No. 637,468. Patented Nov. 21, 1899.

A. KITSON.

VAPORIZING TUBE.

(Application filed Aug. 27, 1898.)

(No Model.)

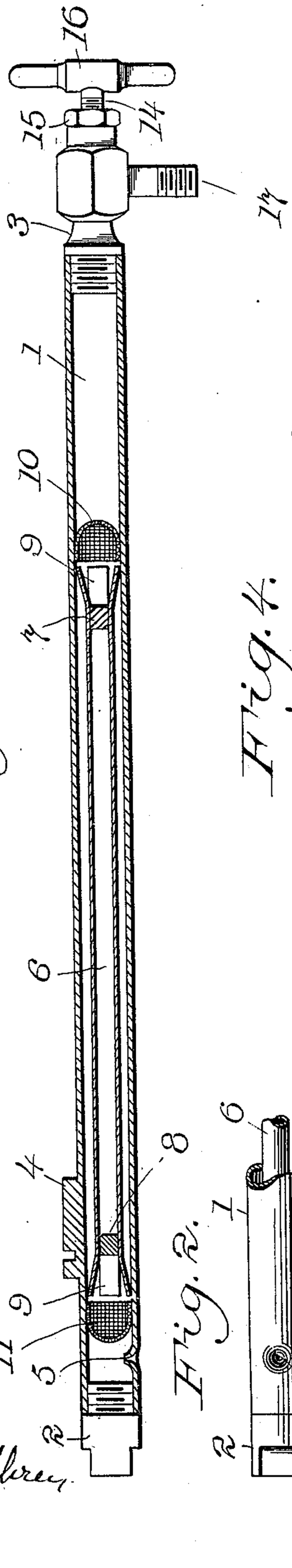

Fig. 1.

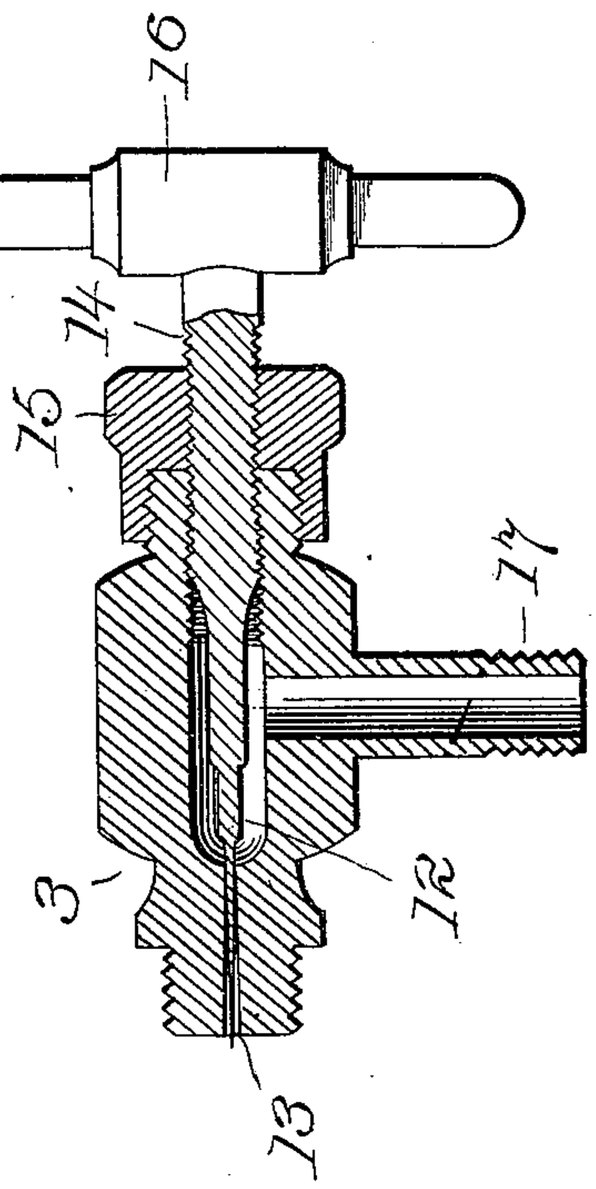

Fig. 4.

Fig. 2.

Fig. 3.

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VAPORIZING-TUBE.

SPECIFICATION forming part of Letters Patent No. 637,468, dated November 21, 1899.

Application filed August 27, 1898. Serial No. 689,657. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR KITSON, a subject of the Queen of Great Britain, and a resident of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Vaporizing-Tubes, of which the following is a specification.

My invention relates to a vapor-burning apparatus, and is specifically designed to produce an improved form of vaporizing-tube for use in such apparatus. The form of tube illustrated and described is particularly intended to be used in conjunction with the form of vapor-burning lamp illustrated and described in my application, filed of even date herewith, although, of course, it may be used in any form of vapor-burning apparatus.

The preferred form of my invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a longitudinal section of the vaporizing-tube and its internal filler. Fig. 2 is a bottom view of the discharge end of the tube, the right-hand portion being broken away. Fig. 3 is a cross-section on line 3 3 of Fig. 1, and Fig. 4 is a central section of the valve controlling the flow of oil to the tube.

Throughout the drawings like reference-figures refer to like parts.

1 represents the seamless cylindrical tube, of metal, in which the oil is to be vaporized. The left-hand end is stopped up by any suitable plug, such as the screw-plug 2 shown. At the right-hand end is the valve 3, screwed into said end.

4 is a feather formed upon one side of the tube to maintain it in the proper position in the lamp structure.

5 is the discharge-opening, which is located in the side of the tube, near one end, and is preferably formed by stamping or punching up the wall of the tube, so as to form a cone-shaped discharge-opening, flaring outwardly, as clearly appears in Figs. 1, 2, and 3.

6 represents a preferred form of internal filler for the vaporizing-tube, composed of a tube of diameter slightly less than the internal diameter of the vaporizing-tube and preferably closed at each end by the plugs 7 and 8. The plug 7 alone might suffice, but better results are obtained by using plugs at both ends, as shown. The filler-tube 6 is maintained in a central position in the vaporizing-tube by any convenient skeleton projections located at proper points; but the most convenient means consists of the split and outwardly-expanded ends 9 9, &c., of the tube itself, as clearly shown in Fig. 1. In addition to the filler-tube I also place within the vaporizing-tube and at either side of the filler-tube gauze strainers 10 and 11, which are formed of wire-gauze, preferably stamped into the form of small thimbles, as shown in Fig. 1.

12 represents the needle or spindle of the needle-valve 3, which controls the flow of oil from the supply-pipe 17 to the vaporizing-tube. The discharge-opening from said valve is preferably given a cone shape, with the apex pointing toward the interior of the valve, as shown at 13 in Fig. 4.

15 is a screw-cap through which and through the body of the valve-casing the screw-threaded stem 14 of the valve runs.

16 represents the valve-key, by which the valve may be rotated and withdrawn from or pushed down upon its seat.

The mode of operation of my invention is as follows: When the vaporizing-tube has been raised to the proper temperature by means not shown or described, the needle-valve is opened by turning the valve-key 16, and the oil flowing through the supply-pipe 17 under pressure passes through the valve-opening in a fine jet or spray in quantities regulated by the position of the valve. The conical-shaped discharge-orifice 13 tends to disperse the particles of oil and form them into a spray. This spray strikes the sides of the hot vaporizing-tube 1 and the hot wire-gauze 10, being more or less vaporized thereby. The mixture of vapor and partly-vaporized oil is then forced on along the narrow annular passage-way left between the filler 6 and the walls of the vaporizing-tube, being thereby exposed to the heat in a thin film and to the best possible advantage. The now thoroughly-vaporized oil finally passes through

the gauze thimble 11 and is then discharged from the opening 5 in a fine jet of vapor.

The advantages of the construction are the complete vaporization of the oil, as above described, and the maintaining of the same in vapor form without giving it opportunity to condense in the tube. The conical discharge-orifice of the needle-valve aids vaporization by producing a spraying effect, as above described, and also is important in preventing clogging up of the valve by particles of foreign matter which may be in the oil. Any particle which can be forced through the fine opening at the inner end of the orifice 13 will not stick in the passage-way, but will pass on, whereas with valve-openings of other form the foreign particles collect in the discharge-orifice and soon choke the valve. The tube-filler 6 and wire-gauze 10 and 11 assist in turning the oil into vapor and maintaining it in that form, as above described, and also produce a steadying action upon the flow of vapor, so that no pulsations of any kind occur in the light, even when the lamp is swinging. The discharge-orifice 5 of the vapor-tube has a similar action to that described in connection with the valve-orifice 13 in that it prevents particles of carbon and other deposited matter from getting into the discharge-orifice, at least until after long usage the tube has become partly filled with such matter, and, moreover, any particle which is forced through the small end of the outwardly-flaring discharge-opening will not stick in any part of the opening, whereas when an outwardly-projecting nozzle is employed the deposited carbon and foreign matter soon pack into the nozzle and completely close the discharge-orifice. The internal filler and the gauze thimble can be removed and cleaned at any time or replaced by new ones at any time without requiring the substitution of a new vaporizing-tube.

Various changes could evidently be made in the details of my invention without departing from the spirit and scope thereof. The gauze strainers 10 and 11 might be made in different form. The filler 6 might have only one plug instead of two or might be made solid, &c.; but after long experiment I have settled upon the within-described construction as being the one that gives the best results.

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

1. As an article of manufacture a seamless vaporizing-tube for vapor-burning apparatus closed at the discharge end and having a discharge-opening in its side consisting of a reentrant portion of the wall of the tube conical in shape and perforated at its apex, substantially as described.

2. As an article of manufacture, a seamless vaporizing-tube for vapor-burning apparatus, having a discharge-opening in its side which flares outwardly only, the portion of the tube-wall surrounding said opening projecting toward the interior of the tube, substantially as described.

3. As a filler for a vaporizing-tube, a tube of less length and diameter, plugged and having its ends split and expanded, substantially as described.

4. In a vapor-burning apparatus, the combination of the vaporizing-tube exposed to the direct heat of the burner, the oil-supply tube, and the needle-valve controlling the passage of oil from the supply-tube to the vaporizing-tube, and adapted to discharge the oil into the vaporizing-tube lengthwise thereof in the form of a fine jet or spray, substantially as described.

5. In a vapor-burning apparatus the combination of the vaporizing-tube, exposed to the direct action of the burner, the oil-supply tube, and the needle-valve controlling the passage of oil from the supply-tube to the vaporizing-tube, the discharge-orifice of the needle-valve being cone-shaped with the apex pointing toward the interior of the valve, substantially as described.

6. In a vapor-burning apparatus, the combination of the vaporizing-tube, the oil-supply tube, and the needle-valve controlling the passage of oil from the supply-tube to the vaporizing-tube, and adapted to discharge the oil into the vaporizing-tube in the form of a fine jet or spray, together with the wire-gauze within the vaporizing-tube, on which said jet or spray impinges, substantially as described.

7. In a vapor-burning apparatus the combination of the vaporizing-tube, the oil-supply tube, and the needle-valve controlling the passage of oil from the supply-tube to the vaporizing-tube, and adapted to discharge the oil into the vaporizing-tube in the form of a fine jet or spray, together with the wire-gauze within the vaporizing-tube, on which said jet or spray impinges, and the filler located in the tube beyond said gauze, substantially as described.

8. The combination of a vaporizing-tube, the internal filler, of a diameter slightly less than the internal diameter of the tube, said filler being disconnected from either end of the vaporizing-tube and means for maintaining said filler concentric to said vaporizing-tube.

Signed by me at Philadelphia, Pennsylvania, this 25th day of August, 1898.

ARTHUR KITSON.

Witnesses:
CHARLES A. LAGEN,
PHOEBE A. REED.