

L. J. CAMPBELL.
CLOSURE FOR BOTTLES, JARS, &c.
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945,444.

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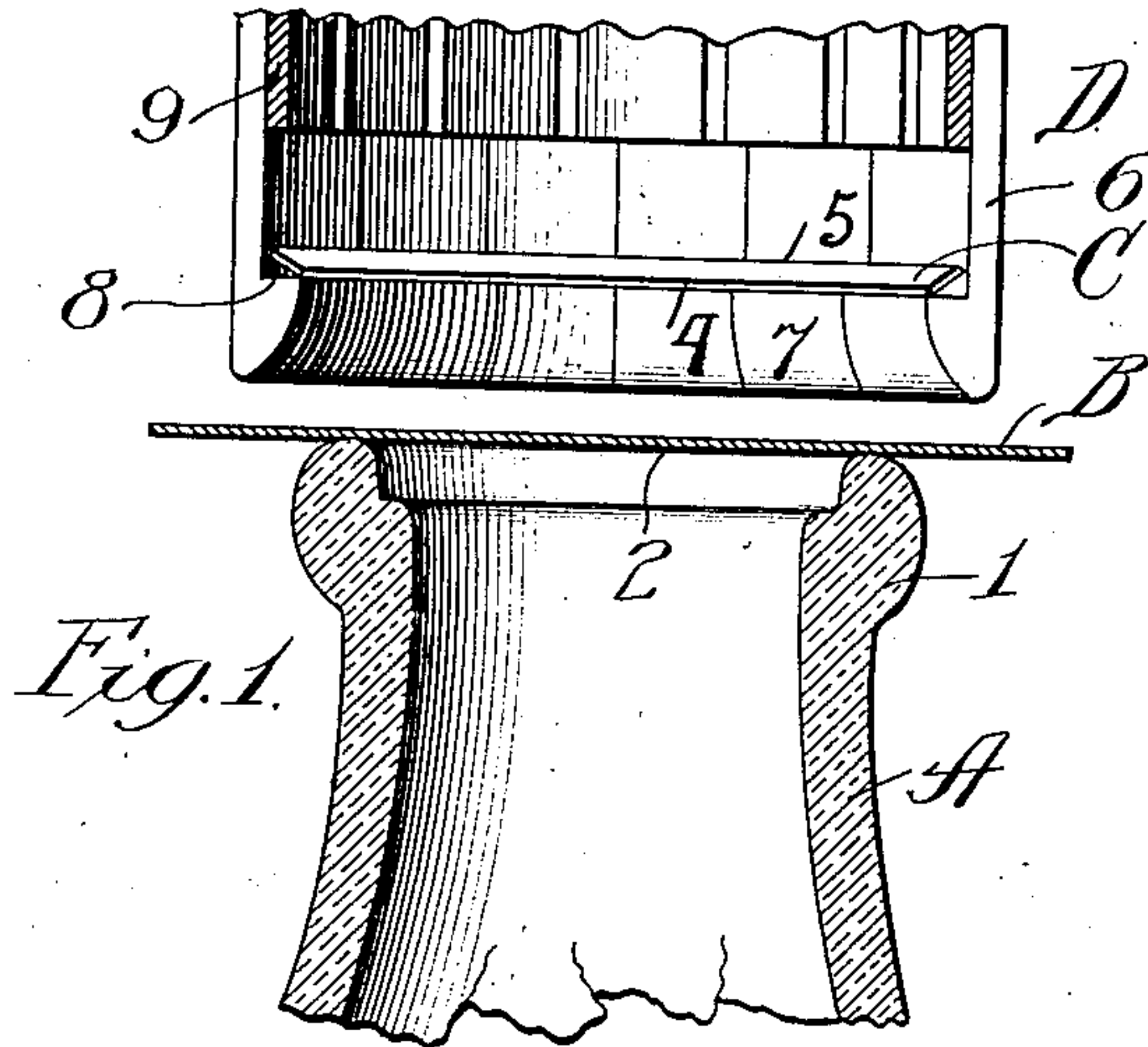


Fig. 1.

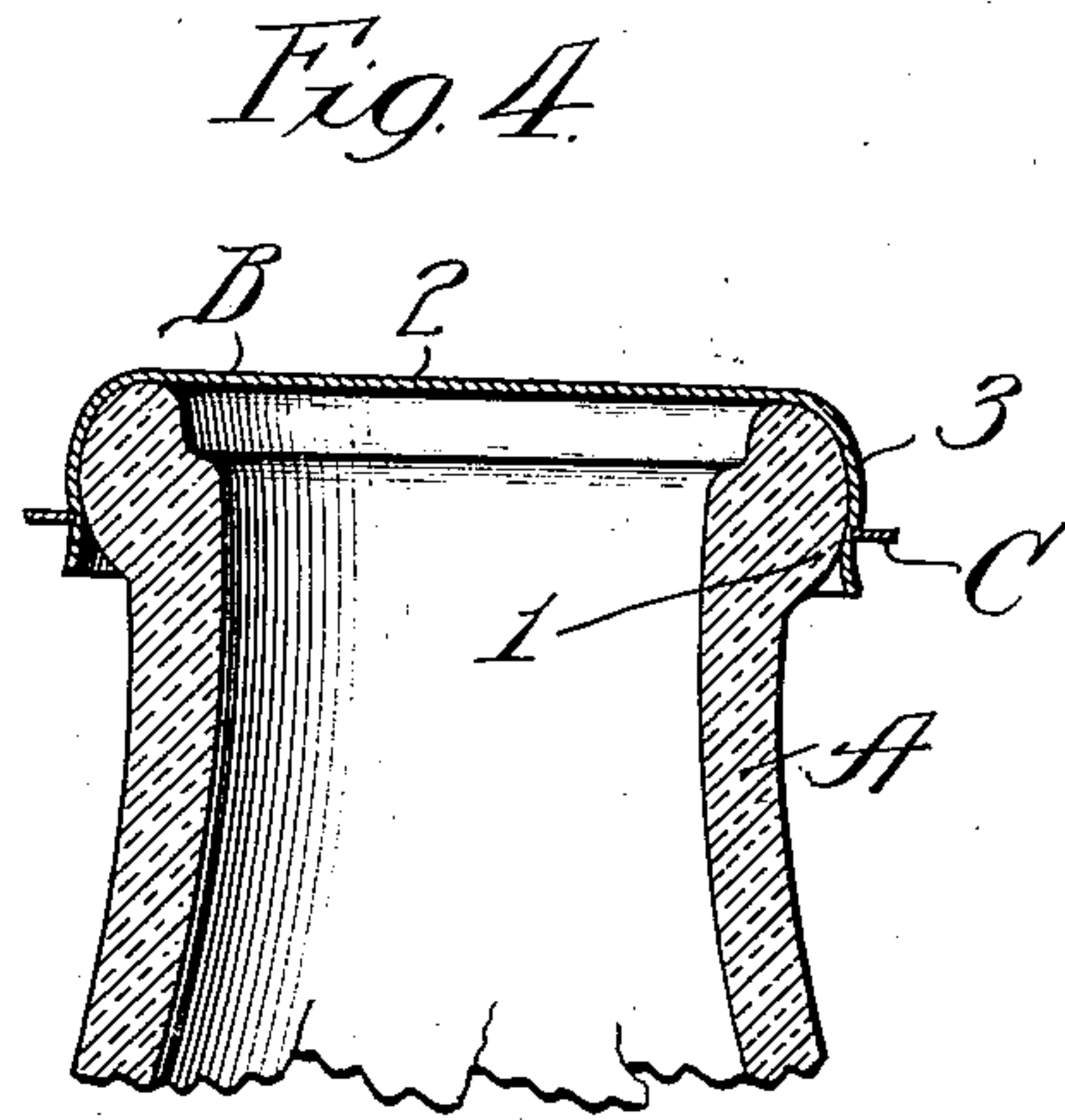


Fig. 4.

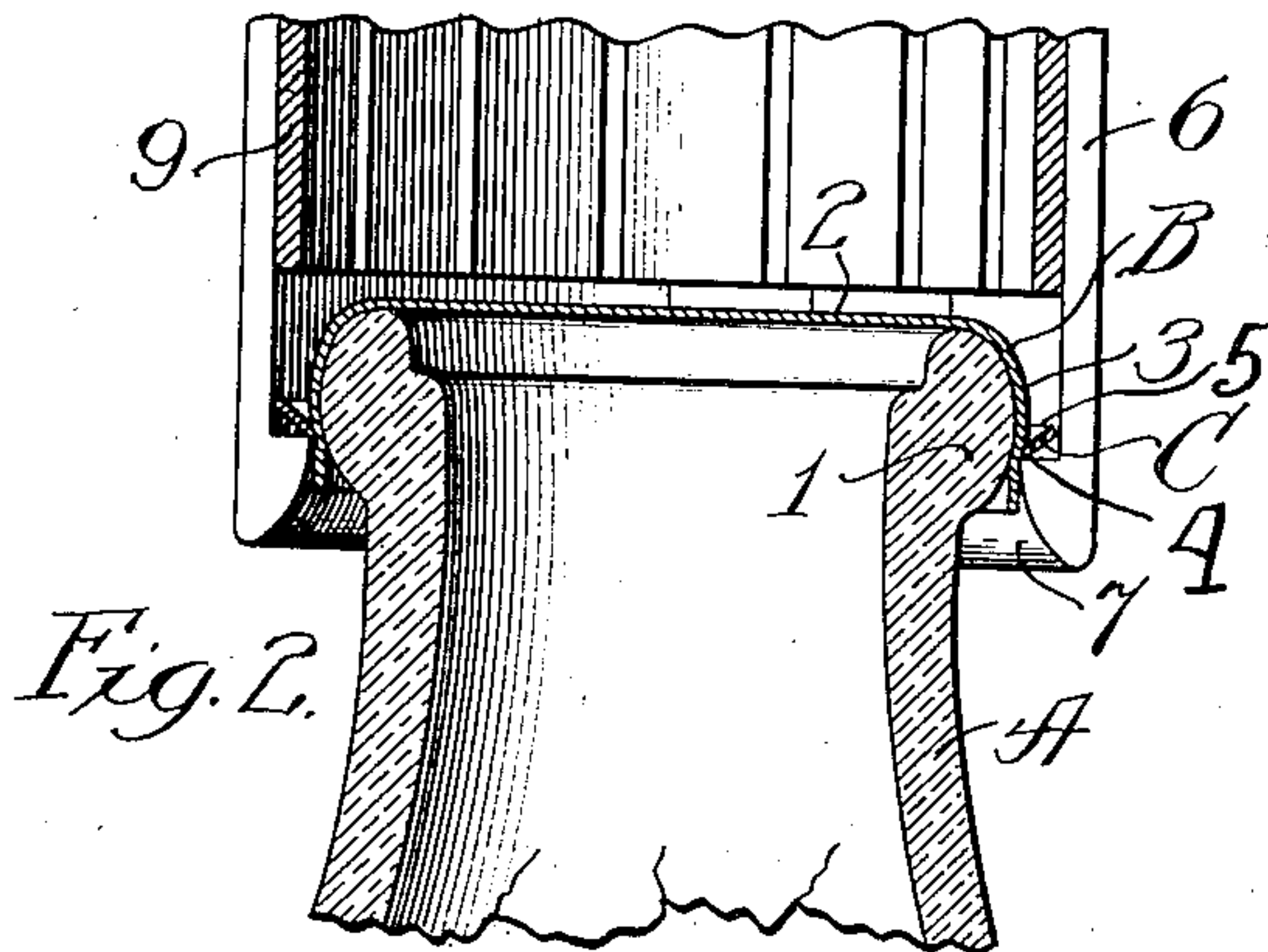


Fig. 2.

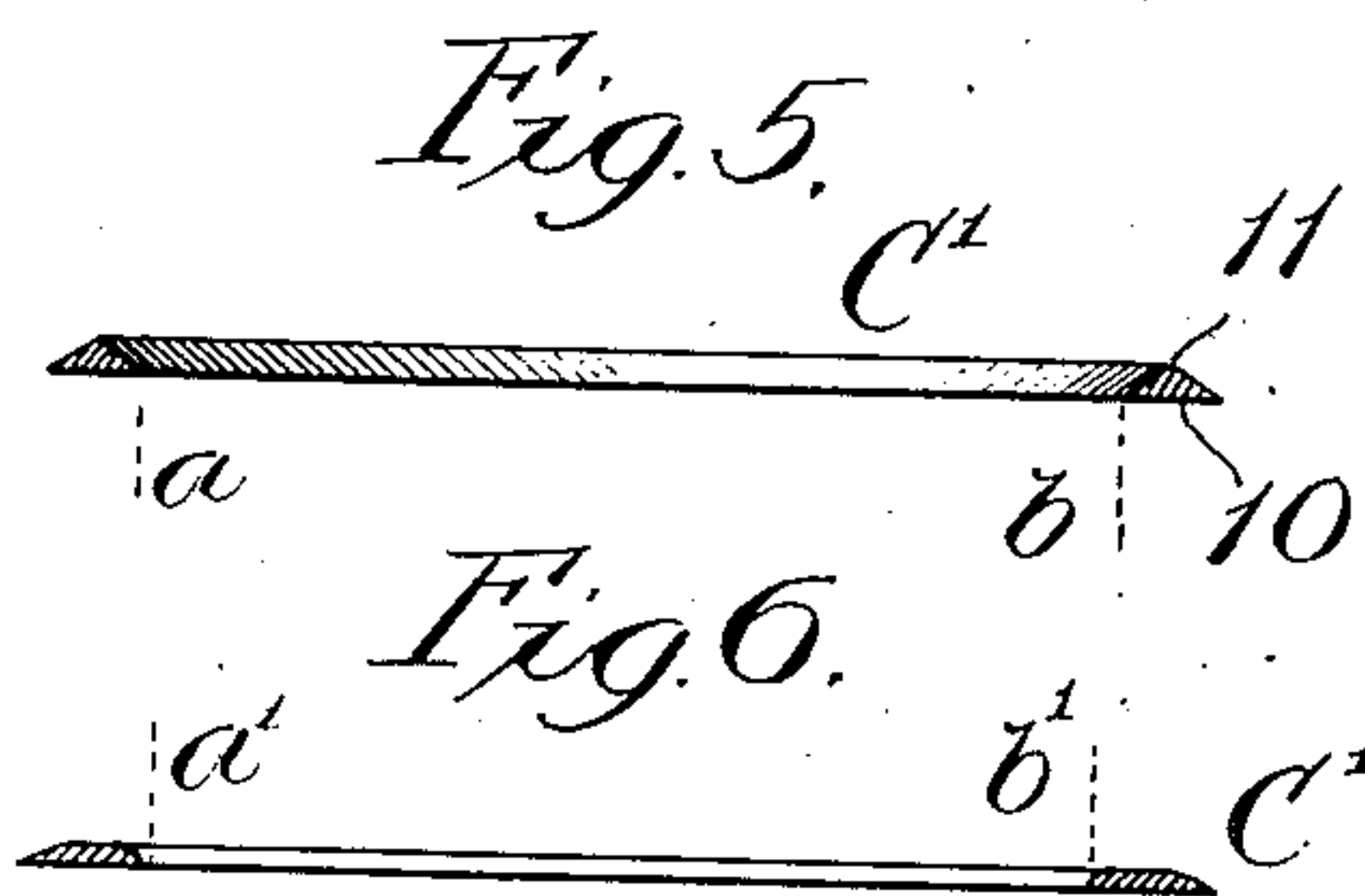


Fig. 5.

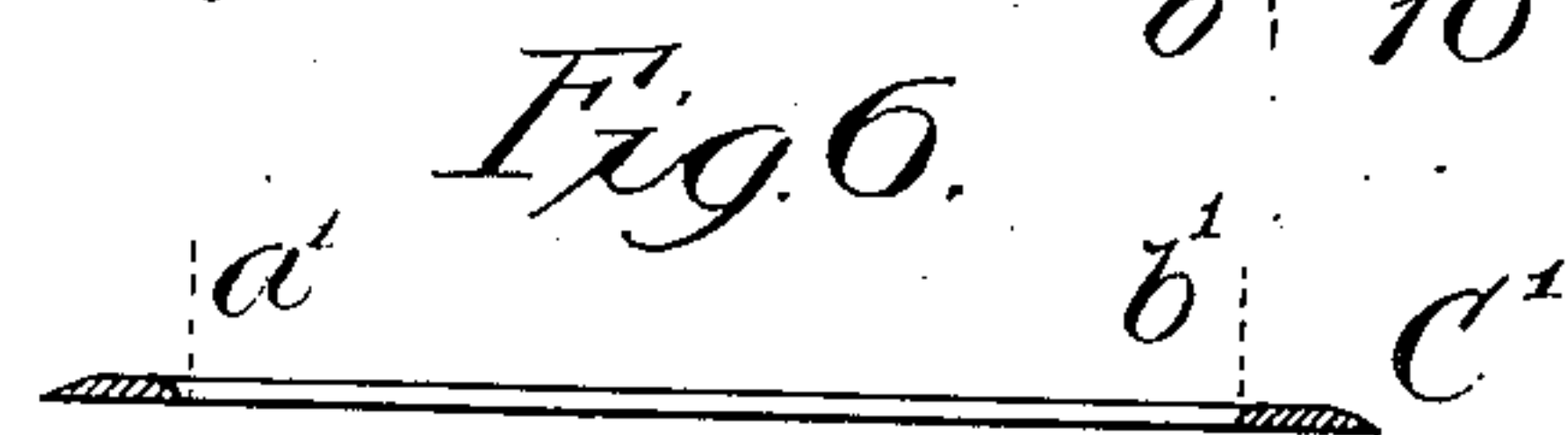


Fig. 6.

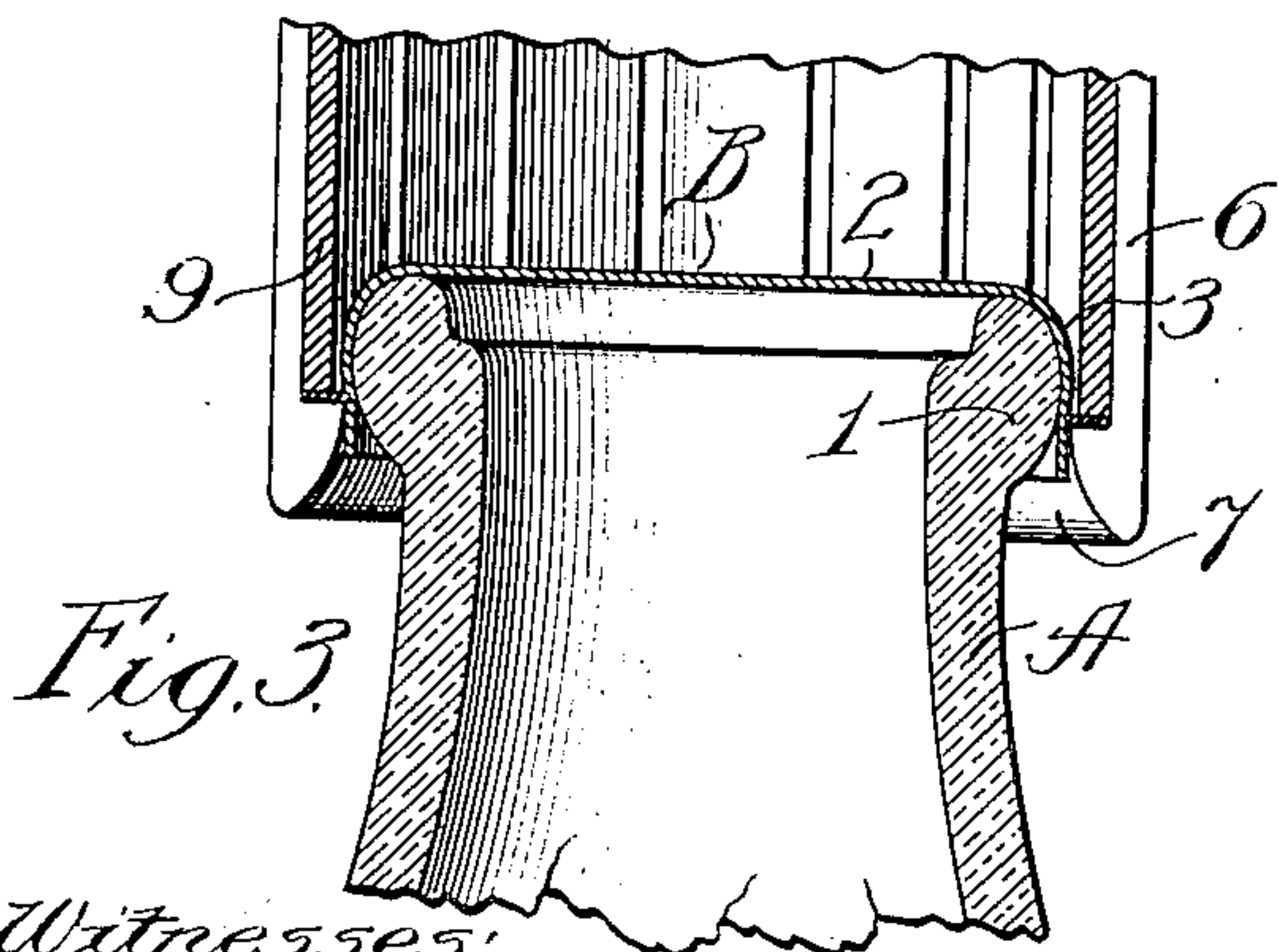


Fig. 3.

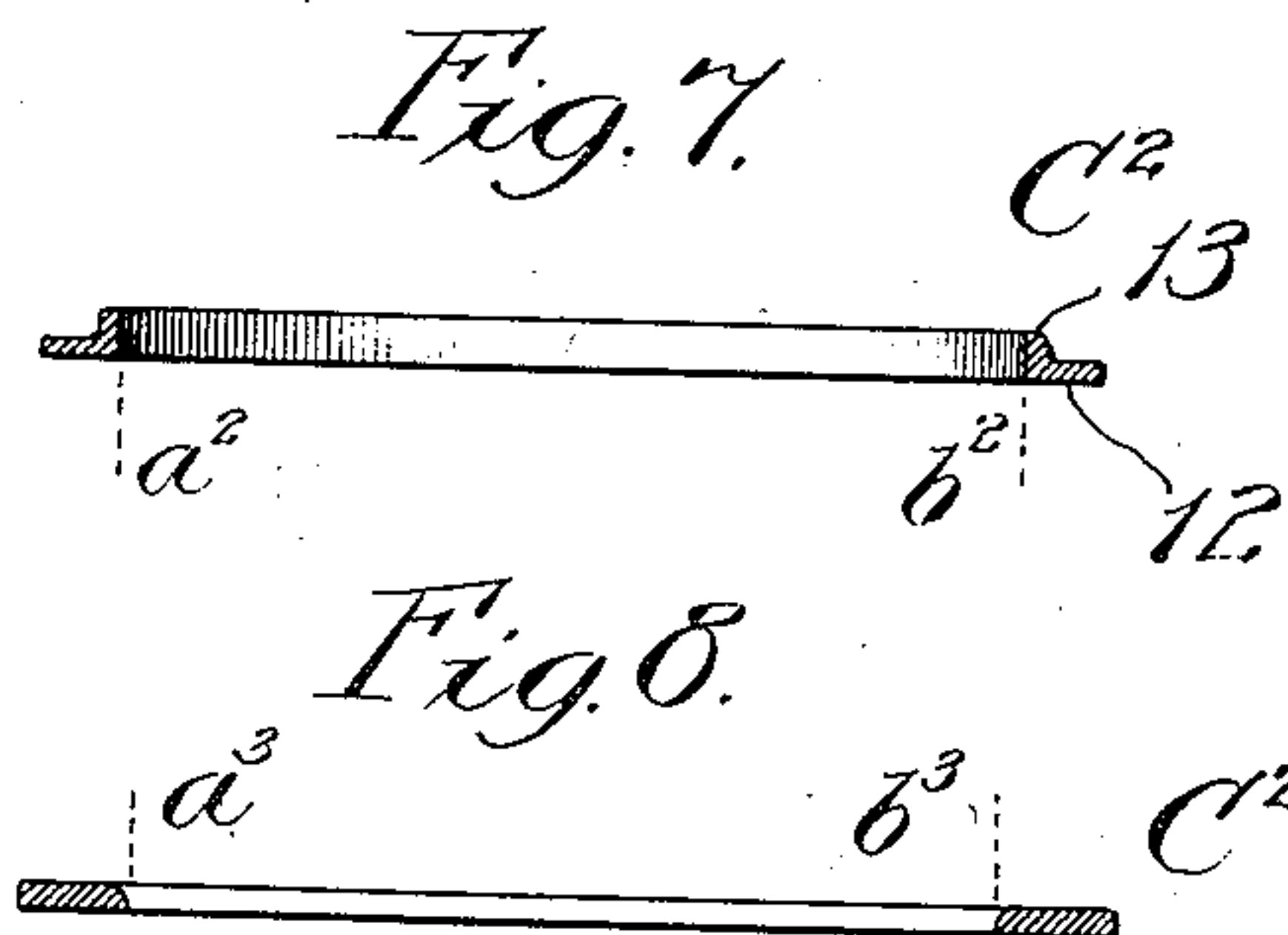


Fig. 7.

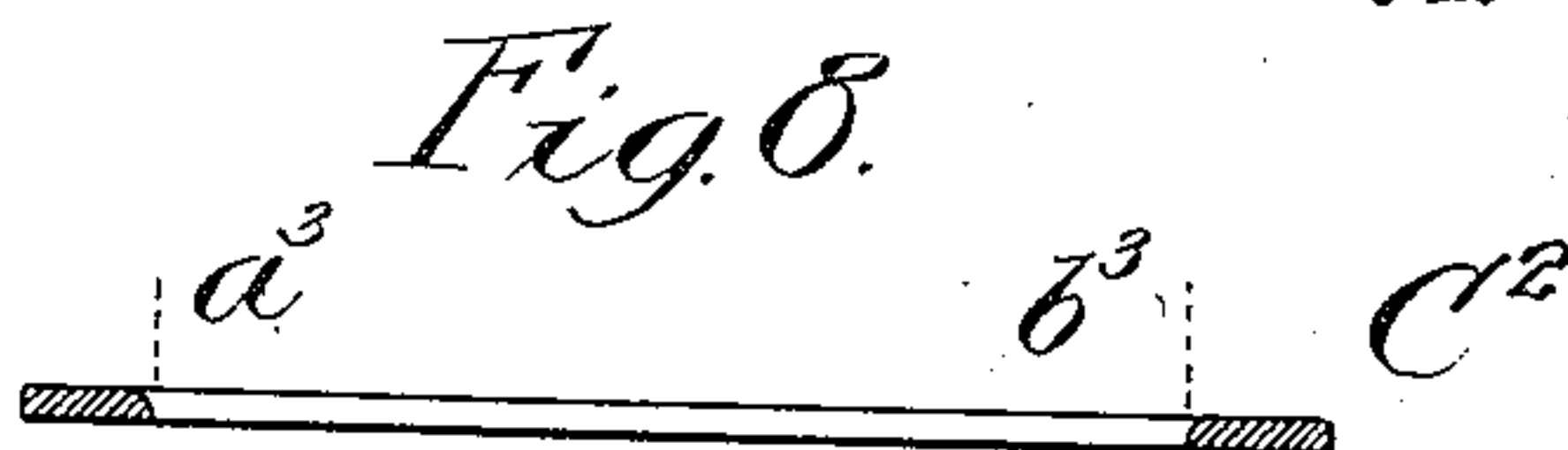


Fig. 8.

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UNITED STATES PATENT OFFICE.

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CLOSURE FOR BOTTLES, JARS, &c.

945,444.

Specification of Letters Patent.

Patented Jan. 4, 1910.

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To all whom it may concern:

Be it known that I, LEON J. CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Closures for Bottles, Jars, &c., of which the following is a specification.

My invention relates particularly to means for and a method of closing or sealing milk-bottles, jam-jars, and the like; and my primary object is to provide improved means of simple and cheap construction, capable of being readily applied, for closing and sealing milk-bottles, jars, and the like, as well as an improved method of applying closures to bottles, and the like, in such a manner as to obviate the danger of breakage.

The invention is illustrated in its preferred embodiment in the accompanying drawing, in which—

Figure 1 represents a broken sectional view of the upper portion of a milk-bottle with a sealing disk, or closure, resting thereon and a securing-ring therefor held by means for applying the same; Fig. 2, a similar sectional view, illustrating the device in process of application; Fig. 3, a similar view showing the same parts after the applying apparatus has operated to flatten the securing-ring and contract its inner diameter so as to firmly secure the sealing-cap, or closure, to the flange of the bottle-neck; Fig. 4, a similar section showing the applying apparatus removed; Fig. 5, a sectional view showing a modified form of securing-ring; Fig. 6, a similar section showing the same securing-ring after subjection to a flattening operation, reducing the interior diameter; Fig. 7, a sectional view of another modification of the securing-ring; and Fig. 8, a sectional view of the same after the flattening operation.

In the construction illustrated, A represents the neck of a milk-bottle provided at its upper portion with the usual external curved flange 1; B, a closure which may be either in the form of a disk, as shown in Fig. 1, or which may be preparatorily formed into the cup-shaped cap shown in Fig. 2; C, a securing-ring adapted to secure the cap, or closure, to the bottle; and D, means adapted for use in applying the closure and sealing device to the bottle.

While the bottle A is shown in the form of a milk bottle, the closing and sealing device may be applied to any bottle or jar, and will serve as an effective closure and sealing device, particularly where the bottle or jar is equipped at its upper portion with an external flange, as is usually the case.

After the closure B is formed into cup-shape it then has a disk-portion 2 which bears upon the top-edge of the bottle-neck, and a downturned flange, or skirt 3, which lies exterior to the flange 1 of the bottle.

The securing-ring C, in its preferred form, comprises an annular band of metal, which is dished somewhat, as shown in Figs. 1 and 2, so that the ring preferably has the form of a short, hollow, truncated cone, whose inner circumferential edge is designated 4 and whose outer circumferential edge is designated 5. For convenience of operation of the applying-device D, it is preferred to arrange the securing-ring C so that the smaller end will be presented downwardly.

The applying-device D may be of any suitable construction. I have illustrated only a portion of a suitable applying-device, as a means of indicating, in a general way, the manner in which the securing-rings may be applied. The device D comprises an expansible, sectionally-constructed, sleeve having a beveled, or rounded, internal surface 7 at its lower end, above which is located an anvil 8, and an internal hollow plunger 9, which may be sectionally constructed and expansible to enable the rings C to be fed from a magazine above to the anvil 8.

In the operation of the device, the external sleeve, or plunger, 6 which carries the anvil 8 descends and carries the peripheral portion of the disk B, which usually is of paper, or paste-board, downwardly, thereby forming the depending flange, or skirt, 3. The anvil 8 then stands in position to support the securing-ring C, and the sleeve 9, descending forces the securing-ring to assume a horizontal plane, thereby causing its inner diameter to contact and firmly secure the cap B to the flange of the bottle-neck. The securing-ring is preferably so positioned as to lie below the largest diameter of the flange 1 of the bottle-neck, so

that the thickness of the cap will effectively prevent the closure from being dislodged.

Fig. 4 shows the same closing and sealing device illustrated in Fig. 3, after the applying device has been removed. In practice, provision is made, in a suitable machine, for applying the closures to a large number of bottles at one operation. It is noted that in the operation of applying the deforming force to the deformable securing-ring, the force is applied in a direction transversely to the plane of the securing-ring, or, in other words, substantially parallel with the axis of the bottle, or other article, to which the closure is applied. Thus, the only pressure exerted upon the bottle is the evenly-distributed compressing-force exerted by the securing-ring.

In the modification shown in Figs. 5 and 6, the deformable securing-ring is designated C^1 . Prior to the flattening operation, this ring has a flat lower surface 10 and converging upper surfaces which meet in an annular apex 11. Thus, the apex-portion of the deformable-ring lies out of the final plane of the ring after the flattening operation. a, b represents the internal diameter of the securing-ring before the deforming operation occurs, and a^1, b^1 represents the internal diameter of the ring after the flattening operation.

In the modification shown in Figs. 7 and 8, C^2 represents the deformable securing-ring. The ring, in this form, has a flat lower surface 12 and an upwardly-extending flange 13. In the flattening operation the ring is flattened to the form shown in Fig. 8. Prior to the deforming operation, the internal diameter of the ring is represented by $a^2 b^2$; and after the deforming operation the internal diameter is represented by $a^3 b^3$.

In each case, it is observed that the deformable securing-ring is adapted to have its internal diameter shortened in the deforming operation, which is produced by striking or compressing the metal, the force being exerted along lines parallel to the axis of the bottle, or other article, to which the closure is applied.

While it is preferred to effect the sealing operation by seating a disk on the upper end of the bottle with the peripheral portion of the disk projecting beyond the bottle, and then curve the projecting peripheral portion downwardly to form a depending flange, or skirt, embracing the exterior surface of the bottle-neck, the cap-piece may be preparatorily pressed or formed in cup-shape. In any case, the depending flange 3 of the cap-piece may be formed without any objectionable wrinkling of the material, and in the operation of applying the closure and its securing-ring, the material of the cap-piece is tightly stretched across the top of the bottle.

To remove the closure, the securing-ring may be forced downwardly until it is free from engagement with the flange of the cap-piece, after which the cap-piece may be removed and the ring may then be slipped off the neck of the bottle. If preferred, the paper cap-piece may be cut or destroyed and the securing-ring slipped from the bottle. It will be found impossible, however, to move the cap-piece without either forcing the securing-ring downwardly out of engagement with the flange 3 of the cap-piece, or destroying the cap-piece.

The foregoing detailed description has been given for clearness of understanding only. Hence, no undue limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is—

1. In combination with a bottle, or like article, a flexible cap-piece having a flange-portion adapted to encircle the upper portion of the outer surface of the neck of the article, and a deformable securing-ring adapted, when struck transversely, to contract its interior diameter and thereby bind said flange-portion to said neck.

2. In combination with a bottle, or like article, a flexible cap-piece having a depending flange embracing the neck of said article, and a deformable securing-ring having a portion lying out of the final plane in use and adapted, when the ring is compressed by force, exerted parallel with the axis of said article, to cause contraction of the inner circumference of said securing ring.

3. In combination with a bottle, or like article, a flexible cap-piece with a neck-embracing flange, and a dished securing-ring adapted to contract its inner diameter when flattened into a transverse plane.

4. In combination with a bottle having its neck provided with an external flange, a flexible cap-piece with a depending neck-embracing flange, and an endless metallic securing-band encircling said depending flange beneath the largest diameter of the bottle-flange, said band having its material struck transversely to the plane thereof, thereby contracting the inner circumference of the band to cause it to grip said depending flange.

5. The method of sealing a bottle, or like article, which consists in seating thereon a flexible cap-piece, applying a deformable securing-ring about the flange-portion of said cap-piece, and applying deforming force transversely to the plane of said securing ring and thereby contracting the inner diameter of said securing-ring to bind said flange-portion to said article.

6. The method of sealing a bottle, or like article, which consists in seating thereon a

flexible disk having its peripheral portion projecting beyond the neck of said article, bending said peripheral portion downwardly to embrace said neck, slipping a deformable
5 securing-ring about the depending flange thus formed, and applying deforming force to said ring in a direction substantially par-

allel with the axis of said article, thereby to contract the inner diameter of said securing-ring.

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In the presence of—

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J. G. ANDERSON.