



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**02.11.2006 Bulletin 2006/44**

(51) Int Cl.:  
**B65D 43/02 (2006.01)**

(21) Application number: **05075992.7**

(22) Date of filing: **26.04.2005**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR LV MK YU**

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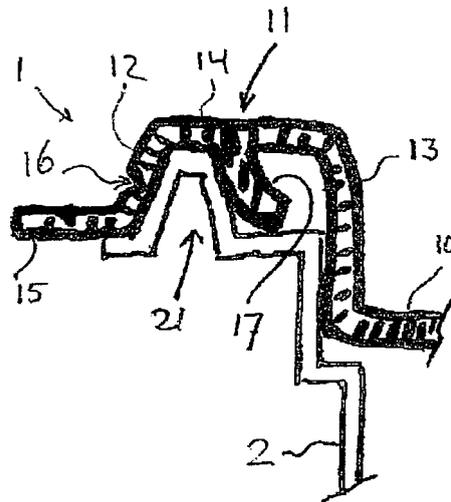
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(54) **Lid for containers**

(57) A lid (1) for a container (2) comprises a rim (11) having a substantially inverted U-shape. The rim comprises an outer flange (12) and an inner flange (13) separated by a top section (14). A tab (15) extends substantially in the plane of the lid away from the rim. The outer flange (12) of the rim is provided with a weakening line (16) which extends substantially parallel to the plane of the lid between the tab (15) and the top section (14). Both

the outer flange (12) and the inner flange (13) are designed for sealing against a rim or other part of the container. The distance between the top section (14) of the rim and the weakening line (16) is between one third and two thirds of the distance between the top section (14) of the rim and the tab (15). In addition, a sealing flange (17) may extend from the top section (14) of the rim between the outer flange (12) and the inner flange (13).



**Fig. 4**

## Description

**[0001]** The present invention relates to a lid for containers. More in particular, the present invention relates to a lid which allows the first opening of the container to be detected. The present invention also relates to a container assembly comprising a lid and a container, the container assembly preferably but not exclusively being made of plastic.

**[0002]** It is well known to provide container lids having a tamper element that has to be damaged or broken before the container can be opened. Typically, such a tamper element consists of a flange that has to be ripped away, the flange extending over the whole circumference of the container.

**[0003]** British Patent Application GB 2 190 661, for example, discloses a container assembly having a lid with a skirt or flange which snap engages spring leaf elements extending from the container and prevents the container being opened. The flange has a line of weakness where it can be torn, so that part of the flange can be ripped away and the lid can be taken off. As the flange cannot be reconnected to the lid, its removal provides evidence of the container being opened and hence of any tampering.

**[0004]** However, the container assembly known from GB 2 190 661 has several disadvantages. Removing the lid is difficult, as the tab extends substantially downward, at a small acute angle to the wall of the container. In addition, the sealing of this known lid relies entirely upon the spring action of the leaves. However, as these leaves are attached to the container by means of living hinges, this spring action may be lost.

**[0005]** It is therefore an object of the present invention to overcome these and other problems of the Prior Art and to provide a lid for a container, which lid (1) provides a clear indication of the container having been first opened, (2) allows the container to be closed after opening while providing a good, preferably water-tight seal, and (3) is easy to open.

**[0006]** Accordingly, the present invention provides a lid for a container, the lid comprising a rim having a substantially inverted U-shape defining an outer flange and an inner flange separated by a top section, the outer flange of the rim having a tab which extends substantially parallel to the plane of the lid away from the rim and a weakening line which extends substantially parallel to the plane of the lid between the tab and the top section, wherein both the outer flange and the inner flange are designed for sealing against a respective surface of the container, and wherein the distance between the top section of the rim and the weakening line is between one third and two thirds of the distance between the top section of the rim and the tab.

**[0007]** By providing a tab which extends substantially parallel to or even in the plane of the lid, which typically is substantially horizontally, the tab can more easily be engaged and the lid can more easily be removed. By

designing both the outer flange and the inner flange of the rim for sealing against suitable surfaces of the container, preferably the two opposite sides of its rim, a proper sealing may be obtained under all circumstances, and the sealing action is not made dependent on the variable resiliency of a living hinge. By providing the weakening line at a distance between one third and two-thirds of the height of the outer flange, a proper tab leverage is obtained and, in addition, a suitable spacing is provided for inserting a thumb or finger when the tab has been removed.

**[0008]** In a preferred embodiment, the distance between the top section of the rim and the weakening line is approximately half the distance between the top section of the rim and the tab. This provides an optimum leverage and a very suitable spacing once the tab has been removed.

**[0009]** As stated above, both the outer flange and the inner flange of the lid rim are designed for sealing against a container surface. This may imply that these flanges have such a spacing and shape that they lie closely against their respective container surfaces when the lid is placed on the container, and that the dimensions of the lid rim are chosen such that the container surfaces are clamped to a certain extent. By clamping, that is exerting some pressure on the sealing surfaces, a better sealing action is achieved. It is noted that the sealing referred to here is present both before and after the container is first opened.

**[0010]** To further improve the sealing, an advantageous embodiment of the lid according to the present invention is providing with a sealing flange which extends from the top section of the rim between the outer flange and the inner flange, the sealing flange being designed for sealing against the rim of the container. That is, a flange may be present which provides an additional seal. In this embodiment, the sealing flange may rest against an inner surface of the container rim, while the inner flange of the lid rim may rest against a ledge or other surface of the container. In this embodiment, the inner flange and the outer flange of the lid rim preferably have different lengths, while in other embodiments their lengths may be approximately equal.

**[0011]** Advantageously, the sealing flange for providing additional sealing is curved and flexible so as to press against a surface of the container.

**[0012]** The tab or tabs may be arranged at part of the rim of the lid. However, if the lid has one or more corners, it is preferred that the at least one tab is arranged at a corner of the lid. This facilitates the opening of the container. The lid may have corners if it is square, rectangular, triangular, or if it has any other shape in which a corner or other substantially pointed section may be identified.

**[0013]** In addition to one or more tabs, the rim of the lid may further be provided with at least one hook extending from the outer flange towards the inner flange and being designed for engaging the rim of the container. Such an inwardly directed hook may be used to clamp

the rim of the container and thus to improve the sealing of the lid. If the lid has corners, the at least one hook is preferably arranged at a further corner of the lid, the tab being arranged at a first corner. If hooks are provided on a lid having corners, it is preferred that the tab is arranged at a first corner, while hooks are arranged at all other corners.

**[0014]** Although the tab and the weakening line may extend over a substantial part of the circumference of the lid, for example over an entire side if the lid is substantially rectangular, it is preferred that the tab is relatively small compared to the circumference of the lid, of course taking the relative dimensions of human fingers into account. More particularly, the tab and the weakening line extend over less than one-fifth of the length of the rim, preferably over less than one-tenth, more preferably over approximately one-twentieth. Although two or more tabs may be provided, it is preferred that the lid has a single tab.

**[0015]** The lid according to the present invention is preferably made of plastic, for example by injection moulding or thermoforming. A suitable plastic material is polyethylene (PE) or polypropylene. It is further preferred that the lid consists of a single piece, that is, that the rim, the tab or tabs, any hook or hooks and any scaling flange or flanges are integral with the lid.

**[0016]** The present invention also provides a container assembly, comprising a container and a lid as defined above. The container may be made of plastic by thermoforming, injection moulding or any other suitable process.

**[0017]** The present invention will further be explained below with reference to exemplary embodiments illustrated in the accompanying drawings, in which:

Figs. 1a and 1b schematically show, in cross-sectional views, parts of a first embodiment of the lid according to the present invention.

Fig. 2 schematically shows, in a cross-sectional view, another part of the first embodiment of the lid according to the present invention.

Fig. 3 schematically shows, in top view, the first embodiment of the lid according to the present invention.

Fig. 4 schematically shows, in a cross-sectional view, part of a second embodiment of the lid according to the present invention.

Fig. 5 schematically shows, in a cross-sectional view, another part of the second embodiment of the lid according to the present invention.

Fig. 6 schematically shows, in top view, the second embodiment of the lid according to the present invention.

**[0018]** A first embodiment of the lid 1 of the present invention is shown merely by way of non-limiting example in Figs. 1 to 3. The lid 1 of which only part is shown in cross-sectional view in Fig. 1a comprises a main surface 10 bordered by a rim 11. The rim 11 has an inverse U-shape and comprises an outer flange 12 and an inner

flange 13, connected and spaced apart by a top section 14. Together, the outer flange 12, the inner flange 13 and the top section 14 define a channel, in which the rim 21 of a container 2 is accommodated. It is noted that in the present example the container 2 also has an inverse U-shaped rim, which fits in the inverse U-shaped rim 11 of the lid.

**[0019]** As can be seen in Fig. 1a, the rim 11 of the lid 1 fits tightly around the rim 21 of the container 2. In particular, the flanges 12 and 13, and the corresponding surfaces of the container 2 are not entirely parallel but slightly inclined, thus providing approximately wedge-shaped rims 11 and 21. This wedge-shape improves the sealing properties of the rim assembly.

**[0020]** A weakening line 16, constituted by a substantially V-shaped channel, extends across the outer flange 12 parallel with the lid main surface 10 in a direction perpendicular to the plane of the drawing. This weakening line, which is part of the tamper indication of the lid, may extend only over the part of the flange 12 where a tab 15 is provided.

**[0021]** According to an aspect of the present invention, the weakening line 16 is arranged at a certain distance from the tab, preferably between one-third and two-thirds of the distance between the tab 15 and the top section 14 of the rim. An advantageous location of the weakening line is approximately halfway between the tab 15 and the top section 14. This ensures an easy handling of the tab and the lower part of the outer flange 12, providing sufficient leverage while allowing a finger or thumb of the user to be conveniently placed.

**[0022]** The tab 15 extends from the lower edge of the outer flange 12, away from the rim 11 and substantially in the plane of the lid main surface 10. This tab 15 facilitates the opening of the container, in particular when it is first opened. The weakening line 16 may act as a living hinge, but is preferably dimensioned in such a way that the outer flange 12 breaks and/or tears at the weakening line 16, allowing the lower part of the outer flange 12 to be removed. It will be clear that a removal of the tab 15 and of the lower part of the outer flange 12 provides a clear indication that the container has been opened.

**[0023]** In the embodiment shown in top view in Fig. 3, a tab 15 and an associated weakening line (16 in Figs. 1 and 2) are provided at only a single corner of the lid 1. At all other corner hooks 19 are provided to provide an improved sealing action. Details of the other corners are shown in Fig. 2. In a variation of this embodiment, the tab 15 ends in a hook 19, as illustrated in Fig. 1b, thus also providing an improved sealing action at the corner where the tab is arranged.

**[0024]** As illustrated in Fig. 3, the essentially horizontal (that is extending approximately parallel to or in the plane of the main surface 10) weakening line 16 may advantageously end in essentially vertical weakening lines 18 which connect the weakening line 16 and the lower edge of the rim 11 so as to allow an easier tearing away of the tab 15.

**[0025]** In the cross-sectional view of Fig. 2, a rim 11 is shown to also comprise an outer flange 12, an inner flange 13 and a top section 14. However, instead of a tab 15 a hook 19 is provided at the lower edge of the outer flange 12. This hook 19 is designed to snap underneath the substantially inverse U-shaped rim 21 of the container 2 and to thereby improve the sealing action of the rim assembly.

**[0026]** A second embodiment of the lid 1 of the present invention is shown merely by way of non-limiting example in Figs. 4 to 6. The lid 1 of which only part is shown in cross-sectional view in Fig. 4 also comprises a main surface 10 bordered by a rim 11. As in the first embodiment, the rim 11 of Fig. 4 has an inverse U-shape and comprises an outer flange 12 and an inner flange 13, connected and spaced apart by a top section 14. However, in contrast to the first embodiment, a sealing flange 17 is arranged inside the rim 11, extending from the top section 14 approximately parallel with the inner flange 13. However, in the particular embodiment shown in Fig. 4 the third or sealing flange 17 is shaped so as to fit the rim 21 of the container 2 and therefore is slightly inclined relative to the inner flange 13. The particular shape and dimensions of the sealing flange 17 will depend on the shape and dimensions of the rim 21 of the container 2. For this reason, it may be advantageous if the sealing flange 17 is flexible and or slightly curved, so as to provide a good sealing action even if the shape of the container rim 21 fails to correspond exactly to the shape of the lid rim 11.

**[0027]** The walls of the container 2 of Fig. 4 have a substantially stepped configuration. The lid of Fig. 4 is adapted to this stepped configuration by providing a third of sealing flange 17 which seals against the container rim 21 and an inner or second flange 13 which is spaced apart from the third flange 17 so as to seal against an inner surface of the container.

**[0028]** In this embodiment too a tab 15 is only provided at one corner of the lid 1, as shown in Fig. 6, although multiple tabs would be possible. A cross-sectional view of the other corners of the second embodiment of the lid is provided in Fig. 5. As can be seen, no hooks are present in this embodiment, although it would be possible to provide hooks. The lid section of Fig. 5 has an outer (or first) flange 12, an inner (or second) flange 13 and a sealing (or third) flange 17. The outer flange 12 and the sealing flange 17 have approximately equal lengths, while the inner flange 13 extends further than the other flanges to reach and seal against the stepped container wall.

**[0029]** Although the inner flange 13 shown in Figs. 4 and 5 is positioned at approximately a right angle relative to the lid main surface 10 and will therefore in use be substantially vertical, the lid of the present invention is not so limited and may advantageously have inclined inner flanges 13, as illustrated in Figs. 1 and 2. The inner flange 13 of Figs. 1 and 2 is arranged at an obtuse angle relative to the lid main surface 10 to allow an easy release of stacked containers.

**[0030]** Instead of the substantially rectangular shape

shown in Figs. 3 and 6, other shapes of the lid 1 are possible, including but not limited to circular, triangular, and square. The lid may be made of polypropylene, preferably by injection moulding, although other materials and techniques may also be used.

**[0031]** The lid according to the present invention may advantageously be sold or used in combination with a suitable container, for example a container designed for containing butter, margarine, oil, sauce, other foodstuff, or non-food contents. The container may be also made of plastic and be produced by thermoforming, injection moulding or any other suitable process. When both the lid and the container are made of the same material, such as polypropylene, it is preferred that the lid and the container have different elasticities to ensure a better sealing. Advantageously, the lid may have a lower elasticity (and hence be more rigid) than the container.

**[0032]** It is noted that any feature of an embodiment may be combined with any feature of another embodiment to provide a lid according to the present invention. For example, the lid according to Figs. 4 - 6 may have a inclined inner flange 13 as illustrated in Figs. 1 and 2.

**[0033]** The present invention is based upon the insight that a lid having a tamper indication should be relatively easy to open and should provide a good seal when closed again, and that these properties may be achieved by providing a tab having a proper direction, and sealing flanges designed to provide a good seal with their container counterparts.

**[0034]** It is noted that any terms used in this document should not be construed so as to limit the scope of the present invention. In particular, the words "comprise(s)" and "comprising" are not meant to exclude any elements not specifically stated. Single (circuit) elements may be substituted with multiple (circuit) elements or with their equivalents.

**[0035]** It will be understood by those skilled in the art that the present invention is not limited to the embodiments illustrated above and that many modifications and additions may be made without departing from the scope of the invention as defined in the appending claims.

## Claims

1. A lid (1) for a container (2), the lid comprising a rim (11) having a substantially inverted U-shape defining an outer flange (12) and an inner flange (13) separated by a top section (14), the outer flange (12) of the rim having a tab (15) which extends substantially parallel to the plane of the lid away from the rim and a weakening line (16) which extends substantially parallel to the plane of the lid between the tab (15) and the top section (14), wherein both the outer flange (12) and the inner flange (13) are designed for sealing against a respective surface of the container, and wherein the distance between the top section (14) of the rim and the weakening line (16)

is between one third and two thirds of the distance between the top section (14) of the rim and the tab (15).

2. The lid according to claim 1, wherein the distance between the top section (14) of the rim and the weakening line (16) is approximately half the distance between the top section (14) of the rim and the tab (15). 5
  
3. The lid according to claim 1 or 2, wherein a sealing flange (17) extends from the top section (14) of the rim between the outer flange (12) and the inner flange (13), the sealing flange being designed for sealing against the rim (21) of the container. 10  
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4. The lid according to claim 3, wherein the sealing flange (17) is curved and flexible so as to press against a surface of the container.
  
5. The lid according to any of the preceding claims, wherein the tab (15) is arranged at a corner of the lid. 20
  
6. The lid according to any of the preceding claims, wherein the rim (11) is further provided with at least one hook (19) extending from the outer flange (12) towards the inner flange (13) and designed for engaging the rim (21) of the container. 25
  
7. The lid according to claim 6, wherein the at least one hook (19) is arranged at a further corner of the lid. 30
  
8. The lid according to any of the preceding claims, wherein the tab (15) and the weakening line (16) extend over less than one-fifth of the length of the rim, preferably over less than one-tenth, more preferably over approximately one-twentieth. 35
  
9. The lid according to any of the preceding claims, which lid is made of plastic, preferably polypropylene. 40
  
10. A container assembly, comprising a container (2) and a lid (1) according to any of the preceding claims. 45

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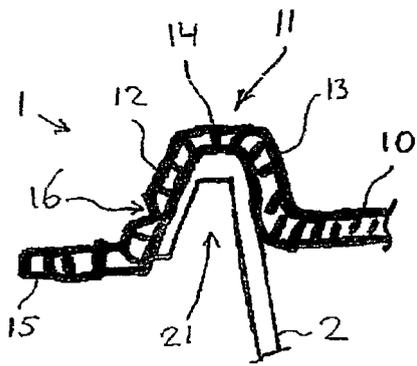


Fig. 1a

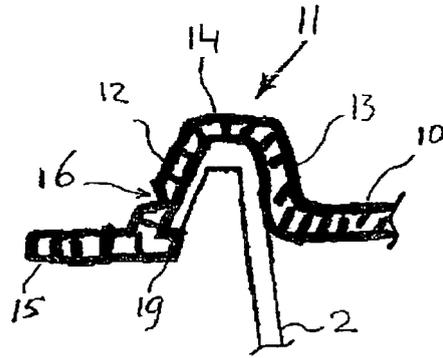


Fig. 1b

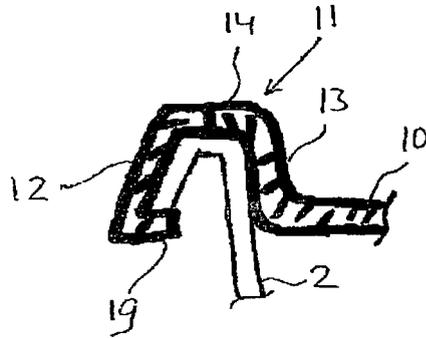


Fig. 2

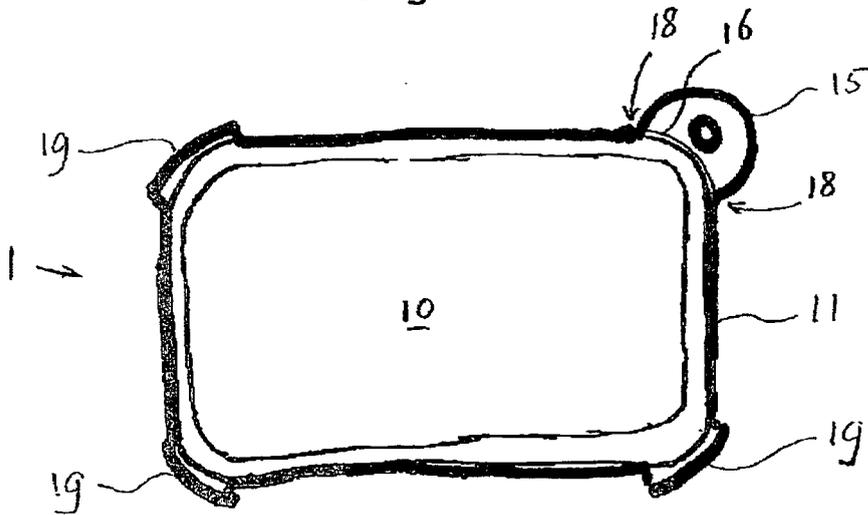


Fig. 3

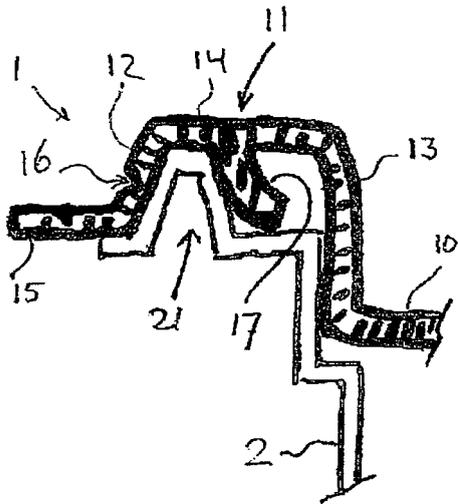


Fig. 4

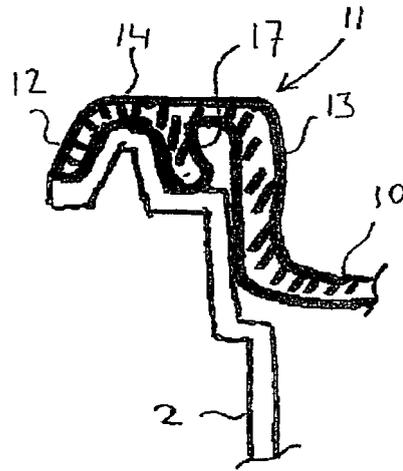


Fig. 5

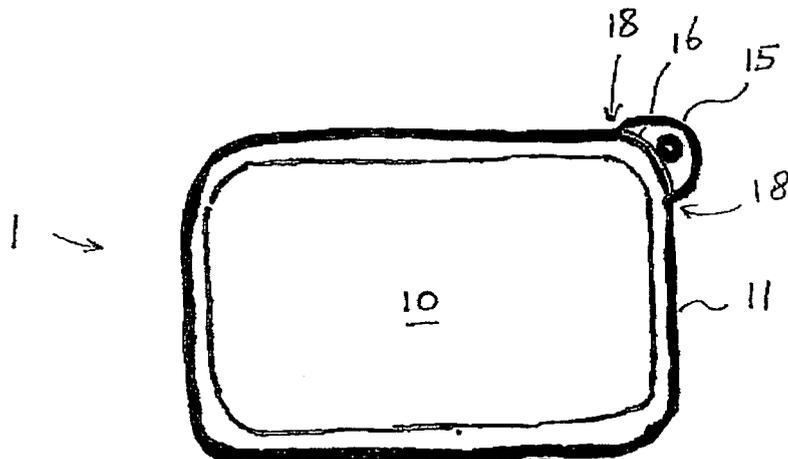


Fig. 6



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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 September 2005	Examiner Grondin, D
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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