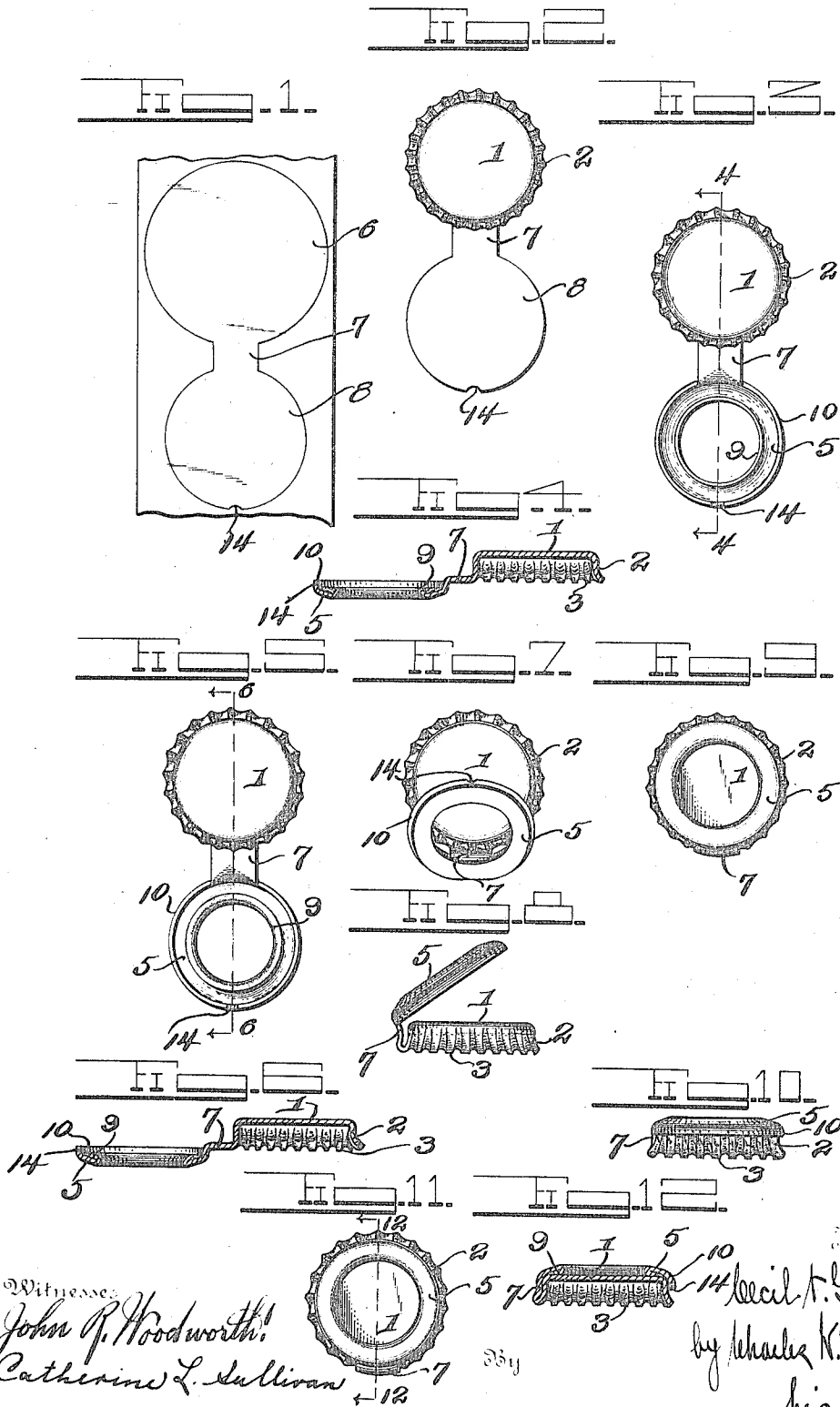


C. V. GAVAZA.
METHOD OF MAKING BOTTLE CAPS.
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Witnesses
John P. Woodworth.
Catherine L. Sullivan

Inventor
Cecil A. Garaga
by Charles K. McDonald
his Attorney

UNITED STATES PATENT OFFICE.

CECIL V. GAVAZA, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GAVAZA BOTTLE CAP COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

METHOD OF MAKING BOTTLE-CAPS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CECIL V. GAVAZA, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Methods of Making Bottle-Caps, of which the following is a specification.

This invention relates to a method of making bottle caps, and more particularly to a method of making bottle caps provided with attached openers.

Bottle caps of the type to which this method relates are usually formed of sheet metal and comprise a top from which extends a circumferential skirt for encircling the mouth of the bottle, the skirt being formed of a series of shoulders or projections for engaging the usual bead or enlargement encircling the outside of the bottle neck slightly below its mouth. In a co-pending application Serial No. 4,865, filed of even date herewith, I have shown, described and claimed a bottle cap of the type referred to which has a connected opening device in the form of an annulus, or ring, which enables the operator to remove the cap from a bottle by inserting his finger in the aperture of the ring and exerting a slight upward pull. This opener is designed to be pressed into close engagement with the top of the cap, is arranged concentric therewith, and is provided with a depending, circumferential, down-turned flange, for embracing the peripheral curved outer edge of the cap, and to be interlocked therewith. The locking engagement between the cap and opener is such as to prevent the opener from being lifted above the cap by other caps in the hopper of the capping machine and thereby interfering with the operation of the selecting and feeding mechanism of such machine, in which the caps are ordinarily fed one by one to the point where they are applied to the bottle by the capping mechanism. The present method consists of a series of operations for efficiently and economically making the cap and attached opener which is covered by my co-pending application above referred to.

The method of making the bottle cap covered by my co-pending application heretofore referred to contemplates first cutting out from a piece of sheet metal the blank

from which the cap and its opener are finally formed: second, suitably forming, by dies or otherwise, a cap comprising a top part and a corrugated or crimped depending skirt; third, cutting out a disk from the center of one of the disks of the blank to form an annulus, and bending or otherwise forming an internal and an external peripheral flange upon said annulus; fourth, bending down the internal flange upon the body of the annulus to produce an edge or bead; fifth, bending the neck connecting the cap and annulus to position the annulus over the cap, at a suitable angle; sixth, forcing the annulus down to the cap, and seventh, completing the operation by pressing the annulus firmly against the top of the cap to cause an interlocking connection between the outer peripheral flange of the annulus and the edge of the cap. These steps may be varied, and if desired, what are described as the two final steps may, in fact, be merged into a single step, the pressing of the annulus down to the cap being continued to completely interlock the annulus and the cap. The final step of interlocking the described parts may be accomplished either by expanding the cap outwardly against the flange of the annulus by a suitable tool applied within the cap, or the outer peripheral flange of the annulus may be made sufficiently smaller in diameter than the external diameter of the cap to require the annulus flange to be expanded as it is forced over the cap, thereby frictionally gripping the latter.

Another important feature of the method is found in the manner of loosening the annulus from the cap by overcoming the locking engagement between these two parts, and whereby the user of the bottle to which the cap is applied may readily lift the annulus, or opener, preparatory to inserting his finger in the annulus and pulling off the cap. This loosening or unlocking operation is performed by the plunger of the capping machine when it forces the cap down upon the bottle. The pressure thus applied to the top of the cap is found to be sufficient to unlock the parts, for the purpose stated.

The invention will best be understood by reference to the accompanying drawings, illustrating a preferred form of cap which is produced by the present method, and also

illustrating the successive steps thereof. In these drawings:

Figure 1 is a plan of the blank from which the cap and opener are formed;

5 Fig. 2 is a plan showing the blank and the cap which has been formed out of one of the disks of the blank;

Fig. 3 is a plan showing the cap formed from the blank, and the annulus with its two flanges formed thereon;

10 Fig. 4 is a sectional elevation on the line 4-4, Fig. 3;

Fig. 5 is a plan illustrating a further step in the method, the interior flange of the annulus being shown completely turned over to form a bead;

Fig. 6 is a sectional elevation on the line 6-6, Fig. 5;

Fig. 7 is a plan showing a further step in the method, the annulus being partly bent over the cap;

Fig. 8 is a side elevation of Fig. 7;

Fig. 9 is a plan illustrating a further step in the method, the opener being bent over 25 upon the cap;

Fig. 10 is a side elevation of the parts in the positions in which they are shown in Fig. 9;

Fig. 11 is a plan of the completed article, the opener being pressed tightly against the cap, and locked thereto and,

Fig. 12 is a sectional elevation on the line 12-12, Fig. 11.

In carrying out the method a blank is 35 first cut out of a sheet of thin metal, such blank comprising a circular disk 6, a neck 7 and a disk 8, as shown in Fig. 1. Following this step the bottle cap is formed by pressing the bottom 1 and the corrugated skirt 2 up in the form illustrated in Fig. 2, 40 either by suitable dies, or by any preferred means. The annulus 5 is then formed by cutting out the center of the disk 8 and pressing up or otherwise forming the internal and external peripheral flanges 9, 10 45 thereon, said flanges standing substantially normal to the plane of the body of the annulus, as illustrated in Figs. 3 and 4. Thereafter the internal flange 9 of the ring or annulus 5 is turned over upon itself to form a rounded edge or bead as shown in Figs. 5 and 6. Following this step, the neck 7 is bent toward the skirt 2, thereby carrying the ring 5 from the position which it formerly occupied to the position shown in Figs. 55 7 and 8, where it stands approximately at an angle of 45 degrees to the plane of the top 1. After this step is performed the annulus is pressed down onto the top 1 of the cap, as shown in Figs. 9 and 10. The next 60 step of the method consists in pressing the annulus firmly against the cap with sufficient pressure to interlock the flange 10 with the curved edge, or periphery, of the cap at 65 the juncture of its top and skirt, thereby

frictionally locking the parts together, as shown in Figs. 11 and 12. If desired the interlocking engagement may be brought about by internally expanding the cap through a suitable tool, so as to force it 70 against the interior of the rim 10; or, the locking engagement may be effected by making the internal diameter of the rim 10 sufficiently less than the external diameter of the cap to cause frictional engagement between these parts when pressure is applied 75 to the annulus to force it down upon the cap.

When the cap is being applied to a bottle by the capping mechanism of the commercial machine the changes made in the shape 80 and dimensions of the cap will operate to unlock the opener from the cap so that, by the application of a finger to the notch 14, which is formed in the front edge of the opener, the latter may be easily lifted from 85 the cap, and the finger inserted in the ring or annulus to thereby pull the cap and thus remove it from the bottle. In this connection the notch 14 is arranged diametrically opposite the neck 7, which latter acts as a 90 hinge for the opener while it is being raised from the cap. By so locating the notch the front of the opener may readily be determined by the user.

It is also within the contemplation of my 95 invention, to perform, as a single step, what I have heretofore described as two steps in the final operation of producing this article. That is, sufficient pressure may be applied to the annulus 5 to bend it down upon the cap, from the position shown in Fig. 8 to 100 that shown in Fig. 10, and, by continuing the pressure, to completely force the annulus 10 over the outside periphery of the cap and lock these parts firmly together. 105

It is also within the broad contemplation of my invention to alter the order of steps described, within reasonable limits, or to omit some of the steps above referred to as separate steps of the method and combine 110 them with other steps, as suggested with reference to the two final steps of producing this article.

Many valuable features of this invention may be also advantageously employed in 115 connection with articles of this type which, while involving the principle of the article described, may differ from such article as to its details of construction.

I do not claim the article described and 120 shown herein as the same is claimed in my co-pending application above designated.

What I claim is:—

1. That improvement in the art of making bottle caps which consists in forming a blank 125 having two disks, forming one of the disks into a cap with a depending skirt, removing the center from the other disk to produce an annulus and forming two concentric flanges thereon, bending the inner of said 130

flanges over to form a bead, and pressing the annulus upon the cap and causing a locking engagement between the outer flange of the annulus and said cap, substantially as described.

2. That improvement in the art of making bottle caps which consists in forming a blank with two disks connected by a neck, forming one of said disks into a cap having a depending skirt, removing the center from the other of said disks to produce an annulus and forming two concentric flanges thereon, bending over the inner flange to form a bead, bending said neck to locate said annulus over the cap, pressing said annulus into contact with the cap, and expanding the cap to lock the annulus and cap together, substantially as described.

3. That improvement in the art of making bottle caps which consists in forming a blank with two disks connected by a neck, forming one of said disks into a cap having a depending skirt, forming the other disk into an annulus with two concentric flanges thereon, bending the inner flange to produce a bead, bending the neck to locate the annulus over the cap, pressing the annulus into contact with the cap, and locking the annulus to the cap, substantially as described.

4. That improvement in the art of making bottle caps which consists in forming a blank consisting of two disks connected by a neck, pressing one of said disks into a cap with a depending skirt, forming the other disk into an annulus with two concentric flanges thereon, bending the inner flange over to produce a bead, bending the neck to locate the annulus over the cap, pressing the annulus into engagement with the cap, and expanding the cap against the outer flange of the annulus to lock said parts together, substantially as described.

5. That improvement in the art of making bottle caps which consists in forming a blank with two disks and a connecting neck, pressing one of said disks into a cap having a depending skirt, forming the other disk into an annulus with two concentric flanges thereon, forming the inner of said flanges into a bead, bending the neck to locate the annulus above and at an angle to the cap, pressing the annulus against the top of said cap, and expanding the cap against the outer flange of the annulus, substantially as described.

6. That improvement in the art of making and applying bottle caps which consists in forming a blank with two disks connected by a neck, forming one of said disks into a cap with a depending skirt, forming the other disk as an opener having an external peripheral flange, pressing the opener against the cap to lock said parts together, and forcing the cap over the mouth of a bottle to seal the

bottle and unlock said parts, substantially as described.

7. The method which comprises forming from a blank a cap with a depending skirt and a connected opener having an external peripheral flange, pressing the opener against the top of the cap and causing said flange to lock the opener to the cap, and pressing the cap against the mouth of a bottle to seal the bottle and to unlock the opener from the cap.

8. The method which comprises forming a cap with a depending skirt and forming an annulus which is connected with the cap by a neck and has an external peripheral flange, pressing the annulus against the cap and causing said flange to engage the cap and lock the annulus to the cap, and thereafter forcing the cap over the mouth of a bottle, thereby sealing the bottle and unlocking the annulus from the cap.

9. The method which comprises forming a cap with a depending skirt, forming an annulus with an external peripheral flange, pressing said parts together to lock the annulus to the cap, and forcing the cap over the mouth of a bottle to simultaneously seal the bottle and unlock the annulus from the cap.

10. That improvement in the art of making bottle caps, which consists in forming a cap with an integral opener, and locking the opener to the cap, substantially as described.

11. That improvement in the art of making bottle caps which consists in forming a cap with an attached opener, locking the parts together, and pressing the cap over the mouth of a bottle and simultaneously therewith unlocking said parts, substantially as described.

12. That improvement in the art of making bottle caps which consists in forming a cap and an opener connected by a neck, and locking said parts together, substantially as described.

13. That improvement in the art of making bottle caps which consists in forming a cap and opener connected by a neck, forcing the parts together to cause them to interlock, and simultaneously applying the cap to a bottle and unlocking said parts, substantially as described.

14. That improvement in the art of making bottle caps which consists in forming a cap with a depending skirt and with an opener on the top of the cap, and locking said opener frictionally to said cap in such a manner that it will be unlocked by the changes produced in the cap by the attachment of the cap to a bottle.

CECIL V. GAVAZA.

Witnesses:

CATHERINE L. SULLIVAN,
WARREN G. OGDEN.