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A. KELLER

3,462,037

VENTED CLOSURE

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FIG. 2

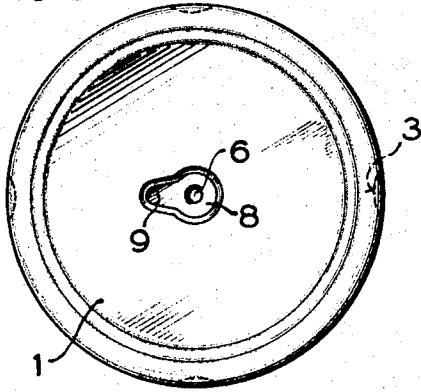


FIG. 5a

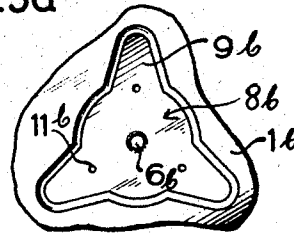


FIG. 1

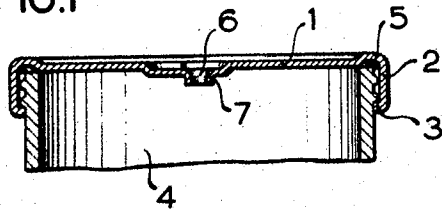


FIG. 5b

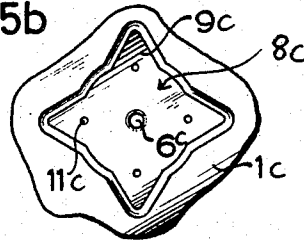


FIG. 5c

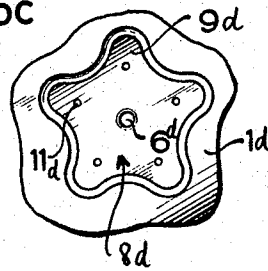


FIG. 3

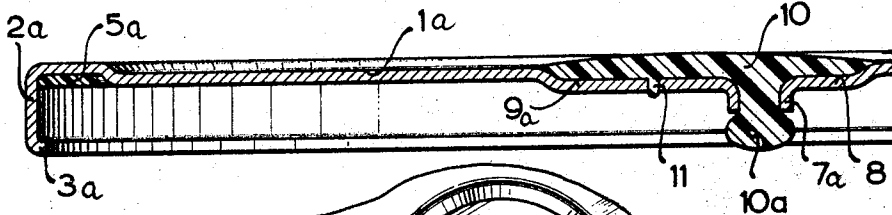
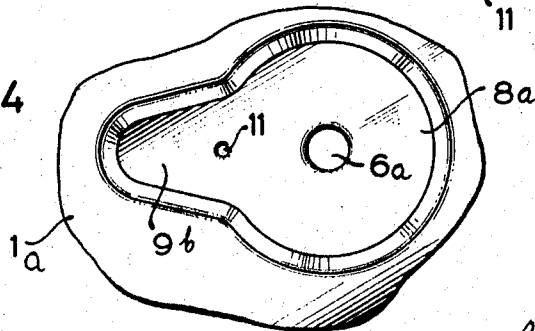


FIG. 4



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3,462,037

VENTED CLOSURE

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8 Claims

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ABSTRACT OF THE DISCLOSURE

A cover for a container which is to be maintained at subatmospheric pressure. The cover comprises a wall which consists of a first material and is provided with an opening. A closure member of a second material overlies one side of the wall in the region of the opening thereof and comprises a portion which sealingly extends into the opening. One of the materials is elastically deformable so that the portion of the closure member is removable from the opening by exertion of withdrawing force on the closure member.

BACKGROUND OF THE INVENTION

The present invention relates to a cover in general, and more particularly to a cover for a container which is to be maintained at subatmospheric pressure.

Various types of containers which are to be maintained at subatmospheric pressure are well known. The present invention specifically concerns the type of container wherein the cover is to be releasably secured to the container in such a manner that, when the cover has been removed and the contents of the container withdrawn, the container can be refilled and the cover again be used to close the container. This type of container is exemplified by canning jars and the like. In such containers the removal of the cover, which may be screwed or otherwise secured to the container with the intermediary of a sealing ring, the atmospheric pressure on the cover makes it difficult to remove the latter when the contents of the container are to be withdrawn. To overcome this impediment it is necessary to equalize the pressure between the interior and the exterior of the container, that is to break the vacuum in the container. This, however, heretofore has been possible only by either deforming the cover to thereby create an opening between the cover and the edge of the container mouth, puncturing the cover, or otherwise deforming it and making it unsuitable for reuse.

SUMMARY OF THE INVENTION

The present invention overcomes the existing disadvantages in this field, and provides the advantages which have been indicated as desirable.

More particularly, the present invention provides a cover for container which are to be maintained at subatmospheric pressure, which cover facilitates pressure equalization between the interior and the exterior of a container on which the cover is utilized without, however, necessitating deformation of the cover or other action which would render the cover non-reusable.

The cover according to the present invention is very simple and inexpensive to manufacture and is suitable for all types of containers which are to be normally maintained at subatmospheric pressure and which are intended to be refilled one or more times, or to be emptied in stages.

In accordance with one feature of my invention I provide a cover which, as already pointed out, is particularly suitable for a container to be maintained at subatmos-

pheric pressure. My cover comprises a wall which consists of a first material and which is provided with an opening. A closure member of a second material overlies one side of the wall in the region of the opening and comprises a portion which is sealingly received in the opening. One of the materials is elastically deformable whereby the portion of the closure member which extends into the opening is removable therefrom by exertion of requisite withdrawing force on the closure member. This effects pressure equalization between the container and the ambient atmosphere, as is readily understandable.

I have found it advantageous if it is the material of the closure member which is elastically deformable. In fact, in accordance with the invention the material of the closure member is to consist of a material which can be applied, for instance in liquid form, onto the one side of the cover in the region of the opening so that the material extends partly into the opening and, either on exposure to the air or as a result of some suitable treatment, congeals and becomes elastomeric in its properties. Such material may be natural or synthetic rubber, or any suitable synthetic plastic material.

It will be understood that this can be accomplished during manufacture of the cover, which latter can be provided with the aforementioned opening by stamping, piercing with a tool, or the like. Once the material of the closure member is applied to the cover with a portion of the material extending into the opening in the cover, it is not affected by storage or handling during transport or at any subsequent time and will not become detached from the wall of the cover until the user exerts the necessary withdrawing force. It will be evident that the invention can be used with various different types of containers to be maintained at subatmospheric pressure, and that it is of no consequence how the subatmospheric pressure in the container is brought about. It is also immaterial how the cover itself is actually connected with the container.

I have found it to be advantageous if the cover is so manufactured that the inner side of the wall, that is that side which faces away from the closure member, is provided with a projecting collar whose free edge advantageously is provided with zig-zag cut-outs which may be regular or irregular. This assists in the formation of a bead of the material when the same is applied onto the outer side of the cover in liquid state, and this bead is then retained by the collar.

In another feature of my invention I contemplate providing that side of the wall over which the closure member is applied, or rather that portion of such side which surrounds the opening, with a depression. This makes it possible for the liquid which subsequently congeals into the closure member to spread out prior to congealing, thereby increasing the sealing area. To facilitate termination of the sealing action it is advantageous if the depression is provided with a main portion containing the major part of the closure member, and with at least one extension portion which extends outwardly from the main portion and which contains a tongue-shaped part of the closure member. This facilitates grasping of this tongue-shaped part, which latter can also be lifted more readily to thereby facilitate entry of air into the opening in the cover. In fact, it is a further feature of my invention to provide in the region of the extension at least one additional aperture, or even two or more such apertures, whose cross-sectional area would be smaller than that of the opening. In this manner a pressure equalization will take place as soon as the extension part of the cover member is lifted off the one or several apertures whereas the opening serves to retain the inwardly-extending portion of the closure member. This is particularly advantageous if only a part of the contents of the container is to be with-

drawn, because thereupon the cover can be placed back onto the container, the closure member is pressed back into place about the apertures, and the container can be stored with its contents again closed off from the ambient atmosphere. It will be understood, of course, that more than one of the extension portions of the depression or recess can be provided, and that each of these extension portions can be provided with one or more such apertures.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a cross section through a cover according to the present invention, shown applied to the neck of a container;

FIG. 2 is a top-plan view of FIG. 1;

FIG. 3 is a view similar to that of FIG. 1, but illustrating another embodiment of the invention;

FIG. 4 is a fragmentary top-plan view of the embodiment shown in FIG. 3; and

FIGS. 5a, 5b and 5c each illustrate in a fragmentary top-plan view similar to that of FIG. 4 a further embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail, and firstly FIG. 1 thereof, it will be seen that reference numeral 1 identifies a wall of a cover for a container 4 which is to be normally maintained at subatmospheric pressure. The wall 1 is provided with a cylindrical rim 2 which in turn is formed with inwardly extending projections 3 so that the cover consisting of the portions 1 and 2 can be screwed onto a thread provided in the neck of the container 4. However, it is to be understood that this is only one exemplary way in which the cover can be connected to the container and that any other type of connection would be equally suitable and would not affect the concept according to the present invention.

The cover 1 is provided with a suitable sealing means so as to seal the cover in airtight relationship with respect to the neck of the container 4.

In accordance with the present invention the outer side of the cover, or more specifically the outer side of the wall 1 is provided with a depression consisting of a main portion 8 and an extension portion 9 which is smaller than the main portion 8 and extends outwardly therefrom as is evident in FIG. 2. Within the confines of this depression, and in the illustrated embodiment more specifically within the confines of the main portion 8, the wall 1 is provided with a small opening 6 which may have a diameter ranging on the order of 2-4 millimeters, although this is of course a figure which can be varied. It is advantageous to press this opening into the wall from the exterior thereof so as to form on the interior of the wall 1 a projecting collar 7. A quantity of any suitable viscous material which, on congealing or setting, will exhibit elastomeric properties, is introduced into the recess 8, 9. On congealing this material will set and form into a closure member which overlies the depression 8, 9. A quantity of the liquid will, prior to setting thereof, have intruded into the opening 6 and will have formed therein a small bead downwardly of the free edge of the collar 7. This assists in retaining the thus-obtained closure member in the opening 6.

It is clear that with a cover so provided the subatmospheric pressure in the container 4 can be negated, and equalization of pressure between the exterior and the interior of the container 4 effected, by lifting the elasto-

meric material of the thus-obtained closure member in the portion 9 of the recess and exerting a slight withdrawing pressure. This permits the intrusion of air through the opening 6 without, however, necessarily requiring the removal of the closure member from the opening 6. Thereupon, the cover can be readily removed from the container 4 without any further resistance. When the closure member is released it will automatically close the opening 6 again.

Coming now to the embodiment illustrated in FIG. 3 it will be seen that this differs from that shown in FIG. 1 in that the wall, which here is identified with reference numeral 1a whereas the rim is identified with reference numeral 2a, defines with the latter a cover which is to be clamped by way of a free edge 3a to the neck of a non-illustrated container. A sealing ring 5a is provided which seals the cover to the neck of the container. The difference between FIG. 3 and FIG. 1 resides in the provision of an aperture 11 which is provided in the extension portion 9a of the depression. The opening 6a is again located in the main portion 8a of the depression and is surrounded by an inwardly projecting collar 7a around which a bead 10a of the closure member 10 develops when the viscous material is introduced into the recess 8a, 9a and prior to congealing of this material into solid state wherein it has elastomeric properties. It will be seen that some of the material of closure member 10 will also enter into the aperture 11 provided in the extension portion 9a of the recess. FIG. 4 shows, in a top-plan view of FIG. 3, the relationship of aperture 11 with respect to opening 6a and it will be understood that to effect pressure equalization between the interior and the exterior of the container utilizing the cover illustrated in FIG. 3 it is not necessary to withdraw the closure member 10 completely from the opening 6a. Rather, it is simply necessary to lift that portion of the closure member 10 which overlies the extension portion 9a of the recess, thereby opening the aperture 11 and permitting the intrusion of air into the interior of the container. The remainder of the closure member 10 is maintained in place at this time by the bead 10a and the collar 7a. If the container provided with the cover of FIGS. 3 and 4 is subsequently to be made airtight again it is simply necessary to press the portion of the closure member which overlies the extension portion 9a back into place, thereby sealing the aperture 11.

Coming, finally, to FIGS. 5a-5c it will be seen that each of these illustrates a modification of the embodiment shown in FIG. 3. Specifically, FIG. 5a shows that the depression can be provided with a main portion 8b from which three extension portions 9b project in different directions. Each of these extension portions 9b can be provided with an aperture 11b. The wall is identified with reference numeral 1b in this figure.

FIG. 5b, wherein the wall is identified with reference numeral 1c, shows the recess to consist of a main portion 8c from which four extension portions 9c project in a substantial star-shape. Again, each of the extension portions 9c is provided with an aperture 11c. It is clear that in the embodiments of FIGS. 5a and 5b, as well as in FIG. 5c which is still to be discussed, any one, or two or more of the apertures can be opened to effect pressure equalization. Evidently, the more of these apertures which are opened, the more rapid will be the pressure equalization which takes place.

FIG. 5c shows again a wall 1d which is provided with a recess consisting of a main portion 8d from which five extension portions 9d extend, each of these being provided with an aperture 11d. The embodiments of FIGS. 5a-5c are the same as the embodiment of FIG. 3 in all other respects. It is clear that the configuration of the depression will not only serve to further enhance the sealing action between the closure member and the wall of the cover, but that the depression and the closure

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member can thereby be given a characteristic form which may be used to differentiate between the products of different manufacturers, which may indicate the contents of the container, or which may for instance simply be used for ornamental purposes.

It will be understood that each of the element described above, or two or more together, may also find a useful application in other types of arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a cover for containers which are to be maintained at subatmospheric pressure, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. A cover for a container which is to be maintained at subatmospheric pressure, comprising a wall consisting of a first material and provided with a plurality of openings arranged in a cluster; and a closure member of a second material overlying one side of said wall in the region of said cluster of openings and comprising a plurality of portions each sealingly received in one of said openings, one of said materials being elastically deformable whereby any desired one of said portions of said closure member is removable from the associated opening by exertion of requisite withdrawing force on said closure member so as to effect pressure equalization between said container and the ambient atmosphere while the remaining portions continue to be received in

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their respectively associated openings so that said closure member remains connected with said wall and upon release thereof that portion of the closure member which is removed from the associated opening will automatically seal-tight reenter and thus close said associated opening.

2. A cover as defined in claim 1, wherein said one material is said second material.

3. A cover as defined in claim 2, wherein said second material is an elastomeric material.

4. A cover as defined in claim 2, wherein said second material is rubber.

5. A cover as defined in claim 2, wherein said one side of said wall is provided with a depression, said cluster of openings being located within the confines of said depression.

6. A cover as defined in claim 1, wherein said openings have different cross-sectional areas.

7. A cover as defined in claim 1, wherein said one side of said wall is provided with a depression including a larger main portion and a smaller extension portion extending outwardly from said main portion one of said openings being located within the confines of said main portion and the remaining openings being located within the confines of said extension portion.

8. A cover as defined in claim 7, and further comprising additional extension portions extending from said main portion, and additional openings located within the confines of the respective additional extension portions.

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220—44