Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

Technical field

[0001] The present invention relates to a reinforcing support for locating over a diaphragm provided with a shaped cavity, the diaphragm used to seal an access opening of a container body. The present invention is particularly (but not exclusively) suitable for use with metal cans for packaging foodstuffs.

Background art

[0002] Containers are known which come supplied with utensils (especially spoons) for dispensing product from the container. To avoid the utensil becoming buried in the product - at least until the container is opened by the end-consumer - it is known for the containers to include a barrier to keep the utensil separate from the product stored beneath the diaphragm. The diaphragm enables the spoon to be kept separate from the product stored beneath the diaphragm.

[0003] Diaphragms of the type described above would typically be formed of inherently thin material with low lateral stiffness - as implied by the term diaphragm; for example, by using foil sheet. Shaping the cavity helps to provide the diaphragm with some rigidity - relative to a wholly planar diaphragm - and thereby offers resistance to pressure differentials. Shaping the cavity into a domed or part-spherical profile would minimise the presence of features, such as sharp corners, which would otherwise act as points of weakness on the diaphragm. Although forming the diaphragm so that it has a spherically-shaped cavity enhances the stiffness/rigidity of the diaphragm, there remains a risk that when a container comprising the diaphragm is subjected to certain environments where the pressure inside the container is greater than the pressure outside the container (i.e. a pressure differential), all or part of the diaphragm may distort. This risk would be present, for example, when transporting such a container in the pressurised cabin of an aircraft or when moving from a location at low altitude to one at high altitude. A known way of minimising the risk of this problem occurring would be to attach a closure which includes an overcap secured to the end of the container, the overcap acting as a bias member for biasing the flexible lid inwardly towards products contained within the tubular container before a vacuum is applied. The flexible lid is maintained in a biased shape until the bias member is removed. As such, the flexible lid is sufficiently restrained during the vacuum packaging process to prevent the breakage of products located adjacent the flexible lid. However, the overcap of EP 1197440 A2 is a solid, homogenous entity (and therefore relatively dense) and not adapted for use with diaphragms of the type referred to above.

[0005] Consequently, there is a need for an improved means of resisting distortion of such a diaphragm when subjected to a pressure differential.

Disclosure of the invention

[0006] Accordingly, there is provided a reinforcing support for use with a diaphragm for sealing the access opening of a container body, the diaphragm formed with an annular region surrounding a shaped cavity, the reinforcing support comprising an annulus profiled such that it corresponds with and is locatable against all or a substantial part of the annular region of the diaphragm, characterised in that the annulus is hollow in cross-section about all or part of the annulus, the hollow annulus thereby defining an open recess, and a tamper evident band is provided to cover the opening of the recess.

[0007] By profiling the annulus profiled such that it corresponds with and is locatable against all or a substantial part of the annular region of the diaphragm, the reinforcing support resists the tendency for the diaphragm to distort when subjected to a pressure differential. Alternatively or in addition, the reinforcing support is profiled such that it is locatable against all or part of the cavity of the diaphragm.

[0008] The reinforcing support is conveniently made from a plastics material to minimise weight. Known techniques such as injection moulding may be used to manufacture the reinforcing support.

[0009] In its simplest form, the reinforcing support may simply consist of an annular ring, which in use would sit on top of the annular region of the diaphragm when the diaphragm is used for a closure on a container body. In order to retain the reinforcing support in position, a secondary closure interfacing with the periphery of the container body may also be placed over the reinforcing support and diaphragm. The secondary closure may for example, be provided by a plastic lid having a generally planar profile, the periphery of the lid provided with a downwardly extending wall section which would interface with the periphery of the container body with a “snap-fit” connection.

[0010] Providing the annulus with a hollow cross-section helps to minimise the thickness and weight of the reinforcing support compared to merely forming the reinforcing support as a homogenous solid entity. The hol-
low cross-section may extend about all or part of the annulus; maximising the circumferential extent of the hollow cross-section will increase the weight and cost savings. The weight and cost savings of a hollow annulus will be particularly noticeable when making the reinforcing support for a diaphragm having one or more inclined areas, because it would:

a) allow the reinforcing support to be correspondingly inclined to enable it to locate against the one or more inclined areas of the diaphragm, and
b) enable the opposing surface of the reinforcing support to define a generally planar surface, thereby enhancing stackability,
c) (a) and (b) both being achieved with less material than would be needed if the reinforcing support were formed as a homogenous solid entity.

Locating the removable tamper evident band above the recess results in the recess being closed and thereby avoids unwanted matter (such as dirt) collecting in the recess, whilst also providing assurance to an end-consumer that a container incorporating the reinforcing support has not been tampered with. Providing a generally planar surface enables easy stacking of containers incorporating the reinforcing support. The tamper evident band may incorporate a tear-off strip.

In a further embodiment, the reinforcing support is adapted to be releasably attachable to a container comprising the diaphragm of the present invention so as to provide a reusable seal between the inside and outside of the container. This aspect of the present invention enables a seal to be maintained between the contents of the container and the environment outside of the container even after the diaphragm has been removed. Maintaining such a seal may be particularly advantageous when considering containers for storing perishable products, such as foodstuffs. Further, it may also avoid the need for a secondary closure in order to retain the reinforcing support in position. Conveniently, the reusable seal may be provided by a snap-fit connection between all or part of the periphery of the reinforcing support and the diaphragm/container. In these situations, the reinforcing support would, in use, be performing the following roles:

a) resisting distortion of the diaphragm when the container is subjected to a pressure differential;
b) covering and protecting the thin material of the diaphragm; and/or
c) sealing and maintaining the freshness of the contents of the container once the diaphragm has been removed.

In a further embodiment, the reinforcing support further comprises retention means for releasably retaining a spoon. Most preferably, the reinforcing support is adapted to retain the spoon such that, in use, the spoon is suspended above and/or extends into the cavity of the diaphragm.

It is to be understood that the reinforcing support may be incorporated into a container comprising the diaphragm. Preferably, the container further comprises a hinge about which the reinforcing support is pivotable. This avoids the reinforcing support becoming separated from the container once the container has been opened.

Mode(s) for carrying out the invention

As shown in figures 1, 3 and 4, a closure 1 is formed by a diaphragm 2 sealed to an annular metal ring 3 along a sealing surface 4. The closure 1 is seamed onto an access opening 5 of a metal can body 6 by the use of a double seam 7 (see figure 4). The sealing surface 4 is approximately perpendicular to the longitudinal axis 8 of the can body 6 (see figure 4).

As shown in figures 1 and 2, the diaphragm 2 has an annular region 9 which surrounds a shaped cavity 10. The annular region 9 consists of a flat annular area 11 located at the periphery of the diaphragm 2 and an inclined area 12 situated inwardly of the annular area 11. The diaphragm 2 is provided with a radius of curvature of approximately 5 millimetres at the transition 13 between the annular region 9 and the cavity 10. The transition 13 defines the periphery of the cavity 10, i.e. the point from which the cavity depth is measured. The cavity 10 is generally part-spherical in shape.

As shown in figure 2, the inclined area 12 is inclined at an angle α of approximately 30° and the angle β described by the arc of the part-spherical cavity 10 is approximately 92°. Although not shown explicitly in any of the figures, the diaphragm 2 is formed from a strengthening layer of aluminium foil of 90 microns thickness coated with a peelable bond layer of heat sealable material,
in this case polypropylene.  

[0026] In an alternative embodiment, there is no inclined area, with the annular region 9 instead being generally flat. By increasing the aluminium foil thickness to 120 microns, the diaphragm with the generally flat annular region was found to provide equivalent performance against pressure differentials to a diaphragm with an inclined area.  

[0027] To provide the optimum balance between minimising use of material and providing stiffness/rigidity to the resulting diaphragm, it is preferred for the diaphragm to be formed from a foil with a metal thickness in the range 20 to 170 microns. More preferably, the metal thickness is in the range 90 to 150 microns.  

[0028] Although aluminium has been used as a material for the foil sheet, this does not preclude the use of other materials - such as plastics or other metals.  

[0029] As seen in figures 5 and 6, the can body 6 is provided with a reinforcing support 14. The reinforcing support 14 has an annulus 15, a lower surface of which is profiled to correspond with and be locatable against the flat annular area 11 and part of the inclined area 12, thereby offering resistance against distortion of the diaphragm 2 when the can body 6 is subjected to a pressure differential. At the innermost region of the annulus 15, a cylindrical wall section 16 (see figure 6) extends first upwards and then inwardly to define a planar surface 17 (see figure 7) above the cavity 10. A recessed handle 18 is provided in the planar surface 17 (see figure 7). The reinforcing support 14 is hollow in cross-section, thereby defining a recess 19 between the cylindrical wall section 16 and the periphery 20 of the reinforcing support. The reinforcing support 14 is situated on top of the diaphragm 2.  

[0030] As shown in figures 5 and 6, at the periphery 20 the reinforcing support 14 interfaces with a U-section 21, the U-section extending over the double seam 7 to attach to the periphery of the can body 6. A hinge 22 (not shown in detail) is provided between the reinforcing support 14 and the U-section 21 (see figure 6). A reusable snap-fit connection (not shown) is provided at the interface between the periphery 20 and the U-section 21 to thereby provide a reusable seal between the inside and outside of the can body 6.  

[0031] As shown in figure 7, a tamper evident band in the form of a tear-off strip 23 is provided between the cylindrical wall section 16 and the U-section 21 to cover and close the recess 19. The tear-off strip 23 is defined by V-section channels 24a, 24b which define lines of weakness along which the tear-off strip 23 may be torn. The tear-off strip 23 is provided with a tab 25 to assist in its removal.  

[0032] The underside of the planar surface 17 is provided with means (not shown) for detachably retaining a spoon 26 above and within the cavity 10.  

[0033] In the embodiment shown in the figures, the reinforcing support 14, U-section 21 and tear-off strip 23 are formed from a plastics material.

[0034] A consumer would open a can of the type shown in the figures as follows:  

[0035] First, the consumer would remove the tear-off strip 23 by pulling on the tab 25 (see figure 7), resulting in the tear-off strip progressively separating along the V-shaped channels 24a, 24b in a tearing manner. The user would engage their fingers with the handle 18 and pivot the reinforcing support 14 about the hinge 22 in order to gain access to the diaphragm 2 (see figures 6 & 7). The diaphragm 2 would be peeled from the can 6 to gain entry to the can's contents (not shown). The user would then detach the spoon 26 from the reinforcing support 14 and use it to dispense the can's contents.  

[0036] In an alternative embodiment, the spoon 26 may simply be located to rest on the bottom of the cavity 10. As a further alternative, the reinforcing support 14 may simply be completely detachable from the container and not include the hinge 22.

Claims

1. A reinforcing support (14) as claimed in claim 1, wherein the reinforcing support (14) is adapted to be releasably attachable to the container body (6) so as to provide a reusable seal between the inside and outside of the container body.

2. A reinforcing support (14) as claimed in claim 1, wherein the reinforcing support (14) is adapted to be releasably attachable to the container body (6) so as to provide a reusable seal between the inside and outside of the container body.

3. A reinforcing support (14) as claimed in claim 2, wherein the reinforcing support (14) is adapted to be releasably attachable to the container body (6) so as to provide a reusable seal between the inside and outside of the container body.

4. A reinforcing support (14) as claimed in either of claim 2 or 3, wherein the reinforcing support (14) is pivotally connectable (22) to the container body (6).

5. A reinforcing support (14) as claimed in any one of claims 1 to 4, further comprising retention means for releasably retaining a spoon (26).

6. A reinforcing support (14) as claimed in claim 5 adapted to retain the spoon (26) such that, in use, the spoon (26) is suspended above and/or extends into the shaped cavity (10) of the diaphragm (2).
7. A reinforcing support (14) as claimed in any preceding claim, wherein the tamper evident band (23) covers the opening of the recess to define a generally planar surface.

8. A container comprising a container body (6) having a sidewall and a base, characterised in that the container further comprises:

- a diaphragm (2) formed with an annular region (9, 11, 12) surrounding a shaped cavity (10), the diaphragm (2) sealing an access opening (5) of the container body (6); and
- the reinforcing support (14) as claimed in any one of claims 1 to 7.

9. A container as claimed in claim 8, wherein the diaphragm (2) is peelably sealed along a sealing surface, the sealing surface inclined at between 45° to 135° relative to the longitudinal axis of the container.

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Patentansprüche

1. Verstärkungsstütze (14) zur Verwendung mit einem Diaphragma (2) zum Abdichten der Zugangsöffnung (5) eines Behälterrumpfes (6), wobei das Diaphragma (2) mit einem ringförmigen Bereich (9, 11, 12) geformt ist, der einen geformten Hohlraum (10) umgibt, und die Verstärkungsstütze (14) einen Ring (15) aufweist, der so profiliert ist, dass er korrespondiert mit dem ganzen ringförmigen Bereich (9, 11, 12) des Diaphragmas (2) oder einem wesentlichen Teil des ringförmigen Bereichs (9,11,12) des Diaphragmas (2) und gegen den ganzen ringförmigen Bereich (9, 11,12) des Diaphragmas (2) oder wesentlichen Teil des ringförmigen Bereichs (9, 11, 12) des Diaphragmas (2) positionierbar ist, dadurch gekennzeichnet, dass der Ring (15) im Querschnitt über den ganzen Ring (15) oder einen Teil des Rings (15) hohl ist, der hohe Ring (15) dadurch eine offene Verliefung (19), bildet und ein Band (23), das einen unbefugten Eingriff offensichtlich macht, vorgesehen ist, um die Öffnung der Verliefung (19) zu bedecken.

2. Verstärkungsstütze (14) wie in Anspruch 1 beansprucht, wobei die Verstärkungsstütze (14) angepasst ist, um lösbare an dem Behälterrumpf (6) befestigbar zu sein, so dass eine wiederverwendbare Dichtung zwischen der Innenseite und Außenseite des Behälterrumpfes gegeben ist.

3. Verstärkungsstütze (14) wie in Anspruch 2 beansprucht, wobei die wiederverwendbare Dichtung durch eine Schnapp-Pass-Verbindung gegeben ist.

4. Verstärkungsstütze (14) wie in einem der Ansprüche 2 oder 3 beansprucht, wobei die Verstärkungsstütze (14) schwenkbar mit dem Behälterrumpf (6) verbindbar ist (22).

5. Verstärkungsstütze (14) wie in einem der Ansprüche 1 bis 4 beansprucht, ferner ausweisend Haltemittel zum lösbaren Halten eines Löfels (26).

6. Verstärkungsstütze (14) wie in Anspruch 5 beansprucht, die angepasst ist, um den Löfel (26) so zu halten, dass, bei Verwendung, der Löfel (26) gehalten ist über dem und/oder sich erstreckt in den geformten Hohlraum (10) des Diaphragmas (2).

7. Verstärkungsstütze (14) wie in einem vorhergehenden Anspruch beansprucht, wobei das einen unbe- fugten Eingriff offensichtlich machende Band (23) die Öffnung der Vertiefung bedeckt, um eine allgemein ebene Fläche zu bilden.

8. Behälter, der einen Behälterrumpf (6) mit einer Seitenwand und einer Basis aufweist, dadurch gekennzeichnet, dass der Behälter ferner aufweist ein Diaphragma (2), das mit einem ringförmigen Bereich (9,11,12), der einen Hohlraum (10) umgibt, geformt ist, wobei das Diaphragma (2) eine Zugangsöffnung (5) des Behälterrumpfes (6) abdichtet; und Verstärkungsstütze (14) wie in einem der Ansprüche 1 bis 7 beansprucht.

9. Behälter wie in Anspruch 8 beansprucht, wobei das Diaphragma (2) abziehbar entlang einer Dichtfläche dichtend befestigt ist und die Dichtfläche mit zwischen 45° bis 135° relativ zu der Längsachse des Behälters geneigt ist.

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Revendications

1. Support de renfort (14) destiné à être utilisé avec une membrane (2) afin de sceller l’ouverture d’accès (5) d’un corps de conteneur (6), la membrane (2) étant constituée d’une région annulaire (9, 11, 12) entourant une cavité (10), le support de renfort (14) comprenant un anneau (15) profilé complémentaire et positionnable contre l’intégralité ou une partie substantielle de la région annulaire (9, 11, 12) de la membrane (2), caractérisé en ce que l’anneau (15) est creux en section transversale autour de l’intégralité de l’anneau (15) ou d’une partie de celui-ci, l’anneau creux (15) définissant ainsi un évidement ouvert (19), et en ce qu’une bande d’inviolabilité (23) est fournie pour recouvrir l’ouverture de l’évidement (19).

2. Support de renfort (14) tel que revendiqué dans la revendication 1, dans lequel le support de renfor:
(14) est adapté à être fixé, de manière détachable, au corps de conteneur (6) de façon à fournir un joint réutilisable entre l’intérieur et l’extérieur du corps de conteneur.

3. Support de renfort (14) tel que revendiqué dans la revendication 2, dans lequel le joint réutilisable est fourni par un raccord encliquetable.

4. Support de renfort (14) tel que revendiqué dans l’une ou l’autre des revendications 2 ou 3, dans lequel le support de renfort (14) peut se raccorder (22), en pivotant, au corps du conteneur (6).

5. Support de renfort (14) tel que revendiqué dans l’une quelconque des revendications 1 à 4, comprenant en outre un moyen de retenue permettant de retenir, de manière détachable, une cuillère (26).

6. Support de renfort (14) tel que revendiqué dans la revendication 5 conçu pour retenir la cuillère (26) de telle sorte que, pendant l’utilisation, la cuillère (26) est suspendue au-dessus et/ou s’étend dans la cavité (10) de la membrane (2).

7. Support de renfort (14) tel que revendiqué dans l’une quelconque des revendications précédentes, dans lequel la bande d’inviolabilité (23) recouvre l’ouverture de l’évidement afin de définir une surface généralement plane.

8. Conteneur comprenant un corps de conteneur (6) ayant une paroi latérale et une base, caractérisé en ce que le conteneur comprend en outre:

   une membrane (2) constituée d’une région annulaire (9, 11, 12) entourant une cavité (10), la membrane scellant une ouverture d’accès (5) du corps de conteneur (6) ; et le support de renfort (14) tel que revendiqué dans l’une quelconque des revendications 1 à 7.

9. Conteneur selon la revendication 8, dans lequel la membrane (2) est scellée, de manière pelable, le long d’une surface d’étanchéité, la surface d’étanchéité étant inclinée entre 45° et 135° par rapport à l’axe longitudinal du conteneur.
Fig. 5
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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