Title: PACKAGING FOR CONSUMER PRODUCTS

Abstract: Thermoplastic container (10) for containing consumer goods, the container having a base (12) and a surrounding side wall (14, 16, 18, 20), the base and side wall defining a cavity (22), the cavity being open on its upper face, the cavity upper face being surrounded by a perimeter rim (24) attached to the side wall, the rim comprising a primary flange (26) which is a continuous upper surface ring with a defined width, wherein a line of weakening (44) is provided in the rim which defines a removable portion (46) of the rim, such that in use, the removable portion can be removed by a consumer.
Packaging for Consumer Products

Technical Field

The invention relates to a thermoplastic packaging for containing consumer goods.

Background

Packaging made from thermoplastic polymers is widely used to package consumer goods, in particular consumer goods in retail outlets such as supermarkets.

In one particular arrangement a packaging housing providing a cavity and having a perimeter rim is filled with a consumer product and the cavity is sealed e.g. by heat-sealing a polymeric film or lid to the rim of the packaging housing.

The consumer can then release the consumer products by removing the polymeric lid.

However, with such containers it is desirable to have some tamper-evident device to determine if the contents of the container remain intact.

Known tamper-evident devices add cost to a product where a small increase in cost can make a large difference to the desirability of the container.

Additionally, such polymeric films can be difficult to remove by a consumer because, by their very nature they are securely sealed onto the upper surface ring of the container.

Thus, improvements in this area would be desirable.
Summary of the Invention

The invention relates to a thermoplastic container for containing consumer goods, the container having a base and a surrounding side wall, the base and side wall defining a cavity, the cavity being open on its upper face, the cavity upper face being surrounded by a perimeter rim attached to the side wall, the rim comprising a primary flange which is a continuous upper surface ring with a defined width, wherein a line of weakening is provided in the rim which defines a removable portion of the rim, such that in use, the removable portion can be removed by a consumer.

Thus, in use such a container may be sealed with a polymeric film lid attached, e.g. by heat sealing to the upper surface ring to enclose the cavity. A consumer can then open the pack by gripping the removable portion and breaking it off along the line of weakening. As the polymeric film will cover the line of weakness a consumer will also necessarily grip a portion of the polymeric film lid and be able to remove the lid conveniently and easily. Furthermore, if such a container is tampered with it will be visibly apparent because the removable portion will be separated from the remainder of the container at the line of weakness. Furthermore such an arrangement can be provided at low cost and be compatible with existing packaging equipment.

Preferably the container is thermoformed.

Preferably the line of weakening comprises perforations, although other forms of weakness such as material thinning are also possible.

Typically the primary flange surface ring will provide a planar surface, however this does not need to be the case as some bends can be tolerated provided the surface is suitable for affixing a lid to the surface ring.
In a preferred embodiment the primary flange surface ring comprises four substantially straight portions joined together by corners. Preferably the surface ring corners are rounded.

Typically also the side wall will be comprised of four substantially planar walls joined together by rounded corners.

In the case when the surface ring has corners, the line of weakening preferably cuts across a corner of the rim, enabling the removable portion to be taken from a corner of the rim.

For simplicity of manufacture, the width of the surface ring is preferably substantially constant. However it has been found that convenient or typical widths of upper surface rings may not be wide enough to accommodate a line of weakness with sufficient material on either side of the line of weakness.

Thus, in a preferred embodiment it is preferable that the primary flange surface rim has a substantially constant width but has an increased width in the region comprising the removable portion. In a particularly preferred embodiment the substantially constant width is in the range of from 2 to 8mm and the increased width has a maximum value of from 8 to 15mm.

The corners of the primary flange are generally curvilinear and are preferably provided by two substantially concentric circular section edges.

In a particularly preferred embodiment, the outer edge of the four corners have substantially the same radius of curvature. However the corner comprising the removable portion has an inner edge having an increased radius of curvature in relation to the other three corners. This has the effect that the upper surface naturally becomes wider in the one corner comprising the removable portion. In addition the exterior profile of the container remains symmetrical at the same time. Additionally, this embodiment may be complemented to be compatible with existing handling equipment as the
thickening can be implemented without altering the exterior profile of the container.

It is known for containers in the prior art to have a secondary flange which depends generally downwardly from the primary upper surface ring. This provides strength to the container and prevents it from deforming during handling and in particular during sealing, e.g. heat sealing. In the present case, such a secondary flange may be present and then the line of weakness will pass through the secondary flange.

Thus, in a preferred embodiment, the rim of the container comprises a secondary flange which depends downwardly a distance defining its width, from the primary flange surface ring, the line of weakening also passing through a portion of the secondary flange, in order to facilitate removal of the removable portion of the rim.

However it has been found that the presence of such secondary flanges can cause problems with providing lines of weakness. It has been found that the generation of the lines of weakness generally requires that the primary and secondary flanges be flattened out, which can cause cracking of the container material.

However, it has been found that such a tendency to crack is greatly minimised if the width of the secondary flange is reduced. Furthermore it has been found that such a reduction in width does not greatly reduce the mechanical strength provided by the secondary flange.

Accordingly, in a preferred embodiment, the secondary flange has a substantially constant width but has a decreased width where the lines of weakness pass through the secondary flange. In a convenient arrangement the secondary flange has a decreased width throughout the removable portion region.
It has been found that a particularly convenient arrangement is wherein the secondary flange has a substantially constant width in the range of from 3 to 7mm and the decreased width is from 1 to 3mm.

As discussed above, the container is intended to be covered with a polymeric film lid. As such, the container preferably comprises a polymeric film lid, the lid being sealed along the primary flange surface ring to close and seal the cavity, the lid covering at least a portion of the line of weakening.

The invention will now be illustrated by way of example, with reference to the following figures, in which:

Figure 1 is a perspective view of a container according to the present invention.

Figure 2 is a plan view of a container according to the present invention.

Figure 3 is a side view of a container according to the present invention.

Figure 4 is a front view of a container according to the present invention.

Turning to the figures, figure 1 shows a thermoplastic thermoformed container comprising a lower base and side walls, providing an open cavity.

Also provided is a rim which runs around the perimeter of the container. The rim comprises a primary flange which is a flat upper facing ring surface. This acts to provide a flat surface onto which a polymeric film can be attached e.g. by heat-sealing, to seal the cavity.

The primary flange can be seen to be made up of four straight portions and four rounded corners.
Also provided is a line of perforation 44 which cuts across the rim 24 to provide a removable portion 46.

As can best be seen in Figure 2, the primary flange 26 has a constant width along straight portions 28, 30, 32 and 34 which is approximately 5mm. The width of the primary flange 26 also remains constant in corners 36, 38 and 40 although it is slightly wider at 6mm. However the width of the primary flange 26 in corner 42 is increased significantly relative the rest of the surface width having a maximum value of 12mm.

As can be seen in Figure 2, corners 36, 38, 40 and 42 all have the same circular section exterior edge with a radius of curvature of 28mm. Corners 36, 38 and 40 have their internal edge provided by the same circular section edge with a radius of curvature of 25mm. However the inside edge of corner 42 is provided by a circular section of radius of curvature of 40mm. This has the effect of thickening the width of the upper surface ring at corner 42.

The increased width at corner 42 ensures that there is sufficient material on the primary flange 24 either side of the perforation 44.

Also provided on the rim 24 is a secondary flange 50, which depends downwards from primary flange 26.

The secondary flange 50 runs all the way around the primary flange 26 and provides strength to the rim 24. The width of the flange is 5mm all the way around except for in the region of corner 42. In this region the secondary flange 50 reduces in width gradually to 2mm.

This is to ensure that the secondary flange has a shorter width in the region of the perforation 44 so that when it is formed there is less secondary flange to perforate and a greatly reduced chance of the material cracking during perforation.
In use a polymeric film is sealed, e.g. by heat sealing onto the primary flange upper surface 26. The polymeric film covers the portion of the perforation 44 that is present on the primary flange 26. The contents of the package are preferably a food product such as heatable food product.

When a consumer desires to open the container, he can grip the removable portion 46 whilst also gripping the attached polymeric film. Bending and pulling the removable portion 46 breaks the line of weakness and the polymeric lid can be peeled off for use. In addition, if the container is undesirably tampered with, this will become immediately apparent due to the breaking of the line of weakness.
Claims

1. A thermoplastic container for containing consumer goods, the container having a base and a surrounding side wall, the base and side wall defining a cavity, the cavity being open on its upper face, the cavity upper face being surrounded by a perimeter rim attached to the side wall, the rim comprising a primary flange which is a continuous upper surface ring with a defined width, wherein a line of weakening is provided in the rim which defines a removable portion of the rim, such that in use, the removable portion can be removed by a consumer.

2. A container according to claim 1, wherein the line of weakening comprises perforations.

3. A container according to claim 1 or claim 2, wherein the primary flange surface ring comprises four substantially straight portions joined together by corners.

4. A container according to claim 3, wherein the surface ring corners are rounded.

5. A container according to claim 3 or claim 4, wherein the line of weakening cuts across a corner of the rim, enabling the removable portion to be taken from a corner of the rim.

6. A container according to claim 5, wherein the primary flange surface ring has a substantially constant width but has an increased width in the region comprising the removable portion.

7. A container according to claim 6 wherein the substantially constant width is in the range of from 2 to 8mm and the increased width has a maximum value of from 8 to 15mm.
8. A container according to any one of claims 3 to 7, wherein the corners are provided by two substantially concentric circular section edges.

9. A container according to claim 6 and 8 or 7 and 8, wherein the outer edge of the four corners have substantially the same radius of curvature and wherein the increased width of the corner comprising the removable portion is provided by its inner edge having an increased radius of curvature in relation to the other three corners.

10. A container according to any one of the preceding claims, wherein the rim comprises a secondary flange which depends downwardly, a distance defining its width, from the primary flange surface ring, the line of weakening also passing through a portion of the secondary flange, in order to facilitate removal of the removable portion of the rim.

11. A container according to claim 10, wherein the secondary flange has a substantially constant width but has a decreased width where the lines of weakness pass through the secondary flange.

12. A container according to claim 11, wherein the secondary flange has a decreased width throughout the removable portion region.

13. A container according to claim 11 or claim 12, wherein the secondary flange has a substantially constant width in the range of from 3 to 7mm and the decreased width is from 1 to 3mm.

14. A packaging according to any one of the preceding claims, wherein the container comprises a polymeric film lid, the lid being sealed along the primary flange surface ring to close and seal the cavity, the lid covering at least a portion of the line of weakening.
# INTERNATIONAL SEARCH REPORT

**PCT/GB2016/051672**

## A. CLASSIFICATION OF SUBJECT MATTER

**IN. B65D75/58**  
**B65D77/20**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**B65D**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

**EPO-Internal**, **WPI Data**

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>
| X        | DE 29 28 626 A1 (HASSIA VERPACKUNG GMBH)  
12 February 1981 (1981-02-12)  
page 2, paragraph 1  
page 3, last paragraph  
page 5 - page 6; claim 1; figures 1, 2 | 1-8, 14 |
| X        | DE 10 2012 002658 B3 (MULTIVAC HAGGENMUELLER GMBH [DE])  
11 July 2013 (2013-07-11)  
paragraph [0008]  
figures 2, 3, 4 | 1-9, 14 |
| X        | EP 1 340 693 A1 (CRYOVAC INC [US])  
3 September 2003 (2003-09-03)  
paragraph [0002] - paragraph [0010]  
figure 1 | 1-8, 14 |
| A        |                                                                           | 9 |

[X] Further documents are listed in the continuation of Box C.  
[X] See patent family annex.

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15 September 2016

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Mans-Kamerbeek, M
### DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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</thead>
<tbody>
<tr>
<td>X</td>
<td>EP 2 774 873 A1 (C G L PACK SERVICE [FR]) 10 September 2014 (2014-09-10) paragraph [0018] - paragraph [0020] paragraph [0040]; figure 1</td>
<td>1,3,4,8, 10,14</td>
</tr>
<tr>
<td>X</td>
<td>US 2 998 158 A (TUPPER EARL S) 29 August 1961 (1961-08-29) column 4, line 19 - line 23 column 6, line 3 - line 23; figures 1, 2, 8, 9</td>
<td>1,10</td>
</tr>
<tr>
<td>A</td>
<td>US 5 249 694 A (NELSON JAMES L [US]) 5 October 1993 (1993-10-05) the whole document</td>
<td>1,10</td>
</tr>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
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<tr>
<td>---------------------------------------</td>
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<tr>
<td>DE 2928626 A1</td>
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<tr>
<td>DE 102012002658 B3</td>
<td>11-07-2013</td>
<td>NONE</td>
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<td>CA 2419844 A1</td>
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<td>EP 1340693 A1</td>
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<td>US 2003183637 A1</td>
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<td>FR 3002922 A1</td>
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<td></td>
<td></td>
<td>WO 2007082034 A2</td>
</tr>
<tr>
<td>US 2998158 A2</td>
<td>29-08-1961</td>
<td>NONE</td>
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<tr>
<td>US 5249694 A2</td>
<td>05-10-1993</td>
<td>NONE</td>
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