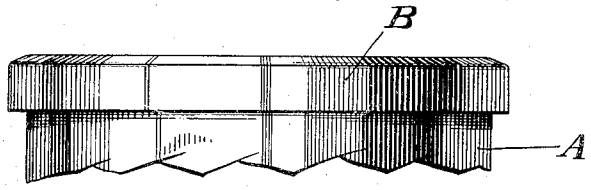
May 29, 1928. 1,671,903

M. JAEGER

HERMETIC SEAL AND METHOD

Filed June 10, 1921

Fig. 1.



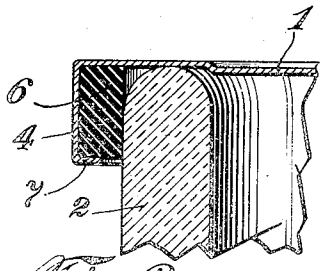


Fig. 2.

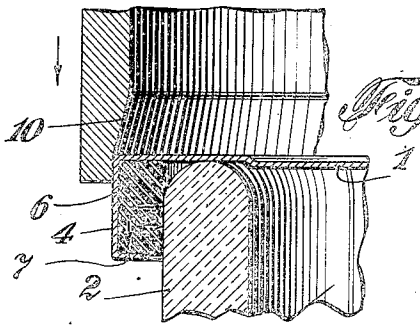


Fig. 3.

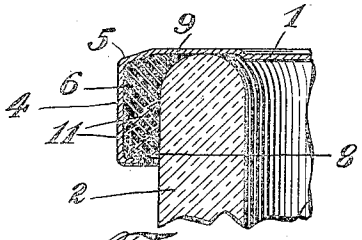


Fig. 4.

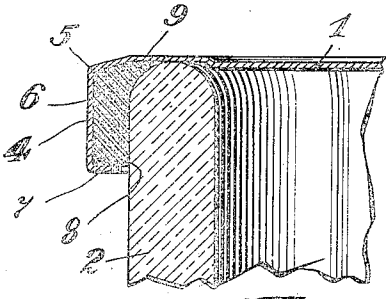


Fig. 5.

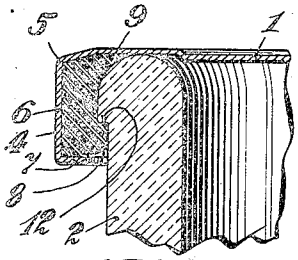


Fig. 6.

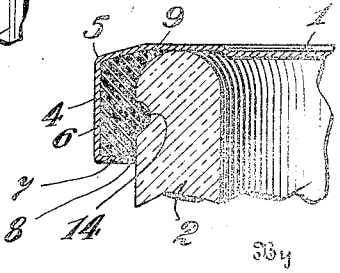


Fig. 7.

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Patented May 29, 1928. 1,671,903

UNITED STATES PATENT OFFICE.

MAX JAEGER, OF BROOKLYN, NEW YORK, ASSIGNOR TO ANCHOR CAP AND CLOSURE CORPORATION, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

HERMETIC SEAL AND METHOD.

Application filed June 10, 1921. Serial No. 476,377.

The present invention relates broadly to packaging and more specially to hermetic seals, and the method of making same.

The principal object of the present invention is to provide a secure hermetic seal with a minimum use of sheet metal.

A further and important object of the present invention is a hermetic seal wherein the sealing operation is performed by radial and downward compression of a suitable gasket upon the mouth of a suitable container.

Another object of the present invention is a hermetic seal wherein a very shallow skirted cap is sealed against a thin gasket to retain the same under compression against an incompressible side wall at the mouth of the container.

Another object of the present invention is a hermetic seal wherein the gasket material is stressed in such manner as to resist forces tending to slide the cap from the mouth of the container.

A still further and important object of the present invention is a hermetic seal wherein the material in the gasket has been moved downwardly adjacent the skirt of the cap and has been retained against the side wall of the vessel whereby the material is compressed in such manner as to increase the compression forces when it is attempted to remove the cap, and thereby increase the resisting powers of the cap to the removal thereof.

Another and important object of the present invention is a hermetic seal wherein a short skirted cap is sealed over a glass container in such manner that the gasket material resists any internal pressure in the container tending to blow the cap from the container.

A further and primary object of the present invention is the method of sealing a gasket cap on a substantially incompressible container which method comprises stressing the gasket material adjacent the cap in a downward and inward direction while preventing the gasket material from sliding on the side wall of the container thereby establishing diagonal stresses in the gasket when the sealing forces are released which stresses establish counter-forces tending to resist forces attempting to remove the cap from the container.

Other and further objects of the present invention will in part be obvious and will in part be pointed out hereinafter by reference to the accompanying drawings forming a part of this specification and wherein like parts are represented by like characters throughout the several figures thereof.

Realizing that the present invention may be carried out in constructions other than those specifically herein disclosed, it is desired that the disclosures herewith shall be considered as illustrative and not to be taken in the limiting sense.

Figure 1 is a package formed in accordance with the present invention.

Figure 2 illustrates a section through the skirt of the cap before the cap is sealed.

Figure 3 illustrates the sealing operation showing the forces active in the gasket.

Figure 4 is a view illustrating the final forces after the seal is complete.

Figure 5 illustrates a finally completed seal.

Figure 6 illustrates the seal formed on a locking walled jar.

Figure 7 illustrates the seal formed over a grooved sealing surface.

Food products in the majority of cases are now so packed that the packages may be subjected to heat for the purpose of sterilizing the contents. It frequently happens that the sterilizing temperatures develop pressures in the packages which exceed the pressure of the heating fluid surrounding the packages. Unless the pressure within the packages is sufficient to burst the packages no harm is done. Where the container is glass, straight side walls as sealing surfaces have been found to be more economical in manufacture, and in sealing than where configurated or special sealing surfaces were provided. It sometimes happens that seals on straight side walls do not hold sufficiently tight to resist the excessive internal pressure which would not be sufficient to burst the glass or rupture the tin of the cap and therefore would be harmless if the seal would hold. However, if the cap is blown off the package is ruined. Various types of side seals have been suggested, among others, a side seal cap comprising a skirt fitting the mouth of the container with an outward bead below the fitted part, with the lower edge of the bead being open, and a relatively long narrow gasket in the open bead. It was proposed to seal such caps by telescoping a conical sealing chuck over the

cap and squeezing the rubber gasket out from between the bead of the cap and the side wall of the vessel in such manner as to cause the gasket to protrude beyond the open edge of the skirt. This type of cap has been unsuccessful because the lower edge of the cap is unsupported and where heavy sealing pressure is used the edge of the cap tends to bell out when the sealing pressure is released by removing the chuck. This leaves the gasket as a wedge shaped cross-section with part of the gasket exposed, unsupported and extending below the skirt of the cap. Internal pressure in the package tends to lift the cap upwardly and raise it from the wedge shaped gasket. Furthermore in the type of cap described, the gasket travels downwardly with the sealing action and not only is liable to be entirely driven out, and lost, when making the seal, but is liable to be blown out by any pressure in the package during sterilizing or at any other time.

The present invention overcomes the difficulties of the known prior art by providing a very simple cap having a cover portion which extends slightly beyond the mouth of the container. The cover portion preferably carries a substantially cylindrical skirt which terminates at the lower edge with an inwardly extending shelf or flange. A gasket of rectangular cross-section preferably, a composition of rubber or other suitable material, adapted to withstand compression forces, is set in the skirt and extends between the shelf and the top of the cap.

The sealing operation may be performed by subjecting the edge of the skirt to radial compressive forces and by carrying the outer edge of the skirt slightly downward. The action of this sealing operation is to first compress the gasket material tightly against the side wall of the vessel and then move the skirt of the cap downwardly to produce a sort of rotating of the gasket material since the outer part moves downwardly while the part in contact with the glass is stationary. In view of the fact that the gasket material is also being compressed radially during this rotating movement it follows that the material is left under diagonal stressed conditions when the sealing chuck is lifted. The axis of these stresses runs outwardly and downwardly and the entire gasket material is completely supported within and above the flange of the skirt so that there is no liability of the material escaping. In view of the outward and downwardly stressed conditions it will be observed that any movement to lift the cap from the container must be in opposition to these forces so that an exceedingly effective seal is made. Where it is desired to make the seal capable of withstanding heavy inward pressure the side of the container may be provided with a groove or shoulder over which the skirt and the gasket extend. In view of the fact that all the metal in the bead of the cap is utilized in making the seal and that no excess metal is folded upon itself during the sealing operation it will be seen that the present cap performs these sealing functions with the use of a minimum amount of metal.

Referring now to the drawings Figure 1 illustrates a package made in accordance with the present method and said package comprises a glass container A or the like on which is mounted a cap B. This cap is illustrated in section in Figure 5 and comprises a cover portion 1 which bears against the end of the glass side wall 2 and carries a cylindrical skirt 4 which is slightly curved outwardly and downwardly as at 5 over a compressible gasket 6. It will be noted that the edge of the skirt terminates in an inwardly projecting shelf or flange 7 and that the edge of the gasket when sealed extends slightly upwardly and inwardly from the flange as at 8, and in a similar manner extends upwardly between the grooved portion 5 and the curve on the edge of the glass side wall 2.

One method by which the seal may be made is illustrated in Figures 2, 3 and 4. Figure 2 illustrates the cap prior to being sealed and shows the top wall of the cover portion thereof, except for the panel in the top, to be substantially flat, and the gasket as being substantially rectangular in cross-section prior to the sealing operation. The sealing member preferably comprises a conical steel shell adapted to be forced down over the skirt and gasket in a straight downward direction. Preferably, though not necessarily, the operative face of this sealing tool is arranged to lie in three surfaces which gradually blend one into the other. The first surface 10 is a long inclined taper and subjects the seal to inward compression to set the gasket against the side wall 2 of the container. The next surface which encounters the cap, as the tool descends, is slightly more inclined and tends to carry the skirt of the cap downwardly and inwardly. This compresses the gasket material in an inward and downward direction adjacent the edge of the skirt and turns the same upon itself in view of the fact that the inner portion of the gasket sticks to the glass wall. This action, when the tool is removed, leaves the gasket material under compression forces indicated by the arrows 11 Figure 4. In view of this condition it will be noted that any force tending to lift the cap is in opposition to the forces 11 consequently, the cap is very tightly held in position.

Figure 6 illustrates the same seal when made on a glass container or the like having an annular shoulder 12 formed as a portion of the sealing surface so that the gasket 6 locks under this shoulder 12. Figure 7 il-

lustrates the cap of the present invention when sealed upon a glass container or the like having a groove provided in the sealing wall and shows the gasket material interlocked under the groove. In both of the constructions illustrated in Figures 6 and 7 the cap is very tightly locked in position and to remove the cap it is necessary to shear the gasket material which lies beneath the locking shoulder or groove.

The foregoing invention provides a cap which is exceedingly simple and economical to seal and wherein the method of sealing operations sets up stresses in the gasket, which automatically tend to hold the cap in position and to resist forces, due to internal pressure on the package, which tend to break the seal.

Having thus described my invention, what I claim is:

1. An article of manufacture comprising a hermetically sealed package formed by a closure cap in combination with a glass container or the like, said closure cap having a cover portion in contact with the end wall of said container, a substantially cylindrical depending skirt ending in a flange at the lower edge thereof, a gasket under compression between said flange and the side wall of said container, in such manner that said gasket extends the full height of said skirt and rounds upwardly over the edge of the glass container whereby a side seal tending to retain said cap in position is formed on said container adjacent the mouth thereof, said cover portion having its outer periphery bent downwardly to increase the effectiveness of said seal.

2. The method of hermetically sealing glass containers or the like with closure caps having gaskets in the skirts thereof, said skirts being provided with inwardly holding flanges, which method comprises setting said gasket against the side wall of the glass container with sufficient pressure to cause the gasket to stick to said side wall; then forcing the outer periphery of the cover portion and the skirt of the cap downwardly and inwardly while carrying with the skirt the portion of the gasket adjacent thereto to establish forces in said gasket material which when the sealing forces are released react as downward and outward forces that tend to resist the removal of said cap from said container and to maintain the cover portion stretched over the container.

3. An article of manufacture comprising the combination of a glass container or the like, and a closure cap and wherein said closure cap comprises a substantially flat cover portion extending over the end wall of said container, a skirt depending over the side wall of said container adjacent the mouth thereof substantially at right angles to the cover portion and gasket material extending from the cover portion of the cap to the full length of the skirt, said cover portion having its outer periphery bent downwardly to press said gasket against the side wall of the container to hold said closure on said container.

4. An article of manufacture comprising the combination of a glass container or the like and a closure cap, and wherein said closure cap comprises a substantially flat cover portion extending over the end wall of said container, a skirt depending over the side wall of said container adjacent the mouth thereof and ending in an in-turned flange, and gasket material extending from the cover portion of the cap to the full length of the skirt and retained in position by said flange, said cover portion having its outer periphery bent downwardly to press said skirt inwardly and to retain said gasket against the side wall of said container to hold said closure on said container.

5. An article of manufacture comprising the combination of a glass container or the like and a closure cap, and wherein said closure cap comprises a substantially flat cover portion extending over the end wall of said container, a skirt depending over the side wall of said container adjacent the mouth thereof, an in-turned flange on the lower edge of said skirt, and gasket material extending substantially from said flange to the cover portion of the closure and retained in position by said flange, said skirt and said flange being pressed downwardly and inwardly without deformation thereof to establish forces in said gasket which react as downward and inward forces that tend to resist removal of said cap from said container.

6. The method of hermetically sealing glass vessels and the like with closure caps having gaskets in the skirts thereof, said skirts being provided with inwardly extending holding flanges adapted to form with the skirt and the outer periphery of the cover portion, a bead, which method comprises setting said gasket against the side wall of the vessel with sufficient pressure to cause the gasket to stick, forcing the outer periphery of the cover portion downwardly out of the plane of the cover portion to carry said skirt and a portion of the gasket adjacent thereto downwardly and inwardly to establish forces in said gasket material compressed between the vessel and the skirt of the cap which when released react as downward and outward forces that tend to resist the removal of the cap from said vessel.

7. As an article of manufacture, a closure cap comprising a cover having a peripheral portion adapted to rest upon the end of a suitable container, a substantially cylin-

drical skirt depending from said cover portion at substantially right angles thereto, said skirt ending in an inturned flange, and a gasket of substantially rectangular cross section extending from said flange to said cover portion.

8. As an article of manufacture, a hermetically sealed package comprising a closure cap in combination with a suitable glass container or the like, having a substantially cylindrical side wall sealing surface, said closure cap having a cover portion and a depending skirt with an annular inturned flange at the lower edge thereof, and a ring gasket extending substantially the full length of said skirt, said gasket being under compression between said skirt and the side wall of said container.

9. As an article of manufacture, a hermetically sealed package comprising a sheet metal closure cap in combination with a suitable glass container or the like, having a substantially cylindrical side wall sealing surface, said closure cap having a cover portion and a depending skirt with the upper part thereof cylindrical and with an annular inturned substantially horizontal flange at the lower edge of the skirt, the edge of said flange being spaced from the side wall of the container, and a ring gasket extending substantially the full length of said skirt, said gasket being held under compression between said skirt and the side wall of the said container without folding the metal in said skirt.

10. As an article of manufacture, a hermetically sealed package comprising a sheet metal closure cap in combination with a suitable glass container or the like, having a substantially cylindrical side wall sealing surface, said closure cap having a cover portion and a depending skirt with an annular inturned flange at the lower edge thereof, and a ring gasket of vulcanized rubber assembled freely within said skirt and extending substantially the full length thereof, upward movement of the gasket being limited by the cover portion of the cap and downward movement being limited by the annular inturned flange, said gasket being placed under compression against the side wall of said container by the skirt of said cap without material deformation of said skirt during the sealing operation.

MAX JAEGER.