Feb. 28, 1933. W. A. RAMSAY 1,899,210

CLOSURE FOR VESSELS

Filed June 17, 1931

Fig. 1.

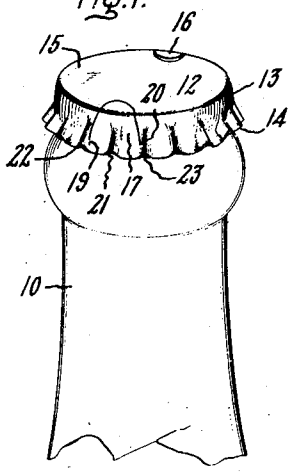


Fig. 2.

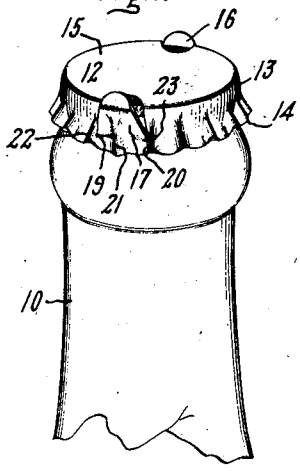


Fig. 3.

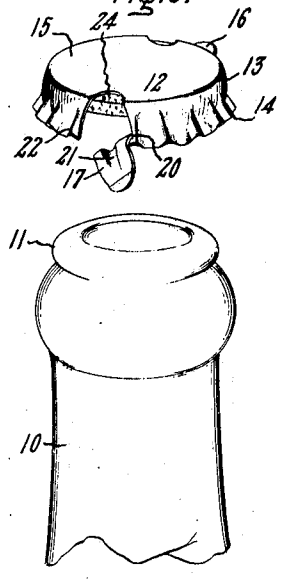


Fig. 4.

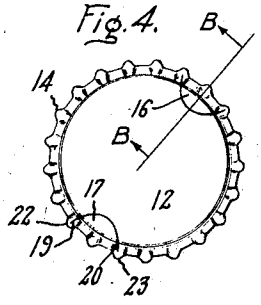


Fig. 5.

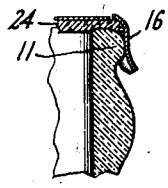
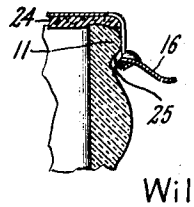


Fig. 6.



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Patented Feb. 28, 1933 1,899,210

UNITED STATES PATENT OFFICE

WILLIAM A. RAMSAY, OF HONOLULU, TERRITORY OF HAWAII

CLOSURE FOR VESSELS

Application filed June 17, 1931. Serial No. 545,060.

My invention relates to closures for vessels, such as bottles, jars and the like, and has for its object the provision of a closure forming a reliable and permanent seal and which may be easily and quickly removed without the use of special tools.

More specifically, my invention relates to closures of the class provided with a serrated or fluted depending flange or skirt which is compressed around and grips a bead or collar on the neck of the bottle. A cap of this type is widely and extensively used in sealing bottled goods of various kinds, particularly soft drinks, mineral waters, etc. It has the very desirable advantages of low cost and ease of application, and it forms a practically permanent seal against leakage of either liquids or gases under considerable pressure. On the other hand, it has the disadvantage that it is removed by forcibly pulling it off the bottle, which operation requires a special tool. To meet the frequent demand for such a tool, especially in the home, many pocket knives are provided with an opener for this type of cap. However, in spite of the well known need for an opener tool nearly everyone recalls his struggles on various occasions in the home or at picnics and other gatherings to remove such a cap when no opener was found to be available. Guests in hotels often use as a substitute the corners of furniture, doors and other pieces of equipment with much damage thereto.

Where ease of removability is the primary consideration, such as in the home, certain caps or closures are provided with a ring of relatively thin metal which is spun over the bead on the neck of the bottle and provided with a tab which may be grasped with the fingers and easily torn out to break the ring and thereby release the cover. The essential feature of this type of cap is the use of a relatively thin metal which can be easily torn by pulling the tab with the fingers, the tab itself being flexible and easily bent. Such a cap, however, provides ease of removability at the sacrifice of low cost and ease of application. Special machinery is required to apply it. Furthermore, this cap is not suitable by reason of its fragile construction to withstand any considerable pressure.

My invention, however, is applied to a different type of closure, i. e., a closure made of relatively heavy metal, too heavy in fact to be severed or torn by the fingers. Consequently, the flexible tab cannot be used since the metal is too heavy to be torn by a pull on the tab. Furthermore, if the tab be bent back and forth, the tab itself will bend and simply break off at its base without rupturing the cap retaining ring of which it forms a part.

In carrying out my invention, I provide a fluted cap-like closure of special construction whereby it may be easily removed in an entirely different manner and without the help of special tools, i. e., by first breaking the skirt to release the cap, after which it may be easily removed. The well recognized characteristics of low cost, ease of application and reliability of the fluted flange cap are not impaired. Furthermore, a special opener tool may be used, if desired, in removing the cap in the conventional manner. In other words, my improved cap has all of the advantages of the fluted flange cap together with the additional advantage of easy removability without a special tool.

More specifically, I provide a special tal or tongue substantially embracing one or more flutes in the depending flange or skirt in such manner that the flute stiffens the tab so that the tab can be forced outward and downward without substantial bending of the tab itself. A twisting strain is thereby imposed on the retaining metal on each side at the base of the tab so as to break it and release the cap which may then be removed. By forcing the tab outward and downward, the retaining metal of the flange can be broken easily. The tab thus acts as a lever to twist and rupture the metal of the flange. Preferably, more retaining metal is left at one side of the tab than the other. In other words, the tab is not cut out as far on one side as the other, for the purpose of allowing one side to break first, the tab remaining secured to the cap. This avoids the discom-

fort and annoyance of littering the floor with the small pieces of metal of the tab.

For a more complete understanding of my invention reference should be had to the accompanying drawing in which Fig. 1 is a view in perspective of a closure embodying my invention as actually applied to a bottle; Fig. 2 is a view similar to Fig. 1 but showing the tabs forced outward somewhat during the source of the opening operation; Fig. 3 shows the tabs each broken out at one side and the closure removed; Fig. 4 is a plan view of a closure embodying my invention; while Figs. 5 and 6 are enlarged sectional views taken along the line B—B of Fig. 4 and looking in the direction of the arrows.

Referring to the drawing I have shown my invention in one form as applied to a closure member for bottles but it will be understood that my invention is not limited to bottles but may be applied to various other vessels or containers such as fruit jars, mayonnaise jars, jugs, etc. The bottle, the neck 10 only of which is shown, is of the type commonly used for soft drinks, various other beverages, etc., and for the purpose of securing the closure member or cap it is provided with a bead 11 at the top around its orifice. It will be understood, however, that the essential feature is an annular portion at this point having such formation that it may be gripped by the closure member to secure it thereto.

The closure member in one form of my invention is in the form of a cap 12 having an annular depending flange or skirt 13 which is fluted or serrated to thereby provide a plurality of outwardly extending corrugations or flutes 14, which are equally spaced apart around the circumference of the flange and extend downward in a direction at right angles to the disc-like top portion 15 of the cap. It will further be noted that the flutes 14 gradually terminate, that is, their depth decreases as the disc top portion 15 is approached, and that they terminate substantially at the junction of the flutes with the top portion or somewhat below that point.

In accordance with my invention I provide specially constructed tabs in the cap, preferably more than one tab being provided, in order that the cap may be easily released for removal without the use of special tools. As shown, I provide two upwardly extending, opening tabs 16 and 17 in the cap these tabs being diametrically opposite each other. The upper ends of the tabs terminate at points which are substantially at the junction of the depending flange with the top disc portion 15 of the cap. At its lower end or base each tab is integrally joined at each side at the points 19 and 20 with the metal of the depending flange. In other words, the tab is struck out of the metal of the cap, there being left a narrow zone of connecting metal at the points 19 and 20 to maintain the continuity of the depending flange and thereby retain its holding effect. The tab is furthermore so constructed that it embraces one or more of the flutes 14 whereby the tab is stiffened. As shown, the tab is provided with a centrally extending flute 21 which serves as a stiffening rib. Furthermore, the points 19 and 20 where the tab is joined at each side integrally in the depending flange are located on the adjoining flutes 22 and 23. As shown, the points 19 and 20, i. e., the junction points, are located substantially at the outermost projecting extremities of the adjacent flutes 22 and 23. In other words, the junction points lie on the adjacent flutes as distinguished from the valleys between the adjacent flutes and the central flute 21.

It will be understood that the cap is preferably struck from a flat sheet of metal by means of suitable dies, and it is contemplated that the cap will be shaped and the tabs formed as simultaneous or consecutive operations. If desired, however, the well known conventional cap, such as now obtainable upon the market and used in large quantities, having a fluted depending flange may be subjected to a special forming operation whereby opening tabs are formed therein in accordance with my invention.

The cap when applied, as shown in Fig. 1, is secured in place by the flutes or more specifically by the inwardly projecting flutes, forming shoulders, which grip the bead 11. A suitable capping tool is used which compresses and diametrically shrinks the flange around the bead while at the same time seating the top of the cap firmly on the edge of the bottle. A gasket 24 made of a suitable material, such as cork, is used to assure a reliable seal against considerable liquid or gas pressure. The cap is thus applied in the conventional well known manner used with caps not provided with releasing tabs in accordance with my invention. It also may be removed in the conventional manner by forcibly lifting it off by means of an opener tool provided with a hook engaging the lower edge of the flange.

The cap can also be removed in accordance with my invention by forcing the tabs outward and downward about the junction points 19 and 20 as pivots whereby a twisting action is applied to the retaining metal at these points. Since the metal of the cap is of substantial thickness to give the stiffness required of the flange to secure the cap by gripping the bead, it is practically impossible to tear the tab out by a straight pull. Fig. 2 illustrates an initial step in the opening operation, the tabs being there shown as forced outward an appreciable amount. This movement of the upper end of the tab is continued outward and downward, the end describing an arc of a circle, until the tab

reaches some such position as indicated in Fig. 6. One or two downward and upward movements of the tab are ordinarily found sufficient to rupture the metal of at least one of the junction points 19 and 20. In fact one complete downward movement followed by a slight upward movement usually suffices. This breaks the flange which thereupon expands and releases the cap. This expansion and releasing action is especially pronounced when the flange is broken at two points by means of the two tabs as shown. The cap may then be readily removed with the fingers.

The tabs can be forced outward and downward without the aid of special tools of any kind, ordinarily by means of the thumb nail, although, if preferred, the edge of a knife, spoon, key or other implement at hand may be used.

The stiffened flute 21 prevents any appreciable bending of the tab itself at its base and thus localizes the bending and twisting stresses at the junction points. The location of the junction points substantially on the outermost points of the adjacent flutes and below the shoulder portions gripping the bead 10 gives freedom for the twisting of the metal at these points. This will be clear from an examination of Fig. 6. The lower end of the tab turns without touching the neck of the bottle, there being a clearance space 25. If the stiffening flute or rib were not provided, the tab would have a pronounced tendency to bend across its base and break off without breaking the flange, which of course would not release the cap. The stiffening rib thus assures effective action.

Preferably, more metal is left at one junction point than the other, i. e., the tab is not cut out as far on one side as on the other. As shown, the junction point 20 is the wider of the two and hence the stronger. This assures that the metal will be ruptured first at the point 19 whereby the tab remains secured to the cap as shown in Fig. 3. This avoids the discomfort and annoyance of littering the floor with small irregular pieces of metal, some at least having sharp corners.

It is important that the top of the tabs terminate substantially at the junction between the flange and top 15, at least so as to leave the top large enough to effectively secure the gasket at the points where the tabs are stuck out. The tabs, after being freed, are initially displaced outward as indicated in Fig. 1 just enough to enable their upper ends to be engaged easily.

With closures for jelly and mayonnaise jars and other vessels having relatively large openings more than two tabs, perhaps four or more, may be used to assure the release of the cover. The cover is easily removable without bending and it can therefore be subsequently utilized as a loose cover until the contents of the vessel have been consumed.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A closure for vessels having a depending flange provided with flutes, and an opening tab in said flange substantially embracing one of said flutes and being substantially coextensive with said flute so that the tab is stiffened by the flute whereby the upper end of the tab may be forced outward to break the flange without substantial bending of the tab itself.

2. A closure for vessels having a depending flange provided with flutes terminating at the top of said flange, and a tab in said flange substantially embracing at least one of said flutes having its upper end terminating substantially with the upper end of said flute and joined integrally at its base with the adjoining flute on each side.

3. A closure for vessels comprising a metallic cap having a depending flange provided with upwardly extending flutes, a tab in said flange substantially embracing at least one of said flutes and having its upper end terminating substantially with the upper end of said flute whereby the tab is stiffened so that it can be forced outward and downward without substantial bending to twist the metal on each side at its base and break it on at least one side to thereby release the closure.

4. A closure for vessels comprising a metallic cap provided with a top portion and a depending flange portion, said flange portion being provided with a plurality of flutes gradually terminating at the junction with the top portion, a tab in said flange substantially embracing at least one of said flutes, the top of said tab terminating substantially with the upper end of said flute and the base of said tab integrally joining with the lower end of the adjacent flute on each side, said tab being stiffened by said flute so that it may be forced outward and downward without substantial bending to thereby twist and break the metal joining it with the flute on at least one side whereby the cap is released.

5. A closure for a vessel comprising a relatively stiff metal cap having a disc portion and an integral depending flange having outwardly and downwardly extending flutes with inwardly extending shoulders between the flutes to engage a vessel when seated, and an upwardly extending tongue in said flange integral at its base with the lower end of the flange and defined by a cut in said flange which extends over the upper end of one of the flutes and downward on each side thereof, said cut terminating at its lower ends in regions below said shoulders.

6. A closure for a vessel comprising a relatively stiff metal cap having a disc portion and an integral depending flange, the latter having downwardly extending flutes with inwardly extending shoulders located between

the flutes to engage a vessel when seated, said flutes and shoulders being interspaced and angularly displaced, upwardly extending tongues cut from the flange each of which is integral at its base with the lower edge of said flange and of such width as to contain at least one of said flutes to stiffen it longitudinally and so disposed that each of its side edges terminates in adjacent flutes.

7. A closure for vessels comprising a metallic cap having a depending flange provided with a plurality of flutes, and an opening tab struck from the metal of said flange substantially embracing one of said flutes so that said flute extends centrally of said tab throughout substantially the entire length of said tab to thereby stiffen it.

In witness whereof I have hereunto set my hand.

WILLIAM A. RAMSAY.