

(No Model.)

G. A. BOYDEN. BOTTLE SEALING DEVICE.

No. 515,990.
Fig. 1.

Patented Mar. 6, 1894.

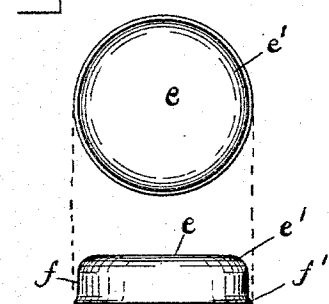


Fig. 2

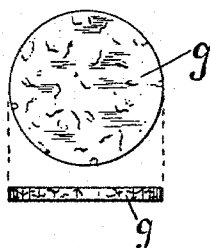


Fig. 3

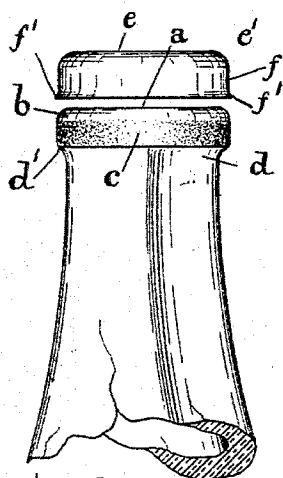
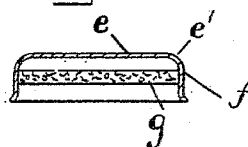


Fig. 4.

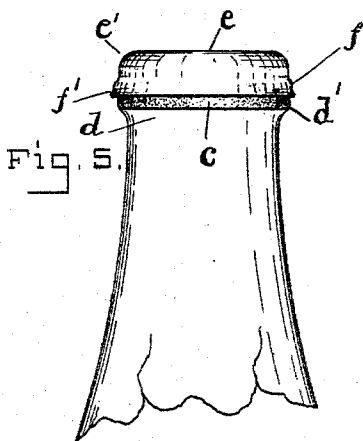


Fig. 5.

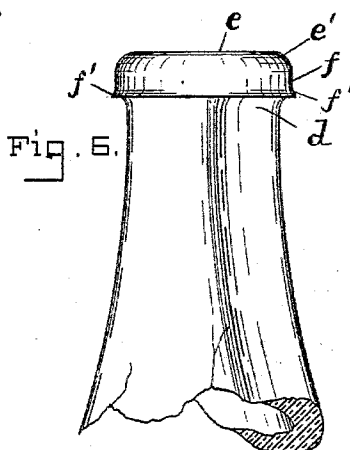


Fig. 6.

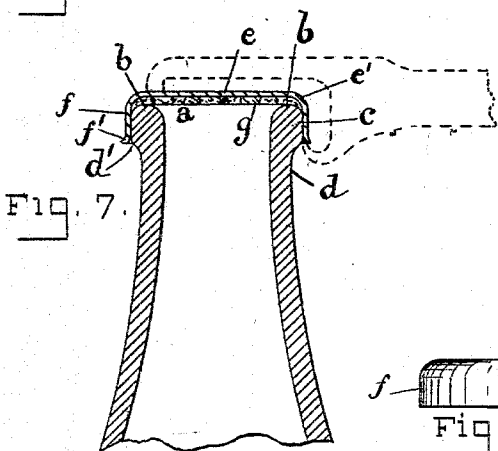


Fig. 7.

Fig. 8.

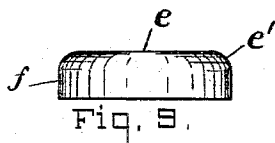
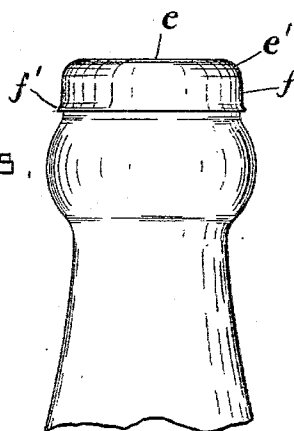


Fig. 9.

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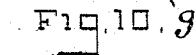


Fig. 10.

UNITED STATES PATENT OFFICE.

GEORGE ALBERT BOYDEN, OF MOUNT WASHINGTON, MARYLAND.

BOTTLE-SEALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 515,990, dated March 6, 1894.

Application filed September 27, 1893. Serial No. 486,575. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ALBERT BOYDEN, a citizen of the United States, residing at Mount Washington, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Bottle-Sealing Devices, of which the following is a specification.

My invention relates to a bottle-sealing device of that class which employs a hard metal cap and an elastic or compressible disk seated within the cap.

My invention consists in providing a sealing disk which is compressed over the mouth of the bottle by a hard-metal cap which is provided with a straight cylindrical flange and secured to the bottle by forcing the cylindrical flange over a contact surface on the bottle which is larger in diameter than the diameter of the said cylindric flange, thus expanding the said flange as it is forced on and thereby produce a frictional contact between the internal wall of the flange and the exterior of the said contact surface sufficiently great to retain the sealing disk in a compressed condition between the bottle-mouth and the hard-metal cap; the frictional contact or grip will also resist the pressure of the gases contained in the bottle and the compressed disk over the bottle-mouth will produce a perfectly tight joint. It will be seen that the following procedure produces conditions which insure the tightness of the seal, namely: starting with the interior of the cylindric flange having a given diameter and the diameter of the mouth-rim of the bottle being larger than the said interior diameter of the flange, when the metal cap is forced on the lip and rim, the flange gradually expands and thereby tightly clamps the bottle-rim at every position during its traverse over the said rim, and when the flange nears its final traverse the compression of the disk begins, and during the final traverse the final expansion of the flange ensues and simultaneously therewith the disk is compressed; this prevents any reaction of the compression of the disk or any backward movement of the cap, and holds the disk in the fully compressed condition and produces an absolutely tight joint between the cap and bottle-mouth.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a top and a side view of the cap. Fig. 2 shows two views of the elastic disk. Fig. 3 shows a section of the metal cap and disk. Fig. 4 is a side view of the neck and mouth of a bottle adapted to receive the cap. Fig. 5 is a side view of the neck of a bottle and shows a cap partly forced onto the bottle-mouth and illustrates the expansion the flange of the cap undergoes when it is forced on the bottle-mouth. Fig. 6 shows a cap attached to the bottle-mouth. Fig. 7 is a section of a bottle-neck and shows the cap and disk in position and the bottle-mouth sealed. Fig. 8 is a view similar to Fig. 6, but showing a different bottle-neck. Fig. 9 is a side view of the cap without a flared edge. Fig. 10 is a section of the cap with two disks instead of one.

I will first describe one form of embodiment of my invention and the method involved as follows: The bottle to be sealed may be of any form or shape having an ordinary mouth, *a*; a short distance below the mouth the bottle has an exterior annular flange, rim or collar, *c*, whose opposite sides are straight or parallel and provided with a rough-ground surface, as indicated by the speckled appearance in the drawings. An expanding lip, *b*, connects between the bottle-mouth, *a*, and the exterior rim, *c*; this lip may be curved or inclined, like the section of a cone. Immediately below the rim or collar is the contracted part, *d*, of the neck and this causes the formation of a shoulder, *d'*; this shoulder, however, has nothing whatever to do with the attachment or application of the sealing cap. The bottle is made or blown, as usual, in a mold, and the exterior annular rim or collar, *c*, and expanding lip, *b*, are formed at the time the mouth, *a*, is finished. After this, suitable grinding-mechanism is employed to grind the surface of the said rim or collar, *c*, to a true round or cylindric shape and at the same time reduce it to some pre-determined or definite size,—as, for instance, and for the purpose of the explanation hereinafter made, say, an external diameter of one inch and one thirty-second of an inch. Of course it may have any other definite size to suit the cap

used. The surface of this rim or collar will preferably not be smooth or polished, but will have a roughness such as that produced by an emery or corundum grinder. The rough-
5 ening of the contact surface, however, is not essential.

The metal cap is made of a hard metal preferably of tinned-iron plate, or steel plate: it has a crown or top, e , and a cylindric or verti-
10 cal, pendent flange, f ; it also has a curved or rounded part, e' , where the crown or top and the vertical flange join; the vertical flange of the cap also has, preferably a slightly flared or bell-mouthed edge, f' , though this is not
15 requisite in all cases. It is an essential requisite of my invention that the internal diametrical measurement across from one side of the cylindric flange of the cap to the oppo-
20 site side, shall be initially or primarily less than the external diameter of the said bottle-rim or collar, c ; as already stated, if the rim, c , is one and one thirty-second of an inch, the inner measurement of the flange should be, say, one inch, in order to provide for the ex-
25 pansion and tight fit.

The elastic disk, g , may be made of any suitable material, and I contemplate various materials, but prefer cork; its dimensions, diametrically, must be sufficient to completely
30 cover the mouth-end of the bottle and so that the rim of the disk will fully cover and rest upon the annular lip, b , of the bottle-mouth. By thus covering the bottle-mouth with the disk the contents of the bottle are prevented
35 from coming in contact with the metallic cap and all injurious effects that might follow are avoided. This elastic disk is within the metal cap, as shown in Fig. 3, where it is slightly contracted within the cylindric flange and
40 pressed or forced to its position. The disk, g , has a greater diameter than the curved or rounded part, e' , of the metal cap; this forcing of the disk into the cap, as stated, insures its retention there while the cap is being handled
45 in the commercial transactions of sale and shipment and previous to its final attachment to a bottle.

My invention contemplates that the cylindric flange, f , shall be expanded as it is forced
50 onto the bottle-mouth. Heretofore metal caps have been applied to the mouths of bottles by surmounting the bottle-mouth with, or placing in position thereon, a cap whose internal diametrical measurement exceeded the exter-
55 nal diametrical measurement of the bottle-mouth, and then by some mechanical operation crimping, contracting or interlocking the excessively large flange of the cap so as to make it fit close with the head of the bottle,
60 or interlock below a shoulder on the bottle-head. My improvement in attaching caps differs radically from all such devices and all such methods, and consists in placing in position upon the mouth of the bottle a hard
65 metal cap having an elastic disk within a cylindric flange whose internal diameter is smaller than the external diameter of the

mouth-rim, or contact surface and then by simultaneously expanding the said flange and compressing the elastic disk, whereby, when
70 the external pressure which forces the cap is removed, there will be no relaxing of the compression of the disk because the cap will remain, in every case, absolutely in the same position to which the external mechanical
75 pressure forced it.

The friction between the metallic cap and the contact surface on the bottle is so great that the cap is enabled to resist the internal pressure that may be in the bottle and hold
80 the sealing-disk in a compressed condition, while the thin disk resting upon the lip of the mouth seals the latter and prevents the escape of the gaseous and liquid contents and also keeps the liquid from coming in contact
85 with the metallic cap, thereby producing a perfect bottle-seal which may be quickly and conveniently applied and removed.

In Fig. 7 a simple device is shown in broken lines indicating the manner of removing the
90 cap from the mouth.

The essential characteristic of the sealing device which co-acts with the cylindric metal cap, is, that it shall prevent the leakage of
95 gases contained in the bottle; it is unimportant, however, as to how the said sealing device is constructed or of what material it is composed.

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

1. The combination of a bottle provided with an exterior annular rim or collar having a rough-ground surface; a metal cap having
105 a cylindric flange, and an elastic disk within the cap and covering the bottle-mouth,—said disk and cap being held in their position by the close frictional contact of the cap-flange with the said roughened bottle-rim or collar.

2. The combination of a bottle provided
110 with an exterior annular rim or collar having straight sides and also provided with an annular curved or inclined lip connecting the mouth and said rim or collar; a hard metal cap having a cylindric flange which is se-
115 cured to the said bottle-rim or collar by close frictional contact therewith—having been expanded thereon; and an elastic disk within the cap and resting on the lip of the bot-
120 tle and covering the bottle-mouth.

3. The combination of a bottle provided with a mouth having a contact surface; a
125 sealing disk closing the mouth of the bottle; and a cap provided with a straight cylindric flange which engages with the said contact surface of the bottle by frictional contact.

4. The combination of a bottle; a sealing disk closing the mouth of the bottle; and a
130 cap provided with a straight cylindric flange which engages with the bottle by frictional contact between the inner wall of the flange and the exterior part of the bottle-mouth and is securely held thereon solely by said frictional contact.

5. A sealing device for bottles consisting of a metal cap provided with a straight cylindric flange, *f*, and a curved or rounded part, *e'*, between the cap-top and said flange, and an elastic disk within the cap and having a greater diameter than the said curved or rounded part of the cap.

6. The combination of a bottle provided with a contact surface adjacent its mouth; a sealing device closing the said mouth; and a metallic cap provided with a cylindric flange, which engages with and is secured to the said contact surface of the bottle by frictional contact.

7. The combination of a bottle provided with a contact surface adjacent its mouth; a metallic cap provided with a cylindric flange which engages with the said contact surface and is secured thereto by means of its frictional grip so as to resist the pressure of the gases confined in the bottle; and a sealing device to prevent the leakage of the gases.

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

GEORGE ALBERT BOYDEN.

Witnesses:

CHARLES B. MANN, Jr.,
THOS. C. BAILEY.