

March 27, 1945.

C. H. BARR

2,372,182

CONTAINER

Filed May 2, 1942

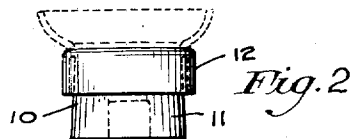
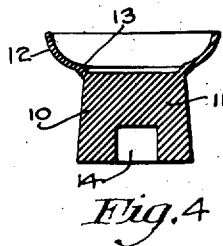


Fig. 1

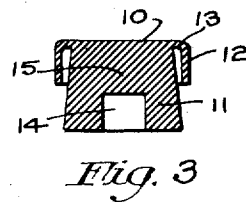
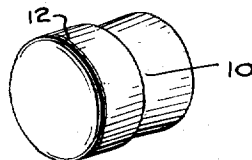


Fig. 6

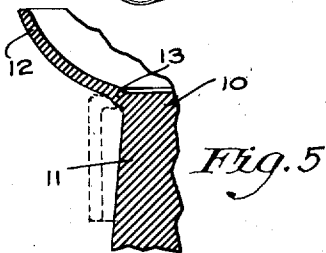
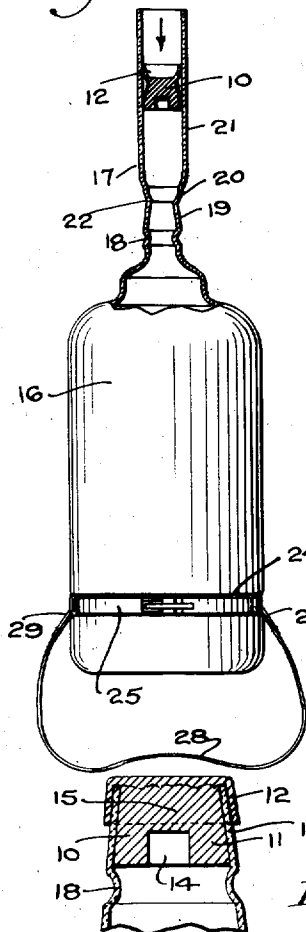


Fig. 8

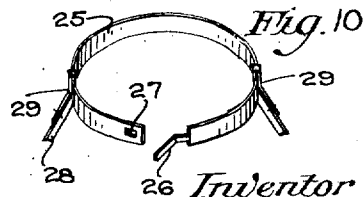
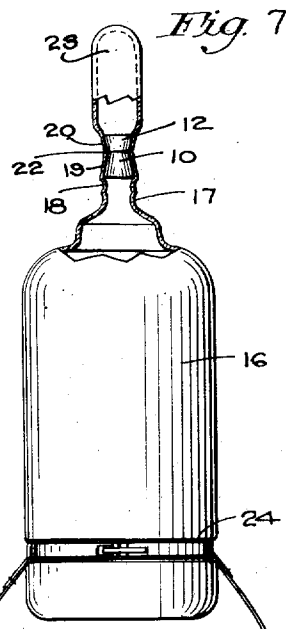
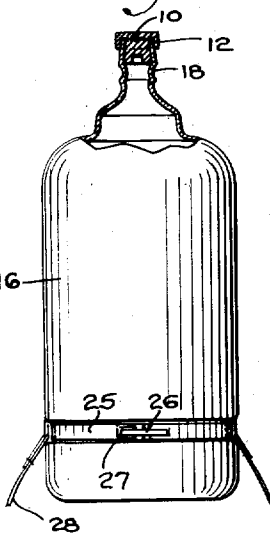


Fig. 9

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UNITED STATES PATENT OFFICE

2,372,182

CONTAINER

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Application May 2, 1942, Serial No. 441,430

5 Claims. (Cl. 215—33)

This invention relates generally to improvements in sealed containers for the preservation, storage and distribution of various biological, pharmaceutical, chemical and any other materials which are required to be maintained free of any possibility of contamination, including particularly desiccated biologically active substances which are produced and sealed in their containers in accordance with processes such as are described in the Reichel Patent No. 2,176,004, of October 10, 1939, and in my prior Patent No. 2,198,752, of April 30, 1940. More particularly, the present invention relates to an improved construction of stopper for sealing the substance in its container.

While both of the said prior patents, Nos. 2,176,004 and 2,198,752, show and describe containers for desiccated substances which are provided with a body portion containing the desiccated substance and with a flame-sealed neck within which latter is positioned a perforable stopper in tight engagement with the neck to seal the interior of the body portion from the atmosphere and against contamination, it was found that the use of such containers presented certain disadvantages, the principal one being that upon breaking off the neck in the region of the stopper, the jagged edge was exposed which might cut the hand of the person handling the container. Further, if the neck were broken off just below the top of the stopper, the latter was sometimes removed together with the broken off portion of the neck, in consequence of which air entered the container and contaminated the contents thereof. Also, it was found that in certain instances when liquid was introduced into the container through the perforable stopper in the manner described in the aforesaid Patents Nos. 2,176,004 and 2,198,752, the stopper was blown entirely out of the neck of the container due to pressure being built up in the container which exceeds that of the atmosphere.

In my prior copending applications Serial No. 420,311, filed November 24, 1941, and Serial No. 427,411, filed January 20, 1942, I have shown and described certain forms of stoppers which to large extent obviate the disadvantages above referred to. The stoppers of my prior copending applications aforesaid are each characterized by the fact that they include body portions formed substantially in the shape of a truncated cone. The portion of the neck of the container in which this type of stopper is adapted to be received is complementally formed to provide such a snug fit between the stopper and the container neck in which the stopper is fitted as to hermetically seal the container. The stopper, of course, is introduced

into proper position by forcing it into place with a suitable plunger, it being apparent that by virtue of the fact that the base of the stopper is of greatest diameter, when the stopper is forced into final position, it is under compression along its entire length with the result that the possibility of its being blown out of the neck of the container is practically eliminated. Not only did the constructions of my prior applications provide an adequate wedge type connection between the stopper and the neck of the container into which it was inserted, but they also eliminated to large extent the hazard which was presented by the exposed jagged edge when the flame-sealed portion of the neck of the container was broken off. In the construction disclosed in my application Serial No. 420,311, this jagged edge was more or less covered by the upper portion of the stopper which, having been under compression, tended to expand somewhat when the flame-sealed neck portion in which said upper part of the stopper was confined, was broken off. In my other application Serial No. 427,411, the jagged edge was more or less covered by an annular flange or disc which extended radially of the stopper when the flame-sealed neck portion of the container was broken off.

The present invention has as its object a still further improvement in the construction of the stoppers and final containers of the types hereinbefore described, which improvement principally consists in providing the stopper, at its outer end, with an annular member which is of such construction and shape that, automatically as the flame-sealed neck portion of the container is broken off, it folds down over the broken edge of the container neck to completely cover the same and so preclude any possibility whatsoever of cutting the hand of the person handling the container. This member which is formed integrally with the stopper not only covers the jagged edge of the container when the flame-sealed neck thereof is broken off, but also envelops the external surface of the stopper neck immediately in the region of said jagged edge and for a substantial depth therebelow, and thus provides in effect an external hermetic seal for the container, which is in addition to and supplements the hermetic seal provided internally of the container neck by the main body portion of the stopper.

Other objects and advantages of the present invention will appear more fully hereinafter, it being understood that the said invention consists substantially in the combination, construction, location and relative arrangement of parts as de-

scribed more fully hereinafter, as shown in the accompanying drawing and as finally pointed out in the appended claims.

In the accompanying drawing, Figure 1 is a perspective view of the stopper constructed in accordance with and embodying the principles of the present invention;

Figure 2 is an elevational view thereof;

Figure 3 is a vertical cross-sectional view thereof;

Figure 4 is a similar cross-sectional view showing the annular skirt portion thereof in upwardly extended position.

Figure 5 is an enlarged view of a portion of Figure 4;

Figure 6 is an elevational view, partially in section, of a container adapted to receive the stopper of the present invention and showing the latter in position to be advanced into final seating position;

Figure 7 is a view of the final container showing the stopper in final seated position;

Figure 8 is an elevational view of the container showing the stopper in operative condition assumed upon breaking off of the flame-sealed neck portion of the container;

Figure 9 is an enlarged view of the stopper neck portion of the container shown in Figure 8; and

Figure 10 is a perspective view of the supporting harness for the container.

Referring now to the drawing and more particularly to Figures 1 to 3, it will be observed that the stopper 10 of the present invention is provided with a body portion 11 substantially in the shape of a truncated cone, with the bottom or base of the stopper being of the greatest diameter. Formed as an integral part of the stopper is an annular skirt portion 12, this portion being secured to the top of the stopper by a radially extending web portion 13. As appears most clearly in Figure 3, the annular part 12 is substantially cylindrical in shape and coaxial with the longitudinal central axis of the stopper. The body portion 11 of the stopper is preferably formed with a central recess 14 extending upwardly from the base to a point short of the top of the stopper so as to provide a relatively thin centrally located portion 15 which may be readily penetrated or pierced by a hypodermic needle.

The depending annular skirt portion 12 is so formed in relation to the main body portion of the stopper that it tends normally to assume the position shown in Figures 1 and 3 and it is this renitency on the part of the annular portion 12 that is availed of to cover and embrace the jagged edge which results when the flame-sealed neck portion of the container is broken off. Figures 4 and 5 show the renitent part 12 held in position against its tendency to assume its normal position, it being observed in these figures that when the part 12 is so upwardly maintained, the web portion 13 is distorted out of its normal flat plane and through its elasticity stores up energy effective to snap the part 12 back into its normal position immediately upon release of the force which holds the part 12 in its upwardly extended position.

The container to be sealed by the stopper of the present invention is of the same general type disclosed in my copending application Serial No. 427,411 aforesaid, having a main body portion 16 and a neck portion 17. This latter neck portion is formed with an annular depression 18 to provide the neck in the region of said depression with an internal diameter sufficiently less than

the diameter of the stopper base as to limit the movement of the stopper inwardly of the neck. The portion of the neck immediately above the depression 18 is inwardly tapered, as at 19, to provide a frusto-conical section which is complementary to the shape of and adapted to snugly receive the main body portion of the stopper. Above the inwardly tapered section 19 of the neck portion 17 of the container is a second outwardly tapered section 20 which terminates in a conveniently long upward tubular extension 21 of substantially uniform diameter. The restricted junction 22 between the oppositely tapered sections 19 and 20 of the neck portion 17 of the container, while of less diameter than the diameter of the base of the stopper, is nevertheless of sufficient size to enable the stopper to be forced therethrough into its final position shown in Figures 7, 8 and 9. This restricted junction 22, it will be observed, is so located that when the stopper is in its final seated position, the said junction 22 and the under surface of the radial web 13 of the stopper lie in a substantially common plane. By scratching or filing the neck portion at a point along the line of the restricted junction 22, the upper part of the neck may be readily broken off along said junction line.

In order to position the stopper in final seated position, it is initially introduced into the upper tubular neck portion of the container as shown in Figure 6, and thence forced downwardly in any suitable manner until it assumes the final position shown in Figure 7. It will be observed that as the stopper is being forced downwardly through the tubular neck portion of the container, the renitent skirt portion 12 thereof is constrained to assume the upwardly extended position as shown, and even in its final seated position (see Figure 7), the said renitent portion 12 is retained in said upwardly extended condition by the confining wall of the outwardly tapered section 20 of the neck portion of the container. When the stopper is seated in its final position as shown in Figure 7, the tubular extension above the stopper is flame-sealed in the manner and for the purpose more particularly described in the aforesaid prior patents, Nos. 2,176,004 and 2,198,752.

When it is desired to employ the material sealed in the container, the flame-sealed extension 23 thereof is broken off along the previously described junction line 22 whereupon, due to the inherent renitency of the part 12 of the stopper, it immediately snaps over and about the broken edge of the container neck to thereby afford complete protection to the person handling the container. Figures 8 and 9 show the stopper in its protective condition after the flame-sealed extension of the container has been broken off, and by reference to these figures, it will be observed that the part 12 of the stopper so snugly embraces the external surface of the neck of the container immediately adjacent the broken edge thereof that it constitutes an outer external seal for the container which is in addition to and supplements the internal seal formed by the main body portion 11 of the stopper. Due to the frusto-conical shape of the stopper and the complementally shaped neck portion of the container, a secure interlock is obtained therebetween which prevents the stopper from being blown out of the container neck or from being removed from the container along with the broken off flame-sealed portion of the container. In the condition of the stoppered container as shown in Figures 8 and 9, a needle may be pushed through the stopper for

the purpose of introducing liquid into or of withdrawing the liquid content from the interior of the container. By forming the stopper of good quality rubber or other suitable material, it will be obvious that it will self-seal itself immediately upon withdrawing the needle therefrom and so preserve the contents of the container from contamination.

In certain cases, it is desirable to support the final container shown in Figures 8 and 9 in inverted position in order to facilitate dispensing of the contents thereof. To this end, the container of the present invention is provided adjacent its base with an annular groove or recess 24 within which is adapted to be fitted a flexible band 25 of light metal or the like. This band is shown more particularly in Figure 10 wherein it will be observed that one end thereof is provided with a terminal extremity 26 of reduced width which is adapted to be projected through a suitable opening 27 provided in the opposite end of the band. The band is securely attached to the container by the simple expedient of seating it in the annular groove 24 and then interlocking the free ends thereof by threading the terminal extremity 26 of the band through the opening 27 and then bending said terminal extremity back upon itself, as shown most clearly in Figure 9.

This band, so secured to the container, serves as the intermediate connecting element for a flexible strap 28, preferably in the form of a cloth tape provided at opposite ends thereof with suitable loops 29—29 through which the band 25 is threaded. These loops at the opposite ends of the supporting tape are frictionally retained in position at points diametrically opposed to one another by the clamping action of the strap 25 in the annular seat in which it is accommodated. Should it be desired to remove the supporting harness from the container, it is merely necessary to disengage the extremities of the band 25 one from the other to thereby permit free removal of its band and its associated supporting strap or bail 28 from the container.

While I have shown and described the stopper of the present invention as having a body portion substantially in the shape of a truncated cone which is adapted to be fitted into a seat of complementary shape formed in the neck of the container, it will be understood that such shape is only preferable and may be departed from as exigencies may require or permit. In its primary aspect, it is only essential that the main body portion of the stopper be tightly fitted in the neck of the container to provide an adequate seal for the contents of the latter and accordingly said body portion of the stopper and its seat in the container neck may be of any desired complementary shapes, a distinguishing feature of the present invention being the provision in a stopper of the character described of an external sealing skirt which automatically embraces the exposed edge of the container neck when the upper portion thereof is broken off. It will be understood further that the present invention is susceptible to various other changes and modifications which may be made from time to time without departing from the real spirit or general principles thereof and it is accordingly intended to claim the invention broadly, as well as specifically, as indicated in the appended claims.

What is claimed as new and useful is:

1. In a package of the type comprising a container having a neck sealed by a stopper and an extension beyond the neck, the neck being adapt-

ed to be broken opposite the stopper to enable the extension to be removed to provide access to the stopper; the improvement which comprises a stopper provided with a skirt portion having an inherent renitency tending normally to maintain the skirt in a position extending from its connection with the stopper toward the inner end of the stopper, the skirt being within the extension and the extension being constructed and arranged to maintain the skirt deformed upwardly, when the container is in upright position, from its connection with the stopper, against its said inherent renitency, whereby when the neck is broken opposite the stopper and the extension removed, the inherent renitency of the skirt portion will cause it to assume its normal position and to overlie the broken edge of the neck and a portion of the neck adjacent thereto.

2. In a package of the type comprising a container having a neck sealed by a stopper and a sealed extension beyond the neck, the neck being adapted to be broken opposite the stopper to enable the extension to be removed to provide access to the stopper; the improvement which comprises a stopper in the shape of a truncated cone seated in the neck of the container with its larger base inward, the stopper being provided with a skirt portion connected to the smaller base thereof and having an inherent renitency tending normally to maintain the skirt in a position extending from its connection with the stopper toward the inner end of the stopper, the skirt being within the extension and the extension being constructed and arranged to maintain the skirt deformed upwardly, when the container is in upright position, from its connection with the stopper, against its said inherent renitency, whereby when the neck is broken opposite the stopper and the extension removed, the inherent renitency of the skirt portion will cause it to assume its normal position and to overlie the broken edge of the neck and a portion of the neck adjacent thereto.

3. In a package of the type comprising a container having a neck sealed by a stopper and a sealed extension beyond the neck, the neck being adapted to be broken opposite the stopper to enable the extension to be removed to provide access to the stopper; the improvement which comprises a stopper, a web portion formed integrally with the stopper and extending in a direction outwardly from the longitudinal axis thereof, a skirt portion connected to the web portion, the web portion and skirt having an inherent renitency tending normally to maintain the skirt in a position extending from the web toward the inner end of the stopper, the skirt being within the extension and the extension being constructed and arranged to maintain the skirt deformed upwardly, when the container is in upright position, from the web, against the inherent renitency of the skirt and the web, whereby when the neck is broken opposite the stopper and the extension removed, the inherent renitency of the skirt and web will cause the web and skirt to assume their normal position and the web to overlie the broken edge of the neck and the skirt to overlie a portion of the neck adjacent the broken edge thereof.

4. In a package of the type comprising a container having a neck sealed by a stopper and a sealed extension beyond the neck, the neck being adapted to be broken opposite the stopper to enable the extension to be removed to provide access to the stopper; the improvement which

comprises a stopper interlocked with the neck to prevent at least inward movement thereof, the stopper being provided with a skirt portion having an inherent renitency tending normally to maintain the skirt in a position extending from its connection with the stopper toward the inner end of the stopper, the skirt being within the extension and the extension being constructed and arranged to maintain the skirt deformed upwardly, when the container is in upright position, from its connection with the stopper, against its said inherent renitency, whereby when the neck is broken opposite the stopper and the extension removed, the inherent renitency of the skirt portion will cause it to assume its normal position and to overlie the broken edge of the neck and a portion of the neck adjacent thereto.

5. In a package of the type comprising a container having therein biologically-active substance or the like which is adapted to be placed in usable condition by the addition of water, which container has a neck sealed by a perforable stopper through which water may be introduced and a sealed extension beyond the neck, the neck being adapted to be broken opposite the stopper to enable the extension to be removed to provide access to the perforable stopper; the improvement which comprises a stopper provided with a skirt portion having an inherent renitency tending normally to maintain the skirt in a position extending from its connection with the stopper toward the inner end of the stopper, the skirt being within the extension and the extension being constructed and arranged to maintain the skirt deformed upwardly, when the container is in upright position, from its connection with the stopper, against its said inherent renitency, whereby when the neck is broken opposite the stopper and the extension removed, the inherent renitency of the skirt portion will cause it to assume its normal position and to overlie the broken edge of the neck and a portion of the neck adjacent thereto.

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COURTLAND H. BARR.

CERTIFICATE OF CORRECTION.

Patent No. 2,372,182.

March 27, 1945.

COURTLAND H. BARR.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 16, for the patent number "2,198,852" read --2,198,752--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of July, A. D. 1945.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.

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