No. 664,746. Patented Dec. 25, 1900.

W. E. HEATH.

BOTTLE SEAL.

(No Model.) (Application filed Oct. 9, 1899. Renewed June 19, 1900.)

Fig. 1.

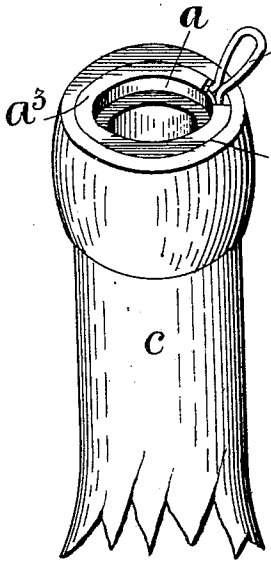


Fig. 2.

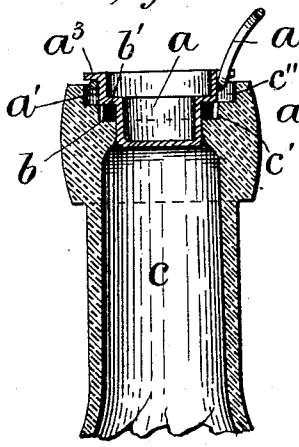


Fig. 3.

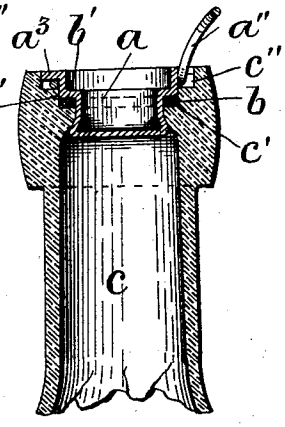


Fig. 9.

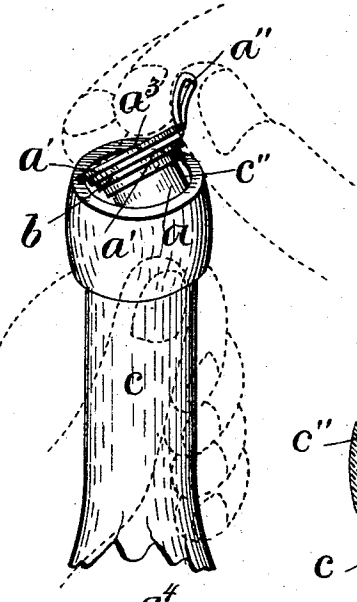


Fig. 8.

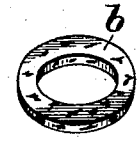


Fig. 5.

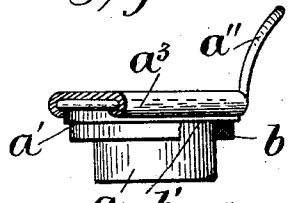


Fig. 6.

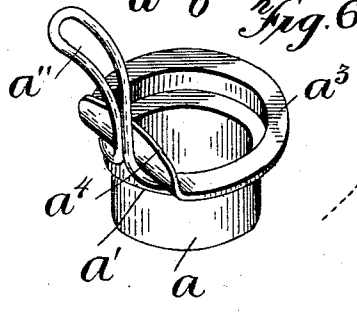


Fig. 4.

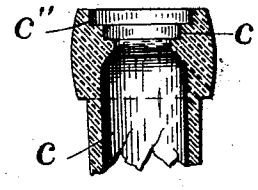
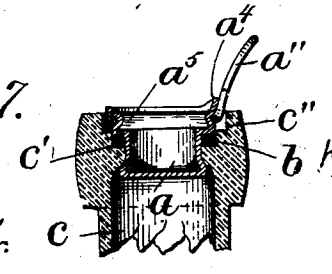


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM E. HEATH, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CORONET BOTTLE-SEAL COMPANY OF BALTIMORE CITY, OF SAME PLACE.

BOTTLE-SEAL.

SPECIFICATION forming part of Letters Patent No. 664,746, dated December 25, 1900.

Application filed October 9, 1899. Renewed June 19, 1900. Serial No. 20,907. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HEATH, (post-office address, Baltimore, Maryland,) a citizen of the United States, residing at Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Bottle-Seals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in bottle-stoppers or bottle-sealing devices; and the objects and nature of the invention will be apparent to those skilled in the art from the following description, in the light of the accompanying drawings of examples of constructions among others within the spirit and scope of my invention.

The invention consists in certain novel features in construction and in combinations and in arrangements of parts, as more fully and particularly described and pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a perspective view of part of a bottle constructed and sealed in accordance with my invention. Fig. 2 is a vertical section through the neck of a bottle constructed to receive a seal or stopper embodying my invention, the seal, plug, or stopper being shown inserted in the neck of the bottle and in the position it assumes before being forced in to expand and compress the sealing medium and before the plug is locked by expansion. Fig. 3 is a vertical section through the neck of a bottle, showing the plug locked in the bottle-neck and sealing the same. Fig. 4 is a vertical section through the neck of a bottle, the plug removed and not shown, constructed to receive the plug herein described. Fig. 5 is a detail elevation of the plug or stopper, the upper flange thereof being shown turned down or spun around or partially around the encircling portion of the wire or band of the projecting extractor. Fig. 6 is a perspective of the stopper, showing the top flange of the plug deflected upwardly to receive the lever end or thumb-piece of the extractor. Fig. 7 is a sectional view through the bottle-neck and stopper, showing the top portion of the plug formed with an annular groove to receive the encircling portion of the wire extractor. Fig. 8 is a detail perspective of the cork or other material washer applied to the plug. Fig. 9 is a perspective view of the upper portion of a bottle, illustrating the method of extracting the plug by means of its rigid attached extractor-lever or thumb-piece.

My invention involves the employment of a hollow or usually cup-shaped plug composed of a suitable soft, ductile, or flexible, preferably non-spring, metal, which after insertion in the neck of the bottle is capable of having its lower portion expanded against the interior surface of the neck of the bottle to lock the plug and maintain the fluid-tight seal or joint.

In the drawings, a is the hollow cup-shaped plug or stopper, formed of thin ductile metal. The cups are preferably, although not necessarily, formed by being stamped, pressed, or drawn from thin sheet metal possessing the necessary qualities. The cup is formed with the closed bottom and is preferably open at the top and hollow, and intermediate its top and bottom or ends is formed with an annular downwardly-facing shoulder or ledge a', below which the cup is reduced in diameter. The cup is cylindrical in form—that is, it is preferably composed of cylindrical portions of different diameters. The annular shoulder a' constitutes a seat for the washer or seal b, of any suitable packing material, such as cork or other suitable material of the desired properties, although I generally prefer not to employ rubber for this purpose, as it is subject to deterioration. I preferably employ a flat washer b, resting against said shoulder b' and snugly fitting on and surrounding the reduced portion of the plug below the shoulder. The external diameter of the washer before the bottle is sealed by the application of the plug is preferably the same or slightly less than the diameter of the portion of the plug above said annular shoulder, although the invention is not restricted in this regard.

It has been found exceedingly difficult and inconvenient to extract or remove the stoppers of this class heretofore produced

from the bottle. This remark applies to the crimped-top seals as well as to the internal expanded-cup stoppers, and in both instances it has been necessary to have at hand peculiar tools in order to remove the stopper, and it is an exceedingly difficult inconvenient operation for an inexperienced person to remove such stoppers, even with the particular tool provided for the particular stopper, in view of the peculiar rocking or lever movement necessary to tilt or twist the cup or cap in releasing it from the bottle. It is practically impossible to pull such cups or caps directly from the end of the bottle; but in order to release the same it is necessary to tilt or rock the same upwardly and back from one edge or side with a twisting or lever action, so that it might be stated that the diametrically opposite side or portion of the cup or cap forms the fulcrum or rocks on the bottle. The cup or cap is in effect moved from the mouth of the bottle with almost the same tilting movement followed by the old swing or yoke stopper plug as it leaves the mouth of the bottle during the opening operation. I provide my plug with an encircling ring formed with a rigid upwardly-projecting lever-arm or thumb-piece a'', against which pressure can be applied about as shown in Fig. 9 to tilt the plug from the bottle-mouth.

In the specific construction shown in the drawings as an example of a device within the spirit and scope of my invention the extractor is formed of a stiff piece of wire wrapped or looped around the upper part of the cup above the annular shoulder receiving the packing. The cup is formed with a top edge annular flange a^8, and the said ring or looped portion of the wire can be passed around the cup under this flange and secured to the cup in any suitable manner, (see Fig. 3,) or the flange can be turned or spun down on the wire, if desired, as shown in Fig. 5. The wire is deflected upwardly from the cup by a narrow loop or double to form the rigid or substantially rigid lever or extractor arm a''. The flange of the cup can be cut away at this point to permit the passage of said loop, as shown in Fig. 1, or the flange can be turned up, as shown at a^4, Fig. 6, and rest against the arm a'' and form a brace to strengthen the cup against breaking or tearing and permitting separation of the wire therefrom in the extracting operation before the cup has been tilted from the bottle. Also, if desired, the ring portion of the wire can be located and secured in any suitable manner or rested loosely in an annular groove a^5, formed around the upper portion of the cup, as shown in Fig. 7, the object in any case being to have the extractor or lever arm sufficiently rigid with the plug or cap or secured thereto so strongly that the said arm will not separate from the plug before the bottle is opened by extracting the plug from the mouth thereof. I prefer that the said lever or extractor arm project directly up from the outer edge or portion of the seal or stopper and from the top edge of the bottle-mouth a sufficient distance to form the necessary bearing-surface for the thumb of the operator. If desired, the said arm can be deflected outwardly to a slight degree to more readily fit the thumb and receive a certain amount of upward pressure therefrom. The wire loop forming the said arm is shown slightly spread to attain a width which will afford the proper bearing-surface.

c is the bottle, which I prefer to provide in its neck or mouth, a short distance below the upper end thereof, with an upwardly-facing ledge or shoulder c' to receive and form a seat for the packing or washer carried by the plug, as before described. This ledge or shoulder c' is preferably annular and of approximately the same width as the corresponding shoulder a' of the plug, which is arranged above and opposes said shoulder of the bottle when the plug is in position. The internal diameter of the neck of the bottle just below said shoulder c' is such as to snugly receive the cylindrical portion of the plug below its shoulder a'. A slight distance below said shoulder c' the interior of the neck is usually flared outwardly or slightly increased in diameter, so that the lower end of the cup can be expanded to a diameter greater than the internal diameter of the neck at the portion between said shoulder c' and said flared portion. In the drawings I show the bottle-neck formed with an annular inwardly-projecting flange or ledge, the upper approximately flat surface of which forms the seat or shoulder c', while the under portion thereof is curved or tapered or reduced upwardly and inwardly to receive the lower expanded portion of the plug or cup. The cylindrical portion of the interior of the bottle-neck extending up from the annular shoulder c' is of such internal diameter as to snugly receive the cylindrical portion of the plug above the shoulder a' thereof. The upper edge of the mouth of the bottle is formed with the annular recess c'' to receive the upper flanged end of the plug and the wire or surrounding ring portion of the extractor-arm. This top annular recess is preferably formed of such depth and diameter as to snugly receive the upper portion of the plug and the wire around the same and permit the top edge of the plug to lie approximately flush with the top surrounding edge of the bottle-mouth when the plug is forced in its full distance and locked.

In applying the plug the same is placed in the mouth of the bottle, as shown in Fig. 2, and the inward movement thereof is arrested by the washer resting on the bottle-shoulder c'. The proper instrument is then applied, which forces the plug into the bottle until the flanged portion or its surrounding wire at the top of the plug rests on the floor of the recess c'', which operation, under considerable pres-

sure, tightly compresses the washer between the shoulder of the plug and that of the bottle-neck opposing the same and forms the liquid and fluid tight joint. The proper instrument then expands the lower portion of the plug below the packing-washer, and thereby firmly locks the plug in the bottle, and said expanding operation at the same time tends to further draw down the plug and expand or compress the washer to most tightly fill the chamber formed by the opposing shoulders c' a' and surrounded by the inner face of the bottle above shoulder c' and the outer face of the plug below shoulder a'. This washer is thus located to directly receive the pressure forcing the plug into the bottle and the possibly drawing operation of expanding the plug, and it is possible that by reason of the peculiar formation of the parts with the sealing-joint located above the expanded portion of the plug a fluid-tight joint can be formed without the employment of the cork or other washer.

I do not herein broadly claim a metal sealing-disk having a rigid projecting extractor thumb-piece rigid therewith, as such is broadly claimed in my companion application, Serial No. 2,129, filed January 20, 1900.

I make no broad claim herein for the sealing-disk having the upturned vertical flange and the central vertical downward projection with a sealing-washer on the disk and surrounding the depression, a vertical portion of said disk formed for radial expansion to lock the disk in a bottle-mouth, as such is claimed in my application, Serial No. 16,475, filed May 12, 1900.

It is evident that various changes and modifications might be resorted to without departing from the spirit and scope of my invention, and hence I do not wish to limit my invention to the constructions shown and specifically described, and it is also evident that the various features of my invention are not limited to employment in connection with each other, but can be employed in some connections, one without the other.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The hollow cup-shaped bottle-sealing plug formed of non-elastic thin ductile metal and formed to have its lower end expanded to lock the plug in and sealing the bottle-neck, and a metal ring permanently affixed to the upper end of the plug and provided with an upwardly-projecting lever thumb-piece, whereby the plug can be removed intact as described.

2. A bottle having an annular recess in the edge surrounding its mouth, in combination with a hollow cup-shaped metal plug in said mouth of the bottle and sealing the same and provided with a rigid metal ring permanently secured around its upper portion and seated in said recess and formed with a rigid upwardly-projecting lever-arm, the lower end of the plug being expanded to lock the same, substantially as described.

3. A cup-shaped metal sealing-plug having the top flange and provided with the metal surrounding ring permanently fixed beneath said flange having the rigid lateral upward deflection through the plane of said flange, the flange displaced for the passage of said deflection, whereby the plug is forced from the bottle by lateral pressure against said deflection which forms a thumb-piece and is rigid with the plug during the extracting operation, substantially as described.

4. A bottle formed with an internal stop-shoulder or ledge in its mouth or neck portion, in combination with a cup-shaped metal sealing-plug expanded at its lower extremity in the neck and formed with a corresponding stop-shoulder or ledge opposing said shoulder of the bottle and sealing means between said opposing ledges, whereby the liquid within the bottle is kept from contact with said sealing means, substantially as described.

5. A cup-shaped metal sealing-plug having the annular downwardly-facing stop-shoulder or seat intermediate its ends, and a flat packing-washer on the plug with its flat face against said seat the lower end of the plug a distance below said washer adapted to be expanded within the bottle-neck, substantially as described.

6. A bottle having a stop-shoulder or seat in its neck and below its mouth, the internal diameter of the neck being increased below said seat, in combination with a hollow cup-shaped sealing-plug in said neck and formed of non-elastic ductile metal, said plug between its ends having a downwardly-facing stop-shoulder opposing said seat of the neck and limiting the inward movement of the plug, sealing means compressed between said opposing shoulders of the plug and neck, the lower end of the plug projecting below said sealing means and shoulder of the neck and expanded against the inner face of the bottle-neck, substantially as described.

7. A bottle having an outwardly-facing seat in its neck portion or mouth with an internally-increased diameter below the seat, in combination with a cup-shaped metal sealing-plug in the bottle-neck provided with a packing-washer at an intermediate portion of its length and compressed between the plug and said seat, the lower portion of the plug below said washer expanded and locking the plug in the bottle-neck, substantially as described.

8. A bottle having the annular recess around the open top of its neck and the annular upwardly-facing seat within its neck, the neck formed with an increased internal diameter below said seat, in combination with the hollow cup-shaped ductile-metal plug having the annular top enlargement provided with the rigid thumb-piece fixed thereto, and projecting above the bottle-mouth, said enlargement located in said top recess of the bottle-neck,

said plug having the intermediate flat annular downwardly-facing stop-shoulder opposing said seat within the bottle-neck, a flat washer compressed between and having its flat faces engaging said seat and shoulder, the lower end of the plug projecting below said washer being expanded into engagement with the inner face of the bottle-neck at said portion of increased diameter, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. HEATH.

Witnesses:

ALBERT P. STROBEL,

HENRY C. TURNBULL, Jr.