H. N. MOTSINGER.

NEBULIZING NOZZLE.

APPLICATION FILED JAN. 29, 1914.

1,133,656. Patented Mar. 30, 1915.

Fig. 1.

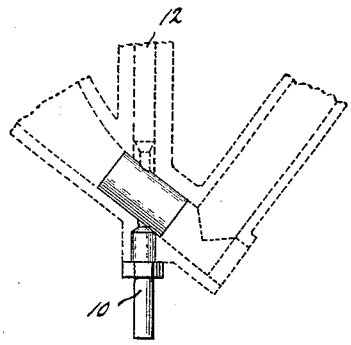
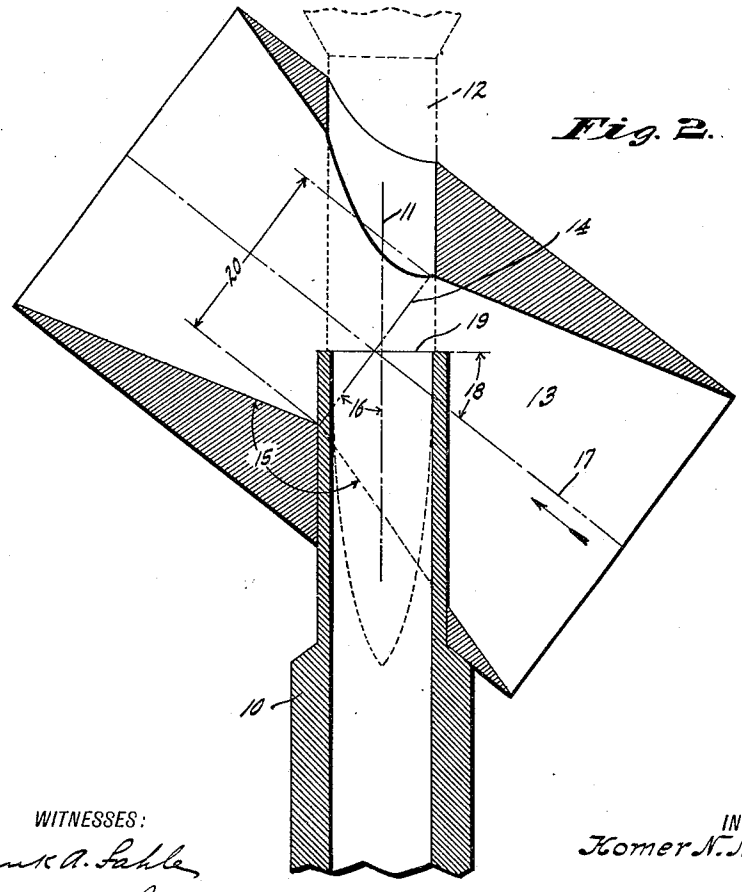


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HOMER N. MOTSINGER, OF LA FAYETTE, INDIANA, ASSIGNOR TO MOTSINGER DEVICE MANUFACTURING COMPANY, OF LA FAYETTE, INDIANA, A CORPORATION OF INDIANA.

NEBULIZING-NOZZLE.

1,133,656. Specification of Letters Patent. Patented Mar. 30, 1915.

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To all whom it may concern:

Be it known that I, HOMER N. MOTSINGER, a citizen of the United States, residing at La Fayette, in the county of Tippecanoe and State of Indiana, have invented a new and useful Nebulizing-Nozzle, of which the following is a specification.

My discovery relates to the production of means by which a liquid, such as a liquid-fuel, may be intimately associated with a stream of air or other gas.

I am aware that it has long been common to provide a nozzle for the liquid stream and to project it into a passage through which the air stream flows, and I do not depart from this general practice except that I have discovered that certain relationships between the parts not heretofore used will produce an apparatus of maximum efficiency.

The accompanying drawings illustrate my discovery in a form which I have found to be efficient in a carbureter for handling gasolene, coal-oil, etc., Figure 1 being a side elevation, full size, with adjacent parts of the carbureter shown in dotted lines, and Fig. 2 a vertical section on an enlarged scale.

In the drawings, 10 indicates a fuel nozzle having axis 11, the capacity of this nozzle being determined by the demands to be placed upon the apparatus. I believe it preferable to arrange nozzle 10 substantially vertical with its delivery end up, and in practice I associate with it a valve (shown in dotted lines 12). The delivery end of the nozzle is projected into a passage 13 through which the liquid-absorbing gas-stream is to pass and it is the relationship between the passage and the nozzle which forms the essence of my discovery. Passage 13 is of less diameter in the plane 14 than at either side of this plane and, although the angle 15 is not especially important, I have found in practice that that shown in Fig. 2 is efficient.

The direction of flow of gas through passage 13 is indicated by the arrow and the angle 16 between the plane 14 of passage 13 and axis 11 of nozzle 10 should be an appreciable angle but less than 90°. My experiments indicate that the angle indicated in the drawings is very close to the most efficient arrangement. The angle 18, between axis 17 and the plane 19 of the delivery end of the nozzle is preferably the complement of angle 16 though this is not essential. Axis 11 should intersect plane 14 above axis 17. The plane 19 of the delivery end of the nozzle should be closely adjacent a line passing through the intersection of axis 17 and plane 14 and my experiments indicate that projection of the delivery end of the nozzle materially beyond this line will result in decrease of efficiency while retraction of the delivery end of the nozzle from this line may be relatively considerable without material decrease of efficiency.

A considerable range in diameter 20 relative to the external and internal diameter of the delivery nozzle may be had without radically affecting the operation of the device. I am unable to state definitely the exact theory underlying the various relationships which I have set forth, but a long series of experiments has demonstrated the correctness of the conclusions which have been stated. In other words, if the delivery end of nozzle 10 be practically at the inter-section of axis 17 and plane 14, the delivery ratio of liquid from the nozzle at various velocities of air through passage 13 will remain uniform through a wide range of air velocities. By retracting the end of nozzle 10 from the construction plane 14, I find that there is a decrease in the proportion of fuel to air as the velocity of air increases so that, by proper retraction a very efficient arrangement can be obtained because, at the high air velocities (which are of course produced only when the engine is moving at high speed) a leaner mixture is preferable.

I claim as my discovery:

1. A nebulizer comprising a passage for gas having a sharply-defined plane of constriction, and a nozzle for liquid projected into the gas passage with its axis at an appreciable angle less than 90° to the plane of constriction on the inlet side of the gas passage and the axis of the nozzle intersecting the constriction plane.

2. A nebulizer comprising a passage for gas having a sharply-defined plane of constriction, and a nozzle for liquid projected into the gas passage with its axis at an appreciable angle less than 90° to the plane of constriction on the inlet side of the gas passage and the axis of the nozzle intersecting the constriction plane with the delivery end

of the nozzle short of the intersection of the axis of the gas passage and the constriction plane.

3. A nebulizer comprising a passage for gas having a sharply-defined plane of constriction, and a nozzle for liquid projected into the gas passage with its axis at an appreciable angle less than 90° to the plane of constriction on the inlet side of the gas passage and the axis of the nozzle intersecting the constriction plane with the delivery end of the nozzle closely adjacent the intersection of the axis of the gas passage and the constriction plane.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this 23rd day of January, A. D. one thousand nine hundred and fourteen.

HOMER N. MOTSINGER.

Witnesses:
ARTHUR M. HOOD,
FRANK A. FAHLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."