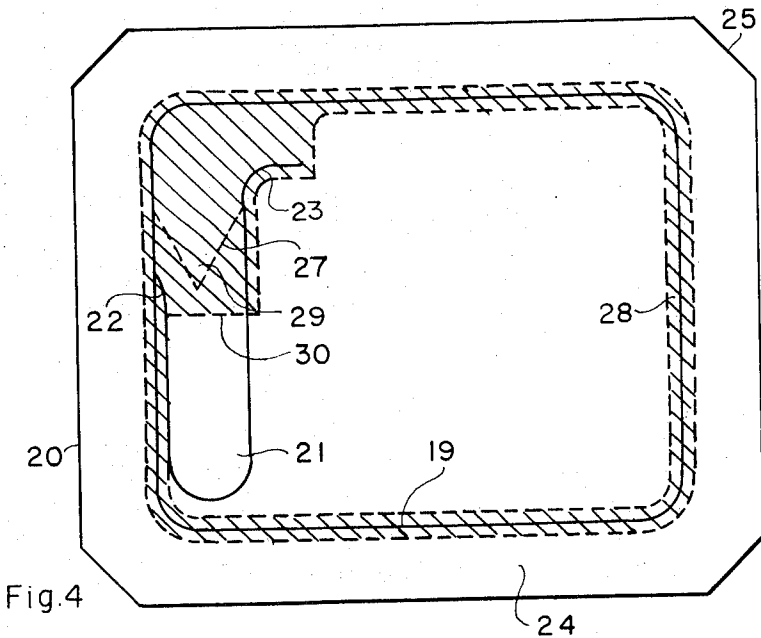
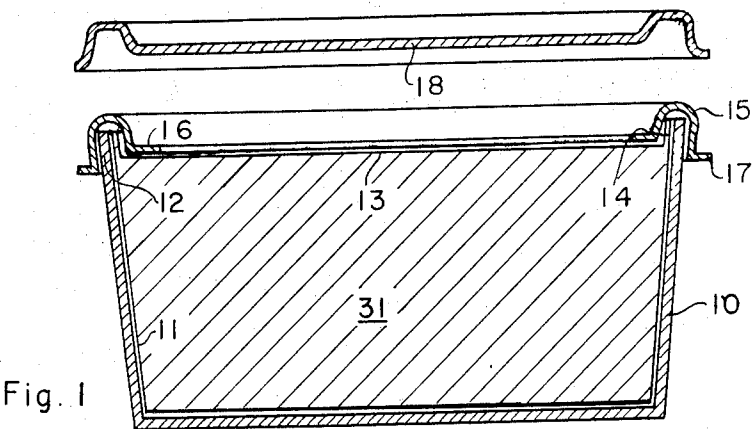
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[57] **ABSTRACT**

A closing foil for easily openable packages of the type wherein the foil is to be laid over the upwardly open mouth of the package and adhered to the mouth of the package. The foil comprises two layers evenly contacting each other, the inner layer being provided with an arrow point-like tear line at the beginning of the tearing area, whereas the exterior layer is provided with tear lines along the continuation of the tearing area, as well as with a tongue for initiating the tearing. One end of the arrow point-like cut ends at a cut in the exterior layer which extends about the exterior layer inwardly of the periphery of exterior layer. The two layers are adhered to each other such that in each of the layers the cuts or tear lines are tightly covered by uncut portions of the other layer, and are adhered along the tear lines. The part of the exterior layer forming the tongue is not connected to the interior layer.

6 Claims, 5 Drawing Figures





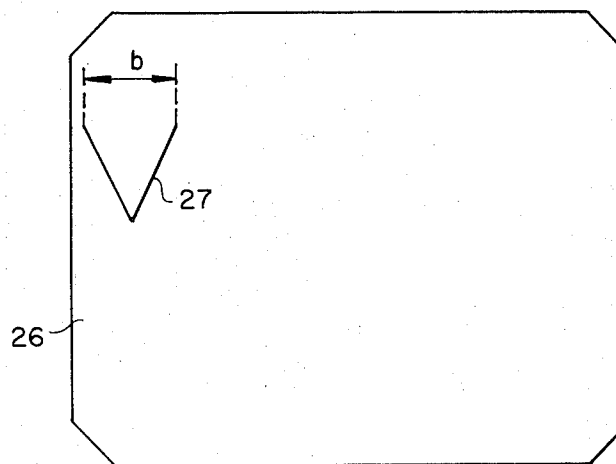
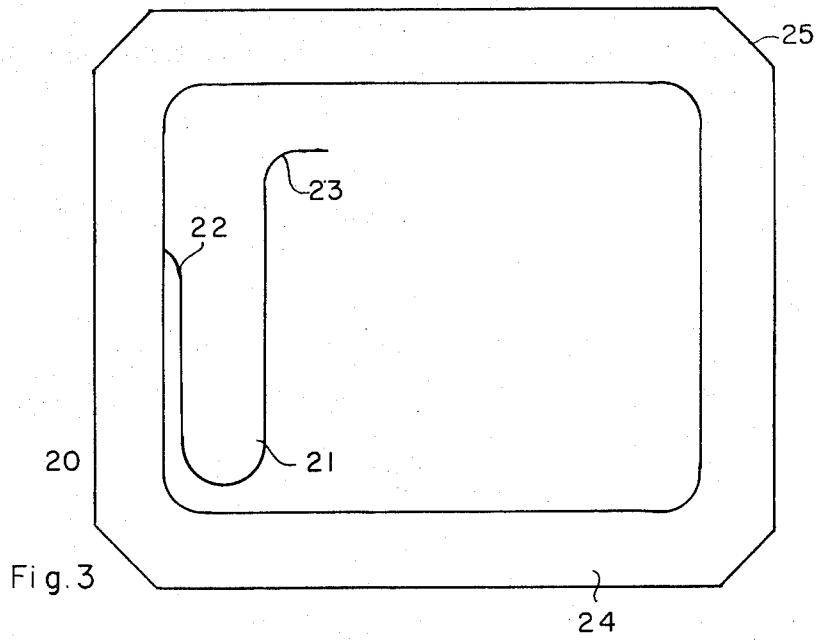


Fig. 2

FOIL FOR CLOSING EASILY OPENABLE PACKAGES

For closing cupformed packages one uses to a substantial extent a foil, which is laid over the upwardly open mouth of the package and which is welded, wax soldered or in any other suitable way attached at its edge to the upper edge of the mouth of the package. The attachment can take place by sealing the upper edge proper of the package to the foil and/or by sealing an edge part of the interior and/or exterior side of the package to the foil. In some cases the edge of the package and the foil are provided with a protection border. Such a foil, used for closing a package, must be easily operable. Hitherto one opened the foil by, for instance, cutting with a knife or similar pointed or sharp object through the foil along the interior side of the package, but such an object is not always close at hand and difficulties may arise with such cutting, viz. if the tool should run in an inclined direction.

The present invention is based upon the idea that the foil should be of such a character, that one may easily separate the foil by pulling on a tearing tongue. Simultaneously the foil must be of such a character, that it is completely tight, and thereby preferably also liquid tight or vacuum tight, respectively, because packages of this type should be possible to use for packing material under vacuum.

The problem thus existing is solved according to the present invention by the foil being composed by two layers evenly contacting each other, the layer turned onto the interior of the package being provided with an arrow point-like cut at the beginning of the tear area, whereas the layer turned onto the exterior of the package is provided with a cut or cuts along the continuation of the tear, and the two layers are tightly attached to each other in such a way, that the cuts existing in each of said layers is tightly covered by parts of the other layer without any such cuts.

The invention will be further described below in connection with a form of execution shown in the attached drawings, but it is understood, that the invention is not limited to this specific form of execution but that all different kinds of modifications may occur within the frame of the invention.

In the drawings, FIG. 1 shows a section through a package which is closable with a foil according to the invention, whereas FIG. 2 shows the interior layer of the foil and FIG. 3 shows the upper layer of the foil. FIG. 4 shows the foil after the two layers have been connected, emphasizing the places, where tight connection is provided between the layers, and FIG. 5 shows the foil seen from the side, however with a thickness of the different layers which is greatly exaggerated.

An outer package 10, FIG. 1, which may for instance be made of cardboard, is lined on its inner side by a vacuum tight liner 11 of some suitable plastic, which is attached to the interior side of the outer package at least at its upper edge part 12. The sealing foil, which may be made in accordance with the present invention, comprises a flat part 13 and parts 14 folded upwardly against the uppermost edge parts of the liner, the foil being welded to said parts, so that a vacuum tight connection is created. As the edge of the package may be sensitive and may easily be damaged, so that the tightness is destroyed, a border 15 is attached over this edge. The border should suitably, in order of giving a better stability, be provided with an inwardly as well as

outwardly directed flange 16 and 17, respectively. A package of this type is intended to be opened by removing the flat part 13 of the sealing foil, which was regarded earlier to be possible by cutting the foil by means of a knife along the guide line formed by the inner edge of the border 16. A re-closing lid 18 is mountable over the border.

For illustrative purpose the thicknesses of the different parts of the package in FIG. 1 have been shown exaggerated, and to some extent such parts have been shown at smaller distance from each other, said parts in reality being positioned tightly against each other. The package of this type is known, and therefore does not form part of the present invention.

For the reasons mentioned above, however, it is desirable to make the foil possible to tear open. Thereby the difficulty has been to form the cuts or weakened areas for said tearing without the foil simultaneously losing sealing tightness. As a matter of fact, it is usual in packages of the above indicated type to pack products under "vacuum," which means in practice that one closes the package in a chamber with a strong sub-pressure, and with a remaining pressure in the order of magnitude of about 4 millibar, whereafter the package is brought out in the surrounding atmosphere, whereby it may happen, that a small compression occurs, whereby the remaining pressure of 4 millibar or what this remaining pressure may have been initially, may rise a little in the package. In any case, there is an essential pressure from the outer atmosphere against the foil in such vacuum packed packages, as well as against the material enclosed in the package, and this pressure thereby, as a rule, may be assumed to be in the order of magnitude close below 1 atmosphere. There is an essential difficulty to provide an effective sealing against such a pressure.

It may be mentioned, that the above indicated remaining pressure in the order of magnitude of 4 millibar was derived by the fact, that coffee, which is a usual material to be packed in packages of the described kind, contains a lot of aromatic constituents, which oxidize under the influence of the oxygen of the air, but the solution pressure of air in the constituents concerned, which are formed by aromatic oils, is in the order of magnitude of 4 millibar partial pressure of the oxygen, corresponding to 20 millibar air pressure. With five fold security one will then obtain the remaining pressure of 4 millibar as the highest remaining pressure, which may exist in the package after its evacuation.

The above mentioned problem is solved by the present invention.

FIG. 3 shows the upper or exterior layer in a foil of two layers, as a chosen form of execution of the present invention. This layer is punched or cut through or at least strongly perforated or weakened along a line 19, which preferably runs all around the layer at such a distance from its edge 20, that the line 19 will coincide with or be situated only slightly inside of the inner edge of the flange 16 on the border 15. A grip tongue for tearing up the foil is cut out at 21, and this grip tongue at its one end continues into the punched cutting line 19, e.g. as shown at 22, whereas the grip tongue on its other side approaches a cut 23, which has for its purpose to direct the tearing line at the first corner of the foil during tearing in a way which will be evident from the following. This layer of the foil has an extension beyond the mouth of package 10, such that outside of the

cutting line 19 there is an edge part 20, which covers the inwardly directed flange 16 on the border 15 and also is sufficient for being folded up in the form of the liner edge 14 to be welded to the upper edge part of the liner 11. For making folding in the corners easier while attaining the required sealing tightness without any surplus of foil material being created, this layer of the foil is cut in inclined direction in the corners, as shown at 25.

FIG. 2 shows the interior or lower layer part of the foil. For reasons which will also be evident from the following, this foil is of somewhat less extent than the layer shown in FIG. 3. Its extent, however, must be such that the layer 26 according to FIG. 2 extends in all places outside of the tear line 19, when the two layers are combined in centered position. In the layer 26 there is a cut line 27, which preferably has the pointed angular form, indicated in the drawing figure, but also other forms may be used, if they are of such a kind that after combining the layers in the way, shown below in connection with FIGS. 4 and 5, the tearing up of the tearing tongue 21 will cause a strip of the width b to be formed and to be released from the foil.

Before the closing of the package 10 with the two above described layers according to FIG. 2 and 3, these are combined in the way, shown in FIG. 4. This takes place by welding, and for this reason it is required that the surfaces, which are turned in the different layers onto each other, either comprise or are covered with a weldable plastic. The parts shadowed in FIG. 4 thereby are welded together within the range of the two layers. It is now immediately seen, that the cut 19 in the upper or outer layer is sealed by the narrower part 28 of the welding joint whereas the cut 27 in the interior or lower layer is sealed by the broader part 29 of the welding joint. The tearing tongue 21 is free, as also seen from FIG. 5, but at its base 30 it is connected to the upper layer, from which it is cut out by means of an incompletely surrounding cutter line, and also due to the welding within the part 27 with the lower layer of the foil. In total therefore either one of the two layers contains the required tearing devices in the form of cutter lines 19 or 27, respectively, but the cutter line in each layer of the foil is covered by a non-cut-through piece of the other layer in the foil, and on both sides of the cutter line the two layers are welded together, so that they will in common be completely tight.

When closing the package one may for instance proceed in such a way, that the foil prepared in accordance with FIG. 4 and 5, is pressed downwardly onto the compressed, packed material 31 by means of a punch or a mandrel of such a form, that the free edges 24 of the foil are folded upwardly against the inner side of the liner 11, see FIG. 1, to which the liner is attached by welding. When introducing the welding tool it is suitable to take care that a smaller part remains unwelded in order of serving as outlet opening for the air at the evacuation. The package, in this state, is placed in a vacuum chamber where evacuation takes place in the above indicated way, and when vacuum still remains, the remaining opening is welded.

When distributing such a package, the foil may easily be damaged, but this is prevented by putting on a reclosing lid 18, FIG. 1. When opening the package one has therefore first to remove the re-closing lid 18 and thereafter to catch the tearing tongue 21, which is drawn straight upwardly. The cutter line about the tear-

ing tongue initially serves as a tearing device, and at the tearing therefore the corresponding part of the interior layer follows, as soon as one has during the tearing, got to the point of the cut 27, whereafter, by means of the form of this cut, a strip of the width b , see FIG. 2, will in the continuation be torn away, comprising both of the layers of the foil. As guide means for this tearing thereby the cutting or marking 19 running all around the circumference serves, and in any case initially also the marking 23. It has proved, that if a suitable material is chosen for the two layers in the foil, then this strip will be of at least approximately even width during all of the tearing step, until one has torn away all of the foil inside of the line 19. The foil can now be lifted up, and the package is opened. It may be re-closed by putting on the reclosing lid 18.

Some difficulty is concerned with the choice of correct material for the two layers. Distinct demands must be put on these materials. Firstly the layers should be vacuum tight, which means that they shall not only be air tight or gas tight, when there is the same pressure on each side of them, but they should also be tight in this respect, when there is a difference in pressure of up to 1 atmosphere. Secondly the layers should be weldable to each other at a temperature, which is not so high, that the packed material is damaged by dry distillation or any similar happening. Thirdly, the material in the foil should be weak and soft, so that it may easily be re-sized into good connection to the uppermost edge of the inner side of the liner, with which it has to be connected vacuum tightly by welding. Further as a fourth condition the material shall have a tendency when being torn to release a rather evenly broad strip, so that the two edges of the material immediately after the end of the cut 23 will not flow together, and the tearing of the continuation thereof be made impossible. Finally, it is often of importance, that one can provide the upper side of the foil with printing for indicating the kind of product, which is packed.

In certain cases the product may further be of such a kind, that it may be damaged when subjected to light, and in such cases consequently the foil should be light tight.

A choice of material, satisfying all of these demands is the following one:

The basic material in each of the two layers is an aluminium foil, which suitably may have a thickness of 0.12 to 0.15 mm. This material is light tight and vacuum tight, and it has the above mentioned property preferably when torn to follow a well guided path. Aluminium foil, however, cannot be welded in other ways than by point welding by means of high frequency arc welding. Point welding will give leakages between the separate welding points, and even if one could solve the problem of providing a tight welding mutually between the two layers before they are applied as a cover over a package, it will nevertheless be impossible to weld the aluminium foil directly to the liner in the package without the temperature being so high, that the packed material will be subjected to detrimental changes. For that reason, one has in advance by a rolling procedure covered the aluminium foil with a thin layer of a weldable plastic. The most suitable plastic for this purpose probably is poly-ethylene, because this plastic is well rollable, and also at rolling it will well attach to the aluminium foil. Further it is desirous with respect to the different welding temperatures of different plastics,

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that one uses the same material for covering the aluminium foil, contained in the foil, and as a liner in the package. The liner suitably is applied by deep drawing, and for that reason the plastic used should also be deep drawable. Poly-ethylene also satisfies this demand.

The upper or exterior layer of the foil therefore is made with the aluminium foil on its upper side and the poly-ethylene on its lower side, whereas the interior or lower layer is made in the opposite way, which means that the aluminium foil is placed on its lower side and the poly-ethylene on its upper side. The two poly-ethylene covers therefore will be in contact with each other, and they are weldable without any difficulty at a temperature, which does not destroy the packed material. It is true, that the two layers are not welded together at a time, when the packed material is in heat transfer proximity of the weld joint, but the outer or upper layer will nevertheless be welded to the liner in the package along the extending edge part 24, and thereby the temperature must not be so high, that the material in the interior of the package is damaged.

With the arrangement now described the upper or outer layer will on its upper side comprise aluminium. Aluminium, however, is to a rather small extent receptive for writing or printing, and as it is desirable as a rule on just this upper side to attach a statement about the contents of the package, the name of the manufacturer or the like, the aluminium foil in the upper layer should further on its upper side be covered by a skin of a material, which is receptive to writing or print, but which also may easily be rolled together with aluminium, preferably in the same rolling procedure during which the foil was provided on its lower side with a layer of poly-ethylene. As a layer for the last mentioned purpose a poly-ester has proved to be especially suitable.

The cover of poly-ethylene as well as the cover of poly-ester, of course, should be extremely thin and preferably essentially less than the aluminium foil.

I claim:

1. A closing foil for forming an openable closure over the mouth of a package of the type wherein a foil is laid over the open mouth of the package and adhered to the package, said closing foil comprising two contacting layers, the interior layer being formed with a weakened tear line of arrow-point-like configuration at the beginning of the tear area, the exterior layer being formed with weakened tear lines extending into said tear area and at least one continuing weakened tear line extending around but spaced inwardly from the periphery of the exterior layer to define one edge of the torn material to be removed, said exterior layer being also

formed with a graspable tongue for initiating the tearing, said tongue being defined by cut lines which merge with said weakened lines in the exterior layer, at least one end of said narrow-point-like tear line in the interior layer ending at the continuing weakened line in the exterior layer, the two layers being sealingly adhered to each other such that weakened tear lines in each of said layers are sealingly covered by and adhered to non-weakened parts of the other layer, the part of the exterior layer forming said tongue not being connected to the interior layer.

2. A closing foil as claimed in claim 1 wherein both ends of the arrow-point-like tear lines in the interior layer end at weakened tear lines in the exterior layer.

3. A closing foil as claimed in claim 1 wherein all weakened tear lines are cut through the layer in which they are formed.

4. A closing foil as claimed in Claim 1 wherein each layer comprises metal foil and a coating of weldable plastic, the plastic coatings of the two metal foils facing each other.

5. A closing foil as claimed in claim 1 wherein the exterior layer is of greater surface extent than the interior layer such that a border of the exterior layer extends beyond and around the periphery of the interior layer for attachment of the foil to the edge of the mouth of the package.

6. A closing foil as claimed in claim 5 wherein said continuing weakened tear line in the exterior layer extends in a closed configuration located inwardly from the periphery of the exterior layer so as to form a completely removable portion, and wherein said interior layer is of such size and configuration as to extend slightly beyond said continuing weakened line but short of the outer periphery of the exterior layer, and wherein said tongue is formed by a cut portion in the exterior layer, the end of one edge of the tongue merging with said continuing weakened line and the other edge of the tongue terminating in a weakened line spaced inwardly from but generally parallel to said continuing weakened line so as to define therebetween the width of at least the beginning of a strip to be torn from both layers, the arrow-point-like weakened tear line of the interior layer ending at one of its ends at said continuing weakened line and at its other end at a weakened line merging with the other edge of said tongue, the two layers being tightly adhered along a narrow path extending slightly to each side of said continuing weakened line and in a broader area encompassing said arrow-point-like weakened line, and the merger areas of the edges of said tongue.

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