

June 19, 1923.

1,459,448

P. H. GENTZEL

OIL ATOMIZER

Filed Oct. 25, 1919

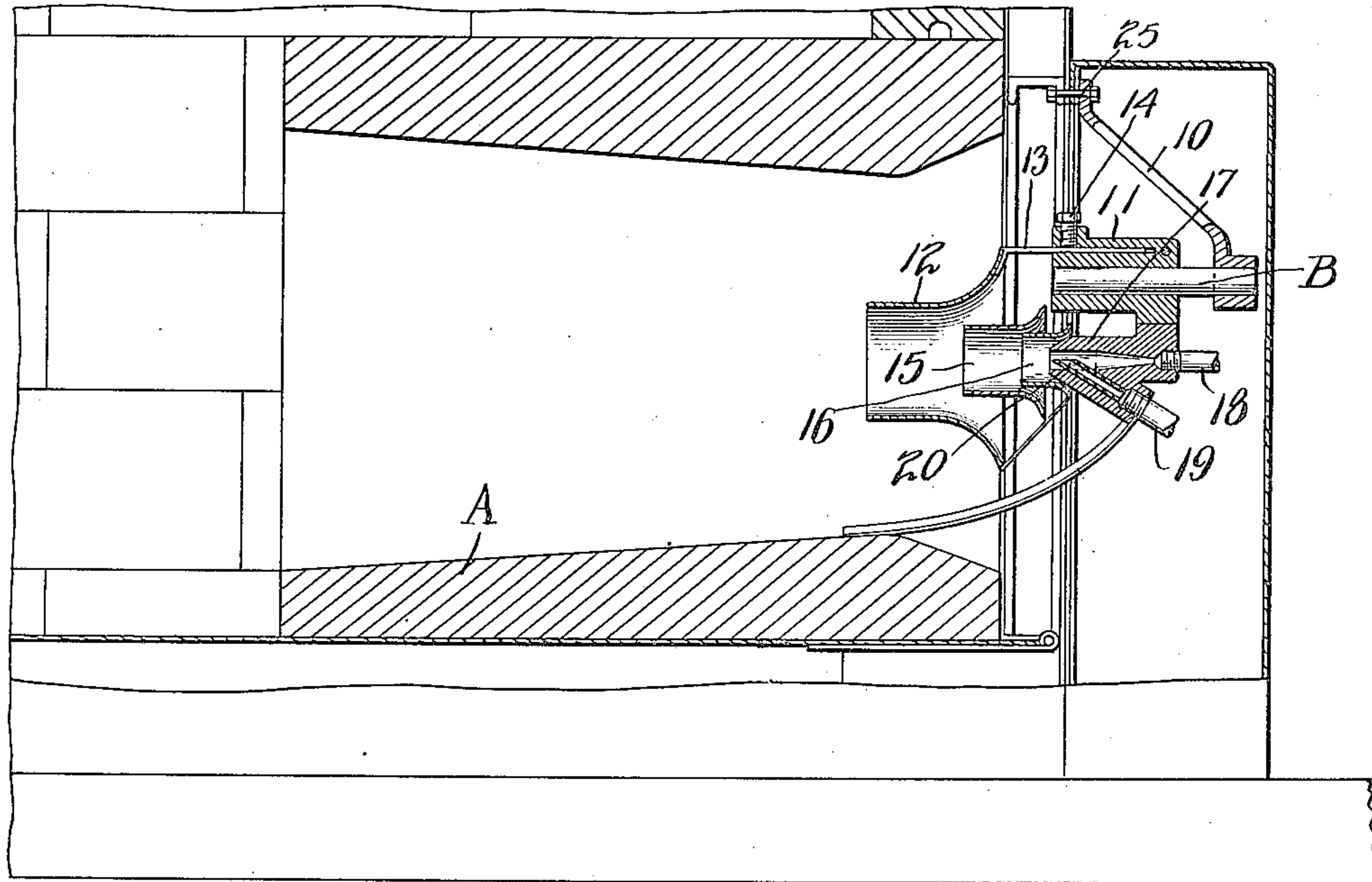


Fig. 1.

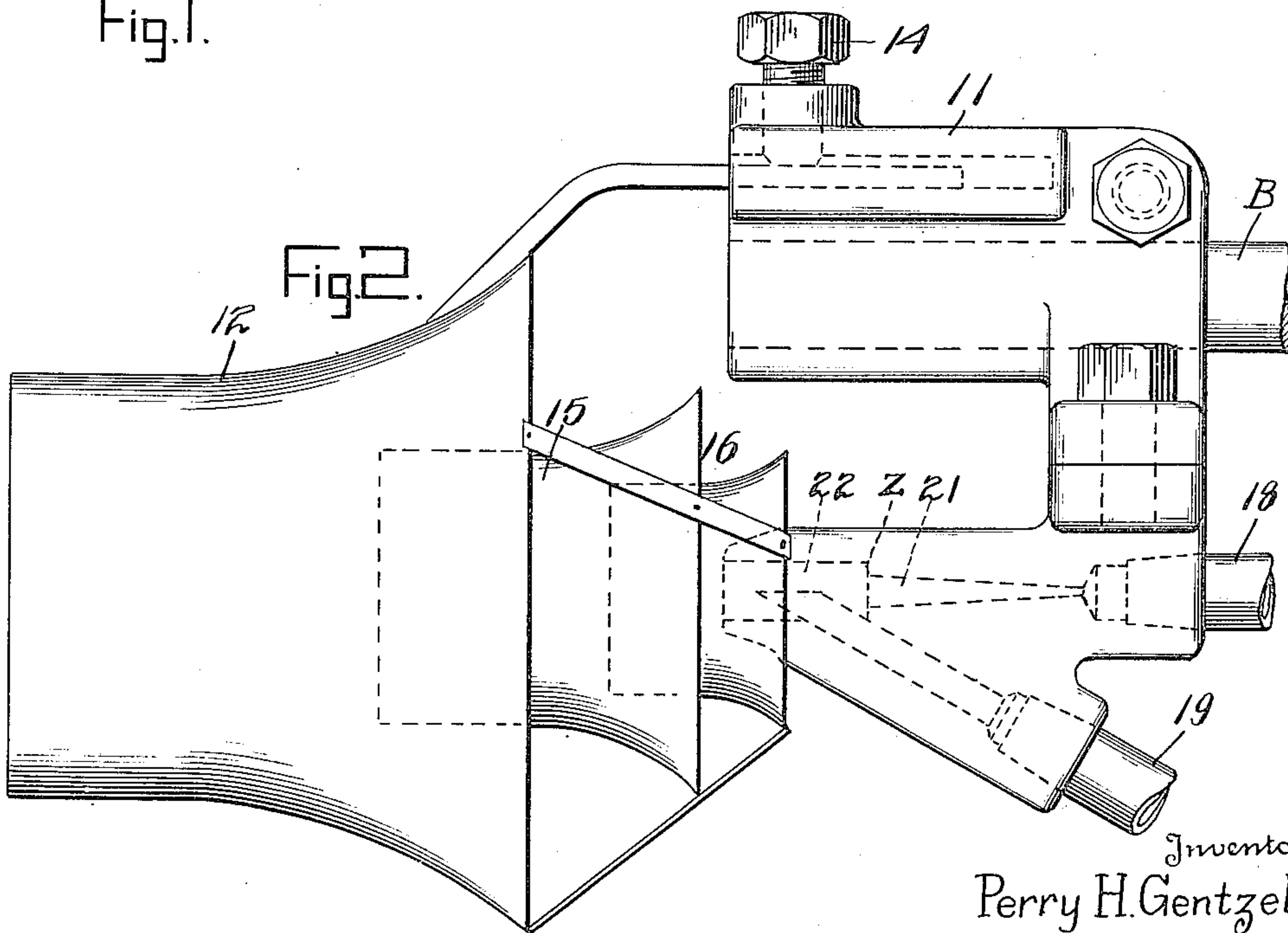


Fig. 2.

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UNITED STATES PATENT OFFICE.

PERRY H. GENTZEL, OF NEWTON, MASSACHUSETTS.

OIL ATOMIZER.

Application filed October 25, 1919. Serial No. 333,298.

To all whom it may concern:

Be it known that I, PERRY HOMER GENTZEL, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Oil Atomizers, of which the following is a specification.

The object of my said invention is to provide an atomizer for thoroughly atomizing hydro-carbon fuel used for the generation of steam under a boiler, particularly the boiler of an engine employed as a motor for cars, whereby such an atomizer is provided which will be efficient in service and will be capable of adjustment to suit all conditions of fuel and atmosphere, all as will hereinafter be more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a section through a burner and the adjacent part of a furnace, illustrating my improved construction of device, and Figure 2 a side elevation of the same.

In said drawings the portions marked A represent the venturi brick at the mouth of the furnace and B a rod on which the burner proper is adjustably mounted.

It will be understood that the portion of the furnace illustrated may be of any approved or desired type, the mouth being preferably of the venturi form, as indicated. The rod B is supported by a spider-like bracket 10 secured by bolts 25 to the front of the furnace and carries a base or support 11 thereon. A bell-mouth tube 12 is supported on a rod 13 adjustably mounted in said base 11 by means of a set screw 14. Another bell-mouth tube 15 of smaller diameter is mounted within said tube 12 and a third bell-mouth tube 16 of still smaller diameter is mounted within tube 15. Said several tubes 12, 15 and 16 are secured together by brace bars 26 attached thereto at intervals around their peripheries, preferably by spot welding or other appropriate means. The burner atomizer 17 is mounted within the bell-shaped mouth of the tube 16, and has a central discharge passage 21 which is of comparatively large diameter near its discharge end, as from point *z* the outer end forming a chamber 22, and communicates with a steam jet supply pipe 18 by a minute passage which increases in diameter toward

said point *z*. An oil supply pipe 19 communicates with a discharge nozzle 20 which projects on an angle of about 30 degrees to within the passage within the burner near its discharge end, with its upper end cut on a horizontal plane and substantially on a line with the center line of said orifice. The burner 17 is supported on the base 11 as shown.

By reason of having the bell-mouthed tubes adjustable in respect to the end of the atomizer burner, the operator is enabled to secure that adjustment which will best suit any atmospheric condition. The formation of the passage in the burner communicating with the steam inlet permits the steam, which comes through the small passage under great pressure, to expand and increase the velocity of the steam, this velocity being secured by the divergent form of the nozzle shown. The steam after passing through the throat of the nozzle and entering the divergent nozzles is calculated to attain a maximum velocity where it passes over the tube 20 at an angle of 30° and serves the double purpose of atomizing the fuel, which passes through said tube, and of drawing the fuel from said tube and increasing the velocity thereof. After the fuel has thus been mixed with the steam it is thoroughly atomized and the ejector draws the mixture through the bell-mouth of the first air supply tube and then so on through the successive tubes, drawing in an additional supply of air which mixes with the mixture coming through the preceding tube until the mixture from the last tube passes into the venturi brick or fire box of the furnace, drawing with it the final supply of air and forming the combustible mixture. The temperature of the steam coming into the throat of the atomizer nozzle would be approximately 700° Fahrenheit and would enter at a velocity of 1860 feet per second. The velocity increases from the time it passes the throat of the nozzle until it reaches a point where the fuel is admitted and at this point is approximately 4150 feet per second.

By this construction a most perfect atomization is obtained and a mixture that can be readily controlled to secure the most desirable results.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent, is:

1. A hydro-carbon fuel atomizer consist-

- ing of an atomizer burner having a throat of increasing diameter and connected with a steam supply pipe, a fuel supply tube having its discharge end positioned centrally within the opening in said atomizer burner and communicating therewith approximately at the point where the said increasing diameter produces the maximum velocity of steam, and a series of bell-mouth tubes positioned around the outer end of said atomizer burner and the outer ends of each other of succeeding increasing diameters and mounted to be adjustable, substantially as set forth.
- 18 2. A liquid fuel atomizer comprising a burner formed with a nozzle having a passage connected with a steam supply, the diameter of which passage increases from the entrance for a distance toward the exit with a comparatively large chamber near its discharge end, a fuel supply nozzle positioned within said chamber, a series of bell-mouth tubes of successive increasing diameters, and mounted around the outer end of said burner and the outer ends of each other and arranged to discharge within the mouth of the furnace, said tubes being adjustably mounted, substantially as set forth.
- 30 3. A hydro-carbon fuel atomizer consisting of an atomizer burner having a throat of increasing diameter connected with a steam supply pipe, a fuel supply tube having its discharge end positioned centrally within the opening in said atomizer burner and near its discharge end, a series of bell-mouth tubes secured together and adjustably mounted upon and relative to the burner.
- 40 4. A hydro-carbon fuel atomizer consisting of a burner slidably mounted upon a support fixed to the furnace at the venturi entrance, said burner having a throat of increasing diameter connected with a steam supply pipe, a fuel supply tube having its discharge end positioned centrally within the opening in said burner and at the point where the steam reaches its maximum velocity, said burner provided with a slot, a series of bell-mouth tubes permanently secured together and provided with an extension slidably supported within said slot, said bell-mouth tubes positioned around the outer end of said atomizer burner and having the outer ends of each other of succeeding increasing diameters.
- 50 5. A hydro-carbon fuel atomizer comprising an atomizer burner having a throat for supplying steam, said throat expanding into a chamber, a fuel supply nozzle extending into the chamber, a series of concentric bell-mouth tubes joined together and means for adjusting the tubes axially with respect to the burner.
- 60 6. A hydro-carbon fuel atomizer comprising an atomizer burner having a throat for supplying steam, the diameter of said throat expanding progressively and merging into a chamber, a plurality of concentric bell-mouth tubes proportioned to admit successively increasing volumes of air to the atomized mixture as it advances through the said tubes.
- 70 7. A hydro-carbon fuel atomizer comprising an atomizer burner having a throat for supplying steam, a diameter of said throat increasing progressively and merging into a chamber, a plurality of concentric bell-mouth tubes proportioned to admit successively increasing volumes of air to the atomized mixture as it advances through the said tubes, said bell-mouth tubes being permanently secured together, and means for adjusting the tubes axially with respect to the burner.
- 80 8. A hydro-carbon fuel atomizer comprising an atomizer burner having an expanding throat for supplying steam, a fuel supply nozzle having its point of discharge near the end of the expanded portion, a series of concentric bell-mouth tubes adjustably mounted upon the burner and proportioned to admit successively increasing volumes of air to the mixture of fuel and steam as it advances through the bell-mouth tubes.
- 90 9. A hydro-carbon fuel atomizer comprising an atomizer burner having an expanding throat for supplying steam, a fuel supply nozzle having its point of discharge near the end of the expanded portion, a series of concentric bell-mouth tubes adjustably mounted upon the burner and proportioned to admit successively increasing volumes of air to the mixture of fuel and steam as it advances through the bell-mouth tubes, a spiderlike bracket rigidly secured to the furnace and depending downwardly and outwardly therefrom, said bracket being provided with a rod for supporting the burner and permitting adjustment of the combined burner and tubes as a unit with respect to the furnace.
- 100 10. A hydro-carbon fuel atomizer comprising in combination with a furnace having an opening, a spiderlike bracket rigidly secured to the furnace and extending outwardly from the furnace and toward the middle of the furnace opening, a horizontal rod projecting from the lower end of the bracket and extending inwardly toward the furnace opening, an atomizer burner slidably mounted on the bar, said atomizer burner having an expanding throat for supplying steam, a fuel supply nozzle and a series of concentrically arranged bell-mouth tubes mounted on the burner.
- 110 11. A hydro-carbon fuel atomizer comprising in combination with a furnace having an opening, a spiderlike bracket rigidly secured to the furnace and extending out-
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wardly from the furnace and toward the middle of the furnace opening, a horizontal rod projecting from the lower end of the bracket and extending inwardly toward the furnace opening, an atomizer burner slidably mounted on the bar, said atomizer burner having an expanding throat for supplying steam, a fuel supply nozzle and a series of concentrically arranged bell-mouth tubes mounted on the burner, said tubes being permanently secured to each other and means for adjusting the tubes as a unit with respect to the burner.

12. A hydro-carbon fuel atomizer comprising in combination with a furnace having an opening, a spiderlike bracket rigidly secured to the furnace and extending outwardly from the furnace and toward the middle of the furnace opening, a horizontal rod projecting from the lower end of the bracket and extending inwardly toward the furnace opening, an atomizer burner slidably mounted on the bar, said atomizer

burner having an expanding throat for supplying steam, a fuel supply nozzle and a series of concentrically arranged bell-mouth tubes mounted on the burner, said tubes being permanently secured to each other, means for adjusting the tubes as a unit with respect to the burner, and means for adjusting the combined burner and tubes as a unit with respect to the furnace opening.

13. A liquid fuel atomizer comprising a chamber, a steam passage of progressively increased diameter leading into the chamber and a fuel supply nozzle extending into said chamber adjacent the point where the said passage opens into the chamber, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Boston, Massachusetts, this 2nd day of September, A. D. nineteen hundred and nineteen.

PERRY H. GENTZEL. [L. S.]

Witness:

E. W. BRADFORD.