Oct. 29, 1929. J. E. THEBAUD 1,733,322

VALVULAR CLOSURE FOR BOTTLES AND JARS

Filed June 14, 1926 2 Sheets-Sheet 1

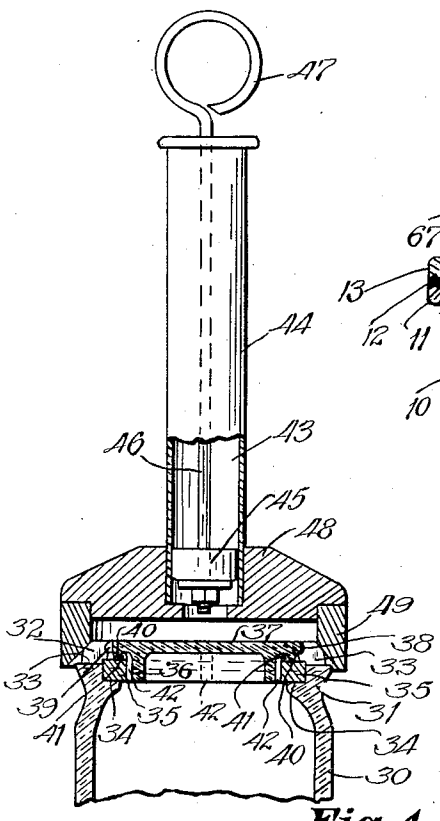


Fig. 4.

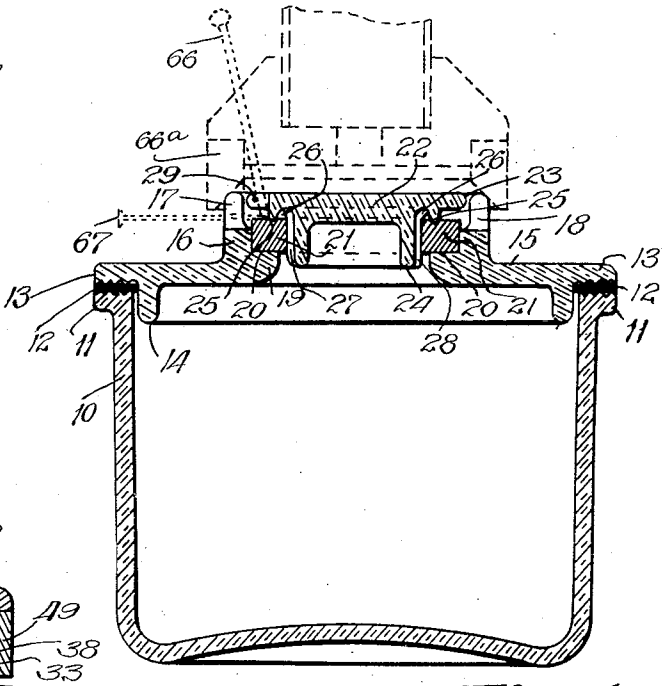


Fig. 1.

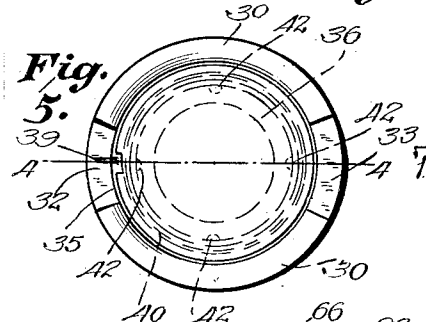


Fig. 5.

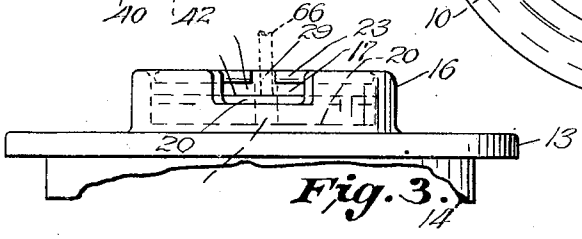


Fig. 3.

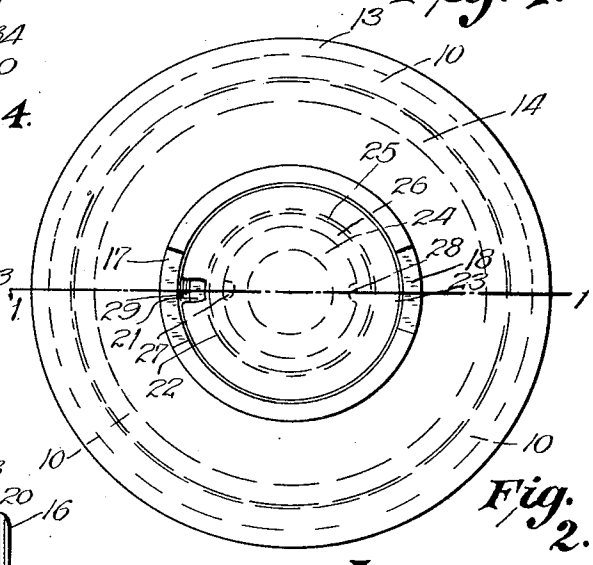


Fig. 2.

Inventor

John Edward Thebaud

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VALVULAR CLOSURE FOR BOTTLES AND JARS

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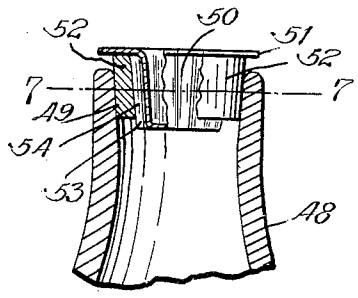


Fig. 6.

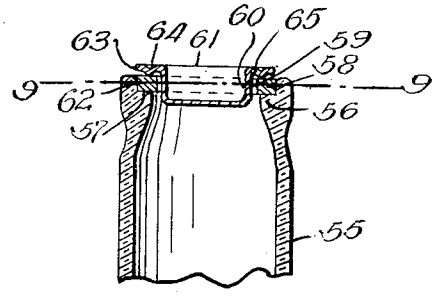


Fig. 8.

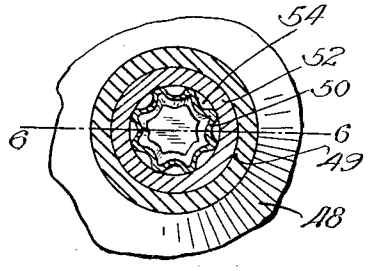


Fig. 7.

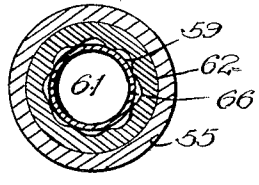


Fig. 9.

Inventor

John Edward Thebaud

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UNITED STATES PATENT OFFICE

JOHN EDWARD THEBAUD, OF CAMDEN, NEW JERSEY

VALVULAR CLOSURE FOR BOTTLES AND JARS

Application filed June 14, 1926. Serial No. 115,842.

This invention relates to valvular closures for bottles and jars, and other containers.

One of the objects of this invention is to provide a valvular closure for bottles, jars or other containers, which can serve either as a self-retaining cork, or as a valve, which can be used in connection with a pump, for exhausting the air from the container. Such a valvular closure then acts as a check valve to exclude the air after the container has been vacuumized. After the air has been admitted, the closure then serves as a self-retaining cork to the container.

A further object is to provide a self-retaining closure, having a valve action, adapted in construction to small wide-mouthed bottles, as well as large containers.

Another object is to provide an easily opened and self-retaining valvular closure, which will retain itself on the bottle, without other securing means, after the suction has been released.

With these and other objects, my invention resides in certain construction, various embodiments of which are illustrated in the drawings, are hereinafter described, their operation is explained, and what I claim is set forth.

In the drawings,

Figure 1 is a section taken on the line 1—1 of Figure 2, showing a jar and lid with a closure embodying my invention. The position of the lower part of a hand pump for exhausting the air is indicated by broken lines.

Figure 2 is a top plan of the jar, lid and closure shown in section in Figure 1.

Figure 3 is a side elevation of the lid and closure shown in Figures 1 and 2.

Figure 4 is a section taken on the line 4—4 of Figure 5, showing a wide mouthed, small bottle, with a valvular closure, embodying my invention. Also shown, partly in section, is a vacuum hand pump, adapted for use on the bottle shown.

Figure 5 is a top plan of the bottle and closure shown in section in Figure 4.

Figure 6 shows another form of my invention, adapted to an ordinary bottle, and is a section taken on the line 6—6 of Figure 7.

Figure 7 is a section taken on the line 7—7 of Figure 6.

Figure 8 shows a further modified form of my invention, and is a section taken on the line 8—8 of Figure 9.

Figure 9 is a section taken on the line 9—9 of Figure 8.

Like figures of reference refer to like parts.

In the figures, referring particularly to Figures 1, 2, and 3, the container body 10, which may be a fruit jar, or any other kind of a container, from which it is desired to exhaust the air, has a rim 11, upon which rests a rubber or other soft ring 12, acting to seal the joint between the lid 13 and the jar body 10. A centering flange 14 depends from the inside of the lid 13 into the jar body 10. Integral with and projecting up from the flat part 15, of the lid 13, is a cylindrical wall 16, having notches 17 and 18 in its rim, diametrically opposite one another. The space within the wall 16 is open into the jar and an inturned flange 19 forms an annular seat 20 upon which rests a rubber sealing ring 21. Closing the upper part of the hole, within the wall 16, is a stopper 22, having a flange 23, radially projecting from the body thereof. Concentric with the flange 23, is a cylindrical flange 24, depending from the body of the stopper 22. The flange 24 is preferably tightly gripped by the ring 21, which frictionally engages the wall 16, in a cork-like action, yet it is not necessary to taper either the flange or wall surfaces in contact with the ring 21, to get a cork-like action. It is also preferable to have the surface of contact, between the wall 16 and the ring 21, of less height than the height of the surface of contact between the ring 21 and the flange 24, so that the ring 21 will have more friction on the stopper flange 24, than it has against the inside of the wall 16, and will remain on the stopper 22, rather than stick in the bottle, when the stopper 22 is withdrawn. Spaced concentrically from the junction of the flange 24, with the body of the stopper 22, is the annular bead 25, forming by the spacing, an annular, inverted groove or channel 26, which, when the annular bead 25 is in contact

with the ring 21, forms an annular channel. Longitudinal grooves 27 and 28, and the inner surface of the ring 21, form channels in open communication between the large cavity of the jar body 10, and the annular groove or channel 26. The radial flange 23 fits loosely within the wall 16. The top surface of the stopper 22 is preferably flush or below the plane of the top of the wall 16, rather than above the same, so that the rim of the wall 16 acts as a guard to the stopper 22, to save it from any eccentric knocks, that might tend to upset it and break the continuity of valvular contact between the annular bead 25 and the ring 21, when the container has been vacuumized.

A notch 29 is provided in the radial flange 23, for access to the ring 21 with a pointed instrument or match, to press the ring 21 away from the bead 25, at the point beneath the notch 29, and break the seal caused by the suction, which will be more fully explained below.

Having described the form of my invention adapted for lids of large containers, wherewith it is desired to use a comparatively small mouthed hand pump, I will now describe the form of my invention shown in Figures 4 and 5, particularly adapted for small candy and other bottles, having a comparatively large top-opening, wherein the stopper itself forms the lid.

The bottle body 30 terminates in a cylindrical wall 31, having notches at 32 and 33, diametrically opposite one another in its rim and has an inturned flange 34, forming a seat for the rubber ring 35, which tightly grips the outer wall of the cylindrical flange 36, of stopper 37. The ring 35 frictionally engages the inner surface of the wall 31 in a cork-like action, while gripping the flange 36. The stopper 37 has an out-turned flange 38, with a notch at 39. The flange 38 fits loosely within the wall 31, having its top flush with the rim of wall 31. Spaced concentrically from the junction of the flange 36 with the out-turned flange 38, is a concentrically positioned and annular bead 40, in continuous valvular contact with the rubber ring 35.

Between the annular bead 40 and the flange 36, is the annular groove 41, forming with the ring 35, an annular channel. Longitudinal, vertical grooves 42, in the outer face of the flange 36, form, with the inner surface of the ring 35, open communications between the inside of the bottle and the annular channel 41.

Illustrating the position of a pump ready for action, there is shown a pump 43, fitting the top of the bottle. 44 is the barrel of the pump, fitting which is the plunger 45, on a rod 46, terminating in a ring 47. The base 48 has a rubber mouth 49 in contact with the rim of the bottle on the outside. This pump is shown merely to illustrate one form of means for exhausting the air from the bottle, in connection with the closure.

Referring now to Figures 6 and 7, the bottle 48 has the usual tapered inner wall at 49, adapted to fit a similarly tapered cork, but in this case the closure includes a tapered and corrugated sheet metal stopper 50, having a flange 51, bearing down on the rubber band 52 at its top. The band 52 grips the corrugated wall 53, of the stopper 50. There is no seat in this case required since the closure with the band 52 comes to a sealed stop where the forced fit leaves it in the bottle top on account of the tapered parts, the closure, as a cork, frictionally stopping at a certain depth within the bottle top. The flange 51 seats itself in sealed relation on the top of the band 52, due to the suction, when the air within the bottle is exhausted. The longitudinal openings 54, afforded by the corrugations of the wall 53, in connection with the inner conical surface of the band 52, serve as air passages, connecting the inside of the bottle 48 with the surface of valvular contact between the band 52 and the flange 51.

In the other form of my invention shown in Figures 8 and 9, the bottle 55 has an inturned flange 56 which forms a seat 57, for the rubber ring 58, which has a corrugated inner face 59, the inner projections of which are in contact with the cylindrical wall 60 of the sheet metal stopper 61. The ring 58 is in cork-like, frictional engagement with the wall 62 of the bottle 55, and grips the wall 60 of the stopper 61. The stopper 61 has a flange 63, with an annular bead 64 formed on the flange 63. Between the bead 64 and the wall 60 is an annular channel 65. The corrugations of the face 59 with the cylindrical wall 60, form air passages between the channel 64 and the inside of the jar.

All of the forms of closures, including the stoppers shown, are adapted for use as corks without suction, or as suction valves to the containers, to which they are fitted, and are used as check valves thereafter, to prevent the air from getting back into the container, until the seal is broken at the contact between the radial flange and the rubber sealing ring, or between the bead on the flange and the rubber ring. The stoppers may be made of any material that is not porous to air. Two kinds are shown, the forms illustrated in Figures 1 and 3, besides in Figures 4 and 5. The forms shown in Figures 6 and 8 are adapted for sheet metal. The pumps indicated in Figures 1 and 4 are suction hand pumps, but all of the types of closures shown are adapted for power pumps and will seal automatically under the suction. Care, however, must be exercised to prevent the closure from flying off when subjected to a sudden suction. In fact it is better to provide some kind of a fixed stop about a sixteenth of an inch above the stopper to prevent the sudden burst of air

from the bottle blowing the closure off. A slight up and down movement between the inner and outer vertical surfaces of the flexible ring 21, affords the valvular lift of the stopper 22, in permitting air to come out beneath the bead 25, and the recoil for the suction.

As for opening the closure, this may be done in various ways. Referring to the form shown in Figures 1, 2 and 3, after the stopper 22 has been drawn down tight by the suction from pumping, a match 66 can be used to open the jar, by pressing an end of the same through the notch 29, on to the rubber ring 21, to force the same away from the bead 25, at that point, letting in air to the annular channel 26 and down through the air passages 27 and 28 into the jar body 10. The stopper 22 will then be loose enough to pull out, although tight enough to remain as a self-retaining cork. The notches 17 and 18 are provided as space in which to apply the fingers to take hold of the stopper 22 at the flange 23. The stopper 22 being flush with the two remaining parts of the rim of the wall 16, afford guards for the protection of the stopper 22, against knocks, which might disturb the seal.

The stopper 22 can also be released by means of a pin 67 inserted between the ring 21 and the bead 25 to let the air in.

The form of closure shown in Figures 6 and 7 uses no seat for the rubber ring at the bottom, nor a bead at the top. The seal in this case is broken by forcing the rubber away from the flange 51 opposite one of the air passages 54 into the jar, formed between two consecutive convolutions of the corrugated wall 53. In the case of the form shown in Figures 8 and 9 the air passages at the inner corrugated surface of the wall, act to let air in and out of the bottle.

In connection with the functioning of the rubber sealing ring on a seat and being confined sideways, attention is called to the fact, that due to the swelling of rubber at right angles to the line of compressive force from the cap, I have in this case an increased side pressure and consequent additional retaining friction set up when the lid is forced down, due to internal suction, so that in addition to the suction holding the lid on, I have an increased friction at the sides of the ring, where it contacts the wall of the container and the depending flange of the lid, which it surrounds. This additional friction materially improves the holding action of the internal suction making a stronger seal. When this suction is released, and the rubber ring assumes its normal thickness, this extra side friction disappears with the release of the top pressure on the rubber ring, permitting an easy removal of the lid.

In the case where the rubber sealing ring has no seat to rest upon, but is wedged in like a cork in a bottle, the external pressure on the lid due to the suction tends to wedge the rubber ring in tighter, and at the same time, due to the side swelling tendency under vertical pressure we have here also an increased side frictional effect, which is released upon destroying the suction.

Other modifications in construction can be made without departing from the spirit and scope of my invention. Therefore I do not wish to be confined to the various forms here shown and described.

I claim:

1. A closure for a container, comprising a stopper, a circumferential flange projecting out from said stopper, an annular bead on the under side of said flange, spaced from the body of said stopper, a sealing ring in contact circumferentially with the body of said stopper, and in contact with said bead and also with the mouth of said container, and means forming a fixed air passage, positioned inside of said ring, between said ring and the body of said stopper, forming a communication from the inside of said container to the surface of contact between said bead and said ring.

2. A closure for a container, comprising a stopper, a radial flange projecting circumferentially out from said stopper, an annular seat on said container, a sealing ring on said stopper, in contact with the under side of said flange and in contact with the said seat, and also in contact with the body of said stopper at said flange, and means forming an air passage, positioned between said ring and said stopper, at the inside vertical side of said ring, and forming a communication from the inside of said container to the surface of contact between said flange and said ring.

3. A closed container, comprising a container body, a lid to said body, a sealing ring between said lid and said body, said lid having an opening thru it into said body, a rim to said opening, an annular seat at said rim, a second sealing ring frictionally fitting within said rim of said lid and on said seat, a stopper fitting within said ring, an annular flange projecting radially outward from said stopper in contact with the top of said ring, and means forming an air passage, positioned between the inside side of said ring and said stopper, forming a communication between the inside of said container and the surface of contact between said flange and said ring.

4. A closed container, comprising a container body, a lid to said body, a sealing ring between said lid and said body, said lid having an opening through it, into said body, a rim to said opening, an annular seat at said rim, a second sealing ring frictionally fitting within said rim of said lid, and on said seat, a stopper fitting within said ring, an annular flange projecting radially outward from said stopper, a bead on said flange, in contact with

said ring, and means forming an air passage, positioned between the inside side of said ring and said stopper, forming a communication from the inside of said container to the surface of contact between said bead and said ring.

5. A closed container comprising a container body, an opening in said body, a wall surrounding said opening, a ring seat at the side of and below the top of said wall, there being a notch thru said wall, above said seat, a sealing ring on said seat, within said wall, a stopper for said opening, an out-turned flange to the said stopper, resting upon said ring, and means forming an air passage positioned between the inside side of said ring and the body of said stopper, forming a communication from the inside of said container to the surface of contact between said flange and said ring.

6. A closed container comprising a container body, an opening in said body, a wall surrounding said opening, a ring seat at the inside of and below the top of said wall, there being a notch thru said wall, above said seat, a sealing ring on said seat, within said wall, a stopper for said opening, an out-turned flange to the said stopper, an annular bead depending from said flange and resting on said ring, and means forming an air passage, positioned between the inside side of said ring and the body of said stopper, forming a communication from the inside of said container to the surface of contact between said flange bead and the said ring.

7. In a closed container having an opening, means forming a closure to said opening, comprising an annular wall at the rim of said opening, a ring seat at said wall, inside and below the top thereof, a sealing ring on said seat, a stopper fitting the inside side of said ring, an out-turned flange to said stopper, fitting on top of said ring, said flange having an opening thru it exposing part of said ring, and forming access to said ring for that which may be used to depress said ring and break its continuity of contact with said flange for the admission of air to said container, and a second means forming an air passage, positioned between the inside of said ring and the body of said stopper, forming a communication from the inside of said container to the surface of contact between said flange and said ring near the opening in said flange, so that when the said ring is pressed away from its contact with said flange near said air passage, a continuity of opening is afforded between the inside of said container and the outside atmosphere.

8. In a closed container having an opening, means forming a closure to said opening, comprising an annular wall at the rim of said opening, a ring seat at said wall, inside and below the top thereof, a sealing ring on said seat, a stopper fitting the inside of said ring, an out-turned flange to said stopper, a continuous bead depending from said flange and in contact with said ring, there being a hole thru said flange outside of said bead, to expose part of said ring, and forming access to the said ring for that which may be used to depress said ring and break its continuity of contact with said bead for the admission of air to said container, and a second means forming an air passage, positioned between the inside side of said ring and the body of said stopper, forming a communication from the inside of said container to the surface of contact between said bead and said ring near said opening thru said flange and said bead.

9. In a closed container having an opening, means forming a closure to said opening, comprising an annular wall at the rim of said opening, a ring seat at said wall, inside of and below the top thereof, a sealing ring on said seat having its outer cylindrical wall in contact with said annular wall, an internal corrugated wall on said ring, a stopper extending over the top of said ring, a depending flange to said stopper fitting within the corrugated wall of said ring.

JOHN EDWARD THEBAUD.