April 7, 1925. 1,532,638

E. B. RODGERS

VAPORIZER

Filed Oct. 4, 1922 3 Sheets-Sheet 1

Fig. 1.

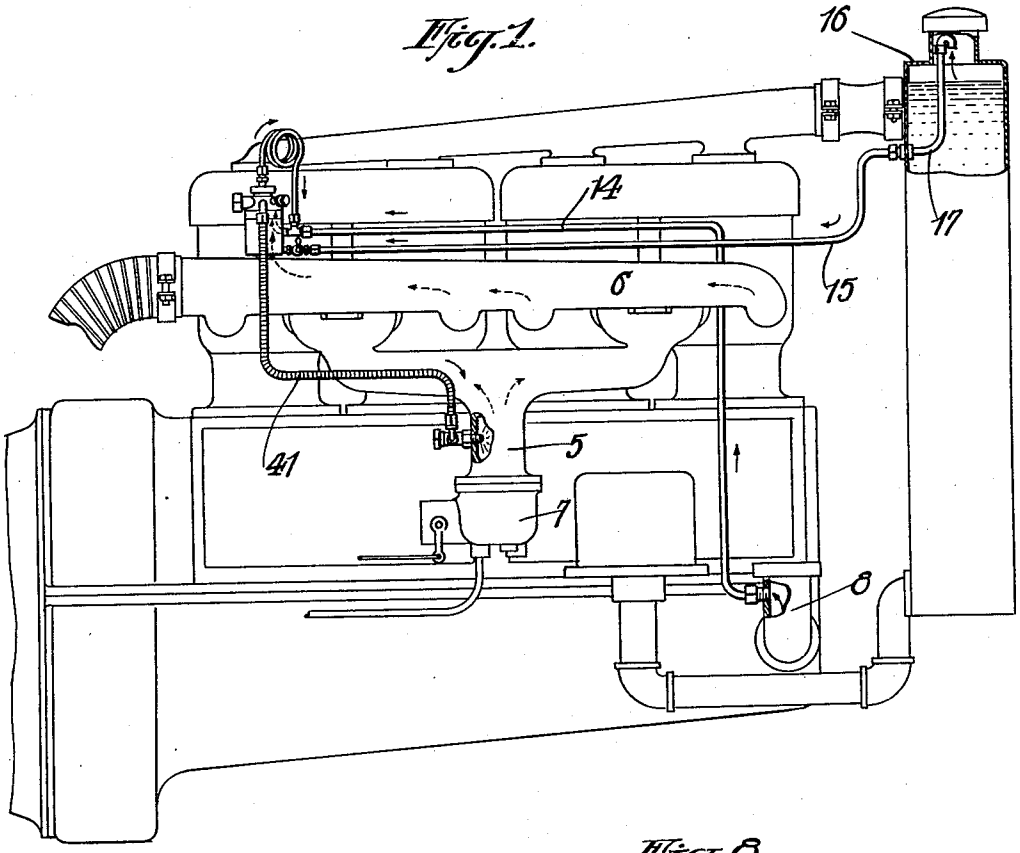


Fig. 7

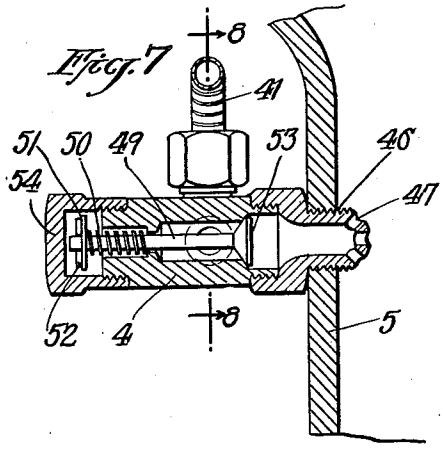
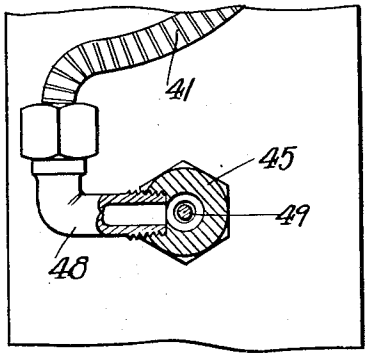


Fig. 8.



INVENTOR.

E. B. RODGERS.

BY Richard B. Owen

ATTORNEY.

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Fig. 2.

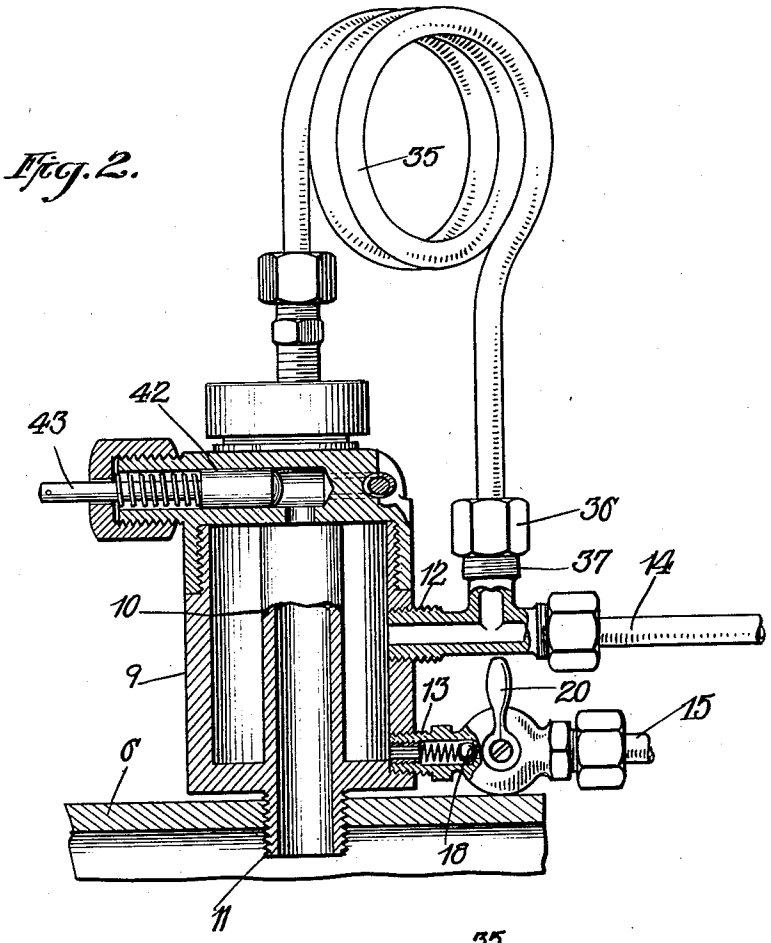
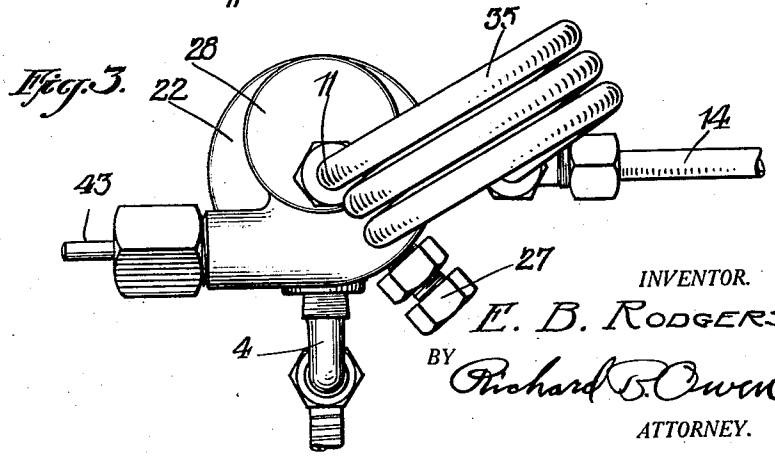


Fig. 3.



INVENTOR.

E. B. RODGERS.

BY Richard B. Owen

ATTORNEY.

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E. B. RODGERS

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Fig. 4.

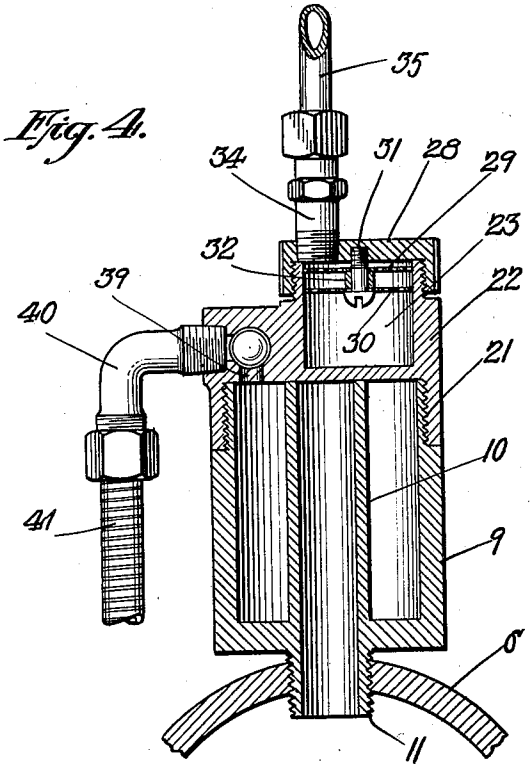


Fig. 6.

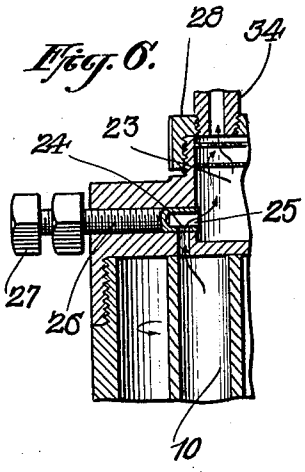
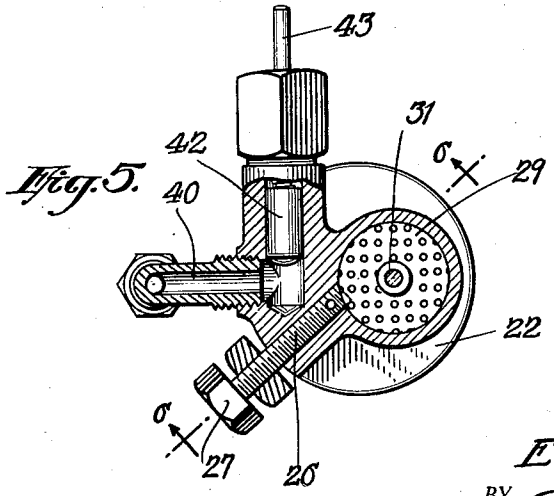


Fig. 5.



INVENTOR.

E. B. RODGERS

BY Richard B. Owen

ATTORNEY.

Patented Apr. 7, 1925. 1,532,638

UNITED STATES PATENT OFFICE.

EDWARD B. RODGERS, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO VICTORY VAPORIZER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

VAPORIZER.

Application filed October 4, 1922. Serial No. 592,313.

To all whom it may concern:

Be it known that I, EDWARD B. RODGERS, a citizen of the United States, residing at Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Vaporizers, of which the following is a specification.

This invention relates to vaporizers and more particularly to a novel and improved device for salvaging the unburned gases from the crank case and exhaust manifold of an internal combustion engine by mixing said gases with steam at a very high temperature.

One of the objects of my invention is the provision of a vaporizer wherein the unburned gases from the crank case and exhaust manifold are converted to a rich mixture with the steam from the radiator and in a superheated state conducted to the intake manifold of the engine.

Another and equally important object of my invention is the provision of a vaporizer wherein the fuel to be salvaged is conducted to a mixing chamber and combined with superheated water vapor and both filtered and expanded so as to remove any carbon that might be present before conducting the mixture to the intake manifold of the engine.

Another and very important object of my invention is the provision of a vaporizer for salvaging unburned gases from the crank case and exhaust manifold by conducting the same to a mixing chamber attachable to the exhaust manifold of an engine, said chamber being so formed as to produce a hot spot whereby the gases may be combined with the water vapor conducted from the radiator at a very high temperature including provision for regulating the quantity of water vapor desired in the final mixture before the same is conducted to the intake manifold of the engine.

One of the objects of my invention is the provision of a vaporizer wherein the unburned gases when mixed with steam at a very high temperature, may be filtered and expanded preliminary to conducting the same to the intake manifold of the engine, including a novel and improved suction nozzle valve operable by the suction of the engine to spray the final mixture into the intake manifold.

I attain the above objects and others which will become apparent as the description proceeds when taken in connection with the following drawings, showing the improved or preferred embodiment of my invention, wherein:

Figure 1 is a view showing my invention installed on a conventional type of internal combustion engine.

Figure 2 is a vertical view partly in section showing the mixing chamber of the vaporizer and its expansion coil.

Figure 3 is a plan view of the vaporizer as shown by Figure 2.

Figure 4 is a vertical section through the vaporizer and its filtering head.

Figure 5 is a plan view of the vaporizer as shown by Figure 4.

Figure 6 is a sectional view taken on the line 6—6 of Figure 5.

Figure 7 is a sectional view of the suction nozzle valve.

Figure 8 is a view partly in section taken substantially on the line 8—8 of Figure 7.

Referring now to the drawings, wherein like reference characters designate corresponding parts throughout the several views, 5 designates the intake manifold of a conventional type of internal combustion engine, 6 the exhaust manifold, 7 a carburetor and 8 the breather pipe, all of which are of a conventional type common to motor vehicle engines in general. An annular mixing chamber 9 formed preferably integral with a central exhaust gas conducting tube 10 is mounted on the exhaust manifold 6 by the threaded connection 11 at the lower end of the tube 10 above referred to. The mixing chamber 9 is tapped to receive the threaded connections 12, 13, the connection 12 being in communication with a conduit 14 leading to the breather pipe 8 and the connection 13 is in communication with the conduit 15 leading to the top of the radiator 16 and below the cap thereof through the extension conduit 17 as clearly shown by Figure 1 of the drawings. The threaded connection 13, which is positioned directly below the connection 12 is provided with a spring controlled ball valve 18 which con-

trols the admission of steam to the mixing chamber 9, there being also providtd a regulator valve 20 for limiting the quantity of vapor to produce the best results depending on the richness of the gases to be salvaged.

The mixing chamber 9 is threaded at its upper end as at 21 for threaded engagement with a flanged closure or head 22 therefor. The head is provided with a baffle chamber 23 communicating with the tube 10 through the passage 24 as clearly shown by Figure 6 of the drawings. The head 22 is provided with a transverse threaded passage 25, which receives a threaded stem and nut 26, 27, respectively, the latter controlling the passage of the exhaust gases to the chamber 23. The said chamber 23 is closed by a knurled cap 28 which carries a pair of spaced, parallel, apertured baffle plates 29, 30 secured by the screw 31 and the spacer 32 as clearly shown by figure 4 of the drawings. The cap 28 above referred to is tapped to receive a threaded connection 34 on which I have attached an expansion coil preferably of aluminum as indicated at 35, the lower and opposite end of which is secured by a nut 36 on the threaded right angle portion 37 of the connection 12 of the conduit 14. By reason of this construction it will be readily seen that as the exhaust gases pass upwardly through the tube 10 to the chamber 23, the apertured baffle plates will tend to break up the impure products of combustion and retard the passage of carbon and the gases entering the expansion coil 35 will be cooled, mixed with the gases coming from the breather pipe 8 and the heated vapor entering by the conduit 15.

The gases, as combined in the mixing chamber 9, pass through the opening 39 to the elbow 40, threaded in the side of the head 22 and the mixture is conducted through a flexible tube or pipe 41 preferably of copper, having a brass covering, the opposite end of said tubing being in turn connected to my novel and improved suction nozzle valve, to be described in detail. The passage 39 leading from the chamber to the conducting pipe or tube 41 is controlled by the spring held plunger valve 42, the stem 43 of which may be connected by any suitable means to any desired position on the dash board of the motor vehicle to regulate the passage of the fuel as above described. Under normal conditions, the valve 42 is opened but when closed prevents the admission of air and consequently permits of the easy starting of the engine since the suction nozzle valve above referred to, is connected to the intake manifold.

Referring now particularly to Figures 7 and 8 of the drawings, I have shown my novel and improved suction nozzle valve attached to the intake manifold and which comprises a cylinder 45 threaded at one end for connection with a threaded nozzle cap 46 having diverging openings 47 whereby the mixture is sprayed into the intake manifold. An elbow 48 is connected at one end to the conduit or pipe 41 and at its opposite end is in communication with the interior of the cylinder or body 45 of the suction nozzle valve. A plunger valve 49 operable within the member 45 is provided with a spring 50 and a washer 51 secured by a cotter pin or key 52 and normally tends to maintain the head 53 of the valve in its seat. A threaded cap 54 on the opposite end of the casing or member 45 prevents the admission of dirt or foreign matter into the suction nozzle valve and permits of its proper operation. It will thus be seen that by positioning the suction nozzle valve, as above described, the suction of the engine will have the tendency to open the valve 49 so as to permit of the admission of the mixture coming through the tube 41 and furthermore prevent any water or condensation from reaching the carburetor. The above description, taken in connection with the drawings, will disclose, to those skilled in the art, that I have provided a novel and improved means for salvaging the unburned gases from the exhaust manifold as well as such gases and vapor as may be present in the crank case due the escape of gas past the piston rings in the cylinder. Since the vaporizer, or more accurately, the mixing chamber 9 is mounted on the exhaust manifold 6, it will be readily apparent that the tube 10 will become very hot in a short time when the engine is running. This tube will then constitute what I term a hot spot, so that as the exhaust gases pass upwardly into the chamber 23 and are filtered, preliminary to being expanded in the aluminum coil 35, said gases will then mix with the incoming gases from the breather pipe 8, which mixture combines with the steam or moist air from the radiator so that as this combination is effected by the hot tube 10, it will break down any carbon that may be present before this mixture is conducted to the spray nozzle in the intake manifold. Both the quantity of exhaust gases and water vapor may be regulated to suit the needs, and as occasion may require, depending on the character and quality of fuel employed, the nozzle valve working on the suction principle due to the operation of the pistons in the cylinder, will open and close the said valve 39 for the admission of the mixture therein.

While I have illustrated and described my invention with some degree of particularity, I realize that in practice various alterations therein may be made. I therefore reserve the right and privilege of changing the form of the details of construction or otherwise altering the arrangement of the correlated

parts without departing from the spirit of the invention or the scope of the appended claims.

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

1. A vaporizer comprising a mixing chamber attachable to the exhaust manifold of an internal combustion engine, means for baffling and expanding exhaust gases and conducting the same to the mixing chamber, a conducting element for crank case gases communicating with said mixing chamber through said means, a water vapor conducting element leading to the mixing chamber, and means for introducing the mixture into the intake manifold of the engine.

2. A vaporizer comprising a mixing chamber, means for introducing exhaust gases from the exhaust manifold, gases from the crank case and water vapor from the radiator of an internal combustion engine into said mixing chamber, means for baffling and expanding said exhaust gases preliminary to the mixing with said water vapor crank case gases, and means for conducting said mixture into the intake manifold of the said engine.

3. A vaporizer comprising a mixing chamber, means for introducing exhaust gases and crank case gases of an internal combustion engine into said mixing chamber, means for preliminarily baffling and expanding the exhaust gases, an advance of their introduction into said mixing chamber, a water vapor conduit also connected to the mixing chamber, means for independently regulating the quantity of said gases and water vapor supplied to said mixing chamber, and means for conducting said mixture into the intake manifold of the engine.

4. A vaporizer comprising a mixing chamber adapted for connection with the exhaust manifold of an internal combustion engine, means for introducing exhaust gases and crank case gases into the mixing chamber, a water vapor conduit also connected to the mixing chamber, a regulating valve for controlling the supply of water vapor, means for baffling and expanding the exhaust gases preliminary to mixing the same with the water vapor, and means for conducting and spraying the mixture into the intake manifold of the engine.

5. A vaporizer comprising a mixing chamber for mixing exhaust and crank case gases and water vapor and having a central exhaust gas conducting tube, a baffle chamber connected to the mixing chamber, valved means for controlling communication between said tube and the baffle chamber, an expansion coil leading from the baffle chamber to the mixing chamber, and means for conducting off and vaporizing the resulting mixture in the mixing chamber into the intake manifold of an internal combustion engine.

6. A vaporizer comprising a mixing chamber having an exhaust gas conducting tube therein, means for directly attaching said tube to the exhaust manifold of an internal combustion engine, a baffle chamber connected to the tube of the mixing chamber and in communication with said tube, means for regulating the passage of exhaust gases through said tube, a conduit for conducting vapor from the radiator of the engine to the mixing chamber, and means for conducting and spraying the resulting mixture in said mixing chamber, to the intake manifold of the engine.

7. A vaporizing attachment for internal combustion engines comprising a mixing chamber provided with a valved outlet and further provided with a valved inlet for water vapor, a baffle chamber arranged over the mixing chamber and provided with an outlet, baffling means within said baffle chamber, a controllable conducting means adapted to be connected to the exhaust manifold of the engine and providing means for conducting exhaust gases from said manifold through said mixing chamber and into said baffle chamber, said mixing chamber further provided with means to constitute an inlet for crank case gases from the engine, a conduit leading from the outlet of the baffle chamber to the said inlet for the crank case gases, and means for conducting the resulting mixture in the said mixing chamber and spraying the same into the intake manifold of the engine.

In testimony whereof I affix my signature.

EDWARD B. RODGERS. [L. S.]