(12) UK Patent Application (19) GB (11) 2565065 (13) A

(43) Date of A Publication 06.02.2019

(21) Application No: 1712203.7

(22) Date of Filing: 28.07.2017

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(51) INT CL:
B65D 43/02 (2006.01) ***B65D 77/20*** (2006.01)

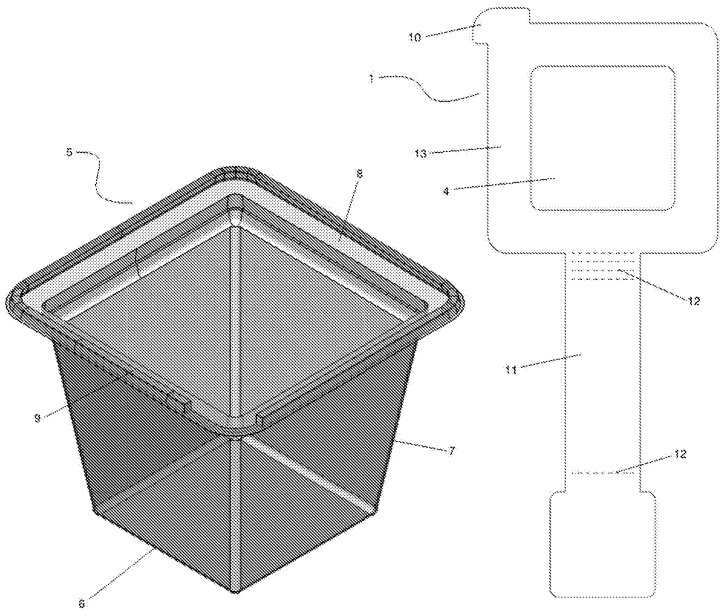
(56) Documents Cited:
JP 2013193757 A
US 3934749 A
US 3410697 A
US 20070023433 A1
JP 2010047268 A
US 3672916 A
US 20130104505 A1

(58) Field of Search:
INT CL **B65D**
Other: **WPI, EPODOC**

(54) Title of the Invention: **An improved food container lid and method of manufacturing the same**
Abstract Title: **Reclosable Lid Laminated with Heat-Sealable Film**

(57) A lid 1 and a possible food container 5. The lid 1 comprises a substrate (2, figure 1), typically carton board, which has a heat-seal film (3, figure 1) laminated to a, preferably inner, surface of the lid. The substrate covers at least the peripheral edge of an open top of a container 5 and the heat-seal film covers the entire open top. The heat-seal film may be PET. Apertures may be made in the substrate to form frame portion 13, so that windows 4 are formed when the card is laminated. The food container 5 may be plastic and may have a flange 8 with a ridge 9 and an undercut section, which together form a groove for inserting and reclosing the lid 1. The lid 1 may have a tab 10 and an extension portion 11 for printing information. A possible method of manufacturing the lid 1 is given.

Figure 2



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

Figure 1

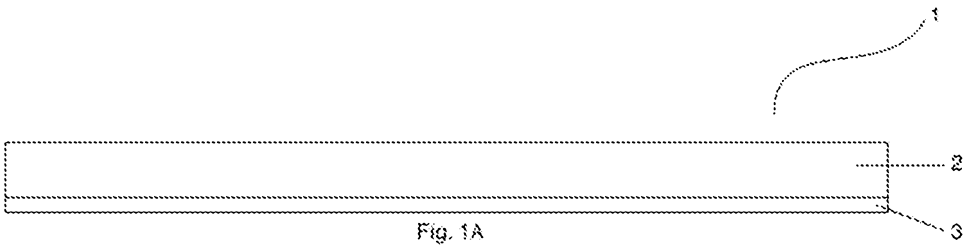


Fig. 1A

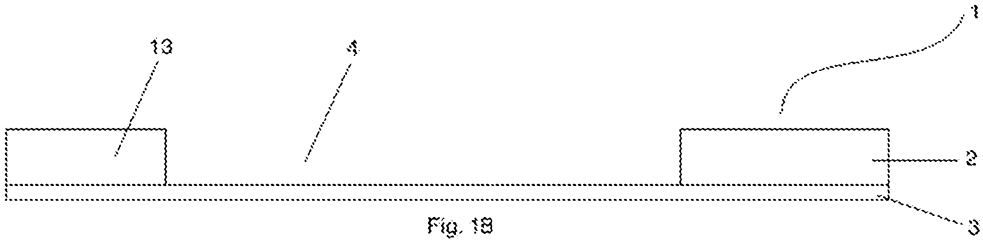


Fig. 1B

Figure 2

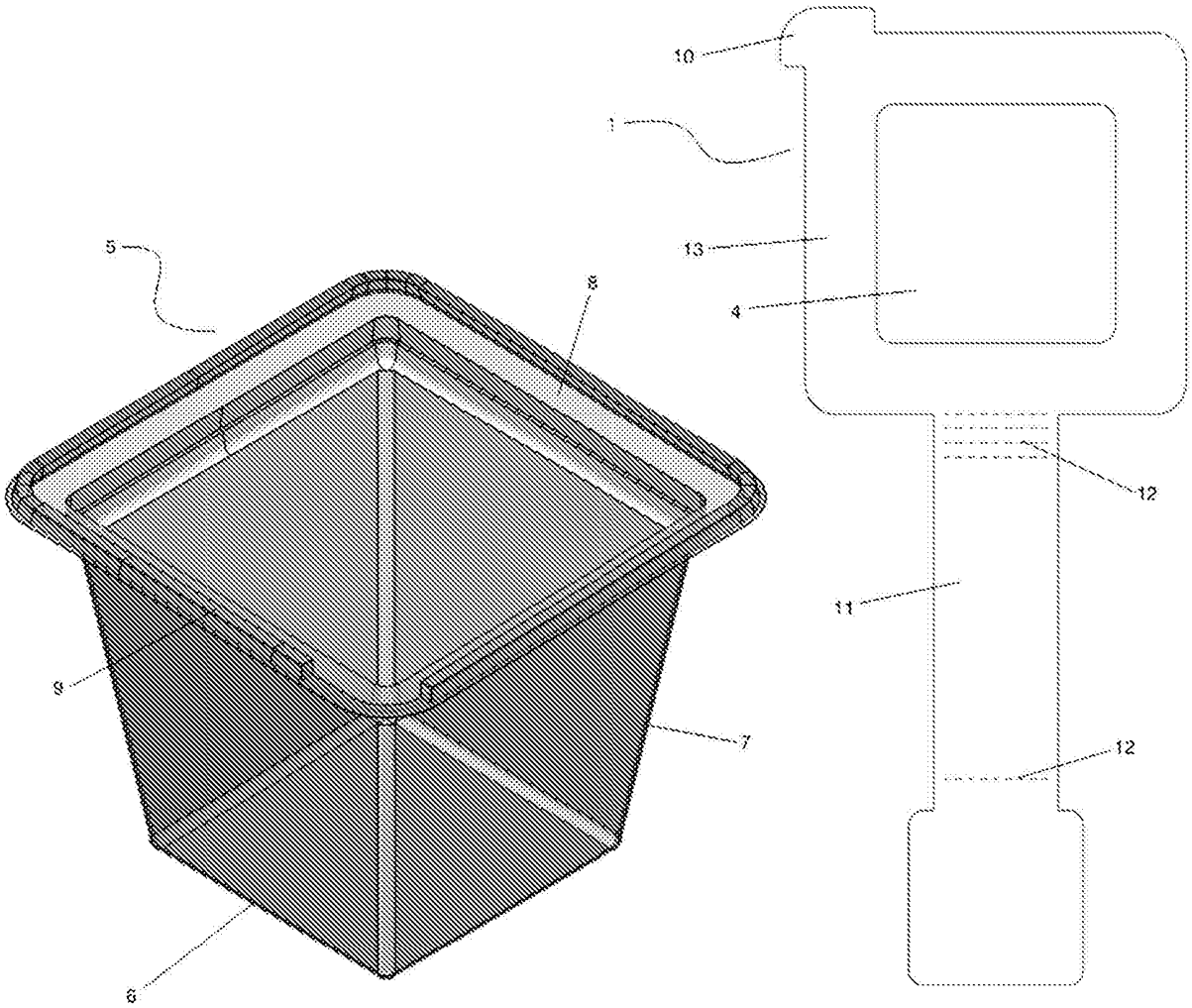


Figure 3

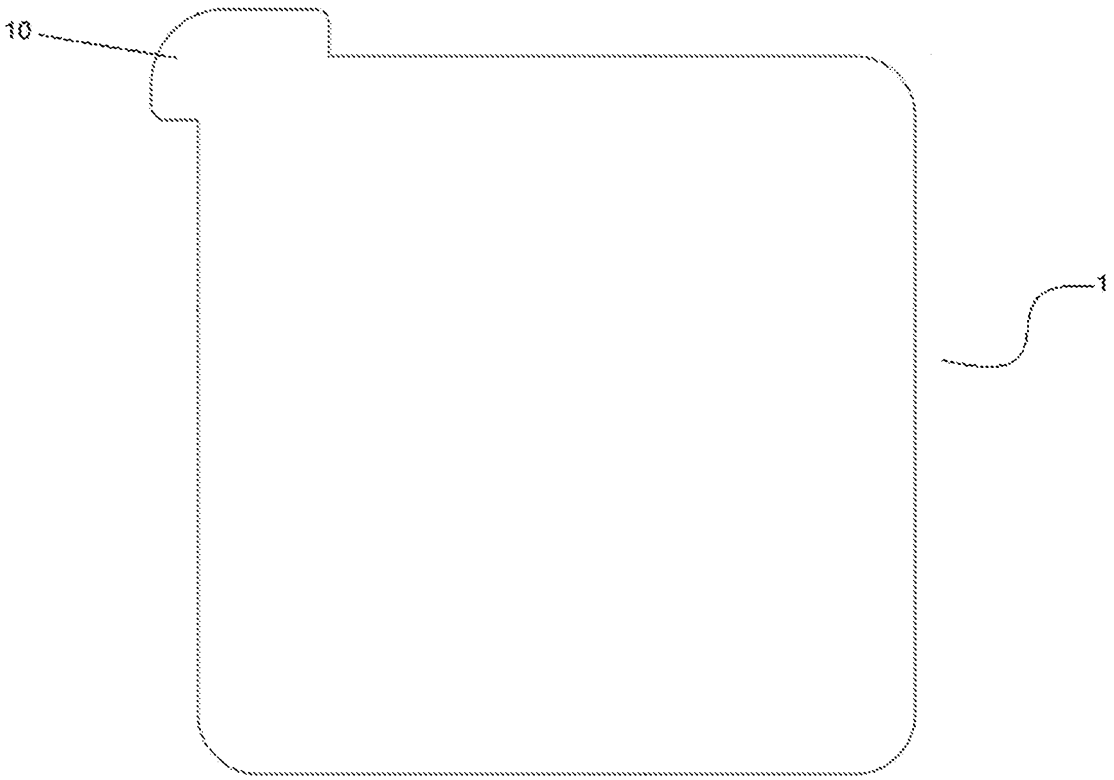


Figure 4a

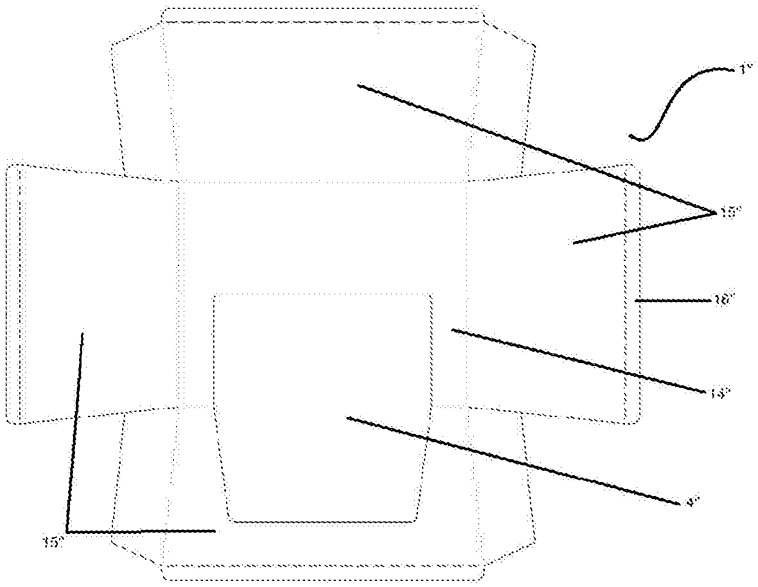
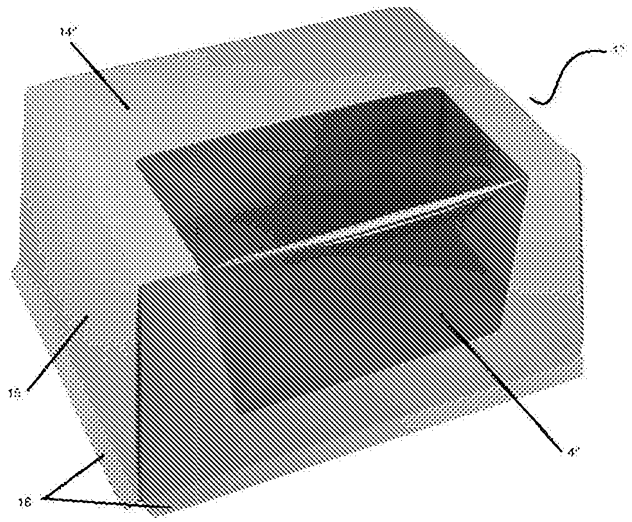
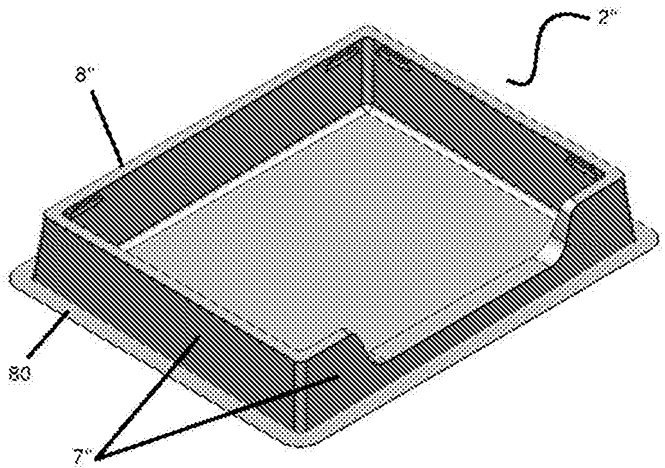


Figure 4b





An improved food container lid and method of manufacturing the same

The present invention relates to a lid for a food container, as well as a food container with said lid and method of manufacturing said lid. The lid comprises a substrate, typically carton board, which has a heat seal film laminated to a surface thereof, the substrate configured such that it will cover at least the peripheral edge of an open top of a container, and the heat seal film configured such that it will cover the entire open top of said container.

Many perishable foodstuffs and ready to eat items are packaged in lidded containers such as thermoformed lidded pots. Typically, in order to maintain the freshness and integrity of the foodstuff, the container or pot is provided with a heat-sealed film which covers the open top of the container, sealing the food therein. Depending on the foodstuff, the heat seal may provide a hermetic seal or it may allow some moisture to travel there-through. Additional printed sleeves (e.g. a card sleeve) or substantially rigid lids, which may have branding and other information printed thereon, can then be placed over, or partially over, the heat-sealed portion.

Whilst such lidded pots are widely used, they do have some drawbacks. In particular, there are cost and weight implications as both a heat seal film and separate lid and or sleeve are typically required by retailers. This is mainly because the heat seal film is not a good surface for printing on and as such branding and other information must be printed onto a separate material. This can be using stickers directly onto the pot of heat seal film, but it is often visually preferable for retailers to have more substantial material such as a card sleeve or rigid lid as this provides a more appealing look to consumers.

There is also a problem associated with the single use nature of the heat seal film, which is typically a very flexible material. Once it is removed, its highly flexible nature is such that it cannot be replace if the foodstuff is not completely used or consumed. In some cases, a separate lid is therefore also included, or the user must decant the unused food into another container or find another way to cover any unused food.

There are also certain containers, in the form of trapezoidal or wedge sandwich boxes which look to avoid the need for lidded pots entirely, however such containers are only suitable in limited circumstances and for certain foodstuffs and effectively are formed out of a single card blank which is folded and glued to form the container i.e. they are not lidded pots. Even with such containers, as the card is folded to make contact with itself, rather than a lid portion to a separate preformed pot, access to the container typically requires the tearing of a sealed flange section such that the container could not be closed over after use.

It is an object of the present invention to obviate or mitigate some of the drawbacks associated with the prior art.

When referring to heat-sealable films/materials or heat sealing this includes both traditional heat-sealing films/materials which are heated by the direct or indirect application of temperature, and may also encompass materials which seal due to di-electric heating of the material e.g. by using high frequency welding. However, it is noted that traditional heat-sealable films are preferred.

According to a first aspect of the present invention there is provided a food container lid portion configured to re-closably seal the open top of a pre-formed food container, comprising;
a substrate defining at least an outer circumference; and
a heat-sealable film,
wherein said heat-sealable film is laminated to a surface of the substrate, and
wherein said substrate is configured such that it will cover at least the peripheral edge of said open top of said food container; and said film is configured such that it is able to entirely cover said open top of said food container when associated therewith.

Advantageously, as the substrate can be printed onto directly this removes the need to have a lid with branding, instructions or ingredient information and a separate lidding film to provide a seal for the food in the container, leading to a reduction in both

processing costs and packaging weight. As the laminated structure of the lid portion provides a level of additional rigidity when compared to traditional lidding film, it also allows the food container to be more easily removed by a user and then maintain its structure such that the lid can then be re-closed if required by the user. The lid of the present invention can therefore effectively replace traditional lidding film and separate sleeve or rigid lid with a single improved lid portion.

Notably, the heat-sealable film is laminated to the surface of the substrate that forms the internal surface of the food container when associated with the lower pot portion. Advantageously, this is the surface that comes into contact with the foodstuff in the container and it precludes the foodstuff coming into contact with the substrate, which is typically a cartonboard material.

Typically, the preformed container is a plastic container. Preferably, the preformed container is a preformed thermoplastic container.

The heat sealable film is a food safe material. Optionally the heat sealable film is water impermeable. Alternatively the heat sealable film may be permeable or semi-permeable to allow moisture to escape.

The heat sealable film is a membrane, effectively a thin pliable sheet of material forming a barrier or lining but which has its own structure, as opposed to a coating.

Preferably the substrate is semi-rigid or substantially rigid. Most preferably the substrate is carton board or paperboard.

Advantageously, the substrate imparts a desired degree of rigidity to lid portion.

The substrate must be able to transfer heat to the surface which the heat sealable film is laminated thereto from a heat source provided at the opposing surface i.e. if heat is applied to the outer or upper surface it must be transferred to the opposing inner or lower surface to which the heat sealable film is laminated.

Preferably the heat sealable film is transparent.

Optionally the heat sealable film is a membrane. The membrane may be made of PET. The membrane may be provided with a heat seal coating to form the heat seal film.

Optionally the substrate may comprise one or more apertures or windows.

Advantageously, if an aperture or window is provided, the heat sealable film can be viewed through said aperture, and when the heat sealable film is transparent the content of a container can be viewed without the lid portion being removed.

Optionally, the lid is planar. Alternatively, the lid may be shaped and provided with planar sealing flanges or sections.

Optionally the pre-formed food container is a pot or tray.

Optionally the pre-formed food container is made from plastic. This may be Polyethylene Terephthalate (PET), e.g. C-PET (crystal-PET), R-PET (recycled PET), A-PET (amorphous PET) , or polypropylene. Preferably the pre-formed food container is made from A-PET (amorphous PET) due to its substantially transparent properties that are often preferred for food packaging, particularly for higher quality foodstuffs.

Optionally the lid portion is resiliently deformable.

Optionally the lid is provided with a tab portion.

According to another aspect of the present invention there is provided a lidded container comprising;

a formed lower container section, said container section comprising a base portion with at least one side wall extending generally upwards therefrom to form an open topped container, and

the lid portion of the above aspect, where said lid portion is heat-sealed to a peripheral edge of the open topped container such that it will act as a top wall and close the container section.

Optionally the formed lower container is a pot or tray for holding foodstuff.

Optionally the pre-formed food container is made from plastic. This may be Polyethylene Terephthalate (PET), e.g. C-PET (crystal-PET), R-PET (recycled PET), A-PET (amorphous PET) , or polypropylene. Preferably the pre-formed food container is made from A-PET (amorphous PET) due to its substantially transparent properties that are often preferred for food packaging, particularly for higher quality foodstuffs.

Optionally, the upper peripheral edge of the open top portion of the lower container section comprises a sealing flange to which the lid portion is heat sealed.

In some embodiments a sealing flange may extend outwards from the outer surface of the side wall.

Optionally, the sealing flange comprises a ridge at least partially defining its circumference.

Optionally, the lid portion is heat-sealed around the entire peripheral edge of the open top portion of the lower container section. This may provide a completely sealed compartment.

Alternatively, the lid portion is heat-sealed at selected points around the peripheral edge of the open top portion of the lower container section. This holds the lid in position and results in a closed compartment, but doesn't fully seal the compartment.

Optionally, the upper portion of the one or more side walls of the lower container section is provided with an undercut feature.

Optionally, the undercut feature is formed in the ridge.

Preferably, the circumference defined by the top part of the ridge is smaller than the circumference defined by the lower part of the ridge.

Preferably, the circumference defined by the top part of the ridge is smaller than the outer circumference of the planar lid.

Optionally, the undercut feature is present just below the upper peripheral edge and is effectively a recessed groove.

Preferably, the undercut or recessed groove extends around the inner circumference of the one or more side walls.

Preferably the undercut or recessed groove is positioned between 0.1mm and 5.0mm below the top of the one or more side walls.

Preferably the undercut or recessed groove is sized to receive the resiliently deformable lid portion.

Most preferably the one or more side walls define a circumference smaller that the circumference of the lid, and the circumference of the uppercut or recessed groove is larger than the circumference of the lid such that the lid can be pushed into the undercut to close the lower container.

Advantageously, after the lid portion has been opened and the heat seal broken, the lid portion may be pushed into the uppercut or recessed groove to reclose the lower container.

According to another aspect of the present invention there is provided a method of manufacturing the lid portion of the first aspect, comprising the steps;
providing the substrate on a reel;
providing the heat-sealable film;
laminating the heat sealable film to the substrate using inline lamination; and
cutting the peripheral shape of the lid.

Optionally the peripheral shape of the lid includes an extension portion. The extension portion may be attachable to a lower container e.g. to include information regarding ingredients etc.

Optionally, the method comprises the step of printing on the substrate prior to the step of laminating the heat sealable film to the substrate using inline lamination.

Optionally, the method comprises the step of cutting one or more apertures or windows in the substrate prior to the step of laminating the heat sealable film to the substrate using inline lamination. Preferably this occurs after the step of printing on the substrate if such step is present.

Optionally the method may comprise the final step of sealing the lid to a pre-formed lower container.

In order to provide a better understanding of the present invention, embodiments will be described, by way of example only, and with reference to the following figures in which;

Figure 1 shows lid cross sectional side views of lid portions in accordance with the present invention, with 1a showing an embodiment without a viewing window and 1b showing an embodiment with a viewing window; and

Figure 2 shows an embodiment of lower pot and associated lid portion; and

Figure 3 shows an alternative lid portion that could be used with the lower pot of figure 2; and

Figure 4a and b shows an alternative embodiment of a lower pot and associated lid portion where the lid is a shaped lid, with 4 a showing a blank for the lid portion prior to it being folded into the lid formation.

The present invention relates to food container lids **1, 1'** that are used to close pre-formed food containers. As can be seen in Figure 1, the lid 1 is formed from a substrate **2** such as cartonboard which has a heat sealable film **3** laminated thereto. In the embodiments described here the heat sealable file is a PET membrane however it would be appreciated that any appropriate heat sealable film could be used. For example, the film could comprise a membrane with a coating of heat sealable material thereon. The substrate 2 imparts a level of rigidity to the lid that is not found in the heat-sealable film alone. As can be seen in Figure 1, the substrate maybe a continuous piece of material, or as depicted in Figure 2 it may have one or more windows **4** in the form of apertures cut from it. The window allows the heat sealable film to be seen, however the substrate still forms a frame **13** to impart the necessary rigidity to allow the lid to remain appropriately shaped even when it is detached from a lower container or pot.

In the embodiments described, cartonboard is the preferred substrate material. Cartonboard is made from cellulose fibres that are produced either from timber or by reusing recovered fibre or waste paper. A combination of the two can be used and there are various types of fibre that produce different characteristics. Typically, up to three layers of coating, made of clay and chalk predominantly, are added to the surface of the board. These coatings improve smoothness and gloss and are required to achieve the high-quality printing that is needed on cartons.

Figure 2 shows a particular embodiment of the present invention. A lower container **5** is provided, which is a preformed pot made from thermoformed A-PET. The lower pot 5 has a base **6** and four side walls **7** which extend upwardly from the base to define

an open topped cavity suitable for holding a range of foodstuffs such as confectionery, salads, coleslaws, pre-prepared meals etc. The upper periphery of the side walls comprises a sealing flange **8**. In the embodiment shown in figure 2, the sealing flange 8 also has a ridge **9** running partially around the its outer circumference. The ridge is shaped to receive the lid portion snugly within its circumference.

In some embodiments, the ridge 9 may have an undercut feature such that the circumference defined by the top part of the ridge 9 is smaller than both the circumference defined by the lower part of the ridge and the outer circumference of the planar lid 1. This allows the lid 1 to be push fit into the undercut portion and effectively re-closed if required.

In other embodiments, an undercut feature is provided in the upper portion of the side walls 7 and again acts to receive the lid 1 if re-closure of the pot is required.

Again, referring to figure 2, the lid 1 is provided with a frame portion 13 which is made from cartonboard with heat seal film laminated thereto, wherein the lid 1 also has a window **4** where there is only heat seal film (as shown in Figure 1b). In use, the lid 1 is heat sealed onto the sealing flange 8 of the lower pot 5. The lid also has a tab **10** which extends from a section of the lid 1 to allow the lid 1 to easily be grasped and pulled by a user to remove the heat sealed lid 1. The ridge 9 on the lower pot 5 has a space which accommodates the tab 10. In this embodiment the space is at a corner, however one skilled in the art will appreciate a tab 10 could be positioned anywhere around the circumference and can be produced in different sizes. The tab 10 could also be configured to fit into an aperture in the lower pot 5 to secure it in position when re-closed.

In this embodiment, the lid 1 also has an extension portion **11** that can wrap around the outer surface of the lower pot 5 onto the outer surface of the base 6. The extension portion 11 has score lines **12** which assist with the folding of the extension portion around the lower pot 5 and also tearing the extension portion 11 to remove the lid portion if required.

Figure 3 shows an alternative lid embodiment which does not include an extension portion.

An alternative embodiment of a lidded pot according to the invention is shown in Figures 4a and 4b. Figure 4a shows a blank that can be formed into a lid of the present invention whilst 4b shows the lid and an exemplary base (it would be understood that although the image is indicative, the base walls would typically be higher). In this case the lower pot **5''** has a base **6''** and a plurality of side walls **7''** which extend upwards therefrom to define a cavity into which foodstuff is placed. However, there is an additional sealing flange **80** which extends outwards from the side walls 7'' at substantially the same plane as the base **6''** (in fact it may be considered as an extension of the base 6''). The lid portion **1''** is shaped such that it has a roof **14** and one or more lid side walls **15** that extend down therefrom. One skilled in the art would understand that such a lid could be formed using conventional methods by folding and adhering portions of a blank formed from the laminated substrate and heat seal film. The inner circumference defined by the inside of the lid side walls 15 is slightly larger than the outer circumference defined by the side walls 7 such that the lid 1'' can fit neatly over the lower pot 5''. The lid portion 1'' may also have one or more lid flanges **16** extending substantially perpendicularly from the lower part of the lid side walls 15 which will align with the additional sealing flange of the lower pot 5'' when the lid 1'' is placed on the lower pot 5''. Notably, as the lid is formed as previously as a substrate and heat seal film laminate, the lid 1'' can be heat sealed to the lower pot 5'' either at the additional sealing flanges, at the sealing flange **8''** at the periphery of the top of the side walls 7'', or both.

The lid is manufactured using an inline lamination method. The cartonboard substrate goes through as a reel. If required, the board is printed, and if required, windows or apertures are cut in the cartonboard as it passes. The cartonboard is then inline laminated to a membrane of heat seal film. The heat seal film is a continuous sheet and, unlike the cartonboard does not have windows or apertures cut therein. A

peripheral cut is then made to give the outer shape of the lid portion and separate it from the reel.

If a shaped lid is required, the lid portion can be folded and adhered using conventional methods.

If required the lid can then be heat sealed to a thermoformed or other lower pot or container as described above.

It will be appreciated that features from one embodiment may be appropriately incorporated into another embodiment unless technically unfeasible to do so.

With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims are generally intended as “open” terms (*e.g.*, the term “including” should be interpreted as “including but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes but is not limited to,” etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to embodiments containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (*e.g.*, “a” and/or “an” should be interpreted to mean “at least one” or “one or more”); the same holds true for the use of definite

articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation is explicitly recited, those skilled in the art will recognize that such recitation should be interpreted to mean at least the recited number (*e.g.*, the bare recitation of "two recitations," without other modifiers, means at least two recitations, or two or more recitations).

It will be appreciated that various embodiments of the present disclosure have been described herein for purposes of illustration, and that various modifications may be made without departing from the scope and spirit of the present disclosure. Accordingly, the various embodiments disclosed herein are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

Claims

1. A food container lid portion configured to re-closably seal the open top of a pre-formed food container, comprising;
   a substrate defining at least an outer circumference; and
   a heat-sealable film,
   wherein said heat-sealable film is laminated to a surface of the substrate, and wherein said substrate is configured such that it will cover at least the peripheral edge of said open top of said food container; and said film is configured such that it is able to entirely cover said open top of said food container when associated therewith.

2. A food container lid portion as in Claim 1 wherein the heat-sealable film is laminated to the surface of the substrate that forms the internal surface of the food container when associated with the lower pot portion.

3. A food container lid portion as in any of the previous Claims wherein the preformed container is a plastic container.

4. A food container lid portion as in any of the previous Claims wherein the heat sealable film is a food safe material.

5. A food container lid portion as in any of the previous Claims wherein the heat sealable film is water impermeable.

6. A food container lid portion as in any of the previous Claims wherein the substrate is semi-rigid or substantially rigid.

7. A food container lid portion as in any of the previous Claims wherein the substrate is cartonboard.

8. A food container lid portion as in any of the previous Claims wherein the heat sealable film is a membrane of PET.

9. A food container lid portion as in any of the previous Claims wherein the membrane is provided with a heat seal coating to form the heat seal film.

10. A food container lid portion as in any of the previous Claims wherein the substrate may comprise one or more apertures or windows.

11. A food container lid portion as in any of the previous Claims wherein the pre-formed food container is a pot or tray.

12. A food container lid portion as in any of the previous Claims wherein the pre-formed food container is made from plastic.

13. A food container lid portion as in any of the previous Claims wherein the lid portion is resiliently deformable.

14. A food container lid portion as in any of the previous Claims wherein the lid is provided with a tab portion.

15. A lidded container comprising;
a pre-formed lower container section, said container section comprising a base portion with at least one side wall extending generally upwards therefrom to form an open topped container, and
the lid portion of any of Claim 1 to 15, where said lid portion is heat-sealed to a peripheral edge of the open topped container such that it will act as a top wall and close the container section.

16. A lidded container as in Claim 15 wherein the pre-formed food container is a pot or tray.

17. A lidded container as in Claims 15 or 16 wherein the pre-formed food container is made from plastic.

18. A lidded container as in any of Claims 15 to 17 wherein the upper peripheral edge of the open top portion of the lower container section comprises a sealing flange to which the lid portion is heat sealed.

19. A lidded container as in Claim 18 wherein the sealing flange comprises a ridge at least partially defining its circumference.

20. A lidded container as in any of Claims 15 to 19 wherein the lid portion is heat-sealed around the entire peripheral edge of the open top portion of the lower container section.

21. A lidded container as in any of Claims 15 to 19 wherein the lid portion is heat-sealed at selected points around the peripheral edge of the open top portion of the lower container section.

22. A lidded container as in any of Claims 15 to 21 wherein the upper portion of the one or more side walls of the lower container section is provided with an undercut feature.

23. A lidded container as in Claim 22 when dependent on Claim 19 wherein the undercut feature is formed in the ridge.

24. A lidded container as in Claim 23 wherein the circumference defined by the top part of the ridge is smaller than the circumference defined by the lower part of the ridge.

25. A lidded container as in Claim 22 wherein the undercut feature is present just below the upper peripheral edge and is effectively a recessed groove.

26. A lidded container as in any of Claim 22 wherein the undercut or recessed groove is sized to receive the resiliently deformable lid portion.

27. A method of manufacturing the lid portion of claims 1 to 15 comprising the steps;
providing the substrate on a reel;
providing the heat-sealable film;
laminating the heat sealable film to the substrate using inline lamination; and
cutting the peripheral shape of the lid.

28. A method of manufacturing the lid portion as in Claim 27 wherein the peripheral shape of the lid includes an extension portion attachable to a lower container.

29. A method of manufacturing the lid portion as in Claims 27 or 28 comprising the step of printing on the substrate prior to the step of laminating the heat sealable film to the substrate using inline lamination.

30. A method of manufacturing the lid portion as in any of Claims 27 to 29 comprising the step of cutting one or more apertures or windows in the substrate prior to the step of laminating the heat sealable film to the substrate using inline lamination.

31. A method of manufacturing the lid portion as in any of Claims 27 to 30 comprising the step of sealing the lid to a pre-formed lower container.

Intellectual Property Office

Application No:	GB1712203.7	**Examiner:**	Dr Kathryn Willett
Claims searched:	1-31	**Date of search:**	11 January 2018

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-31	JP 2013193757 A (TOPPAN PRINTING) See whole document, especially paragraphs [0040], [0050] and [0053].
X	1-31	US 2007/023433 A1 (VAHAVIHU) See the figures, their description and paragraphs [0016] and [0019].
X	1-31	JP 2010047268 A (TOPPAN PRINTING) See the figures, their description and paragraphs [0030] and [0033].
X	1-31	US 3934749 A (ANDRULIONIS) See whole document, especially the figures and their description.
X	1-31	US 2013/104505 A1 (MINETTE et al) See whole document, especially paragraphs [0032] and [0040].
X	1-31	US 3410697 A (STEPHENSON) See whole document, especially the figures and column 2 lines 9 to 15, column 3 lines 45 to 55, and column 4 lines 17 to 22.
X	1-31	US 3672916 A (VIRNIG) See whole document, especially the figures and their description.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

B65D

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
B65D	0043/02	01/01/2006
B65D	0077/20	01/01/2006