June 18, 1935. M. H. RANEY 2,005,349

SEALED PACKAGE AND PARTS THEREOF

Filed Jan. 4, 1933

Fig. 1.

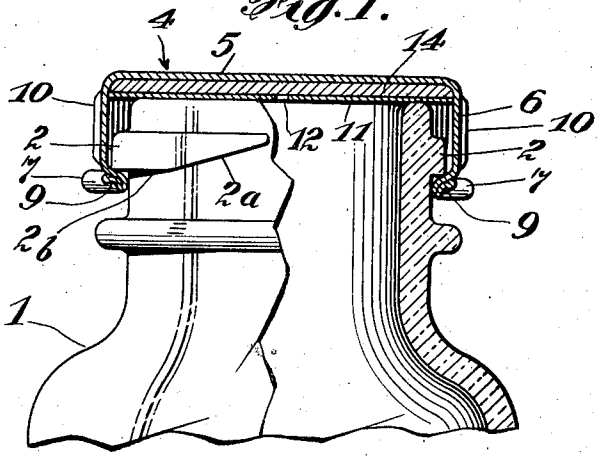


Fig. 2.

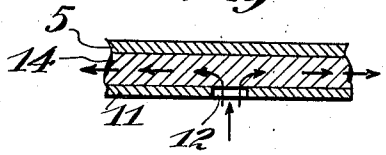


Fig. 3.

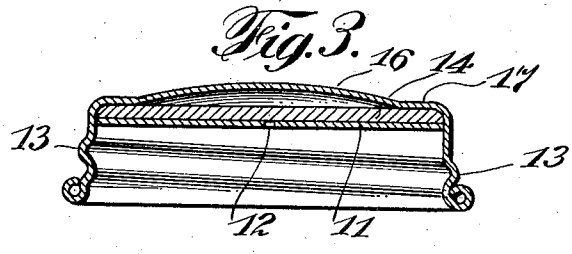
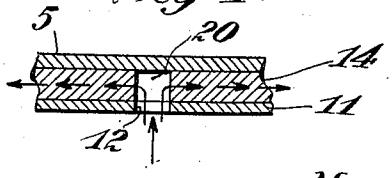


Fig. 4.



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Patented June 18, 1935

2,005,349

UNITED STATES PATENT OFFICE

2,005,349

SEALED PACKAGE AND PARTS THEREOF

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Application January 4, 1933, Serial No. 650,081

19 Claims. (Cl. 215—56)

The present invention relates to sealed packages, and more particularly to an improved package and the parts thereof adapted to release excess pressure therein.

Certain products, such as effervescent salts, when sealed, tend to create a pressure within the package. This is due to the fact that the salts cannot be completely dehydrated before they are sealed and necessarily contain water of crystallization which, upon slight decomposition of the salt, causes effervescence. As a result, the product within the package creates a substantial pressure. Upon opening the package, due to the excessive pressure, a part of the product is likely to be blown out of the container, causing the purchaser to think that something is wrong with the product. In other instances, caps may be forced out of proper sealing position by excessive internal pressure and fail to seal the package thereafter against incoming moisture. As a result, the moisture within the atmosphere causes further decomposition of the salt and may spoil the entire contents of the package. The above contingencies are very objectionable, since they create dissatisfaction on the part of the consumer and often cause serious accidents, due to the excessive pressure created within the packages.

The use of ordinary screw caps with the usual liners has not been satisfactory for the reasons noted above. Attempts have been made heretofore to provide a package which would relieve the pressure in a container, but such attempts have resulted in an inferior seal, which permitted the product to deteriorate, or in a seal too expensive to be practical. In most cases, the cost was increased greatly and the sealing efficiency decreased greatly.

The present invention aims to overcome the above difficulties by providing a simple, inexpensive sealing means adapted to be used in connection with standard types of caps and containers. In this way, an improved package adapted to prevent pressures therein is provided, without materially increasing the cost thereof and without impairing the sealing efficiency.

An object of the invention is to provide an inexpensive sealing means adapted to vent a package when pressure accumulates therein.

Another object of the invention is to provide a sealed package adapted to gradually relieve excessive pressures in a package and to retain sufficient pressure to prevent entrance of air into the package.

Another object of the invention is to provide a sealing disc treated to gradually release the pressure within a container, without permitting entrance of air into the package.

Another object of the invention is to provide a pair of sealing discs adapted to seal a container against incoming moisture and adapted to vent excessive pressure within the package, without impairing the effectiveness of the seal.

Another object is to provide sealing means particularly adapted to be used in connection with existing types of closure caps.

A further object of the invention is to provide an improved closure and package particularly useful for products likely to generate pressure within the package.

Other and further objects of the invention will be obvious upon an understanding of the illustrated embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification, wherein

Fig. 1 is a sectional view illustrating a preferred embodiment of the present invention;

Fig. 2 is an enlarged fragmentary sectional view illustrating pressure being relieved by the sealing means;

Fig. 3 is a sectional view illustrating a slightly different embodiment of the present invention; and

Fig. 4 is an enlarged fragmentary sectional view illustrating another embodiment of the present invention.

Referring again to the drawing, and more particularly to Fig. 1, there is shown a container 1 having suitable screw threads or lugs 2 at substantially the upper end thereof adapted to cooperate with screw lugs on a closure cap. Preferably, the container is made of glass and provided with any desirable thread finish, such as a continuous thread or an interrupted thread. However, it has been found desirable to utilize interrupted threads or lug projections 2 having an inclined surface 2a merging into a substantially straight horizontal surface 2b having a stop portion at the end thereof.

The container may be sealed by a closure cap 4 having a cover portion 5 and a depending skirt 6, having its lower edge rolled into a wire

edge or bead 7 to conceal the raw edge of the metal. Suitable projections 9 are formed from the wire edge 7, which are adapted to engage the threads 2. If desired, suitable corrugations 10 may be provided in the skirt 6 to facilitate gripping of the cap during application and removal thereof. While the present closure is shown constructed of metal, in some instances it may be desirable to form the closure cap of moldable material adapted to embody artistic designs and colors which enhance the appearance of the package.

To carry out the objects of the present invention, a suitable sealing liner 11 is placed within the skirt of the cap so that it fits above the mouth of the container. Preferably, this liner is made of material such as oil paper, "Cellophane", or the like, which is impervious to moisture and air pressure, so that the liner may provide an air-tight seal at the rim of the container. In order to relieve pressure within the package, an aperture 12, of suitable size, is provided in the liner 11 and any pressure generated by the product will pass through the aperture 12. Above and adjacent to the liner 11, a disc 14, of less effective sealing material, is provided. Preferably, the disc 14 is formed of cardboard, pulp board or other substantially compressible material, so that it acts as a cushion between the cap and the liner 11 to hold the latter resiliently against the rim of the container and to conform to any irregularities in the rim of the container. Preferably, the disc 14 is substantially impervious to moisture but is sufficiently porous to relieve any substantial pressure within the container. While good results may be obtained in this manner, it has been found that better results are obtained by partially impregnating or coating the disc 14 with moisture resisting material, such as paraffine. Preferably, the disc 14 is subjected to a bath of molten paraffine until it has absorbed from five to fifteen per cent of the paraffine. This percentage of paraffine is based upon the increased weight of the disc after the paraffine has been applied thereto. It has been found that cardboard and the like, when subjected to a paraffine bath, is sufficiently porous to relieve the pressure but is resistant to the entry of air and moisture. In this manner, any substantial pressure within the package may be relieved through the aperture 12 and through the disc 14. At the same time, incoming air and moisture will not pass through the liner 14. It has been found that paraffine produces a surface coating on the liner 14 substantially impervious to gases and also causes the members 11 and 14 to adhere more or less to each other so that gases, in escaping from the container, have to pass through disc 14 from the aperture 12 to the edge of the disc, as shown more particularly in Fig. 2. Likewise, any air or moisture, to enter the container, must permeate to the center of the disc 14 to reach the interior of the container. The paraffine coating on the liner 14, together with the apertured disc 11, have been found to be effective in sealing the package against entry of air and moisture, which is important. If desirable, the liner 11 may be bonded to the disc 14 with any suitable adhesive.

By utilizing interrupted threads 9, another advantageous result is attained. The angular, inclined portions serve to draw the cap downwardly into sealing position, while the straight horizontal portions hold the cap in a predetermined position with respect to the mouth of the container. Since the horizontal portions are definitely spaced from the mouth or rim, the cap will be sealed with substantially the same tightness in every instance. Likewise, the liners will be compressed substantially the same amount in every package, whereby the effective porosity of the liners 14 will be uniform. In this manner, the sealing means in every cap are responsive to release the pressure within the package at substantially the same internal pressure. For this reason, the effectiveness of the seal against pressure may be accurately controlled by varying the amount of paraffine applied to disc 14, or by increasing or decreasing the thickness of the disc. If continuous threads are utilized, the same result may be attained by applying the caps with automatic machinery adapted to seal the caps with the same degree of tightness in every instance. It has also been found that the percentage of paraffine may be varied within predetermined limits to control the pressures in the package.

In Fig. 3, a slightly different embodiment of the present invention is illustrated, wherein a closure cap is provided with suitable screw threads 13 and a dome-shaped cover portion 16 which provides a substantial air space above the disc 14. This space serves a two-fold purpose, namely, it provides an air space into which pressure may be temporarily discharged through the disc and also permits the liners to flex or bulge upwardly when excessive pressures are created within the package. The latter result is particularly desirable, since it permits the liners to flex without flexing the cap, whereby the annular zone 17 of the cover portion remains in sealed position to hold the impervious liner 11 against the rim of the container. Another advantage is that when the disc 14 flexes upwardly, it is slightly stretched or expanded, whereby the porosity is increased to permit the pressure to be relieved more rapidly.

In Fig. 4, a slightly different embodiment is shown, wherein a suitable aperture 20 is provided in the disc 14. Preferably, aperture 20 is substantially in alignment with the aperture 12 of the liner 11, whereby pressure within the package may pass directly into the middle of the disc 14 and then outwardly therethrough to the outer edges, as illustrated by the arrows. The above construction may be utilized with either a cap having a flat cover portion or a cap having a dome-shaped cover portion, as shown in Fig. 3. If desired, the aperture 20 may be spaced to the side of aperture 12 or a plurality of spaced apertures may be provided to facilitate relief of pressure through the liner 14. However, a single aperture has been found to give excellent results. The paraffine forms a surface coating which forces the gases to pass through the middle of the disc 14 and substantially prohibits passage through the surface thereof.

The above described devices are preferably made by utilizing standard types of closure caps which can be made with existing machinery. The liners 11 and discs 14 are preferably cut from rolls of the desired material by automatic machinery which, at the same time, may provide the apertures 12 and apertures 20. The cardboard material for the disc 14 may be subjected to a bath of paraffine prior to or at the cutting of the discs, until it has absorbed substantially five to fifteen per cent of paraffine. The liners 11 and 14 may be placed in the cap 4 by the cutting machinery or by hand to as-

semble them within the closure. The caps are then ready for shipment and are adapted to be applied by the packer without further adjustment of the venting means and without the aid of special machinery.

The liner members 11 and 14 are preferably large enough to remain, during shipment and application, within the closures. The caps may be screwed on the containers in the usual manner to seal the container by pressing the impervious liner 11 against the rim of the container through the intermediation of the resilient disc 14. The disc 14 is compressed at the sealing zone to hold the liner 11 firmly in position and to provide a secure seal. Any pressure created within the container by decomposition of the products is relieved by passing through the aperture 12 in liner 11 and then through the middle of the disc 14, as illustrated more particularly in Fig. 2.

It will be seen that the present invention provides a simple inexpensive closure which will vent a package at a desired pressure without impairing the effectiveness of the seal against external moisture. The cap may be manufactured by existing machines and may be made of metal or moldable material such as plastics. These caps may be provided either with interrupted or continuous thread engaging means adapted to engage corresponding means upon a container. The liners can be provided with apertures without increasing the cost of the closure and are made from any desirable material adapted to accomplish the above described results. The simplicity of the closure for achieving these results is a feature of the invention.

As various changes may be made in the form, construction and arrangement of parts herein without departing from the spirit and scope of the invention and without sacrificing its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt, a relatively porous liner provided with a coating of paraffine, and a non-porous liner substantially bonded to said first liner having an aperture therein.

2. As an article of manufacture, a closure cap comprising, in combination, a cover portion, a depending skirt, a liner adjacent to said cover portion formed of compressible material such as cardboard and the like having a coating of paraffine thereon, and an oil paper liner adjacent to said first liner having an aperture therein.

3. As an article of manufacture, a closure cap comprising, in combination, a depending skirt having container engaging means therein, a compressible liner partially saturated with paraffine adjacent to said cover portion, and an impervious liner adjacent to and beneath said first liner, said second liner having an aperture therein substantially at the center thereof.

4. As an article of manufacture, a closure cap comprising, in combination, a dome-shaped cover portion, a depending skirt, a compressible liner partially saturated with paraffine adapted to fit against the marginal portions of said cover portion, and an impervious liner adjacent to said first liner having an aperture therein.

5. As an article of manufacture, a closure cap comprising, in combination, a cover portion, a depending skirt, a substantially porous compressible liner partially saturated with moisture resisting material, and an impervious liner adjacent to said first liner having an aperture therein.

6. As an article of manufacture, a closure cap comprising, in combination, a cover portion and a depending skirt, a substantially porous liner having an aperture therein, and an impervious liner adjacent to said first liner having an aperture therein.

7. As an article of manufacture, the combination of a disc liner impregnated with paraffine and an oil paper liner bonded to said disc liner and having an aperture therein.

8. In a sealed package, the combination of a container having cap engaging means thereon, a closure cap having a cover portion and a depending skirt provided with means adapted to engage said means on the container, a relatively porous compressible liner partially saturated with moisture resisting material, and an impervious liner substantially bonded to said first liner having an aperture therein.

9. In a sealed package, the combination of a container having cap engaging means thereon, a closure cap having a cover portion and a depending skirt provided with means adapted to engage said means on the container, a relatively porous compressible liner impregnated with moisture resisting material, and a second liner adjacent to said first liner having an aperture therein.

10. In a sealed package, the combination of a container having cap engaging means thereon, a closure cap having a cover portion and a depending skirt provided with means adapted to engage said means on the container, a slightly porous liner adjacent said cover portion having an aperture therein, and an impervious liner adjacent to said first liner adapted to seal the rim of the container, and having an aperture therein adapted to relieve pressure within the container.

11. In a sealed package, the combination of a container having a plurality of interrupted cap engaging lugs or threads, said lugs being provided with an inclined surface adapted to draw a cap downwardly and a horizontal surface definitely spaced with respect to the rim of the container and adapted to hold the cap in a predetermined sealed position, a closure cap having a cover portion and a depending skirt provided with lugs adapted to engage said lugs on the container, a compressible liner adjacent to said cover portion adapted to permit the passage of gases under pressure therethrough, and a second liner adjacent to said first liner having an aperture therein, said liners being compressed a predetermined amount by reason of the horizontal portion of the lug on the container.

12. A sealed package, comprising a glass container, a closure cap sealed upon said container, said cap having a cover portion, a depending skirt, and a liner of pulp material having an aperture therein, said aperture being adapted to permit pressure within the container to be released by passing laterally between the two surfaces of the liner.

13. As an article of manufacture, a closure cap comprising in combination, a cover portion, a depending skirt, and a liner made of a substantially porous material, the two surfaces of

said liner being coated with moisture resisting material, said liner having an aperture therein to permit excess pressure in a package to be relieved by permitting the gases to escape between said two surfaces.

14. As an article of manufacture, a liner comprising a compressible substantially porous disc having its two sides coated with paraffine, and said liner having an aperture therein to permit pressure within a package to be relieved by passing between the two sides of said liner.

15. As an article of manufacture, a closure cap comprising, in combination, a cover portion and a depending skirt provided with means adapted to engage cooperating means on a container, a disc formed of slightly porous material adjacent said cover portion, and a disc formed of impervious material adjacent to said first disc adapted to seal the rim of a container, and having an aperture therein adapted to relieve pressure within the container.

16. As an article of manufacture, a closure cap having, in combination, an imperforate cover portion, a depending skirt provided with means adapted to engage cooperating means on a container for holding the cap thereon, a compressible and slightly porous disc liner of pulp material adjacent said cover portion, and an oil paper liner adjacent to said first liner adapted to engage and form a seal on the rim of the container, said oil paper liner having an aperture therein adapted to relieve pressure within the container.

17. As an article of manufacture, a closure cap comprising, in combination, a cover portion, a depending skirt, and a liner of pulp material having its lower surface coated with moisture resisting material, said liner having an aperture therein adapted to permit pressure to pass laterally between the surfaces of the liner.

18. As an article of manufacture, a closure cap comprising a cover portion, and a depending skirt provided with means for engaging and holding the cap on a container, a disc formed of compressible porous material adjacent said cover portion adapted to permit gases under pressure to leak therethrough and a second disc substantially thinner than said first disc, said second disc being made from a more effective sealing material than said first disc and having an aperture therein adapted to relieve pressure within a container.

19. As an article of manufacture, a closure cap comprising, in combination, a cover portion and a depending skirt provided with means adapted to engage cooperating means on a container, a disc formed of slightly porous material adjacent said cover portion, and a second disc formed of impervious material adjacent to said first disc and bonded thereto adapted to seal the rim of a container, and said second disc having an aperture therein adapted to relieve pressure within the container.

MARION H. RANEY.