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2,423,295

CLOSURE CAP FOR BOTTLES, JARS, AND THE LIKE

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Fig. 1.

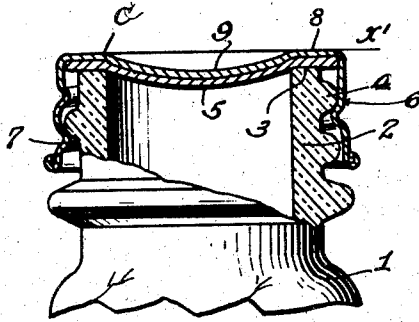


Fig. 2.

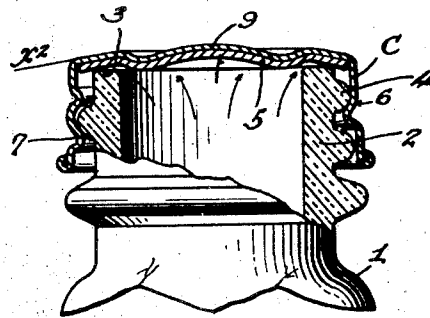


Fig. 3.

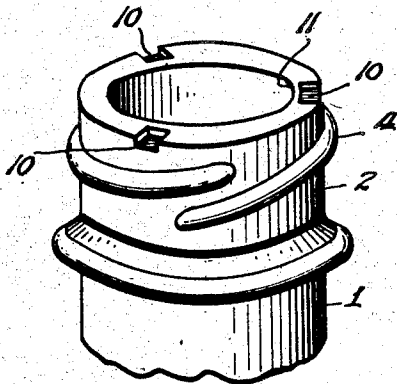


Fig. 4.

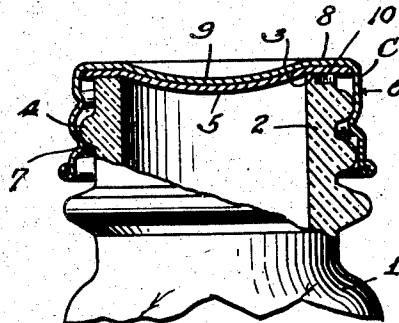
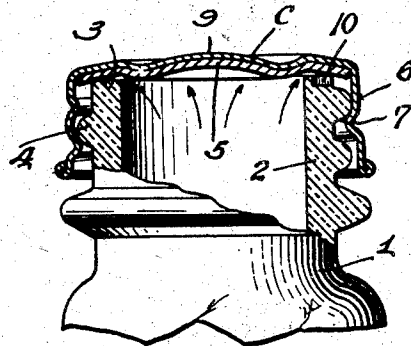


Fig. 5.



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CLOSURE CAP FOR BOTTLES, JARS,
AND THE LIKE

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2 Claims. (Cl. 215—56)

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The invention relates to new and useful improvements in a closure means for bottles, jars and the like, and more particularly a closure means which will vent when the internal pressure developing in the container becomes excessive.

An object of the invention is to provide a closure means of the above type which includes a metal cap wherein the top portion thereof is so dimensioned and shaped that it will flex outwardly when subjected to an internal pressure above a predetermined degree and relieve pressure of the cap on the sealing gasket sufficiently to permit venting.

A further object of the invention is to provide a closure means of the above type wherein the flexing of the top is within the elastic limits of the metal so that when the internal pressure drops to near atmospheric pressure, said top portion will spring back to its initial position and form a very satisfactory liquid-tight seal.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings:

Figure 1 is a view partly in vertical section of a closure means embodying the improvements as initially applied to a container for sealing the same;

Figure 2 is a view similar to Figure 1 but showing the top portion of the container as flexed outwardly by an excessive internal pressure so as to relieve the pressure of the cap against the sealing gasket sufficiently to permit the gases to escape between the gasket and the lip of the bottle and thus vent the container;

Figure 3 is a perspective view of the upper end of a container showing the sealing lip as notched at intervals at the outer side thereof to facilitate venting;

Figure 4 is a view similar to Figure 1 but showing the improved closure cap applied to a container having a notched sealing lip as shown in Figure 3;

Figure 5 is a view similar to Figure 4 but showing the top portion of the container as flexed outwardly by an excessive internal pressure so as to relieve the pressure of the cap against the sealing gasket sufficiently to permit the gases to escape through the notched portions in the lip of the bottle.

The present invention has to do with a closure means for containers and in particular a container having a neck portion terminating in a flat sealing lip. The closure means includes a sealing gasket in the form of a disk which may be made

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of any suitable gasket material and is so dimensioned as to extend all the way across the mouth of the jar and overlies the sealing lip thereof.

The sealing gasket is pressed against the lip of the container for sealing the same by a metal cap which is provided with a depending skirt. The skirt is secured to the neck of the bottle by any suitable means. The top of the cap is formed with an annular flat portion which extends from the skirt to a point just inside of the lip of the container. The central portion of the cap is concaved inwardly all the way from one side to the other of the annular flat portion. This inwardly concaved portion, when the cap is applied to the container, extends slightly into the mouth of the container and forces the gasket firmly against the lip of the container and thus forms a tight seal.

When the internal pressure in the container develops to a predetermined degree, the concave portion of the top will be forced outwardly and inverted to a certain extent into an outwardly bulging portion which will lift the inner part of the annular flat section and relieve the pressure of the cap against the gasket at the inner side of the lip thereof and, to some extent, outwardly therefrom, so that the gases under the developed pressure will work outwardly inbetween the gasket and the lip of the container and escape, and thus the container is vented.

The metal of the cap is so dimensioned that the flexing of the same outwardly by the internal pressure is within the elastic limits of the metal and, therefore, when the internal pressure drops so as to approach atmospheric pressure, the metal will spring back to its initial position and force the gasket against the sealing lip so as to form a satisfactory liquid-tight seal. This venting of the container by the flexing of the top portion of the cap is very satisfactory when used in conjunction with the standard finish of the lip of the container. It is, however, sometimes desirable to provide cut-away portions at intervals in the outer portion of the container lip to facilitate venting.

Referring more in detail to the drawings, the container illustrated is of glass and is intended to represent a bottle or a jar. The container is indicated at 1 and is provided with a neck portion 2. The neck 2 terminates in a flat sealing lip 3 which, as shown in Figures 1 and 2, is the standard bottle finish. On the outer face of the neck of the bottle is a standard thread or lug 4.

The closure means includes a sealing disk 5 which may be of any suitable gasket material.

This gasket extends all the way across the mouth and overlies the lip of the bottle and preferably extends beyond the lip so as to provide a diameter of gasket which will cause the gasket to be retained in a closure cap as a unit therewith. The closure means includes a metal cap, indicated as a whole at C. This cap is provided with a depending skirt 6 which is formed with a thread adapted to cooperate with the thread or lug 4 on the neck of the container. This is the usual form of means for securing the cap to the bottle. It will be understood that other mechanical ways may be employed as the securing means for holding the cap attached to the bottle as this securing means forms no part of the present invention.

The top of the cap is formed with an annular flat section 8 which extends inwardly from the skirt and terminates just inside of the lip 3 of the bottle. This flat portion of the cap lies initially in a plane which is parallel with a plane containing the outer face of the lip of the bottle. The top portion within this annular flat section is concaved inwardly as indicated at 9 in the drawings. This concaved portion is of a diameter slightly less than the diameter of the mouth of the bottle. When it is desired to seal the bottle, the cap with the gasket therein is turned onto the neck of the bottle and this will force the gasket against the lip until a tight seal is produced all the way across the lip by the flat section of the cap pressing thereagainst. The concave portion 9 of the top will curve the sealing disk inwardly, bringing it into tight contact with the inner edge portion of the lip. This sealing of the bottle is clearly illustrated in Figure 1 of the drawings.

The metal constituting the top of the cap is so dimensioned that when the internal pressure becomes excessive, the concaved portion will be forced outwardly, and the central portion thereof, at least, will become convexed. This bulging of the central portion of the cap outwardly will lift the inner portion of the annular flat section of the cap and relieve the pressure of the cap against the gasket at the inside of the lip so that gases under the excessive internal pressure will pass between the gasket and the lip and escape, as indicated by the arrows in Figure 2. This outward bulging of the central portion of the cap is within the elastic limits of the metal, and when the internal pressure drops to near atmospheric pressure, then the top will spring back substantially to its initial position shown in Figure 1 and reseal the container so as to provide a very satisfactory liquid seal.

In Figure 3 of the drawings the lip of the bottle is shown as provided with cut-away portions 10. There are three of these cut-away portions and they are shown as rectangular in shape. This notch formed by cutting away the lip of the bottle extends all the way to the outer edge of the lip but terminates short of the inner edge of the lip so that there is a continuous portion 11 of the sealing lip extending all the way around the mouth of the bottle. The improved closure cap, which has been described as used in connection with a standard finish, wherein the lip is smooth and unbroken throughout the entire extent, may be used with advantage in connection with the notched lip shown in Figure 3. In Figure 4 the cap is shown as applied to a bottle having a notched sealing lip. The cap pressing on the gasket will force it into tight engagement with the lip and there will be a continuous unbroken

sealing line all the way around the inner edge portion of the lip indicated at 11 in Figure 3.

In Figure 5 of the drawings the cap is shown as subjected to a developed internal pressure which becomes excessive and which will force the central concaved portion of the cap outwardly in the same manner as described in connection with Figure 2. This outwardly bulging central portion, incident to the gas pressure from within, will lift the inner portion of the annular section 8 so as to relieve the pressure of the gasket against the inner portion of the lip and thus the gases will wedge in between the gasket and the lip and gradually escape into the notches and thus bring about a venting of the container. Here again, when the internal pressure drops to near atmospheric pressure, the top of the cap will spring back into substantially its initial shape, as shown in Figure 4, and bring about a resealing of the bottle, which produces a very satisfactory liquid-tight seal.

While the invention has been described as particularly adapted for use in connection with a glass container such as a bottle, it will be understood, of course, that it will have advantages in connection with containers made of plastics or any other suitable material.

It is obvious that many changes in the details of construction and shaping of the parts may be made without departing from the spirit of the invention as set forth in the appended claims. It is essential that the metal cap shall be so shaped and dimensioned that when initially applied to the container it will effectively seal the container and also so shaped and dimensioned that when the internal pressure develops to an excessive degree, the central portion of the cap will be caused to bulge outwardly and deform within the elastic limits of the metal sufficiently to relieve the pressure of the gasket against the inner portion of the lip of the container and thus permit the gases to escape, and further, it is desirable that, when the internal pressure drops to near atmospheric pressure, the deformed top portion of the cap shall spring back into substantially its initial position and reseal the container so as to make an effective liquid-tight seal.

We claim:

1. A closure cap for containers having a neck terminating in a mouth surrounded by a lip comprising a resilient flexible metal top and a depending skirt having means whereby the cap may be secured to the neck of the container and a sealing gasket within the cap adapted to extend across the mouth of the container and overlie the sealing lip thereof, said top in the region which is adapted to overlie the mouth of the container being curved inwardly and biased so as to remain in said inwardly curved position and cooperate with the remainder of said top in pressing the gasket against the sealing lip of the container when applied thereto and so long as the pressures on the opposite sides of the top are substantially equal, said entire top being resiliently flexible upwardly when the internal pressure of the container becomes excessive and exceeds the external pressure on the top whereby to relieve the pressure of the gasket against the lip and permit venting, said flexing of the top being within the elastic limits of the metal whereby said top will return substantially to its initial position when the internal pressure becomes substantially equal to the external pressure for resealing the container.

2. The combination of a container having a

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neck terminating in a mouth surrounded by a sealing lip, the inner portion of said lip being continuous and the outer portion being notched at intervals, a metal cap having a resilient, flexible top and a depending skirt provided with means whereby the cap may be secured to the neck of the container and a sealing gasket within the cap extending across the mouth of the container and overlying the sealing lip thereof, said top in the region which overlies the mouth of the container being curved inwardly and biased so as to remain in inwardly curved position and cooperate with the remainder of the top in the pressing of the gasket against the sealing lip of the container when applied thereto and so long as the pressures on the opposite sides of the top are substantially equal, said entire top being resiliently flexible upwardly when the internal pressure of the container becomes excessive and exceeds the external pressure on the top whereby to relieve the pressure of the cap and gasket against the lip and permit the gases within the container to pass between the gasket and the lip and escape through said notches, said flexing of the top being

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within the elastic limits of the metal whereby said top will return substantially to its initial position when the internal pressure becomes substantially equal to the external pressure for re-sealing the container.

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