No. 794,149. PATENTED JULY 4, 1905.

R. A. HALL.

CAP.

APPLICATION FILED MAR. 16, 1905.

Fig. 1.

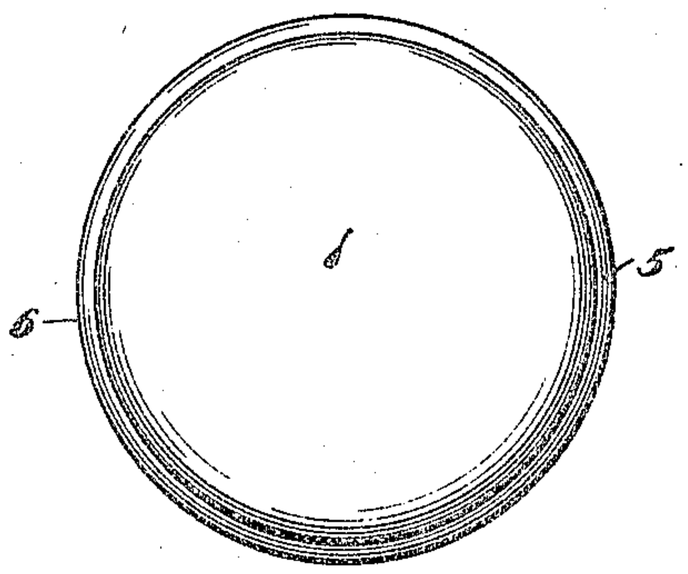


Fig. 2.

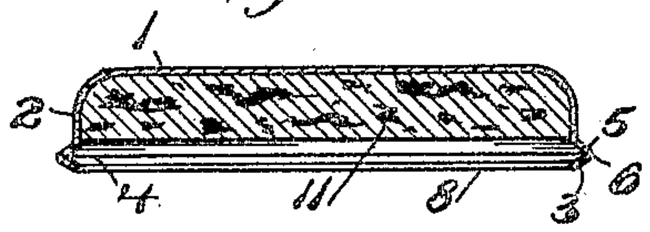


Fig. 3.

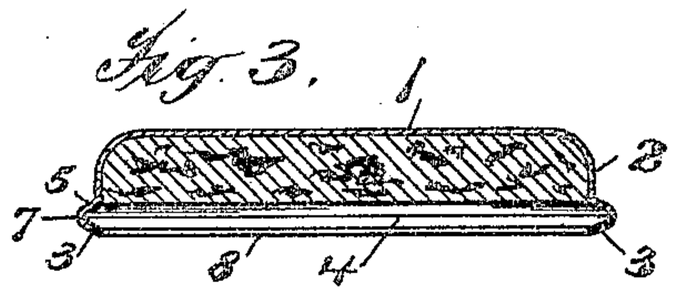


Fig. 4.

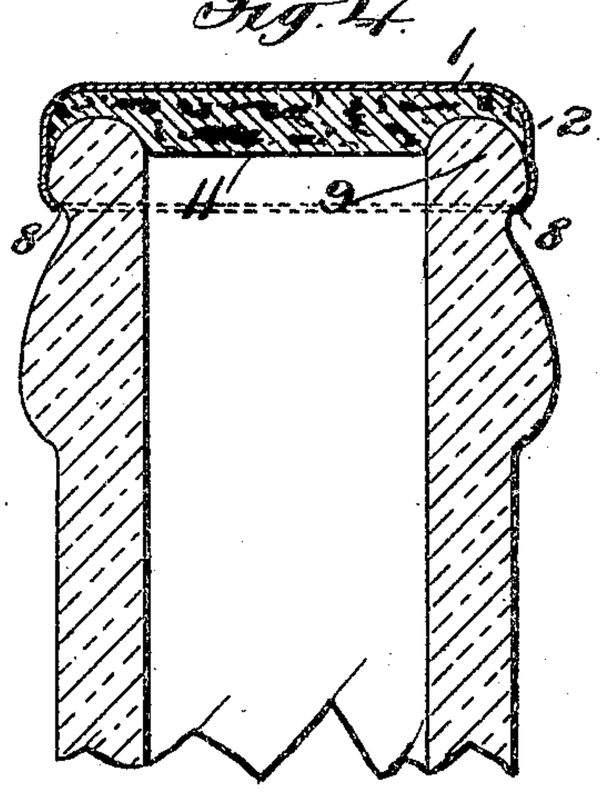
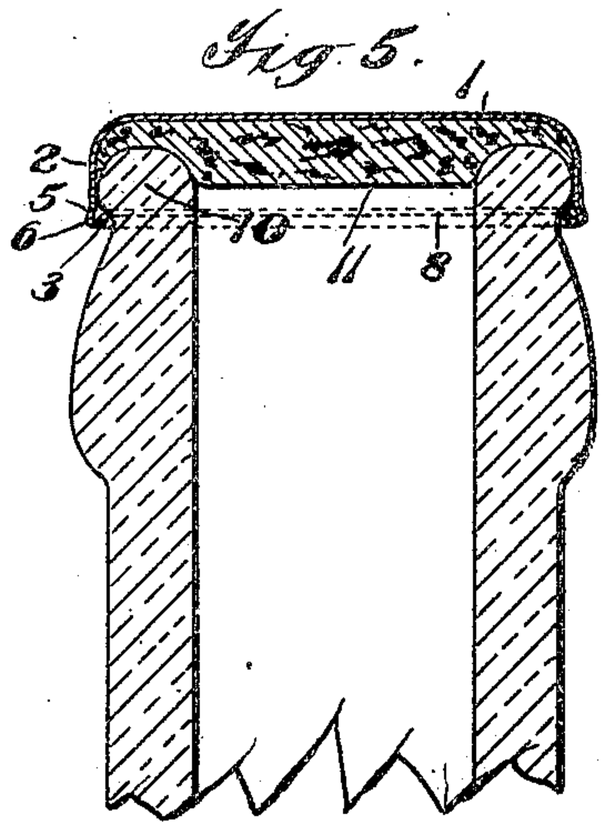


Fig. 5.



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UNITED STATES PATENT OFFICE.

ROBERT A. HALL, OF NEW YORK, N. Y., ASSIGNOR TO STANDARD STOPPER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CAP.

SPECIFICATION forming part of Letters Patent No. 794,149, dated July 4, 1905.

Application filed March 16, 1905. Serial No. 250,429.

To all whom it may concern:

Be it known that I, ROBERT A. HALL, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Caps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in metallic bottle-caps, and has for its object to produce a simple effective cap which is adapted to be applied to bottles having shoulders of varying heights, which may be cheaply made, which does not require complicated machinery in its manufacture, and of which a large number may be obtained from the sheets of metal from which such caps are commercially manufactured.

With this and other objects in view the invention consists in a novel construction hereinafter set forth.

Referring to the drawings, Figure 1 is a plan view of the improved cap. Fig. 2 is a central vertical section of the construction shown in Fig. 1. Fig. 3 is a central vertical section illustrating a modified form of cap. Fig. 4 is a central vertical section of the cap shown in Figs. 1 and 2 supplied with a sealing-disk and applied to a bottle having a low or long locking-shoulder. Fig. 5 is a view of the same cap applied to a bottle having a short or high locking-shoulder.

The cap which embodies the invention will be formed from non-resilient flexible metal—that is, metal which is capable of being bent into shape and which retains its shape after being bent—the term "flexible" being used in a restricted sense and not being intended to cover material which is elastic.

Caps embodying the invention, as shown in the drawings, comprise a crown 1, said crown having depending therefrom a flange 2. This flange is provided with an inturned locking-lip 3, which is designed, as will be hereinafter explained, to engage the shoulder of the bottle to which the cap is to be applied. In the best constructions this locking-lip will be formed by providing the lower edge of the flange 2 of the cap with an open groove 4, the upper wall 5 of which extends outwardly from the flange of the cap and lies at an angle thereto. In the best constructions, furthermore, the upper wall 5 of the groove and the locking-lip 3 will be connected by a sharp angular bend 6, as illustrated in Fig. 2 of the drawings, though fairly good results may be obtained with constructions like that illustrated in Fig. 3, where the bend connecting the lip 3 and the upper wall of the groove is rounded, as indicated at 7.

It is to be understood that bottles which are intended to be of the same size will vary somewhat even when made by the same tools. These variations in bottles, which must be provided for where caps of uniform size are to be employed and especially where a hermetic seal is desired, are of two kinds: first, variations in the greatest diameter of the locking-shoulder and, second, variations in the position of the under side of the locking-shoulder with respect to the lip or top of the bottle. In some bottles the under side of the locking shoulder or rib lies comparatively close to the top or lip of the bottle, such bottles being said to have short or high shoulders. Other bottles have the under side of the locking rib or shoulder lying comparatively far from the top or lip of the bottle, these bottles being said to have long or low shoulders. A bottle having the long or low shoulder 9 is illustrated in Fig. 4, while a bottle having a short or high shoulder 10 is illustrated in Fig. 5. The variation in the diameter of bottle-shoulders is taken care of in the improved cap by making the cap sufficiently large in diameter so that it may be applied to bottles having the greatest diameter of locking-shoulder. The cap can therefore readily be slipped over such a bottle and any bottle the locking-shoulder of which is smaller in diameter. The variation in the position of the under side of the locking-shoulder with respect to the top or lip of the bottle is taken care of by the action of the flange and locking-lip when the cap is being applied to the bottle, as will be described.

The improved cap may be used either in connection with a sealing-disk, the seal being effected by forcing the disk into sealing contact with the top or lip of the bottle, or it may be used in connection with a plug-cork

which enters the mouth of the bottle for a considerable distance. In the constructions illustrated the cap is shown as being used in connection with a sealing-disk 11. In applying the cap when it is used in connection with a sealing-disk such a disk is first placed in the interior of the cap, after which the cap is placed in position on the top of the bottle. Pressure is then applied to the cap and bottle. This pressure may be such as to fully compress the sealing-disk before the bending operation hereinafter described is begun, or the compressing of the disk may be continued during the bending operation.

The cap having been placed upon the bottle and the sealing-disk being under compression, the flange of the cap is subjected to the action of a suitable tool, such as a bending-die or spinning-wheel, which forces the inner edge 8 of the locking-lip 3 into contact with the locking-shoulder. The action of the locking-lip in effecting the locking varies somewhat with the height or length of the locking-shoulder on the bottle to which the cap is being applied. When the shoulder is long or low, as illustrated at 9 in Fig. 4, the edge 8 of the lip of the cap slides down the shoulder, the lip being carried under the shoulder and into locking contact therewith, as shown in that figure. During the bending operation the bend (indicated at 6) opens up, the amount of this opening depending on the position of the under side of the locking-rib with respect to the top of the bottle. The construction shown in Fig. 4 illustrates what has been observed to occur in actual practice where the shoulder is of extreme length, the locking-lip in this instance standing, when the cap is locked to the bottle, at an obtuse angle to the elements of the flange of the cap. When the cap is to be applied to a bottle having a short or high shoulder, such as illustrated at 10 in Fig. 5, the bending action causes the edge 8 of the lip 3 to strike the shoulder, after which the metal forming the upper wall 5 of the groove is bent downward, the locking in this case being effected chiefly by the contact of the edge of the lip with the under side of the locking-shoulder. Fig. 5 illustrates what has been observed to occur in actual practice with bottles having unusually short or high locking-shoulders, the locking-lip in this instance standing, when the cap is applied to the bottle, at an acute angle to the elements of the flange of the cap.

It has been found in practice that the improved cap by reason of the action of the locking-rib during the bending operation adapts itself readily to such variations as occur in commercial bottles which are intended to be of the same size.

While the best results so far as sealing bottles containing liquids bottled under a considerable internal pressure will be obtained from forming the cap with the part 2 of the flange continuous and the locking-lip 3 continuous, fairly good results may be obtained by slitting the lip part of the cap or the flange, or both. It will be understood, however, that this slitting lessens the capacity of the cap for sustained internal pressure. Care should be taken, however, in case the slitted form of cap is employed not to carry the slits sufficiently far vertically to form legs which are elastic—that is, which will spring outward after the cap has been subjected to the bending operation referred to.

The improved cap should be carefully distinguished from prior construction—such, for instance, as cork-holders which have comparatively long elastic legs or locking extensions with inturned ends, which are intended to engage beneath shoulders on bottles or similar receptacles. Some of these constructions have the inturned ends lying substantially in a circle the diameter of which is normally greater than the greatest diameter of the locking-shoulder to which the cap-holder is to be applied, and in these constructions some extraneous holding means—such, for instance, as a ring or band—is employed to hold the legs in locking position, for if such means were not employed the legs would spring outward after the bending pressure was removed, whereas in the improved cap the metal of the flange after the cap has been applied remains in locking position by reason of the non-resiliency of the flange. In other prior cap or cork-holder constructions employing such elastic legs with inturned ends as have been referred to the ends lie in a circle the diameter of which is normally smaller than the greatest diameter of the smallest locking-shoulder of the bottles with which the holder is to be used, the elasticity of the legs or extensions being relied upon to allow the legs or extensions to spring out as the cap or holder is forced down upon the bottle and then spring inwardly when the cap is seated. Furthermore, these cap or cork-holder constructions are applied to bottles by forcing them down upon the bottles until the inturned ends of the legs can be sprung underneath the shoulder of the bottle. The relation or position of these inturned ends with respect to the legs is not, therefore, varied or changed as the bottle-shoulder varies in height. On the contrary, the angle between the inturned ends and the legs remains the same no matter whether the shoulder on the bottle to which the cap or holder is applied be higher or lower. The improved cap is also to be distinguished from such constructions as are shown, for instance, in the United States patent to Patterson, No. 682,995, dated September 17, 1901, wherein is shown a cap having a plurality of locking legs or extensions consisting of an outer and inner section, these locking-levers being swung into position by bending the legs or extensions inward and compensating

for various heights of shoulders by a shortening action of the inner section due to a rolling action of the metal. In the construction shown in this patent the inner sections do not form any such locking-rib as exists in the improved cap, and, furthermore, these inner sections never bend downward or open up by reason of their contact with the bottle-shoulder, so that these sections do not change or vary their angular relation with respect to the flange of the cap as the cap is applied to the bottle.

The improved cap has been found in practice, especially in the best form, to be exceedingly efficient, notwithstanding high internal pressure, with bottles the shoulders of which vary considerably in the manner hereinbefore referred to. Furthermore, the cap is cheap to make, in that it requires no complicated machinery, but can be struck up by simple dies from circular blanks. Furthermore, the blanks required for making caps for the ordinary commercial bottles are comparatively small in diameter and a relatively large number of blanks can be obtained from a single sheet of tin such as is used in the commercial manufacture of caps of this description.

While the constructions which have been described embody the invention in its best form, it is to be understood that changes and variations may be made therein. The invention is not, therefore, to be limited to the precise details of construction hereinbefore described. While, furthermore, the construction has been illustrated and described in connection with caps applied to bottles, it is to be understood that the invention may be employed with caps which are to be applied to other shouldered receptacles.

What is claimed is—

1. A flanged cap of non-resilient flexible metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, said cap having the edge of its flange turned inward to form a locking-lip the edge of which contacts with the shoulder of the receptacle below the line bounding the greatest diameter of the shoulder as the flange is forced inward and the lip being constructed to vary its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

2. A flanged cap of non-resilient flexible metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, the lower edge of the cap being provided with a circumferential groove which faces the interior of the cap, the upper wall of said groove lying at an angle to the part of the flange above it and the lower wall forming a locking-lip the inner edge of which strikes the receptacle-shoulder below the line bounding the greatest diameter of the shoulder as the flange is forced inward, said lip changing its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

3. A flanged cap of non-resilient flexible metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, the lower edge of said flange being provided with an open circumferential groove which faces the interior of the cap, the upper wall of said groove lying at an angle to the flange above it, the lower wall forming a locking-lip and the two walls of said groove being joined by a sharp angular bend in the metal, the locking-lip varying its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

4. A cap having a continuous flange of non-resilient flexible metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, said cap having the edge of its flange turned inward to form a locking-lip the edge of which contacts with the shoulder of the receptacle below the line bounding the greatest diameter of the shoulder as the flange is forced inward and the lip being constructed to vary its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

5. A cap having a continuous flange of non-resilient metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, the lower edge of the cap being provided with a circumferential groove which faces the interior of the cap, the upper wall of said groove lying at an angle to the part of the flange above it and the lower wall forming a locking-lip the inner edge of which strikes the receptacle-shoulder below the line bounding the greatest diameter of the shoulder as the flange is forced inward, said lip changing its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

6. A cap having a continuous flange of non-resilient metal adapted to be applied to shouldered receptacles having shoulders of varying height by forcing the flange inward, the lower edge of said flange being provided with an open circumferential groove which faces the interior of the cap, the upper wall of said groove lying at an angle to the flange above it, the lower wall forming a locking-lip and the two walls of said groove being joined by a sharp angular bend in the metal, the locking-lip varying its angular position with respect to the flange of the cap as the receptacle-shoulders vary in height.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ROBERT A. HALL.

Witnesses:
J. A. GRAVES,
A. WHITE.