Dec. 25, 1928. 1,696,555

A. PODEL

CLOSURE AND METHOD OF SEALING

Filed March 18, 1925

Fig. 1.

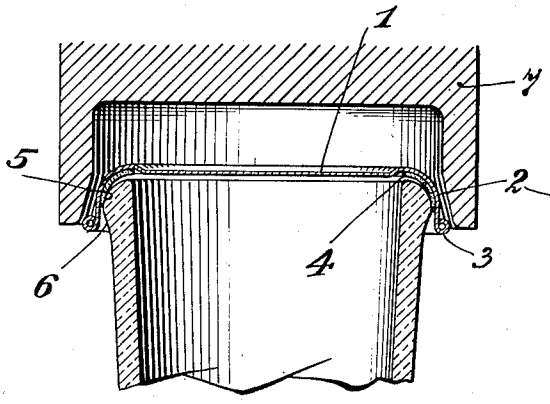


Fig. 3.

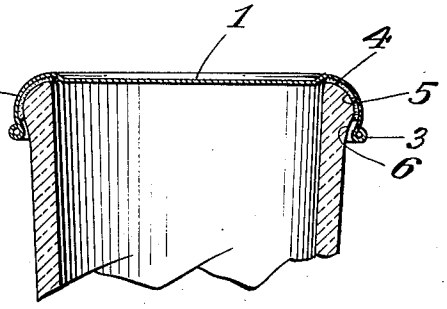


Fig. 2.

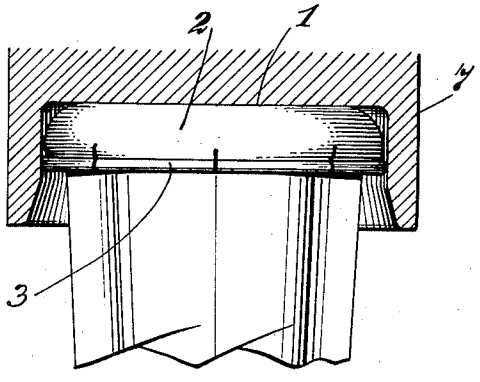
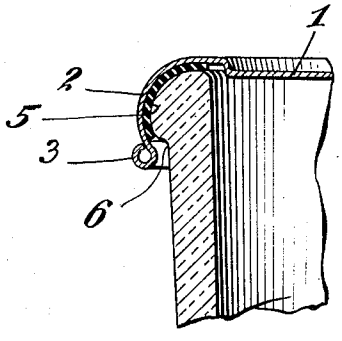


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CLOSURE AND METHOD OF SEALING.

Application filed March 18, 1925. Serial No. 16,274.

This invention relates to the art of packaging and particularly to a cap and package of the type which utilizes atmospheric pressure in the formation and maintenance of a hermetic seal. In certain of its aspects, the invention is an improvement upon the cap disclosed in the United States Patent to White, Reissue 15,842 of May 20, 1924.

The principal object of the invention is to provide an inexpensive and reliable one piece closure of the type that utilizes atmospheric pressure in the formation and maintenance of a hermetic seal and which is adapted to sealing either with or without the use of a vacuum chamber.

Another object of the invention is to provide a closure of the type that utilizes atmospheric pressure, which can be quickly and surely applied and which can be readily removed without the aid of a special tool.

An important object of the invention is to provide a method of sealing containers that utilizes atmospheric pressure and which can be rapidly and economically carried out and which produces a securely sealed package which can be readily opened.

Another object of the invention is to provide a method of sealing a vessel with a closure adapted to be held in place by atmospheric pressure which method sizes the closure to the individual size of the container to be sealed.

A further object of the invention is to produce a securely sealed package which utilizes atmospheric pressure in the maintenance of the seal and which can be readily opened.

In acccordance with the above and other objects of the present invention there is provided a closure cap, preferably formed of sheet metal or the like, which has a skirt forming a zone of curved cross section that is adapted to cooperate with a sealing gasket. The extremity of the skirt is preferably formed into a wire edge which may be severed at intervals to facilitate constriction or expansion thereof. This closure is adapted to be applied to a container which has a curved sealing zone contiguous to its mouth and a downwardly extending zone of diminished diameter beneath the sealing zone.

The formation of a sealed package involves the removal of a large part of the air from the container so that atmospheric pressure may become effective upon the closure to press the curved zone of the skirt into sealing relationship with the curved sealing zone of the container. When the closure is applied a reducing die or the like is caused to operate upon the wire edge of the cap to constrict the wire edge and force the skirt inwardly. This operation sizes the curved zone of the skirt to the individual container which is being sealed; and in addition it constricts the wire edge into interlocking relationship with the container at the zone of diminishing diameter, thus locking the closure to the container independently of the sealing force of atmospheric pressure.

Fig. 1 of the drawings is a fragmentary cross sectional view showing a container and a closure of the present invention before sealing.

Fig. 2 is an elevational view partially in section illustrating the constriction of the wire edge with a reducing die.

Fig. 3 is a fragmentary sectional view showing a sealed package embodying the present invention.

Fig. 4 is a fragmentary sectional view showing a sealed package incorporating modified forms of closure and container.

The cap which is preferably formed of sheet metal comprises a cover portion 1 and a skirt which is formed into a curved zone 2, the skirt terminating in a wire edge 3 which is severed at intervals as shown in Fig. 2. The container to which the closure is applied may be formed of suitable material such as glass, and is provided with a curved sealing zone 5 contiguous to its mouth. The container is also provided with a downwardly extending zone of diminishing diameter at 6 which may be completely beneath the sealing zone, or may overlap it. This zone may be of any suitable form and degree of inward taper; and may be an abrupt locking shoulder.

In sealing, the air may be drawn from the container either by the use of a vacuum chamber or by filling the container and heating it. During this operation the closure may, if desired, be rested loosely upon the container. After the air has been removed from the container and the closure has been positioned, a reducing die 7 is caused to act upon the wire edge 3 as indicated in Figs. 1 and 2 thereby constricting the wire edge and forcing the skirt inwardly to size it to the individual container. The constricted wire edge then com-

prises the portion of the skirt which interlocks with the container at its zone of diminishing diameter, thereby holding the closure upon the container independently of any atmospheric pressure.

When atmosphere pressure becomes effective upon the closure it flexes the cover portion 1 downwardly below the mouth of the container as indicated in Fig. 3 thereby drawing the curved zone 2 tightly against the gasket 4. If the container is sealed in a vacuum chamber such as that of U. S. patent to Townsend 1,291,662 this flexing of the cover portion will take place as soon as the vacuum in the chamber is broken by the admission of air to the chamber. If the air is removed from the container by filling it with a product and heating it, the flexing of the cover portion will take place gradually as the container cools. Even though the atmospheric pressure becomes effective gradually upon the cover 1, it is unnecessary to use any separate means to clamp the closure in place until the air pressure becomes effective as the cap is held in place by the constricted wire edge.

The sealing zone 5 and the corresponding zone of the cap 2 may each be made of curved form in cross section so that there will be perfect sealing cooperation between the two even though the cap may not be accurately aligned upon the container. However, accurate alignment of the cap may be facilitated by forming the cover portion with a depressed center as shown in Fig. 4. The zone 2 may be made of such a shape that when the closure rests loosely upon the container only the outer portion of the sealing gasket is in contact with the sealing zone 5. This construction facilitates the passage of air from the container when it is heated or placed in a vacuum chamber with the closure resting loosely on the container. When the downward flexing of the cover portion takes place, the zone 2 is drawn into engagement through the entire width of the gasket as indicated in Fig. 3.

The gasket 4 is preferably of curved cross-section to correspond with the shape of zones 2 and 5; and it may be handled as a separate element, or it may be previously shellacked to the closure so as to make it a part thereof. As shown in Figs. 3 and 4, the package preferably has a space between the wire edge and the container which is not filled by the gasket so that a knife or a screw driver or the like may be inserted under the wire edge to pry it outwardly and effect a removal of the cap. This is readily accomplished since the wire edge is severed at intervals.

It is realized that the present invention may be embodied in forms other than that particularly disclosed and hence it is desired that the disclosure be considered as illustrative and not be considered as limiting.

Having thus described my invention what I claim is:—

1. As an article of manufacture a closure cap comprising a cover portion; a skirt of curved cross section adapted to cooperate with a curved zone contiguous to the mouth of a container; and a wire edge at the extremity of said skirt, the lower portion of said skirt being adapted to be interlocked with a suitable container by mere bodily movement of the wire edge radially of the cap and the wire edge being cut at intervals to facilitate such radial movement.

2. As an article of manufacture a closure cap comprising a cover portion; a skirt adapted to contact with a gasket contiguous to the mouth of a container; and a wire edge at the extremity of said skirt, the lower portion of said skirt being adapted to be interlocked with a suitable container by mere bodily movement of the wire edge and the wire edge being severed at intervals to facilitate constriction thereof upon the sealing of a container and expansion thereof upon the opening of a container.

3. In combination; a container having a sealing surface; a downwardly extending annular zone of diminishing diameter beneath said sealing surface; a closure having a sealing surface which before exhausting the air from the container is only in partial engagement with the corresponding container sealing surface, the closure being flexible under the influence of a vacuum whereby the flexing of the closure materially increases the area of sealing engagement between the closure and the container; and a zone on said closure constricted into interlocking relation with said container at its zone of diminishing diameter.

4. In a package adapted to be sealed by atmospheric pressure; the combination of a container having a sealing zone and a downwardly extending zone of diminishing diameter beneath the sealing zone; a closure having a circumferential depending portion adapted to fit over the mouth of said container, a gasket between said circumferential depending portion of the closure and the container, the central portion of said closure being flexed below the upper end of the container wall and into said container thereby drawing a part of said depending portion over the mouth of the container to seat said gasket tightly against the sealing zone to form a hermetic seal between the container and the closure; and a wire edge on said closure constricted into interlocking relation with said container at its zone of diminishing diameter.

5. A sealed package comprising a container having a sealing zone adjacent to its mouth; a zone of diminishing diameter beneath said sealing zone; a gasket in contact with said sealing zone; and a closure seated

on said gasket and held in position by atmospheric pressure, said closure having a zone locked to said container at its zone of diminishing diameter by mere constriction of the closure zone.

6. A sealed package comprising a container having a sealing zone adjacent to its mouth; a gasket in contact with said sealing zone; a closure seated on said gasket and held in position by atmospheric pressure, said closure having a wire edge and having its lower portion constricted into interlocking relation with said container by mere movement of the wire edge radially of the closure.

7. A sealed package comprising a container having a sealing zone adjacent to its mouth and a downwardly extending zone of diminishing diameter beneath said sealing zone; a gasket in contact with said sealing zone; and a closure seated on said gasket and held in position by atmospheric pressure, said closure having a zone locked to said container at said zone of diminishing diameter and severed at intervals to facilitate removal of the closure.

8. A sealed package comprising a container having a sealing zone adjacent to its mouth and a downwardly extending zone of diminishing diameter beneath said sealing zone; a gasket in contact with said sealing zone; and a closure seated on said gasket and held in position by atmospheric pressure, said closure having a wire edge and having its lower portion interlocked with said container at said zone of diminishing diameter by mere movement of the wire edge radially of the closure, said wire edge being severed at intervals to facilitate removal of the closure.

9. The method of sealing a container having a sealing zone adjacent to its mouth and a downwardly extending zone of diminishing diameter beneath the sealing zone, which comprises eliminating the major portion of the air from the container; applying a closure to the container while interposing a gasket between the closure and the container sealing zone; constricting the lower edge of the closure to interlock it with the zone of diminishing diameter of the container, and then subjecting the package to the action of atmospheric pressure.

10. The method of sealing a container having a sealing zone adjacent to its mouth and a zone of diminishing diameter beneath the sealing zone, which comprises eliminating the major portion of the air from the container; applying a closure to the container while interposing a gasket between the closure and the sealing zone; constricting a zone of the closure to cause it to interlock with the container at its zone of diminishing diameter, and then subjecting the package to the action of atmospheric pressure.

11. In a closure cap adapted to seal a container having a substantially spherical sealing zone adjacent its mouth; a cover portion; a skirt having a substantially spherical zone corresponding to the container sealing zone; and a wire edge immediately beneath the substantially spherical zone, said wire edge being cut at intervals.

12. The method of sealing a container with a one-piece closure, which method comprises placing the closure cap on the container with a gasket interposed between the depending portion of the closure and the side wall of the container, bowing inwardly the center of the cover of the cap to press the gasket tightly against the container, and constricting the lower portion of the skirt of the cap beneath the gasket to complete the sealing operation.

13. The method of sealing a container with a one-piece closure cap having a depending portion, which method comprises placing the closure on the container with a gasket interposed between the depending portion of the closure and the sealing zone of the container, applying pressure to the center portion of the cover of the cap to pull a portion of said gasket firmly against the sealing zone of the container and permanently setting the lower portion of the skirt of the cap beneath the gasket in closer relation to the side wall of the container.

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