

O. D. LUCAS.
 ATOMIZER AND THE LIKE.
 APPLICATION FILED JUNE 29, 1908.

957,976.

Patented May 17, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

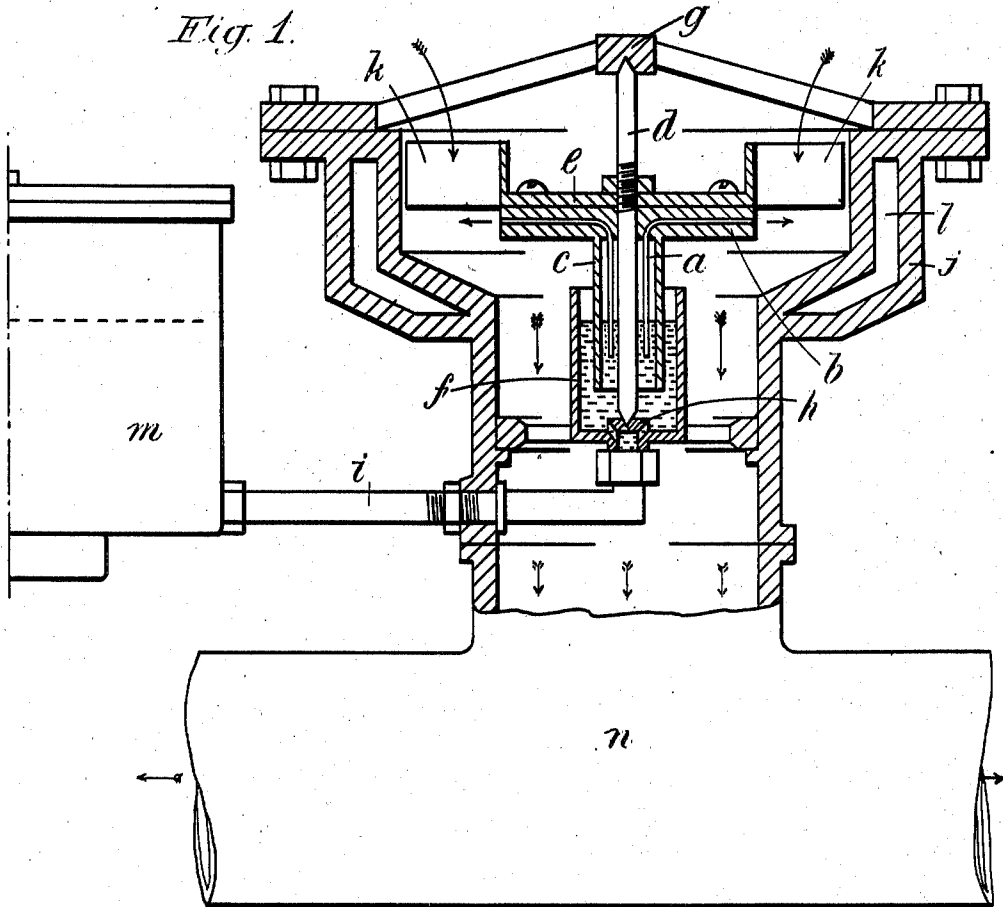
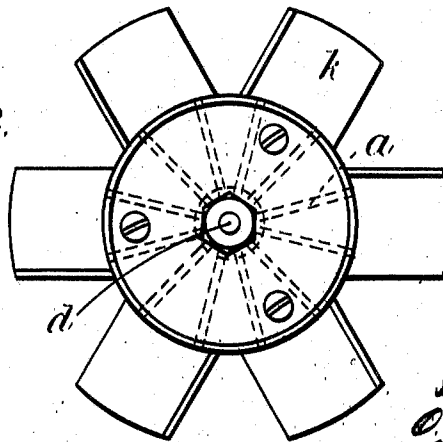


Fig. 2.



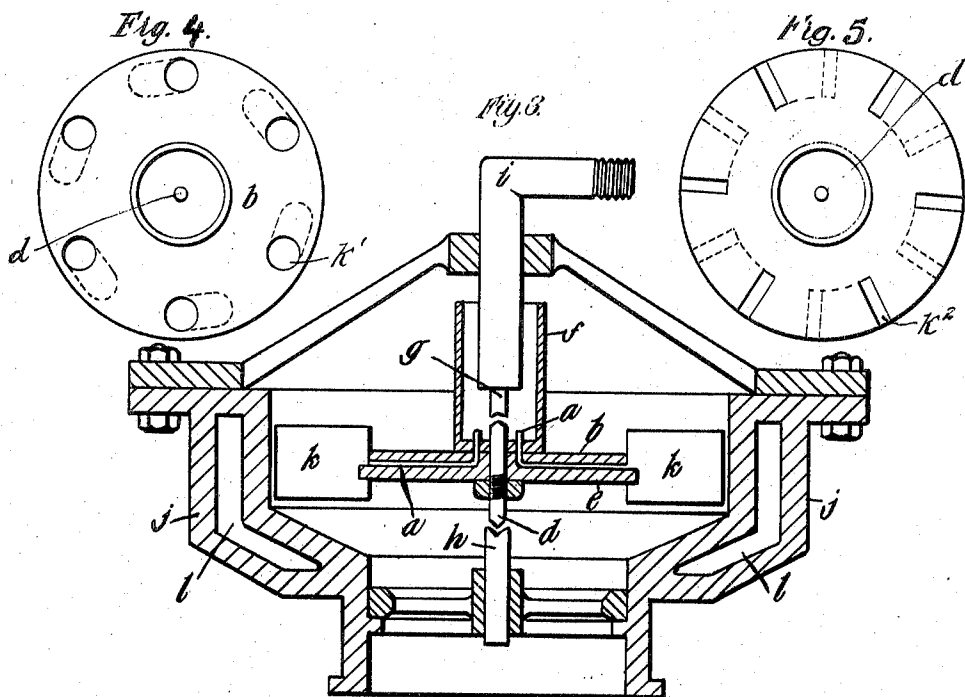
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 2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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ATOMIZER AND THE LIKE.

957,976.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OWEN DAVID LUCAS, a subject of His Majesty the King of England, residing at Bayswater, in the county of London, in the Kingdom of England, have invented certain new and useful Improvements in Atomizers and the Like, of which the following is a specification.

This invention relates to improved means and apparatus for the atomizing and vaporization of liquids, whereby a very fine subdivision of the liquid is obtained and complete vaporization is rendered possible. The apparatus is capable of giving intimate mixture of air or other gas and vapor of any desired proportions.

According to one form of the present invention I employ a number of independent capillary tubes of glass, steel, or other suitable material of any suitable length. Each such tube is bent at right angles at some point in its length and a number of such bent tubes are grouped around an axis so that several tubes lie in juxtaposition up to the bend and the bent portions radiate from the axis in a plane perpendicular to the same. The axis may as shown be arranged vertically and the upper or lower ends of the tubes are immersed in the liquid to be atomized, which is preferably kept at a more or less constant level in any of the well known ways. The group of tubes or element is now caused to rotate about the vertical axis and the effect of the rotation is to project the liquid from the open ends of the radiating portions of the tubes into the surrounding space in an exceedingly fine spray. The action takes place even if the bend in the tubes is above the point to which the liquid will rise by capillary attraction. However the action when the liquid is up to the bend is more rapid and more liquid will be vaporized in a given time. Thus the rate of atomization of liquid can be varied by altering the level of the liquid into which the tubes dip and by altering the speed of rotation. It will be found that every liquid requires a capillary of particular bore to give the best results.

The invention is illustrated in the accompanying drawings in which:—

Figure 1 is a sectional elevation of a complete apparatus constructed for use in connection with internal combustion engines. Fig. 2 is a plan of the tubes and their supporting element showing the arrangement of

the wings or vanes thereon. Fig. 3 is a similar view to Fig. 1 of a slightly modified form of apparatus in which the tubes and their support are mounted in a relatively inverted position. Figs. 4 and 5 are similar views to Fig. 2 of the tube supporting disk provided respectively with siren holes and turbine blades.

Like letters of reference are employed to denote like parts throughout the specification as far as application will allow.

In carrying out this invention and referring more particularly to Figs. 1 and 2 of the drawings, I make my tubes *a*—*a* of glass and bend them at right angles. These glass tubes are mounted and cemented on or to a support *b* of celluloid, metal, wood, or other material not acted on by the liquid, and are arranged so that the horizontal limbs point radially from the axis outward. The vertical limbs are inclosed in a vertical tube *c* rigidly attached to the support *b*. The axis *d* is rigidly attached to the support by a flanged disk or spider *e* or other suitable means secured by a nut and runs centrally down the vertical tube *c*, and is provided with end bearings *g*, *h* on which the whole freely rotates. The lower vertical portions of the tubes *a* depend into a tube or receptacle *f* containing the liquid to be atomized. The liquid is fed into the tube *f* from below, from the float feed chamber *m* or other suitable level maintaining means through a pipe *i* and may be kept at a constant level in it or varied by adjusting the float in the known manner.

Rotation is imparted to the apparatus shown in the drawing, by inclosing it in a cylindrical case *j* and providing the support *b* with inclined wings *k*—*k*, siren holes *k'* (Fig. 4), or turbine blades *k²* (Fig. 5). The wings are as shown operated upon and the device thereby rotated by the current of air caused by the suction of the engine and for this purpose the lower part of the casing *j* is connected with the induction pipe *n* leading to the cylinders of the engine.

In the modified arrangement as shown in Fig. 3 of the drawings in which, as previously stated, the rotating capillary element is mounted in a relatively inverted position, the liquid to be atomized is admitted directly into the tube *f* surrounding the vertical portions of the tubes *a*. The tube *f* rests on the support *e* which is provided with wings *k*, as in Fig. 1, and which carries the tubes *a*.

The support is provided with a centrally arranged spindle *d* having upper and lower end bearings *g, h*. The support is rotated in the same manner as that described in Fig. 1 and the liquid may be supplied and maintained at the required level by any suitable well known means. It will thus be seen that the level of the liquid into which the vertical portions of the tubes are placed will have some influence on the flow of the liquid from the tubes for instance if the level were lowered in Fig. 1 a greater speed of rotation of the tube element would be required to vaporize a given amount of liquid as the actual capillary length of the tube would be increased. It has been found in practice that even when the tubes are arranged as shown in Fig. 1 and the level of the liquid is above the ends of the tubes the liquid will not flow therefrom when the apparatus is at rest.

The tube element could be rotated mechanically by gearing it to some rotating part of the engine by means of a belt, pinion gear, or other means.

This invention is also suitable for atomizing liquids for furnaces and the like, when the apparatus may be rotated as before mechanically or by the blast of air employed in the furnace or by injecting steam under pressure, or steam and air.

I may if desired inclose the apparatus in a jacketed cylinder *l* or other chamber provided with means of keeping the said chamber hot or cold.

What I claim and desire to secure by Letters Patent of the United States is:—

1. An atomizing apparatus comprising a

vertically arranged liquid-containing vessel, a series of independent tubes extending into the liquid-containing vessel, and having their ends disposed below the liquid level therein and whose lengths are so proportioned in relation to their diameters that the liquid will not normally flow out from them when the apparatus is at rest, a support on which the tubes are mounted, means for rotating the support, and means for supplying liquid in proper quantities to the tubes.

2. An atomizing apparatus comprising a vertically arranged liquid-containing vessel, a series of independent capillary tubes extending into said vessel having their ends arranged below the liquid level therein and whose lengths are so proportioned in relation to their diameters that the liquid will not normally flow out of them when the apparatus is at rest, a support on which the tubes are mounted, means for rotating the support and means for supplying liquid in proper quantities to the tubes.

3. An atomizing apparatus comprising a rotatable support, a series of independent bent tubes carried thereby and having vertical portions connected with horizontal radial portions, a supply tube into which the vertical portions extend, means for supplying liquid in proper quantities, and means for rotating the tube support.

In testimony whereof, I have hereunto subscribed my name.

OWEN DAVID LUCAS.

Witnesses:

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