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(54) PRESS-ON CLOSURE WITH PEELABLE END PANEL

AUFDRUCKVERSCHLUSS MIT ABLÖSBAREM ENDPANEEL

DISPOSITIF DE FERMETURE A PRESSION A PAN TERMINAL DETACHABLE

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(73) Proprietor: POLYSTAR PACKAGING INCORPORATED
Norwalk, CT 06854 (US)

(72) Inventors:
• ROTH, Donald, J.
  Westport, CT 06880 (US)

• SAUER, Donald, G.
  Harwinton, CT 06791 (US)

• FRASER, Robert, W.
  Stamford, CT 06903 (US)

(74) Representative: Goddard, David John et al
Harrison Goddard Foote,
Vine House,
22 Hollins Lane
Marple Bridge, Stockport SK6 5BB (GB)

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Description

This invention relates in general to new and useful improvements in closures for containers, particularly containers which have a tubular body and an open end which is to be closed by a closure such as an end unit.

BACKGROUND OF INVENTION

There have been developed closures for containers, particularly cans, which include removable end panels. These closures include a peripheral frame having peelably bonded thereto an end panel. When containers incorporating such closures are subjected to post-filling treatment including rototining or high vacuum, positive or negative pressure is built up within the container with the result that the end panel flexes axially outwardly or inwardly and has a tendency to internally initiate peeling from the frame. This can result in improperly sealed containers.

WO91/089568 on which the preamble of claim 1 is based describes a closure of the type described above.

Another problem with closures of this type is the securement of the closure to the container. There is a great need for a closure which can be tightly sealed and permanently attached to a container by merely applying heat and an axial pressure on the closure after it has been seated on the container.

SUMMARY OF THE INVENTION

According to the present invention there is provided a closure for a container, the closure comprising an open frame and a closure panel having a peripheral portion, said open frame defining a generally inflexible inner peripheral ledge for receiving in sealed relationship said peripheral portion of said closure panel by being seated on said ledge and bonded thereto, said closure being characterized by said frame having a radially inwardly projecting flexible flange forming an extension of said generally inflexible ledge, said peripheral portion of said closure panel being also seated on and bonded to said flexible flange.

One feature of the invention is the forming of a closure which includes a frame, formed of thermoplastic material, defining an axially outwardly facing ledge on which there is seated a peripheral portion of an end panel with that peripheral portion being peelably bonded to the ledge. The end panel is formed of a flexible material and should there be internal pressure different from atmospheric pressure, such as during pressure cooking or vacuum processing, the end panel will bulge either outwardly or inwardly. During any outward bulging of the end panel, such as during a retot operation, there was a tendency for the end panel to begin peeling from the ledge at the inner edge of the ledge. In accordance with this invention, the frame is provided with a radially inwardly extending flange which forms an extension of the ledge. The frame is formed of a flexible material and the flange, being very thin and being peelably bonded to the underside of the end panel, can flex with the end panel and eliminate any internally initiated peeling of the end panel from the frame. The area of adhesion between the end panel and the flange will experience shear forces instead of forces tending to peel the end panel from the frame.

Another feature of the closure is the formation of the frame on one side thereof with a downwardly opening groove in which there is received a curl formed at the end of a container. The container curl terminates in a raw edge which in accordance with the configuration of the frame becomes embedded in the thermoplastic frame and serves to protect the raw edge against corrosion as well as to lock the frame on the container.

Most specifically, the closure frame includes a depending skirt which has an upper part forming part of the groove. This skirt is deformable under heat and pressure as the frame is being forced down onto the container curl and aids in the reception of the raw edge of the container.

Another feature of the invention is to provide for easier opening of the end panel by forming a sloped surface on the frame which precludes bonding to the peripheral edge of the end panel.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a top plan view of a container closed with a closure formed in accordance with this invention.

Fig. 2 is a fragmentary transverse vertical sectional view taken generally along the line 2-2 of Fig. 1 and shows the specific construction of the closure resting upon a specifically formed curl at the end of the container incident to the start of attaching the closure to the container.

Fig. 3 is a view similar to Fig. 2 but showing the closure interlocked with the container curl after heat and axial pressure have been applied to the closure.

Fig. 4 is a fragmentary sectional view showing the deformation of the end panel of the closure due to internal pressure within the container.

Fig. 5 is a fragmentary vertical sectional view similar to Fig. 4 and shows the deformation of the end panel in response to a vacuum within the container.

Fig. 6 is a fragmentary sectional view showing a modified form of end panel.

DESCRIPTION OF PREFERRED EMBODIMENT OF INVENTION

Referring now to the drawings in detail, it will be
seen that there is illustrated a closure which is generally identified by the numeral 10 which closes one open end of a container generally identified by the numeral 12. The closure 10 includes a molded plastic frame, generally identified by the numeral 14, which carries a peelable plastic end panel generally identified by the numeral 16.

The basic concept of the molded plastic frame 14 and a peelable end panel 16 is the subject of a pending application and will not be described in complete detail here. However, it is to be understood that the frame 14 is formed of a resilient plastic material, such as polypropylene, which may be readily injection molded. In a like manner, the end panel 16 will be formed of a flexible plastic material which may be polypropylene, or other resin, or which may be a laminate, as will be described in more detail hereinafter.

The frame 14 includes a body 18 which has depending from a radially outer part thereof a skirt 20. The frame also includes an upstanding ridge 22 which stiffens the frame 14. The ridge 22 further includes an upstanding rim 24 which together with the ridge 22 defines an annular recess 26. This recess 26 has a lower boundary in the form of a ledge 28 on which an outer peripheral part of the end panel is suitably bonded.

As is best shown in Fig. 1, in order to open the container, the end panel 16 is provided with a pull tab 30 which is attached to the end panel 16 by a strap 32. The ridge 22 and the rim 24 are notched as at 34 to receive the strap 32.

The closure 10 as described to this point is known in the art.

It is to be understood that the closed container 12 is subject to internal high pressures and the vacuum different from atmospheric pressure. For example, the product may be one which must be retorted after filling and the high temperature of the retort results in an internal expansion of the product and the gases in the head space with the result that the flexible end panel 16 will bulge outwardly as is schematically shown in Fig. 4. It has been found in the past that the outward bulging of the end panel 16 can result in the initiation of peeling of the end panel 16 from the ledge 28 beginning at the inner edge 29 of the ledge 28.

In accordance with this invention, the frame 14 has been modified with respect to prior frames by the addition of a radially inwardly directed flange 36 which has an outer surface which forms a continuation of the ledge 28. The flange 36 is thin and relatively flexible as compared to the relatively inflexible ledge 28 and other portions of the frame 14 so that flange 36 is readily deformable.

Inasmuch as the end panel 16 is also peelably bonded to the flexible flange 36, it will be seen that when there is internal pressure applied against the end panel 16 and the end panel 16 bows axially outwardly or upwardly, as shown in Fig. 4, instead of an edge of the securement between the end panel 16 and the ledge 28 being available, there is the flange 36 which is free to bend with the end panel 16 and there is no adequate peeling force to initiate peeling between the end panel 16 and the frame 14 at inner edge 29.

Referring now to Fig. 5, it will be seen that the flexibility of flange 36 in no way detracts from the radially inwardly directed deflection of the end panel 16 in the event a vacuum is drawn within the container 12.

In the past, the ledge 28 has been formed by notching the upper surface of the frame 14. As a result, the peripheral edge of the end panel 16 opposed an standing surface of the frame 14 and had a tendency to bond thereto so as to restrict easy opening of the end panel 16. In the present construction of the frame 14, this direct notch arrangement is eliminated and the surface of the frame 14 which forms a continuation of the ledge surface slopes upwardly and radially outwardly to provide a sloped surface as at 38 so that a free edge 40 of the end panel 16 remains free of an upstanding wall 41. This allows for easier opening when the end panel 16 is being peeled to an open position with respect to the frame 14.

ATTACHMENT OF CLOSURE TO CONTAINER

The preferred container 12 is in the form of a metal can which includes a tubular body 42. The body 42 is closed at the opposite end thereof (not shown) in any conventional manner. Container body 42 includes an upper portion 44 which at its extreme end terminates in a radially outwardly and downwardly directed curled 48. The curled 48 includes an inner part 50 which is an integral extension of upper portion 44. Next, the curled 48 includes a reversely turned part 52 which depends downwardly and outwardly and terminates in a free raw edge 54.

As shown in Fig. 3, the upper portion 44 of container 12 is disposed at an angle A to a vertical line 56. This angle A may vary between 0 degrees and 25 degrees with a preferred angle A being about 15 degrees.

As previously described, the frame 14 includes a lowermost and outermost depending skirt 20. This skirt is elongated and is tapered in wall thickness so as to be of a minimum wall thickness at the free lower end thereof. The skirt 20 includes an inner wall surface 60 and an outer wall surface 62.

The upper portion of the skirt 20 forms a radially outward portion of the wall surface of a downwardly opening groove 64, a preferred shape of which is shown in Fig. 2. The groove 64 at its radially inner end terminates in a reversely curved radially innermost lower part 66 of the frame 14.

The container 12 is to be closed at its upper portion 44 by having the closure 10 applied thereto simply by seating the closure 10 on the curled 48 and applying a downward force on the ridge 22 generally in vertical alignment with the curled 48 and axially of container 12. As a result, the curled 48 is forced into groove 64. Curl 48 is preferably heated by induction heating and causes
softening and/or slight melting of the ceiling and walls of groove 64 to get proper penetration of curl 48 into frame 14 and assure a good adhesive bond. Because of the softness of the frame 14, as the curl 48 enters into the groove 64, it becomes seated therein and due to its angular relationship to the vertical, at angle A, as the curl 48 seats in the groove 64, the raw edge 54 becomes embedded in the upper part of the skirt 20 as is clearly shown in Fig. 3. The softened, and molten, portion of the frame 14 forms an inner bead 66 and an outer bead 68. The outer bead 68 not only functions to embed raw edge 54, it serves to permanently lock the closure 10 onto the container 12 under all conditions of use including the time in which the container 12 is internally pressurized as the result of heating of the product when retorted.

Inasmuch as the curl 48 is in adhesive engagement with the underside of the frame 14 within the recess 64, a pressure seal is formed.

In Figs. 3-5 the end panel 16 has been illustrated as being of a single thickness. When the product which is packaged is sensitive to gases permeating through the closure, the end panel may be of a construction as illustrated in Fig. 6 wherein an end panel 16A is illustrated. This end panel is of a laminated construction including an outer layer 70, an inner layer 72 and an intermediate layer 74. The layers 70 and 72 are preferably formed of polypropylene or like plastic while the inner layer is a barrier layer and is preferably formed of a barrier plastic such as EVOH, PVDC or similar materials.

Although only a preferred embodiment of the closure including the mounting of the end panel with respect to the frame and the mounting of the closure on the container have been specifically illustrated and described herein, it is to be understood that variations may be made within the scope of the invention as defined by the appended claims.

Claims

1. A closure (10) comprising an open frame (14) and a closure panel (16) having a peripheral portion, said open frame defining a generally inflexible inner peripheral ledge (28) for receiving in sealed relationship said peripheral portion of said closure panel (16) by being seated on said ledge (28) and bonded thereto, said closure being characterized by said frame (14) having a radially inwardly projecting flexible flange (36) forming an extension of said generally inflexible ledge (28), said peripheral portion of said closure panel being also seated on and bonded to said flexible flange (36).

2. A closure according to claim 1 wherein said peripheral portion of said closure panel (16) is in sealed peelable relationship with said ledge (28) and flange (36).

3. A closure according to either claim 1 or claim 2 wherein said closure panel is subjectable to axial bowing, said flexible flange (36) being bowable with said closure panel (16) for preventing internally initiated peeling of said closure panel from said generally inflexible ledge (28).

4. A closure according to any one preceding claim wherein said closure panel (16) has a pull tab (30) for peeling said closure panel from said ledge and said flexible flange.

5. A closure according to any one preceding claim wherein said flange (36) is an integral part of said frame (14).

6. A closure according to any one preceding claim wherein said end panel (16) has a free outer peripheral edge (40).

7. A closure according to any one preceding claim wherein said frame (14) has means (64, 20) for sealing attachment to an open ended container (12).

8. A closure according to any one preceding claim wherein said frame (14) is of a molded plastic construction.

9. A closure according to either claim 7 or claim 8 wherein said frame is particularly shaped (64, 20) for receiving a reversely and radially outwardly turned curl (52) of a container (12) in sealed relation.

10. A closure according to any one preceding claim from 7 to 9 wherein said frame is particularly shaped (64, 20) for receiving a reversely and radially outwardly turned curl (52) of a container (12) in mechanically interlocked (66, 68) sealed (64) relation.

11. A closure according to any one preceding claim from 7 to 10 wherein said frame configuration includes a downwardly opening groove (64) in an underside of said frame, said groove being in part defined by an outer depending skirt (20) depending beyond said groove.

12. A closure (10) and container (12) assembly, said assembly comprising a container (12) having an open end defined by a reversely turned curl (52) terminating in an outermost raw edge (54), and a closure (10) including a peripheral plastic frame (14) formed of heat-softenable plastic, said frame being of a configuration including a downwardly opening groove (64) receiving said curl (52), said groove being in part defined by a downwardly sloping plastic skirt (20) forming part of said plastic frame, means
Verschluß (10) mit einem offenen Rahmen (14) und einer Verschlußplatte (16), die einen Umfangabschnitt umfaßt, wobei der offenen Rahmen einen allgemein starren, inneren Umfangsrand (28) zur Aufnahme des am Rand (28) aufliegenden und mit diesem in abgedichteter Weise verbundenen Umfangsabschnitts der Verschlußplatte (16) festlegt, wobei der Verschluß dadurch gekennzeichnet ist, daß der Rahmen (14) einen radial nach innen vorspringenden, biesamen Flansch (36) aufweist, der eine Verlängerung des allgemeinen starren Randes (28) ausbildet, wobei der Umfangabschnitt der Verschlußplatte auch auf dem biesamen Flansch (36) aufliegt und mit diesem verbunden ist.

2. Verschluß nach Anspruch 1, bei dem der Umfangsabschnitt der Verschlußplatte (16) in abgedichteter, aber abziehbarer Weise mit dem Rand (28) und dem Flansch (36) in Verbindung steht.

3. Verschluß nach Anspruch 1 oder 2, bei dem die Verschlußplatte einer axialen Verbiegung unterworfen ist, wobei der biesame Flansch (36) zusammen mit der Verschlußplatte (16) verziehbar ist, um ein auf der Innenseite eingebautes Ablösen der Verschlußplatte von dem im allgemeinen starren Rand (28) zu verhindern.


5. Verschluß nach einem der vorhergehenden Ansprüche, bei dem der Flansch (36) ein integraler Bestandteil des Rahmens (14) ist.

6. Verschluß nach einem der vorhergehenden Ansprüche, bei dem die Endplatte (16) eine freie Außenumfangskante (40) aufweist.

7. Verschluß nach einem der vorhergehenden Ansprüche, bei dem der Rahmen (14) mit Einrichtungen (64, 20) zum dichtenden Befestigen an einem ein offenes Ende aufweisenden Behälter (12) versehen ist.


9. Verschluß nach Anspruch 7 oder 8, bei dem der Rahmen insbesondere zur abgedichteten Aufnahme einer umgewendeten und radial nach außen gedrehten Umbiegung (52) eines Behälters (12) ausgebildet ist.

10. Verschluß nach einem der vorhergehenden Ansprüche 7 bis 9, bei dem der Rahmen zur abgedichten, mechanisch verriegelbaren (66, 68) Aufnahme einer umgewendeten und radial nach außen gedrehten Umbiegung (52) eines Behälters (12) ausgebildet ist.

11. Verschluß nach einem der vorhergehenden Ansprüche 7 bis 10, bei dem die Rahmenkonfiguration eine nach unten hin offene Vertiefung (64) auf einer Unterseite des Rahmens aufweist, die teilweise von einem äußeren herabhängenden Rand (20), der über diese Vertiefung herabhängt, festgelegt wird.

12. Aus einem Verschluß (10) und einem Behälter (12) bestehende Anordnung, die einen Behälter (12) mit einem offenen Ende, das von einer umgewendeten Umbiegung (52) festgelegt wird, die in eine äußere Gradkante (54) ausläuft, sowie einen Verschluß (10) mit einem aus wärmeerweichbarem Kunststoff bestehenden Kunststoff-Umfangsrahmen (14) aufweist, der aus einer Konfiguration besteht, die zur Aufnahme der Umbiegung (52) eine nach unten offene Vertiefung (64), die teilweise von einem nach unten verlaufenden Kunststoffrand (20) festgelegt wird, der seinerseits Bestandteil des Kunststoff-Rahmens ist, sowie Mittel umfaßt, die zum induktiven Heizen und zum Erweichen des Kunststoffrandes verwendbar sind, wobei die Gradkante (54) in diesen Kunststoffrand (20) eingebettet ist, der Rahmen einen radial nach innen gerichteten Rand (28) festlegt, der axial nach außen verläuft, und wobei eine biesame Endplatte (16) vorgesehen ist, die auf dem Rand sitzt und am Rand nach innen hin in ablösbarer Weise angesiegelt ist, wobei eine Zuglasche (30) von der Endplatte (60) zu deren Abziehen vom Rand (28) getragen wird, dadurch gekennzeichnet, daß der Rahmen einen biesamen Flansch (36) mit einer axial nach außen weisenden Fläche aufweist, die eine Verlängerung des Randes.
Recommandations

1. Fermeture (10) comprenant un cadre ouvert (14) et un panneau de fermeture (16) comportant une partie périphérique, ledit cadre ouvert définissant un rebord (28) périphérique intérieur sensiblement rigide, apte à recevoir de manière scellée ladite partie périphérique dudit panneau de fermeture (16) en étant en appui sur ledit rebord (28) et fixé à celui-ci, ladite fermeture étant caractérisée en ce que ledit cadre (14) présente une colerette (36) flexible et faisant saillie vers l'intérieur radialement, et formant un prolongement dudit rebord (28) sensiblement rigide, ladite partie périphérique dudit panneau de fermeture étant également en appui sur et fixée à ladite colerette flexible (36).

2. Fermeture selon la recommandation 1, caractérisée en ce que ladite partie périphérique dudit panneau de fermeture (16) est liée audit rebord (28) et à ladite colerette (36) de manière détachable.

3. Fermeture selon l'une des recommandations 1 ou 2, caractérisée en ce que ledit panneau de fermeture est apte à plier de manière axiale, ladite colerette (36) flexible étant susceptible de plier avec ledit panneau de fermeture (16) pour empêcher le détachement provoqué de manière interne de ladite fermeture, dudit rebord sensiblement rigide (28).

4. Fermeture selon l'une des recommandations précédentes, caractérisée en ce que ledit panneau de fermeture (16) comporte une languette de traction (30) pour permettre le détachement dudit panneau de fermeture dudit rebord et de ladite colerette flexible.

5. Fermeture selon l'une des recommandations précédentes, caractérisée en ce que ladite colerette (36) forme une partie intégrante dudit cadre (14).

6. Fermeture selon l'une des recommandations précédentes, caractérisée en ce que ledit panneau terminal (16) présente un bord (40) périphérique libre vers l'extérieur.

7. Fermeture selon l'une des recommandations précédentes, caractérisée en ce que ledit cadre (14) comporte des moyens (64, 20) permettant sa fixation à un récipient (12) à extrémité ouverte.

8. Fermeture selon l'une des recommandations précédentes, caractérisée en ce que ledit cadre (14) est réalisé en plastique moulé.

9. Fermeture selon l'une des recommandations 7 ou 8, caractérisée en ce que ledit cadre est formé (64, 20) de manière à recevoir et être fixé à un bord recourbé et tourné radialement vers l'extérieur (52) d'un récipient (12).

10. Fermeture selon l'une des recommandations 7 à 9, caractérisée en ce que le cadre est formé (64, 20) de manière à recevoir un bord (52) recourbé et tourné radialement vers l'extérieur d'un récipient (12) et lié (64) par une fixation à liaison interdépendante (66, 68).

11. Fermeture selon l'une des recommandations 7 à 10, caractérisée en ce que la configuration dudit cadre comporte une gorge (64) ouverte vers le bas et située du côté intérieur dudit cadre, ladite gorge étant en partie définie par une jupe pendante (20) vers l'extérieur et allant au-delà de ladite gorge.

12. Ensemble de fermeture (10) et récipient (12), ledit ensemble comprenant un récipient (12) comportant une extrémité ouverte définie par un bord (52) retourné et se terminant par un bord à l'état brut (54) le plus à l'extérieur, et une fermeture (10) incluant un cadre périphérique (14) en plastique, formé en plastique susceptible d'être ramolli à la chaleur, le dit cadre présentant une configuration comportant une gorge (64) ouverte vers le bas apte à recevoir ledit bord (52), ladite gorge étant en partie définie par une jupe (20) en plastique et en pente vers le bas, et formant une partie dudit cadre en plastique, des moyens aptes à permettre de chauffer et ramolir ladite jupe en plastique, ledit bord (54) brut étant encastré dans ladite jupe en plastique (20), ledit cadre définissant un rebord (28) disposé vers l'intérieur radialement, et faisant face axialement vers l'extérieur, à un panneau (16) terminal flexible portant sur ledit rebord et fixé audit rebord de manière détachable vers l'intérieur, une languette de traction (30) portée par ledit panneau terminal (16) pour détacher ledit panneau terminal dudit rebord (28), caractérisé en ce que ledit cadre comporte une colerette (36) flexible avec une surface tournée vers l'extérieur de manière axiale et formant un prolongement dudit rebord (28), ladite colerette flexible (36) étant liée audit panneau terminal (16) et étant apte à se plier avec ledit panneau terminal sans détachement provoqué de manière interne.