

No. 837,812.

PATENTED DEC. 4, 1906.

A. EIMER.
BOTTLE AND BOTTLE CLOSURE.
APPLICATION FILED FEB. 17, 1906.

2 SHEETS—SHEET 1.

Fig. 1

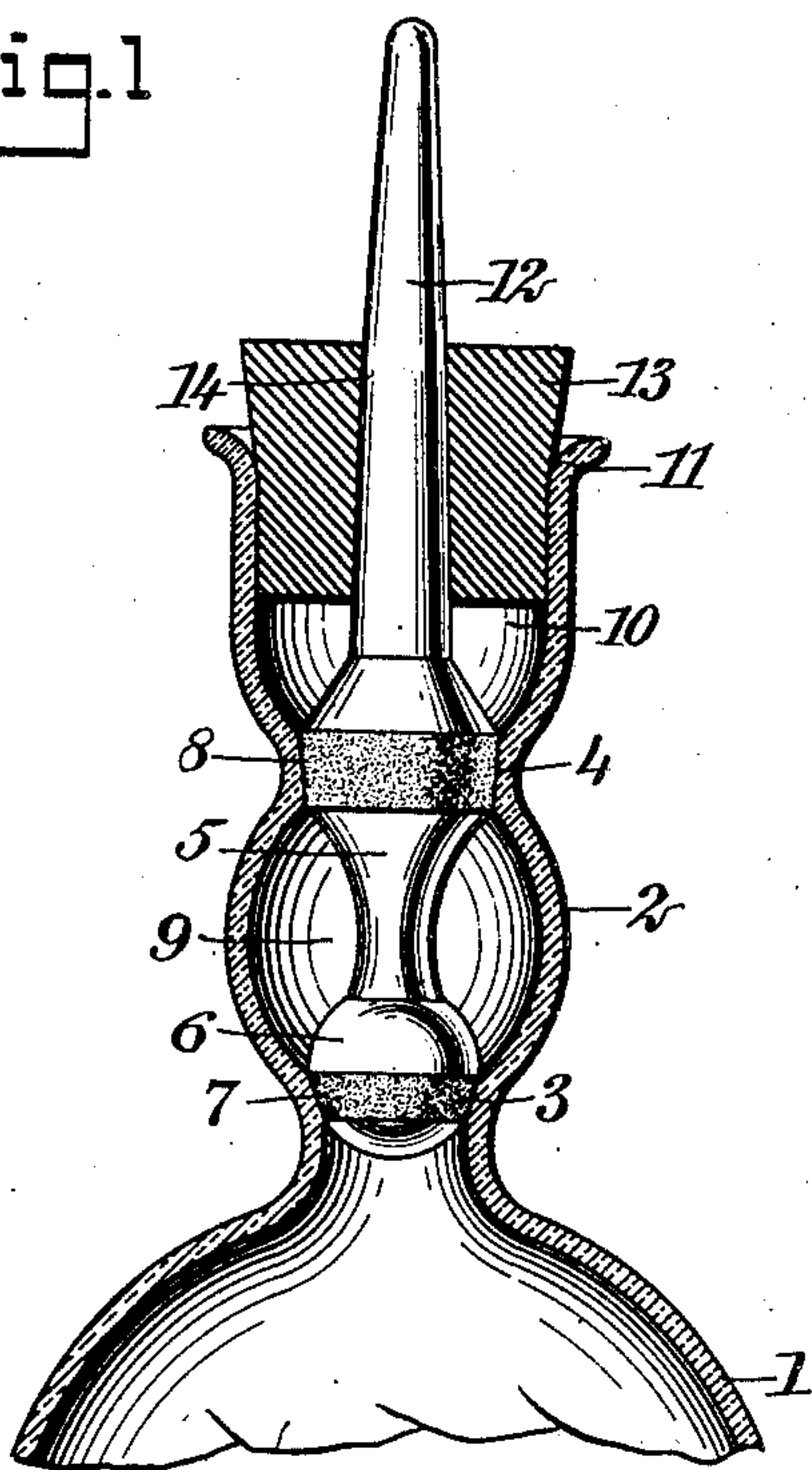


Fig. 2

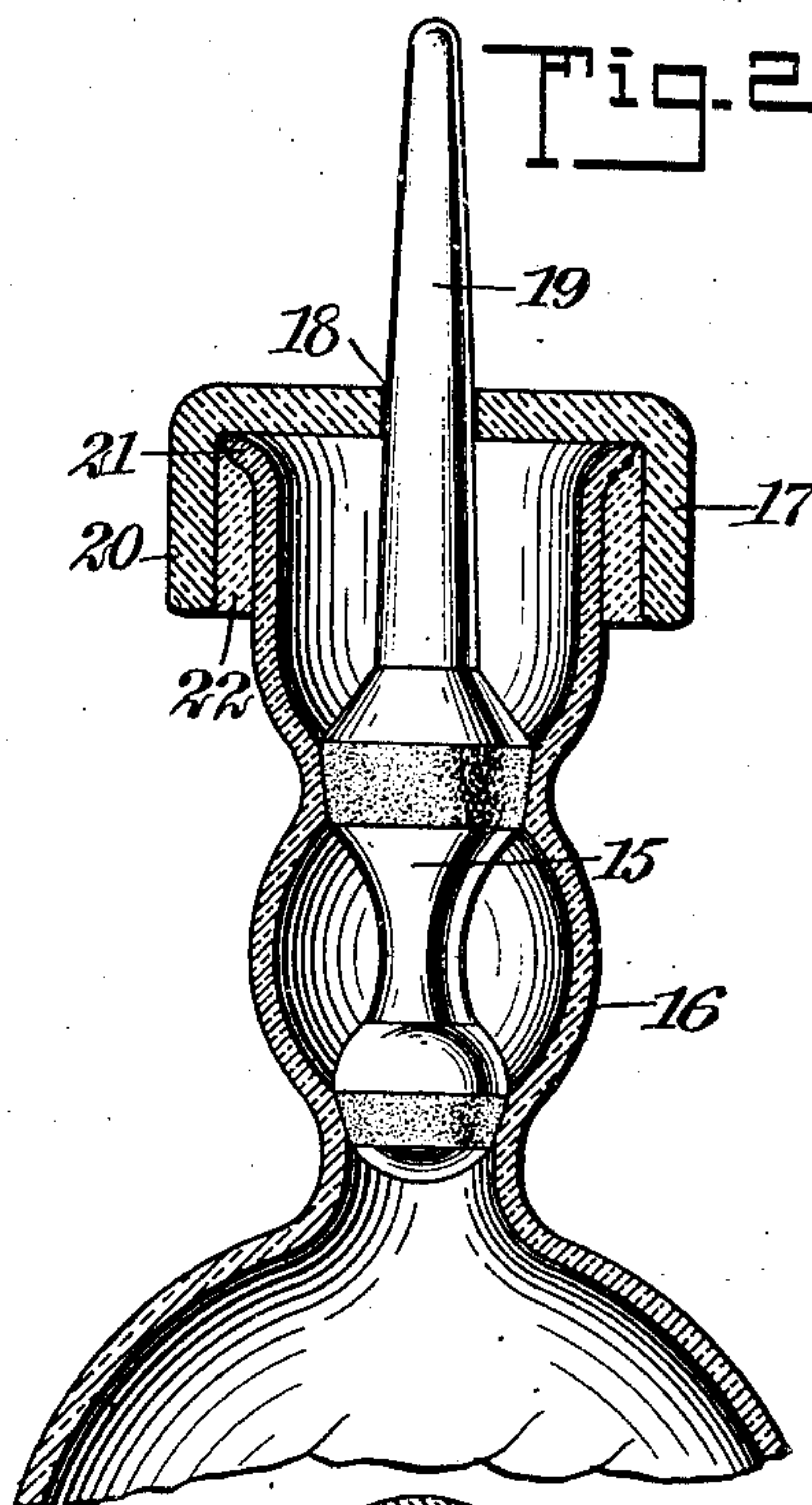


Fig. 3

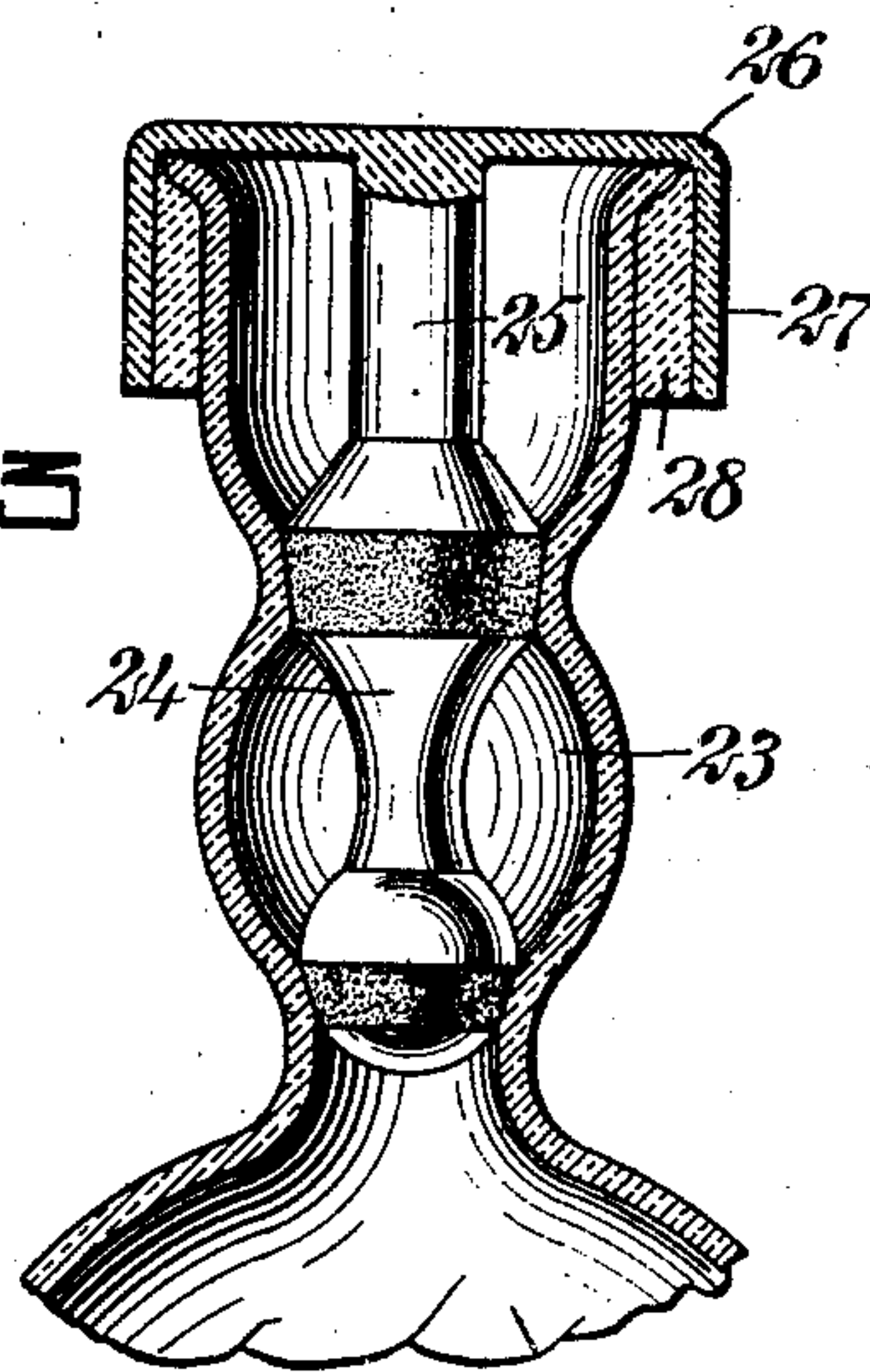
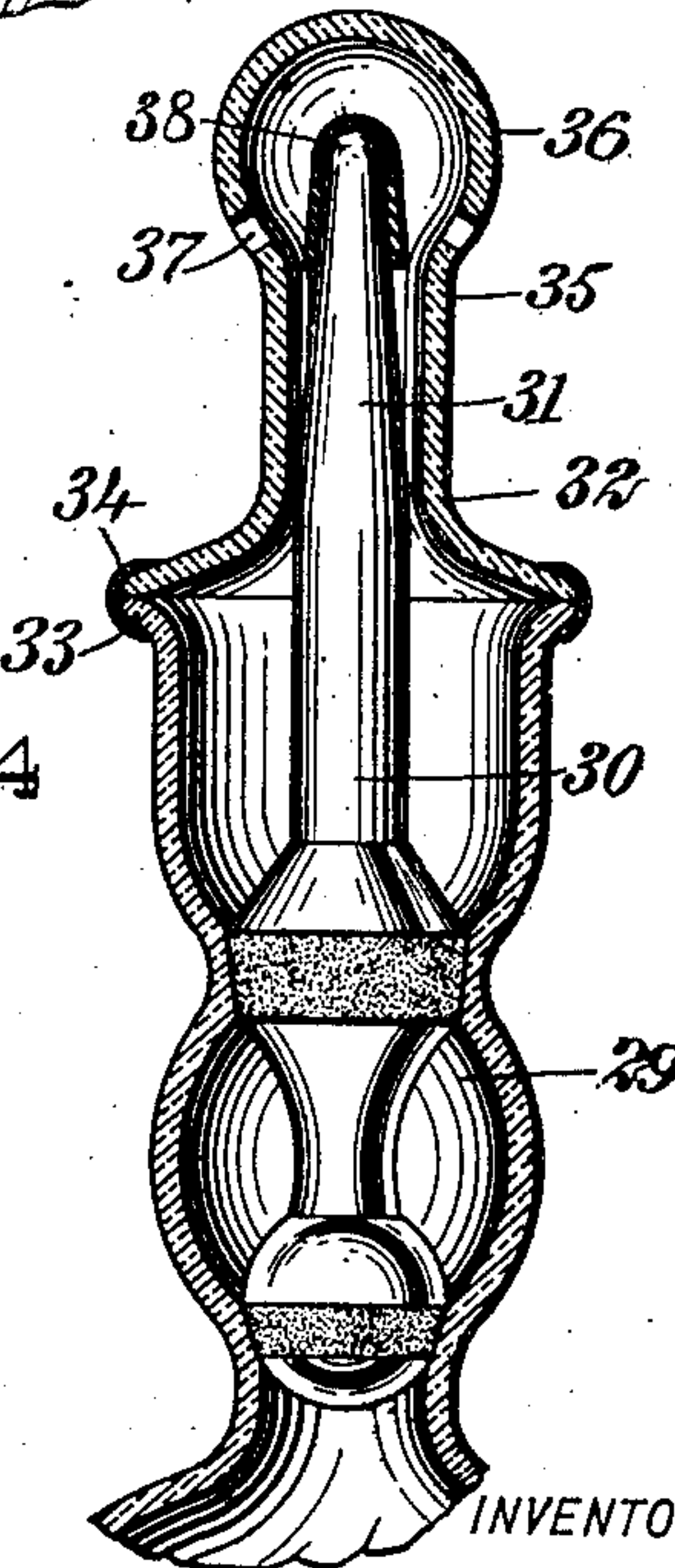


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5

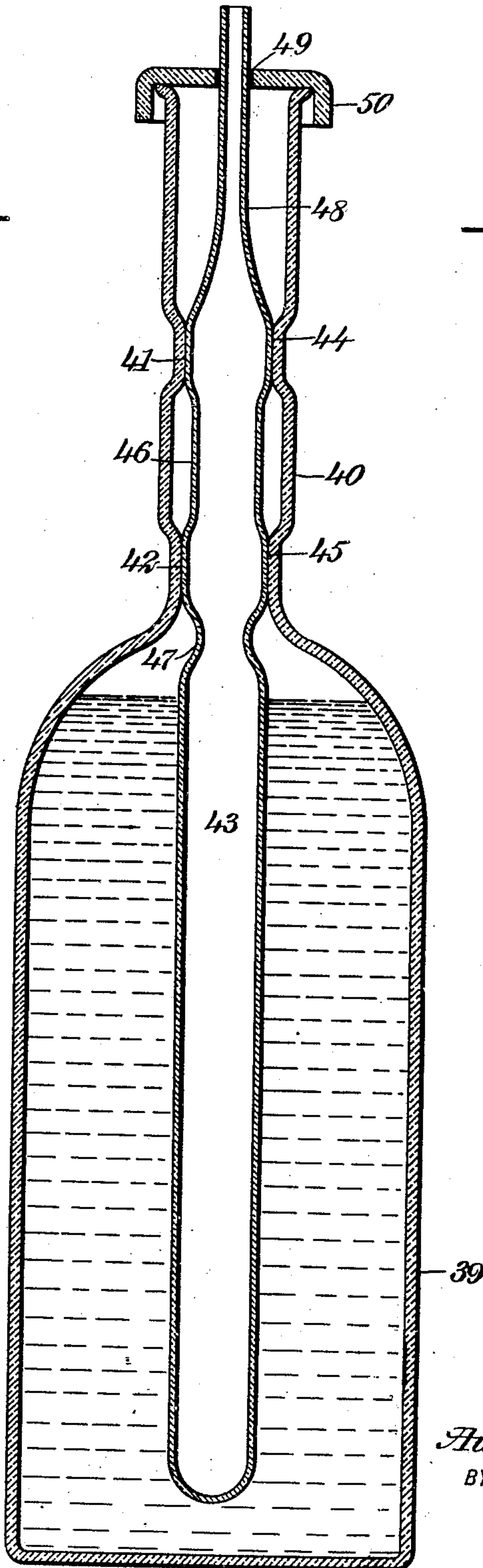
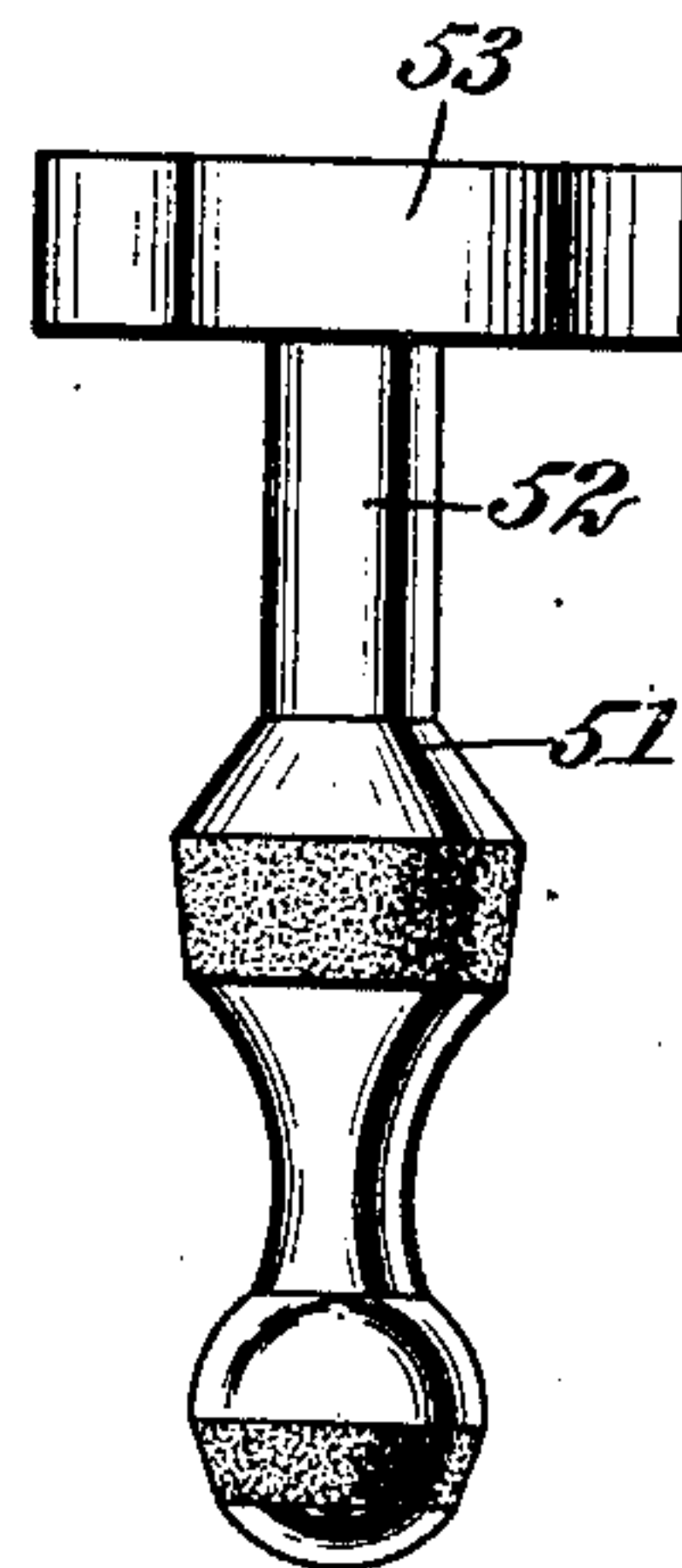


Fig. 6



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BOTTLE AND BOTTLE-CLOSURE.

No. 837,812.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed February 17, 1906. Serial No. 301,628.

To all whom it may concern:

Be it known that I, AUGUST EIMER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Bottle and Bottle-Closure, of which the following is a full, clear, and exact description.

This invention relates to bottles and bottle-closures.

The invention is especially useful in connection with bottles containing chemicals. When stoppers of cork are used for closing bottles containing chemicals, they are objectionable, for the reason that they tend to contaminate the contents. On the other hand, rubber stoppers are apt to be attacked by the chemicals and will deteriorate. Bottles used for containing chemicals are commonly provided with slightly-tapered ground-glass stoppers; but these are open to objection for the reason that they frequently become so tightly secured in position that it is impossible to remove them without breaking the stopper or the bottle-neck. Other defects with glass stoppers are especially noticeable in acids, such as nitric acid, or volatile substances like ether, &c., which have a tendency to fume, and also where the contents of the bottle includes an efflorescent salt which tends to deposit around the stopper. This action frequently results in a firm cementing of the stopper in position, with the disadvantages referred to above. With stoppers of the class referred to above the mouths of the bottles are not properly protected against dust and atmospheric influences.

The object of this invention is to provide efficient means for effecting the closure of bottles such as described which will overcome the aforesaid defects.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section through the neck of a bottle and illustrating a form of my invention. Fig. 2 is a view similar to Fig. 1, but illustrating a modified form. Fig. 3 is a view similar to Figs. 1 and 2 and showing a

third modified form. Fig. 4 is a view similar to the foregoing figures, but representing a special form of the invention especially adapted for permitting the escape of fumes from the interior of the bottle. Fig. 5 is a vertical central section through the bottle and showing a form which the invention may take which enables the influx or efflux of gases from the interior, and Fig. 6 is a side elevation of a stopper of special form.

Referring more particularly to the parts, 1 represents a bottle, the body of which may be of any suitable form, the said bottle being provided with a neck 2, preferably having substantially the form shown. At two or more points the inner diameter of this neck is restricted, as shown, so as to form seats 3 and 4 for a stopper 5, the said stopper being preferably of glass, as illustrated, and formed below into a ball 6, having a ground-glass belt or shoulder 7, which is ground upon the seat 3, and having thereabove a belt or shoulder 8, which is ground upon the seat 4. Between the seats 3 and 4 the bottle-neck is enlarged, preferably, so as to form a chamber 9, and above the seat 4 the neck is enlarged again, so as to form a chamber 10, the wall whereof terminates above in a mouth 11. The stopper 5 is formed with an upwardly-projecting stem 12, which is preferably slightly tapered, as indicated. In the mouth 11 there is seated an auxiliary stopper 13, which may be of rubber or similar material, which seats tightly in the mouth, as shown, the said stopper being provided with a central opening 14, through which the stem 12 passes upwardly, as indicated. When the auxiliary stopper 13 is forced into position, as shown, the stopper 5 is securely held in place, so as to make an air-tight closure for the bottle, and at the same time there is no possibility of the contents or the fumes therefrom reaching the auxiliary stopper, so as to exert a destructive action thereupon. While the ground belts 7 and 8, which come upon the seats 3 and 4, are amply sufficient to make a substantially air-tight closure, the stopper 5 may be readily removed after removing the auxiliary stopper 13, as the area of the belts is small enough to prevent any cementing action taking place between the surfaces of the glass which come together. In this connection attention is called to the fact that the belt 8 is removed a sufficient distance above the belt 7, so that even in the event of a quantity of acid lodging at the belt 7 the chemicals

would not reach the belt 8, so that no cementing effect whatever could take place at this point. The diameter of the seat 3 is preferably smaller than the diameter of the seat 4, as shown.

In Fig. 2 a form of the invention is shown in which the glass stopper 15 is used, seating in the neck 16 of the same form as the neck 2, described above. The auxiliary rubber stopper 13, however, is dispensed with and a glass cap 17 is substituted, the same having a central opening 18, through which the stem 19 of the glass stopper passes upwardly. This cap 17 forms an effective closure against dust. If desired, the stem 19 may make a ground-glass fit in the opening 18, or this point may be sealed in any suitable manner. The cap 17 is preferably formed with a downwardly-projecting flange 20, which seats over the lip 21 of the bottle-neck, the lip forming a space in which a seal 22, of wax or similar material, may be received.

In Fig. 3 a modified form is shown, in which the neck 23 of the bottle and the stopper 24 are similar to those described above, the only difference being that the stem 25 of the stopper 24 is formed integrally with the cap 26, said cap having a depending flange 27 forming a space around the mouth of the bottle adapted to receive a seal 28, of wax or similar material. Such an arrangement as this, or an arrangement such as that described in Figs. 1 or 3, is especially desirable when bottles containing chemicals are being shipped.

Where the contents of the bottle are highly volatile, so that there is danger of a breaking pressure being developed within the same, I provide a construction such as that shown in Fig. 4, in which the bottle-neck 29 has the form described above and the stopper 30 has the same general form as the glass stoppers described above. In this case, however, the stem 31 of the stopper is extended above the mouth of the bottle, as indicated in Figs. 1 and 2. Upon the mouth of the bottle a bonnet 32 is seated, the same being secured to the lip 33 of the bottle by any suitable means, such as an elastic band 34, arranged as shown. The bonnet 32 presents an elongated neck 35, which terminates above in a head or bulb 36, which bulb is provided with vents 37, as shown. Upon the upper extremity of the stem 31 a rubber tip 38 is received. The stem 31 passes loosely through the neck 35. With closures of this form if gases should generate beneath the stopper 30 these may operate to displace the stopper, permitting the gas to escape upwardly into the mouth of the neck, whence it will pass into the neck 35 through the bulb 36, thence through the vents 37. The bonnet 32 is not injured by the rising of the stopper 30 in the manner described, by reason of the rubber tip 38, which operates as a pad to prevent the breaking of

the bulb 36 in case the stem should strike the bulb.

In some cases it may be desirable for an action to take place which is substantially the reverse of that described above—that is, an action enabling air to flow into the interior of the bottle. This necessity arises where there has been an unduly large absorption of gases or fumes by the liquid. In this instance I prefer to use the construction shown in Fig. 5, in which 39 represents a bottle having a body of any common form, said body having an upwardly-projecting neck 40, having two seats 41 and 42 of a suitable diameter. A stopper 43 consists of a glass tube which extends down into the interior of the bottle and floats therein. The upper portion of this tube is formed into shoulders 44 and 45, which normally lie, respectively, at the seats 41 and 42. These shoulders fit nicely at these seats; but it should be understood that the closure is simply a sliding one, so that the tube or stopper 43 may be readily raised or lowered. Between the shoulders 44 and 45 the stopper has a neck 46 of reduced diameter, and a reduced neck 47 is formed below the shoulder 45. Likewise, above the shoulder 44 the diameter of the tube is reduced so as to form a tip 48. This tip extends upwardly and passes through an opening 49 in the dust-cap 50, which seats upon the mouth of the bottle, as shown. The dimensions and weight of the tube are such that it will normally float in the bottle in the position shown in Fig. 5. Should undue absorption of gases or fumes occur, the atmospheric pressure above the bottle will depress the tube or stopper 43 sufficiently to move the shoulders 44 and 45 out of engagement with their seats 41 and 42, or it will move the stoppers sufficiently to enable a quantity of air to pass downwardly into the interior of the bottle. In this way equilibrium will be reestablished.

In Fig. 6 I illustrate a stopper 51 of the general form shown in Figs. 1 to 4, the upper extremity of the stem 52 of the stopper being provided with a head 53, which facilitates its being rotated to seat the stopper in case it should become stuck.

While I have described a closure presenting two seats for the stopper and a stopper having two belts corresponding to the seats, it should be understood that one belt may be used, or even three or more seats could be used, cooperating with the corresponding number of belts formed on the stopper. Special attention is called to the fact that by having the upper belt of the stopper removed sufficiently from the lower belt if it should happen that the liquid contents of the bottle should pass into the chamber 9, as shown in Fig. 1, this liquid will not reach the seat 4 and no danger of cementing at this point results. By reason of the fact, also, that the

areas of contact between the stopper and the neck are removed from each other I am enabled to make these areas relatively very small, so that even in the event of the cementing together of the glass surfaces the stopper may be readily removed. The width of these belts on the stoppers and the seats will of course be changed to suit special circumstances or to suit the properties of different chemicals to be held. Special attention is called to the fact, also, that in the form shown in Fig. 4 the vents 37 are arranged on the under side of the bulb 36, so that while escape of the gases from the interior is permitted the bonnet operates substantially as a dust-cap, preventing the settlement of dust in the mouth of the neck.

The restrictions in the bottle-necks necessary to form the seats do not tend to prevent the free flow of the liquid. On the contrary, they seem to promote a freer flow, as they appear to facilitate the ascent of the air as the fluid descends.

Attention is called to the fact that in the construction of the bottle-neck it is only necessary that the restrictions forming the seats for the stopper occur in the bore of the neck. These may be formed as shown; but the same effect may be produced on a neck having a plain cylindrical outline by thickening the material of the neck to form annular projections or shoulders which would constitute seats.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A bottle having a neck presenting a seat of restricted diameter with a chamber below said seat, a second seat below said first seat

and a stopper presenting rigidly-connected shoulders resting on said seats, and cutting off communication between said chamber and the interior of said bottle.

2. A bottle having a neck presenting a seat of restricted diameter, a second seat therebelow, said neck having an enlarged chamber between said seats, and a stopper having rigidly-connected shoulders resting respectively upon said seats, and cutting off said chamber from the interior of said bottle, said stopper comprising a cap closing the mouth of said neck.

3. A bottle having a neck presenting a seat of restricted diameter, a second seat therebelow of smaller diameter than said first seat, said neck having a chamber formed in said neck between said seats, a stopper having shoulders resting respectively on said seats and cutting off said chamber from the interior of said bottle, said stopper having a reduced body rigidly connecting said shoulders.

4. A bottle having a neck presenting a seat of restricted diameter therein with a chamber below said seat, a second seat below said first seat, and a stopper having rigidly-connected shoulders resting on said seats and cutting off communication between said chamber and the interior of said bottle, said stopper having a rigid cap at the upper extremity thereof seating on the mouth of said neck and adapted to be sealed thereto.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST EIMER.

Witnesses:

JNO. M. RITTER,
F. D. AMMEN.