

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO VACUUM PACKAGING

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(71) I. GINO BEGHINI, a French citizen of 42 Rue d'Avron 75020, Paris, France do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to vacuum packaging, for example of food products and industrial materials, such as paints, and particularly to lid assemblies for closing containers to be evacuated.

In such vacuum packaging, the evacuating facility demands that the container comprises a lid having a valve which comprises an opening in the lid closed by a valve member. The valve member is attached to the lid by a hinged connection and can lift freely on evacuation and close the opening hermetically on return of the pressure externally of the container to atmospheric pressure.

Moreover, such a valve member, which only closes the opening under the influence of external pressure, must have sufficient dimensions not to lift at the least effort, and must close the opening sufficiently well to prevent entry of air into the container.

According to the present invention, there is provided a lid assembly for closing a container to be evacuated, the assembly comprising a lid having a portion defining an opening; a valve member connected to the lid for closing the opening; inner and outer lips on the lid for engaging a container rim portion surrounding an opening in the container to be closed by the lid assembly; and first and second lips on the lid portion defining the opening, said first lip extending outwardly of the lid generally perpendicular to the general plane of the lid and said second lip extending generally parallel to the general plane of the lid inwardly of the opening when the opening is not closed by the valve member.

A lid assembly in accordance with the invention and modifications thereof will now be described, by way of example, with reference to the accompanying drawings.

In the drawings:

Figure 1 is a sectional view of the lid assembly applied to a jar;

Figure 2 is a sectional view of a valve member

of the lid assembly of Figure 1.

Figure 3 is an enlarged sectional view through half the lid assembly of Figure 1, with vacuum established in the jar;

Figure 4 is a sectional view showing one modification of the lid assembly of Figure 1; and

Figure 5 is a sectional view showing another modification of the lid assembly of Figure 1.

The lid assembly shown in Figures 1, 2 and 3 is of moulded plastics material and includes a main part 1 provided with a peripheral circular skirt 2 having an inwardly projecting bead 3 which in use engages under a bead on the neck of the jar B.

Part 1 of the lid is reinforced by stiffening ribs 4 and provided with a central opening 5 of a valve and which receives a valve member 6, of generally frusto-conical form, hingedly connected to the lid by a tongue 7. When the member 6 is positioned in opening 5, tongue 7 is received in a recess 8 in the part 1 and a gripping tab 9 connected to member 6 diametrically opposite tongue 7 is received in a recess 10 in the lid diametrically opposed to recess 8. Part 1 of the lid is provided with two internal peripheral lips 11 and 12 which in use bear on either side of the edge of the neck of the jar. Outer lip 11 is slightly spaced from the skirt 2 so as to be able to lie against it and lip 12 has an inclined face 12a on one side which bears on the neck edge and an axial face on the other side such that, under the effect of a pressure differential across the lid which draws the lid inwardly of the jar (see Figure 3), face 12a is applied to the inner surface of the jar neck.

Opening 5 is cylindrical and has at its base, an axially directed lip 13 and a lip 14 extending substantially perpendicularly to lip 13. As shown, the opening 5 is inwardly covered by a perforated bowl 15 which is designed to protect valve member 6 from shocks applied by the products contained in the jar.

The gripping tab 9 is provided with an eye 16 provided with a transverse bar 17. A nipple 18 provided in recess 10 is engaged in the eye 16 when the member 6 is received in opening 5, bar 17 being located in a groove 19 in the nipple. Valve member 6 comprises a first cylindrical portion 20 connected conically to a

second cylindrical portion 21 of small diameter, followed by a frusto-conical portion 22 connected by a cylindrical portion 23 to a frusto-conical portion 24. The portion 24 is inclined at an angle of approximately 33° and is closed by a domed base 25, the concavity of the base facing inwardly of the jar.

When a vacuum has been established in the jar and the valve member is applied by the external pressure (see Figure 3), cylindrical portion 20 plugs cylindrical opening 5 and cylindrical portion 21 is in contact with lip 13, which forms a seal therewith; lip 14 bends and is applied against conical portion 22, while base 25 becomes domed in the opposite direction, i.e. with the concavity facing outwardly.

The lid itself bends under the influence of the external pressure and face 12a of lip 12 is applied to the inner surface of the jar neck, while lip 11, pushed against skirt 2, is applied to the outer edge of the jar neck, leaving a chamber 26 above the rim of the jar neck. This chamber 26 is at a pressure intermediate the vacuum in the jar and the external pressure.

Chamber 27, which remains between lips 13 and 14 and portion 22 of the valve is also at a pressure intermediate the vacuum in the jar and the external pressure.

To form a vacuum in the jar, a suction head connected to a vacuum-pump is applied to the lid, or the jar with its lid is placed in a chamber in which a vacuum is formed. Under the influence of the suction, the valve member lifts and a vacuum is formed in the jar. As soon as pumping ceases, the valve member returns into opening 5 and, when the lid is subjected to atmospheric pressure, the valve member is firmly applied to close the opening, as shown in Figure 3.

Figures 4 and 5 show modifications of the above-described lid, which have been adapted to the particular type of container to be closed thereby. In Figure 4, bead 3 has been replaced by a thread 28, for a screw-necked container, while in Figure 5, the bead of skirt 2 has been omitted, the lid being held on the container only by the effect of the external pressure.

The above-described lid assembly can be fitted in a fluid-tight manner to a jar or other container. The evacuation valve is easily operable while ensuring perfect fluid-tightness.

The invention is not limited to the embodiment described and illustrated but, on the contrary, covers all its modifications within the scope of the appended claims.

WHAT I CLAIM IS:-

1. A lid assembly for closing a container to be evacuated, the assembly comprising a lid having a portion defining an opening; a valve member hingedly connected to the lid for closing the opening; inner and outer lips on the lid for engaging a container rim portion surrounding an opening in the container to be closed by the lid assembly; and first and second lips on the lid portion defining the opening, said first lip

extending generally perpendicular to the general plane of the lid and said second lip extending generally parallel to the general plane of the lid inwardly of the opening in the lid, when said opening is not closed by the valve member.

2. A lid assembly according to claim 1, wherein the valve member is generally frusto-conical.

3. A lid assembly according to claim 1 or 2, wherein gripping means are connected to the valve member for securing the valve member to the lid portion.

4. A lid assembly according to claim 3, wherein the gripping means comprises a tab comprising an eye having a transverse bar which clips on to a nipple attached to the lid, the nipple having a groove for receiving the bar.

5. A lid assembly according to any of the preceding claims, wherein the valve member comprises a first cylindrical portion having a diameter substantially equal to that of the opening in the lid, a second cylindrical portion having a diameter substantially equal to the diameter of a further opening defined by said first lip, a frusto-conical portion, another cylindrical portion, and another frusto-conical portion closed by a domed end portion, the concavity of the end portion facing inwardly of the lid.

6. A lid assembly according to any of the preceding claims wherein the opening in the lid is covered inwardly of said lid by a perforated bowl which receives the valve member.

7. A lid assembly according to any of the preceding claims, wherein the lid comprises a skirt, spaced from the outer lip, which is adapted to enclose the rim portion of the container, the inner lip having an inclined face which bears, in use, on the rim of the container and a face extending perpendicular to the general plane of said lid.

8. A lid assembly according to any of the preceding claims, wherein in use of the lid assembly two annular chambers at intermediate pressure are defined, one chamber between said inner and outer lips and the other chamber between said first and second lips.

9. A lid assembly according to any of the preceding claims, wherein the lid and valve member are moulded of plastics material and are hingedly connected together by a tongue moulded integrally therewith.

10. A lid assembly for closing a container to be evacuated, the assembly comprising a lid having a portion defining an opening and a skirt for surrounding the end portion of the container; a generally frusto-conical valve member for closing the opening; first and second lips on said lid portion, said first lip extending generally axially of the opening and said second lip extending generally normal thereto when the opening is not closed by the valve member; a generally frusto-conical valve member for closing the opening the valve



second cylindrical portion 21 of small diameter, followed by a frusto-conical portion 22 connected by a cylindrical portion 23 to a frusto-conical portion 24. The portion 24 is inclined at an angle of approximately 33° and is closed by a domed base 25, the concavity of the base facing inwardly of the jar.

When a vacuum has been established in the jar and the valve member is applied by the external pressure (see Figure 3), cylindrical portion 20 plugs cylindrical opening 5 and cylindrical portion 21 is in contact with lip 13, which forms a seal therewith; lip 14 bends and is applied against conical portion 22, while base 25 becomes domed in the opposite direction, i.e. with the concavity facing outwardly.

The lid itself bends under the influence of the external pressure and face 12a of lip 12 is applied to the inner surface of the jar neck, while lip 11, pushed against skirt 2, is applied to the outer edge of the jar neck, leaving a chamber 26 above the rim of the jar neck. This chamber 26 is at a pressure intermediate the vacuum in the jar and the external pressure.

Chamber 27, which remains between lips 13 and 14 and portion 22 of the valve is also at a pressure intermediate the vacuum in the jar and the external pressure.

To form a vacuum in the jar, a suction head connected to a vacuum-pump is applied to the lid, or the jar with its lid is placed in a chamber in which a vacuum is formed. Under the influence of the suction, the valve member lifts and a vacuum is formed in the jar. As soon as pumping ceases, the valve member returns into opening 5 and, when the lid is subjected to atmospheric pressure, the valve member is firmly applied to close the opening, as shown in Figure 3.

Figures 4 and 5 show modifications of the above-described lid, which have been adapted to the particular type of container to be closed thereby. In Figure 4, bead 3 has been replaced by a thread 28, for a screw-necked container, while in Figure 5, the bead of skirt 2 has been omitted, the lid being held on the container only by the effect of the external pressure.

The above-described lid assembly can be fitted in a fluid-tight manner to a jar or other container. The evacuation valve is easily operable while ensuring perfect fluid-tightness.

The invention is not limited to the embodiment described and illustrated but, on the contrary, covers all its modifications within the scope of the appended claims.

WHAT I CLAIM IS:—

1. A lid assembly for closing a container to be evacuated, the assembly comprising a lid having a portion defining an opening; a valve member hingedly connected to the lid for closing the opening; inner and outer lips on the lid for engaging a container rim portion surrounding an opening in the container to be closed by the lid assembly; and first and second lips on the lid portion defining the opening, said first lip

extending generally perpendicular to the general plane of the lid and said second lip extending generally parallel to the general plane of the lid inwardly of the opening in the lid, when said opening is not closed by the valve member.

2. A lid assembly according to claim 1, wherein the valve member is generally frusto-conical.

3. A lid assembly according to claim 1 or 2, wherein gripping means are connected to the valve member for securing the valve member to the lid portion.

4. A lid assembly according to claim 3, wherein the gripping means comprises a tab comprising an eye having a transverse bar which clips on to a nipple attached to the lid, the nipple having a groove for receiving the bar.

5. A lid assembly according to any of the preceding claims, wherein the valve member comprises a first cylindrical portion having a diameter substantially equal to that of the opening in the lid, a second cylindrical portion having a diameter substantially equal to the diameter of a further opening defined by said first lip, a frusto-conical portion, another cylindrical portion, and another frusto-conical portion closed by a domed end portion, the concavity of the end portion facing inwardly of the lid.

6. A lid assembly according to any of the preceding claims wherein the opening in the lid is covered inwardly of said lid by a perforated bowl which receives the valve member.

7. A lid assembly according to any of the preceding claims, wherein the lid comprises a skirt, spaced from the outer lip, which is adapted to enclose the rim portion of the container, the inner lip having an inclined face which bears, in use, on the rim of the container and a face extending perpendicular to the general plane of said lid.

8. A lid assembly according to any of the preceding claims, wherein in use of the lid assembly two annular chambers at intermediate pressure are defined, one chamber between said inner and outer lips and the other chamber between said first and second lips.

9. A lid assembly according to any of the preceding claims, wherein the lid and valve member are moulded of plastics material and are hingedly connected together by a tongue moulded integrally therewith.

10. A lid assembly for closing a container to be evacuated, the assembly comprising a lid having a portion defining an opening and a skirt for surrounding the end portion of the container; a generally frusto-conical valve member for closing the opening; first and second lips on said lid portion, said first lip extending generally axially of the opening and said second lip extending generally normal thereto when the opening is not closed by the valve member; a generally frusto-conical valve member for closing the opening the valve



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5 member comprising a first cylindrical portion having a diameter substantially equal to that of the opening, a second cylindrical portion having a diameter substantially equal to that of a further opening defined by said first lip and a frusto-conical portion engageable by said second lip, said first and second lips and frusto-conical member delimiting a chamber which, in use, is at a pressure intermediate that
10 within the container and externally thereof; means for connecting said valve member to said lid; and inner and outer lips on the lid for engaging the rim of the open end of the container, said inner and outer lips when
15 engaged with the container rim delimiting a chamber which, in use, is at a pressure

intermediate that within the container and externally thereof.

11. A lid assembly for closing a container to be evacuated, constructed and arranged substantially as herein described with reference to Figures 1 to 3 or as modified by either Figure 4 or Figure 5 of the accompanying drawings. 20

12. A container having a lid assembly according to any of the preceding claims. 25

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