No. 676,088. Patented June 11, 1901.

W. E. HEATH.

BOTTLE SEAL.

(Application filed Dec. 29, 1899. Renewed Sept. 27, 1900.)

(No Model.)

Fig. 1.

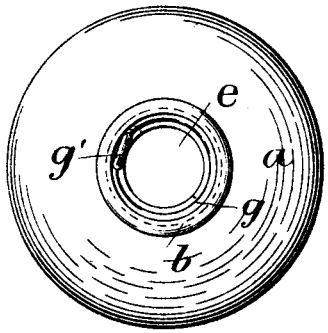


Fig. 2.

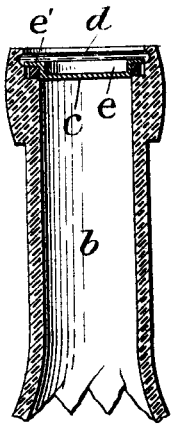


Fig. 3.

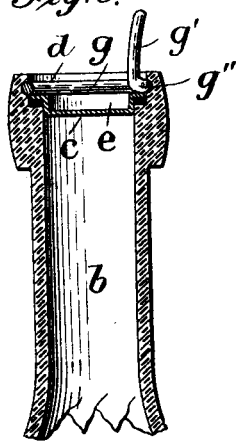


Fig. 4.

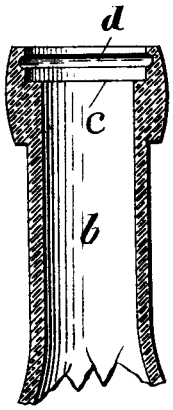


Fig. 5.

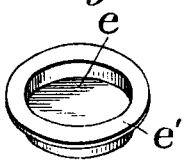


Fig. 6.

Fig. 7.

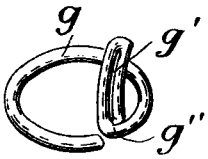
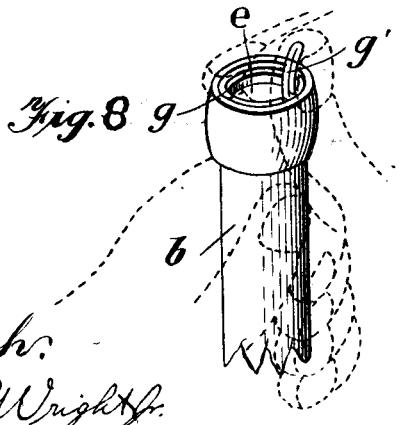


Fig. 8



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UNITED STATES PATENT OFFICE.

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BOTTLE-SEAL.

SPECIFICATION forming part of Letters Patent No. 676,088, dated June 11, 1901.

Application filed December 29, 1899. Renewed September 27, 1900. Serial No. 31,286. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HEATH, 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-seals; and the objects and nature of the invention will be obvious to those skilled in the art in view of the following explanation, taken in connection with the accompanying drawings, which illustrate constructions merely as examples of various other constructions and arrangements within the spirit and scope of my invention.

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

Referring to the accompanying drawings, Figure 1 is an end view of a bottle having its mouth or neck sealed by a device within the spirit and scope of my invention. Fig. 2 is a longitudinal section of a bottle-neck internally constructed to receive my improved bottle-seal, the sealing-plug being shown in position before it has been forced in to compress the sealing medium or washer and before the detachable locking means has been applied. Fig. 3 is a view corresponding to Fig. 2, showing the plug forced home and the washer compressed and the retaining or locking means in position. Fig. 4 is a longitudinal section of the bottle-neck to illustrate clearly the internal formation thereof. Fig. 5 is a detail perspective view of the sealing-plug. Fig. 6 is a detail perspective view of the sealing means or washer. Fig. 7 is a detail perspective view of the detachable retaining means. Fig. 8 is a detail perspective of a neck of a bottle sealed in accordance with my invention, dotted lines showing fingers and indicating the method of extracting the seal.

In the drawings, *a* is a bottle, having the neck *b*, which is formed with an internal annular shoulder or seat *c* a distance below its upper end or mouth. The internal diameter of the neck from its top edge down to said seat is greater than the internal diameter of the neck at the inner surrounding edge of said seat, so that the sealing-plug, as hereinafter set forth, can move freely into the bottle-neck until it rests on and is stopped by and seated on said seat or shoulder *c*. At a suitable distance above said annular seat the inner surface of the bottle-neck is formed with an annular groove or depression *d*, which is preferably so arranged with respect to said seat as to leave the inner face of the bottle-neck cylindrical or plane between the seat and groove, although my invention is not so limited, as said intervening surface of the bottle-neck between the seat and groove might be otherwise formed, according to the contour or outline of the surrounding edge flange of the sealing-plug hereinafter referred to.

e is the sealing-plug, preferably formed of thin ductile metal. The plug is dished or cup-shaped and hollow, and I usually strike them up by suitable dies from thin sheet metal which is very light—such, for instance, as thin sheet-aluminium. The central depressed cylindrical portion of the plug is formed with such external diameter as to snugly fit and enter the contracted internal portion of the bottle-neck at the inner edge of the said internal shoulder or seat, substantially as shown in Fig. 3, and thus project and extend below the plane of the said seat or shoulder. The plug at the upper end of said depressed or dished center is formed with the annular outwardly-projecting flat flange *e'*, formed or arranged to approximately fit snugly the internal portion of the bottle-neck intervening between the groove *d* and the seat, so that when the plug is in place an annular approximately closed chamber will be formed between said seat and flange and surrounded by the internal face of the bottle-neck and closed at the inner side by the outer face of the depressed center of the plug. I preferably provide sealing means between said seat and flange—such, for in-

stance, as a flat washer *f*, of any suitable material. I can use cork for this purpose, although my invention is not so limited. Before the plugs are applied to the bottles the flat washers are applied thereto, so as to fit snugly around and retain their places on the depressed centers and lie with their flat faces against the under surfaces of the said flanges of the plugs. The plugs when thus provided with packing or sealing washers are dropped into their respective bottle-necks with the washers resting with their under flat faces on the annular seats of the bottle-necks, as shown approximately in Fig. 2 of the drawings. Downward pressure is then applied to the plugs by suitable mechanism until the washers are compressed to the necessary degree to insure a liquid-tight joint, (see Fig. 3 of the drawings,) and then the proper detachable retaining or locking means are applied to retain the plug and sealing-washer or other means in the sealing condition.

I do not wish to limit myself to a metal sealing-plug of the form shown, as the central depressed portion can be otherwise shaped or formed, or possibly sealing-plugs might be otherwise formed, although material advantages are attained by providing the centrally-dished or cup-shaped form of plug, as a liquid-tight joint or seal is thereby insured and the washer is kept in place and confined from contact with the contents of the bottle, the sealing-washer is inclosed in what might be termed a "chamber" between the plug and inner surface of the bottle-neck, and the plug fits the bottle-neck snugly below the sealing-washer, and, furthermore, the washers can be placed on the plugs and maintained in place thereon before the plugs are applied to the bottle, and hence the plugs and washers can be applied by one operation, and plugs can be supplied to the market having the sealing-washers thereon, in addition to certain other advantages.

A material and important object of my invention is to provide a thoroughly-efficient bottle-seal which will prevent leakage of the gases or liquids and yet which can be extracted without the employment of peculiar or other implements the necessary presence and use of which constitute such a serious disadvantage against the employment of the metal-cap and sealing-plug bottle-seals now generally found on the market. In carrying out this object I can provide various devices, and as an instance of what might be employed for this purpose, although my invention is not so limited, I show a detachable retaining or locking device separate from the sealing-plug and arranged to spring into the groove *d* and firmly and rigidly hold the plug down with the washer compressed below the same, and I provide such retaining means with a projecting thumb-piece, so arranged that lateral pressure against the same will force the said retaining means from the bottle-mouth and permit the internal pressure of the gas within the bottle to force the sealing-plug therefrom.

In the drawings I show a split ring *g*, formed of spring-wire, usually, although not necessarily, round in cross-section and so bent and formed as to spring into the annular groove or depression *d* and firmly maintain its position therein and bearing down on the surrounding flange of plug immediately above the sealing-washer below said flange, and thus maintain the liquid-tight joint. The said ring usually enters the annular groove or depression a distance equal to one-half or less the diameter of the wire, and the groove and ring are so relatively formed as to accomplish approximately this result and also are so arranged that the ring bears down on the plug entirely around its top face, the split or break in the ring being of the slightest possible length, so as to avoid the slightest possibility of leakage around the edge of the flange of the plug. The retaining means can be of any suitable construction, and my invention is not limited to the employment of a split-ring construction, as other arrangements and constructions of retaining devices can be employed. In the construction shown the extractor or lever projection, arm, or thumb-piece *g'* projects upwardly from the retaining means to a point above the mouth of the bottle, and the said projection is of such length and width as to provide a proper and sufficient bearing-surface for the thumb or finger in extracting the retainer. In the specific example shown the wire of the ring is formed with a lateral upward loop or deflection of the proper length to form the projection *g'* and is so arranged with respect to the ring or other-formed retainer that lateral pressure thereon of the sufficient force and power will cause such a contraction of the ring as to spring or bend a portion of the ring inwardly from the groove, and hence permit easy removal of the entire ring. The ring is formed with an inward deflection *g''*, from which the thumb-piece or projection extends upwardly and clears the groove in the bottle-neck. I usually extend the projection or thumb-piece up from one end of the split ring to facilitate extraction, as the end of the ring can be readily forced inwardly from the groove, and a slight upward pressure on the thumb-piece will cause the ring to tilt entirely from the mouth of the bottle, and the internal pressure within the bottle will cause the plug to immediately follow and also aid in extracting the retainer.

As hereinbefore stated, I do not wish to limit my invention to any particular form or construction of sealing-plug or stopper nor to the specific form of retainer shown, as other forms of retainers can be employed having the lever projection extending to a readily-accessible point at the exterior of the bottle or bottle-mouth.

The retainers are usually applied to the

bottle after the plugs have been inserted and forced down, a suitable device being provided to hold the plugs down with the washers compressed and to insert the retainers while contracted, so that they will expand into the grooves as soon as released and before the downward pressure on the plug has been released. Hence as soon as the downward pressure on the plug is released the tendency of the washer to expand will tend to take up any looseness between the plug and the retainer and will maintain the seal tightly locked against leakage.

I do not desire to limit my invention to the employment of the particular sealing-plug in connection with the particular retaining means, nor do I desire to limit myself to a spring-retainer provided with a projecting lever thumb-piece to use in connection with any particular sealing means, and it is obvious that various changes might be made in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention.

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 bottle-seal comprising a removable sealing-plug, in combination with the expansive spring-retainer seated on the plug and springing into the bottle-neck and provided with the extractor thumb-piece projecting to the exterior of the bottle-mouth and having an offset connection with the retainer, whereby pressure on the thumb-piece will spring the retainer from its locked position and from the bottle-mouth and release the sealing-plug, substantially as described.

2. In combination, a bottle having a sealing shoulder or seat, a removable sealing-plug thereon, and a removable spring-retaining ring within the bottle-neck and springing outwardly against the wall thereof and holding the sealing-plug down in sealing position, said ring provided with an approximately rigid upwardly-projecting thumb-piece having a lateral connection therewith, whereby lateral pressure applied to the thumb-piece will spring the ring from the bottle-neck and release the sealing-plug therefrom, substantially as described.

3. The bottle having a sealing-shoulder within its mouth and a locking-seat above the shoulder, a removable sealing-plug having the cylindrical portion fitting the bottle-mouth below the shoulder and having the top flange opposing the shoulder, the sealing-washer on the plug and between the shoulder and flange, the separate split spring-retaining ring fitting on said flange and sprung into said locking-seat, said plug being forced down to tightly compress said washer and permit said ring to spring into said seat and lock the plug, said ring provided with a rigid lever thumb-piece projecting upwardly to a point above the bottle-mouth and forming a broad bearing-surface, whereby lateral pressure against said lever thumb-piece tilts the ring from the bottle-mouth, substantially as described.

4. The bottle-seal comprising the sealing-plug, and the expansible split spring-retaining ring formed with a lateral and upwardly-projecting loop constituting the upwardly-projecting lever thumb-piece, whereby the plug is retained in its sealing position in the bottle-mouth by the said ring expanded in the bottle-mouth above said plug, and whereby the seal is broken by lateral pressure applied to said thumb-piece which tilts the ring from the bottle-mouth and releases the plug, substantially as described.

5. A bottle-seal comprising the cup-shaped thin metal plug having the top annular flange and a sealing-washer surrounding the plug beneath the flange, in combination with an expansible retaining-ring provided with a deflected lateral loop forming the upwardly-projecting lever thumb-piece, the plug adapted to fit removably in and sealing the bottle-neck and to be held down therein compressing the washer by said ring expanded into a groove in the bottle-neck, whereby lateral pressure on said thumb-piece will spring the ring from the groove and rock the same from the bottle and release the plug, substantially as described.

6. A bottle having its neck formed with an internal sealing-seat and a locking groove or shoulder above the same, in combination with a cup-shaped metal sealing-plug having a top flange and a sealing-washer around the plug beneath the flange, said plug removably sealing the bottle-neck with the washer compressed between said flange and sealing-seat, and an annular retainer resting on said flange of the plug and expanded in said locking-groove and thereby holding the plug down with the washer compressed, said retainer having a lever thumb-piece approximately rigid therewith and projecting laterally and upwardly therefrom to the exterior of the bottle-mouth, whereby lateral pressure on the thumb-piece will tilt said retainer from the groove and from the bottle and release the plug, substantially as described.

7. A bottle-seal comprising a readily-removable sealing-plug, adapted to seal the bottle, in combination with a split spring-metal retaining ring adapted to expand into a locking-seat in the bottle-neck above and holding down said sealing-plug, said ring formed with a projection extending to the exterior of the bottle-mouth and united to the ring by an inwardly-projecting offset, whereby said projection forms a lever thumb-piece by which the ring can be sprung from said locking-seat and tilted from the bottle to release the plug, substantially as described.

8. The bottle-seal comprising a removable plug or sealing means, and the split spring-

retaining ring resting on and holding down the plug and expanded into a locking-seat within the bottle-mouth, and provided with an upward rigid loop forming a broad bearing-surface above the bottle-mouth and constituting a lever thumb-piece for the purpose described.

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

WILLIAM E. HEATH.

Witnesses:
ELISHA S. HEATH,
CHAS. C. HEATH.