Nov. 23, 1937. H. E. TOWNSEND 2,099,710

HERMETICALLY SEALED PACKAGE

Filed Oct. 20, 1932 2 Sheets-Sheet 1

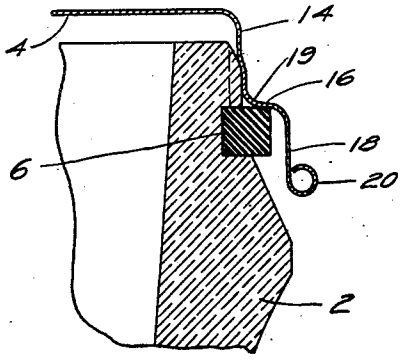


FIG. 2

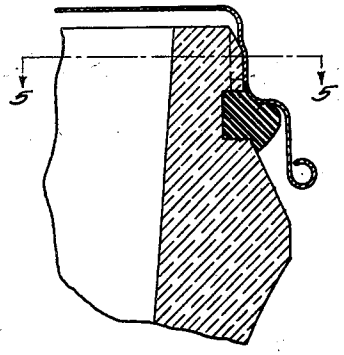


FIG. 3

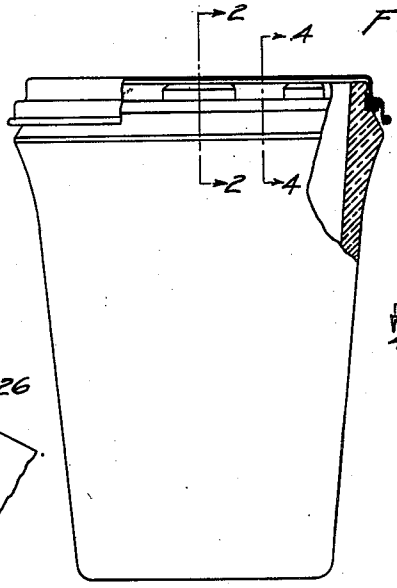


FIG. 1

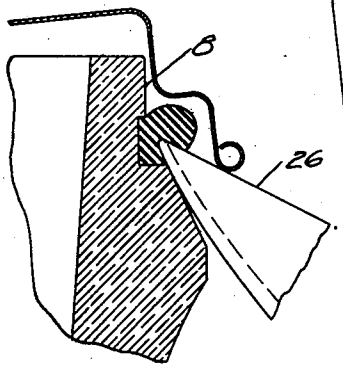


FIG. 6

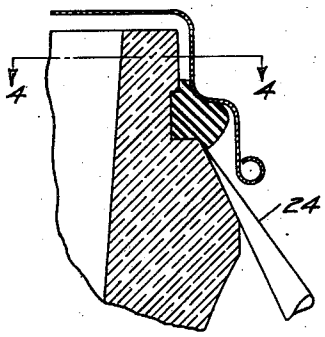


FIG. 4

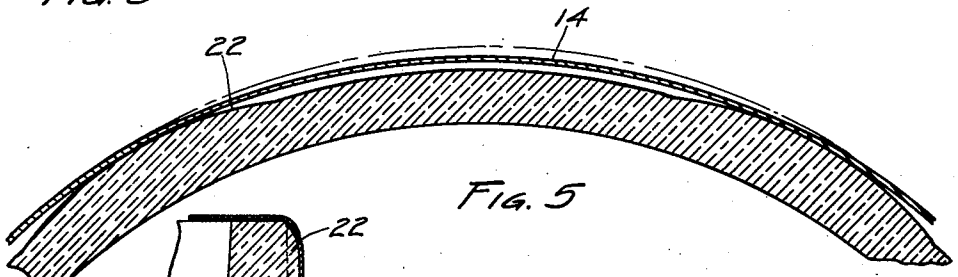


FIG. 5

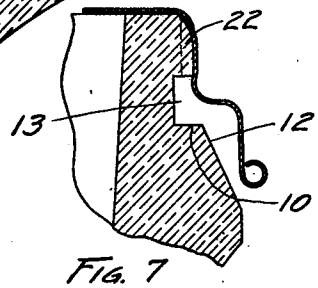


FIG. 7

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Nov. 23, 1937. H. E. TOWNSEND 2,099,710

HERMETICALLY SEALED PACKAGE

Filed Oct. 20, 1932 2 Sheets-Sheet 2

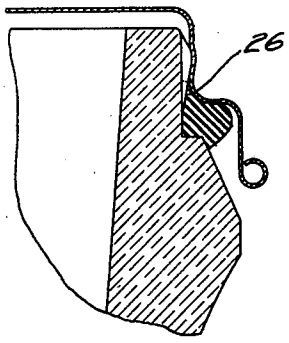


FIG. 9

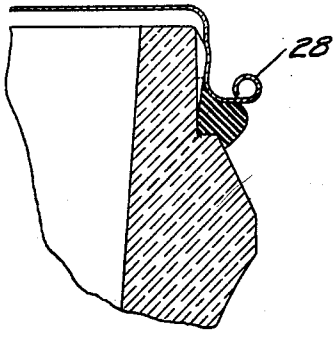


FIG. 10

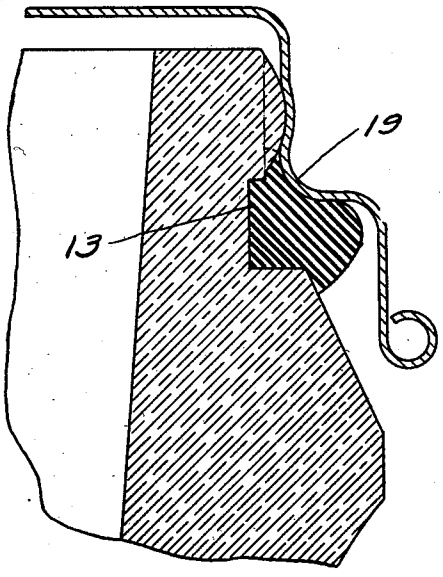


FIG. 8

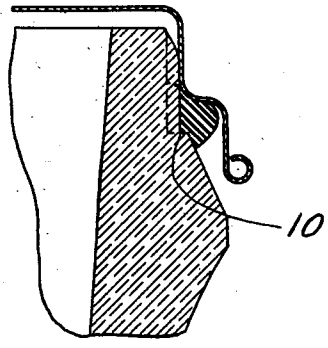


FIG. 11

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UNITED STATES PATENT OFFICE

2,099,710

HERMETICALLY SEALED PACKAGE

Harry E. Townsend, Brooklyn, N. Y.; Title Guarantee and Trust Company executor of estate of said Harry E. Townsend, deceased

Application October 20, 1932, Serial No. 638,741

4 Claims. (Cl. 215—38)

My invention relates to packages, and has special reference to packages of the type in which a glass jar, tumbler or other receptacle is closed by a cap, usually of sheet metal, that is pressed downwardly over the mouth of the receptacle into sealing position on an elastic gasket which is seated on a shoulder spaced a distance below the upper end of the receptacle, the cap being held sealed partly or entirely by atmospheric pressure.

The object of my invention is to provide a novel and improved package of this character.

The several features of the invention will be clearly understood from the following description and accompanying drawings, in which:

Figure 1 is a side elevation, partly in section, of a package embodying the features of my invention in their preferred form;

Fig. 2 is a detail sectional view on an enlarged scale, taken on the line 2—2 of Fig. 1, showing the closure of the package as it is about to compress the gasket;

Fig. 3 is a similar view showing the closure in sealing position on the mouth of the receptacle;

Fig. 4 is a sectional view, taken on the line 4—4 of Fig. 1, a portion of an ice-pick or similar implement being shown in position where it may be used to lift the closure from the receptacle;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a view similar to Fig. 4, showing the manner in which the bowl of a spoon or other more or less wedge-shaped implement may be used to remove the closure from the receptacle, the closure being shown partially lifted;

Fig. 7 is a detailed sectional view, taken on the line 2—2 of Fig. 1, but with the gasket removed and the closure forced down over the mouth of the receptacle;

Fig. 8 is a view similar to Fig. 3 of a modified form, this view being on a larger scale;

Figs. 9 and 10 are sectional views, similar to Figs. 2 and 3, respectively, of other modified forms; and

Fig. 11 is a view similar to Figs. 3, 9 and 10.

My improved package as illustrated in the drawings, is of the type of the one described and claimed in my pending application, Serial No. 248,292, filed January 21, 1928.

My improved package as illustrated in the drawings, comprises a glass jar 2, a sheet metal closure or cap 4 which may be made of resilient sheet metal as customary, and an elastic gasket 6.

The jar is provided with a cylindrical mouth portion 8 of considerable depth, and is further provided, at the bottom of the cylindrical portion, with a narrow horizontal shoulder 10 and a downwardly and outwardly sloping annular shoulder or face 12. In the form shown in Figs. 1 to 7 inclusive, the cylindrical mouth portion is provided with a gasket retaining groove 13 having its lower wall forming a continuation of the shoulder 10.

The gasket 6, which is substantially square in cross section, is positioned over the mouth portion 8 of the jar and upon the horizontal shoulder 10, the inner portion of the gasket fitting in the groove 13. The gasket is made slightly smaller in diameter than the cylindrical mouth portion so as to cause it to tend to hug the mouth portion when placed thereon. The ample depth of the mouth portion permits the gasket to be easily positioned thereon, and reduces to a minimum the chance of accidental displacement before and during the sealing operation. The groove 13 also assists in preventing such displacement of the gasket.

The cap 4 is provided with a depending cylindrical crown 14, an outwardly extending stiffening and reenforcing flange 16 and a downwardly extending skirt 18. The outwardly extending flange 16 is preferably horizontal, and the downwardly extending skirt 18 is preferably cylindrical. It will be observed that the crown 14 is relatively deep in proportion to the length of the skirt. The lower edge of the skirt is shown as curled over to provide a bead 20.

When the cap is to be sealed on the jar by means of a vacuum sealing machine, it is first placed over the mouth of the jar and rests lightly on the top thereof. Owing to the rapidity with which the operator must place the caps on the jars, the caps are almost always placed in an unlevel condition, partly on the top of the jar and partly on the gasket. The jar, with the cap thus initially positioned thereon, is then placed in the sealing chamber of the machine, the air exhausted from the jar, the cap pressed down to sealing position by mechanical means, air readmitted to the sealing chamber to surround the jar, and the mechanical pressure on the cap released. Atmospheric pressure, together with other means to be described, then holds the cap sealed on the jar.

Many products, such as hot preserves and peanut butter, can not be sealed in a high vacuum. Also, when sealed jars are passed through a sterilizer, and their contents heated, the vacuum in the jar is considerably reduced. In either of these cases the unbalanced pressure available for holding the closure on the jar is much less than

full atmospheric pressure, and in fact, may amount to very little. It is, therefore, necessary to so form the sealing seat of the jar and the closure, that the limited pressure available will have maximum effect. This is particularly true in view of the fact that jars as commercially made are not always round, a considerable percentage being slightly elliptical, and in order to seal such a jar, the gasket must be sufficiently compressed at the major axis of the mouth of the jar to permit the cap to be pressed down far enough to effect sealing compression at the minor axis.

It will be observed, by reference to Fig. 2, that the horizontal gasket seating shoulder 10 is considerably narrower than the wall thickness of the gasket. It will be further noted that the crown of the closure is somewhat spaced away from the lip of the container and as above stated the crown portion is joined to the outwardly extending flange by a rounded corner 19. It will thus be seen that the zone of initial downward pressure on the gasket, at the beginning of the sealing operation lies outwardly from the outer edge of the gasket seating shoulder 10, in other words that the zone of initial downward pressure is on the overhung portion of the gasket. It will further be noted that the skirt 18 of the closure is spaced well away from the gasket, so that at all times, during and after the sealing operation, the gasket material is free to flow or extend outwardly from the sealing zone. This is desirable because, in order to effectively compress the gasket material in one direction, it must be readily displaced in some other direction.

From the foregoing it will be understood that in the initial gasket compressing operation the gasket offers little resistance to distortion by the downward movement of the closure, and that as the overhung portion of the gasket is forced downwardly over the outer edge of the shoulder 10 a zone of maximum compression is set up between the shoulder and the rounded corner 19 of the closure. That portion of the gasket lying inwardly from the zone of maximum compression is trapped, and further downward movement of the closure not only increases the pressure at this zone, but causes the trapped portion to be forced tightly against the cylindrical mouth portion above the horizontal shoulder 10, and somewhat into the space between the cylindrical mouth portion and the crown 12 of the closure. In case the container is somewhat out of round, the initial pressure on the gasket is, of course, at the major axis of the container, but the fact that the gasket material is free to flow outwardly from the sealing zone admits of sufficient excess compression at the major axis to effect sealing compression at the minor axis. Another feature that contributes to the security of the seal in out of round jars is the fact that the principal sealing zone is on the shoulder 10 and over the sharp corner between said shoulder and the inclined shoulder 12, and as this shoulder is horizontal it is not affected by any allowable out of roundness of the container.

It has been found, that so effective is the construction above described in causing sealing compression of the gasket by atmospheric pressure that it matters little whether, in its original form, the gasket is round or rectangular in cross-section, provided the gasket material has the degree of elasticity found in gaskets in common use. Nor does it matter, when a gasket of substantially square cross-section is used, if the gasket is twisted when it is placed on the shoulder 10. This fact greatly facilitates rapid placing of gaskets on the containers, as it obviates the necessity for extreme care in this operation. The groove 13 when employed adds to the area of the sealing zone, as well as serving to retain the gasket in place on the container when the closure is removed which is considered to be desirable in some cases.

In my improved package as illustrated in the drawings, the mouth portion or lip of the jar is provided with a series of outward projections or lugs 22. In Figs. 1 to 7 these projections are shown extending from the edge of the jar to the upper wall of the gasket retaining groove 13. The projections may be curved transversely as shown, and the central portions of the projections are of slightly greater thickness than the normal width of the space between the lip of the jar and the crown of the cap, if the cap were accurately centered on the jar. The upper ends of the projections may be beveled to the edge of the jar, and the lower ends thereof may be horizontal and form continuations of the upper wall of the gasket retaining groove 13.

This construction provides improved means for insuring a secure seal when the cap is forced down over the mouth of the jar into sealing position. The projections 22 cause the cap to be accurately centered on the mouth of the jar, thus insuring uniform engagement of the cap with the gasket all around, and level sealing.

Also, with the construction as above described, including the use of the projections 22, the cap may be easily replaced for resealing purposes after the jar has been opened by the housewife. In resealing, as the cap is pushed down over the mouth of the jar the rounded corner 19 as it initially rides over the beveled upper ends of the projections 22 is gradually forced outwardly adjacent said projections, and the portions of the crown of the cap between said projections are flattened out more or less as indicated in Fig. 5, allowing the cap to be easily forced into sealing engagement with the gasket. When the cap is thus re-sealed, the rigidity provided by the rounded corner 19 and the outwardly projecting flange of the cap, insures the cap firmly and securely engaging the projections so that the cap is securely held in place close down to the gasket sealing zone. The transverse curvature of the projections together with their beveled upper ends permits the cap to be thus positioned without danger of breaking the lacquer on the cap, the caps for these jars being usually lacquered in order to prevent the contents of the jars from coming in contact with the bare metal.

The unyielding projections are not subject to wear or deformation, and owing to the crown of the closure being reinforced by the outwardly flaring skirt, the jar may be re-sealed any desired number of times without materially impairing the re-sealing qualities or mutilating the cap.

The projections 22 also assist in securely holding the cap on the jar when the cap is initially vacuum sealed on the jar. The projections form a firm support extending to the gasket sealing zone to hold the cap from lateral and turning movements as well as upward movement, and thus cooperate to provide a firm and secure seal. Said projections also serve the purpose of frictionally holding the closure securely on the jar independently of atmospheric pressure, so that if a

package loses its vacuum after leaving the packing plant the closure will not be displaced and the contents spilled over other packages in a case.

The horizontal lower ends of the projections provide abutments tending to retain the gasket in place as the cap is removed, and when used in association with the grooves 13, serve therewith to retain the gasket in place.

When the cap is placed on the jar, with the gasket removed as shown in Fig. 7, the lower portion of the crown of the cap reinforced by the corner 19 and the flange 16 between it and the skirt is positioned beneath the lower ends of the projections 22, with the result that the portion thereof projecting below the lower ends of said projections tends to return to a true circle from its distorted form which it took as it passed over the projections, resulting in this portion tending to lock beneath and securely grip the lower end or corners of the projections.

It will be apparent that the projections should be spaced a sufficient distance apart with respect to their centers or outer extremities in order to allow the necessary flexing of the crown of the cap between the projections as the cap is forced down into sealing position.

My improved closure may be easily removed even when sealed in the highest vacuum without danger of bending or otherwise mutilating the cap.

As the skirt of the cap extends a substantial distance below the lowermost portion of the gasket when the cap is sealed on the jar, and the lower edge of the skirt, reinforced by the bead 20 is spaced outwardly a substantial distance from the jar, the cap may be removed by the simple act of inserting a wedge-shaped implement such as the bowl of a teaspoon 26 between the sloping surface 12 and the lower beaded edge of the skirt of the cap. Also, like with the cap of my said pending application, the cap may be easily removed by means of an ice-pick or other implement as illustrated in Fig. 4.

In the form shown in Fig. 8 instead of the projections extending straight down they are curved downwardly and inwardly to the top wall of the gasket retaining groove 13. With this construction when the cap is forced into sealing position, owing to the resiliency of the crown portion thereof reinforced by the rounded corner 19 and the flange 16, the lower portion of the crown tends to lock beneath the adjacent portion of the projections, this being caused by the tendency of the lower portion of the crown to return to its circular form after being distorted as it passes over the outer extremities of the projections.

In the form shown in Fig. 9, the gasket retaining groove is omitted and the projections on the rim of the jar extend further downwardly. As shown, the lower portions 26 of these projections are inclined downwardly and inwardly. It may be noted that substantially the same yielding locking action occurs between the cap and the projections in this construction as in the construction shown in Fig. 8.

In the construction shown in Fig. 10, the cap is shown with the downwardly extending skirt portion removed, the horizontal gasket engaging flange of the cap extending outwardly and having its edge curved over to provide a bead 28. Although this is a most inexpensive cap, an effective seal is provided.

In the form shown in Fig. 11 no gasket retaining groove is provided and the projections on the rim extend straight down to the gasket sealing shoulder 10. This construction may be employed where there is not available a glass-making machine of the type in which the mold is provided with an opening and closing mold ring, such machines being necessary in making the other forms of jars above described.

As will be evident to those skilled in the art, my invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. In a package of the class described, a receptacle having a mouth, outwardly extending projections spaced apart around and below the mouth and having downwardly and inwardly sloping faces, a horizontal shoulder below the projections, an elastic gasket seated thereon, a sheet metal closure for the receptacle having a top, a resilient and flexible crown depending from the top and encompassing the mouth of the receptacle having a smooth inner face of slightly less perimeter than the perimeter of the mouth at the outer extremities of the projections and extending below said outer extremities and into engagement with the gasket, a horizontal flange extending outward from the lower edge of the crown, a rounded corner between the crown and the flange, a depending skirt on the flange, and a bead on the lower edge of the skirt, whereby as the closure is seated on the receptacle the crown is locally sprung outward at and by the projections while those parts that have passed the outer extremities of the projections spring back behind them, the closure being held in yieldable interlocking engagement with the projections by the greater rigidity of the horizontal flange, and the gasket compressed by the flange.

2. In a package of the class described, a receptacle having a mouth, outwardly extending projections spaced apart around and below the mouth and having downwardly and inwardly sloping faces, a gasket seat on the receptacle, an elastic gasket seated thereon, a closure for the receptacle having a top, a resilient and flexible crown depending from the top and encompassing the mouth of the receptacle having a smooth inner face of slightly less perimeter than the perimeter of the mouth at the outer extremities of the projections and extending below said outer extremities, a horizontal flange extending outward from the lower edge of the crown, and a rounded corner between the crown and the flange, whereby as the closure is seated on the receptacle the crown is locally sprung outward at and by the projections while those parts that have passed the outer extremities of the projections spring back behind them, the closure being held in yieldable interlocking engagement with the projections by the greater rigidity of the horizontal flange, and the gasket compressed.

3. In a package of the class described, a receptacle having a mouth, outwardly extending projections spaced apart around and below the mouth and having downwardly and inwardly sloping faces, a closure for the receptacle having a top, a resilient and flexible crown depending from the top and encompassing the mouth of the receptacle having a smooth inner face of slightly less perimeter than the perimeter of the mouth at the outer extremities of the projections and extending below said outer extremities, and means reenforcing and stiffening the lower edge of the crown whereby as the closure is seated on the receptacle the crown is locally sprung outward at and by the projections while those parts that have

passed the outer extremities of the projections spring back behind them, the closure being held in yieldable interlocking engagement with the projections by the greater rigidity of the reenforcing means.

4. In a package of the class described, a receptacle having a mouth, outwardly extending projections spaced apart around and below the mouth, a closure for the receptacle having a top, a resilient and flexible crown depending from the top and encompassing the mouth of the receptacle having a smooth inner face of slightly less perimeter than the perimeter of the mouth at the projections, a horizontal flange extending outward from the lower edge of the crown, and a rounded corner between the crown and the flange whereby as the closure is seated on the receptacle the crown is locally sprung outward at and by the projections, the closure being held in yieldable, frictional engagement with the projections by the greater rigidity of the horizontal flange.

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