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Patented Nov. 7, 1899.

F. H. LIPPINCOTT & W. MORLOK.  
PNEUMATIC LIQUID DISPENSING JAR.

(No Model.)

(Application filed Mar. 26, 1898.)

Fig. 2

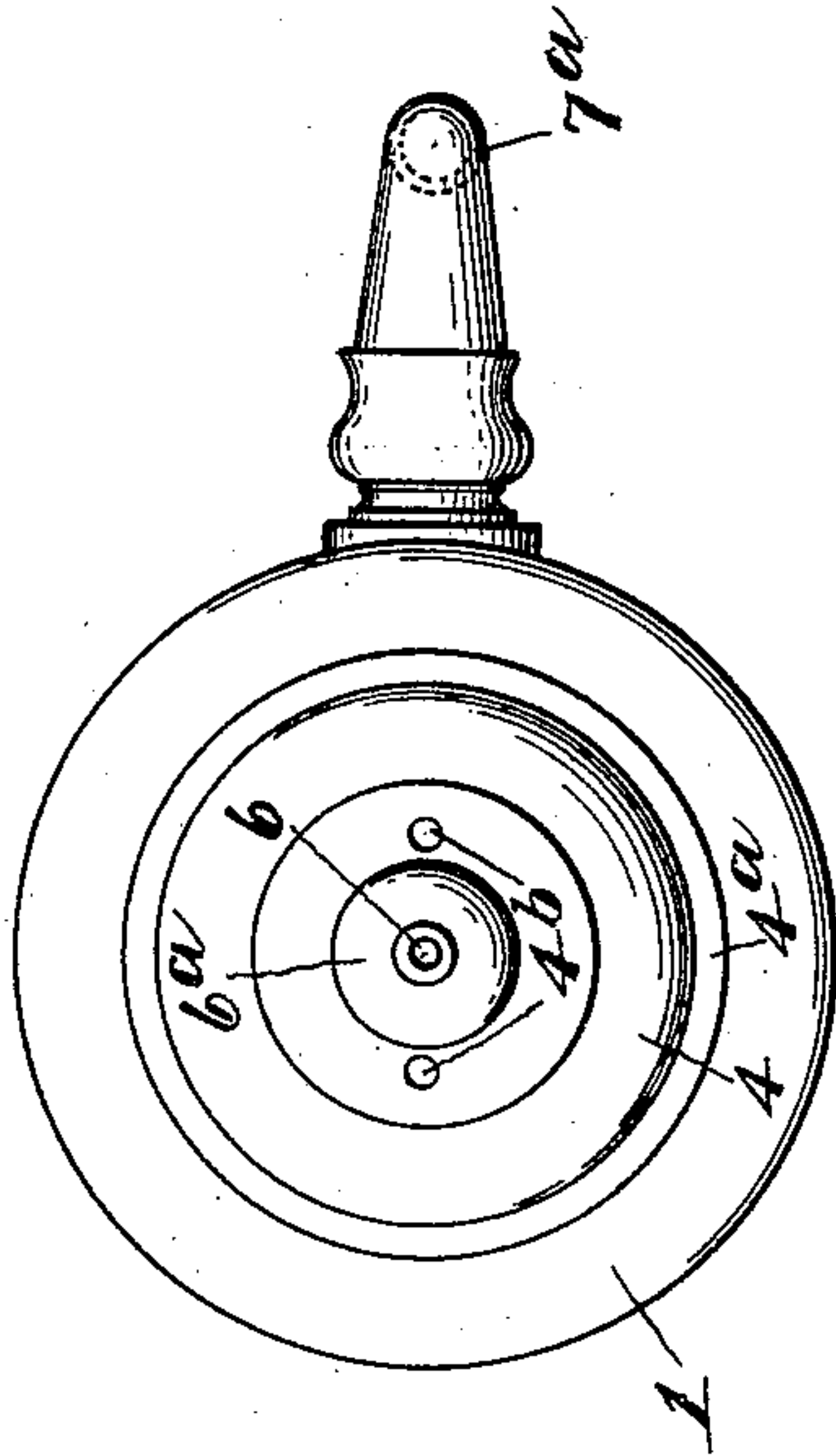


Fig. 3

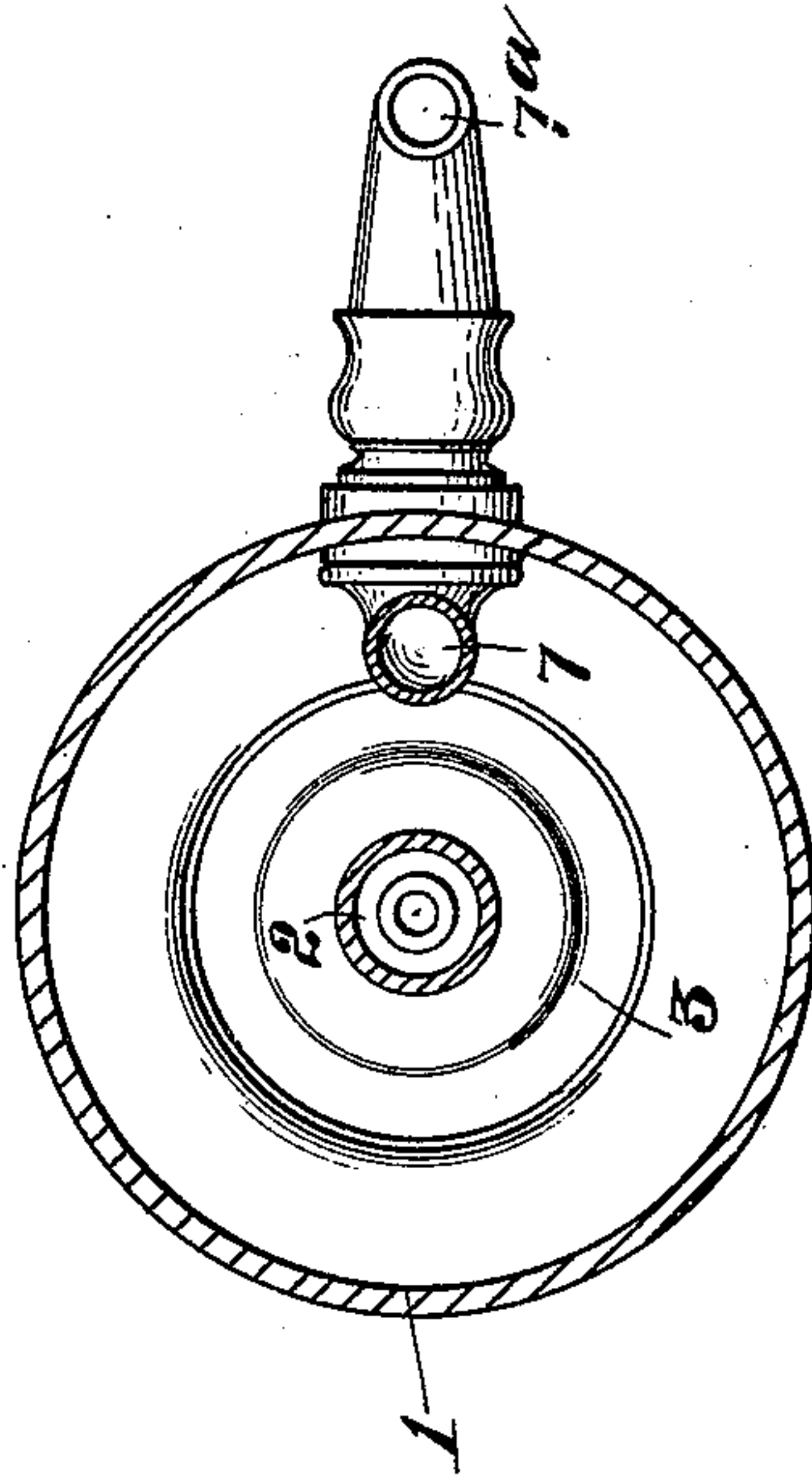
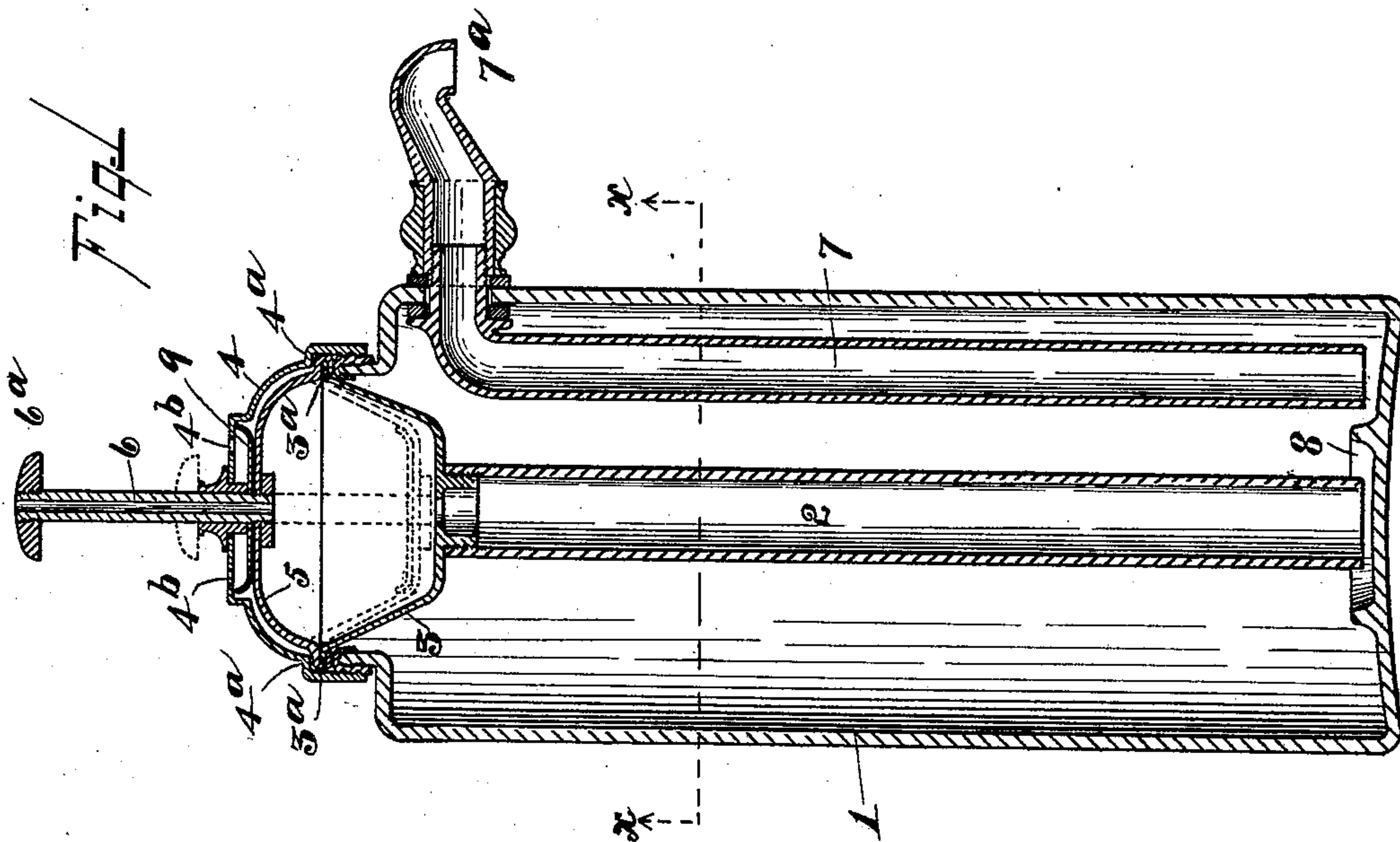


Fig. 4



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## PNEUMATIC LIQUID-DISPENSING JAR.

SPECIFICATION forming part of Letters Patent No. 636,537, dated November 7, 1899.

Application filed March 26, 1898. Serial No. 675,249. (No model.)

*To all whom it may concern:*

Be it known that we, FISHER H. LIPPINCOTT and WILLIAM MORLOK, citizens of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Liquid-Dispensing Jars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a vertical section through the middle of our jar; Fig. 2, a top plan view; and Fig. 3, a section on line  $x\ x$ , Fig. 1.

The object of this invention is to provide, in connection with a suitable jar or the like for containing syrups or other liquids, means whereby a desired quantity may be readily and conveniently forced out of the jar by air-pressure.

The invention, broadly considered, comprises the combination of a jar or other suitable vessel, a tube, open at the top and bottom, suspended therein, a second tube also suspended in the jar and communicating with the outer air, and means for compressing the body of air within the first-mentioned tube and forcing a quantity thereof out of the lower end of the latter into the jar, whereby a portion of the liquid contained in the jar will be forced out of the same by way of the said second tube by pneumatic pressure, as hereinafter described.

The invention further comprises certain particular features or combinations herein-after pointed out.

Referring to the accompanying drawings, which represent a form of our invention which we have put into practice, 1 designates a syrup-containing jar of a usual form.

2 is a tube within the jar, whose upper end is secured to a cup-shaped support 3, that is suspended from the top of the jar, the lower end of the tube extending, preferably, close to the bottom of the jar, as shown.

4 is a cap that is screwed or otherwise fastened to the top of the jar.

5 is a flexible india-rubber diaphragm within the space between the cap 4 and the support 3, its peripheral part being suitably

secured, in this instance being bent around and under a peripheral flange 3<sup>a</sup> of support 3, and is held in place by means of the cap 4, which is provided with a horizontally-extending offset 4<sup>a</sup>. When the cap is screwed down, the rubber is compressed between the offset and the edge of the top of the jar, as seen in Fig. 1, thus making an air-tight joint. To the middle part or crown of the diaphragm is secured the lower end of a tubular rod or plunger 6, that is adapted to be reciprocated vertically in a guide-hole in cap 4. There is a knob 6<sup>a</sup> on the upper end of the plunger for convenience in operating the latter. One or more apertures 4<sup>b</sup> in the cap serve to admit air between the latter and the diaphragm.

7 is a second tube, hereinafter termed the "outlet-tube," suspended within the jar, and whose lower end extends near to the bottom of the jar, and its upper end projects through an air-tight aperture in the side of the upper part of the jar and has connected thereto a nozzle 7<sup>a</sup>, whose end is preferably downwardly turned, as seen.

Having thus described the construction of the invention, its mode of operation is as follows: The cap 4 and adjuncts, as also the support 3 and tube 2, having been detached and removed from the jar, the latter is filled with the syrup or other liquid. These parts are then replaced. The liquid will obviously stand at the same level in the two tubes and exterior thereto within the jar. When it is desired to draw some of the syrup from the jar, the finger or hand is placed upon the top of the tubular plunger 6, so as to close the same, and then the plunger is depressed. This carries down the diaphragm 5 and so compresses the underlying air, and consequently the syrup, or a portion thereof, will be forced out of the lower end of the tube 2 into the jar-space, and having no other outlet it escapes by way of the tube 7 and may be received in a cup or tumbler placed beneath the downturned end of the nozzle 7<sup>a</sup>. Upon now opening the upper end of the plunger the liquid will come to a certain and the same height within the two tubes lower than it was before; but that within the jar exterior to



said tubes will remain at substantially the same height that it was before the operation. This is because the upper ends of the said tubes are open to the air, while the upper part of the jar immediately below the support 3 is closed thereto. It being understood that the plunger and diaphragm have been first brought to the elevated position either by drawing up the plunger or allowing it to be brought up by the elasticity of the diaphragm, if the plunger be given another downward stroke, with the hand or finger stopping the opening therein, as before, some of the liquid will again be expelled from tube 2 and escape from the nozzle of the outlet-tube, as before, and upon unsealing the end of the plunger the liquid will come to a level within the two tubes lower than before, and the level exterior to the tubes will still remain substantially unchanged. Finally, at the next or a subsequent depression of the plunger and diaphragm all of the liquid within tube 2 will be forced out therefrom; but the quantity thus expelled may not suffice to cause the liquid to rise high enough in tube 7 to escape; but, however, as the plunger descends, thus compressing the body of air within tube 2 above the liquid therein, a quantity of this compressed air will be forced out of the lower end of said tube and rise to the air-tight space above the top of the body of the liquid exterior to the two tubes and so establish a pressure upon that body of the liquid. This pressure may, however, not be sufficient to compel the outflow of the liquid from the tube 7. If not, the operation is repeated as may be necessary to obtain such pressure. At each repetition of this air-supplying operation the level of the liquid exterior to the tubes will fall, while that within the latter will relatively rise.

If the capacity of the space below the diaphragm and the top of tube 2 be greater than the capacity of the said tube, and the jar being full of the liquid, the tube would be emptied at the first stroke and (if it be desired to then expel so much of the liquid) a quantity of the air will also be forced out into the jar, and the same with each repetition of the operation.

By suitably operating the rod and depressing the diaphragm any desired quantity of the liquid may of course be forced out from the outlet-tube.

We remark, that although not essential, it is preferred that the diameter or capacity of the tube 2 should be greater than that of the tube 7. In case the device is to be used with ordinary syrups, as for soda-water fountains, we would have tube 2 about double the capacity of tube 7, as in the construction shown in the drawings.

In order to prevent air forced from the tube 2 from, so to say, "jumping" across the interval between said tube and the tube 7, and thus escaping up through the latter, we usually

form a vertical guard or projection 8 in the bottom of the jar, extending above the line of the lower end of tube 7.

To secure the full effect of the rubber diaphragm 5 in its descent, we generally secure to the plunger 6, immediately above the diaphragm, a plate 9 of suitable diameter with upturned periphery, as shown, whereby when the diaphragm is depressed it will take the cup-shaped form indicated by dotted lines in Fig. 1.

We remark that we do not limit ourselves to the precise construction of the invention shown in the drawings or of any of the elements thereof. We have simply shown and described that form which we have found by practical experience to be a suitable and convenient one.

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

1. In an apparatus for the purpose recited, the combination with a jar closed at its top, of an air-inlet tube suspended in said jar and extending to a point below the surface of the liquid therein, an independent liquid-outlet tube also arranged within the jar and also extending to a point below the surface of the liquid therein, a flexible diaphragm for forcing air into said air-inlet tube, and a tubular plunger for operating said diaphragm, substantially as described.

2. In an apparatus for the purpose recited, the combination with a jar closed at its top, of an air-inlet tube suspended therein and communicating normally with the external air, said tube extending to a point below the surface of the liquid in the jar, an independent liquid-outlet tube also arranged within the jar and also extending to a point below the surface of the liquid therein, a flexible diaphragm for forcing the air out of the lower end of the air-inlet tube, and a tubular plunger for operating said diaphragm, substantially as described.

3. In an apparatus for the purpose recited, the combination with the jar, of the outlet-tube, the tube, 2, terminating below the level of the liquid in the jar, the air-tight support from which it is suspended, the flexible diaphragm mounted above said support, and the vertically-movable tubular plunger connected to said diaphragm; substantially as and for the purpose set forth.

4. In an apparatus for the purpose recited, the combination with the jar, closed at the top, the tube, suspended therein having its lower end adjacent to the bottom of said jar, and its upper end communicating normally with the external air; the outlet-tube having its lower end adjacent to the bottom of the jar, means for forcing the air out of the lower end of the first-mentioned tube, and the deflector for preventing escape of air into the outlet-tube, substantially as described.

5. The combination with a jar closed at its

top, of the independent air-inlet and liquid-  
outlet tubes within said jar, a flexible dia-  
phragm for forcing air through the air-inlet  
tube and through the liquid for accumulation  
5 at the upper portion of the jar, and a tubular  
plunger for operating said diaphragm, sub-  
stantially as described.

In testimony whereof we have hereunto af-

fixed our signatures this 16th day of March,  
A. D. 1898.

FISHER H. LIPPINCOTT.  
WILLIAM MORLOK.

Witnesses:

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