

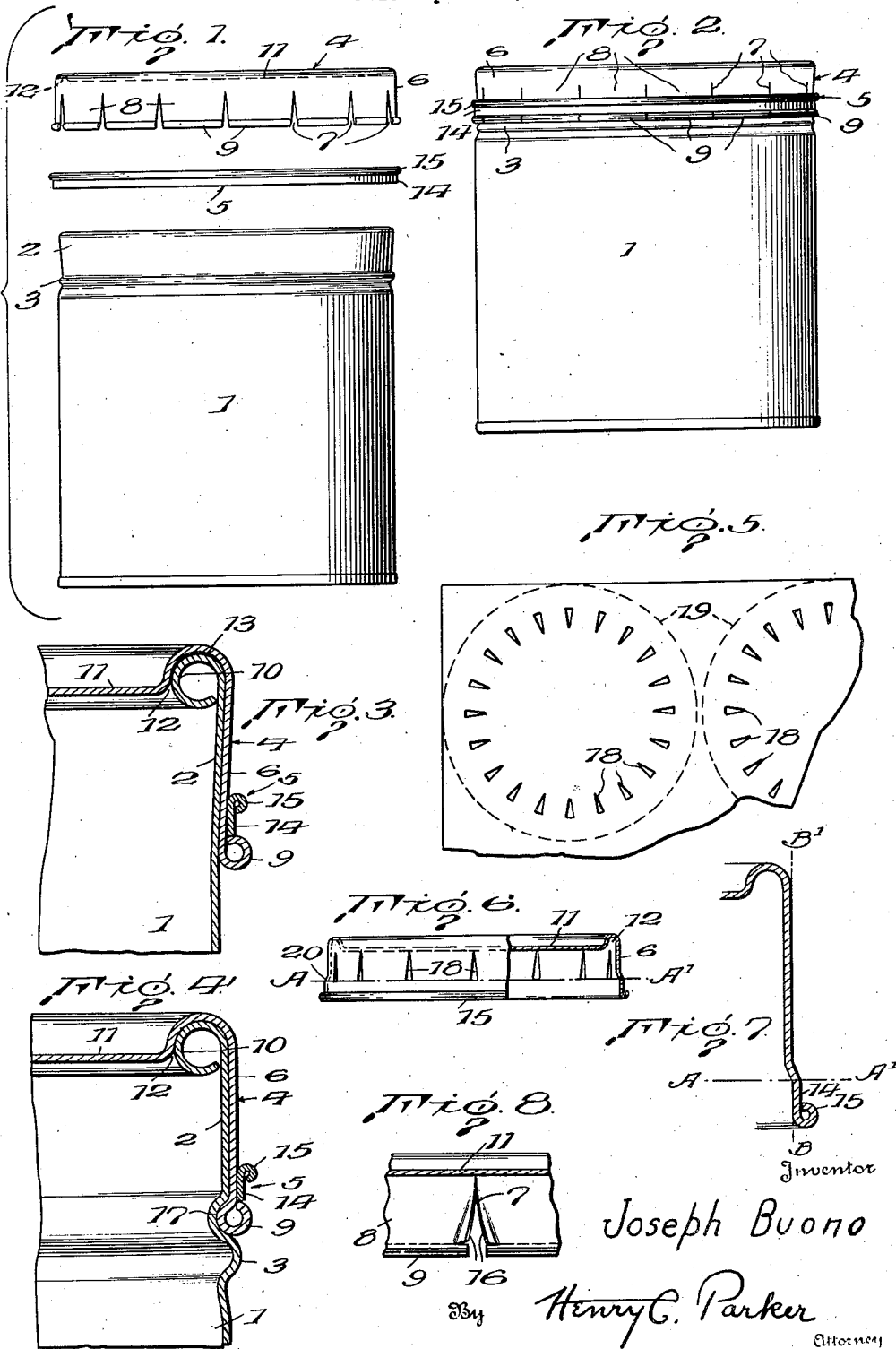
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CLOSURE FOR CONTAINERS

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CLOSURE FOR CONTAINERS

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This invention relates to closures for containers; these closures being particularly adapted for use with flexible walled containers having lips which are slightly flared and usually provided with a curled or rounded edge. My closures comprise a cover part or cap, having a top which may be paneled and a depending peripheral flange or skirt which is advantageously slit to form a plurality of resilient tongues curled at their ends, and a cooperating ring adapted to fit snugly over said depending skirt and to compress said skirt tightly against the neck wall of the container to form a frictional contact therewith. The ring advantageously has a skirt portion and a curled portion, the skirt serving to space said curled portion from the curls of said tongues and the curled portion cooperating with said curls to provide a convenient means for separating said closure from said container; all as more fully hereinafter set forth and as claimed.

While innumerable closures have been suggested in the prior art for use with glass and other substantially non-flexible containers, the number which have been developed for use with metal and other flexible walled containers is much smaller. The recent development of containers made from artificial plastics, all of which possess considerable flexibility, has greatly increased the demand for the latter type of closure. Closures of the so-called friction type, that is, closures which rely substantially upon friction for retention, are particularly adapted for use with flexible walled containers but very few of these friction type closures are available. The requisites of a satisfactory closure include ease of application, ease of removal, the production of a tight seal, which is usually required to be hermetic, and fool-proofness. It is also desirable that the closures be capable of removal without damaging them in order that they may be employed thereafter as temporary closures. By far the most of the closures which have been proposed heretofore have been lacking in one or more of these particulars. To my knowledge none of the friction type closures which have been proposed possess all of these characteristics.

I have developed a closure of the friction type, which is particularly applicable to containers having resilient neck walls and lips, which is readily applied and removed without damage, which is capable of producing a hermetic seal and which is substantially proof against accidental removal. This closure is made in two parts. The cover or cap can be made with a flat top if desired but if the container is provided with a rounded lip I prefer to provide a paneled or dished top having a peripheral recess for reception of said rounded lip. The cap is provided with a depending skirt or flange which is usually slit in such manner as to provide a

plurality of depending resilient tongues which normally embrace the neck of the container closely. The ends of these resilient tongues are curled or rolled over. The cap may be made slightly smaller than the top of the container so that, when applied, it slightly compresses the container lip and neck walls.

The second part of my closure consists of a ring which is adapted to fit over the resilient tongues of the cap compressing them tightly against the neck of the container. The ring is provided with a depending skirt, which is adapted to seat against the curls of the cover and with an upper curled or rolled edge, the skirt portion serving to space the rolled edge of the ring from the curls of the cover. This spacing provides sufficient room for the insertion of a coin or other implement between the rolled edge of the ring and the curls of the cover. And when the ring is thus pried away from its seat or removed from the cover, the depending tongues of the cover are released and the cover becomes easily removable. The closure can then be removed without damage. It forms a highly satisfactory temporary closure either with or without the use of the ring. If both cover and ring are employed, a tight friction closure results whereas, if the ring is discarded, the cover acts as a slip cover. The lip and neck walls of my container can be made straight if desired but it is advantageous to slightly flare or taper this portion of the container in order to provide additional friction tending to prevent accidental removal of the closure. When the neck and/or lip portion of the container is flared, these parts are compressed to some extent upon application of the closure. It is thus evident that my closure is particularly applicable to containers having resilient neck and lip walls since the resiliency of these parts is an important factor in retaining the closure on the container. When the containers are provided with flared necks and lips it is therefore advantageous that these parts be resilient.

My closure is retained in position essentially by means of the high friction between closure and container. The major part of this friction arises from the close contact between the skirt of the cover and the neck wall of the container, this being increased by any flaring of the neck wall. An appreciable amount of friction also occurs between the rounded lip of the container and the cover recess into which it fits. On account of these frictional contacts it is extremely difficult to remove my closure without initially releasing or removing the ring. And the ring is protected from accidental displacement by the curls on the depending tongues of the cover. My closure can be made sufficiently tight even

to retain oil or other penetrating fluids and is capable of holding a vacuum.

While the cover and ring of my closures can be applied separately, I have found it advantageous to apply the closure with the ring in its seated position. The containers are thus closed and sealed in one operation. The lip and neck walls of the container are compressed to some extent during application of the closure and the closure expands slightly. Since these parts are resilient they tend to return to their original shape after being applied. In the modification wherein the cap is provided with a recessed top the recess tends to force the container lip back into its normal position upon seating of the closure.

My invention can be explained with greater accuracy by reference to the accompanying drawing which illustrates several embodiments of my invention. In this showing:

Fig. 1 is an elevation of a container showing the cap and ring parts of the closure removed,

Fig. 2 is a similar view of the same container with closure applied,

Fig. 3 is an enlarged vertical section through the neck and lip of a container showing a closure applied thereto,

Fig. 4 is a similar sectional view of a modification showing my closure applied to a container having a straight neck and lip,

Fig. 5 is a plan view of a sheet of metal showing the results of the first punching operation employed in the making of my closures,

Fig. 6 is an elevation, partly in section, of the closure blanks after being cut out and drawn in the second operation employed in making my closures,

Fig. 7 is an enlarged view in vertical section of the edge of the closure blank showing how the blank is cut to separate the ring from the cap in the next step of making my closures, while

Fig. 8 shows a modified form of slit cap which can be employed in my invention.

In the various figures like elements are represented by like reference numerals. The container to which my closures are applied is shown generally at 1. This is usually provided with a slightly flared neck portion 2 above a bead 3, the circumference of the neck just above the bead being slightly smaller than that at the mouth of the container, as shown in Fig. 1. The bead 3 may be omitted, if desired, as shown in Fig. 3 and the neck portion can be made straight as shown in Fig. 4. This neck portion, when flared, should be made of resilient material such as metal or one of the artificial plastics, such as phenol-formaldehyde or aurea-formaldehyde plastic, for example. If made of metal the lip edge of the container is advantageously curled as shown at 10 in Figs. 3 and 4.

The closure is made in two parts, a cover or cap shown generally at 4 and a ring, shown generally at 5. The cover is provided with a depending skirt 6 in which slits 7 are usually formed leaving depending tongues 8. The latter are rolled or curled at their ends, forming curls 9. If desired the tongues 8 may be partly rolled or bent at their lateral edges, as shown at 16 in Fig. 8. These curls 16 may be turned either inwardly or outwardly. The cover may have a flat top or it may be provided with a depressed panel portion as shown at 11 leaving a peripheral inner recess 12 for reception of the bead 10. The bead 10 should fit the recess 12 closely making a tight joint at this point. If desired this joint

may be provided with a rubber or other packing element 13, as shown in Fig. 3. For example, a thin coating of a rubber cement may be applied to the recess 12 which, after drying, forms a highly satisfactory packing gland capable of producing a hermetic seal. The cover is generally made of the same general contour as the top portion of the container over which it fits. This provides a snug fit between cover and container over their entire area of contact.

The ring 5 is provided with a depending skirt 14 and its upper edge is rolled over at 15. Its inner diameter may be made slightly smaller than the outside diameter of the cap in order that the ring may tend to compress the resilient tongues of the cap. In other embodiments, however, these diameters may be made substantially equal. The skirt 14 of the ring serves to space the rolled edge 15 from the curls 9 and a coin may be inserted in this space in order to pry the ring upwardly or to remove it, thereby releasing the tongues 7 and making the cap easily removable. When the lateral, partially rolled edges 16 of the tongues 8 are turned inwardly, as shown in Fig. 8, they tend to key into the surface of the container thus locking the closure tightly on the container until released by sliding the ring upwardly above the curled edges of the tongues.

When a container with a straight neck wall is employed, as shown in Fig. 4, it is not necessary that the container be made of resilient material. Glass can be used, for example. When the wall of this container is of sufficient thickness its lip may be rounded to fit the recess 12, the curl 10 being omitted. It is also possible to omit the slits in the skirt of the cover which is used in this modification. The closure can be forced on over the container mouth owing to its own elasticity. In this case however it is desirable to provide an additional means for locking the closure in position and insuring against its accidental removal. Such an additional means is shown in Fig. 4. In this modification a recess 17 is provided in the container wall in position to receive the curls 9 of the cap. In this modification the curls 9 are shaped in such manner as to fit into the recess 17, as shown in Fig. 4. When the ring is applied the curls lock into the recess and effectually prevent accidental removal of the closure.

Figs. 5, 6 and 7 illustrate an advantageous method of making my closures from a sheet of metal. In this method the caps and rings are cut out and shaped in one piece. In the first operation a circle of triangular cut-outs 18 is made, as shown in Fig. 5 usually by means of a punching operation. If desired several of these circles of cut-outs may be punched at the same time. The next step is a drawing or stamping operation in which the closure blanks are cut out, along the dotted lines 19 shown in Fig. 5, and simultaneously the closure blanks are drawn into the form shown in Fig. 6. The metal which eventually forms the ring is that just below the cut-outs. It will be noted that, owing to the drawing operation, the cut-outs are reduced in width forming slits. It will be noted also that, during the drawing operation, the lower edge of the blank is rolled over, thereby forming the rolled edge 15 of the ring and that the section of the blank wall below the cut-outs is expanded in size, as shown at 20 in Fig. 6, thus forming the skirt 14 of the ring. In the next step the ring is cut from the cap. This cutting operation can take place along the line B-B' or A-A' or along any angle between these two lines. The cutting

takes place at a point on a line with the lower edges of the cut-outs hence the cutting operation changes the cut-outs into the slits in the skirt of the cap. In the final step of my process the lower edges of the tongues 8 are rolled to form the curls 9 and the closure is completed. Cutting and rolling may be accomplished advantageously during the same stamping, spinning or die forming operation. When made in this manner my closures are accurately dimensioned and exactly reproducible. The process is very simple and inexpensive.

While I have described what I consider to be the best embodiments of my closure and process of making the same it is obvious that several modifications can be made without departing from the scope of the present invention. It is possible, for example, to vary the process outlined above to a considerable extent. Thus in the first step the cut-outs may be formed and the blanks cut along the dotted lines 19 simultaneously. The tops of the blanks may be first stamped flat and later embossed to form the inner recess 12. It is also possible to cut the ring from the cap before the rolled edge 15 is formed. However, the steps which have been outlined previously are believed to represent the best and cheapest method of forming my closures.

The skirt of my cap can be varied in length depending upon the amount of friction desired. The dimensions of the ring may also be varied considerably. The recess 17 for receiving the curls 9 may be provided, as an added element to prevent accidental removal of the closure, even when the neck and lip walls of the container are flared. Other modifications which fall within the scope of the following claims will be immediately evident to those skilled in the art.

What I claim is:

1. In combination, a container having resilient lip and neck walls and a resilient, friction-type closure having a depending peripheral flange with a curled margin adapted to fit tightly over said neck wall and to conform thereto, and a tightly fitting ring adapted to fit over said closure and to compress said depending flange tightly against said neck wall to make a friction-type seal therewith, said ring having a curled portion spaced from the curl of said depending flange, when said ring is in its seated position, a sufficient distance to permit entry of an implement therebetween, thereby permitting removal of said closure without destruction of said ring.

2. The combination of claim 1 wherein the inner diameter of said closure and the outer diameter of said ring are so related that the lip and neck walls of the container are compressed and the closure is expanded slightly upon application of said closure, the said lip and neck walls, the said closure and the said ring being sufficiently resilient to permit application of the closure on the container while the ring is in its seated position on said closure.

3. The combination of claim 1 wherein said depending flange terminates in a plurality of tongues rolled at their ends and wherein said ring is adapted to seat over said tongues.

4. The combination of claim 1 wherein said depending flange terminates in a plurality of tongues rolled at their ends and partially rolled at their edges and said ring is adapted to seat over said tongues.

5. The combination of claim 1 wherein said ring is provided with a depending skirt for separating its rolled edge from the rolled edge of the depending flange of said cover.

6. In combination, a container having slightly flared resilient lip and neck walls and a resilient, friction-type closure having a depending peripheral flange terminating in a plurality of depending tongues with rolled ends adapted to fit tightly over said lip and neck walls and to conform thereto, and a ring adapted to fit over said depending tongues and to compress said tongues tightly against said neck wall, said ring having a rolled edge spaced from the rolled ends of said tongues, when in its seated position, a distance sufficient to permit entry of a coin for displacement of said ring from its seated position thereby releasing the pressure on said tongues and permitting removal of said closure without destruction of said ring.

7. In combination, a container having resilient lip and neck walls with a recess in its neck wall, and a resilient, friction-type closure having a depending peripheral flange terminating in a plurality of depending tongues with rolled ends and adapted to fit tightly over said lip and neck walls, and a ring adapted to fit snugly over said depending tongues and to seat said rolled ends in said recess, said ring being provided with a rolled edge cooperating with the rolled ends of said tongues to provide means for removing said closure from said container without destruction of said ring.

8. The combination of claim 7 wherein said ring is provided with a skirt portion adapted to space its rolled edge from the rolled ends of said tongues.

9. The combination of a container, having a substantially straight neck wall and a rounded lip, with a friction-type closure of resilient material provided with an inner recess adapted to receive said curled lip, said closure comprising a depending skirt portion having a marginal curl, and a ring with a curled portion adapted to seat over said depending skirt thereby compressing said skirt against the neck wall of the container, the curl of said skirt and the curled portion of said ring being spaced sufficiently to provide room for the insertion of an instrument for unseating said ring.

10. The combination of claim 9 wherein said container is of metal and said rounded lip is curled.

11. The combination of claim 1 wherein said depending flange terminates in a plurality of tongues rolled at their ends and partially rolled inwardly at their edges and said ring is adapted to seat over the edges of said tongues thereby keying said edges into the wall of said container.

12. In combination, a container having slightly-flared resilient lip and neck walls and a resilient, friction-type closure having a depending peripheral flange with a curled margin adapted to fit tightly over said neck wall and to conform thereto, and a ring provided with a curl adapted to fit over said depending peripheral flange and to compress said flange tightly against said neck wall; the curl of said peripheral flange and the curl of said ring being spaced apart in the seated position of said ring a sufficient distance to permit entry of a coin for displacement of said ring from its seat thereby permitting removal of said closure without destruction of said ring.

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