

# UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND.

## BOTTLE-SEALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 468,258, dated February 2, 1892.

Application filed June 16, 1890. Serial No. 355,603. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM PAINTER, of the city of Baltimore, in the State of Maryland, have invented certain new and useful  
5 Improvements in Bottle-Sealing Devices; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of my  
10 invention.

For use with any suitable sealing medium, whether in the form of a plug or a disk, or a combined disk and plug, applied at or in the mouth of a bottle, I have devised metallic  
15 sealing-caps embodying certain novel characteristics which render them highly effective and so inexpensive as to warrant throwing them away after a single use thereof, even when forcible displacement, as in opening  
20 bottles, has resulted in no material injury to the caps.

Metallic sealing-caps have heretofore been devised and largely used, and these have involved great variety in the character of metal  
25 employed and in the form and construction of their pendent flanges; but my sealing-cap in its best form differs from all others of which I have knowledge in that it has a pendent flange which is unbroken or continuous, but  
30 is nevertheless resilient both radially and circumferentially, and it is therefore contractible and expansible and capable of adapting itself and of being adapted to the largest as well as the smallest head in a set of bottles,  
35 it being well known that bottles of the same size are unavoidably more or less varied in the external dimensions of their heads.

Prior sealing-caps or "capsules" composed of thin soft metal have had continuous or un-  
40 broken pendent flanges; but they are not resilient, although capable of some slight distension, as when forced upon a bottle-head. Other prior sealing-caps have been composed of harder metals, and they have had continuous or unbroken flanges, which, unlike the  
45 capsules, are practically incapable of being distended upon a bottle-head; but, like the capsules, they are capable of distension on a diametric line, but are not resilient or springy  
50 circumferentially, and hence when distended diametrically on one line the flange correspondingly contracts on a line at right angles

to the line of distension, whereas the continuous or unbroken flange of my cap in its best form may be extended diametrically without  
55 this corresponding contraction because of its circumferential resiliency and its contractile and expansible capacities, all of which are secured by me, because in the best form of my cap the flange is corrugated substantially  
60 throughout all, or at least a considerable portion, of its depth in lines substantially parallel with the axial line of the cap.

For use with liquids bottled under maximum pressure my sealing-caps in their best  
65 form should be employed, because of the specially-effective locking capacity due to the circumferential continuity of the metal in the flange; but if the flange be slotted at one or more points the cap may be relied upon in  
70 bottling liquids under low pressures. The aforesaid corrugations not only serve an important purpose in connection with securing adaptability of caps of some one precise size to bottle-heads, varied as to their external di-  
75 ameter as well as to the precise location of their locking or engaging shoulders, but still further in that after having been forcibly applied for service on a bottle the flange retains its corrugations on the line of locking contact  
80 with the bottle-head, thus securing a firm reliable union of the cap and head without danger of fracturing the bottle while the metal is being forced into contact therewith.  
85 This corrugation on said line of locking contact need not, however, be always dependent upon the initial development of corrugations in the flange, inasmuch as valuable results will accrue if the flange be not corrugated  
90 until after the cap has been forced into proper compressing relations with a sealing-disk and while forcing the metal into locking contact with an annular engaging shoulder on a bottle-head. Regardless of how the corrugations  
95 may have been developed the metal at the locking line is in more or less yielding contact with the bottle-head and at intervals of space, and after a cap has been displaced it can readily be reapplied and caused to promptly re-engage with the annular shoulder on the bottle-head and perform effective  
100 temporary service. Soft-metal capsules have been heretofore corrugated, but merely for ornamentation, and their corrugations have

been located only at the upper portions of the capsules, the lower portions thereof being plain and flaring and sometimes slitted or cut away for enabling them to be smoothly laid upon the neck of a bottle below its head. Caps of harder metal—such as tinned sheet-iron—have also had a flaring pendent flange of continuous metal, and the lower edge of the flange has been ornamentally corrugated, the corrugations been so short and of such a character as to not afford the circumferential resiliency which is a characteristic feature of my caps in their best form, and, moreover, said prior ornamentally - corrugated hard-metal caps were not employed in combination with bottle-heads having an annular engaging shoulder, nor were they adapted to be bent into locking contact with such a shoulder, as with caps embodying all or any portion of my present invention.

The corrugations in the flange of the best form of my sealing-caps not only secure the peculiar expansible and contractible capacities referred to, but a portion of the metal at each interior corrugation is readily made to conform to an annular engaging shoulder on the head of a bottle and the radial and longitudinal stiffness of the corrugations enables them to bear such pressure applied to the outer surface of the flange as is necessary for causing the metal in a portion of each inner corrugation to be bent into close locking relations with said shoulder.

My sealing-caps properly applied to a bottle with suitable sealing-disks, or with corks, are capable of successfully resisting gaseous pressure of upward of one hundred and fifty pounds to the square inch, and mine are the first sealing-caps (not involving the screw-threaded principle) which require special provisions and means for enabling them to be promptly and easily displaced from a bottle. In other words, instead of tearing off the caps in fragments, as is usual with those composed of soft metal, or of separately detaching one or more spring-fingers, as with certain forms of prior hard-metal cork-holders having pendent arms or fingers, my sealing-caps are so strong, so constructed, and so firmly applied to bottles that some form of lever or a cork-screw must be employed for detaching them, and my caps are also the first which when applied to a bottle and locked thereto, as described, have the edge of the flange so projected as to afford a reliable shoulder, with which a detaching-lever may be engaged, for enabling a cap to be promptly removed as a result of a prying or wrenching action.

For obtaining the best results I employ in my caps such sheet metal as tinned-iron plate and preferably that soft-coated plate known as "roofers' tin."

As hereinbefore indicated, I am aware that cork-holders of hard-metal plate have heretofore been provided with a flange cut or slotted to afford a series of pendent arms or fingers, each of which at its lower end was bent

inwardly for causing it to engage with an annular shoulder on a bottle-head. Some of said prior devices have had two or three pendent spring-arms, which were corrugated at their inwardly-bent extreme lower ends to afford strong fingers at their points of contact with an engaging shoulder on the bottle, said arms and fingers operating with said shoulder somewhat after the manner of latches in engaging with their keepers. Said prior spring-arm devices could not, however, be practically employed with sealing-disks, because a sealing-disk, being necessarily quite compressible, would under pressure be protruded at its periphery at all points between said arms and thereby defeat a uniform sealing effect with the lip of a bottle, whereas my caps are true caps and they peripherally encircle the disk and so confine it against lateral expansion that it is made under pressure to not only evenly conform to the annular edge or lip of the bottle, but also to follow downwardly and to lie in close packing contact with the outer surface of the bottle below its mouth. Such of my caps as have a slotted flange have in substance a series of pendent arms; but they differ from all prior cap-arms in that each arm is so far corrugated that each inner corrugation is adapted to and is forcibly conformed to the contour of the engaging shoulder on a bottle, and therefore such variations as are liable to and do occur in the form and location of said shoulder do not and cannot cause any variations in the relation of the top of the cap to the upper surface of a sealing-disk, which is forced upon and held in close contact with the mouth of the bottle during the bending of the flange of the cap into locking contact with the engaging shoulder on the bottle.

In my application for Letters Patent filed November 5, 1889, Serial No. 329,314, I have disclosed and claimed a novel sealing-disk composed of granulated cork or suitable woody matter and the gum of linseed-oil, and that kind of sealing medium is preferred by me to any other. I find, however, that in bottling beer, which is pasteurized, as usual, in the bottle after sealing, these disks require a slight coating or facing, which, when subjected to heat, will not become displaced, as by melting, or adhere to the bottle-lip, as with ordinary varnishes, and which will be free from taste and odor, and one which, in fact, will render the disk even more effective for sealing, because more impervious. After various experiments I have secured such a facing by coating the inner surface of the disk with a special solution of gutta-percha, as will be hereinafter more fully described.

After describing several forms of my sealing-caps and the methods of their application and use, as illustrated in the accompanying drawings, the features deemed novel will be specified in the several clauses of claims hereto annexed.

Referring to the drawings, Figures 1, 2, and

3 illustrate one of my sealing-caps in its best form, the same being shown, respectively, in top view, side view, and diametrical section. Fig. 4, in top and edge view, illustrates a preferred form of sealing-disk. Fig. 5, in side view, illustrates a bottle-head in its best form for use with my sealing-caps. Figs. 6 and 7, in side view and section, illustrate one of said caps applied to a bottle-head. Fig. 8, in side view, illustrates one of my sealing-caps having a flange in which the corrugations are symmetrically developed, as in the cap of Fig. 1; but said corrugations do not extend throughout the depth of the flange. Fig. 9, in side view, illustrates the cap, Fig. 8, as applied to a bottle-head. Fig. 10 illustrates in side view one of my sealing-caps having a flaring flange which at its edge is more or less irregularly crimped or corrugated. Fig. 11 illustrates the cap, Fig. 10, applied to a bottle-head. Fig. 12 illustrates in side view a sealing-cap having a plain flange, partly nearly vertical and partly flaring, and which in itself embodies my invention only in so far as it is adapted to be bent into locking contact with the engaging shoulder of a bottle-head, as illustrated in Fig. 13, said flange, when thus applied being corrugated in the line of locking contact with the bottle. Fig. 14 illustrates in side view still another form of flanged cap which in itself embodies my invention only in so far as it has a flange which is adapted to be bent into locking contact with a bottle-head in a manner as illustrated in Fig. 15, wherein the metal in the flange is shown to have been developed into well-defined corrugations in the line of locking contact with a bottle-head, as is clearly illustrated in the sectional view, Fig. 16.

The sealing-cap A (shown in Figs. 1, 2, and 3) in itself and when applied to bottles embodies the several features of my invention in their best form. Said cap has a flange  $a$ , which is symmetrically corrugated substantially throughout its depth and parallel with the axis of the cap, and for the purposes of this specification I will term the outer ribs  $a'$  the "outer corrugations" and the inner ribs  $a''$  the "inner corrugations." These caps are struck up from disks of sheet metal by means of appropriate dies, the corrugations enabling the development of the flange without rupturing or unduly straining the metal, and hence low-priced grades of metal can be employed. The flanges may be varied in depth or width; but I prefer that it be as narrow as will be consistent with a proper engagement with a bottle-head having thereon an annular shoulder located as near to the lip of the bottle as will involve enough bulk of glass to secure the requisite strength.

The head B of a bottle, Fig. 5, adapted to use with my caps may be varied in form; but it must have at a proper distance below the top of the bottle or lip  $b$  an annular engaging shoulder  $b'$ . The location of this annular

shoulder with reference to the top or lip of the bottle is a matter of material consequence when considered with reference to the top surface of the sealing plug, disk, or cork employed at or in the mouth of the bottle and the depth or width of the flange of the cap. In other words, either the shoulder should be so located or the flange be of such width or depth that when the top of the cap has been properly forced upon the sealing-disk and held there the flange will so overlie said shoulder that the latter may be properly embraced by the inner corrugations  $a''$ . In its best form the bottle-head has also an annular inclined surface  $b^2$  between the shoulder and lip. The edge of said shoulder, although angular, is slightly rounded for strengthening purposes, as by avoidance of fracture during a forcible contact therewith of portions of the flange; but said shoulder is well defined, the head being quite deeply recessed below it. Below the recess and shoulder the head has an outwardly-rounded surface, the upper portion  $b^3$  of which is or may be relied upon as a fulcrum for a cap-detaching device.

The bottle being as thus described, a cap with a disk C therein is placed upon the bottle-head and pressure applied to the cap-top  $a^3$ , causing the disk to be well compressed and the thin-edged lip  $b$  of the bottle to be well embedded therein, and then the periphery of the flange is so compressed that each of the inner corrugations will be bent into close locking contact with the shoulder, those portions  $a'$  of the metal in each inner corrugation which underlie the shoulder serving to firmly maintain the cap in precisely the position to which it has been forced during the compression of the disk. The disks are initially snugly fitted to the interior of the caps, and a disk being encircled peripherally by the flange of the cap cannot expand under pressure, and hence its contact with the lip of the bottle is not only uniform, but near its periphery it is forced downwardly and makes good packing contact with the outer surface of the bottle below the mouth, as is clearly illustrated in Fig. 7: The requisite inward pressure for securing locking contact may be variously applied, the outer corrugations having sufficient radial strength to bear without much distortion a force sufficient to cause the inner corrugations to in part effectually embrace the locking-shoulder, and also to freely occupy the recess below and to be in firm contact with the lower surface of the shoulder. It will be seen that after a cap has been thus applied to a bottle-head the lower edge  $c$  of the flange is so far projected from the adjacent surface of the bottle that it is readily accessible for engagement by a bottle-opener for prying or wrenching the cap from the bottle, the metal being hard and strong enough to resist tearing or crippling during the operation. As, for instance, as illustrated in dotted lines in Fig. 6, a hook-shaped lever may be engaged with the opposite edge  $c$

and fulcrumed on top of the cap, so that a downward movement of the outer end of the lever will promptly and easily open the bottle. The said projecting edge *c* is also available for the same purpose for engagement by a forked opener or lever, which will freely receive the head of the bottle between its prongs, and in that case the rounded surface *b*<sup>3</sup> of the bottle-head serves as a fulcrum for the lever-prongs in displacing a cap.

Bottle-openers devised by me of the character indicated and adapted to the removal of sealing-caps by engaging with their projecting edges will be made the subject of one or more separate applications for Letters Patent. This projecting edge on a metallic sealing-cap employed in combination with and locked to a bottle is believed to be novel and is of material value when considered in connection with opening a bottle; but such an edge is not wholly dependent upon these corrugations, although the lower end of each outer corrugation presents a properly-projected edge for reliable engagement with an opener. It will be seen that the metal in the flange on and adjacent to the line of locking contact is corrugated, and hence between each two points of close contact there is an interval or space at which there is no close contact of the metal with the glass, and hence there is more or less freedom for the metal at the actual points of contact to spread laterally in avoidance of such compressing contact as would be liable to break or split the glass at and adjacent to the engaging shoulder *b'*; but these advantages are not wholly dependent upon initially providing the flange with corrugations throughout its depth, nor upon initially providing symmetrical and uniform corrugations, nor even upon initially providing any corrugation whatever, so long as the metal cap has a flange which is adapted to be bent into locking contact with an engaging shoulder on a bottle, and which, when in combination with a bottle, as in use, has the metal of the flange more or less corrugated on or adjacent to the line of locking contact. As, for instance, in the cap *A'*, as shown in Fig. 8, the flange is flared and is symmetrically corrugated at its lower portion only; but when applied to a bottle and pressure applied to the top of the cap, followed by inward pressure applied to the outer corrugations, the inner corrugations are caused to effectually engage with the locking-shoulder on the bottle, as shown in Fig. 9, and the lower edge *c* of the flange projects so far from the adjacent surface of the glass that an opener may be freely engaged therewith.

As a further instance, the cap *A*<sup>2</sup>, as shown in Fig. 10, has a flaring flange, which has its lower portion initially corrugated, but in a more or less irregular manner, the metal being crimped instead of being symmetrically corrugated, as in the caps previously described. This cap, in combination with a bottle, as shown in Fig. 11, has its flange bent

into locking contact with the engaging shoulder, and the metal of the flange which performs the locking service is corrugated on or adjacent to the line of locking contact, and the lower edge of the flange *c* is projected for engagement by or with a bottle-opener.

As another instance, the cap *A*<sup>3</sup> is shown in Fig. 12. This cap has a flaring flange which is not initially corrugated at all, but which, when applied to and in combination with a bottle, as shown in Fig. 13, has the lower portion of the flange irregularly corrugated, as the result of bending the expanded flange downwardly and inwardly into locking relations with the engaging shoulder on the bottle, and the metal in the flange is corrugated on or adjacent to the line of locking contact, as in the previous instances, and the lower edge *c* of the flange affords the same reliable projection with which a bottle-opener may engage.

As a still further instance, the cap *A*<sup>4</sup> is shown in Fig. 14, this cap having a plain flange which is not flaring and not initially corrugated; but when applied to and in combination with a bottle, as shown in Fig. 15, portions of the flange are corrugated, as the result of radial indentations at proper intervals, which bend the flange into desired locking relations with the engaging shoulder and cause the metal to be corrugated at or adjacent to the line of locking contact, as shown in Fig. 16, leaving the lower edge *c* projected, as with the other caps, for reliable engagement with a bottle-opener.

It is now to be distinctly understood that the sealing-caps shown in Figs. 14 and 15 must be composed of hard metal and that their flanges must be adapted to be bent into locking contact with a bottle, and although I do not presume them to be novel as to form and construction I do believe they are the first caps composed of hard sheet metal which are adapted to the service indicated and that they involve radical and valuable novelty when considered in combination with a sealing-disk and bottle having a locking-shoulder, and, further, with the metal of the flange corrugated or indented circumferentially adjacent to or in the line of locking contact, and, still further, with the lower edge of the flange so strong and so projected that it will afford a reliable shoulder or abutment with which an opener may readily engage for detaching the cap, and, finally, in each of them the flange of the cap confines the disk against peripheral expansion under heavy pressure, and thereby secures a uniform sealing contact not only with the lip of a bottle, but also with the exterior surface below the lip, and these close packing or sealing relations between the disk and the bottle are permanently maintained, because the flange is always bent into locking contact with the annular shoulder while the disk is under pressure. Any one of these several caps having been properly applied to a bottle and then displaced

can be readily replaced for temporary service and made to effectively resume locking relations with the bottle if mere endwise hand-pressure be employed or a quick blow delivered to the top of the cap, because in each instance the flange is sufficiently contractile and expansible to allow it to be detached without serious derangement, and to so far recover from such expansion as it may have undergone during detachment as to enable it to resume fairly reliable locking and sealing relations with the disk and bottle.

It will be obvious that while some special form of opener may be required for detaching caps with the greatest possible convenience any thin-edged tool or a knife may be readily applied to the projecting edge *c* for detaching a cap, and to provide for the use of a corkscrew each cap is centrally perforated at the top, as at *d*, enabling a corkscrew to enter the sealing disk or cork, this being also a feature of novelty in sealing-caps. In certain forms of cap I provide each with a loop at its top, as disclosed and claimed in my aforesaid application for patent, Serial No. 329,314. In some instances it is desirable that the edge of the flange be so thoroughly housed within the recess below the engaging shoulder as to practically eliminate the projecting edge feature and to thereby secure specially-high resisting power—as, for instance, with some kinds of malt liquors bottled for shipment to tropical countries—and then either the loops described in my said other application may be relied upon for opening purposes or the central perforation for receiving a corkscrew, and it will be obvious that while all of the corrugated caps shown will afford a well-defined, stiff, and strong projecting edge either of them on being well compressed on the line of the middle of the recess in the bottle-head will have the entire lower portion of the flange made substantially flush with and merging with the surface of the bottle-head below the recess.

While I prefer that the flanges of my caps be continuous or unbroken, the caps may be relied upon for service with liquids under comparatively light pressure if the flanges be slitted at intervals, as set forth in my said prior application.

I have illustrated but one form of sealing-disk; but it is to be understood that various forms may be employed, and also that they may be varied as to their component character; but I prefer the flat linoleum disk composed of granulated woody matter and a practically tasteless and odorless gum, as disclosed and claimed in my aforesaid application. I have, however, found that while subjecting bottled beer to the process of pasteurization the disks should be faced or coated with some substance capable of successfully withstanding heat, and which will not and cannot adhere to the lip of the bottle, as would be and is liable with ordinary varnishes; and, moreover, it is absolutely essential that said

coating shall be both tasteless and odorless. I have discovered that all of these conditions are well provided for with a thin coating or layer *e* of properly-prepared gutta-percha, which is further of value because of its peculiar impermeability, toughness, and flexibility. The gutta-percha so used requires no vulcanizing components or processes, has no taste or odor, and is applied in the form of a solution, the solvent of which is aromatic benzole, which is very volatile, and in itself is free from objectionable odor and taste; but its taste and odor in any event are both completely eliminated during the proper aging of the coated sheeted material from which the disks are cut.

It is to be understood that the bottle-head herein illustrated embodies what I believe to be certain novel and valuable features, which will be made the subject of a separate application for Letters Patent.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, substantially as herebefore described, of a bottle having on its head an annular engaging shoulder, a sealing-disk, and a metallic sealing-cap which encircles the periphery of the disk and has a flange which is bent into locking contact with said shoulder, and which also has a projected edge to afford a surface with which a bottle-opener may reliably engage for detaching the cap from the bottle.
2. The combination, with a bottle having on its head an annular locking-shoulder and below said shoulder a projecting surface, of a sealing-disk and a hard-metal sealing-cap having a flange which is bent into locking contact with said annular shoulder and has a projecting lower edge for engagement by a bottle-opener lever fulcrumed on the projecting surface of the bottle below said edge.
3. The combination, substantially as herebefore described, of a bottle having a head provided with an annular engaging shoulder, a sealing-disk, and a hard-metal sealing-cap having a flange which encircles the disk and is bent into locking contact with said shoulder and is corrugated in the bent portion in the line of said locking contact.
4. The combination, with a bottle having a head provided with an exterior annular shoulder, of a sealing-disk and a metallic sealing-cap which encircles the disk and has its pendent flange corrugated substantially throughout its depth, and also having its inner corrugations bent to conform with or to the annular shoulder on the head of the bottle, substantially as described.
5. The combination, with a bottle having a head provided with an exterior annular shoulder, of a sealing-disk at the mouth of the bottle, and a metallic sealing-cap having a continuous or unbroken pendent flange corrugated substantially throughout its depth in lines parallel with the axis of the cap and having a portion of the metal at each interior

corrugation bent or indented to conform with the coincident surface of the annular shoulder.

6. A bottle-sealing cap composed of sheet metal and having a continuous or unbroken  
5 integral pendent flange which is corrugated substantially throughout its depth in lines parallel with the axis of the cap, whereby said  
10 flange is caused to be resilient diametrically and circumferentially for enabling the cap to be applied to any one of a set of bottles having heads slightly varied in their external diameter.

7. A bottle-sealing cap composed of sheet metal and having an integral pendent flange  
15 corrugated substantially throughout its depth in lines parallel with the axis of the cap and at each interior corrugation bent to conform to an annular engaging shoulder upon the head of a bottle with which the cap is adapted  
20 for use.

8. The combination, with a metallic sealing-cap having a flange adapted to be bent into locking contact with a bottle-head provided with an annular engaging shoulder, of a linoleum disk having on its inner surface a coating or layer of gutta-percha for strengthening the disk and preventing its adhesion to the lip or mouth of a bottle. 25

9. The combination, with a bottle having a head provided with an exterior annular shoulder, of a sealing-disk at the mouth of the bottle, and a metallic sealing-cap having a continuous or unbroken flange bent or indented circumferentially to conform with the coincident surface of the annular shoulder and  
30 having a projecting lower edge, as set forth. 35

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Witnesses:

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BOTTLE SEALING DEVICE.

No. 468,258.

Patented Feb. 2, 1892.

Fig. 1.

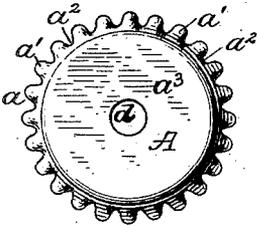


Fig. 2.



Fig. 3.

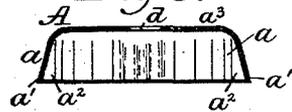


Fig. 4.

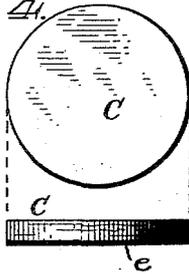


Fig. 5.

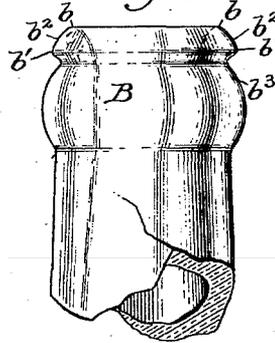


Fig. 6.

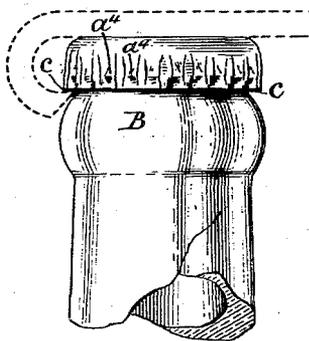
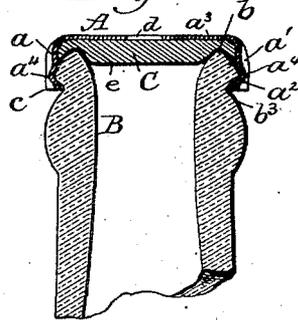


Fig. 7.



Attest:  
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Inventor:  
William Painter.  
By *Wm. B. Wood*  
Attorney.

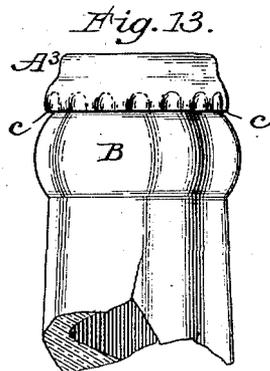
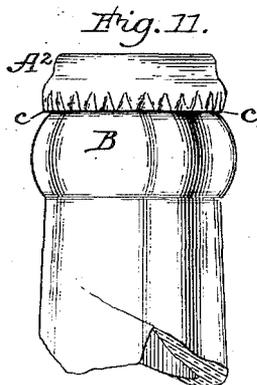
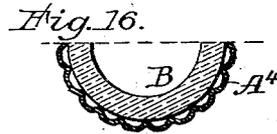
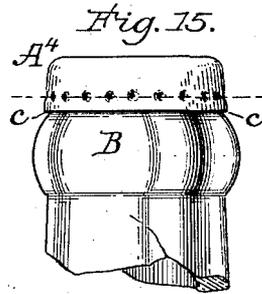
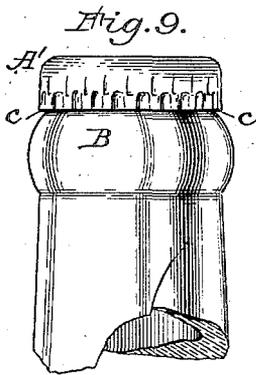
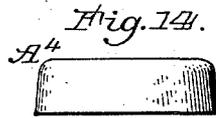
(No Model.)

2 Sheets—Sheet 2.

W. PAINTER.  
BOTTLE SEALING DEVICE.

No. 468,258.

Patented Feb. 2, 1892.



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