

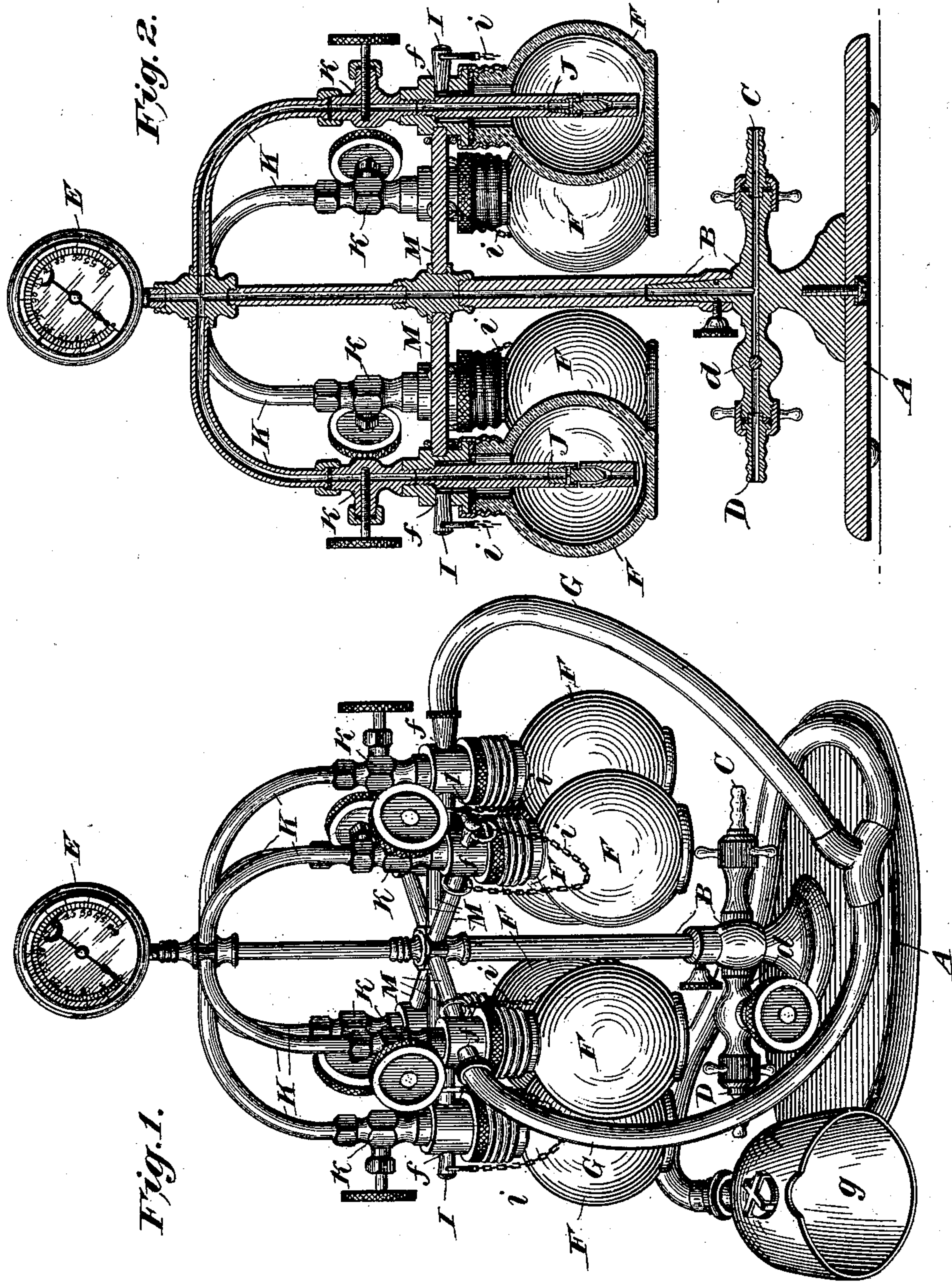
No. 698,898.

Patented Apr. 29, 1902.

W. & J. BOEKEL.  
NEBULIZER.

(Application filed Nov. 7, 1901.)

(No Model.)



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM BOEKEL AND JULIUS BOEKEL, OF PHILADELPHIA, PENNSYLVANIA.

## NEBULIZER.

SPECIFICATION forming part of Letters Patent No. 698,898, dated April 29, 1902.

Application filed November 7, 1901. Serial No. 81,392. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM BOEKEL and JULIUS BOEKEL, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Nebulizers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to nebulizers, chiefly for medical use, having a cluster of nebulizing-bulbs and a common means of support. In such devices radial horizontal tubes have sometimes been used to connect the nebulizer-bulbs individually to a central bulb or chamber where different vapors may be allowed to mix before using. In practice this is open to one serious objection. The pressure in the central chamber drives the vapor received from one bulb into another, and vice versa. Consequently after a little use no bulb supplies one kind of vapor in purity, but only some indefinite mixture.

The object of our present invention is to insure the absolute purity of each solution and the vapor given off by each bulb by isolating each bulb from all the rest, dispensing with the central chamber, and providing for the mixture of vapors when that is necessary under conditions that preclude all return of them to the bulbs and enable the operator to be sure of what he is administering; also, where no mixture of the vapors from different bulbs is desired, to permit the supply of vapor from any one bulb in absolute purity. To this end we make use of the construction and combination of parts herein-after more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a perspective view of a nebulizer embodying our invention, and Fig. 2 represents a vertical central section of the same.

A designates the base, which may be a plain wooden disk of small diameter, as shown; B, the air-tube fastened thereon and extending upward to serve also as the support of the nebulizer-frame; C, the air-inlet nozzle, adapted to receive a rubber tube from a source of supply of compressed air and connecting with the interior passage of said air-tube at

or near its lower end; D, a short outlet-nozzle controlled by a valve *d* and arranged diametrically opposite said inlet-nozzle C for use at will with a single atomizer or in blowing off, and E a pressure-gage mounted on and connected with the upper end of the said air-tube.

F designates the nebulizing-bulbs, each having at its upper end an outlet-opening *f*, to which the receiving end of a rubber tube G may be attached for conducting the vapor to a mask or bell *g*, fitting over the patient's mouth and nostrils. When the bulb is not in use, a plug I, provided with a suspending-chain *i*, is fitted into said opening *f*, preventing the ingress of air. Each bulb has within it a spray-tube J, through which the compressed air is driven from the central air-tube B, and a downwardly-curving branch tube K, the immediate source of air-supply for said bulb. A valve *k* in the lower end of this tube K cuts off the bulb at will. The construction and operation of the spray-tube may be the same as that described in our Letters Patent No. 669,020 or in any other of our patented spray-tubes. It is not deemed necessary to describe them here, as they form no part of the present invention. The various branch air-tubes K curve symmetrically out and down to the various bulbs, which are arranged at regular intervals in a circle of about the same diameter as the base A. These tubes K are also rigid suspending devices for the said bulbs, which are further braced and supported by solid rods or bars M, extending radially from the central supporting-tube B to the several bulbs.

In our nebulizer there is no central or other mixing-chamber and no possibility of accidental mixture of vapors. Of course nothing can pass through the solid rods M, and the tube K is cut off by closing the air-valve *k* whenever the pressure is off. While the air-pressure is on there can be no backflow. There is also no passage at any time directly from bulb to bulb nor from any two bulbs to any common receptacle. A simple solution may therefore be vaporized in any one bulb and applied through its rubber tube and inhaling-bell with no interference from the contents of any other bulb and perfect certainty that the patient will inhale exactly what is intended.



If a mixture is to be thus vaporized and applied, the procedure is the same provided the ingredients are such as will mix properly in liquid form, the bulb being first charged with the mixture by unscrewing it from the frame and pouring the mixture in at the top. In the case of ingredients that will not mingle properly as fluids two bulbs are independently charged, each with its solution. Each also, as shown in Fig. 1, has one branch end of a bifurcated rubber tube N fitted on it. The vapors driven out through these branch tubes mingle in the main tube under such forward pressure that separation and return are alike impossible and the patient inhales them together. Using our patented spray-tubes and the other construction shown, we get practically dry vapor under an air-pressure of not more than three pounds. Our nebulizer allows us to supply what is needed in exactly the right quantity, quality, and proportion and in the most efficient manner.

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

1. A nebulizer adapted to supply at will either a single vapor or a mixture of vapors from different bulbs and provided with a central air-tube which is also the main support, a series of nebulizing-bulbs, a series of branch air-tubes which serve as their means of sus-

pension and are provided with shut-off valves and a series of solid radial rods or bars extending from the said central tube to the individual nebulizing-bulbs substantially as set forth. 35

2. A nebulizer provided with a series of independent nebulizing-bulbs, a series of rigid solid suspending-tubes bending down to them for the supply of compressed air and a central air-tube extending continuously up through the nebulizer-frame to the said suspending-tubes, the said tubes assisting to brace and support the said bulbs and permitting one or more of them to be brought into action at the same time as preferred, substantially as set forth. 45

3. A nebulizer provided with a series of isolated nebulizing-bulbs, means of supplying air to them individually from above and solid radial rods or bars connecting them separately to a central support, the said means of supplying air, also assisting to support and brace the said bulbs, substantially as set forth. 50

In testimony whereof we affix our signatures in presence of two witnesses. 55

WM. BOEKEL.  
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Witnesses:

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