

N. B. ABBOTT.

SHEET METAL SEALING CAP FOR BOTTLES.

(Application filed Feb. 6, 1902.)

(No Model.)

Fig. 1.

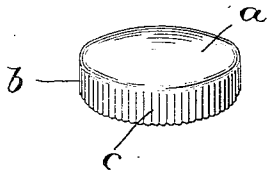


Fig. 4.

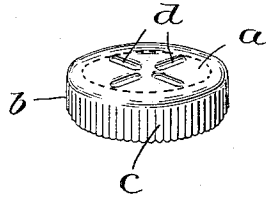


Fig. 2.

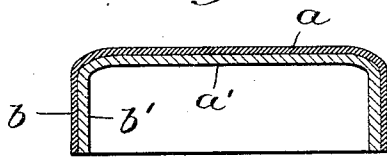


Fig. 5.

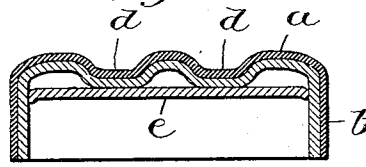


Fig. 3.

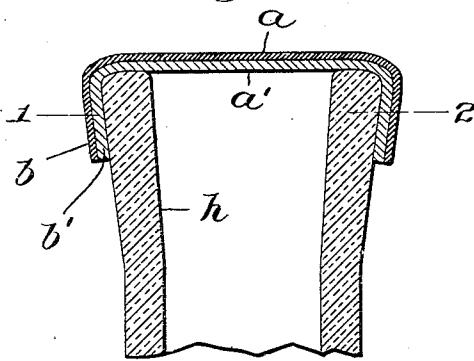


Fig. 6.

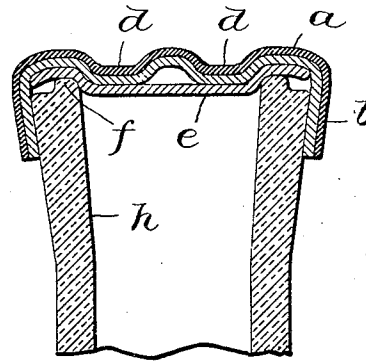
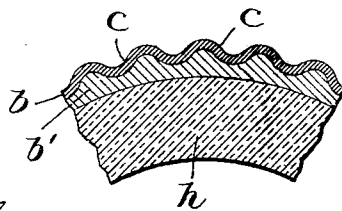


Fig. 7.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

NATHANIEL B. ABBOTT, OF BALTIMORE, MARYLAND, ASSIGNOR TO IMPERIAL BOTTLE CAP & MACHINE COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF DELAWARE.

## SHEET-METAL SEALING-CAP FOR BOTTLES.

SPECIFICATION forming part of Letters Patent No. 704,167, dated July 8, 1902.

Application filed February 6, 1902. Serial No. 92,885. (No model.)

*To all whom it may concern:*

Be it known that I, NATHANIEL B. ABBOTT, a citizen of the United States, and a resident of the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Sheet-Metal Sealing-Caps for Bottles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to sheet-metal sealing-caps used for sealing bottles, and has for its object to produce a paper-lined sheet-metal sealing-cap composed of a metallic exterior and a paper interior throughout, with connecting and combining means between the same, the concrete cap having an integral continuous pendent flange with crimps or corrugations exteriorly (in the metal portion) to adapt it to be compressed circumferentially on a bottle-head and interiorly presenting throughout (by its paper-lining portion) a soft, smooth, and unbroken surface, each element being integral as to its crown and flange.

My invention also comprises certain novel detail features of construction hereinafter described.

In the drawings illustrating my invention, Figure 1 is an elevation in perspective of one form of my sealing-cap; Fig. 2, an enlarged section thereof; and Fig. 3 a like section in place on a bottle-head having a tapered neck, said view being designed to show the form of bottle to which the cap is most applicable. Fig. 4 is an elevation illustrating the cap of Fig. 1 with the addition of a detail feature sometimes employed; Fig. 5, a section thereof, and Fig. 6 a section of the device of Figs. 4 and 5 after it is compressed on the bottle, and Fig. 7 is a segment of an exaggerated sectional view on the line 1 2 of Fig. 3.

It is well known to those skilled in the art that sheet-metal sealing-caps with a pendent continuous annular rim or flange slitted, indented, crimped, or corrugated and some of them partly lined with wax or paper, supplied with cork disks, retaining-plates, &c., have been extensively used. Illustrations of these may be found in prior Letters Patent, No.

128,849, dated July 9, 1872, to S. S. Butler; No. 38,617, dated May 19, 1863, to N. P. Whittlesey; No. 468,258, dated February 2, 1892, to William Painter, and No. 521,752, dated June 19, 1894, granted to myself. Most of those devices, particularly that described in Letters Patent No. 468,258 to William Painter, were designed for use on and applicable only to specific forms of bottle-heads, respectively, and so, also, with my present new sealing-cap, which, while useful on other than one form of bottle-head, is especially applicable to the smooth-necked tapered bottle-head shown and described in above-mentioned Letters Patent No. 521,752 granted to me and also illustrated in the accompanying drawings.

Metallic sealing-caps which have an integral and continuous annular pendent flange crimped or corrugated, while well-known in the art and externally similar, belong to two wholly different and distinct classes governed by the character of the interior superficies of the cap and its flange. For example, the flange or rim of the cap of Patent No. 468,258 to Painter has interior ribs or corrugations, which are essential, as described, to enable it to be locked over and around an exterior annular shoulder on the neck of the bottle-head shown and described in said patent, while the other class is represented by the cap described in Patent No. 521,752, granted to me, in which it is essential that they present a perfectly-smooth surface on the whole interior of the annular flange and preferably of the crown also of the cap and also be lined with a relatively compressible lining in order that said lined flange may be tightly sealed against the smooth-necked bottle shown and described in my said patent and also serve to hold the crown of the cap or a disk interposed therein tightly and fixedly against the mouth of the bottle.

The desideratum in sheet-metal sealing-caps of the class last referred to, to which my present invention belongs, is that the continuous pendent annular flange should be indented, crimped, or corrugated to take up the surplus metal when the flange is circumferentially compressed to a smaller circumfer-

ence around the tapered neck end of the bottle and yet that the cap shall, notwithstanding the indentations, crimps, or corrugations, present a perfectly-smooth surface interiorly, that it shall be lined throughout with a relatively compressible material, such as thick paper, and, finally, that the sheet-metal paper-lined cap shall be a concrete device—namely, one in which the paper lining is so connected and combined with the metallic exterior that it cannot be easily detached therefrom. Two essential features which impart the greatest utility to such a cap, and without which it would be of little utility and commercially valueless, are, first, that the paper lining shall be in itself an interior paper cap integral throughout and shall cover the entire interior of the cap, and, secondly, that it shall adhere to and be held within the exterior metal cap. My present invention to these ends consists in a paper-lined sheet-metal sealing-cap comprising these two essential novel features last recited.

My invention also consists in providing the central portion of the crown of the cap with diametric depressions, preferably two of them, crossing each other, and these depressions or ribs in the metal enter the paper lining incidentally to hold the two together, but chiefly to enable thinner metal to be used, as the crown is subjected to great pressure when the cap is sealed on the bottle-head.

Referring now to Figs. 1 and 4 of the drawings and the sectional views thereof, Figs. 2 and 5, I form the finished cap, Figs. 1 and 4, from a sheet-metal blank and a thick paper blank, each being merely sections of thick paper and sheet-tin, respectively, and these being placed in position, the former over the latter, and the two in that position placed in a "stamping-up" press of the general character used for stamping up sheet-metal forms, the blanks are ready to be acted on to form the cap, the dies thereof being of the requisite form to produce a shaped cap having a disk-shaped crown *a* and an integral pendent continuous annular flange *b*, which is to be substantially at right angles with the horizontal plane of the crown, the line of junction of crown and flange being slightly rounded, (which, however, is the usual result of bending the metal,) and a series of substantially parallel corrugations *c*, which are longitudinal—that is to say, in line with the axis of the crown—said corrugations extending from the line of the lower edge of the aforesaid bend or curve at the junction of crown and flange to the extreme annular edge or rim of the flange. In lieu of these corrugations a series of indentations, such as shown in Patent No. 521,752, may be substituted, arranged in like manner relatively to the whole flange below the bend from the crown; but they are not so desirable nor effective as the corrugations. For greater certainty in securing the paper lining within the metallic cap and for other purposes hereinafter mentioned I prefer to

supply the die or former with devices to strike in the crown short diametric depressions *d*, forming ribs which enter the paper lining, as shown in Figs. 4 and 5. The result of this method of forming the concrete cap is that an integral metallic cup-like cap is formed, having an adhering cup-like paper lining throughout its interior, the cup and lining being fastened together by the interior ribs of the crimps or corrugations on the sheet-metal flange entering to some extent, but not passing through, the paper lining next the same. Hence the interior surface of the flange of the paper-lining cap, while fastened thereby to the exterior metal cap, is left perfectly smooth interiorly and most suitable for my purpose of sealing taper-necked bottles.

A valuable detail feature in the device is the central diametric ribs *d* in the crown. These also form combining means between the metal and the paper, and they enable thinner metal to be used, because without them thicker metal must be used to resist the impact-blow when a circular section of the crown is forced into the bottle-mouth by the closing-press employed, as shown in the sectional view, Fig. 6. These ribs enter the bottle-mouth, as shown in said Fig. 6, and aid in holding the cap in position.

In sealing the bottle the cap, Figs. 1 and 2, is placed thereon, as shown in Fig. 3, and the corrugated flange compressed circumferentially around the tapered neck below the mouth of the bottle by suitable means, preferably by either of the clamping devices shown in United States Patents Nos. 521,751 and 563,552, granted to myself and Robert Brass, respectively. I deem it best, however, that these clamping means should also have die portions, which force into the bottle-mouth a circular section of the cap-crown, (indicated by the dotted lines in Fig. 4,) with the result (especially where the diametric depressions *d* are employed) that this circular depression and these ribs both aid very materially in holding the cap firmly in position on the bottle, because they and the paper lining and disk below them are thus forced into the bottle-mouth.

In Fig. 6 I have shown a form of taper-necked bottle having a top annular bead *f*, and for some purposes this form of bottle-head is preferred by users, and I have shown it only to illustrate that my cap is not confined to use on the single form of bottle-head shown in Fig. 3.

Another valuable element of utility in my new paper-lined cap is that in sealing bottles used for holding liquids which give off gases, wherein it is desirable to use a mouth-disk, such a disk, made of textile fabric—for example, cotton-duck, (indicated at *e* in Figs. 5 and 6)—can easily be set into the crown of my paper-lined cap and be sufficiently well held therein until the cap is used by making the disk a close fit circumferentially within the crown or by previously touching the inner

side of the textile disk with gum-arabic or other harmless gum, which will easily hold it sufficiently well attached for the purpose to the crown portion of the paper lining of the cap. This is particularly useful, because experience has demonstrated that a cotton-duck disk is superior to cork and will swell when moistened by the liquid contents of the bottle, causing it to make almost a hermetically-sealed joint with the rim of the bottle-mouth.

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

1. A paper-lined sheet-metal sealing-cap composed of a metallic crown circular in outline with integral pendent annular flange, an adherent paper lining therefor coextensive with and conforming to the interior thereof, and longitudinal crimps or corrugations in the metal flange the inner ribs of which are embedded in the coinciding surface of the paper flange without penetrating through the same, said paper flange thereby retaining a smooth interior surface.

2. A paper-lined sheet-metal sealing-cap, composed of a sheet-metal portion having a circular crown with integral pendent annular flange, an adherent like-shaped paper lining therefor, a series of longitudinal crimps or corrugations in the sheet-metal flange, the inner ribs of which are embedded in the coinciding surface of the paper-lining flange without penetrating through the same, said concrete flange having a crimped exterior metallic surface and a smooth interior paper surface, and diametric ribs in the crown of the concrete cap of less length than the diameter thereof.

3. A paper-lined sheet-metal sealing-cap, composed of a sheet-metal circular crown with an integral pendent annular flange, a like-shaped paper lining therefor fitting closely within the interior of the metal cap and its flange, said sheet-metal crown being provided

with diametric depressions embedded in the surface of the interior paper crown, of less length than the full diameter of the crown.

4. In combination with a bottle, a paper-lined sheet-metal sealing-cap therefor consisting of an exterior metallic portion and an interior like-shaped coextensive paper-lining portion, each having a circular crown with integral pendent annular flange, the flange of the paper lining having a smooth interior surface, and the metallic portion of the concrete paper-lined flange having longitudinal corrugations entering without penetrating through or interrupting the smooth interior surface of the paper flange, and circumferentially compressed around the bottle-neck and against the interposed interiorly-smooth paper-lining flange.

5. In combination with a bottle, a paper-lined sheet-metal sealing-cap therefor, consisting of an exterior metallic portion and an interior like-shaped coextensive paper-lining portion, each composed of a circular crown with central diametric ribs and each having an integral pendent annular flange, the flange of the paper lining having a smooth interior surface, and the metallic portion of the concrete paper-lined flange having longitudinal corrugations entering without penetrating through or interrupting the smooth interior surface of the paper flange, and circumferentially compressed around the bottle-neck and against the interposed interiorly-smooth paper-lining flange, and a central section of both metal and paper of the crown of the concrete cap being forced into the bottle-mouth.

In testimony whereof I have hereunto affixed my signature this 27th day of January, A. D. 1902.

NATHANIEL B. ABBOTT.

Witnesses:

FRANK W. COALE,  
W. BERNARD DUKE.