

No. 846,909.

PATENTED MAR. 12, 1907.

A. W. CORDES.
BOTTLE STOPPER.

APPLICATION FILED APR. 20, 1906.

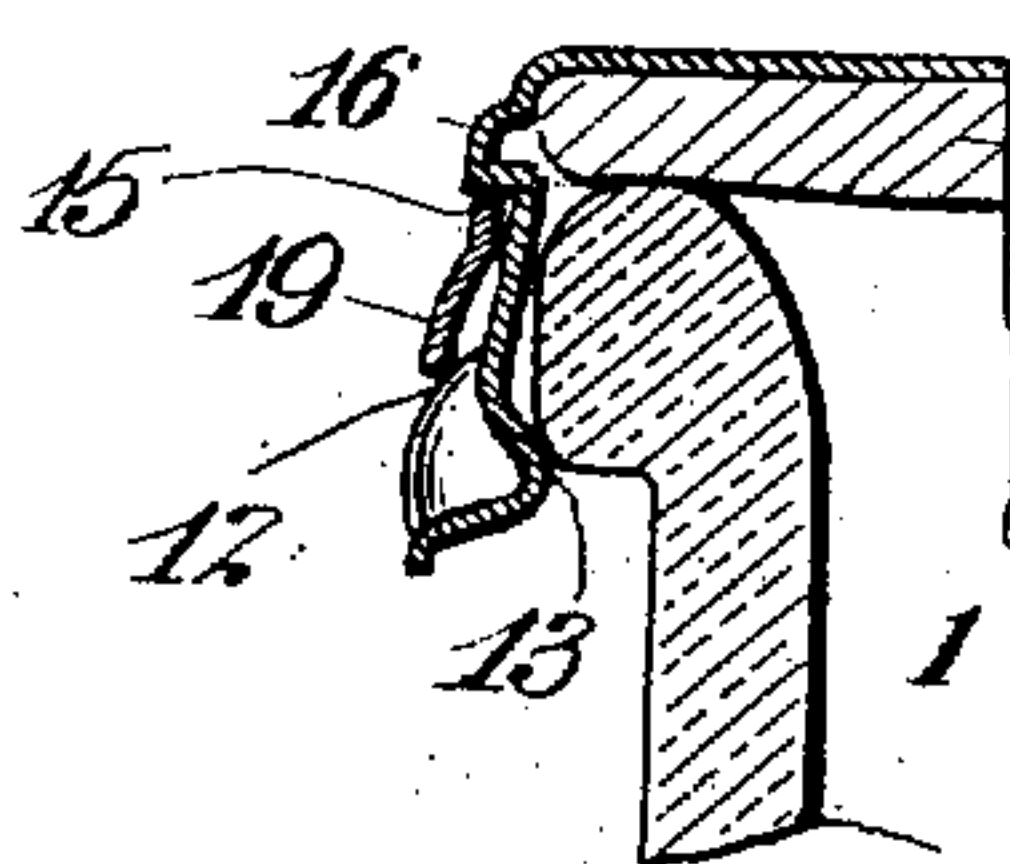
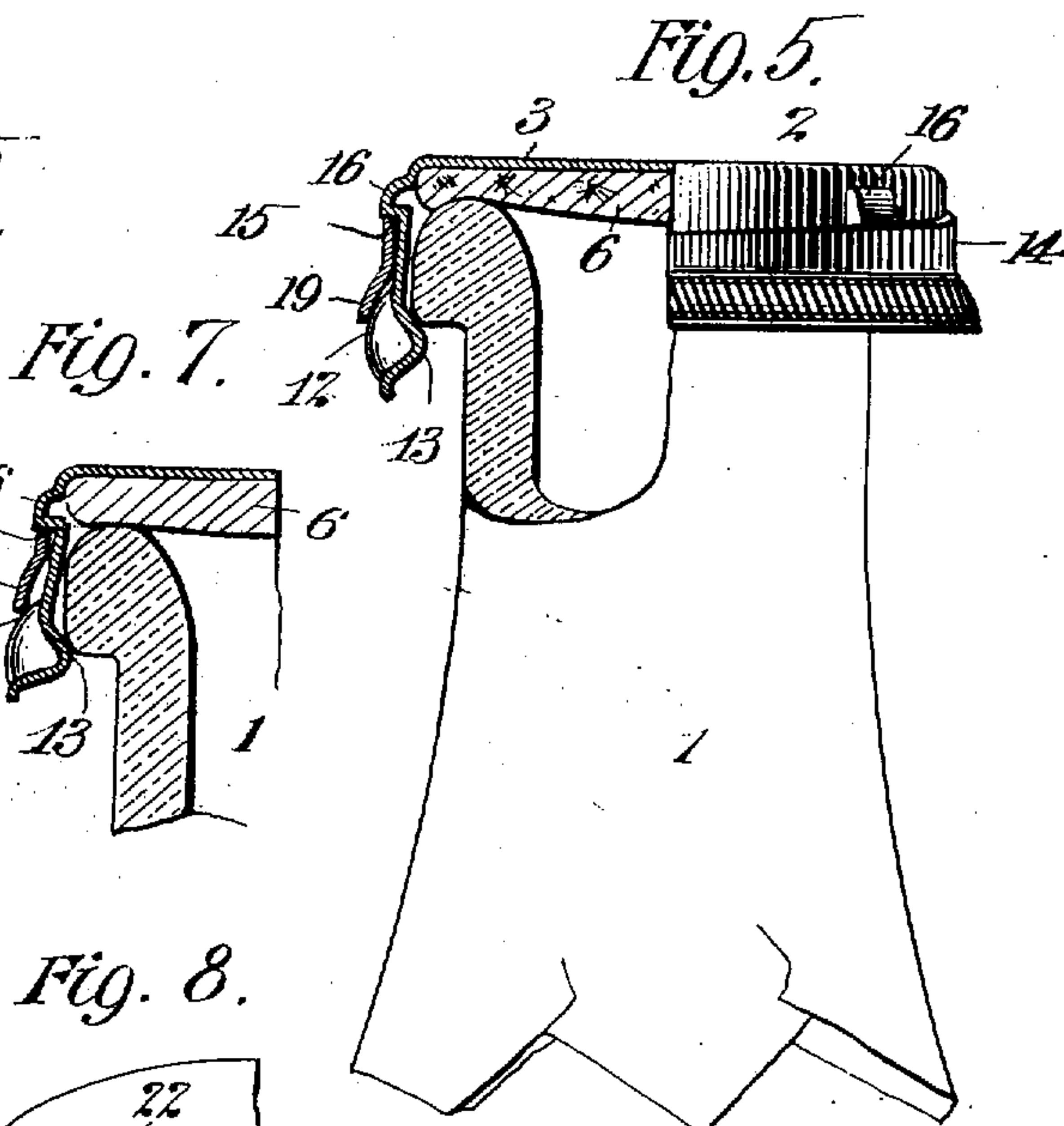
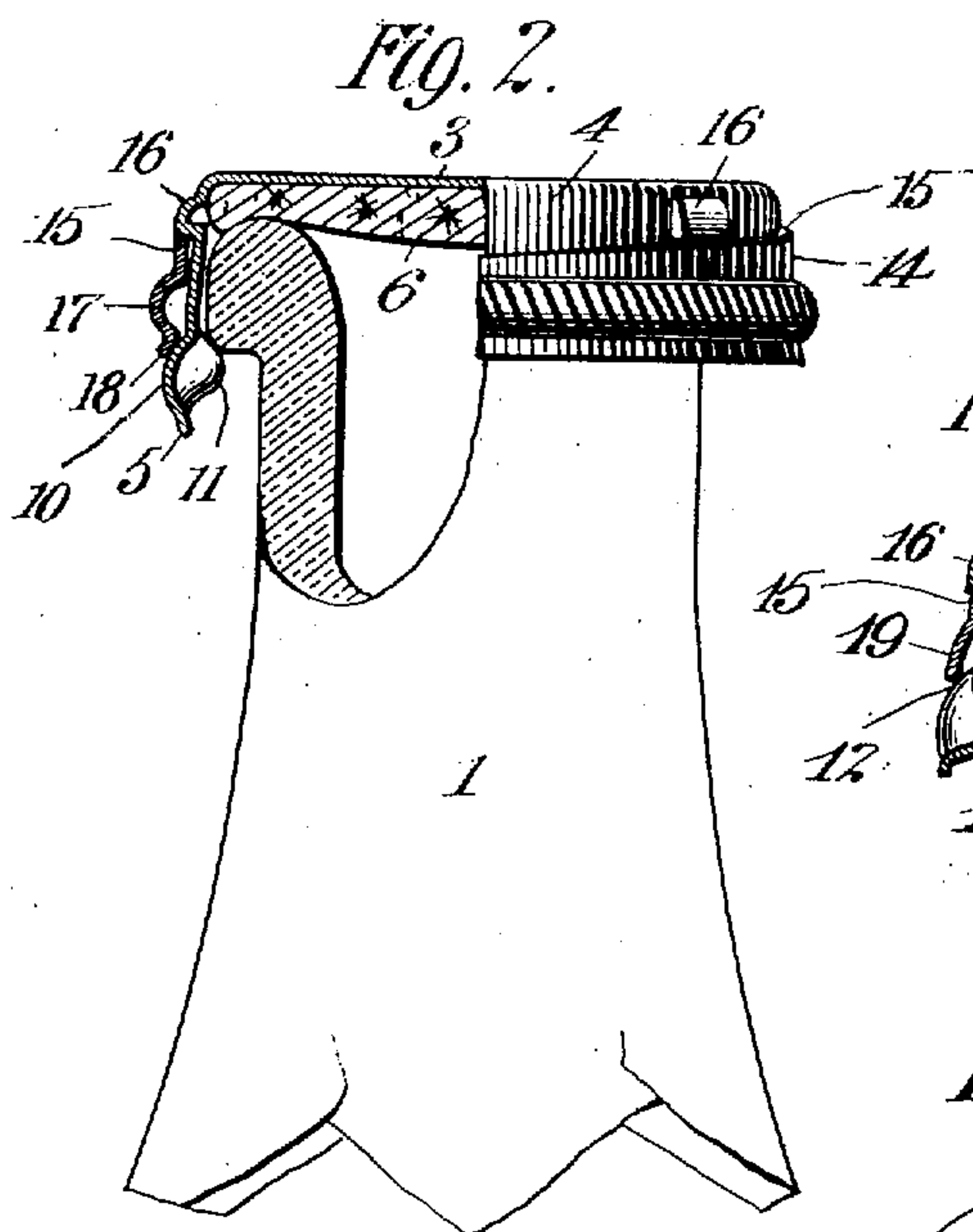
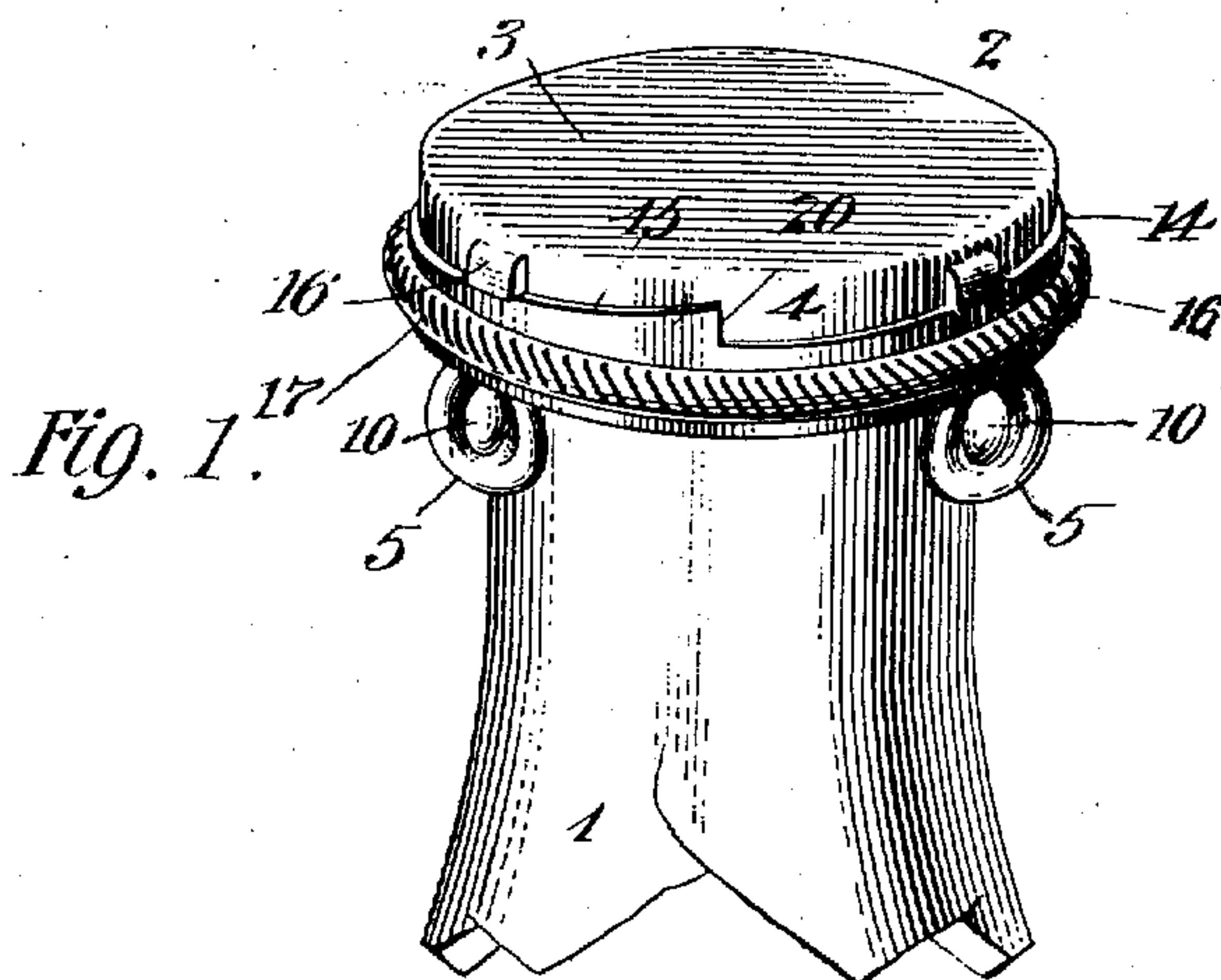


Fig. 8.

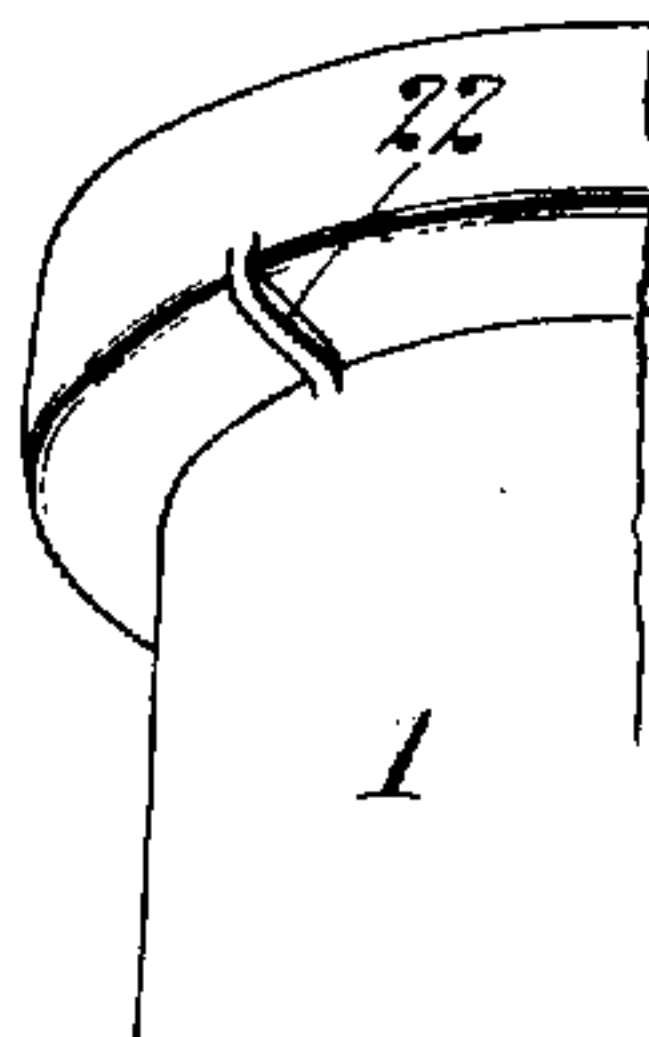
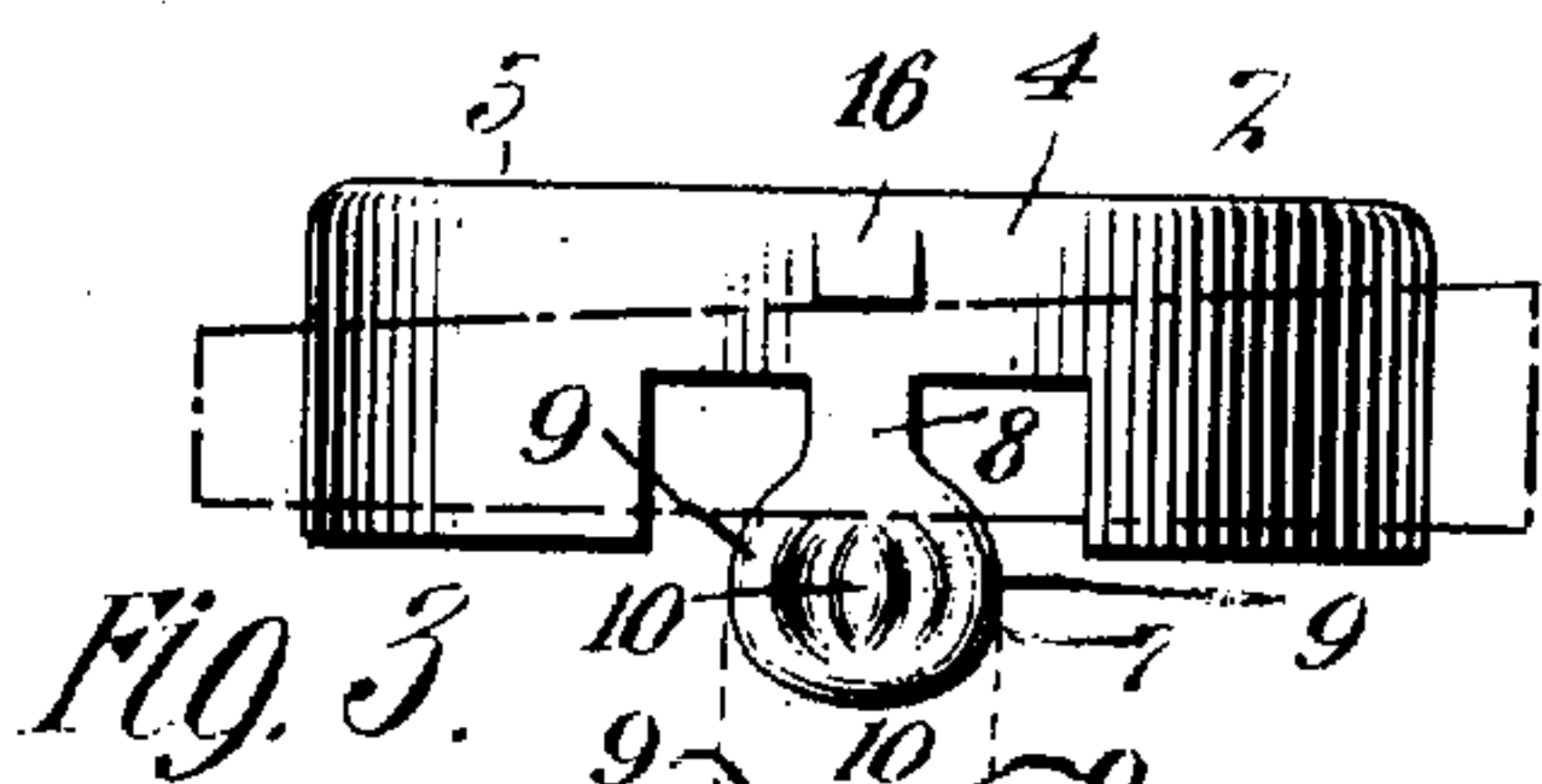
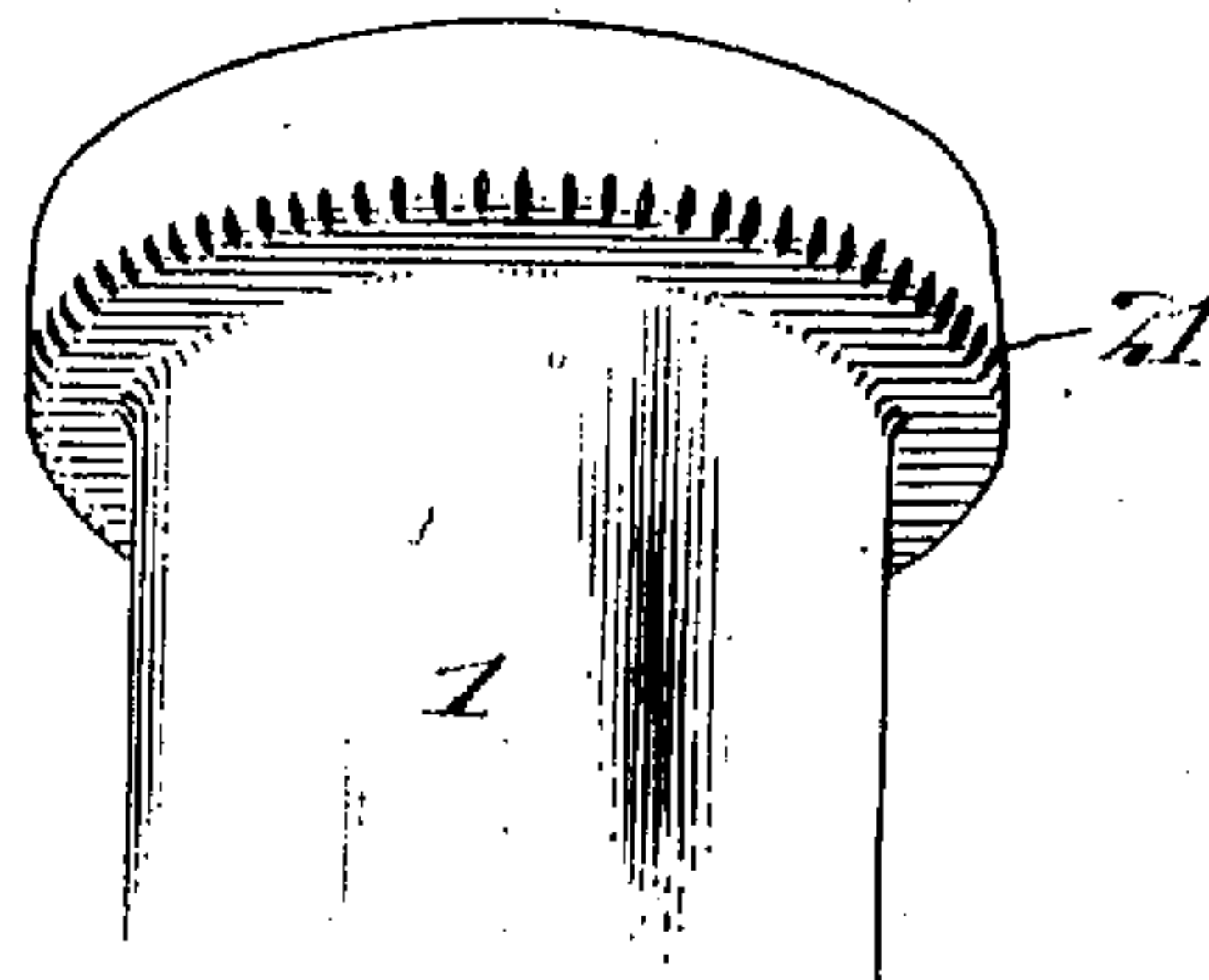
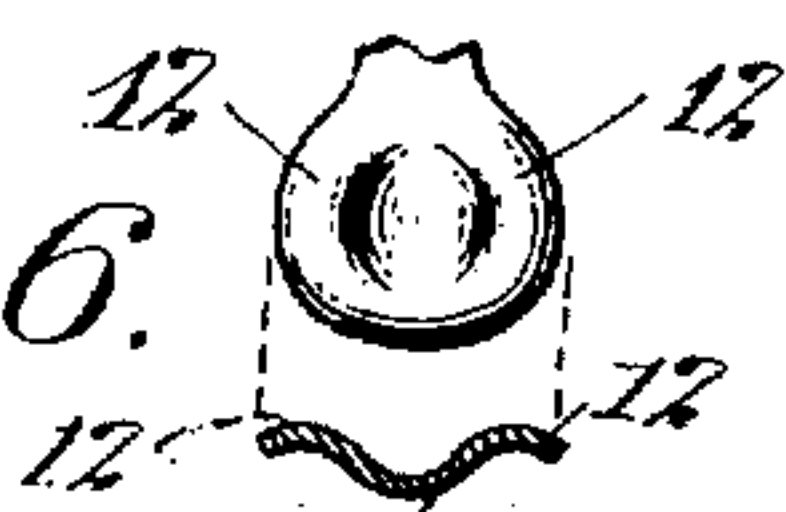


Fig. 4.



Witnesses
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Fig. 6.



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UNITED STATES PATENT OFFICE.

AUGUST W. CORDES, OF NEW YORK, N. Y.

BOTTLE-STOPPER.

No. 846,909.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed April 20, 1906. Serial No. 312,772.

To all whom it may concern:

Be it known that I, AUGUST W. CORDES, a citizen of the United States, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Bottle-Stoppers, of which the following is a full, clear, and exact description.

My invention relates to bottle-stoppers of that class in which the cap is removable or replaceable at will upon the bottle and in which cam means are employed for making a good sealing engagement when the parts are in closed relation.

A bottle-cap of this description forms the subject of my prior application, Serial No. 291,546, filed December 13, 1905. The present case relates to an improvement of this type of cap or stopper in which the parts are made more efficient, more durable, and more practical for the purposes of manufacture.

With these and other objects in view my invention consists in the construction, combination, in the location, and in the arrangement of parts, as hereinafter set forth and shown and finally particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a complete cap embodying the principles of my invention applied to a bottle. Fig. 2 is a side view of the same, partly in section. Fig. 3 is a detail view showing the construction of part of the cap. Fig. 4 is a perspective view showing a form of bottle which is advantageously employed in my invention. Fig. 5 is a side view, partly in section, showing a slightly-modified form of clamping-ring. Fig. 6 is a detail view of one of the depending fingers. Fig. 7 is a sectional view showing the cap of Fig. 5 in its open or disengaged relation, and Fig. 8 shows a slightly-modified bottle.

The essential principle which I employ in the present and in my above-mentioned application depends upon the inward deflection of fingers having cam-surfaces which engage the under side of a bead upon the bottle neck. This I accomplish by a clamping-ring which is moved or cammed downward to engage exterior cam-surfaces upon the depending fingers.

In order that the depending fingers properly perform their functions, it is necessary that they be specially formed, and the particular shape and construction of these fingers constitutes the important part of the

present invention. It is also necessary that the clamping-ring be properly constructed and properly organized with relation to the fingers in order to secure the best results. This is partly by reason of the fact that the cap is entirely made of sheet metal which is not very strong or very rigid unless it is reinforced and acted on in the proper way. The parts are also made in a die-press, which does not give a perfect finish to the sheared edges of the metal parts. This must, therefore, be taken account of in order that the action may be uniform and perfect for all caps in spite of the imperfections of die-press work and the inherent weakness of thin sheet-metal stampings.

Referring to the drawings, in which like parts are designated by the same reference-sign, 1 indicates a bottle of ordinary or any preferred construction, and 2 denotes a cap constructed in accordance with the principles above outlined. The cap is formed with a disk or plate 3, the edges of which are flanged or drawn downward, so as to produce a rim 4. At spaced points upon the periphery of the rim are arranged the depending fingers 5, of which three are shown, but which may be of any desired number. 6 designates the usual sealing-disk, of cork or any suitable packing material, which is contained within the cap and held in place by the rim 4. These features are of the same construction as in my prior application above mentioned and form no part of the invention of the present case.

The lower extremities of the depending fingers 5 are embossed or ribbed for the double purpose of imparting great strength and rigidity thereto and to produce cam-surfaces with smooth rounded faces upon which the clamping-ring can act. The form of depending finger which I prefer is illustrated particularly in Fig. 3 and has somewhat the shape of the letter W in horizontal section. In other words, the finger is made with its lower part 7 considerably enlarged over the supporting-stem 8 and is indented both inward and outward at such enlarged extremity by alternating corrugations or ribs. The outwardly-pointing corrugations are indicated at 9 and 10, while the inwardly-pointing corrugations are shown at 11. These corrugations are conveniently made curved, rather than straight, in the direction of their length, by which absolute stiffness and rigidity is made possible. In addition to the

rigidity thus secured the corrugations form cam-surfaces, as clearly shown in Figs. 2, 5, and 7. The outwardly-pointing ribs or corrugations 9 and 10 form exterior cam-surfaces for the clamping-ring, while the interior-pointing ribs or corrugations 11 produce a cam-surface for engagement with the under side of the usual bead upon a bottle-neck. The exterior and interior cam-surfaces are respectively designated as 12 and 13 in the drawing.

From an inspection of Figs. 2, 5, and 7 it will be seen that the inner cam-surface, which bears against the shoulder on the bottle, is located directly opposite the reversed exterior surface, upon which the ring acts, the two converging cams thus forming a wedge between the ring and the bottle. Thus when the ring is forced axially downward the leverage of a wedge is obtained to draw the cap against the mouth of the bottle. This construction adds greatly to the efficiency of the stopper.

The clamping-ring is preferably stamped from sheet metal and beaded or ribbed in such a way as to give the proper rigidity thereto. In the drawings I have shown a clamping-ring 14 with spiral wedge surfaces 15 formed upon its upper edge and which work against lugs 16, embossed upon the rim 4. I make the number of lugs 16 exactly corresponding to the number of depending fingers 5 and arrange the lugs in vertical alinement over the fingers as shown in Fig. 3. This arrangement has an important practical advantage, which will hereafter appear, although, of course, it is not absolutely essential. In Figs. 1 and 2 the clamping-ring is beaded at 17 and has a lower lip or edge 18, somewhat inclined, and forming an engaging shoulder to work against the exterior cam-surfaces 12. In Figs. 5 and 7 the lower part of the clamping-ring is flared outward at 19, so as to sufficiently stiffen the construction, and the inside surface of the flared portion constitutes the shoulder for engaging the exterior cam-surfaces.

The interior cam-surfaces 13 make a fairly steep angle with the length of the fingers, so as to give an efficient action in drawing the cap downward upon the bottle when said fingers are cammed inward.

The operation is as follows: The cap is placed upon the bottle with the clamping-ring 14 turned to the left as far as it will go, in which relation it is arrested by the engagement of the lugs 16 with the vertical surfaces 20 of the ring. In this condition the ring occupies its upper position, and the depending fingers 5 are allowed to spread out by their own resiliency, as shown in Fig. 7. The cap being applied to a bottle, it is merely necessary to grasp the clamping-ring 14, which is conveniently knurled or milled for this purpose, and rotate it right-handedly,

so that the cam-surfaces 15 are borne downward by their engagement with the lugs 16. By this means a considerable pressure is transmitted from the lugs 16 in a downward direction through the clamping-ring, and the pressure is transmitted from the ring to the depending fingers 5. Inasmuch as the fingers are directly beneath the lugs, it is apparent that the transmission of force is in a direct line without producing any bending or breaking strains in the ring, as would be the case if the lugs were not in vertical alinement with the fingers. The relation is indicated in Fig. 3, in which the dot-and-dash lines indicate diagrammatically the manner of operation of the clamping-ring. It will be apparent that the clamping-ring acts exactly like a simple wedge. As the clamping-ring moves downward the lip 18 or the inside surface of the flared portion 19 bears against the exterior cam-surfaces 12 of the fingers, which are thereby forced inward. In this action the internal cam-surfaces 13 of the fingers bear against the under side of the usual bead on a bottle and draw the cap downward into sealing relation, which movement is efficiently accomplished by the wedge-like action of the fingers. In some cases I employ a single central corrugation or rib 13, Fig. 6, in place of the double corrugations 11. (Shown in Fig. 3.) This is a simpler construction; but I prefer the double ribs in practice, since they impart greater strength and rigidity to the fingers and also because they give an efficient friction-surface to engage the bottle-neck, for a purpose which will presently appear.

A very important feature of my invention relates to the way in which the cap is prevented from rotating on the bottle by the turning movement imparted to the device when the ring is rotated. In previous stoppers this has been a serious difficulty and has led to much inconvenience, it having been necessary to hold the cap fast by some means while the ring was being turned.

With my device while an ordinary bottle with a smooth beading may of course be used I prefer to have the usual bead milled or roughened, as shown, for instance, at 21 in Fig. 4. Under these circumstances the fingers, with their corrugation or corrugations, partly enter the notches and are thereby precluded from rotation under the turning movement. A further advantage is secured in that the resistance to turning obtained by the notches is greater in proportion to the need, it being evident that the gripping and the friction will be greater at the final than at the initial stages of the clamping action.

In Fig. 8 the usual bead has one or more ribs 22 thereon, cast or formed at the time the bottle is manufactured. With this construction it is evident that the vertical shoulder of the rim at each side of finger will en-

gage with the rib on the bottle-neck and prevent the cap from rotating.

What I claim is—

1. A bottle-stopper comprising a cap or disk having depending fingers corrugated with exterior and interior cam-surfaces curved in the direction of their length, whereby the fingers are made absolutely stiff or rigid, and a clamping-ring supported to bear against said exterior cam-surfaces.

2. In combination with a bottle having a beaded neck roughened or notched upon its under surface, a cap having depending fingers with internal corrugations to engage said roughened or notched portion of the bottle.

3. In combination with a bottle having a neck with a bead roughened or notched upon its under side, a cap or disk having depending fingers arranged to bear against said notched or roughened surface, and a relatively revoluble part arranged to move said fingers inward.

4. In combination with a bottle having a neck with a bead, the under surface of which is roughened or notched, a cap or stopper having fingers to engage said roughened surface, and a part to tighten said fingers when said part is rotated, the fingers being held against rotation by said roughened surface.

5. In combination with a bottle-cap having depending fingers, a bottle having a bead with means to prevent independent rotation of the cap thereon.

6. A bottle-stopper, for use in connection with a bottle having a shoulder on the neck thereof, the same comprising a disk having depending fingers provided with inner and outer cam-surfaces set at an angle to each

other and to the plane of the body of said fingers, and a vertically-movable ring embracing said fingers and adapted, when the stopper is applied to a bottle, to act upon the outer cam-surfaces thereof and force the inner cam-surfaces thereof into engagement with the shoulder on said bottle, for drawing the stopper downwardly thereon.

7. A bottle-stopper, for use in connection with a bottle having a shoulder on the neck thereof, the same comprising a cap having depending fingers, each provided with a downwardly and inwardly inclined interior surface and with a downwardly and outwardly inclined outer surface, arranged opposite each other to form a wedge, an axially-movable ring embracing said fingers and adapted, when the stopper is applied to a bottle, to act upon the surface of each wedge and force the interior surface thereof into engagement with the shoulder on said bottle, for drawing the cap downwardly thereon, and cooperating means on the cap and the ring for forcing the latter axially when it is rotated.

8. A bottle-stopper comprising a cap and a ring surrounding the cap and rotatable with respect thereto, in combination with a bottle and cooperating devices on the bottle and cap to prevent the latter from rotating when the ring is turned.

In witness whereof I subscribe my signature in the presence of two witnesses.

AUGUST W. CORDES.

Witnesses:

WALDO M. CHAPIN,
WILLIAM DORMAN.