

1,054,308.

Fig.1.

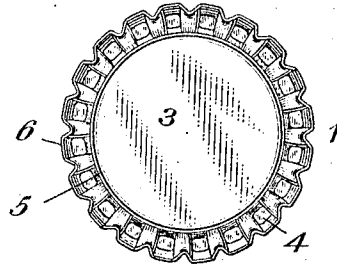


Fig.2.

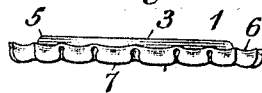


Fig. 3.

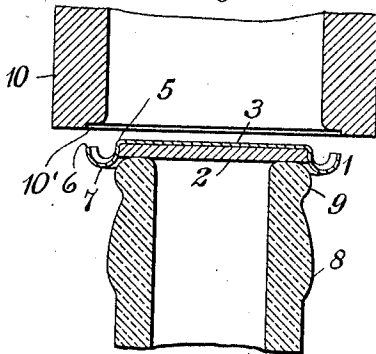


Fig.5.

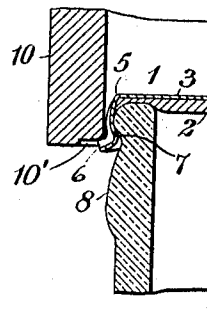


Fig. 4.

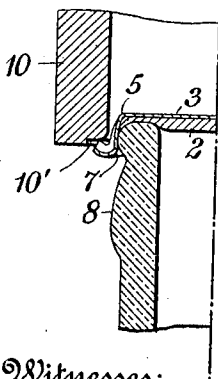
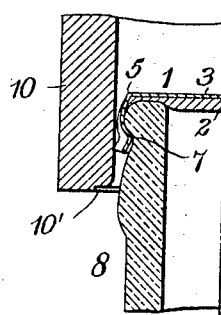


Fig.6.



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UNITED STATES PATENT OFFICE.

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METHOD OF APPLYING CLOSURES TO RECEPTACLES.

1,054,308.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed October 25, 1911. Serial No. 656,663.

To all whom it may concern:

Be it known that I, TOIMI A. NISSINEN, a legal resident of Helsingfors, Finland, a subject of the Czar of Russia, and at present residing at the city of New York, in the borough of Bronx and State of New York, have invented certain new and useful Improvements in Methods of Applying Closures to Receptacles, of which the following is a full, clear, and exact description.

This invention relates to a process of applying closures to receptacles, and more particularly to a method of capping bottles. It is to be understood however that by the term "bottle cap" as herein used, I contemplate not only stoppers or caps for bottles but for all similar receptacles, such as jars, etc.

As cork and other resilient materials are relatively expensive and as such materials are becoming more and more in demand, it is extremely desirable that such a material, if used at all in a bottle cap, be reduced to a minimum quantity, or indeed that resilient material be dispensed with entirely. If it were possible to place a cap upon a bottle and to deform the material thereof into firm engagement with the lip of the bottle in such manner that all portions of the metal cap would remain exactly where they were bent to by the throat or applying device, it is evident that a great saving in cork could be effected. In fact it would become possible, in many cases, to successfully use treated pulp or paper, or the like, substantially non-resilient in character, and merely sufficiently yielding and flexible to conform closely to the shape of the head of the bottle, the disk of such material being clamped firmly between the head of the bottle and the metallic cap.

I have devised a novel method of applying metal caps to bottles in such manner as to accomplish these desirable results.

Realizing that it is substantially impossible to press resilient material against a non-flat and unyielding surface, such as that presented by a bottle head, and have such material there remain unless held by something under stress, I have discovered that it is possible to so form the metallic cap and to so handle the material thereof when applying the same to a bottle, that portions of the stopper itself can be made to successfully oppose this deleterious loosening action of other parts; all parts of the stopper

remaining in exactly the positions with respect to each other and to the bottle head in which they are placed by the applying means.

In the accompanying drawings, which form a part hereof, I have exemplified a stopper adapted for use in connection with my novel method, and have illustrated the manner in which such stopper may be applied in accordance with said method. In said drawings, like reference characters designate like parts throughout the several views.

Figure 1 is a plan or top view of a bottle stopper embodying the principles of this invention; the stopper being undeformed, not having as yet been applied to a bottle. Fig. 2 is a side elevation of the said stopper. Fig. 3 is a vertical section through a bottle head, showing the cap about to be applied thereto. Fig. 4 is a fragment of a similar section, showing the stopper partly applied. Fig. 5 is a similar fragmentary section, showing the stopper still further, but still not completely, applied. Fig. 6 is a similar fragmentary section showing the bottle head just after the cap has been secured in position thereon, the cap being within the capping tube.

The stopper shown in Figs. 1 and 2 comprises a metal cap 1 and a shive 2, of cork, paraffined blotting paper, or other suitable material. Such material, in many instances, need not be resilient, for reasons hereinbefore stated. Cork, however, when used, need only be .05, .06 or .07 inches thick, if of reasonable good quality. The metal cap also may be made lighter than has been customary heretofore in most cases. It consists of a preferably flat, table-like body 3, around which extends a preferably channeled or guttered flange 4 of somewhat peculiar configuration. To form this flange the sheet metal of which the cap is formed is bent substantially at right angles to the table-like surface at 5, and is then bent around between this line and the edge, back through substantially 180°; the edge 6 being preferably brought back almost into the plane of the body 3, and the channel hence opening upwardly. The metal forming this channel is corrugated or swaged out at spaced intervals to form a series of projections 7 upon the under side of the gutter, which are adapted to engage the under side of the lip

of a bottle, when applied thereto. These corrugations are not absolutely essential, but it is highly desirable that they be provided, since without them it has frequently
 5 been found difficult to remove such a cap from a bottle to which it has been applied. It is advisable also to dispose these corrugations radially and to extend them well around into the inner vertical wall of the
 10 channel. The shive 2 is disposed within the recess formed by the downwardly directed inner wall of the channel. In general it should be particularly observed that the guttered flange 4 is curled up with a substantially continuous curvature through it
 15 and a considerable portion of said flange. The curvature in said flange in other words is not simply a curved angle but is a broad arch or bend which will unroll instead of merely unbending at a given crease line
 20 when the cap is applied to the bottle in the manner hereafter described and the absence of a noticeable or material annular crease in this flange is I believe not only desirable but
 25 practically essential in view of the mode of operation of the cap during the application of the same to the bottle.

Metal caps such as those herein shown are inexpensive to manufacture as the amount
 30 of metal therein may be made even less than in bottle caps in common use, the gage of the metal being lighter. They may be made in a single operation by means of a suitable press; and the disk or shive of cork or other
 35 material preferably placed therein may be relatively very thin. In spite of the thinness of the cork, for example, used, and despite the relatively light gage of the metal in the cap, pressures considerably above
 40 those encountered in practice may be held in bottles to which these stoppers have been applied, and with but a very small percentage of "leakers."

The application of the present stopper depends upon a novel principle, the metal being
 45 handled when applying the stopper to a bottle in a somewhat analogous fashion to that in which a new glove is usually drawn over the hand; the material being turned, in
 50 part at least, inside out and then unrolled down over the part to be engaged. Thus when the glove is to be drawn over the hand, customarily the portion which is to engage the back and palm of the hand is reversed.
 55 The fingers of the glove are pushed down over the fingers of the hand and thereafter the body or main portion of the glove which had been reversed in manner aforesaid is unrolled down toward the wrist, the unrolling
 60 of this body portion again reversing it back to its original form. Correspondingly the cap in the present instance has an upturned or reversed flange, and the center portion of the cap, like a finger of a glove,
 65 is pushed down over the lip of a bottle as far

as its upturned flange will permit. Thereafter the flange is unrolled down around the bottle lip, neatly engaging the same. To properly unroll said flange it is evident that
 70 no sharp circular edge should be present in the curvature of the flange, since such sharp bend would oppose a smooth unrolling action.

Referring to Fig. 3, a bottle head 8, provided with the usual lip 9 is shown in section,
 75 and upon this head is a stopper of the type in question, also in section.

Any suitable means may be employed to unroll the edge of the cap but it is preferable that this operation be conducted substantially evenly and simultaneously on all
 80 sides of the stopper. To this end a tube or ring 10, such as is shown in the drawings may be used. This tube should have an interior diameter somewhat greater than the
 85 diameter of the table-like top 3 of the stopper in order to freely receive the latter. It should also be provided with a stopper receiving recess 10' in its lower end. The
 90 lower end of the tube is preferably brought down into contact with the up-turned edge of the stopper, pressure is applied thereupon, and the edge 6 is thereby driven down. Edge 6 cannot move outwardly during this
 95 operation owing to its engagement with the annular wall of recess 10'.

Fig. 4 shows the stopper partly applied, the edge 6 being spaced a materially greater
 100 distance below the bending line 5, than it was in the stopper before the latter had been subjected to such distortion. The
 105 downward movement of the edge 6 forces the inner and initially substantially vertical inner wall of the channel or gutter to close in radially onto and around the lip of the
 110 bottle, portions of said wall, i. e., the projections thereon, moving toward their positions of engagement with the under side of the bottle lip 9. As the flange continues to
 115 unroll, portions of what was the inner wall and bottom of the channel initially provided therein are driven firmly against the bottle lip below the greatest diameter thereof, and the extreme edge 6 is finally wiped
 120 downwardly and inwardly by the tube or throat until it slips into the interior of the latter, the cap being then firmly applied. Downward pressure upon the edge 6 hence
 125 effects, virtually, a progressive displacement of the channel downwardly through the flange, the metal in the flange having a wave like movement imparted thereto as the channel advances toward said edge. The
 130 closure thus effected is adapted to very effectively seal bottles against high pressures, the rolling, or rather unrolling, down of the flange enabling it to grip the head of the bottle very snugly and firmly, and were it not for the projections or corrugations upon this flange, considerable force would be re-

quired to remove it from the bottle unless the metal in the cap were of very light gage. The action of the flange when being uncurled down around and in toward the lip of the bottle by the downwardly directed pressure upon the upstanding edge of said flange is peculiarly adapted to set the sheet metal closely up against the unyielding glass and to cause it to remain thereagainst. If any backward movement due to the resiliency of the metal occurs at all it is only at the extreme edge of the flange which is not necessarily in engagement with the bottle. The fact too that no inwardly directed thrust or pressure is applied to the edge or bending line 5 of the cap while it is being secured to the bottle obviates the tendency which such a thrust would exert to bow up the flat table-like top, or body of the cap. This latter action is observable in certain stoppers of an analogous type to that herein presented, and it exercises a deleterious effect upon the closure or seal, the bowed top tending to resume its flat form when the pressure of the cap applying throat is removed, and thereby tending to swing the depending flange outwardly on all sides a short distance, developing a loosening action such as has previously been discussed; such action necessitating the provision of relatively thick shives of cork in bottle caps of this character. The present stopper when applied in the manner herein described exhibits no such tendency since the cap applying tube or throat need not, and preferably does not, touch the edge 5 of the top, but substantially at all times merely engages portions of the extreme edge 6 of the stopper. The flat top hence remains flat and is practically unchanged when the cap is applied to a bottle. Further, it is drawn down firmly and forcibly toward the bottle head during the unrolling operation, and the layer of cork or other material within the cap is thereby clamped against the bottle so effectively as to make a very tight closure.

The action of unrolling a metal stopper into engagement with the head of a bottle is, I believe, very broadly new and I hence desire to protect my invention as broadly as possible. I am aware also of a variety of modifications of the stopper herein exemplified which are adapted to operate substantially in accordance with the principles of the invention and therefore desire that the various aspects of my said invention shall be regarded as being limited only by the scope of the claims appended hereto.

If the process herein set forth be effectuated by some special mechanism it may be pointed out as an added advantage thereof

that it does not require any compensating device in such mechanism, since the unrolling action of the flange adapts it to neatly and firmly fit bottle heads having lips of various diameters and depths, within of course reasonable limits, while when the cap has been completely applied it slips readily into the capping tube, so that the question of different heights of bottles also becomes an immaterial one, a bottle merely extending a greater or less distance up into the tube when the cap has been applied thereto.

No matter how applied, it is evident that the tube, throat or other device used to unroll the stopper flange will, if made properly, exert no dislodging or disturbing effect upon the stopper after the latter has been applied to the bottle; since the tube, for example, if such device be employed to apply the unrolling pressure to the flange, may be withdrawn without disturbing the stopper.

Having described my invention, I claim:—

1. The method of sealing a bottle which consists in covering the mouth of a bottle with a metal cap provided with an arcuately guttered flange, the gutter-forming curvature of which is substantially continuous throughout a considerable portion of said flange, the annular edge of the flange being upturned, then applying downward pressure to a portion of the flange, thereby unrolling said flange and reversing the curvature thereof to cause portions of the same to embrace the mouth of the bottle.

2. The method of applying to the bottle a metal cap having a curled-up flange, the curl of which is of substantially continuous curvature throughout a considerable portion of said flange, which consists in placing a cap upon the bottle, and forcing said flange downwardly by the pressure upon the edge proper thereof; thereby unrolling said flange and forcing portions thereof inwardly into locking engagement with the neck of the bottle.

3. The method of applying to a bottle a metal cap having a curled-up flange, the curl of which is of substantially continuous curvature throughout a considerable portion of said flange, which comprises unrolling said flange downwardly in such a manner as to force the curl therein generally toward the edge of said flange with a wave-like motion.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

TOIMI A. NISSINEN.

Witnesses:

CHAS. P. HIDDEN,

WM. M. STOCKBRIDGE.