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VAPORIZER

Filed Sept. 15, 1930

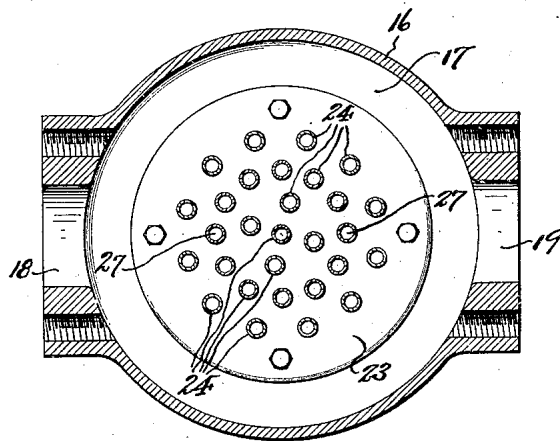
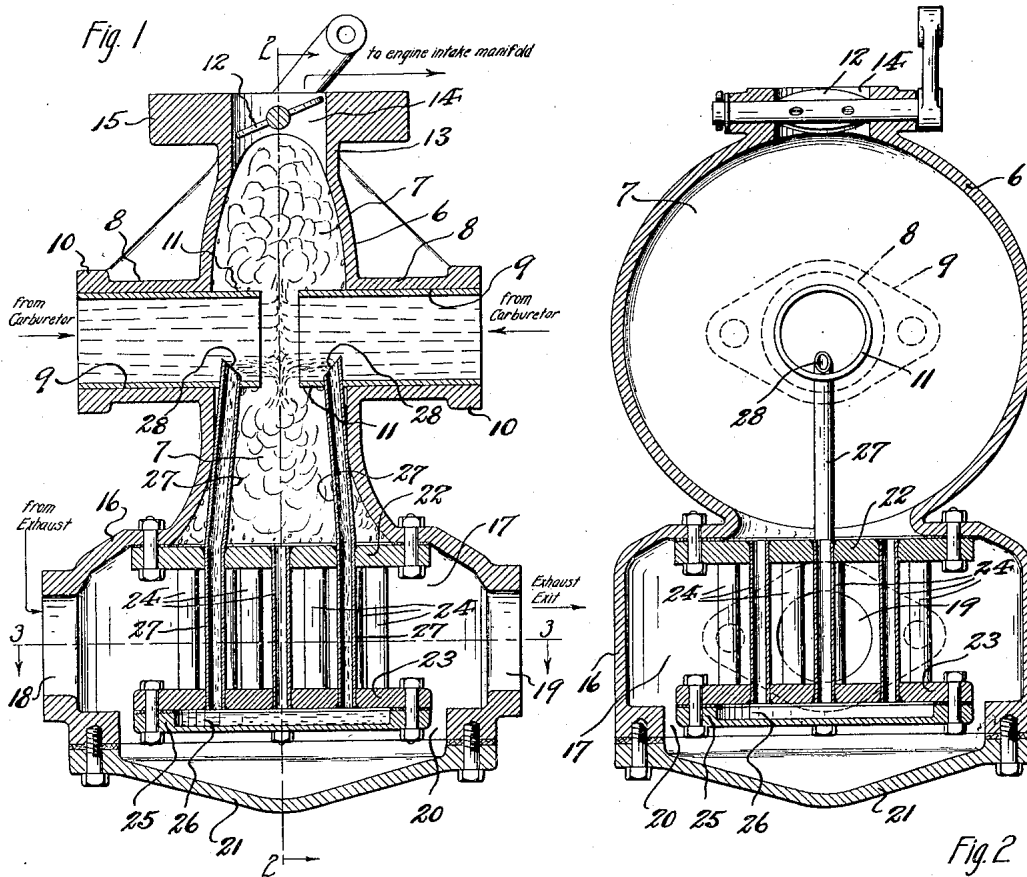


Fig. 3

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# UNITED STATES PATENT OFFICE

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## VAPORIZER

Application filed September 15, 1930. Serial No. 481,975.

This invention relates to improvements in apparatus for vaporizing fuel mixtures such e. g. as are supplied in internal combustion engines; and the invention has reference, more particularly, to improvements in fuel mixture vaporizers of the kind shown and described in my co-pending application for United States Letters Patent Ser. No. 442,417, filed on or about April 11th, 1930.

The present invention has for its principal object to provide in a vaporizer adapted to bring a plurality of fuel mixture streams into collision for the purpose of shattering the liquid fuel particles to expedite vaporization thereof, means to collect unvaporized liquid fuel particles gravitating from the colliding mixture streams subject to the vaporizing effects of applied heat, together with means to return the resultant vapor thereof into the ingoing fuel mixture streams, for ultimate discharge with the output of the vaporizer to an internal combustion engine or other place of use.

Other objects of the present invention, not at this time more particularly enumerated, will be understood from the following description of the same.

An illustrative embodiment of an apparatus made according to the principles of the present invention is shown in the accompanying drawings, in which:

Fig. 1 is a verical longitudinal section of my improved vaporizer apparatus, and Fig. 2 is a transverse vertical section, taken on line 2—2 in Fig. 1; and Fig. 3 is a horizontal section, taken on line 3—3 in Fig. 1.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

Referring to the drawings, the reference characters 6 indicates the casing of a transverse collision or atomizing chamber 7 having centrally located at its opposite sides tubular necks 8 providing oppositely entering intake passages 9. Said necks 8 have flanged

portions 10 at their outer ends for the connection therewith of suitable conduits arranged to deliver an ordinary wet gaseous fuel mixture from suitable carburetor means (not shown). Arranged within said necks 8 are sleeves or nozzles 11, the inner free ends of which are spaced one from the other in opposed relation within the collision or atomizing chamber 7.

Extending outwardly from the periphery of said collision or atomizing chamber is a neck portion 13 providing an outlet passage 14 for connection with the intake manifold (not shown) of an internal combustion engine or other place of vaporized fuel consumption. Said neck portion 13 is provided with a flanged free end 15 to couple with said manifold. If desired, a throttle valve 12 may be mounted within said outlet passage 14 of said neck portion 13.

Connected with the lower side of said casing 6 is a secondary casing 16 the interior of which provides a heating chamber 17. Said secondary casing 16 is provided, preferably at opposite sides respectively, with an intake opening 18 and an outlet opening 19, providing means for introducing into and circulating through and discharging from said heating chamber a heating fluid, such as exhaust gas from an internal combustion engine. The bottom of said secondary casing is provided with a bottom opening 20, normally closed by a detachable cover plate 21.

Said collision or atomizing chamber 7 is open at its lower end toward said heating chamber 17. Arranged within said heating chamber 17 and connected in communication with the lower end of said collision or atomizing chamber 7 through its lower open end is means to collect and vaporize by heat liquid fuel particles gravitating from the fuel mixture streams treated in said collision and atomizing chamber. This latter means is of improved form and construction, and comprises a top plate 22 secured across and

closing the lower open end of said collision or atomized chamber 7, between the same and said heating chamber 17. Downwardly spaced from said top plate 22 is a bottom plate 23, and secured for vertical extension between and through said top and bottom plates are a plurality of collector tubes 24, laterally spaced apart in relation one to another so that the heating fluid within said heating chamber may circulate around and in contact with the external sides of the same. Secured to the underside of said bottom plate 23 is a reservoir member 25, having an internal chamber 26 with which the lower ends of said tubes 24 communicate. The reference character 27 indicates inspirator tubes which respectively extend upwardly from said reservoir chamber 26, through the top plate 22 and lower portion of the collision or atomizing chamber into the respective nozzles 11, within the interior of which the upper extremities of said inspirator tubes terminate. Preferably said upper ends of the inspirator tubes are chamfered, as at 28, to face the discharge ends of said nozzles 11, thus providing emission jets within said discharge ends of said nozzles 11.

In the operation of the apparatus, fuel mixture streams, drawn from suitable carburetor means under the suction effects of internal combustion engine operation, are caused to enter at opposite points, through the opposed nozzles 11, into the collision or atomizing chamber 7 so that the opposed streams will meet in head-on collision within the latter, whereby liquid fuel particles carried in the mixture are caused to mutually impinge or collide with considerable force, with the result that, for the most part, such liquid particles are further shattered, broken up or more finely atomized to form a fog or vapor. The resultant fog or vapor will expand within the interior of the chamber 7, which is warmed by the conduction of some heat through its walls from the heating chamber, and tends to form a gaseous or vaporized fuel mixture which eventually discharges through the outlet passage 14 to the engine intake manifold and thence to the engine cylinders.

In the operation above described, such liquid fuel particles as are not thoroughly broken up or vaporized, will tend to directly drop to the bottom of the collision or atomizing chamber 7, or, if deposited on the walls thereof, to trickle down the same to the top plate 22, flowing thence into the upper ends of the collector tubes 24, down which the same further gravitate to eventually lodge within the reservoir chamber 26. Owing to the high heat furnished by the heating medium circulated through the heating chamber 17 and around the collector tubes 24 and reservoir member 25, the more volatile constituents of the liquid fuel will vaporize within the hot

collector tubes and will rise therethrough to return to the collision chamber 7 for discharge therefrom to the engine. The less volatile constituents of the collected liquid fuel, which finally come to rest within the reservoir chamber 26, will there be subjected to the continued effects of the applied heat until boiled off into vapor. The vapor thus generated within the reservoir chamber 26 will be sucked up through the inspirator tubes, by the suction effect exercised by the inrushing streams of carburetted fuel mixture entering the chamber 7 through the nozzles 11, and moving past the emission jets 28 of said inspirator tubes. The vapor thus drawn upwardly from the reservoir chamber 26 through the inspirator tubes 27, will be discharged from the latter, to join the fuel mixture streams entering the chamber 7, thereby being returned thereto so as to join with vaporized fuel discharged therefrom to the engine.

From the above description it will be obvious that the instant invention provides a simple and yet efficient means for more thoroughly vaporizing initial liquid fuel mixtures, the same being effective, owing to the novel liquid fuel collecting and heating elements, to adequately treat the heavier or less volatile constituents of the particular liquid fuel employed as well as the lighter or more volatile constituents thereof.

As many changes could be made in the above described construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A device for vaporizing carburetted fuel mixtures comprising, an annular transverse chamber having opposed intake passages for admission of fuel mixture streams in opposition one to another for mutual colliding effect within said chamber, a discharge passage leading out of said chamber, a plurality of collecting tubes communicating at their upper ends with the lower interior of said chamber, a reservoir member with which the lower ends of said collecting tubes communicate, means for applying heat to said collecting tubes and reservoir member, and inspirator tubes extending from said reservoir member respectively into said intake passages of said first named chamber.

2. A device for vaporizing carburetted fuel mixtures comprising, an annular transverse chamber having opposed intake passages for admission of fuel mixture streams in opposition one to another for mutual colliding effect within said chamber, a discharge passage leading out of said chamber, a plurality of

collecting tubes communicating at their upper ends with the lower interior of said chamber, a reservoir member with which the lower ends of said collecting tubes communicate, a heating chamber surrounding said collecting tubes and reservoir member, means for admitting and discharging a hot fluid for circulation through said heating chamber and around said collecting tubes and reservoir member, and inspirator tubes extending from said reservoir member respectively into said intake passages of said first named chamber.

In testimony that I claim the invention set forth above I have hereunto set my hand this 10th day of September, 1930.

ERNEST R. GODWARD.

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