

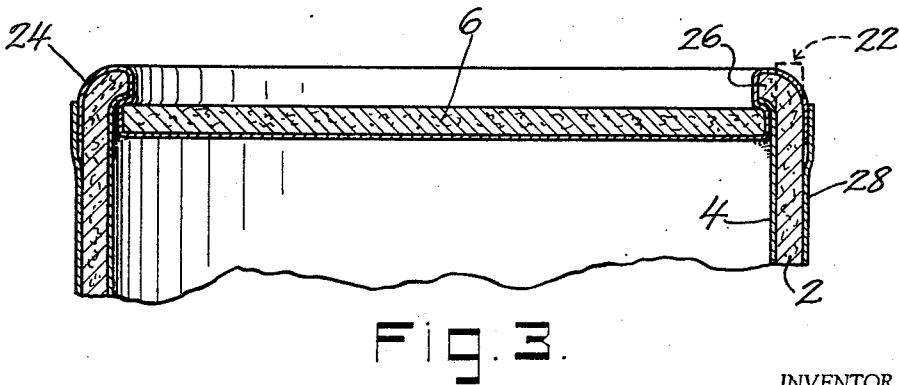
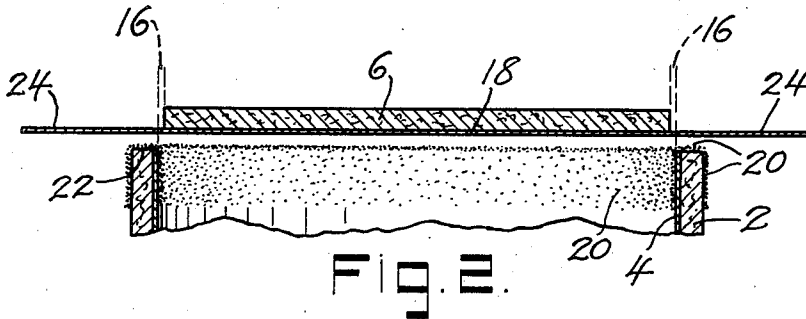
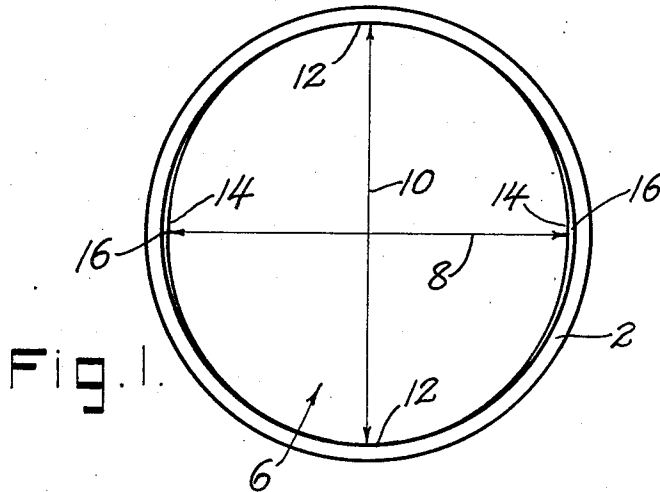
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2,370,018

CONTAINER AND CLOSURE THEREFOR

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2,370,018

CONTAINER AND CLOSURE THEREFOR

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My invention relates to containers and methods of closing the same, and particularly to constructions whereby the air displaced by insertion of a closure member into the end of a container body may be vented without impairing the sealing of the container.

Heretofore considerable difficulty has been experienced in closing containers in which a closure member is inserted into the end of the container body for the reason that the closure displaces a portion of the air as it is inserted causing the air to pass outward between the container body and closure member. When a sealing compound is employed to seal the space between the container and closure the air being vented forms pin holes or small fissures in the sealing compound. It has been suggested heretofore that the wall of the container be formed with notches or vent holes to allow air to escape as the closure is inserted into the container body, but such constructions increase the cost of the container and are not entirely satisfactory because the closure must in all cases be inserted some distance beyond the vent holes to insure proper sealing of the container.

In accordance with the present invention these objections to constructions of the prior art are overcome and effective sealing of containers assured by providing the container with a closure member which does not conform exactly to the contour of the inner surface of the container body but instead presents an elongated venting space between the edge of the closure member and the inner surface of the body. By providing an elongated space which preferably is only a few thousandths of an inch in width and merges gradually into the contour of the container it is possible to insure proper venting of the container while the subsequent sealing operations serve to close the venting space and provide effective sealing of the container.

One of the objects of my invention is to provide a novel closure member for containers.

Another object of my invention is to provide novel methods for closing and sealing a container.

A further object of my invention is to provide a container with a closure and an effective sealing construction therefor.

A particular object of my invention is to provide a container with a closure which differs in shape from the inner surface of the container in such a way as to provide an elongated vent which is only a few thousandths of an inch in

width and merges gradually into the form of the container.

These and other objects and features of my invention will appear from the following description thereof in which reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a top plan view of a typical container and closure embodying my invention.

Fig. 2 is a vertical sectional view of the end of the container and closure illustrated in Fig. 1 with the closure in place preparatory to its application to the container, and

Fig. 3 is a vertical sectional view of the upper portion of a finished container embodying that form of the invention illustrated in Fig. 1.

In the form of my invention illustrated in the figures of the drawing, the container is of cylindrical form and has a body 2 formed of fibrous or other material capable of being slightly deformed without injury thereto. The body preferably is made of spirally wound material such as chipboard, cardboard, paper or the like, and when the container is to be used with paints, oils or the like, it may be provided with a liner 4 of oil resistant material. A typical container body of this character is shown and described in the issued patent to Kernahan No. 2,202,558.

The closure member employed in the practice of the present invention is shown at 6 and while in the general form of a disc it differs slightly in shape from the contour of the inner surface of the container body. Thus, as illustrated the closure is actually an oval in which the diameter 8 is slightly shorter than the diameter 10. The long diameter is equal or substantially equal to the normal inside diameter of the container body so that upon insertion of the closure into the end of the container the portions 12 thereof at the ends of the long axis 10 engage the inner surface of the container body. However, the portions 14 at one or both ends of the shorter axis 8 of the closure are spaced a short distance from the adjacent inner surfaces of the container body. In actual practice it has been found that very satisfactory venting of the container is effected if the axis 8 is .008 inch shorter than the axis 10 so that two elongated venting spaces 16 of approximately .004 inch in width are provided at each side of the closure. The venting spaces thus provided are generally crescent shaped and merge gradually into the shape of the inner surface of the container body so that there are no abrupt or sharp angles or spaces to be closed in sealing the container.

In the preferred form of my invention illustrated in the drawing the closure member is provided with a sealing diaphragm 18 in the form of a disc of oil resistant paper parchment or the like of substantially larger diameter than the closure member. This diaphragm and closure may be of the type shown and described in any one of my copending applications Serial No. 447,726, filed June 19, 1942; Serial No. 467,804, filed December 3, 1942 or Serial No. 467,805, filed December 3, 1942, or it may be of any other preferred form and construction. In each of the containers described in said applications the closure member is employed in combination with a sealing diaphragm and an adhesive or sealing compound is used to insure complete sealing of the container. It is found that the presence of the sealing diaphragm does not interfere with proper venting of the container on insertion of the closure into the end of the container even though the axis 8 is only .008 inch shorter than the axis 10. Moreover, this difference in shape is sufficient even when the diameter of the closure is relatively great, said 8 or 10 inches in length. In general, however, when no sealing diaphragm is used the width of the vent space should be less, or at least no greater than when a sealing diaphragm is used.

In most constructions wherein closures of the present invention are used, an adhesive or sealing compound is applied to the container or to the closure or to both elements in order to provide an effective seal between the closure and the inner surface of the container body. As shown in Fig. 2 the adhesive 20 is preferably applied to the end of the container body so as to extend over the cut and fibrous edge 22 thereof and both on the interior and exterior of the body adjacent said edge. In this way the adhesive is caused to penetrate into the edge or end portion of the body and is presented on those surfaces which are engaged by the marginal portions 24 of the sealing diaphragm 18.

In applying the closure to the container when using a sealing diaphragm, the diaphragm 18 may be placed in contact with the adhesive on the end of the container in one operation and the closure member 6 may thereafter be forced downward against the diaphragm and into the end of the container body. However, in most cases I prefer to assemble the closure member and diaphragm prior to their application to the container and to apply these two elements as a unit as shown in Fig. 2. For this purpose the sealing diaphragm may be secured to the lower surface of the closure member by adhesive or other means and centered with respect to the closure member so as to leave the marginal portions 24 thereof free to enshroud the end of the container body.

When the closure member and diaphragm are assembled as a unit the closure member is forced downward into the end of the container body and below the cut edge thereof to the position shown in Fig. 3. The end or edge 22 of the body then projects above the closure member as shown in dotted lines in Fig. 3 whereas the venting space or spaces 16 at the edge of the closure member permit air to pass upward and outward very readily and as displaced by the insertion of the closure.

The closure may be most easily inserted by means of a suitable die such as that described in my application Serial No. 447,726 referred to above. When the sealing diaphragm is used the

positioning of the closure is aided by the engagement of the diaphragm with the container body to prevent movement of the closure too far into the container whereas, if no sealing diaphragm is used the frictional engagement of the portions 12 of the closure member at the ends of the long axis of the closure in contacting the inner surface of the container body prevent movement of the closure too far into the container.

The operations by which the container is finally sealed may vary but I prefer to mold or otherwise form the upper edge of the container body so that it extends inward over the marginal portions of the closure member as shown at 26 in Fig. 3. This may be accomplished by any suitable means and method such as that shown and described in my copending application, Serial No. 447,726 or by any other molding, turning or spinning operation suitable for use on the materials employed. In this operation the adhesive material applied to the cut edge portion of the container body is subjected to action of heat and pressure or is otherwise treated to cause the adhesive to set or harden so as to retain the edge portion in its inturned position to retain the closure member in place. The distance which the inturned edge 26 projects inward is itself sufficient to close the vent space or spaces 16 so as to completely seal the container. However, the dies or other members used in such molding operations preferably are formed to correspond more nearly to the shape of the closure member than to the closure body so that they serve to distort the body of the container very slightly in the direction of the shorter diameter 8 of the closure. In this way the container is shaped to the closure member and the clearance between the edges of the closure member and the inner surface of the container body is made substantially uniform whereby proper sealing of the container and complete closing of the venting space is assured.

The gradual merging of the ends of the vent space 16 into the shape of the inner surface of the container body prevents the formation of any breaks or sharp angles and abrupt bends in the material of the container body and as a result the container retains its normal appearance and shape. Moreover, the very limited amount of distortion of the container body necessary to conform to the shape of the closure member is insufficient to give rise to any strains which might tend to open up the seal between the parts and the hardening or setting of the adhesive is sufficient to retain the container body in its distorted and sealed condition.

During the operation of applying the closure and sealing diaphragm the marginal portions 24 of the diaphragm are pressed inward against the adhesive on the outer surface of the container body so as to adhere thereto. Ordinarily a wrapper 28 is applied to the sealed container to cover the edges of the diaphragm on the exterior of the container body so that the sealed and finished container presents a neat, trim and attractive appearance.

While I have suggested that the closure have one diameter approximately .008 inch shorter than the other, this dimension is not critical and may be varied somewhat although the width of the vent apparently need not be materially increased, even when the diameter of the closure is varied greatly. Moreover, the venting space obviously may be located adjacent one edge only of the closure member. Furthermore, the inven-

tion is applicable to containers and closures having bodies of rectangular or other cross section, and is not limited to containers of cylindrical or conical form.

The closure itself may be formed of metal fiberboard, chipboard, paper or any other substantially stiff or rigid material and while the container body may also be formed of various materials I prefer to form the body of deformable fibrous material such as chipboard, paper, cardboard or the like.

In view of the numerous changes and modifications which may be made in the construction and methods of assembling the elements of containers embodying my invention it should be understood that the particular form thereof shown in the drawing and described above is intended to be illustrative only and is not intended to limit the scope of the following claims.

I claim:

1. A container having a body presenting an inner surface of normal predetermined contour and a closure member located within said body and having an edge thereof which differs from that of said normal predetermined contour but merges gradually therewith leaving a relatively long narrow venting space between the edge of the closure member and the inner surface of the container body.

2. A container having a body presenting an inner surface of normal predetermined contour and a closure member located within said body and having an edge thereof which differs from that of said normal predetermined contour but merges gradually therewith leaving a relatively long narrow venting space between the edge of the closure member and the inner surface of the container body, and means closing said venting space.

3. A container having a body presenting an inner surface of normal predetermined contour and a closure member located within said body and having an edge thereof which differs from that of said normal predetermined contour but merges gradually therewith leaving a relatively long narrow venting space between the edge of the closure member and the inner surface of the container body, and sealing material located between the edge of the closure member and the inner surface of the container body and closing said venting space.

4. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, and a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body.

5. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped vent-

ing space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, and means closing said venting space.

6. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, and sealing means located between the edges of said closure member and the inner surface of said container body.

7. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, the portion of said container body adjacent the closure member being distorted to conform generally to the shape of the closure member.

8. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, the portion of said container body adjacent the closure member being distorted to conform generally to the shape of the closure member, and means closing said venting space.

9. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch between the edge of the closure member and the inner surface of the container body, the portion of said container body adjacent the closure member being distorted to conform generally to the shape of the closure member, and sealing means located between the edges of said closure member and the inner surface of said container body.

10. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval

shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, the extremities of said container body being turned inward over the edges of said closure member.

11. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, adhesive material applied to the end of said container body adjacent the closure member and to the edges of said closure member and said end of the container body being distorted to conform to the closure member and turned inward over the edges of said member and held in place by said adhesive material.

12. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being

of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, and a sealing diaphragm extending over the inner face of the closure member and having marginal portions thereof extending over and adhesively secured to the inner surface of the container body, the end of said body and a portion of the outer surface thereof.

13. A container having a body of normal cylindrical shape formed of deformable material and presenting an inner surface of normal circular cross section, a closure member of generally oval shape located within the end of said container body, the long axis of said closure member being substantially equal in length to the diameter of said inner surface of the container body and the shorter axis of said closure member being of such length as to provide a crescent shaped venting space a few thousandths of an inch in width between the edge of the closure member and the inner surface of the container body, and a sealing diaphragm extending over the inner face of the closure member and having marginal portions thereof extending over and adhesively secured to the inner surface of the container body, the end of said body and a portion of the outer surface thereof, the extremities of said container body being turned inward over the edges of said closure member.

14. In combination with a container of circular cross section a closure member of generally oval shape having its long axis substantially equal in length to the internal diameter of the container to which it is to be applied and having its short axis a few thousandths of an inch shorter than said long axis.

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