

No. 702,849.

Patented June 17, 1902.

A. WRIGHT.

MAXIMUM AND MINIMUM RECORDING ELECTRIC METER.

(Application filed July 1, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

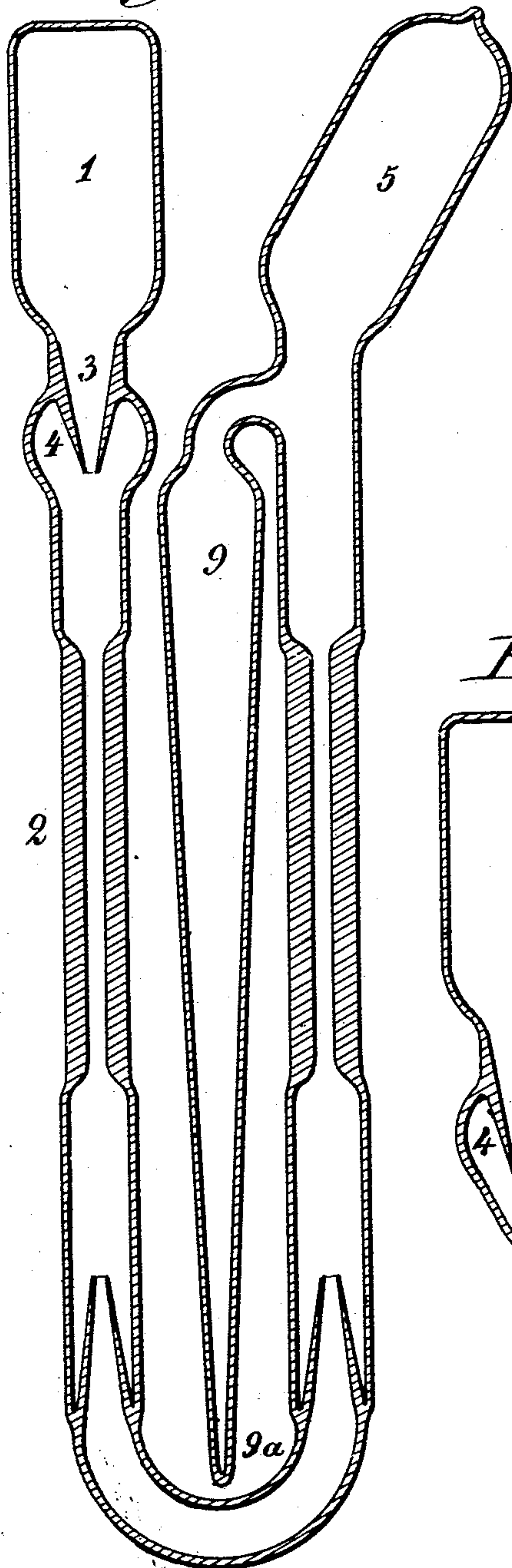


Fig. 2.

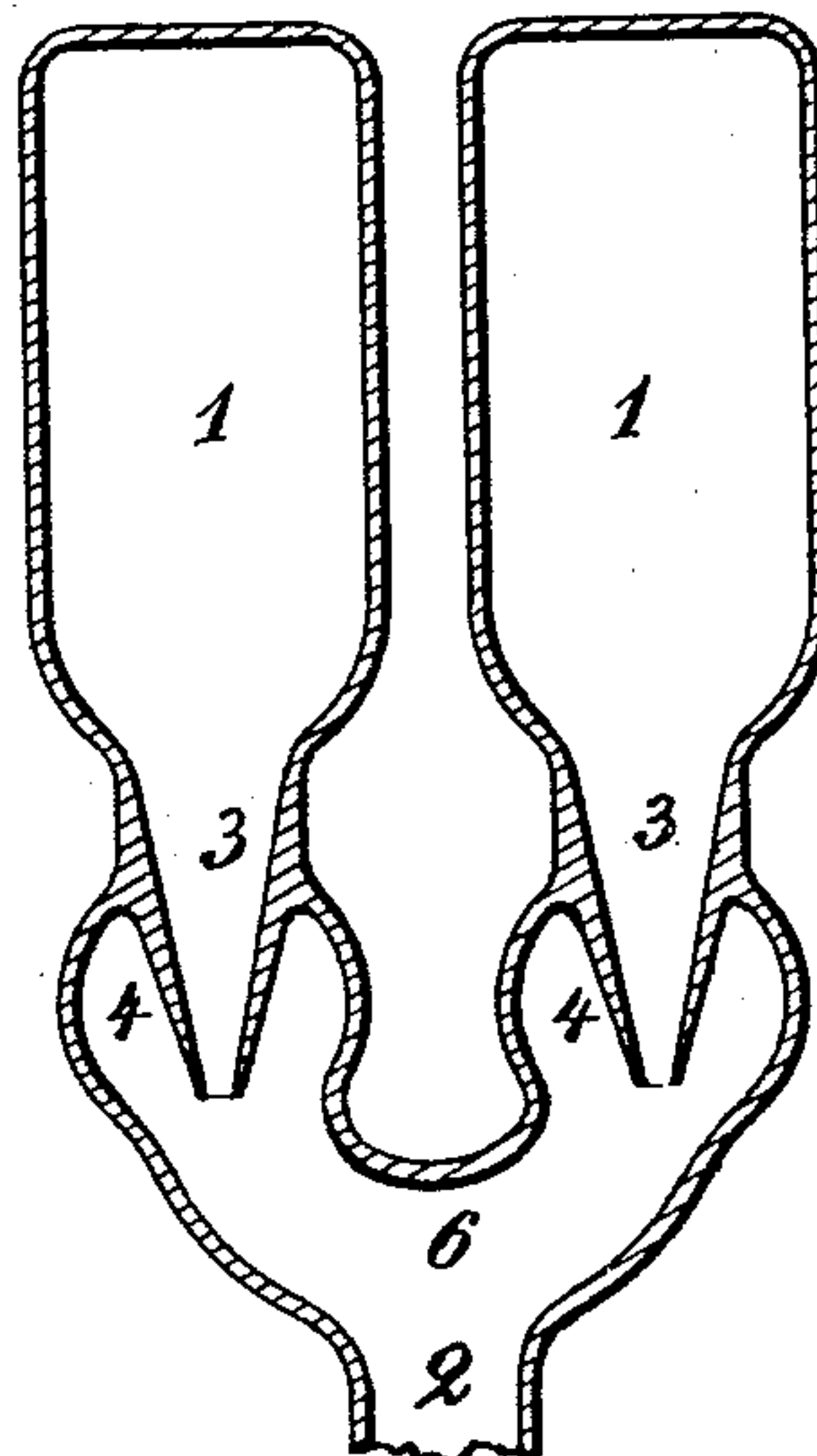
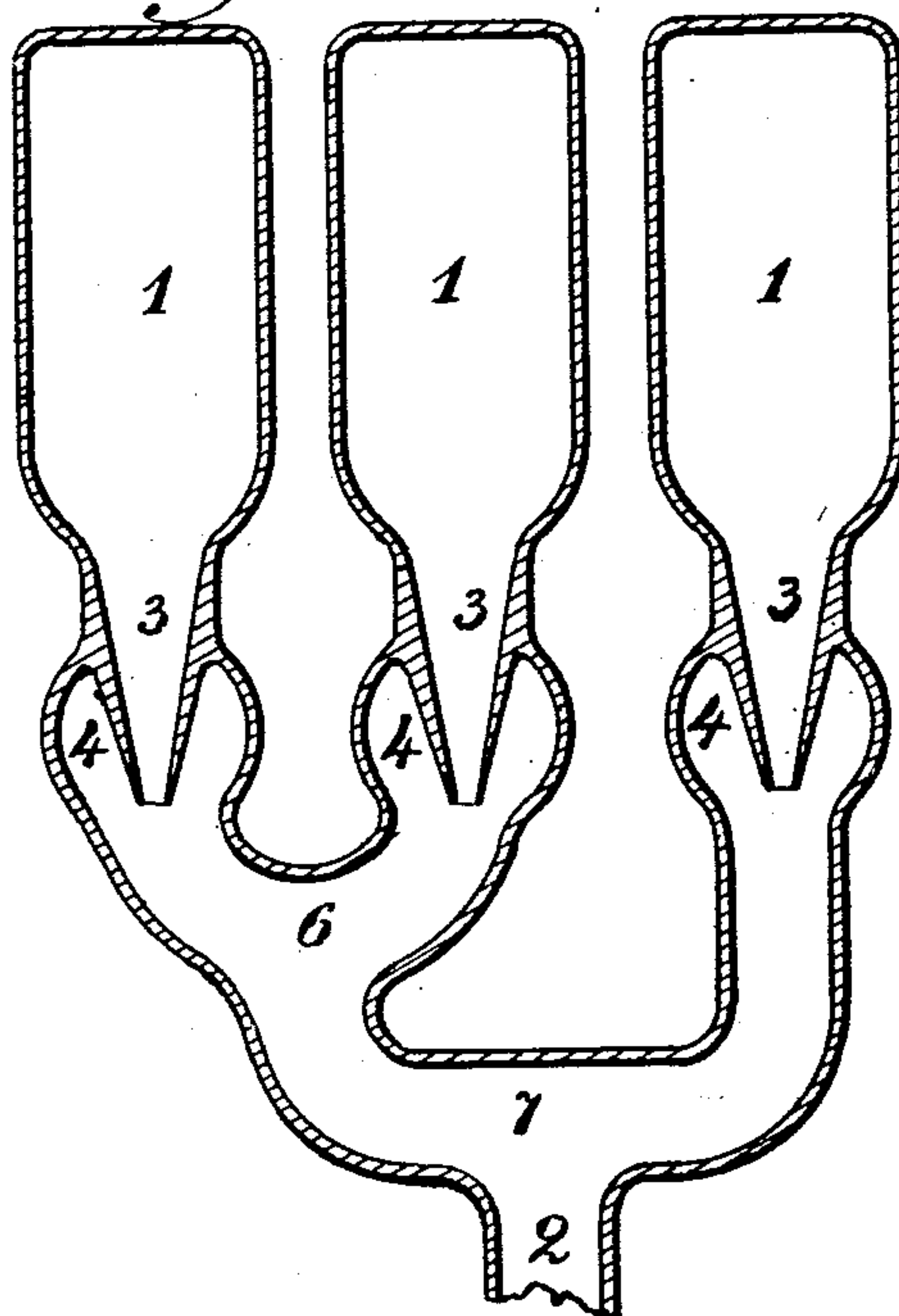


Fig. 3.



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Fig. 4.

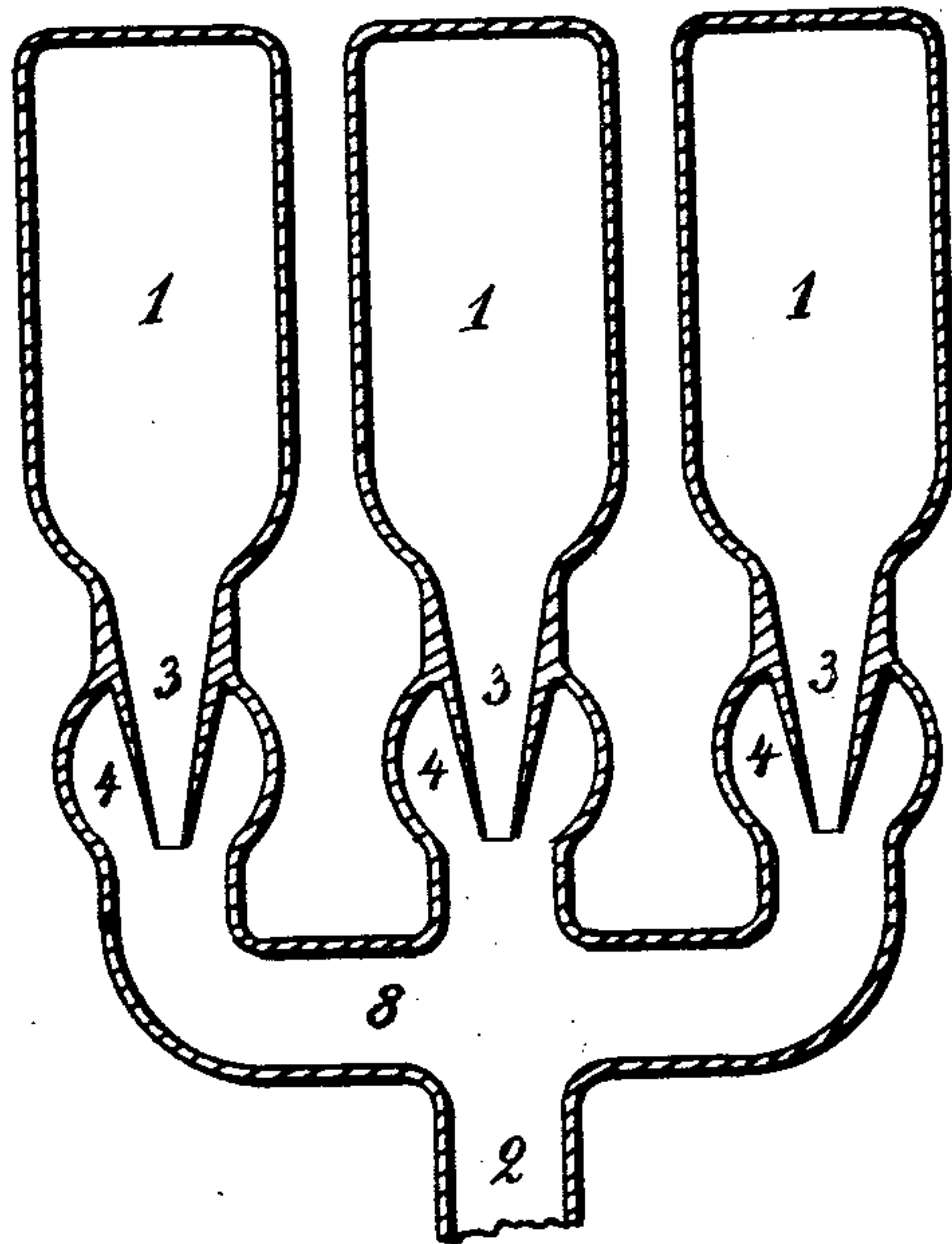


Fig. 9.

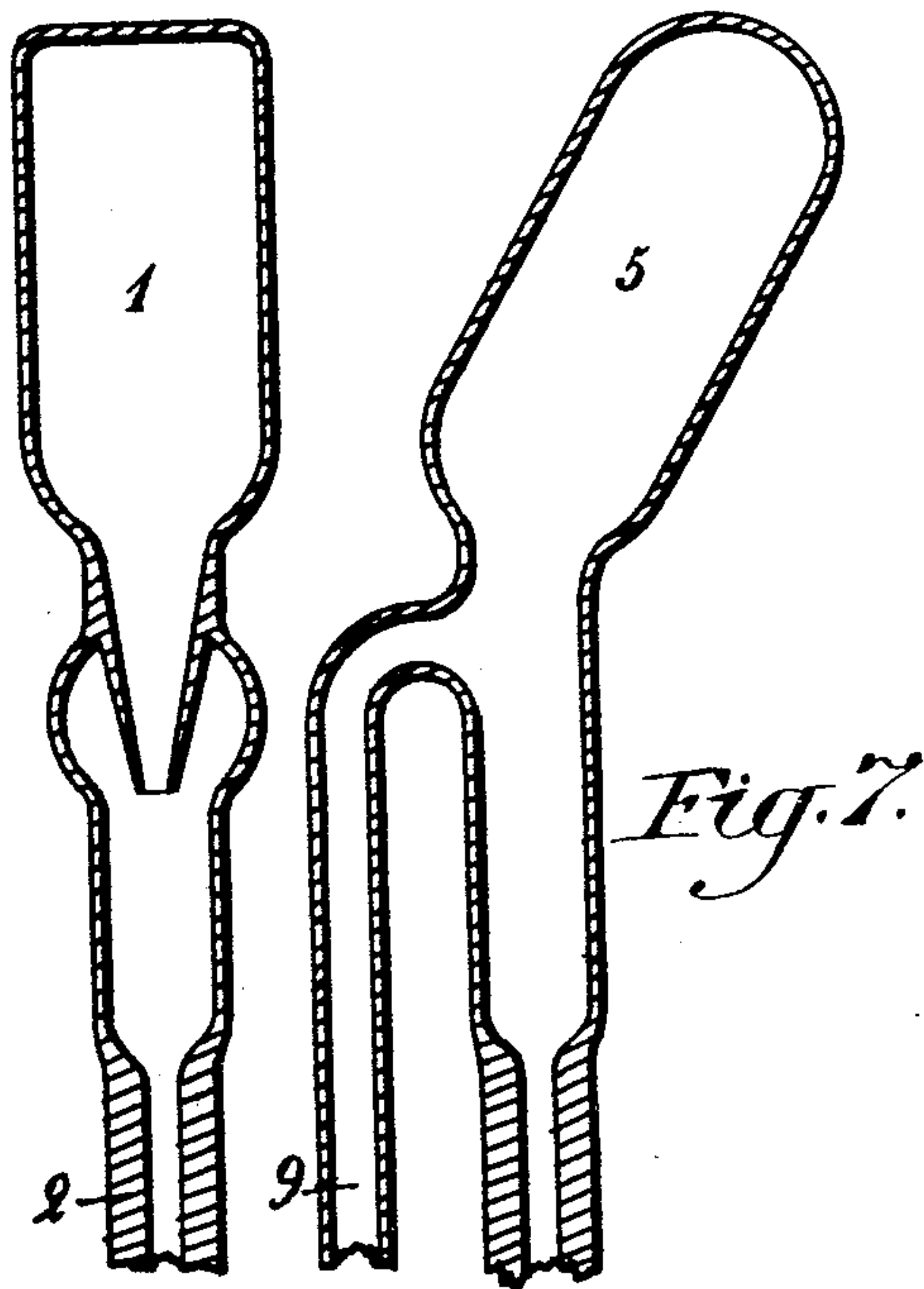


Fig. 7.

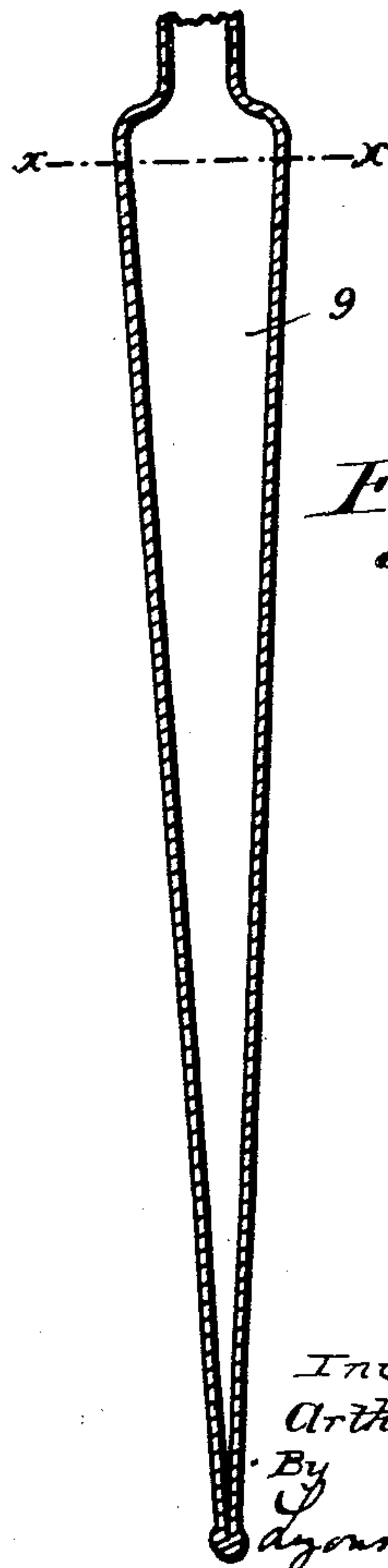


Fig. 8.

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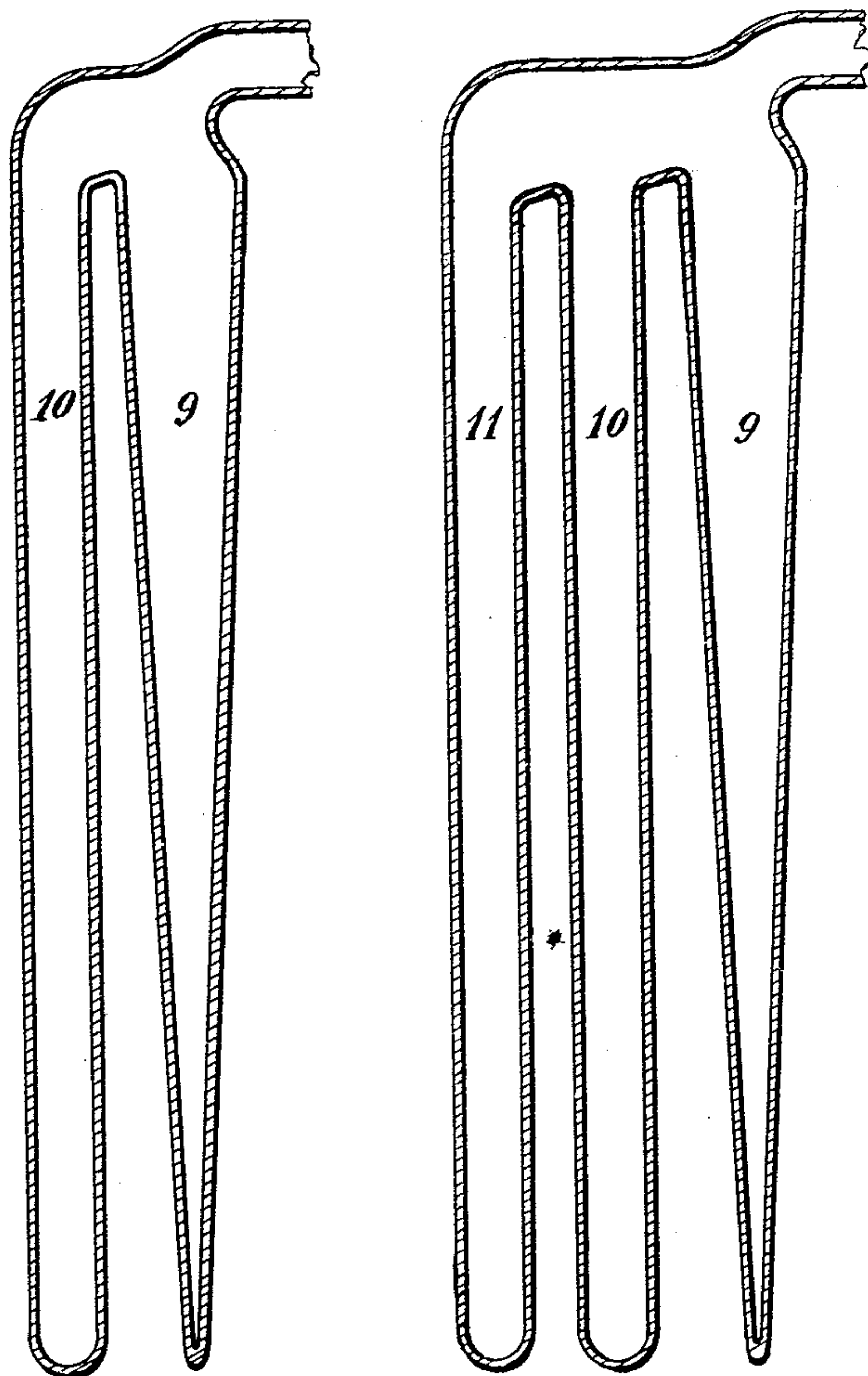
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(No Model.)

3 Sheets—Sheet 3.

Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

ARTHUR WRIGHT, OF BRIGHTON, ENGLAND, ASSIGNOR TO THE MUTUAL ELECTRIC TRUST, LIMITED, OF BRIGHTON, ENGLAND.

MAXIMUM AND MINIMUM RECORDING ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 702,849, dated June 17, 1902.

Application filed July 1, 1901. Serial No. 66,739. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR WRIGHT, a subject of the King of Great Britain, and a resident of Brighton, in the county of Sussex, England, have invented certain new and useful improvements in Maximum and Minimum Recording Electric Meters, of which the following is a specification.

This invention relates to improvements in maximum and minimum recording electric meters of the type set forth in the United States patent granted to me on the 25th day of May, 1897, and numbered 583,160. I shall hereinafter refer to the specification of the said patent as my prior specification.

In the accompanying drawings, Figure I is a form corresponding with that shown in Fig. 13 of my said prior specification, but embodying certain improvements hereinafter to be described. Fig. II illustrates what I term a "double expansion-head." Fig. III illustrates what I term a "treble expansion-head." Fig. IV is a modified form of treble expansion-head. Fig. V illustrates a double receptacle. Fig. VI illustrates a treble receptacle. Fig. VI is an elevation of part of a modified form of instrument. Fig. VIII is a side elevation of the receptacle thereof. Fig. IX is a cross-section on the line xx of Fig. VIII.

The first of my improvements consists of a novel form of trap (shown in Figs. I, II, and III) for use below the expansion-bulb. The ordinary compression-bulb is numbered 5, but the expansion-bulb 1 instead of being continuous with the expansion-limb 2 of the U-tube is drawn out at one part to a nozzle 3, and this nozzle is sealed into a trap-bulb 4, so as to penetrate for some distance thereinto. This form of trap may conveniently be employed in addition to the usual bubble-trap employed in instruments of this type, and its object is not only to prevent or aid in preventing the liquid from entering the expansion-bulb on the instrument being reset, but also to prevent air passing from the compression-bulb around to the expansion-bulb should any sudden cooling of the expansion-bulb take place during resetting.

A second improvement consists in the employment of two expansion-bulbs connected in a particular way instead of the single ex-

pansion-bulb usually employed. When I employ two expansion-bulbs, as aforesaid, instead of causing them to open directly into the limb of the U-tube I cause them to open into a crutch or cross-tube 6, which crutch or cross-tube itself opens into the expansion-limb 2 of the U-tube. The two bulbs constitute a novel and useful form of expansion-head, hereinafter termed a "double expansion-head," which is very convenient for use in connection with three-wire circuits, each of the said bulbs being embraced by a resistance-wire, each of these resistance-wires being connected with one of the outers—that is to say, the resistance-wire around one of the bulbs is connected with the positive and the resistance-wire around the other is connected with the negative.

I may also employ a treble expansion-head for use in connection with circuits carrying three-phase currents. The three expansion-bulbs 1 1 1 of this head instead of each directly opening into the limb of the U-tube are connected therewith in the following manner: Two of the bulbs are connected by a cross-tube or crutch 6 after the manner hereinbefore described with reference to the double bulb-head used for three-wire circuits. The said crutch or cross-tube in this case, however, instead of itself opening into the expansion-limb of the U-tube opens into one end of a second crutch or cross-tube 7, either directly or by means of a short tube or neck, while the third bulb opens into the other end of this second crutch or cross-tube 7. This second crutch or cross-tube opens into the expansion-limb 2 of the U-tube.

In a modified form of my treble expansion-head instead of employing two crutches or cross-tubes, as above described, I employ a single crutch or cross-tube 8, into which the three expansion-bulbs open, two of them at the ends of the said cross-tube and one at the center or other intermediate part thereof, as shown in Fig. IV.

In a further improvement I make the receptacle or index-tube 9, (see Fig. I,) within which the liquid which is spilled over collects, of conical or substantially conical shape. The said conical receiver is arranged with its apex 9^a downward, and it serves two functions.

First, it holds a larger amount of liquid than the existing form of index-tube and allows of the instrument having a larger range of registration—say from one-twentieth of its full-
 5 load capacity. It also allows of a large scale-reading being obtained with the smaller currents and owing to the swelling out toward the top (base) of the cone enables the readings to be crowded together at that point, so as to
 10 have a longer range of current-readings than if the divisions were equally placed over the scale.

In a modified form of receptacle, hereinafter termed my "duplex receptacle," I make
 15 the receptacle as shown in Fig. V. Here it will be seen that my duplex receptacle consists of two receptacles or index-tubes, one, 9, which is that into which the liquid first flows, being of conical form, similar to that shown
 20 in Fig. I. From this branches off a second or cylindrical receptacle 10, which may be of cylindrical or other desired shape. In practice I prefer to make the second receptacle 10 of a gage not smaller than that of the conical
 25 receptacle at its broadest part.

When desired, I may cause a third vessel 11 to branch from the second vessel of the duplex receptacle, so as to constitute, in fact, a triplex receptacle, as shown in Fig. VI.

30 In Fig. VII, I show a part elevation, in Fig. VIII a side elevation of the receptacle, and in Fig. IX a section on the line *xx* of Fig. VIII of a form resembling that shown in Fig. I, but with the difference that the receptacle, although still conical in form, is no
 35 longer a cone with a circular cross-section. Instead the cross-section of the cone is a flattened ellipse. This form of receptacle I find very convenient in practice, and I term it
 40 my "flat conical" form of receptacle.

I may graduate my receptacles in any convenient manner or place a scale beside them for convenience of reading.

The general operation of my meter is that
 45 which has been fully described in my prior patent, above referred to. The operation of the heating resistance about the expansion-bulb causes the liquid in the meter to spill over into the index tube or tubes, the amount
 50 of the liquid in such tubes being read off on the scale. This scale may be so calibrated as to enable the user to read therefrom the maximum amount of current or of any of the quantitative characteristics of the current
 55 which has passed since the instrument has been set. To reset the meter, it is merely

tilted at such an angle as to cause the liquid in the index-tubes to flow back to the compression-bulb.

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

1. A maximum and minimum electric recording-meter comprising an expansion-bulb, an expansion-limb and a trap between the
 65 two, substantially as described.

2. A maximum and minimum electric recording-meter comprising an expansion-bulb, a nozzle connected therewith and a trap-bulb surrounding the nozzle, substantially as de-
 70 scribed.

3. A maximum and minimum electric recording-meter comprising a plurality of expansion-bulbs an expansion-limb and a crutch or cross-tube therebetween, substantially as
 75 described.

4. A maximum and minimum electric recording-meter comprising a plurality of expansion-bulbs, crutches or cross-tubes connected to the expansion-bulbs and an expansion-
 80 limb connected to the crutches, substantially as described.

5. A maximum and minimum electric recording-meter comprising an index-tube, in which liquid collects, which is of substan-
 85 tially conical form, substantially as described.

6. A maximum and minimum electric recording-meter comprising an index-tube, in which liquid collects, which is substantially
 90 of a flat conical form, substantially as described.

7. A maximum and minimum electric recording-meter comprising a series of index-tubes connected with each other at their up-
 95 per ends, substantially as described.

8. A maximum and minimum electric recording-meter comprising a series of index-tubes connected with each other and with the
 100 meter at their upper ends, substantially as described.

9. A maximum and minimum electric recording-meter comprising a series of index-tubes connected with each other at their up-
 105 per ends, one of said tubes being conical, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ARTHUR WRIGHT.

Witnesses:

GEO. J. B. FRANKLIN,
 T. J. OSMAN.