

J. R. BALLENTINE.
 ATOMIZER.
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955,937.

Patented Apr. 26, 1910.

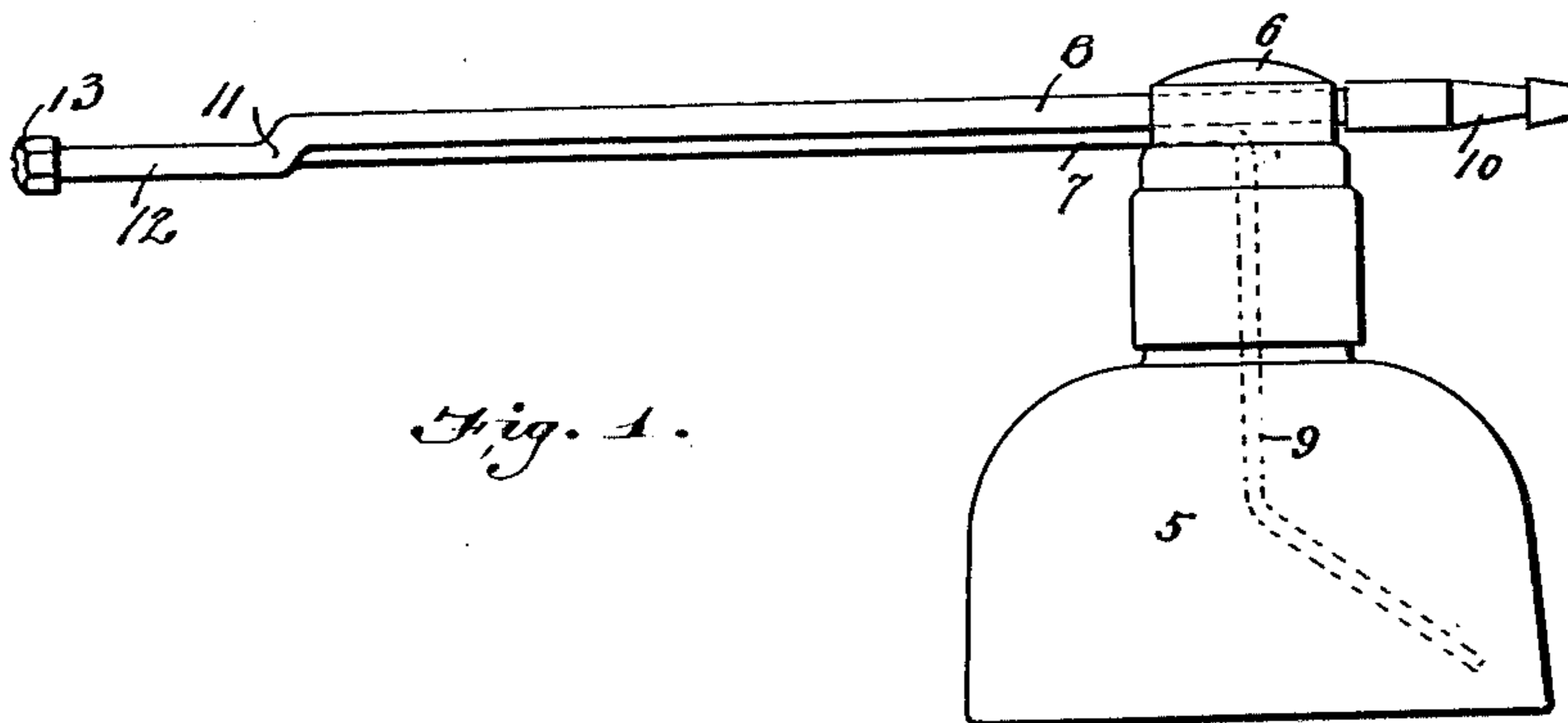


Fig. 1.

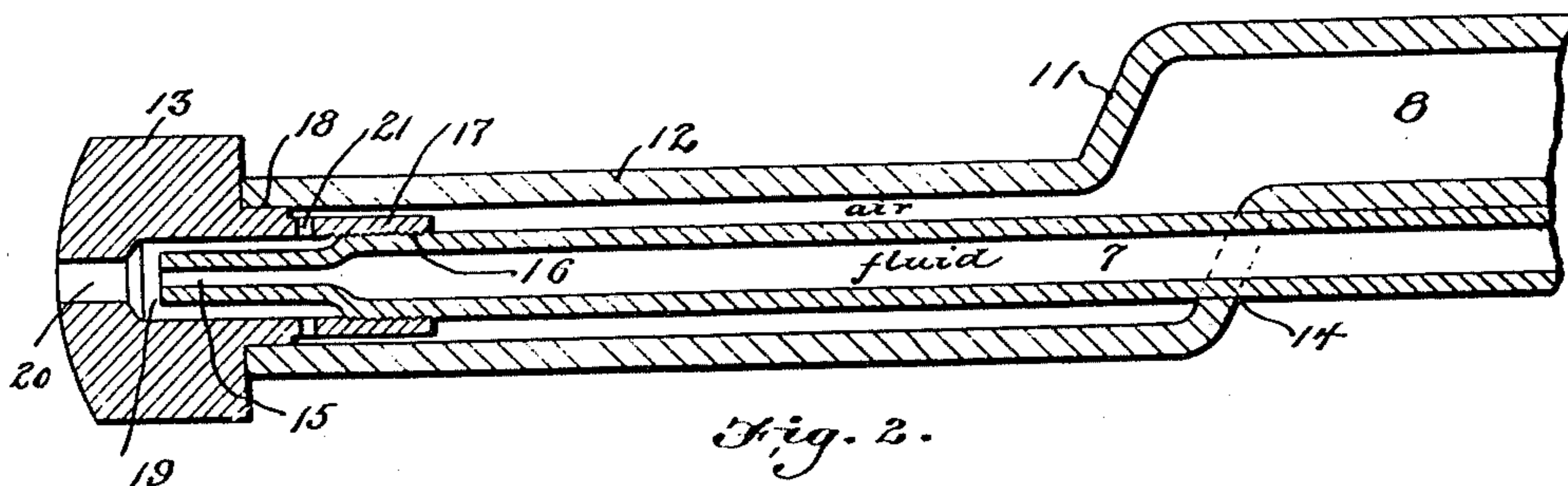


Fig. 2.

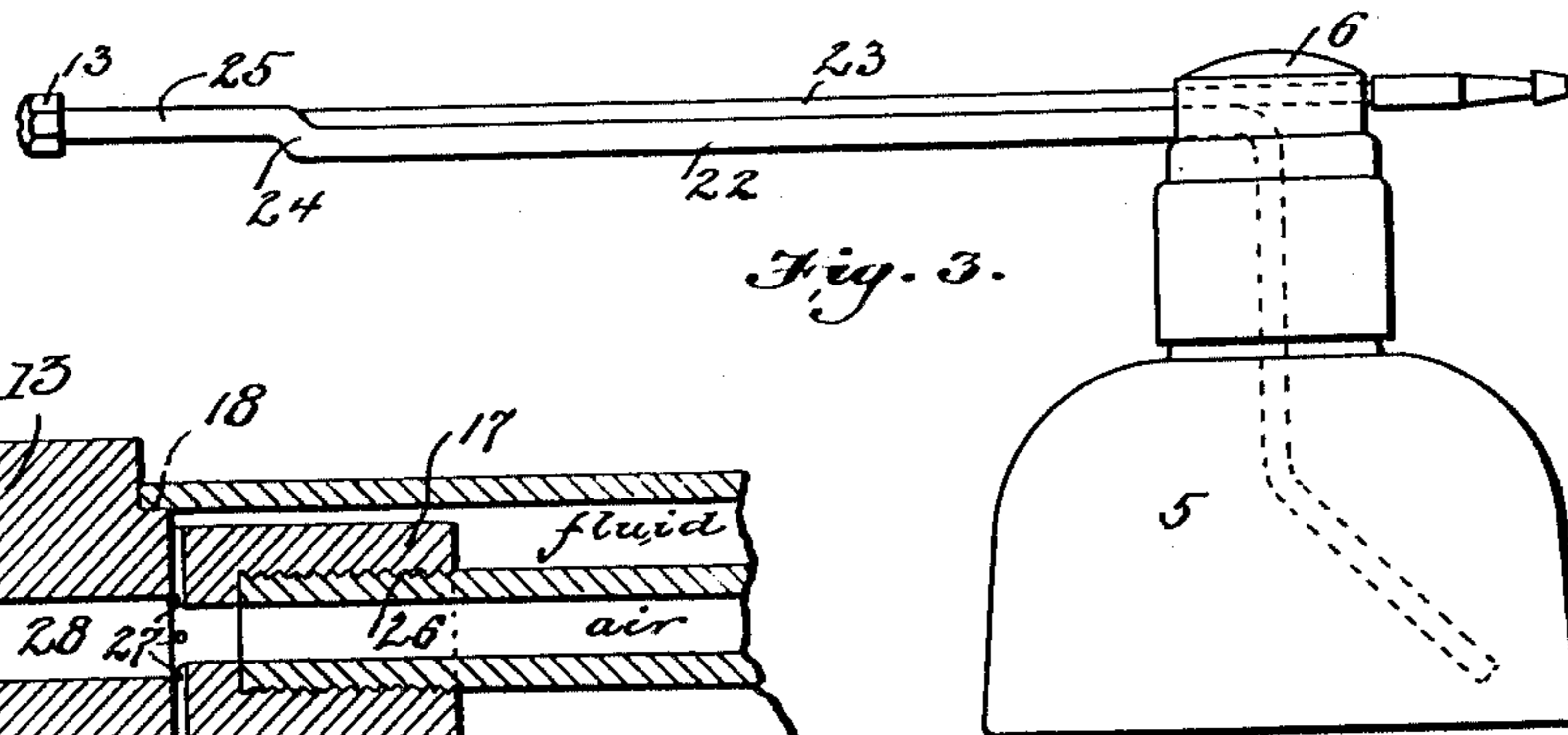


Fig. 3.

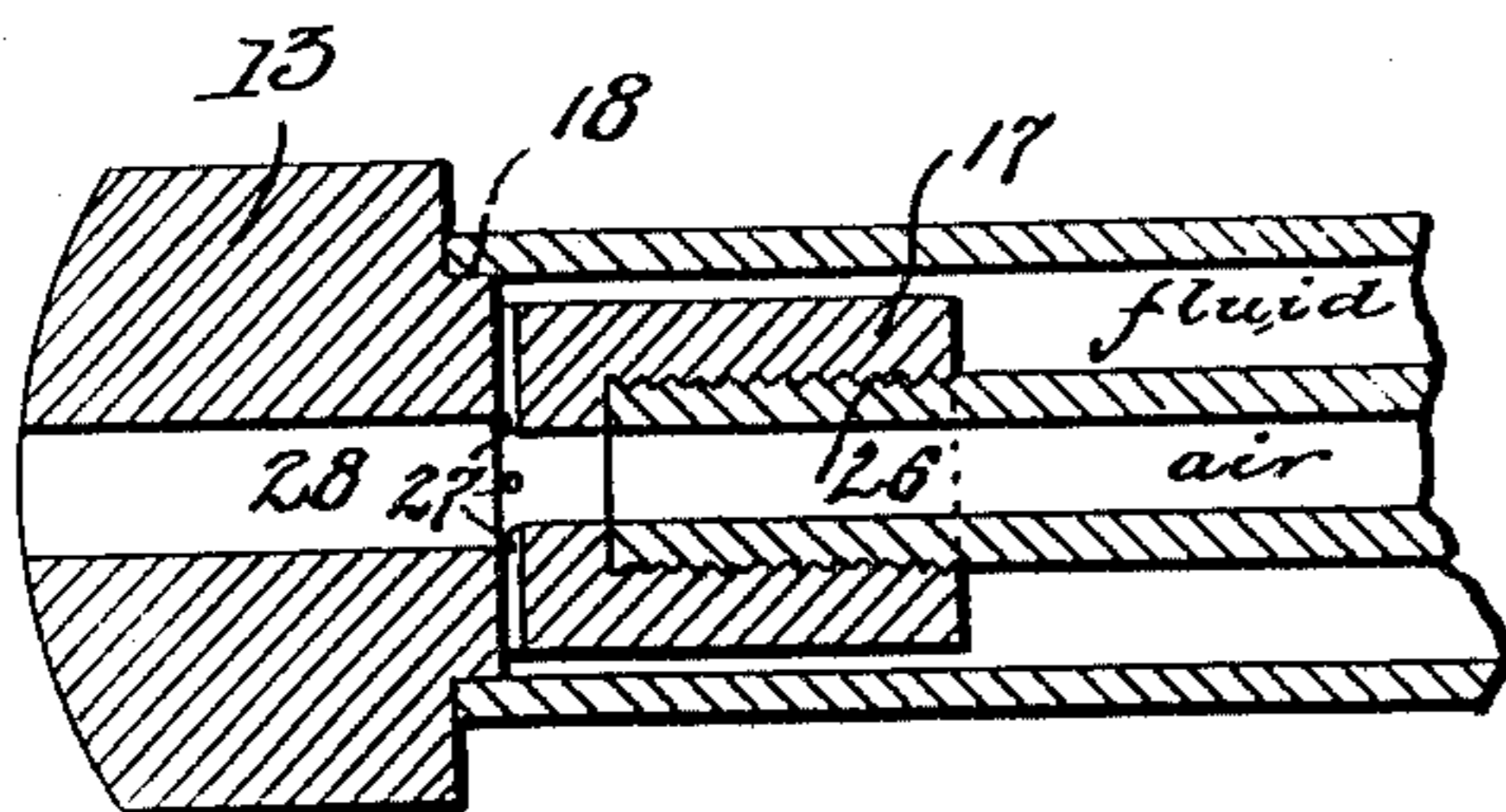


Fig. 4.

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ATOMIZER.

955,937.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN R. BALLENTINE, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Atomizers, of which the following is a specification.

This invention relates to atomizers of the "vacuum" type, wherein liquid in any bottle or vessel may be exhausted therefrom and discharged through a spraying head or nozzle by means of a blast of air. In this type of atomizers it is necessary that there be two tubes, one for the air and the other for liquid, and it is also desirable that the two tubes be merged into one at some point of their length, in order that the air blast may be brought into the most effective position with respect to the nozzle or outlet for the liquid, and also in order that the nozzle may be protected and inclosed by a suitable head. It is old in this type of atomizers to connect the tubes by means of a block, containing air and liquid passages, but this has the objection that it is expensive and is of such large size that it can not conveniently enter the passages of the nose or the throat.

In the present invention the connection between the pipes is formed by simply offsetting one pipe and running the other one into it, through a hole in the side. This cheapens the cost of construction by avoiding the expense of a block at the joint and also reduces its size so that the head can be readily entered into the passages to be sprayed.

A further feature of the invention is the simple and efficient manner in which the two pipes are supported by the cap, the tubes being set and supported crosswise in the cap. This makes the atomizer more compact, and cheapens the construction, and gives added strength to the tubes, and avoids any joint between the tubes within the cap.

In the accompanying drawing, Figure 1 is an elevation of the invention. Fig. 2 is a longitudinal sectional view of the spraying-head. Fig. 3 is an elevation of a modification and Fig. 4 is a longitudinal sectional view of the spraying-head thereof.

Referring specifically to the drawing, 5 denotes a glass or other vessel which contains the fluid to be atomized. The vessel is closed by a cap 6 which carries the fluid

tube 7 and the air tube 8, the former depending into the bottle from the cap as indicated at 9. The air tube extends transversely through the cap above the fluid tube and has at its inner end a nipple 10 for attachment of the bulb or other suitable means for producing an air blast. The fluid and air tubes extend in parallelism from the cap, and at any portion of its length the air tube is bent laterally as at 11 and continued in an offset portion 12 at the extremity of which is the spraying-head 13. The bend 11 has an opening 14 through which the fluid tube enters the offset portion 12 of the air tube. The fluid tube extends lengthwise through the offset portion 12 of the air tube and is arranged concentrically therein, with sufficient space between the tubes to permit the passage of the air to the spraying-head. The extremity of the fluid tube 7 is contracted as at 15 to form a nozzle, and behind the contracted portion, the tube is threaded externally as at 16 for attachment of the spraying-head 13. Said head has a reduced rear extension 17 which enters the air tube and screws on the threaded portion 16 of the fluid tube. The extension 17 is formed with an enlargement or collar 18 whereby it is spaced from the inside of the air tube. The nozzle 15 extends into the bore 19 of the head and beyond the mouth of the nozzle said bore is contracted as at 20 through which contracted portion the fluid is discharged from the head 13. Behind the collar 18 the extension 17 has openings 21 which communicate with the bore 19 behind the mouth of the nozzle 15.

In use, the air in the tube 8 flows through the openings 21, past the nozzle 15 and out of the head 13 through the bore 20. This creates a suction at the nozzle 15 and induces a flow of liquid therefrom which is blown through the bore 20 in the form of a spray.

In the modified form shown in Figs. 3 and 4 the arrangement herein described is reversed, the fluid tube being on the outside and the air tube inside the same. In this case the fluid tube is indicated at 22 and the air tube at 23. The lateral bend which in this instance is in the fluid tube is indicated at 24 and the offset portion of said tube is indicated at 25. The spraying-head 13 has a reduced rear extension 17 as be-

fore, which enters the fluid tube and screws on the air tube as indicated at 26. The extension 17 is spaced from the fluid tube by a collar 18 as before, and behind this collar are openings 27 which communicate with the bore 28 of the cap 13. The action is substantially the same as in the previous construction. The air flows past the openings 27 and creates a suction whereby the fluid is drawn through said openings and discharged from the head 13 in the form of a spray.

It will be seen that in order to make the most simple and inexpensive joint between the tubes, and to enter one tube within the other as they should be, the off-set portion of one of the tubes enables this to be done by simply drilling a hole, thereby avoiding the expense of a block at the joint and reducing the size of the spraying head to that of a single tube, the cost of off-setting the tube and drilling the hole at the off-set being very much cheaper than to use a block which must be drilled and constructed to fit. The construction is also quite strong and rigid inasmuch as both tubes are fastened together and support each other. Furthermore, the tube for the liquid, at the free end thereof, is or may be made free from the air tube, and consequently may be bent at a right angle at any place or point along its length, to enter any bottle or vessel.

I claim:—

1. An atomizer comprising air and fluid tubes, one of said tubes having an offset portion, and the other tube entering said offset portion from the outside thereof and extending lengthwise therethrough and spaced therefrom, and a spraying-head at the ends of the tubes.

2. An atomizer having separate air and liquid tubes extending beside and outside of each other, and one of which is entered into the other through the side thereof and extends therein, and a spraying head at the end of both tubes.

3. In an atomizer, the combination of a vessel and cap thereon, a liquid tube extending through one side of the cap and down into the vessel, and an air tube extending crosswise through the cap, one of said tubes being entered into the other beyond the cap, and a head at the end of both tubes.

4. In an atomizer, the combination with an outer air tube, and an inner liquid tube having a contracted nozzle at the end, of a head fitted into the outer tube and onto the inner tube and having a bore which communicates with the outer tube and into which the nozzle projects, the said bore being spaced from, and contracted beyond, the nozzle.

5. In an atomizer, the combination with an outer air-tube, and an inner liquid-tube having a contracted nozzle at the end, of a

head fitted into the outer and onto the inner tube and having a bore which communicates with the outer tube and into which the nozzle projects, said bore being spaced from the nozzle.

6. In an atomizer, the combination with an outer air-tube, and an inner liquid-tube having a contracted nozzle at the end, of a spray-head fitted into the outer and onto the inner tube and having a bore into which the nozzle projects, said bore spaced from the nozzle and having lateral communication with the air-tube.

7. An atomizer having the discharge ends of its air and liquid-tubes telescoped and spaced from each other with the former inclosing the latter, said liquid-tube having a restricted discharge orifice, and a nozzle member forming a close joint with the end of the air-tube and having its throat or bore incasing the end of the liquid-tube and forming a space therearound and a close joint therewith to the rear of its end, said space being in communication with the passage of the air-tube through laterally disposed passages provided in said member.

8. An atomizer having the discharge ends of its air and liquid-tubes telescoped and spaced from each other with the former inclosing the latter, and a plug closely fitting into the end of the air-tube and having its inner end extended and reduced to form a space between it and the air-tube casing, which space opens into the air-passage of the air-tube, said plug being bored to form a discharge throat into which the liquid-tube closely fits to the rear of its end to completely close the rear end of said throat and provided with passages opening from the space around the inner end of the plug into the throat at the sides of the discharge end of the liquid-tube.

9. In an atomizer, an air-tube, a liquid-tube inclosed at its discharge end within the discharge end of the air-tube, and a nozzle member attached to the discharge end of the liquid-tube, said member having air-passages which communicate at one end with the passage in the air-tube and at their other end with the discharge opening in the member in advance of the point of attachment of the liquid-tube therewith and in a manner to discharge the air laterally against the discharge end of the liquid-tube.

10. An atomizer having in combination an air-tube and a liquid-tube arranged concentric at their discharge ends, the liquid-tube being the inner one and having its discharge end reduced to provide a restricted discharge orifice and threaded to the rear of such reduced portion, and a nozzle plug closely fitting into the end of the air-tube and having its throat larger than the reduced end of the liquid tube and receiving the same with its rear end threaded to the

threaded portion of the liquid-tube to form
a close joint therewith entirely around the
tube, said plug comprising a vacuum cham-
ber and being provided within the air-tube
5 with laterally-disposed air passages which
have their discharge against the reduced
portion of the liquid-tube whereby to break
thereagainst and envelop the same and their

outer ends in communication with the air-
tube passage, substantially as described. 10

In testimony whereof I affix my signature,
in presence of two witnesses.

JOHN R. BALLENTINE.

Witnesses:

G. W. FECHTER,
ANSIL PRATT.