DEVICE FOR DEFORMING AND REMOVING CROWN CAPS

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

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The present invention relates to a device for removing and re-forming crown bottle caps, and has for an object to provide a device adapted to re-form a cap prior to its removal from the bottle by depressing the central portion of the cap within the mouth of the bottle, so that the non-compressed central portion of the cork sealing disk of the cap inwardly of the compressed margin of the disk is downwardly and outwardly displaced from its original sealing position. As a result of this operation the cap may be re-engaged upon the bottle simply by pressing it with the palm of the hand, and the sealing disk will effectively seal the bottle, due to the fact that the displaced portion of the disk is sufficiently compressible to be compressed into sealing relation within the mouth of the bottle. Hereetofore attempts have been made to reseal a bottle by re-forming the rim-gripping flange of the cap as it is re-engaged with the bottle. This, however, merely results in again compressing the compressed part of the sealing disk which formed the original seal, and as this part has usually lost its compressibility it cannot be depended upon to effectively seal the bottle, even though mechanical means are employed to firmly re-engage the cap with the bottle.

A further object is to provide a device which will function to remove the cap from the bottle after the re-forming operation. It is particularly proposed to provide a lever having cam means which during the initial movement of the lever exerts a substantially vertical pressure on the center of the bottle cap to press it inwardly, without at the same time disengaging it from the bottle, and which upon a further movement of the lever exerts a turning force upon the cap to disengage it from the bottle.

With the above and other objects in view, embodiments of the invention are shown in the accompanying drawings, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of a bottle cap removing and re-forming device, according to one illustrated exemplary embodiment of the invention.

Fig. 2 is a similar view, showing the device in position to be operated to disengage the cap.

Fig. 3 is a bottom plan view.

Fig. 4 is a sectional view, showing the device engaged with a bottle cap preparatory to re-forming the cap.

Fig. 5 is a similar view, showing the device operated to re-form the cap.

Fig. 6 is a similar view showing the device in position to be operated to disengage the cap.

Fig. 7 is a vertical sectional view showing the re-formed cap reengaged upon the bottle.

Fig. 8 is a side elevation of a modified form of the invention.

Fig. 9 is a plan view thereof.

Fig. 10 is a vertical sectional view, showing the device of Fig. 8 operated to re-form the cap.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, the device for removing and re-forming crown bottle caps, according to the illustrated exemplary embodiment of the invention shown in Figs. 1 to 7 thereof, comprises a substantially cylindrical body 10 provided at its underside with three downwardly extending lug portions 11, two of which are substantially diametrically opposed to each other and have their forward edges 12 in a vertical diametrical plane of the body, and the other of which is substantially midway between two opposed lugs.

These lugs are flush at their outer surfaces with the cylindrical outer surface of the body and their inner surfaces are concentric thereto and to the axis of the body and at their lower ends are provided with inwardly extending lips 13 adapted to engage beneath the edge of the bottle cap, as will presently more fully appear, the upper surfaces 14 of these lips being inclined at a slight angle downwardly and outwardly.

A shoulder 15 of semi-circular form is formed upon the underside of the body 10 at the upper ends of the lugs 11 and extends between the forward edges 12 of the two opposed lugs, the corner edge of this shoulder being concentric to the axis of the body 10 and inwardly of the inner surfaces of the lugs, for the purpose of abutting the upper peripheral corner of the bottle cap A so as to position it centrally within the body, with the lower edge of the corrugated flange or skirt of the cap resting on the upper inclined surfaces 14 of the lips 13 in inwardly spaced relation to the inner walls of the lugs 11, to thus permit slight expansion of the rim as the top portion of the cap is re-formed, as will presently more fully appear. The shoulder 15 also has the function of positioning the device upon the cap with the inner edges of the lips 13 of the lugs 11 outwardly spaced from the top cap retaining bead B of the bottle, so that in removing the cap the lips are prevented from directly engaging the bead of the bottle with the consequent possibility of chipping or breaking the bottle. The outwardly inclined surfaces 14 of the lips 13 tend to cen-
ize the cap as downward pressure is applied thereon and also facilitate the outward flaring of the flange of the cap as pressure is applied to its central portion, as will presently more fully appear.

At a point diametrically opposed to the intermediate lug 11 there is provided upon the underside of the body a boss 16 adapted to assist in positioning the device upon the bottle cap. The height of this boss being somewhat less than the depth of the shoulder 15, so that it will not interfere with the free engagement and disengagement of the device with the bottle cap.

The body 13 is provided with a central cylindrical passage 17 having an annular recess 18 at its upper end, and in which there is engaged for vertical movement a plunger 19 having a flange 20 at its upper end adapted to engage within the recess 18 upon downward movement of the plunger, a helical expansion spring 21 being engaged about the plunger between the flange 20 and the base of the recess 18 to normally press the plunger upwardly. The plunger is provided at its lower end with a rounded surface 22, preferably spherical, adapted to engage the central portion of the bottle cap at a point inwardly removed from the inner wall of the neck of the bottle, for purposes presently to be more fully described.

Upon the upper side of the body 10 there are provided ears 25-29 at each side of the recess 18 and between which a lever 23 is pivotally mounted by means of a cross pin 24. This lever is provided at its lower end with a projected cam surface 35 for engaging the cap portion of the plunger 19 and with flat surfaces 26 and 27 at each side thereof, the flat surface 26 being nearer to the pivot pin 24 than the surface 27 and adapted in the operative position of the device, as shown in Fig. 1, to be engaged under spring pressure by the upper end of the plunger to retain the position of the lever. The surface 27 is adapted in the cap removing position of the lever, as shown in Fig. 6, to engage the upper end of the plunger during removal of the cap as will presently more fully appear.

A projecting anvil surface 28 is provided at the outer end of the flat surface 27 for engaging the upper side of the body for the purpose of retaining the bottle cap, as will presently more fully appear.

The pivot pin 24 is substantially in line with the central vertical axis of the plunger 19 and the cam surface 25 is formed so that it engages substantially centrally with the upper end of the plunger in the fully projected position of the latter, the rise of the cam being such as that as the lever is turned in clockwise direction the plunger is depressed with the line of force exerted between the pivot 24 and the rounded end 22 of the plunger being at all times in substantial vertical line with the vertical axis of the plunger.

It will be noted that in the engaged position of the device with the cap, as shown in Fig. 4, the upper surface of the cap is supported against the lower end of the plunger and the lips 13 of the two opposed lugs 11 engage beneath the edge of the cap at opposed sides along a diametrical line of the cap, so that the cap is thus supported at its lower edge to divide downward movement of the handle, and adjacent the ball portion 36 there is provided an anvil projection 37 adapted at the completion of the depression operation to engage the marginal portion of the cap, as shown in Fig. 10, whereupon further downward movement of the handle prsy the cap
from the bottle. It will be noted that in the fully depressed position of the ball portion 36 its center is substantially in line with the central axis of the bottle cap, and to this end the axis of the pivot pin 35 is laterally offset from the central axis, the arrangement of the pivot pin with respect to the opposed lips 31 being such that as the ball portion 36 engages the top of the cap the opposed lips are drawn upwardly into engagement with the lower edge of the cap. As the ball portion is depressed the component line of force is substantially in a vertical line.

We have illustrated and described preferred and satisfactory embodiments of the invention, but it will be understood that changes may be made therein, within the spirit and scope thereof, as defined in the appended claims.

What is claimed is:

1. A device for re-forming and removing a flange bottle cap, wherein said cap has a normally substantially flat top and has a compressible sealing disk within it, a body, lip means rigidly carried by said body engageable beneath the flange of the cap at diametrically opposite points thereof to support it against a substantially vertical force applied to its top, and forming means movably connected to said body engageable substantially with the center portion of the top of the cap and adapted to have relative movement to depress said center portion.

2. A device for re-forming a flanged bottle cap, wherein said cap has a normally substantially flat top and has a compressible sealing disk within it, a body, lip means rigidly carried by said body engageable beneath the flange of the cap at diametrically opposite points thereof to support it against a substantially vertical force applied to its top, forming means movably connected to said body engageable substantially with the center portion of the top of the cap and adapted to have relative movement to depress said center portion, and abutment means rigidly carried by said body arranged to engage the outer side of the flange of the cap to centralize said cap therein.

3. A device for re-forming and removing a flanged bottle cap, wherein said cap has a normally substantially flat top and has a compressible sealing disk within it, a body, lip means carried by said body engageable beneath the flange of the cap to support it against a substantially vertical force applied to its top, a lever movably connected to said body, forming means adapted to be moved by said lever and engageable substantially with the center portion of the top of the cap adapted to have relative movement to said body to depress said center portion, movement limiting means associated with said lever adapted at the completion of its cap forming movement to exert a turning force on said body and said cap to remove said cap from the bottle.

4. A device for re-forming and removing a flange bottle cap, wherein said cap has a normally substantially flat top and has a compressible sealing disk within it, a body, lip means carried by said body engageable beneath the flange of the cap to support it against a substantially vertical force applied to its top, a lever movably connected to said body, forming means adapted to be moved by said lever and engageable substantially with the center portion of the top of the cap adapted to have relative movement to said body to depress said center portion, said lever adapted at the completion of its cap forming movement to engage said body to exert a turning force thereon to remove the cap from the bottle.

5. A device for re-forming and removing a flanged bottle cap, wherein said cap has a normally substantially flat top and has a compressible sealing disk within it, a body, lip means carried by said body engageable beneath the flange of the cap to support it against a substantially vertical force applied to its top, a lever movably connected to said body, forming means adapted to be moved by said lever and engageable substantially with the center portion of the top of the cap adapted to have relative movement to depress said center portion, said lever adapted at the completion of its cap forming movement to engage the cap adjacent its periphery to exert a turning force thereon to remove it from the bottle.

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