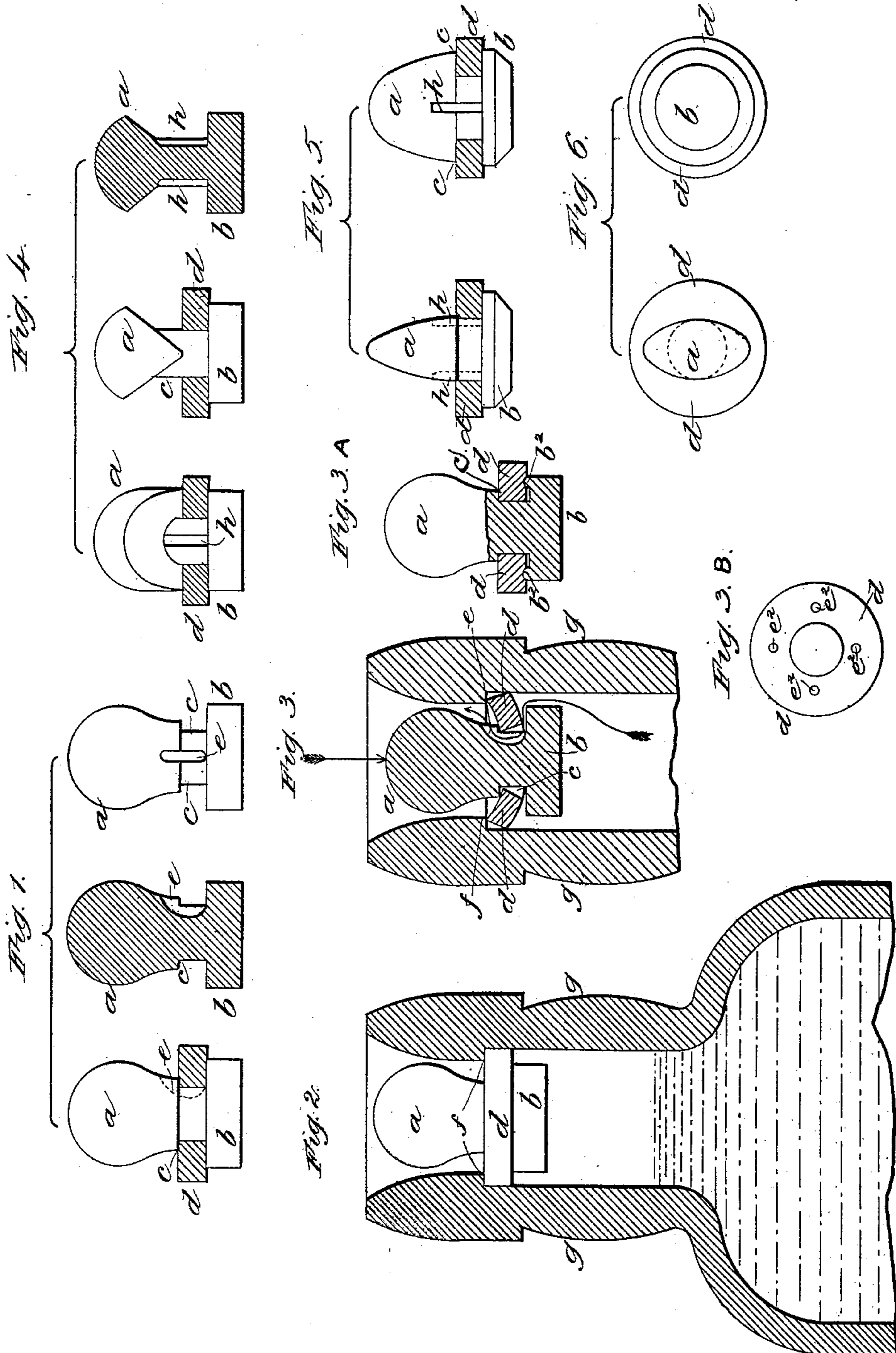


A. B. VANES.

VALVE STOPPER FOR BOTTLES.

No. 338,571.

Patented Mar. 23, 1886.



Witnesses
H. E. Aughinbaugh
Carrie M. Sweet.

Inventor
Arthur Bayly Vanes
by John J. Alated & son
his attys.

(No Model.)

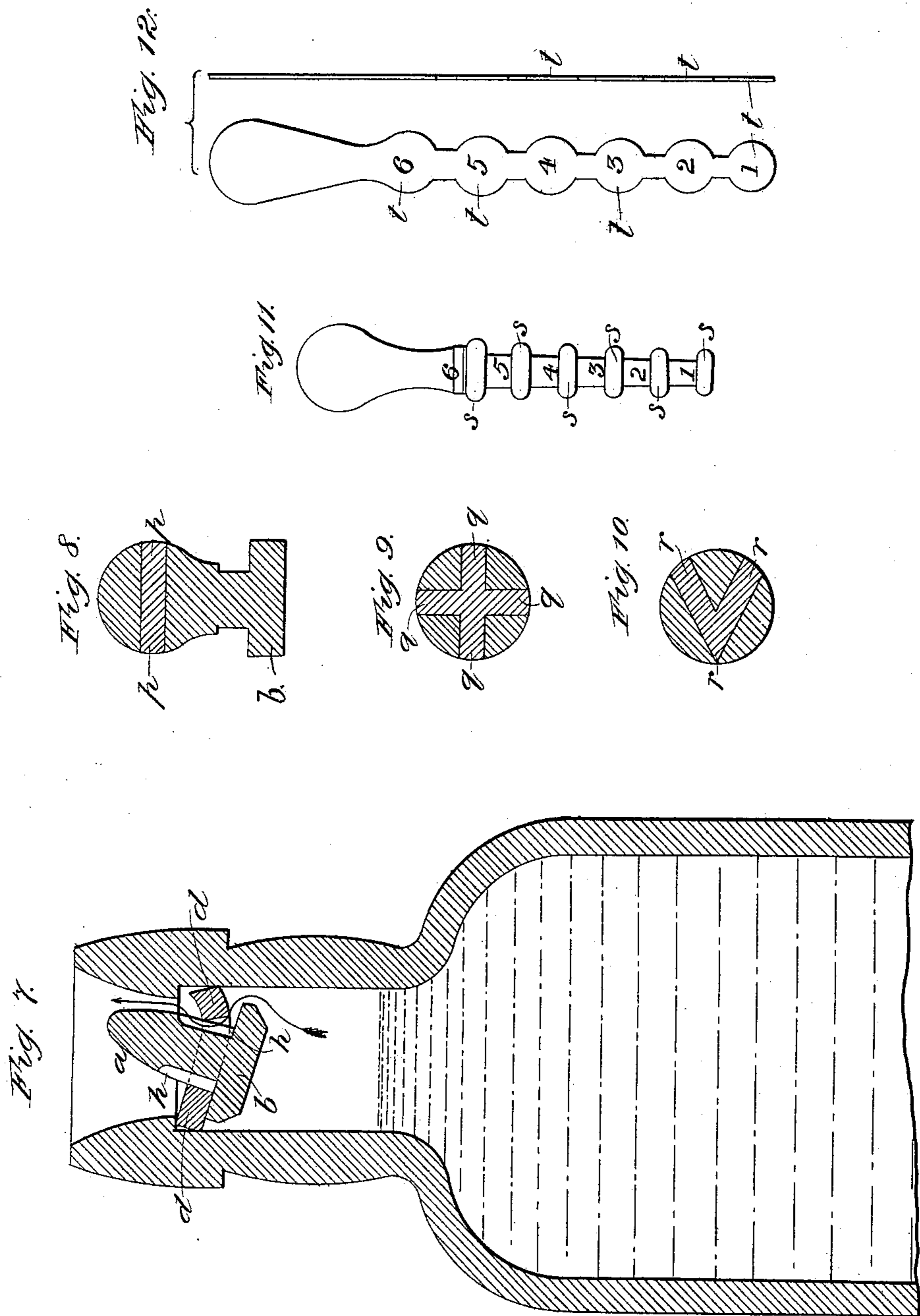
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

ARTHUR BAYLY VANES, OF UITENHAGE, CAPE OF GOOD HOPE.

VALVE-STOPPER FOR BOTTLES.

SPECIFICATION forming part of Letters Patent No. 338,571, dated March 23, 1886.

Application filed July 1, 1885. Serial No. 170,370. (No model.) Patented in England May 19, 1883, No. 2,512.

To all whom it may concern:

Be it known that I, ARTHUR BAYLY VANES, a subject of the Queen of Great Britain, and a resident of Uitenhage, in the Colony of the Cape of Good Hope, have invented certain new and useful improvements in stoppers or valves for bottles containing aerated liquids or liquids under gaseous pressure and an instrument or apparatus for facilitating the adaptation of the said stoppers to the said bottles, of which the following is a specification.

My invention consists of the improvements hereinafter described in stoppers or valves for bottles containing aerated liquids or liquids under gaseous pressure, by which improvements the construction of the said stoppers or valves is much simplified and their action made more efficient.

In constructing one of the said stoppers according to my invention, I make the body of a pear shape, the tapering end terminating in a flange. A shallow groove or neck is made at the part where the taper end joins the flange, and an india-rubber perforated washer or ring is fitted on the said neck and constitutes the valve, which, when the stopper is in use, seats itself on the contraction or valve-seat in the neck of the bottle. In the narrow part of the body is a notch or groove parallel or nearly parallel with the axis of the stopper, and extending from the upper surface of the flange to a height above the india-rubber washer or valve. When the stopper is in use, the flange is pressed against the india-rubber washer or valve, and the latter is pressed onto the valve-seat in the neck of the bottle and the bottle is tightly closed, the groove in the lower part of the body being covered and closed by the india-rubber valve.

In order to open the bottle, it is only necessary to press on the head of the stopper when, by the slight descent of the body, the india-rubber washer takes a slightly-concave form. The lower end of the notch or groove described is thereby partly uncovered, and gas escapes along the said groove into the atmosphere, and the stopper, being no longer pressed upward, falls and the bottle is thereby opened. The flange of the body may have on its upper side,

either near its margin or near its central part, an annular rib or projection, which under pressure embeds itself in the india-rubber washer, thereby more effectually preventing the escape of gas.

Stoppers of this kind are sometimes weighted at one end, in order to cause the stopper to fall with its weighted end downward in closing the charged and inverted bottle. The weight, usually lead or iron, is generally inserted in the extreme end of the stopper, and frequently becomes detached, thus rendering the stopper more or less faulty.

In weighting the said stoppers I make the weighting material in the form of a small bar or rod, which I pass through the end of the stopper crosswise, and by riveting the ends it is prevented from becoming detached.

The instrument or apparatus for facilitating the adaptation of the said stoppers to the said bottles consists of a rod on which, near one end, a series of disks or spheres are fixed axially, the said spheres or disks progressively increasing in diameter from the end. The use of this instrument is to determine by its introduction into the mouth of the bottle the internal diameter of the neck, and consequently the size of stopper to be used with the said bottle.

Bottles for aerated liquids are made with necks of several different sizes, and great loss of time is in consequence frequently incurred in fitting them with stoppers of the proper size. On introducing the said instrument into the neck of the bottle the size of the stopper suitable for the bottle is immediately indicated by the distance to which the said instrument will enter the neck of the bottle.

I will now proceed to describe my invention with reference to the accompanying drawings.

Figure 1 represents elevations taken at right angles to one another, and a vertical section of a stopper or valve constructed according to my invention and having a pear-shaped body. Figs. 2 and 3 represent the same applied to the neck of the bottle, Fig. 2 exhibiting the stopper or valve pressed to the valve-seat in the neck of the bottle by the

pressure of the gas so as to close the bottle, and Fig. 3 exhibiting the stopper or valve partly pressed from its seat for opening the bottle.

5 The several figures of the drawings, excepting the gage for measuring the size of the necks of the bottles, are drawn about double the full size.

10 *a* is the pear-shaped body of the stopper or valve, the tapering end of which terminates in the flange *b*.

15 *c* is the shallow groove or neck made between the taper end of the body and the flange *b*. In the groove or neck *c* an india-rubber perforated washer or ring, *d*, constituting the valve, is fitted, as represented.

20 *e* is a notch or groove, made preferably, parallel to the axis of the stopper. It will be seen by an examination of Fig. 1 that the said notch or groove *e* extends from the flange *b* to above the neck *c*, and that the india-rubber washer or valve *d* is fitted in the said neck.

25 *f* is the contraction or valve seat in the neck *g* of the bottle, upon which valve-seat *f* the washer or valve *d* seats itself by the pressure of the gas within the bottle, as represented in Fig. 2, thereby tightly closing the bottle. When the stopper is in the position Fig. 2, the groove or notch *e* in the lower part of the
30 body is closed by the india-rubber valve *d*, and no gas can escape from the bottle through the valve.

The notch or groove *e* in the stopper may be dispensed with, in which case I employ an
35 india-rubber washer or valve, *d*, of the kind represented in Fig. 3^B—that is to say, an india-rubber washer or valve having one or more small perforations in it marked *e*² *e*², or a plain india-rubber ring without the small
40 perforations may be employed, in which last case the central perforation in the india-rubber washer or valve fits loosely on the neck of the stopper-body with which it engages.

45 When it is wished to open the bottle, the head *a* of the stopper is pressed downward, as indicated by the upper arrow in Fig. 3. By the slight descent of the body of the stopper the india-rubber washer or valve *d* takes the slightly-concave form represented in the said
50 Fig. 3, and the flange *b* is separated a short distance from the said valve *d*. The lower end of the notch or groove *e* is thereby partly uncovered, and gas escapes along the said groove *e* into the atmosphere, as indicated by
55 the lower arrow in Fig. 3, and the stopper, being no longer pressed upward, falls and the bottle is opened. Where a stopper without the notch or groove *e* is employed in conjunction with a washer or valve of the kind represented in Fig. 3^B, the depression of the stopper in deflecting the washer or valve opens
60 one or more of the holes *e*² *e*² and permits of an escape of gas.

65 Where an unperforated washer or valve is employed fitting loosely in the neck *c* of the stopper, the deflection of the washer or valve by the depression of the stopper permits of the

escape of gas between the central perforation of the washer or valve and the neck *c*, in which it engages.

70 The depression of the stopper for opening the bottle is much facilitated by the diminished size of that portion of the stopper situated immediately above the india-rubber valve.

75 In order to effectually secure the embedding of the flange *b* in or against the india-rubber valve *d*, the said flange *b* may have on its upper side a circular rib or projection, as represented in Fig. 3^A, and marked *b*². This rib may either be made at or near the margin of
80 the flange *b*, as represented, or it may be made near the central part of the flange *b*.

85 Instead of making the body of the stopper of a pear shape, as represented in Figs. 1, 2, and 3, it may be made of the shape represented in the elevations taken at right angles to one another, and the vertical section, Fig. 4—that is to say, opposite sides of the body of the stopper are partly cut away, so as to somewhat flatten the body, the said body having
90 in one direction a wedge shape, as represented; or the body of the stopper may have the flattened cone shape represented in the elevations taken at right angles to one another and the vertical section, Fig. 5, and plans of upper and lower sides, Fig. 6.

95 In each of the modifications, Figs. 4, 5, and 6, a notch or groove for the escape of gas on opening the bottle is made at opposite sides of the body of the stopper instead of at one side only, as in Figs. 1, 2, and 3.

100 In the said Figs. 4, 5, and 6 the flattened body of the stopper is marked *a*. The neck or contraction is marked *c*. The flange is marked *b*. The india-rubber washer or valve is marked
105 *d*, and the notches or grooves for the escape of the gas are marked *h* *h*.

110 The stoppers, Figs. 4, 5, and 6, are applied to the bottles, and act in the manner described with respect to the stopper, Figs. 1, 2, and 3, the stopper being either pressed downward or
115 aside in order to open the bottle.

120 Fig. 7 represents in section the stopper, Figs. 5 and 6, applied to a bottle, and exhibits the position of the stopper and its valve or washer when the stopper is pressed aside for opening the bottle. When the stopper is pressed aside, as illustrated in Fig. 7, the india-rubber washer or valve *d* has the figure given to it represented in the drawings, so that one of the
125 notches or grooves *h* is uncovered and gas escapes through the said notch or groove and the stopper falls. Should the stopper be turned aside in the other direction, the other notch or groove *h* at the opposite side of the stopper is uncovered.

130 In all the various forms of stoppers I make the part bearing on the upper side of the india-rubber valve of small size, the small size of this part rendering its depression or pressing aside and the consequent opening of the bottle easy.

Fig. 8 represents a stopper weighted according to my invention. The weight repre-

sented in Fig. 8 consists of a small metallic bar or rod, p , which is passed through the head of the stopper and its ends riveted; or melted lead may be poured into a cross-hole in the head, or the weight in the head of the stopper may either have the cruciform shape shown in Fig. 9 and marked q , or the angular figure shown in Fig. 10 and marked r . By weighting the stopper in the ways described and represented the weighting material is prevented from becoming detached from the stopper.

Fig. 11 represents a gage or apparatus constructed according to my invention for facilitating the adaptation of stoppers to the bottles with which they are to be used. The said gage or apparatus consists of a rod having at one end a handle, and below the handle a series of disks, s , is fixed axially upon the said rod, the said disks progressively increasing in diameter from the lower end to the handle end of the rod and numbered accordingly. By introducing the gage or apparatus into the neck of the bottle the size of the stopper suitable for the bottle is immediately indicated by the number of disks which have passed through the contracted portion of the neck of the bottle or the distance to which the said instrument enters the contracted portion of the neck. Instead of making a series of numbered disks upon the rod, numbered spheres of the same

diameter as the disks may be used; or, in place of disks or spheres on a rod, a series of numbered disks of progressively-increasing diameter and joined together may be cut from sheet metal. This modification of the gage is represented in Fig. 12, where the disks are marked t .

Having now described the nature of my invention and the manner in which the same is to be performed, I wish it to be understood that I claim as my invention—

1. A stopper in which the valve consists of a rigid flange or disk on the bottom of the body of the stopper, combined with an elastic ring or washer supported on such flange, said stopper having on the upper side of said flange a circular rib or projection, b^2 , adapted to embed itself against said rubber and having a groove or grooves, h , as and for the purpose set forth.

2. In combination with a rigid stopper-body having the bottom flange, b , and groove c , the rubber valve-ring d , fitted in such groove and having in it one or more small perforations e^2 , all as and for the purposes set forth.

ARTHUR B. VANES.

Witnesses:

ALFRED J. HARDY,
ROBT. H. BLACK.