

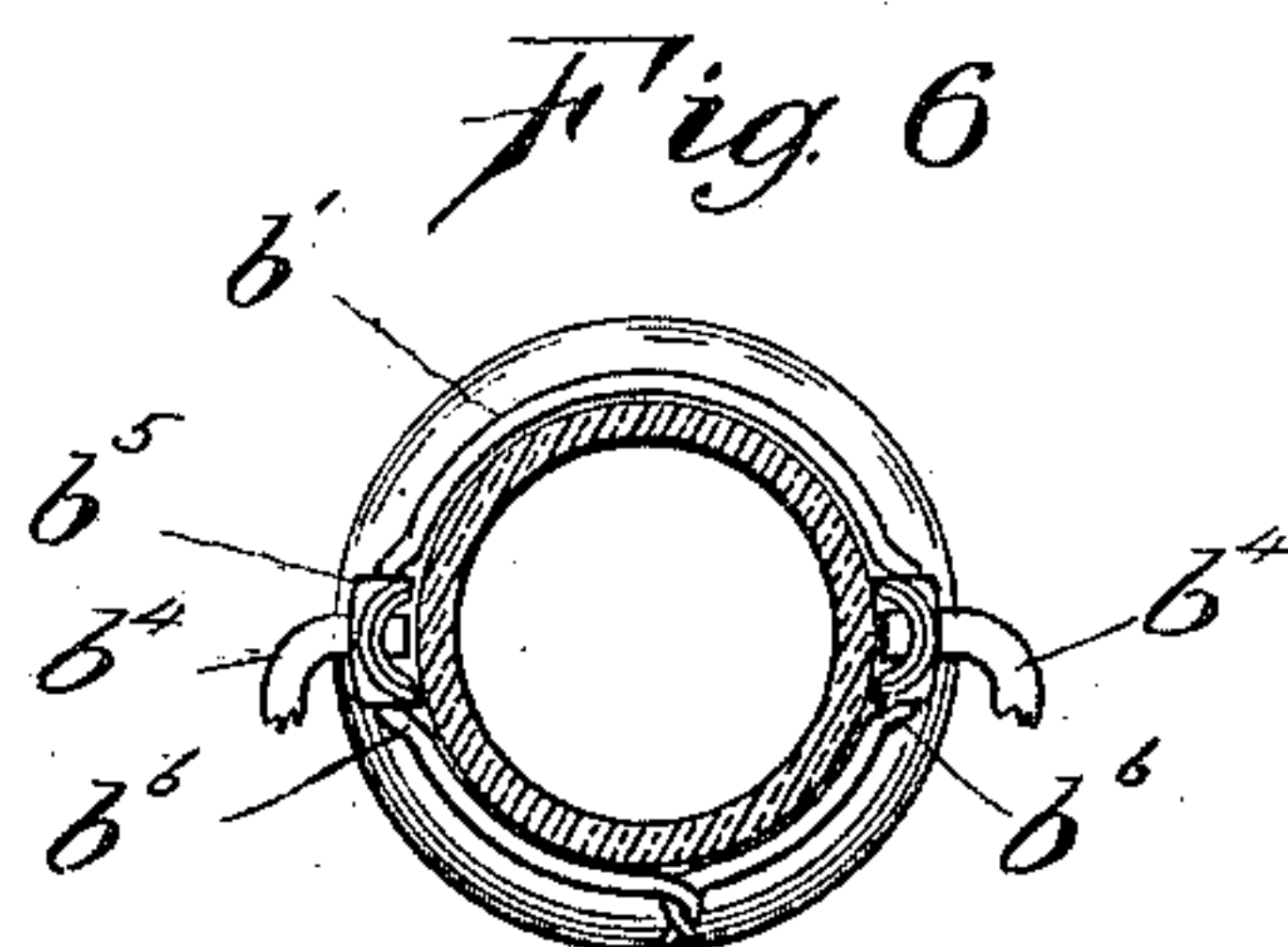
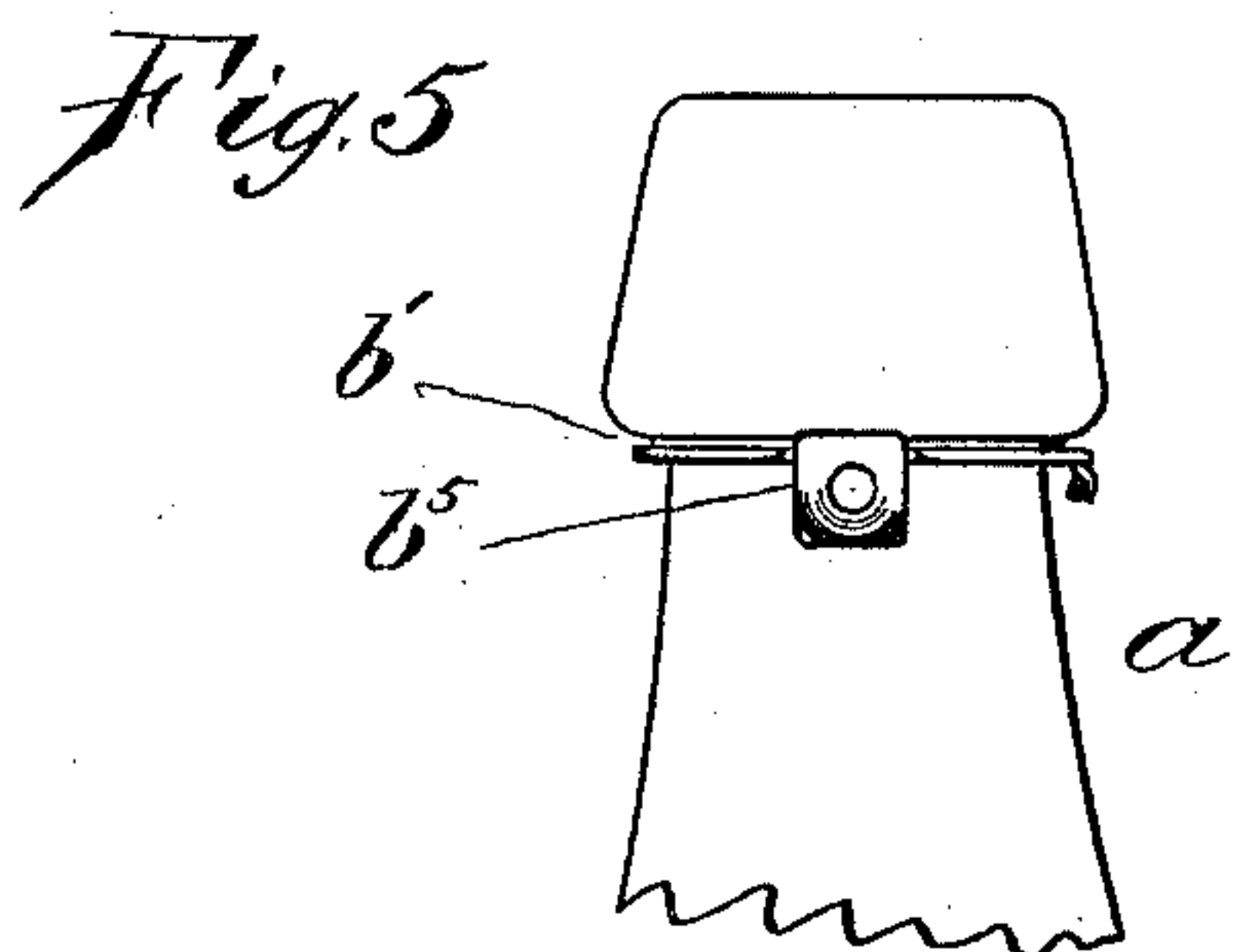
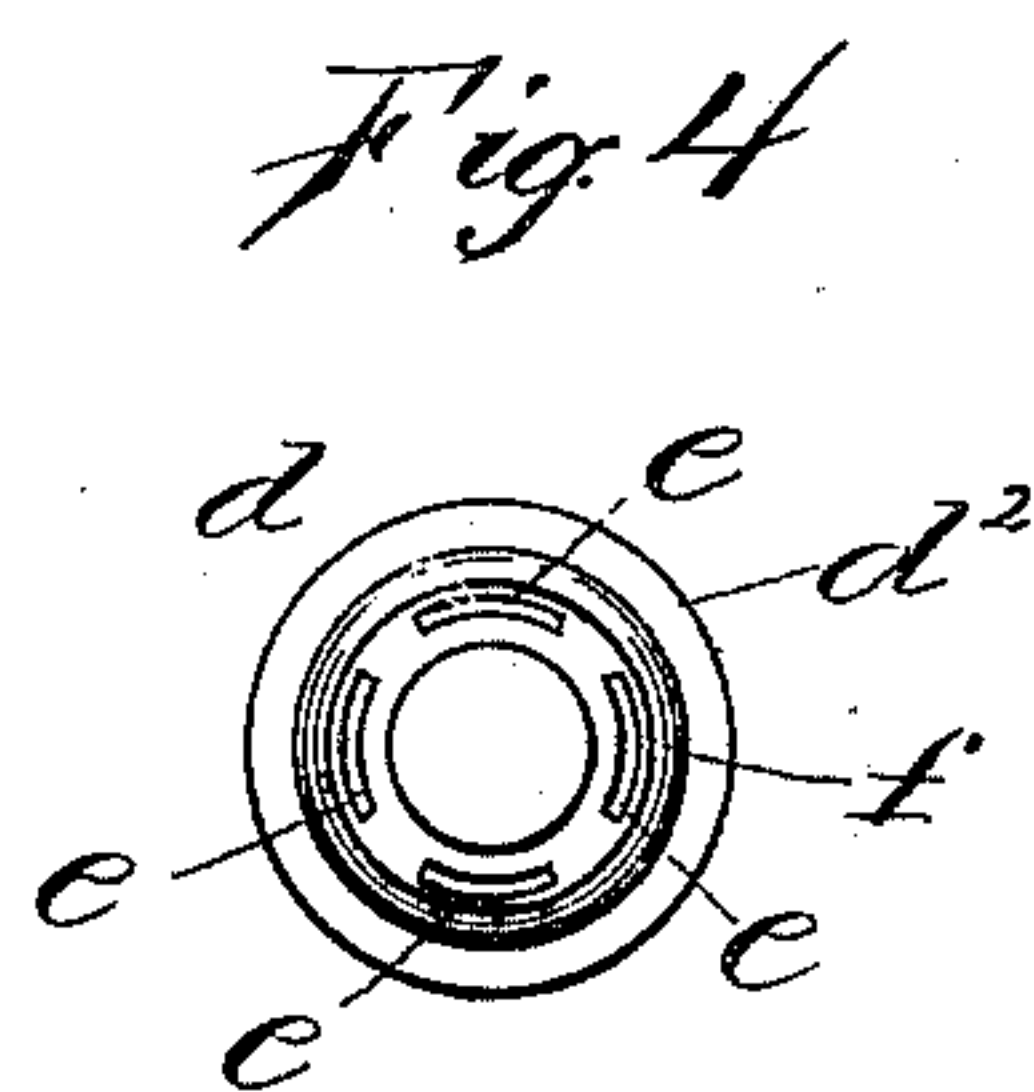
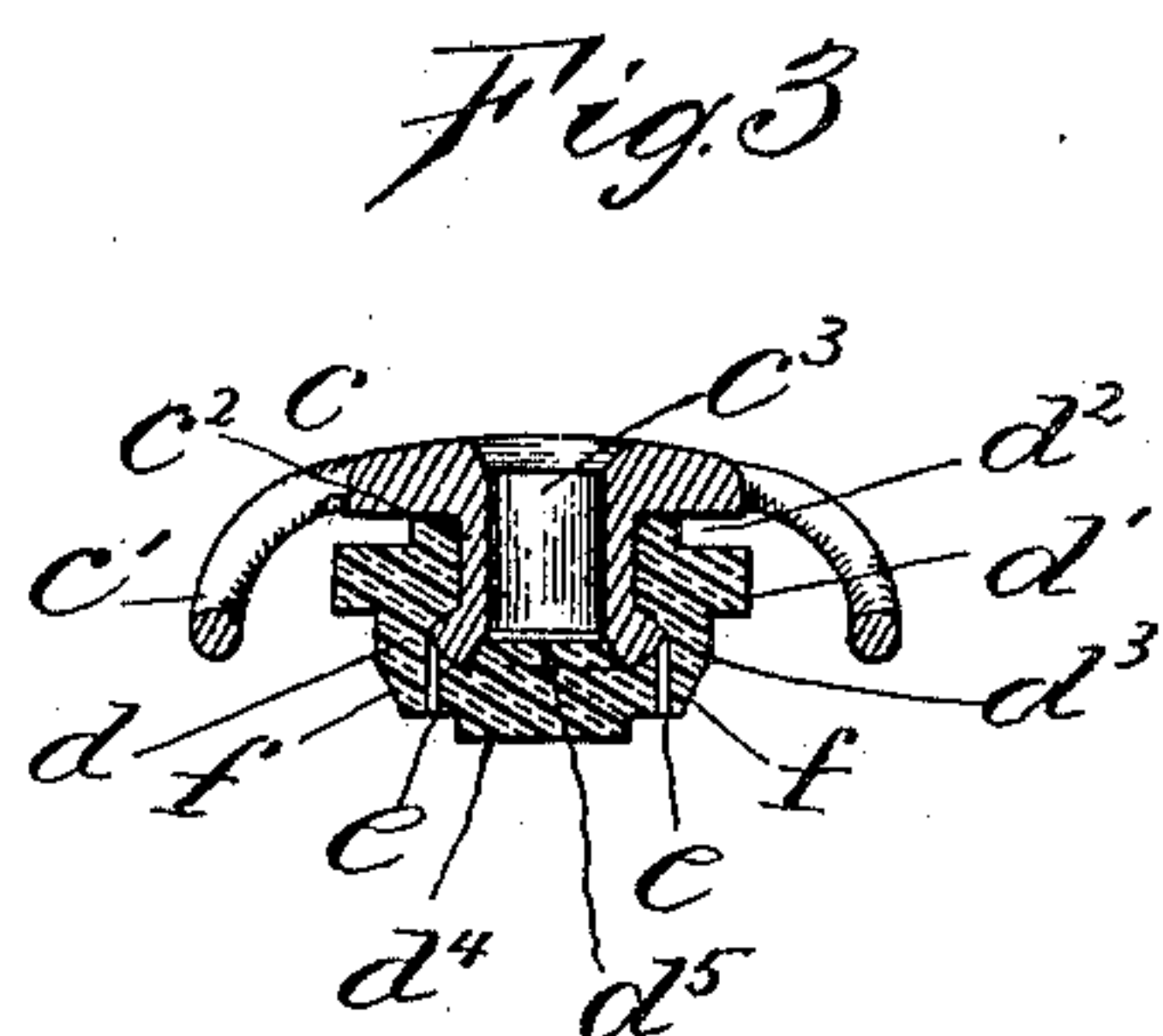
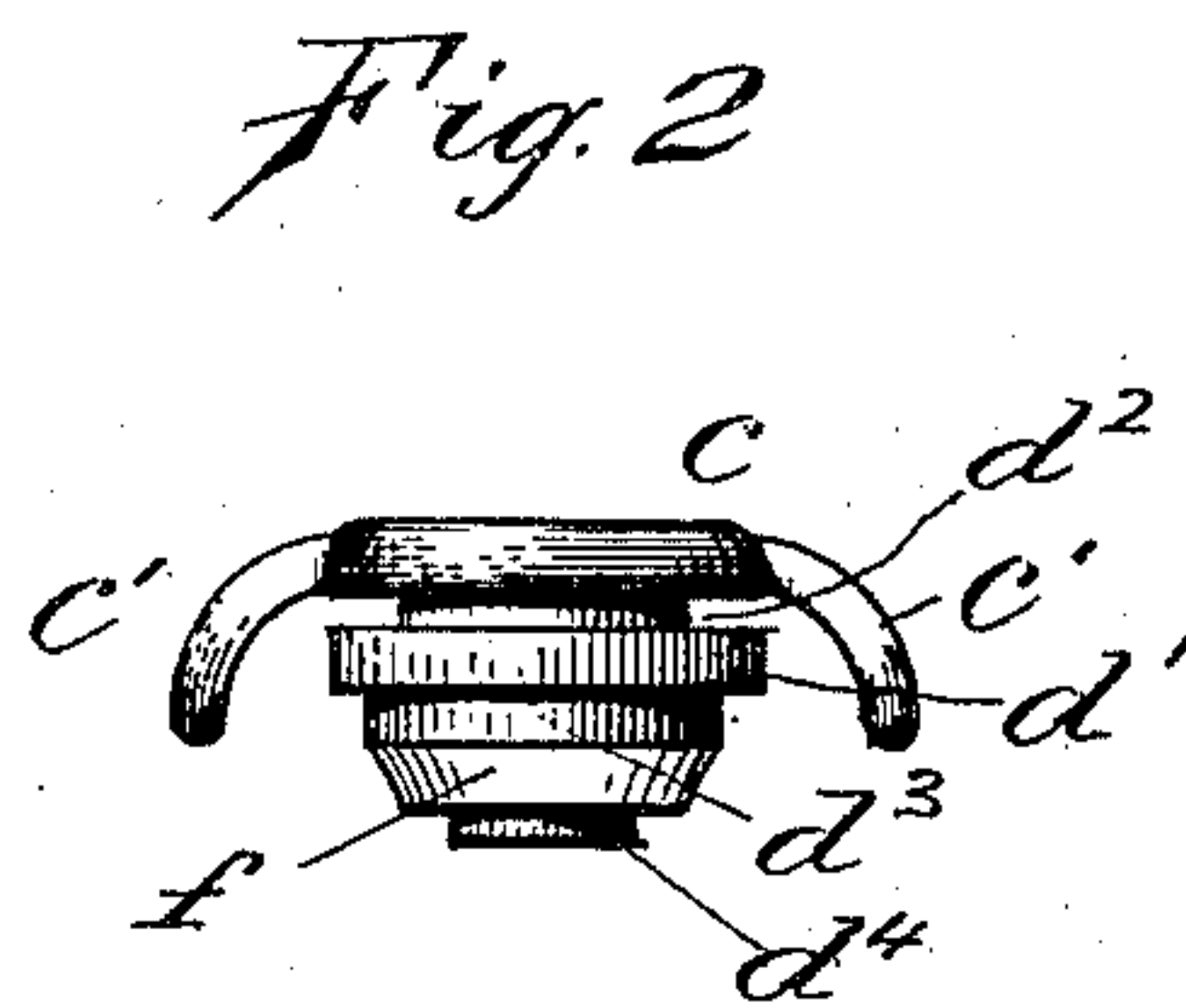
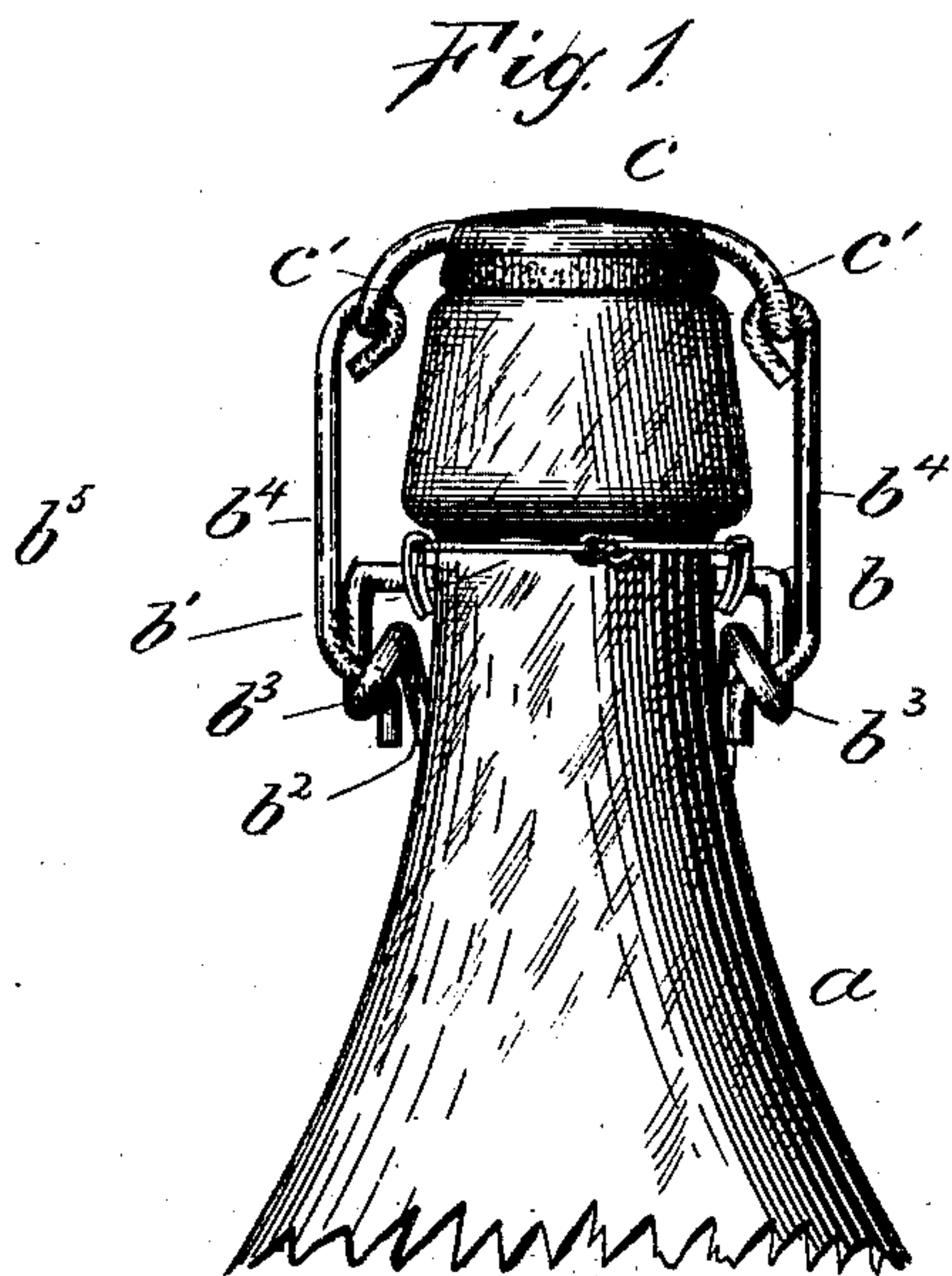
No. 684,476.

Patented Oct. 15, 1901.

F. B. THATCHER.
BOTTLE STOPPER.

(Application filed Mar. 23, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FREDERICK B. THATCHER, OF PROVIDENCE, RHODE ISLAND.

BOTTLE-STOPPER.

SPECIFICATION forming part of Letters Patent No. 684,476, dated October 15, 1901.

Application filed March 23, 1901. Serial No. 52,523. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK B. THATCHER, a citizen of the United States, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Bottle-Stoppers, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

My invention relates to the class of bottle-stoppers which are united to the neck of the bottle by fastening devices and which includes an elastic packing the valve-opening through which is closed by compression when the stopper is fastened to close the bottle.

My invention resides in details of construction of the elastic stopple by means of which a tight packing is insured when the stopple is expanded.

Referring to the drawings forming part hereof, Figure 1 shows the upper part of a bottle with the stopper closed by means of the fastening. Fig. 2 is a detail side view of the stopper. Fig. 3 is a detail view, in central vertical section, through the stopper. Fig. 4 is a detail bottom view of the stopple. Fig. 5 is a detail view of the top of a bottle, showing my improved neck-band. Fig. 6 is a detail view, in cross-section, of the neck of the bottle just below the neck-band and looking upward.

In the accompanying drawings the letter *a* denotes a bottle of ordinary construction, such as is used for beer or beverages bottled under pressure, as soda and the like. To the neck of this bottle a fastening device *b* is secured, and to it is attached a stopper *c*, provided with an elastic plug or stopple *d*, which forms the packing. The fastening means shown includes a neck-band *b'*, a lever *b''* of U shape pivoted by its inturned ends in pivot-openings in socket-pieces *b'''* on the neck-band on diametrically opposite sides of the bottle-neck and having loops *b''''*, in which inturned ends of links *b'''''* are pivoted, the outer ends of the links being connected to loops *c'*, formed on diametrically opposite sides of the stopper. The neck-band *b'* is made, preferably, of wire and has on diametrically opposite sides of the bottle socket-pieces *b'''*, of thin metal, clamped onto

or made as an integral part of the neck-band. When the neck-band is of wire, an offset *b''''* is formed in the wire, and a thin strip of metal is bent around the wire and clamped down upon it, the sharp bend at each end of the offset forming shoulders that aid in locating and holding the socket-pieces in proper position on the neck-band. The socket-pieces are shaped so as to fit snugly against the neck of the bottle at the edges and curve outward to allow room for the ends of the lever to securely engage. A main advantage of this construction of the neck-band with socket pieces or the equivalent-socket openings is that the band can be firmly secured at and just below a very slight shoulder on the neck of the bottle in a manner not possible with other forms of neck-bands.

The stopper *c* is perforated and has on its under surface a projection *c''*, with an opening *c'''* extending completely through the stopper, a flange or like device on the lower end of the projection providing a shoulder, by means of which the elastic stopple *d*, which is fitted upon this projection, is held from accidental removal.

The main feature of my invention resides in this stopple *d* as used in combination with a centrally-perforated stopper. The stopple is made up of a body portion *d'*, which is of sufficient diameter to overlie the opening in the mouth of a bottle and be located between the edge of the mouth and the under surface of the body of the stopper. Between this body portion *d'* of the stopple and the under surface of the stopper the diameter of the stopple is reduced to a considerable extent, so that this portion *d''* when it is compressed, as by means of the fastening device in closing the bottle, thrusts directly downward along the face of the stopple nearest to the projection or neck on the stopper and locates the point of compression.

Below the body portion *d'* the stopple is reduced to a diameter which enables it to fit snugly in the mouth of the bottle with a packing fit, and through this portion *d''* of the stopple a number of ports *e* are formed, each port being located near the outer limit of the bottom of the shoulder on the neck or projection on the stopper. The lower edge of the portion *d''* of the stopple is chamfered,

beveled, or rounded, as illustrated at f in Figs. 2 and 3 of the drawings, this beveling of the stopple forming a very material feature of the improvement. The removal of the lower edge of the portion d^3 is of great importance to the successful operation of the stopple in preventing leakage of fluids under pressure from within the bottle. The stopple has two functions to serve, one being the secure closing of the mouth of the bottle by preventing the leakage of the contents along the inner surface of the neck and across the edge of the mouth and the other being to so support the valve which closes the central opening through the stopper that no leakage can occur through the passage.

The construction described permits the introduction of the stopple or plug into the mouth of the bottle without such frictional contact with the bottle as to drag the lower part of the stopple to one side or expand the supporting-straps between the ports and distort the valve portions. It further leaves the valve so supported as to allow it freedom of movement both in opening under the thrust of the filling-stem and in closing on its removal. No distortion of the valve and its supporting-straps is possible. It has a further advantage in that it leaves the valve wholly supported and governed as to its position when free from outside forces by the straps which unite it to the stopple-body. All these advantages result from the removal of the edge of the body part of the stopple, as described.

The lower portion of the stopple has a projection d^4 , which is of less diameter than other portions of the stopple, as shown, and, in fact, is of but slightly-larger diameter than the inner diameter of the central opening through the stopple. Within the recess in the stopper there is an upward projection d^5 , which fits within the lower end of the opening, which is countersunk or beveled. The effect of this construction of the stopple d is to insure, first, a proper thrusting of the face of the material downward between the projection on the lower side of the stopper and the inner surface of the opening at the mouth of the bottle when the stopple is closed down in place, as by means of the fastening device, and its function and advantage have been determined only by long experiment, and, second, the bevel or chamfer at the lower edge of the stopple has a function in insuring a packing fit of the stopple to close the opening through the stopper when the device is in place, and the thickening of the bottom of the stopple by the downward projection d^4 and the upward projection d^5 prevents the buckling of the stopple under the pressure of contained fluids within the bottle as will so distort the stopple as to open the valve and cause leakage.

Each of the several features and details of construction of the stopple above described have been reached after years of test and ex-

periment, and when the stopple is produced in the form shown and described and embodying the several features of construction relatively to each other a perfect packing is insured that will hold liquid within the bottle for a very long time under the highest degree of pressure used in bottled beverages.

Of course it will be understood that the stopple is for use in that form of stopper in which the stopper is closed tight and the valves in the stopple are opened for filling the bottle by means of a tube or stem inserted through the stopper and thrusting the bottom of the stopple downward until the ports are opened for the inward passage of the fluid contents into the bottle under pressure.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a bottle-stopper having a central opening and downward projection on the under side, an elastic stopple having a body part overlying the mouth of the bottle, an upper portion of reduced diameter located directly below the under surface of the stopper, a reduced portion with a chamfered edge below the said body part, and a bottom portion having a projection on the under side and an upward projection within the recess in the stopper, and ports through the bottom of the stopple for the passage of the fluid contents of the bottle.

2. In combination with a bottle-stopper having a central opening and a shouldered projection on the under side, a stopple of elastic material having a body part of greater diameter than the mouth of the bottle adapted to be closed, a reduced portion below the said part and having upright walls and a chamfered lower edge, a chamber or recess opening to the upper surface of the stopple, and a thickened bottom portion with ports extending through the stopple outside of said thickened central portion thereof.

3. In combination with a bottle, a stopper adapted to close the mouth of the bottle, fastening means connecting the bottle and the stopper, a shouldered projection on the under surface of the stopper, an opening through the stopper with the lower end of the opening enlarged, a stopple of elastic material having a recess in its upper surface and fitted upon the projection on the stopper, the body portion of the stopple lying between the upper edge of the bottle-mouth and the under surface of the stopper, the part below the body portion of the stopple having its edge rounded or chamfered, the lower portion of the stopple thickened by a downward projection on the under surface, and an upward projection within the recess, and ports through the stopple located outside of the thickened portion.

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