

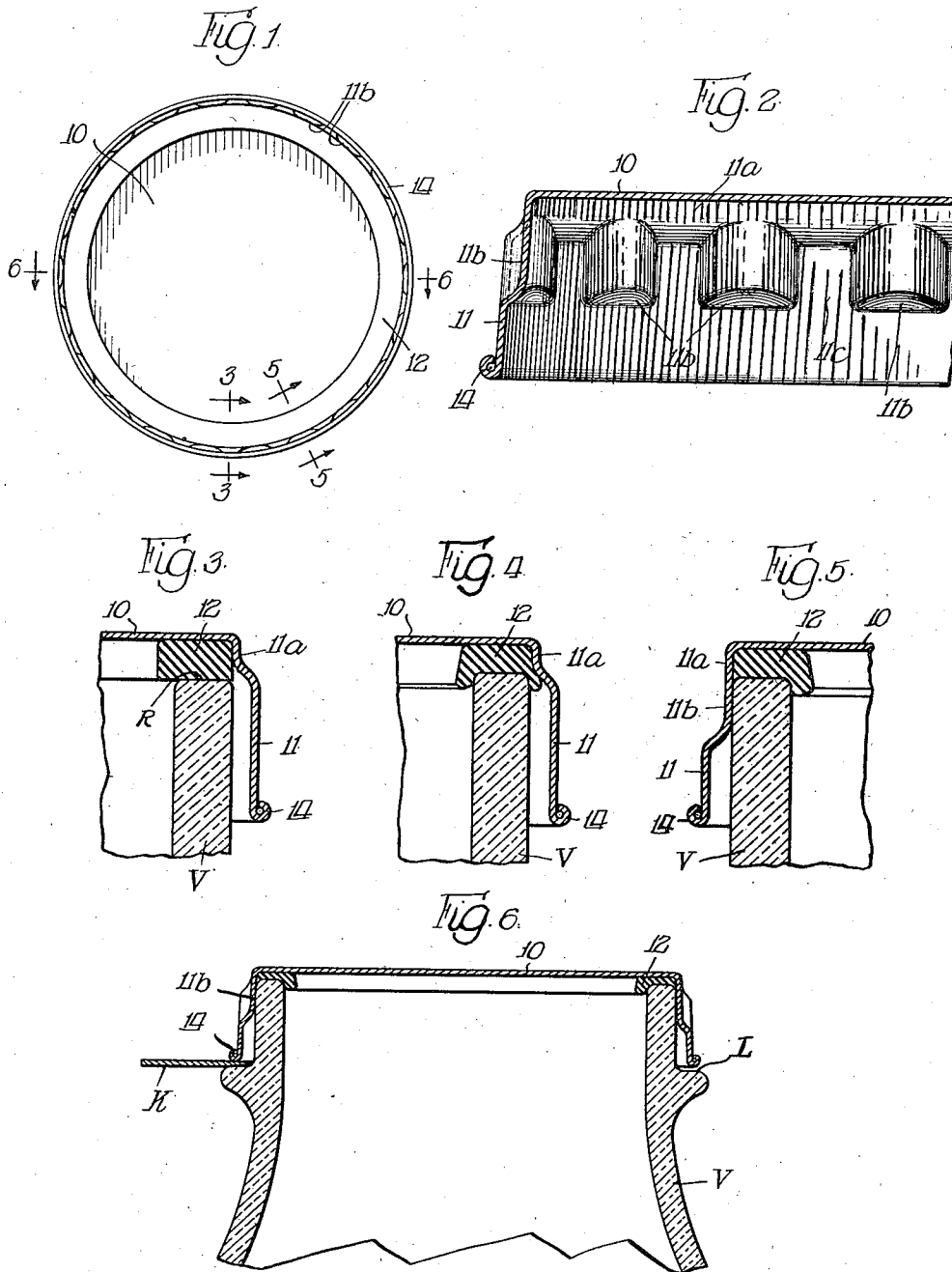
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CLOSURE CAP AND PACKAGE

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CLOSURE CAP AND PACKAGE

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This invention relates to closure caps of the sort utilized for sealing jars, tumblers or the like for packaging and preservation of foodstuffs and similar commodities. It relates particularly to that type of closure cap wherein a hermetic seal is formed upon the packing vessel by a plastic gasket which is compressed between the top of the shell of the cap and the mouth rim of the vessel, the closure being held in place on the vessel by atmospheric pressure consequent upon the exhaustion or removal of air from the unoccupied head space of the vessel.

An object of the invention is the provision of such a closure cap which may be manufactured at low cost, and which is particularly adapted to form a very secure connection with the packing vessel on which it is sealed, and which, furthermore, is of a character such as to facilitate its removal from the vessel without preliminary puncturing of the shell to equalize the air pressure.

Other and further objects of the invention will be pointed out or indicated hereinafter, or will be apparent upon an understanding of its character or employment of it in actual use.

For the purpose of aiding in an explanation of the invention, I show in the accompanying drawing forming a part of this specification, and hereinafter describe, one form of closure cap constituting an embodiment of it. It is to be understood, however, that this is presented simply for the purpose of illustration, and hence is 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.

In said drawing,

Fig. 1 is a bottom view of a closure cap embodying the invention;

Fig. 2 is a part sectional elevation on an enlarged scale;

Fig. 3 is a diagrammatical illustration in the nature of a section on approximately line 3—3 of Fig. 1 and serving to illustrate the relationship of the various parts of the closure to the mouth portion of a receptacle preliminary to the sealing of the closure on the receptacle;

Fig. 4 is a similar illustration in the nature of a section on line 3—3 of Fig. 1 showing the relationship of the parts after the closure has been pressed down to sealing position on the receptacle;

Fig. 5 is a similar illustration in the nature of a section on line 5—5 of Fig. 1 and serving to illustrate the relationship of the parts after the

closure has been pressed down to sealing position on the receptacle; and

Fig. 6 is a sectional elevation showing the closure in sealing position on a suitable receptacle.

There are various kinds of closure caps, employing metal shells and sealing gaskets of various types, which are intended to be applied to packing vessels after exhaustion of air therefrom and to be held on the packing vessel by the external atmospheric pressure.

In order to remove such closures from the receptacles on which they are thus sealed, it is necessary in most instances, to puncture the closure, or otherwise mutilate or distort it, in order to admit air for the purpose of equalizing the internal pressure with the external atmospheric pressure. Such puncturing or distortion of the closure, as a rule, renders it unfit for further use as an effective closure for the receptacle.

The present invention is designed to obviate the necessity of puncturing the closure and to avoid permanent distortion of it in the operation of admitting air to the sealed package for the purpose of permitting removal of the closure.

The present invention also is designed to increase the adhesive or retentive cooperation of the sealing gasket with the receptacle, and to attain various other advantages which will be pointed out as the description proceeds.

An understanding of the nature of the present invention may be had most quickly by consideration of the illustrative embodiment shown in the drawing which will now be described.

The closure cap here shown comprises a shell, which may be made of sheet metal or other appropriate material, which shell is formed with a top portion 10 and a depending annular skirt 11, and a sealing gasket 12, which is of ring type and is composed of a plastic sealing material, such as unvulcanized rubber.

As illustrated in Fig. 6, the shell is formed in such proportions that the lower margin of the skirt 11 is of materially greater diameter than the mouth portion of the receptacle V for which the closure is intended. As a consequence, the lower margin of the skirt, when the closure is in place on the receptacle, will be spaced a substantial distance outwardly from the periphery of the receptacle. The lower margin of the skirt is stiffened and reinforced by being spun upwardly and outwardly to form a continuous circumferential bead 14.

The upper portion of the skirt which is immediately adjacent the top 10 is formed as a restricted portion 11a, on an internal diameter

which is substantially less than that of the lower portion of the skirt and but slightly greater than the external diameter of the mouth of the container, and below the portion 11a, the skirt is fluted in such fashion that its inner face presents a plurality of inwardly projecting embossments 11b which have portions of their inner faces extending downwardly as extensions of the portion 11a, said embossments 11b being interspaced by recesses 11c, the inner surfaces of which are upon approximately the same radius as the lower portion of the skirt 11. Spacing between the embossments 11b may be such as desired.

The pre-formed ring gasket 12, which is of general rectangular cross section, is of such diameter as to fit within the small-diameter portion 11a of the skirt, and the thickness of the gasket is such that when its upper surface is in contact with the top 10, its lower surface will be somewhat below the cylindrical portion of the small-diameter skirt portion 11a. The gasket is adherently attached to the shell top 10.

The closure cap is sealed on the receptacle by pressing it downwardly thereon after air has been exhausted or displaced from within the cap and receptacle. Fig. 3 serves to illustrate the relationship of the various portions of the cap to the mouth portion of the receptacle when the cap is first placed thereon, it being noted that the gasket rests upon the mouth rim R of the receptacle. The operation of placing the cap on the receptacle, which operation is usually performed by automatic machinery, is facilitated by the relatively large diameter of the lower portion of the shell skirt, which permits the mouth of the vessel to enter freely, even though the cap may not be in accurate concentric relationship with the receptacle. The inwardly extending embossments 11b, which have their innermost portions disposed on a circumference corresponding to that of the gasket and slightly larger than that of the receptacle's mouth, act as guides to center the cap on the receptacle, thus causing the gasket to come to rest on the mouth rim, as illustrated in Fig. 3, entirely around the mouth, thus effecting a continuous sealing contact between the gasket and mouth rim. Downward pressure is then applied to the top of the cap to force it downwardly on the receptacle, which causes the mouth rim of the receptacle to be forced into the plastic gasket. In this operation, the small-diameter portion 11a of the cap skirt retains the upper portion of the gasket against spreading. As a consequence, a greater proportion of the gasket material which is displaced by the intrusion of the receptacle's mouth is displaced downwardly than would be the case if the upper portion of the gasket were free to move outwardly. At the points where the embossments 11b are in contact with or quite close to the peripheral surface of the receptacle, there can be relatively little downward displacement of the gasket material. However, in the intervening spaces, the gasket material may be plastically displaced to a considerable extent downwardly along the peripheral surface of the receptacle's mouth. Of course, displacement of the gasket material likewise occurs downward along the inner surface of the receptacle's mouth. In Fig. 5 is illustrated the relationship of the parts where the embossment 11b is closely associated with the periphery of the receptacle, and in Fig. 4 is illustrated the relationship of the parts at a point between the embossments where there is

a substantial space between the periphery of the receptacle's mouth and the skirt of the cap.

In Fig. 6 the closure is shown in sealed position on the receptacle. It will be observed that because of the form of the shell skirt, its lower margin is spaced a substantial distance outwardly from the peripheral surface of the portion of the receptacle which it encompasses, the portions 11b acting as spacers and as guiding or centering elements to maintain the closure in concentric relationship with the receptacle. This spacing of the margin of the skirt outwardly from the periphery of the receptacle is a desired and advantageous feature, for the purpose of permitting said margin to be engaged effectively by a suitable implement by which upward pressure may be exerted upon it to force the closure upwardly. Such an implement is indicated at K. To facilitate the application of upward pressure to the closure, the receptacle preferably is provided with an outwardly extending ledge or shoulder L, located at a proper distance below its mouth, upon which the implement may be fulcrumed to exert leverage upwardly against the reinforcing bead 14. By such operation the closure may be pried upwardly sufficiently to break the seal and permit air to enter the package, whereupon the closure may be lifted off easily.

The marginal bead 14 reinforces the shell skirt against distortion by the pressure applied to it in this operation, and the embossments 11b also act as stiffening elements in the skirt. Naturally, as the closure is pried upwardly at one side, it is tilted toward the other side, and the fact that the margin of the skirt is spaced away from the receptacle at said opposite side permits the closure to tilt without opposition or interference between those portions at that point. All of these features cooperate to prevent distortion of the shell and thus enable it to withstand the pressure necessary to tilt it sufficiently to break the seal. Thus preliminary puncturing of the shell is rendered unnecessary, and it may be removed in such condition as to be continued in use as an effective closure for the receptacle.

I claim:

1. A closure for sealing packing receptacles, comprising a shell having a top and depending annular skirt, said skirt being formed at its upper end with a shallow restricted annular portion which is of relatively small diameter, and with a substantially non-distensible lower portion which at both its upper and lower limits is of materially larger internal diameter than said restricted portion, said skirt having formed in its lower portion a plurality of circumferentially distributed inwardly projecting substantially rigid embossments which merge at their upper ends into said restricted portion and at their lower ends into said lower portion at a distance above its lower margin and outwardly beyond said restricted portion, and a gasket of plastic sealing material secured in the shell against the top with its periphery alongside said restricted portion of the skirt, said embossments in the skirt being disposed on a radius from its axis such as to permit the mouth of the intended vessel to enter freely into sealing contact with the gasket without any distortion of the shell, and serving to space the lower portion of the skirt outwardly from the mouth of the vessel.

2. A closure as specified in claim 1 and wherein said embossments are formed as downward continuations of said restricted portion and with

their innermost parts on substantially the same radius as the inner surface thereof.

3. A closure as specified in claim 1 and wherein the innermost portions of said embossments extend downwardly from the periphery of the gasket.

4. In a package having a receptacle with a mouth rim and an outwardly projecting peripheral ledge therebelow, a closure comprising a shell 10 accommodating the mouth rim of the receptacle and containing a gasket of sealing material positioned between and in sealing engagement with the top of the shell and the mouth rim of the receptacle, said skirt having an annular lower 15 part of substantially greater internal diameter than the portion of the receptacle which it encompasses and having also a shallow annular restricted part adjacent the top and running along-

side the periphery of the gasket, said shell being provided with substantially rigid inwardly projecting embossments spaced from one another circumferentially and extending downwardly from said restricted portion and terminating short of the lower margin of the skirt, said embossments being spaced from the axis of the shell sufficiently to accommodate the mouth rim of the receptacle freely but cooperating with its periphery to maintain the shell in coaxial relationship thereto and with the lower portion of the skirt spaced from the periphery of the mouth rim above the peripheral ledge.

5. In a package, a construction as specified in claim 1 and wherein the lower marginal portion of the shell skirt is formed with an annular stiffening bead which is spaced below the lower ends of the embossments.

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