Sept. 12, 1939. I. PANTER 2,172,544

RECEPTACLE CLOSURE

Filed May 17, 1937

FIG. 1.

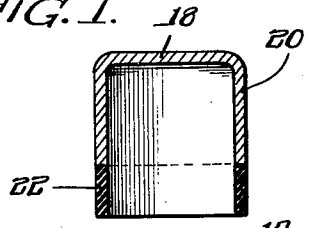


FIG. 2.

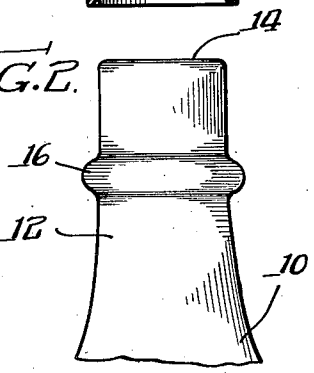


FIG. 3.

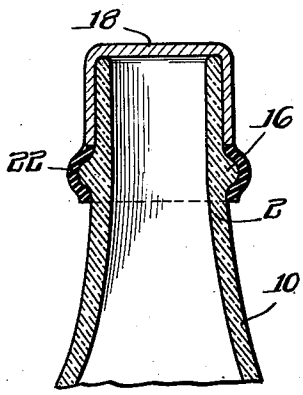


FIG. 4.

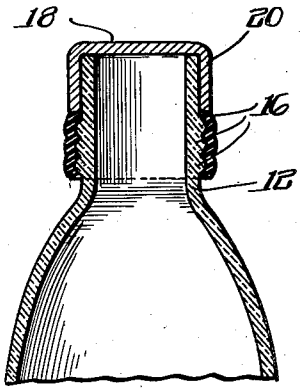


FIG. 5.

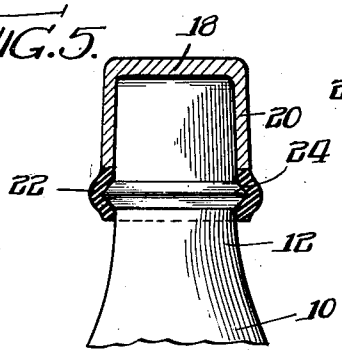


FIG. 6.

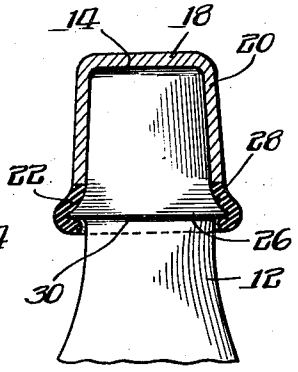


FIG. 11.

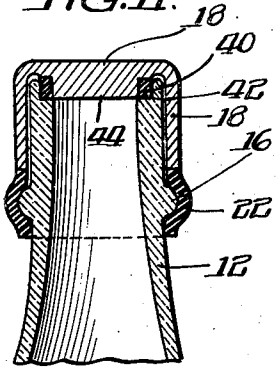


FIG. 7.

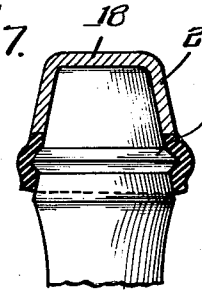


FIG. 9.

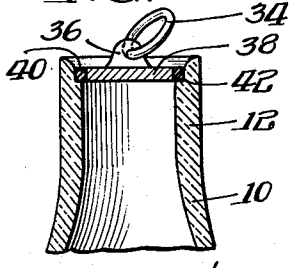


FIG. 12.

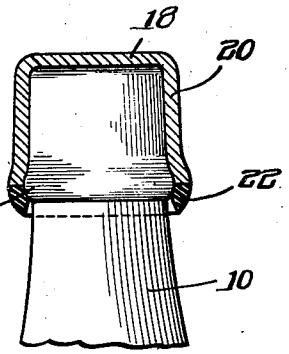


FIG. 8.

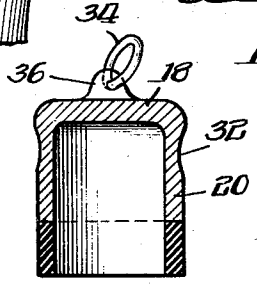
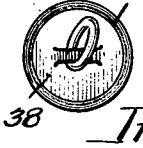


FIG. 10.



Inventor

Irwin Panter

By: Cox & Moore attys.

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UNITED STATES PATENT OFFICE

2,172,544

RECEPTACLE CLOSURE

Irwin Panter, Chicago, Ill., assignor of one-half to Louis Gethner

Application May 17, 1937, Serial No. 142,981

4 Claims. (Cl. 215—41)

The present invention relates to a closure means and more particularly a closure especially useful in the sealing of bottles and other receptacles.

It is an object of the present invention to provide an improved closure which is extremely simple and which may be readily applied to seal a receptacle by merely being slipped in place without the use of screw threads or other means which must be especially applied or actuated.

A further object of this invention is to provide a new and improved unitary closure means which will co-act with specially formed receptacles to become a sealed closure which may be repeatedly removed and replaced at any time to open and seal the receptacle.

An additional object of this invention is to provide an improved closure for receptacles and particularly for bottles and the like, comprising a substantially rigid cap which may be readily engaged about the mouth of the bottle, in combination with resilient skirt means adapted to be tensioned by a portion of the bottle to provide a relatively impermeable seal.

Still another object of this invention is to provide a closure for receptacles having an opening bordered by upstanding walls, which closure comprises a unitary cap of a plastic material having sufficient rigidity to permit ready application about said opening and having integral, relatively elastic means associated therewith to removably engage a portion of the walls for the purpose of maintaining the closure resiliently in place and/or effectually sealing the opening.

Numerous other objects and advantages will more fully appear during the course and progress of the following specification.

Referring to the drawing:

Fig. 1 is a sectional elevation through a bottle cap embodying the present invention.

Fig. 2 is a side elevation showing the neck and mouth of a bottle adapted to co-act with the cap shown in Fig. 1.

Fig. 3 is a sectional elevation showing the cap in operative position with respect to the mouth of the bottle.

Fig. 4 is a sectional elevation through an alternative preferred type of closure embodying the present invention.

Figs. 5, 6, 7, 8 and 9 are sectional elevations of yet further alternative preferred embodiments.

Fig. 10 is a top view of the closure means shown in Fig. 9.

Figs. 11 and 12 are sectional elevations of yet further alternative preferred embodiments.

The closure means, shown for the purpose of illustrating the present invention, is applied specifically to a bottle 10 of the general type used for distributing catsup and comprises an upstanding neck 12 terminating in a mouth 14. The neck is provided at a point spaced from the mouth 14 with an annular rib 16 projecting radially from the outer face thereof.

The closure means for sealing the bottle, shown clearly in Figs. 1 and 3, comprises a cap comprising a generally flat end wall 18 having an annular wall 20 projecting therefrom and of such interior dimension as to be readily applicable to engage freely about the mouth 14 and neck of the bottle 10. The material forming the thus far described portions of the cap is, according to the present invention, formed of a relatively rigid, stiff, inelastic material so that it may be firmly gripped and readily presented into operative position with respect to the bottle neck.

The remainder of the cap comprises an annular skirt 22 integrally formed with the remainder of the cap and providing a continuation of the annular wall 20. The skirt 22, being substantially of the same interior dimension as the wall 20, will fit fairly readily about the upstanding wall of the bottle neck adjacent the mouth and above the wall 18. However, the cap is so proportioned that, when engaged about the mouth of the bottle as shown in Fig. 3, the elastic skirt 22 will reside adjacent and around the rib 16, being distended elastically outwardly. This portion of the cap is not formed of rigid material as in the case of the walls 18 and 20, but, on the contrary, is formed of some carefully selected material having considerable elasticity.

Thus, the normal elastic force of the skirt 22 against the rib 16 will serve to seal the two members together against the ingress or egress of the exterior atmosphere into or from the bottle. By a careful selection of the resilient material forming the skirt and a proper proportioning of the parts, the tenacity with which the closure engages the bottle and the degree of impermeability thereof may be relatively accurately predetermined.

The materials for forming the cap may comprise any suitable substances having the desired properties. It is preferred, however, that the cap be manufactured from some suitable plastic material, or materials, which may be formed into an integral unit. For example, the walls 18 and 20 of the cap may be made from some relatively stiff, rigid, either thermo-plastic or thermo-setting, mouldable material while the

skirt may be formed of a suitable plastic material having elastic properties. Specifically the rigid portions of the cap may, for instance, be made of hard rubber moulded into an integral unit with the skirt portion of soft resilient rubber.

Various ways for manufacturing such an article will at once suggest themselves to those skilled in the art of moulding. According to one process of procedure, a mould suitable for the formation of a cap may be charged, in the portions corresponding to the walls 18 and 20 of the finished cap, with a milled rubber composition containing the proper ingredients for the formation, after vulcanization, of a hard rubber. The portions of the mould corresponding to the skirt 22 will be loaded at the same time with a milled rubber composition having vulcanizing ingredients suitable for the formation of a soft, relatively resilient rubber. After the composite charge has been moulded and vulcanized into a unitary integral cap, it will be found that the portions forming the walls 18 and 20 are stiff and hard, whereas the skirt 22 is relatively elastic, the whole being integrally bonded.

Alternatively it will be apparent that the elastic skirt portion and the rigid top portion of the cap may be moulded separately and then vulcanized or otherwise secured together along the line of juncture.

While the present embodiment has been specifically described as being manufactured from a rubber composition, it will be apparent from the above disclosure that any other suitable mouldable materials may be employed. For example, the resilient portion may be made of chlorinated rubber or of any of the synthetic, highly elastic materials such as "Thiokol" formed by the action of olefin halides on alkyl polysulphides, or the elastic products resulting from the polymerization of chlorobutadiene. It has been suggested in the moulding art that the term "lastics" be employed to cover this class of elastic substances possessing rubber-like physical properties. The walls 18 and 20 may be alternatively formed of any suitable plastic such as the phenol-formaldehyde resins and the like which, in their finished form, are substantially devoid of elasticity such as the term is employed in accordance with the present specification.

In use, the rigid portions of the cap apparently, not only support the elastic skirt portion 22 at all times, but serve to effectually and properly present it to the rib portion of the bottle when the cap is being initially applied. As a consequence the tendency for buckling, generally experienced in attempting to force a relatively thin, elastic wall longitudinally about a transverse protrusion, is eliminated and it will be found that the skirt 22 may be repeatedly removed from the mouth of the bottle and replaced as often as desired. It will be found that a thin film of a suitable lubricant will assist the positioning of the elastic portion of the cap about the rib 16. When rubber or an equivalent substance is employed, mere moistening of the parts with water will prove sufficient.

The alternative embodiment disclosed in Fig. 4, differs mainly from the aforementioned structure in providing a plurality of ribs 16 extending completely around the exterior surface of the neck 12 of the bottle. The cap may be substantially the same as that hereinbefore described. For certain purposes the plurality of annular ribs 16 will be found to provide a multiple seal which is of enhanced value.

The alternative preferred embodiment illustrated in Fig. 5, comprehends the provision on the neck 12 of the bottle of an annular rib 24 tapering to a sharpened outer edge. It has been found that this type of structure produces a much superior seal beween the sharp edge of the rib and the adjacent surface of the skirt 22, since there is a definite tendency for the sharp edge to force its way into the elastic material.

The alternative type of structure disclosed in Fig. 6 is particularly useful in cases where there is a necessity for increased resistance to removal of the cap. The outstanding portion or annular rib 26 on its upper side has a face 28 which slopes gracefully toward the mouth 14 of the bottle. The lower side of the rib, however, extends radially inwardly in a direction substantially transverse to the axis of the neck. As shown in this figure, the resilient skirt 22 will normally tend to grasp about the lower face 30 of the rib 26 to resist forces in the direction of withdrawal. On the other hand, the gentle slope of the face 28 permits ready application of the closure.

The cap and bottle shown in Fig. 7, are provided with a tapered side wall and a sharpened annular rib 24. A cap of this type is somewhat more adaptable to conventional moulding processes and is characterized by increased ease of application.

The cap disclosed in Fig. 8 is similar in construction to those described above, but has an annular depression 32 about the side wall 20, providing a finger grip. Application and removal of the cap is additionally facilitated by means of a ring 34 anchored in a suitable aperture in the projecting lug 36 on the end wall 18 of the cap. Any suitable means may be applied to the cap to assist in maintaining a firm grasp thereupon.

The structure disclosed in Fig. 9 comprises merely a circular central disk 38 of rigid material having about its circumferential margin an integral strip 40 of elastic substance. A suitable ring 34 is provided in a protruding portion 36 of the disk 38 to permit removal. The disk is designed to fit securely within an annular shoulder formed adjacent the opening 14 in the neck of the bottle, the elastic shoulder 40 being pressed securely against the circumferential wall of the shoulder by the rigid core 38. This member may be moulded or otherwise manufactured according to the processes defined above and may be used in combination with one of the aforementioned types of closure devices so arranged as to cover the number 38 and the neck of the bottle as aforementioned.

Alternatively this device may be combined in a unitary manner with the type of cap shown in the above described embodiments in the manner illustrated in Fig. 11. Herein the end wall 18 of the cap is thickened to provide a concentric circular boss 44 having an annular circumferential edge portion 40 of the elastic material.

In use, this type of structure provides an efficient double seal suitable to prevent contamination of the contents of the bottle under substantially any conditions of service, that is, the resilient skirt being maintained forcefully against the annular rib 16, will provide one elastic seal, whereas the elastic member 40 forced into the annular shoulder 42 will effectually close and seal the container substantially at the opening.

The embodiment disclosed in Fig. 12 comprehends the provision of a cap in which the sealing effect may be subservient to the primary purpose

of maintaining the cap removably in position upon the container. According to this specific embodiment the rib or bulged portion 16 of increased diameter, formed on the neck of the bottle 10, may be the same as described before. The relatively rigid side wall 20, however, is extended down to a point adjacent the central part of the rib. The wall 20 may be moulded to conform with the upper curve of the rib 16 in the manner clearly shown in this figure.

The skirt portion 22 in this embodiment is preferably relatively short and extends inwardly and about the lower face of the rib 16 to engage therewith. It has been found that this inwardly extending elastic skirt 22 need be only of relatively limited extent since it must be readily capable of being forced over the rib 16 without buckling. When positioned as shown in Fig. 12, however, elastic and resilient engagement against the lower face of the rib portion 16 will maintain the position of the elements against accidental misplacement. It has further been found desirable in enhancing application of the cap to the container to form the bulged portion 16 with a relatively gradual slope.

While the present invention has been illustrated in connection with a bottle it will be obvious that it is not so limited and may be applied equally well to many receptacles of widely varying characteristics as well as to a multitude of devices demanding closure means. Moreover, the structure and materials of the cap are not limited to the specific plastics described but may be formed of any material having suitable properties. Various modifications coming within the scope of the present invention may be readily suggested after a perusal of the specification.

The present invention provides an improved closure which operates in a manner of great simplicity, that is, by mere application to the opening to be closed. The step of removing the closure is equally as simple and may normally be accomplished in such a manner that the cap may be readily replaced when desired. A housewife, for instance, in using a catsup bottle, each time it is desired to remove the cap, may do so quite readily, being assured that during intermediate periods the cap will be retained in place and/or the contents thereof will be effectually sealed from the exterior atmosphere. This is accomplished without resort to the use of screw threads, additional fastening means or separately actuable seals.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. In a receptacle having a neck portion and an opening in the neck, a continuous projection arranged exteriorly about the said neck, a closure member having a relatively rigid and inelastic end wall and side wall adapted to engage about the open end of the neck to enclose the opening, and an integral skirt portion attached to the said side wall forming a continuation of said side wall and composed of relatively elastic material, said skirt being elastically extended about said projection whereby to provide an elastic seal, said skirt being supported in coextensive circumferential relationship with the side wall and having a thickness relative to its axial length sufficient to resist buckling when the skirt is forced axially against the rib whereby to permit the skirt to be axially forced over the rib.

2. In a receptacle having a generally cylindrical neck portion, an opening in the end of the neck, a contiuous annular rib formed on the exterior of the neck and spaced from the opening, a closure member having a relatively rigid and inelastic end wall and side wall adapted to engage freely about the open end of the neck to enclose the opening, and an annular integral skirt portion forming a continuation of said side wall and composed of relatively elastic material, said skirt being elastically extended about said rib whereby to provide an elastic seal, said skirt being supported in coextensive circumferential relationship with the side wall and having a thickness relative to its axial length sufficient to resist buckling when the skirt is forced axially against the rib whereby to permit the skirt to be axially forced over the rib.

3. In a closure for sealing an end portion of a receptacle or the like, said end portion having axially extending walls defining a section to be sealed by the closure and having projecting rib means located at least at one point on the walls, said closure having a relatively rigid and inelastic end wall, said closure also having a relatively inelastic side wall extending from the end wall adapted to engage about and enclose the said end portion of the receptacle, and a skirt portion attached to said side wall, said skirt being composed of a relatively elastic material, said elastic skirt being arranged to extend about the end portion of the receptacle and about said rib means for engaging elastically over the rib in elastically distended relationship to maintain the closure resiliently in place and seal the opening, when the closure is in operative position, said skirt having a thickness relative to its axial length sufficient to resist buckling when the skirt is forced axially against the rib whereby to permit the skirt to be axially forced over the rib.

4. In a closure for sealing an end portion of a receptacle or the like, said end portion having generally parallel walls defining a portion to be sealed by the closure and having projecting rib means located at least at one point on the walls, said closure having a relatively rigid and inelastic end wall, said closure also having a relatively inelastic side wall extending from the end wall adapted to engage about and enclose the said end portion of the receptacle, and an integral skirt portion attached to said side wall and forming a continuation of the said side wall, said skirt being composed of a relatively elastic material, said elastic skirt being arranged to extend about the end portion of the receptacle and about said rib means for engaging elastically over the rib in elastically distended relationship to maintain the closure resiliently in place and seal the opening, said skirt having a thickness relative to its axial length sufficient to resist buckling when the skirt is forced axially against the rib whereby to permit the skirt to be axially forced over the rib, said end wall of the closure having a projecting portion extending interiorly of said side wall and spaced therefrom and adapted to project into the mouth of a receptacle, said portion having elastic peripheral edges for engaging and sealing against the inner edges of the receptacle walls when in operative position.

IRWIN PANTER.