May 16, 1939. W. P. WHITE 2,158,683

CLOSURE CAP

Filed June 17, 1935

Fig. 1.

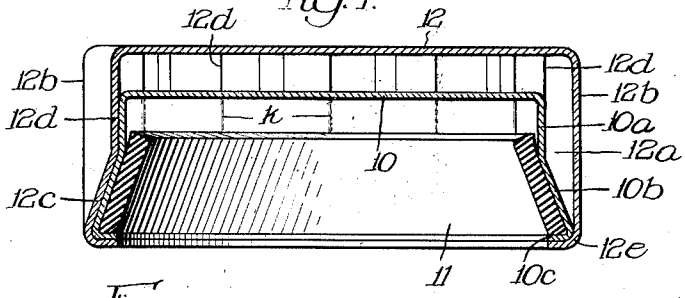


Fig. 2.

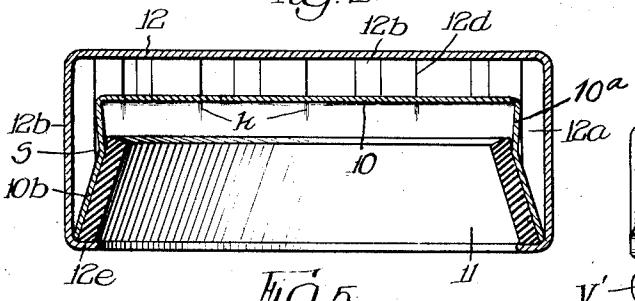


Fig. 3.

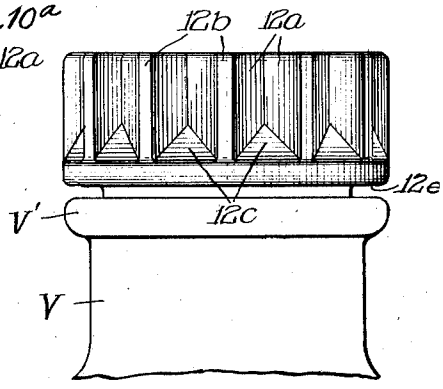


Fig. 5

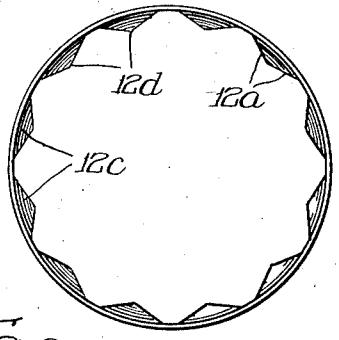


Fig. 4

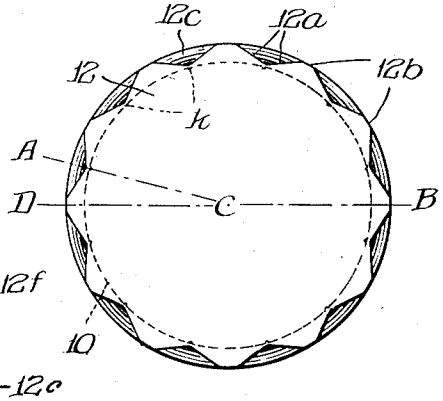
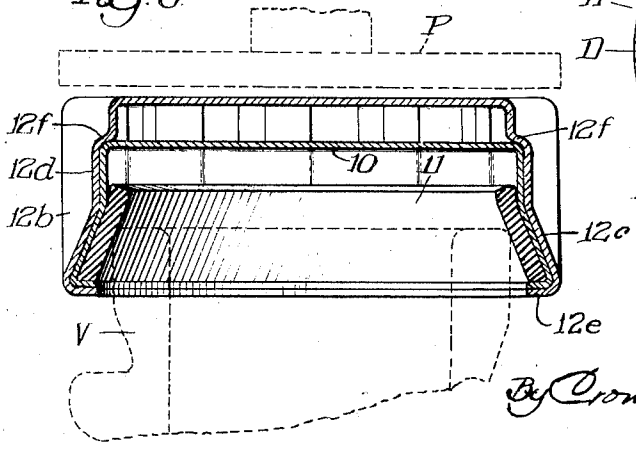


Fig. 6



Inventor:
William P. White,
By Cromwell Bentzen Wooden
Attys

Patented May 16, 1939

2,158,683

UNITED STATES PATENT OFFICE

2,158,683

CLOSURE CAP

William P. White, Glencoe, Ill., assignor to White Cap Company, Chicago, Ill., a corporation of Delaware

Application June 17, 1935, Serial No. 26,978

4 Claims. (Cl. 215—40)

This invention relates to closure caps for packing vessels such as bottles, jars, etc.

One of the objects of the invention is the provision of such a cap which may be employed for the hermetic sealing of such vessels for preservation of their contents, and which is also specially adapted for manipulation conveniently by hand in removing it from and putting it back on the vessel, after it has been initially removed, as is frequently desirable when the contents is dispensed piecemeal.

Another object of the invention is the provision of such a closure which may be applied with facility and with certainty in the initial hermetic sealing of the vessel and which will retain its place on the vessel securely, and which can be removed without mutilation or distortion and easily re-applied to form an effective closure and protection for the contents of the vessel.

Another object is the provision of a closure cap having the characteristics above specified and which may be manufactured economically, and with good appearance, so that it will contribute to the attractiveness of the package.

Other and further objects and advantages of the invention will be pointed out or indicated hereinafter or will be apparent from the following description or upon 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, certain structural forms in which it may be embodied; 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.

In said drawing:

Fig. 1 is an elevational sectional view of one form of closure cap embodying the invention, the section being taken on substantially lines A—C—B of the top view which is shown in Fig. 4;

Fig. 2 is a diametrical sectional elevation of a slightly modified embodiment;

Fig. 3 is a side view of the closure cap in sealed position on the mouth of a jar or bottle;

Fig. 4 is a top view of the closure caps illustrated in Figs. 1, 2 and 3;

Fig. 5 is a bottom view of the mantle shell which forms part of the constructions illustrated in Figs. 1 and 2; and,

Fig. 6 is a diametrical sectional elevation of a second modified form of construction, said Fig. serving also to illustrate a position of any of the closures shown in this drawing preliminary to the sealing or seating of the closure on an appropriate vessel.

In the packaging of various commodities, such as catsup, sauces, etc., it is desirable to equip the package with a closure which may be re-used on the vessel after it has been initially opened. Such a closure must form a very secure, and in many cases hermetic, seal upon the vessel in the first instance, yet be susceptible of removal in such fashion as to permit its re-use. It is also important that it form a secure closure when subsequently applied to the vessel after dispensing of part of the contents, and that it be susceptible of easy and ready manipulation for unstoppering and re-stoppering the vessel. It is also highly important that the closure be susceptible of being very easily and quickly applied in the original sealing of the vessel by the packer, such original sealing usually being effected by more or less automatic machinery which operates at a rather high rate of speed. Particularly where hermetic sealing is required, it is essential that the closure operate with certainty to accomplish the proper sealing of the vessel.

The present invention provides such a closure which may be seated and sealed on the vessel simply by a straight downward pressure, as distinguished from a screwing or turning movement or crimping or other re-forming of the closure incident to its application to the vessel, and which can be, with equal facility, removed from the vessel in a condition for re-use thereon, and thereafter be conveniently and easily re-applied and removed repeatedly by hand.

An understanding of the invention can be most quickly had by reference to the illustrative embodiments shown in the drawing, which will now be described.

The closure cap illustrated in Fig. 1 comprises an inner or closure shell **10**, a gasket **11**, and an outer or mantle shell **12**. The closure shell has a top portion of approximately circular form, from which depends a skirt having an upper portion **10***a* of approximately cylindrical form and a lower flaring portion **10***b* of approximately frusto-conical form. The gasket **11** is a sleeve gasket made of a suitable compressible elastic sealing material, such as rubber composition, and it is positioned within the closure shell in such fashion that it rests in contact with the inner surface of the flaring skirt portion **10***b*. Preferably the gasket is normally of substantially cylindrical form and is circumferentially constricted or compressed for insertion into the shell **10**, and held

under circumferential constriction thereby. The upper end of the gasket extends somewhat above the upper limit of the flaring skirt portion 10*b*, but is spaced a substantial distance from the top of the closure shell. The closure shell 10 may be made of any suitable resilient sheet metal, such as light steel plate having suitable rigidity for the purpose.

The mantle shell 12, as seen in Figs. 1, 3, 4 and 5, is formed of a material having suitable rigidity, such as light steel plate, and is formed with a top portion and a depending skirt portion, both of such dimensions as to accommodate the closure shell. The skirt portion is substantially deeper than the skirt of the closure shell, so that the top of the latter will be positioned a substantial distance below the top of the former. The skirt of the mantle shell is formed throughout most of its height with flutings which merge into the top of the mantle shell so that said top is of a serrated form, as seen in Fig. 4, said flutings being formed by pressing portions 12*a* of the skirt inwardly. The portions 12*b* of these flutings which remain on the original circumference of the skirt extend almost to the bottom of the skirt, but the inwardly displaced wall portions 12*a* are of gradually decreased height as they proceed inwardly, so that inwardly and upwardly inclined parts 12*c* are formed at the lower ends of the fluting walls 12*a*. The slope of these inclined portions 12*c*, and of the lower terminals of the wall portions 12*a*, corresponds to the slope of the outer surface of the flaring portion 10*b* of the closure shell skirt, and the inner crowns or crests 12*d* of the flutes contact the upper portion of the closure shell skirt. The inner crests 12*d* of the flutings may indent the skirt portion 10*a* slightly, as indicated at *k*, to form an interlock against rotation of the mantle shell relative to the closure shell.

With the closure shell so positioned in the mantle shell, the two are held in coaxial relationship, with the flaring skirt portion 10*b* in abutment with the inwardly sloping elements 12*c* and lower termini of the fluting walls 12*a*. The two shells and the gasket 11 are retained in this assembled relationship by the lower marginal portions 10*c* and 12*e* of the two shells, which portions are turned inwardly below the lower end of the gasket. This securely clamps the flaring skirt portion 10*b* of the closure shell against the inwardly-sloping abutting portions of the mantle shell, so that the two are rigidly connected and held against relative rotation. The inwardly turned portions 10*c* and 12*e* do not clamp or pinch the gasket, however, but do retain it in place in the closure shell. Consequently, the gasket is free to slide upwardly in contact with the inner surface of the closure shell skirt.

The modified construction shown in Fig. 2 corresponds to that above described in all excepting two particulars. The first difference is that the lower margin of the closure shell skirt terminates approximately flush with the lower end of the gasket 11, the lower portion 12*e* of the mantle shell being turned inwardly in tight clamping engagement with the lower margin of the closure shell skirt and across the lower end of the gasket, and serving to clamp the flaring portion of the closure shell tightly against the elements 12*c* and lower terminals of the fluting walls 12*a*. The second difference is that a slight clearance or space S is left between the crests 12*d* and the closure shell skirt at the junction of the portions 10*a* and 10*b*, so as to accommodate some outward resilient movement of the closure shell skirt relative to the mantle shell skirt at that point. This may be accomplished by forming the portion 10*a* with a slight downward taper.

In the modification illustrated in Fig. 6 the construction is the same as that shown in Fig. 1 with the exception that the upper portions of the inwardly fluted walls 12*a* are further offset inwardly to form shoulders 12*f* in a position to jut over and contact marginal portions of the top 10 of the closure shell.

A closure cap constructed in accordance with any of the foregoing examples is adapted to be hermetically sealed on a suitable vessel which presents a substantially cylindrical peripheral sealing surface adjacent its mouth rim, the cross-sectional size of the vessel at the sealing surface being somewhat less than the internal compass of the portion 10*a* of the closure shell but somewhat greater than the internal compass of the gasket on a line somewhat below the lower terminus of the shell skirt portion 10*a*. The mouth portion of such a vessel is indicated in dotted lines in Fig. 6.

In the sealing operation, the closure cap is first placed loosely upon the vessel, as illustrated in Fig. 6, the flaring form of the gasket admitting the mouth of the vessel to such position. Then downward pressure is applied to the top of the mantle shell 12, as by means of a suitable pressing anvil P, and the closure cap forced down to sealing position on the vessel, which position is illustrated in Fig. 3. This movement of the closure cap wedges it onto the vessel, the gasket being elastically deformed and portions of it molded upwardly between the peripheral sealing surface of the vessel and the inner surface of the skirt portion 10*a*, said portions being placed under high compression between the peripheral sealing surface of the vessel and the skirt of the closure shell. Accordingly, when the closure is seated on the vessel it is held very firmly by the tight engagement of the gasket against the peripheral sealing surface of the vessel due to the elastic pressure of the gasket under the constraining pressure of the skirts of the closure shell and mantle shell.

It will be noted that in the operation of forcing the closure cap to sealing position on the vessel, the downward pressure applied to the top of the mantle shell is transmitted to the flaring portion 10*b* of the closure shell through the skirt of the former, the flutings acting as stiff struts which effectively resist collapse or distortion of the mantle shell and transmit the thrust to the closure shell. This thrust is distributed against the flaring portion 10*b* of the closure shell by the abutting portions 12*c* of the mantle shell. The inward flange 12*e* at the lower end of the mantle shell effectively resists any tendency of the lower portion of that shell to flare under the wedging pressure.

With the closure fully seated on the vessel as above described, it forms an hermetic seal thereon against the peripheral sealing surface. The closure cap may be removed without distortion simply by prying it upwardly, and to facilitate this the vessel may be provided with an extending pry-off ledge *v'*, which is slightly spaced from the lower end of the cap when the latter is in sealed position. In such removal the gasket remains in position in the closure shell, and the closure cap may be replaced on the vessel simply by pressing it downwardly thereon. The mantle shell facilitates such re-application and subse-

quent removal of the closure cap because of its depth and the provision of the fluting, and these operations may be attended by rotation of the closure relative to the vessel, as the mantle shell is securely retained against rotation relative to the closure shell.

What I claim is:

1. A closure cap comprising, in combination, an inner shell having a top portion and a depending skirt formed with an outwardly projecting part, a gasket of sealing material retained within said inner shell, and an outer shell of greater depth than the inner shell and having a top portion covering the top of the inner shell and a depending skirt encompassing the inner shell, the skirt of the outer shell being provided with longitudinal flutings to form struts extending from its top portion to and in overlying abutment with the outwardly projecting part of the inner shell skirt.

2. A closure cap comprising, in combination, an inner shell having a top portion and a depending skirt formed with an outwardly projecting part, a gasket of sealing material retained within said inner shell, and an outer shell of greater depth than the inner shell and having a top portion covering the top of the inner shell and a depending skirt encompassing the inner shell, the skirt of the outer shell being provided with longitudinal flutings to form struts extending from its top portion to and in overlying abutment with the outwardly projecting part of the inner shell skirt, portions of said flutings engaging peripheral portions of the inner shell skirt and portions of said flutings being spaced laterally from the inner shell skirt.

3. A closure cap comprising an annular inner member having a flaring lower part, an elastic sealing gasket in contact with the inner side of said flaring part, and an outer shell secured to the inner member and having a top portion covering and spaced a distance above the same and a depending skirt encompassing the inner member, said skirt having parts in overlying abutment with the flaring part of the inner member and portions turned inwardly below and in engagement with the lower margin of the inner member, whereby the gasket and inner member may be pressed to sealing position on a suitable vessel by pressure applied to the top of the outer shell.

4. A closure cap as specified in claim 3 and wherein the skirt of the outer shell is fluted longitudinally from its top portion to the flaring part of the inner member.

WILLIAM P. WHITE.