

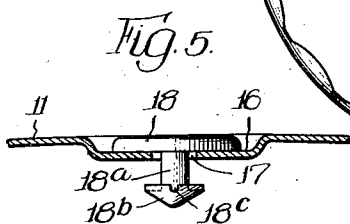
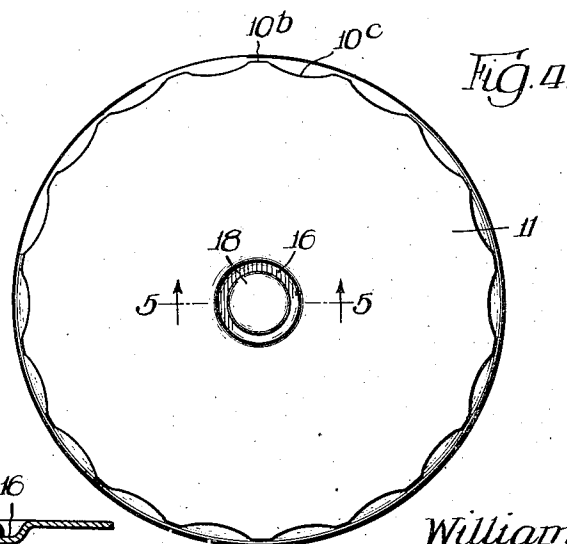
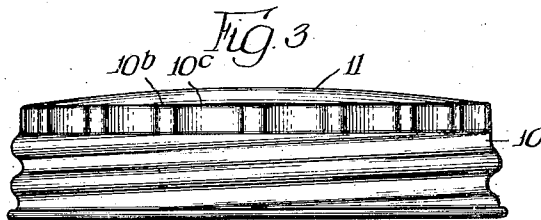
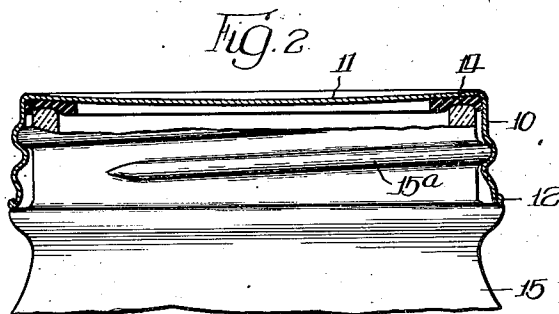
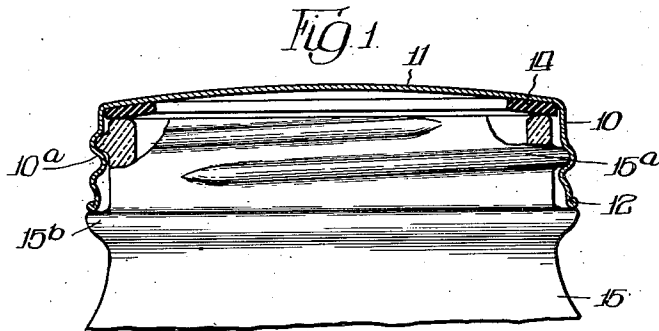
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CLOSURE CAP FOR JARS

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CLOSURE CAP FOR JARS

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11 Claims. (Cl. 215—43)

This invention relates to closures for packing vessels, such as jars and the like, adapted for the packing or packaging of food stuffs. It is adapted for use in both domestic and commercial packing or canning.

A general object of the invention is the provision of a closure for jars and the like which may be manufactured at low cost, which is adapted to be quickly and easily applied to a vessel to form an effective hermetic seal and closure for the vessel, which will retain its place on the vessel securely, and yet which may be removed with facility when it is desired to open the package.

Other and further objects of the invention will be pointed out or indicated hereinafter, or will be apparent to one skilled in the art upon an understanding of the invention or its employment in use.

In the drawing forming a part of this specification I show certain forms of closure caps embodying the invention, but it is to be understood that these are presented merely by way of illustration and are not to be construed in any fashion calculated to limit the appended claims short of the true and most comprehensive scope of the invention in the art, inasmuch as the invention may be embodied in numerous other forms differing in various particulars from those here illustrated and hereinafter described.

In said drawing:

Fig. 1 is a sectional elevational view of a closure cap in position on the mouth of a jar preliminary to the operation for forming the hermetic seal;

Fig. 2 is a similar view showing the relationship of the parts after the hermetic seal has been formed;

Fig. 3 is an elevational view of the closure cap;

Fig. 4 is a top view of the same, but including a modified feature not disclosed in the preceding figures; and

Fig. 5 is an enlarged detail in the nature of a section on approximately line 5—5 of Fig. 4.

The invention will be described as embodied in a cap of the screw type, but it is to be understood that the designation "screw cap" as used in the following description and claims is to include other specific types of caps besides those equipped with screw threads, for example, in various forms of caps provided with holding or attaching lugs, quick threads, or other means for engaging threads, inclines, lugs, or other hold-

ing devices on the vessel, whereby the cap is attached thereto.

I will now describe the embodiments illustrated in the drawing. The closure cap comprises a shell which may be drawn from sheet metal or other suitable material having the proper qualities. Said shell is formed with a skirt portion 10 having screw threads 10^a or other means for retentively engaging the vessel and with a resiliently flexible top panel 11 at the upper end of the skirt portion. The top panel is domed upwardly from its line of junction with the skirt, as seen in Fig. 1. The lower margin of the skirt is preferably rolled to form a bead 12. Due to its flexible character, the top panel is adapted to be flexed downwardly on its line of juncture with the skirt, but its inherent tendency is to return to the upwardly domed position even after being flexed inwardly to a concave form.

As seen in Figs. 3 and 4, the upper portion of the skirt is preferably fluted to form salient portions 10^b alternating with re-entrant portions 10^c, the top panel conjoining the upper ends of said portions so that its marginal contour corresponds to the form of the fluting. This arrangement augments the inherent tendency of the top panel to return to its upwardly domed form.

Seated against the under surface of the top panel is a flat ring gasket 14 of yieldable sealing material. This gasket preferably is somewhat plastic, but at the same time possesses some elastic quality. A suitable gasket may be formed of an unvulcanized or partly vulcanized rubber composition. Preferably it is adherently affixed in position on the top panel, its location being such that it will be over the mouth rim of the contemplated vessel 15 when the closure cap is properly positioned thereon.

The vessel is provided with a screw thread 16^a or other suitable means for retentive engagement by the closure cap.

In the sealing operation, the closure cap is applied to the vessel and screwed down to an extent such that the gasket 14 barely contacts the mouth rim of the vessel so that the parts are in approximately the relationship illustrated in Fig. 1. Then air is withdrawn or displaced from within the vessel. This may be accomplished by submitting the package to exhaustion in the receiver of an air pump or by heating the vessel so as to expand its air content and force some of it out. The air thus removed from within the vessel passes out between the gasket and the mouth rim, as those two parts are not in sealing engagement. After air has thus been displaced from within

the package, mechanical pressure is applied to the top panel so as to flex it downwardly. Since the top panel flexes on its line of juncture with the skirt, the downward flexing of the panel swings the gasket downwardly into firm sealing engagement with the mouth rim of the vessel. While the top panel is held in this flexed position, wherein the vessel is hermetically sealed, an air pressure differential is established as between the outer and inner surfaces of the top panel. If removal of air from the package has been effected by an air pump in a vacuum machine, the pressure differential is established by admitting atmospheric pressure to the receiver, which pressure will be effective to hold the panel in its downwardly flexed position. If the displacement of air from the package has been accomplished by a heating of it, the pressure differential may be established by the cooling of the package so that its internal pressure is reduced below atmospheric pressure as a consequence of the contraction of contained air and other material or condensation of the contained vapors. Accordingly, when the pressure differential is established, the external atmospheric pressure on the top panel will hold it in its depressed position, approximately as illustrated in Fig. 2 and maintain the gasket hermetically sealed on the mouth rim of the vessel. However, the top panel still retains its elastic tendency to resume its upwardly domed position, even though it has been flexed to a concave form as illustrated in Fig. 2.

For removal of the closure cap, atmospheric pressure is restored beneath the top panel by admission of air into the package. This may be accomplished by puncturing the top panel. Upon such equalization of the pressure on the upper and lower surfaces of the top panel, the top panel springs back to its upwardly domed position under the inherent elasticity of the structure. This relieves the compression on the gasket and frees the cap from the binding effect thereof. Thereupon the closure cap may be readily unscrewed from the vessel.

It will thus be observed that the construction is one which facilitates the removal of screw caps which are hermetically sealed on vessels from which air has been exhausted. It is a frequently encountered circumstance that considerable difficulty is involved in the removal of screw caps from hermetically sealed packing vessels, even after puncturing of the cap, due to the friction between the parts resulting from the high compression of the gasket between the cap shell and the vessel. This is particularly true of commercial packages which have been sealed by machinery. This difficulty is obviated by the present construction, since the closure cap itself automatically relieves the compression of the gasket on the vessel upon the admission of air to the package, and permits the closure to be unscrewed quite readily. To prevent the screwing down of the cap too far on the vessel, the latter may be provided with a peripheral ledge or shoulder 15^b in proper position to act as an abutment for the lower margin of the skirt when the latter has been screwed down to the proper extent.

In Figs. 4 and 5 is illustrated an additional feature which may be employed. In this modification, the central portion of the domed top panel is countersunk as at 16 and apertured as at 17. The upper surface of this countersunk portion forms the seat for a valve 18. This valve may be formed of rubber. It has a stem 18^a which passes through the aperture 17 with a clearance

and carries a stop head 18^b at its lower end. This head is of greater diameter than the aperture 17, but is so formed as to be elastically deformable whereby to permit its insertion through the aperture yet prevent its ready withdrawal after insertion. This head is provided with ducts 18^c which afford communication between the aperture 17 and the space below the top panel when the head is displaced upwardly into contact with the lower surface of the panel.

In the use of a closure cap containing this feature, the vessel is sealed as above described, the ducts 18^c and aperture 17 affording passage for air from within the package in the exhausting operation. When the flexing pressure is applied to the top panel, the valve 18 is held in seated position, and is held seated by the superior external air pressure when the pressure differential is established. For removal of the closure, the valve 18 is lifted, and air admitted to the package through the aperture 17. This renders it unnecessary to puncture the cap, and consequently the closure may be reused, as for domestic canning.

What I claim is:

1. A closure cap for jars and the like comprising a skirt portion having engaging elements for retentively engaging cooperating elements on the jar to retain the closure against removal axially therefrom, an upwardly domed top panel conjoining the upper skirt portion, and a gasket retained in contact with the under surface of the top panel adjacent the skirt portion, said top panel being resiliently flexible downwardly from its margin whereby to swing the gasket downwardly, and retaining its elastic tendency to return to its upwardly domed position after being flexed to a concave position.
2. A closure cap for jars and the like as specified in claim 1 and wherein the upper part of the skirt portion is fluted and the top panel is of scalloped peripheral contour.
3. A closure cap for jars and the like as specified in claim 1 and wherein the top panel is integral at its margin with the top of the skirt portion and the upper part of the skirt portion is fluted to form alternately associated salient and re-entrant portions.
4. A closure cap for jars and the like comprising an annular screw-threaded skirt portion, an elastically flexible upwardly domed top panel conjoining the skirt portion and a gasket of yieldable sealing material in contact with the under surface of the top panel adjacent the skirt portion, said top panel being flexible downwardly from its margin to swing the gasket downwardly and its inherent elasticity being effective to return it to an upwardly domed position after it has been flexed to a concave position.
5. A closure cap for jars and the like as specified in claim 4 and wherein the gasket is adherently secured to the top panel.
6. A closure cap for jars and the like as specified in claim 4 and wherein the gasket is of plastic quality.
7. A closure cap for jars and the like as specified in claim 4 and wherein the gasket is of elastic quality.
8. A closure cap for jars and the like as specified in claim 4 and wherein the top panel is provided with a valve arranged to seat under pressure applied thereto in a direction tending to flex the top panel downwardly.
9. A closure cap for jars and the like as specified in claim 4 and in which a portion of the top

panel is countersunk and a valve is arranged to seat in said countersunk portion under pressure applied to the upper surface of the top panel to flex it downwardly.

- 5 10. A packing container comprising in combination a vessel having a mouth rim, and a closure cap for hermetically sealing the mouth of the vessel, said closure cap having a skirt portion and an upwardly domed resiliently flexible top
10 panel conjoining the upper part of said skirt portion and a gasket of sealing material seated against the top panel adjacent the skirt portion, said vessel and skirt portion having elements engageable to retain the closure cap against removal
15 from the vessel in the axial direction and to support the closure cap with the gasket above and out of sealing engagement with the mouth

rim, said top panel being flexible downwardly to place it under resilient tension and to depress the gasket into sealing engagement with the mouth rim.

11. A packing container comprising in combination a screw-threaded closure cap having an upwardly domed resiliently flexible top panel and a sealing gasket resting in contact with a portion of said upwardly domed panel so as to be movable downwardly by downward flexing thereof, and a vessel having a screw thread engageable with the cap to support the same with the gasket out of sealing cooperation with the vessel but in position to be pressed into sealing cooperation with the vessel by downward flexion of the top
15 panel.

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