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CONTAINER CLOSURE

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Fig. 1.

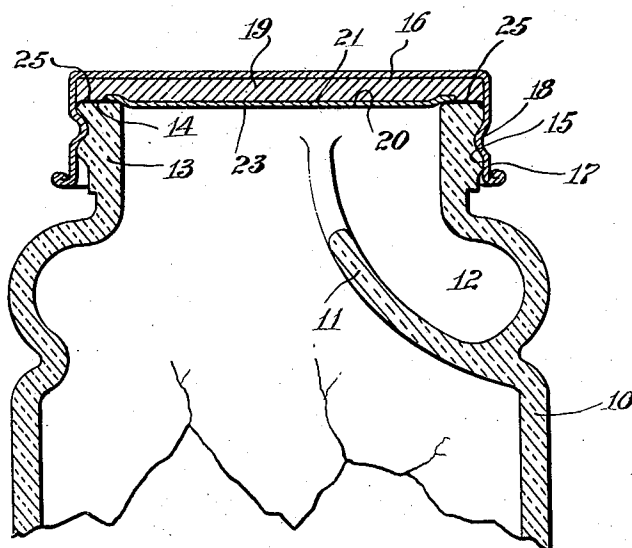


Fig. 2.

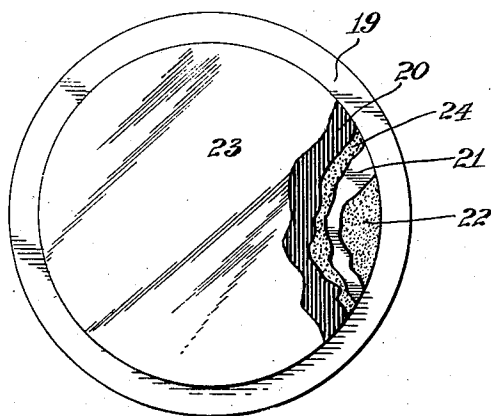
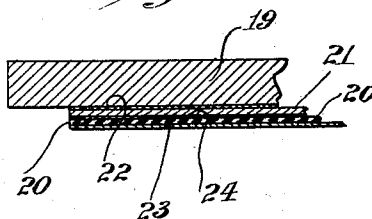


Fig. 3.



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CONTAINER CLOSURE

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12 Claims. (Cl. 215—43)

The invention relates to container closures, and more particularly to a closure for use with containers from which the liquid contents are to be removed otherwise than by pouring.

5 There is now extensively used a bottle for the packaging of ink, containing an interior well adjacent the neck of the bottle to permit the filling of a fountain pen by withdrawing ink from this well instead of from the bottle proper. This
10 construction is for the purpose of preventing the smearing of the outside of the pen barrel with ink or an incomplete filling of the bulb in the barrel due to the low level of ink in the bottle, notwithstanding the presence of an adequate
15 supply of ink to properly fill the bulb.

To fill the well with ink, it is necessary to invert the bottle. In the packaging of various other liquids, it is necessary to agitate or shake the bottle or other container, or to completely
20 invert it to secure a thorough admixture of the constituents of the contents.

With containers in which the fluid contents are thus brought into contact with a closure having a metal or plastic composition shell the skirt of which has a screw threaded connection with the neck of the container, experience has demonstrated that the contents of the bottle will adhere to, and accumulate upon, the cushion within said metal shell and, upon repeated replacement of the closure, spread across the cushion disc in a manner to cause it to be forced between the screw threads of the skirt of the closure shell and the neck of the container. This
25 not only interferes with the removal and replacement of the closure upon the container, but results in the accumulation of the extruded contents of the container below and about the closure skirt upon the neck of the container and the soiling of the fingers of the user when removing the closure.

This is particularly true with the type of ink bottle above referred to, wherein ink escaping to below and about the skirt of the closure, and even upon the screw threads themselves, dries
30 and forms a powder which will fall upon the object upon which a bottle rests when removing the closure, as well as soil the hands.

The same condition prevails with other constructions of containers closed by means of screw cap closures wherein, before removing the closure, it is necessary to violently shake the bottle or invert it, a common practice with druggists and physicians as well as laymen. If the contents of a container are to be poured therefrom,
35 this condition cannot be avoided, but if the con-

tents of the bottle are to be removed, as when filling an ordinary fountain pen, or by a fluid dropper or an applicator such as a swab, the above conditions may be avoided.

Prior to my invention, a container closure so
5 constructed as to prevent the liquid contents of the container from contacting with the inner rim of the neck of the container, upon the inversion thereof, or to be deposited upon the top of said neck when removing said liquid from the
10 container by means of a fountain pen, a fluid dropper, or an applicator or swab, was produced.

In this closure, exclusion of the liquid from the top of the neck of a container was relied upon to avoid the presence of ink which might be subsequently forced by the application of the closure to the container, between the skirt of the shell of the closure and the neck of the container.

By the present invention, a closure is provided by which the compression of the sealing gasket
15 is relied upon to exclude, as effectively as possible, liquid from the top of the neck of a container when it is inverted or during transportation, the closure being so constructed that in the event of the liquid seeping past this seal, or being
20 deposited upon the top of the neck of the container when removing a portion of the contents therefrom, such liquid will be so removed, upon replacement of the closure, as to prevent its being squeezed outwardly of the neck of the container and ultimately between the skirt of the shell
25 and the outside of the neck of the container.

With this construction, any liquid which may reach the top of the neck of the container, or be deposited thereon in removing fluid from the
30 container, is removed by absorption by the material of the liner. The compressibility of the portion of this liner engaging the top of the neck of the container extends the absorption area throughout sufficient of the body of the liner to
35 ensure a continued effective action of the liner in removing liquid which may reach the top of the neck of the container, and preventing an accumulation of such liquid, or its creepage or seepage toward the outer lip of the neck of the
40 container.

The portion of the liner effective to remove the liquid by absorption is located only adjacent the top of the neck of the container toward the outer lip thereof, the central portion of the liner
45 presented toward the container having a continuous protective facing of liquid, or liquid and acid resistant material, extending to a point beyond the inner lip of the top of the neck of the container.

55

This facing forms a sufficiently effective seal to minimize, if not absolutely prevent, the escape of liquid from the top of the neck of a container when it is inverted. It also prevents saturation of the material of the liner in a degree to have a limiting effect upon the removal of liquid from the top of the container by the exposed portion of the liner about the edge thereof, and also prevents any chemical reaction between the contents of the container and the material of the liner which might result in deterioration of said liner or modification of the characteristics of said contents.

By limiting the exposed absorptive area of the liner and providing such a protective facing for the portion thereof with which the contents of the container contact upon inversion of the container, the absorptive body of the liner adjacent the exposed edge portion will dissipate, by capillary attraction, the liquid absorbed by the liner adjacent this exposed portion and behind the protective facing.

To minimize likelihood of liquid of the contents of the container adhering to the protective facing, it is desirable to provide this facing with a thin film of paraffin, or to otherwise so treat the material of this facing as to increase its liquid repellent properties.

The top of the neck of a container may, if desired, also be provided with a coating of lacquer or other material which will serve to fill any imperfections in the material of the container and so condition the surface of this material as to retard possible creepage of liquid from the inside of the container toward the outside thereof. This lacquer coating is not used to adhere the liner to the neck of the container, it being desirable to permit a free turning movement of said liner in relation to the container when removing and applying the closure to the container.

The invention consists primarily in a container closure embodying therein a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner within, having an absorbent ring extending about and adjacent the skirt of said shell, and a facing of non-absorbent material centrally of said shell and spaced from said skirt a distance to permit engagement of said ring of absorbent material with the top of the neck of a container and to form a substantially liquid tight seal between said facing and the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said ring, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented; and in such other novel features of construction and arrangement of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawing,

Fig. 1 is a sectional view upon an enlarged scale, of the upper part of a container and a closure embodying the invention applied thereto;

Fig. 2 is a plan view, broken away upon different planes, of a liner forming a part of the closure; and

Fig. 3 is a sectional view of a fragmentary portion of the liner shown in Fig. 2, upon a greatly enlarged scale.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention as shown

in the accompanying drawing, it is illustrated in connection with a well known form of glass bottle used in the packaging of ink.

The body of the bottle is shown at 10, and adjacent the top thereof, at one point of the bottle, is a partition 11 forming a well 12 which may be filled with liquid contents of the bottle by inverting or tilting it according to the quantity of ink which may be therein.

The neck 13 of the bottle is provided with a flat top 14, and exteriorly of this neck are screw threads 15, or other means by which a re-seal closure may be connected with the bottle. Said securing means 15 may be in the form of continuous or interrupted screw threads, inclined lugs or other well known devices facilitating the attachment of a closure to the neck of a bottle.

The closure proper includes a skirted shell which may be made of any desired material, such as drawn sheet tin, molded plastic or any other material commonly used in the production of closure shells.

In the drawing, a sheet metal shell 16 having a screw threaded skirt 17 is shown, but when sheet metal is used for the material, it is immaterial whether the means for attaching the shell to the neck of the container, such as the screw threads 18, are produced prior to the application of the shell to a container, or subsequent to such application by means of a tool deforming the skirt to conform to projections upon the exterior of the neck of the bottle. The particular material in, and form of, the skirted shell are immaterial to the invention, any old and well known structure as to such being capable of use.

To prevent the seepage of liquid contents of a container across the top of the neck thereof, or the squeezing of any liquid which may be deposited upon the top of this neck when removing the contents from a container, a ring of absorbent material is provided within the shell adjacent the skirt. This ring will absorb any liquid which may pass the sealing means when a container is tilted, or following such action, and will remove any liquid which may be present upon the top of the neck of the container or bottle when replacing the closure after the contents have been removed therefrom.

Within the area of this ring which contacts with the neck of the container, is a disc of non-absorbent or liquid repellent material, the edge of which is utilized in forming a seal about the inner edge of the neck of the container. Said disc also prevents the adherence of the contents thereto in sufficient volume to permit seepage of this material from the disc to the top of the neck of the container. In the event that some small seepage may occur, the ring of absorbent material will prevent creepage of such liquid to adjacent the skirt of the shell.

To provide the ring of absorbent material, it has been found preferable to use a liner 19, which is in the form of a disc of absorbent material such as felt-board or heavy blotting paper, which is of the same diameter as the top of the shell 16. The thickness of this material may vary according to the service which is required of the closure, and it may be white, gray or any other color desired.

The central portion of the disc 19 is provided with a facing disc of liquid repellent or liquid and acid resistant material, preferably formed of a thin stratum of chlorinated rubber 20 having a thin paper backing 21 by means of which it is

bonded, by a suitable adhesive 22, to the face of the liner 19.

To increase the effectiveness of said facing disc in repelling liquid, or preventing its accumulation thereon, the material of the stratum 20 is treated with a protective coating 23 of paraffin, or is otherwise treated to increase the effectiveness of this facing in preventing adherence of the liquid contents of the container thereto when the contents of the container are brought into contact therewith.

The facing disc is of a diameter slightly greater than the inside diameter of the neck of the container, so that the sealing of the container results from engagement of this facing with the inner edge of the neck of the container, thus, when the closure is in place upon the container, interposing between the contents of the container and the absorbent ring about the skirt of the closure, a barrier of non-absorbent material.

A suitable adhesive 24 is employed to bond the facing stratum 20 to its backing 21.

The liner 19 need not be, and ordinarily is not cemented to the shell of the closure.

It has been found desirable, in some instances, to provide the neck of the container with a thin coating of lacquer 25 to aid in preventing the creeping of liquid across the top of this neck. Such lacquer coating is not used to bond the liner to the neck of the container, since a free turning movement of the closure and its contained liner, in relation to the neck of the container, is desirable, both in applying and removing the closure.

Various adhesives may be used in the strata 22 and 24, particularly as such adhesives are protected by the facing disc from deterioration as a result of contact of the contents of the container therewith.

The action of a closure embodying the invention is substantially as follows:

When a closure is applied to the neck of a container, sufficient pressure is developed to compress the liner 19 and the edge portion of the facing disc against the top of the neck of the container. That portion of the facing disc extending across and beyond the inner edge of the mouth of the container forms a liquid tight seal about said mouth and between the container and the liner 19.

If there are slight irregularities at the top of the mouth of a container, or slight imperfections in the material of the facing disc, there may be a slight seepage of the liquid contents of the container through the seal secured by the facing disc at some point about the neck of the container. Any such liquid, however, will be absorbed by the absorbent ring provided by the liner 19.

When the liquid contents of a container are brought into engagement with the non-absorbent facing disc, as when the container is inverted to fill the well 12, or when the container is shaken, this liquid, when the container is restored to an upright position, will fall back into the container, little or none of it adhering to said facing.

As with the seepage above referred to, any liquid which may pass the seal between the facing disc and the neck of the container will be absorbed by the exposed portion of the liner adjacent the skirt. The closure may therefore be removed with little or no likelihood of any of the liquid contents of the container remaining upon the top of the neck of the container. In removing the contents from a container, some of such contents may be deposited upon the top of the

neck of the container, but only in small quantities and at a point where it will not reach the outside of the neck of the container.

When the closure is replaced upon the container, any such liquid will be absorbed by the exposed surface of the liner 19, and none of this liquid will be squeezed or extruded from between the top of the neck of the container and the liner to a point where it may escape between the outside of the neck of the container and the skirt of the shell.

If a large globule of such liquid should be upon the top of the neck of the container, the combined downward and rotary movement of the closure will cause the absorption of the major portion of the liquid of this globule before any pressure is developed between the liner and the neck of the container, and any residue will be spread about the neck of the container as a result of the turning movement of the closure.

When the exposed portion of the liner 19 is compressed during the final movements of the closure in applying it to the container, liquid absorbed by the liner will be forced into the body of the liner and not from the top to the neck outside of the container.

While, with repeated inversions of the container and the removal and re-application of the closure, the quantity of liquid absorbed by the liner will gradually increase, tests have demonstrated that there will be no such degree of saturation of the material of this liner as will destroy its effectiveness in absorbing liquid as above described, even after repeated inversions of the container and removal of the contents thereof in number in excess of those which would ordinarily complete emptying of the container.

By using a disc 19 of absorbent material throughout, the capacity of the absorptive means may be materially increased without undue thickness of the material of said liner, since, while a container is not in use, liquid absorbed by the exposed ring portion of the liner will be dispersed by capillary attraction throughout the material of the liner toward the central portion thereof behind the facing disc. Hence, expression of the absorbed liquid, as a result of compression of the ring-like portion of the liner, is either completely eliminated or reduced to a point to be negligible.

By using a container, the neck of which has a flat top, escape of liquid thereover to between the outside of the neck of the container and the skirt of the closure is reduced to a minimum.

In actual tests it has been found that the use of a lacquer coating upon this flat surface is not essential, and that satisfactory results can be secured without it.

It is not the intention to limit the invention to the use of the particular materials herein described, since other materials, acting in the same manner, may be used. In packaging some materials, the use of a metal facing disc has been found to deleteriously affect such materials. While materials other than chlorinated rubber may be used for the facing disc, it has been determined that this material is highly effective with a wide range of liquids being packaged.

Having described the invention, what I claim as new and desire to have protected by Letters Patent is:

1. A container closure embodying therein a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner within, having an absorbent ring extending about and adjacent, the skirt of said

cape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

6. A container closure embodying therein a shell having a skirt adapted to be engaged with a securing means exteriorly of the neck of a container, a liner composed of a disc of felt-board within said shell and extending to the skirt thereof, and a facing of chlorinated rubber bonded to said disc centrally thereof and spaced from said skirt a distance to permit engagement of the edge portion of said liner disc with the top of the neck of a container, and the edge portion of said facing with the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said liner, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

7. A container closure embodying therein a 20
shell having a skirt adapted to be engaged with
securing means exteriorly of the neck of a con-
tainer, a liner within, having an absorbent ring
extending about and adjacent, the skirt of said
shell, and a facing of non-absorbent material 25
having a protective coating to prevent adherence
of liquid thereto, centrally of said shell and
spaced from said skirt a distance to permit en-
gagement of said ring of absorbent material with
the top of the neck of a container and to form a 30
substantially liquid tight seal between said fac-
ing and the inner edge of said top, whereby any
liquid which may be upon the top of the neck of
the container will be removed by absorption by
the material of said ring, and escape of such liq- 35
uid to between the skirt and the outside of the
neck of the container will be prevented.

8. A container closure embodying therein a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner composed of a disc of absorbent material within said shell and extending to the skirt thereof, and a facing of chlorinated rubber having a protective coating to prevent adherence of liquid thereto bonded to said disc centrally thereof and spaced from said skirt a distance to permit engagement of the edge portion of said liner disc with the top of the neck of a container, and the edge portion of said facing with the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said liner, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

9. A container closure embodying therein a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner composed of a disc of felt-board within said shell and extending to the skirt thereof, and a facing of chlorinated rubber having a protective coating to prevent adherence of liquid thereto bonded to said disc centrally thereof and spaced from said skirt a distance to permit engagement of the edge portion of said liner disc with the top of the neck of a container, and the edge portion of said facing with the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said liner, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

10. A container closure embodying therein the combination with a container provided with a

neck having a top, and a coating of lacquer thereon, of a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner within, having an absorbent ring extending about and adjacent, the skirt of said shell, and a facing of non-absorbent material centrally of said shell and spaced from said skirt a distance to permit engagement of said ring of absorbent material with the top of the neck of a container and to form a substantially liquid tight seal between said facing and the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said ring, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

11. A container closure embodying therein the combination with a container provided with a neck having a flat top, and a coating of lacquer thereon, of a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner composed of a disc of absorbent material within said shell and extending to the skirt thereof, and a facing of non-absorbent material centrally of said disc and spaced from said skirt a distance to permit engagement of the edge portion of said liner disc with the top of the neck of a container, and the

edge portion of said facing with the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said liner, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

12. A container closure embodying therein the combination with a container provided with a neck having a flat top, and a coating of lacquer thereon, of a shell having a skirt adapted to be engaged with securing means exteriorly of the neck of a container, a liner composed of a disc of felt-board within said shell and extending to the skirt thereof, and a facing of chlorinated rubber having a protective coating to prevent adherence of liquid thereto bonded to said disc centrally thereof and spaced from said skirt a distance to permit engagement of the edge portion of said liner disc with the top of the neck of a container, and the edge portion of said facing with the inner edge of said top, whereby any liquid which may be upon the top of the neck of the container will be removed by absorption by the material of said liner, and escape of such liquid to between the skirt and the outside of the neck of the container will be prevented.

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