

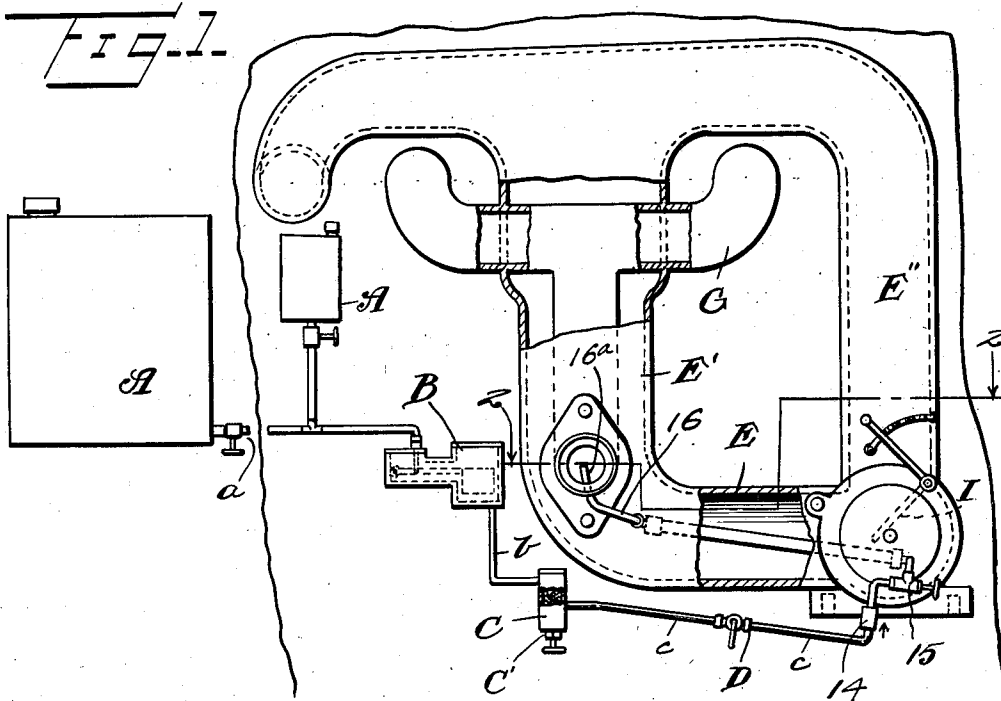
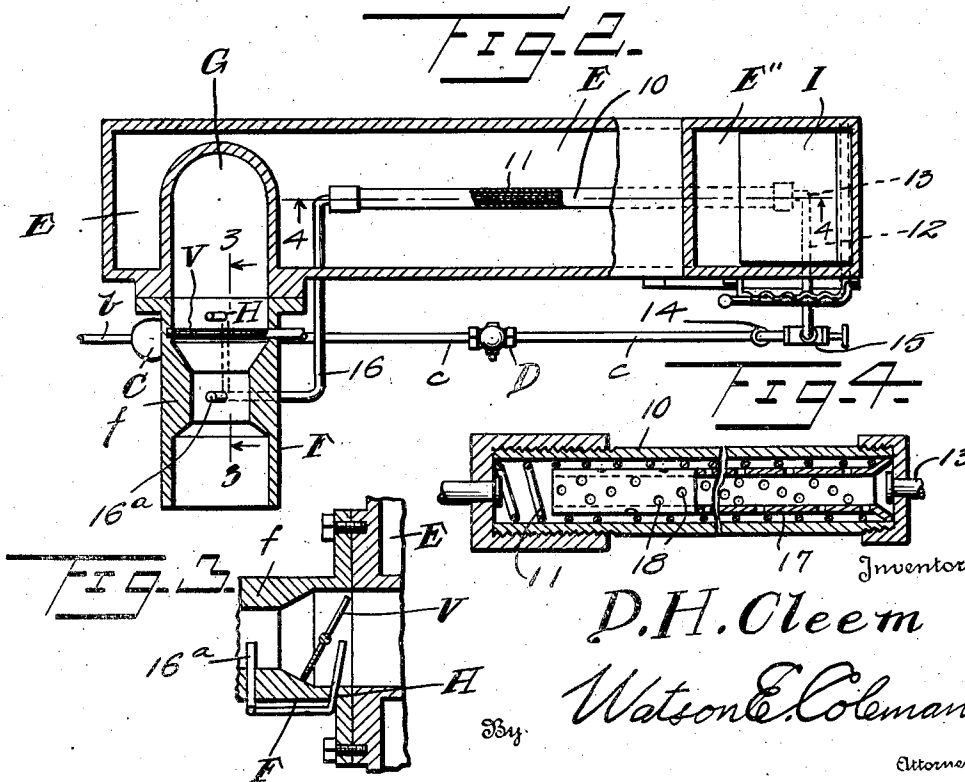
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VAPOR GENERATOR FOR CARBURETORS

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VAPOR GENERATOR FOR CARBURETORS

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3 Claims. (Cl. 123—133)

This invention relates to carburetors and particularly to a vapor generator for use with carburetors.

The general object of the invention is to provide a vapor generator by which all of the liquid fuel before any admixture of air thereto will be vaporized by the generator before it is delivered to the venturi of the carburetor, the air necessary for combustion of this fuel being mixed with the dry vapor just before the fuel is admitted to the engine. In all other carburetors known to me, the liquid fuel and air are mixed together by spraying the fuel into an air current or jet and then the carburetor depends on the heat of the intake manifold or upon other means of like character to vaporize this mixture.

A further object is to provide a generator of this character which includes a metallic tube disposed entirely within the exhaust manifold of the engine, this tube having means at one end for the inlet of liquid fuel and at the other end means for discharging the vaporized fuel, the tubular element having therein a helical metallic coil extending practically the full length of the tubular element and having within the coil a tubular perforated distributor.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawing wherein:

Fig. 1 is an elevation of a portion of an engine with the intake and exhaust manifolds, the exhaust manifold being broken away and showing my generator therein and its connections.

Fig. 2 is a section approximately on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary section of my improved generator.

In Fig. 1, I have illustrated the intake and exhaust manifolds such as are used on the International Harvester tractor. This is, of course, purely illustrative as my invention is equally applicable to other forms of manifolds.

My vapor generator, as shown in detail in Figs. 2 and 4, includes a metallic tube 10 within which is disposed a metallic helix 11 preferably of brass, which extends practically or nearly the entire length of the tube 10. The coils of this helix bear against the wall of the generating tube 10 so as to conduct heat from this wall into the interior of the tube 10 and for a purpose to be later stated.

At its inlet end, the tube 10 is connected to a source of liquid fuel by means of the pipe 12 engaged with the end of the tube 10 as by means of

an elbow 13. The pipe 12 is preferably $\frac{1}{4}$ " brass pipe. This pipe 12 leads to a valve chamber 14 within which is disposed a check valve. Between the check valve and the pipe 12 is a needle valve casing 15. From the opposite end of the tube 10 leads a discharge tube 16. Disposed within the tube 10 and supported by the coiled wire 11 in spaced relation to the tube 10 is an internal brass tube 17 having a flared end engaging with one end of the tube 10 and open at both ends. This tube 17 is provided with a plurality of spirally arranged perforations 18. The tube 17 is $\frac{3}{8}$ " shorter than the outer tube 10. The tube 17 is disposed within the coil 11 so that the liquid fuel is distributed more evenly along the generator, making the evaporation of the fuel steady and thereby making the motor run more smoothly and steadier while developing full power from the fuel.

It will be noted that the coils of the helix 11 act as channels along which the vaporized fuel between the tube 17 and the tube 10 will flow. Inasmuch as the holes 18 are disposed in spiral formation, it will make no difference how the tube is inserted within the coil. There will always be just as many of the holes directed upward as downward and as many on one side as on the other. The liquid fuel entering the tube 17 being heavier, is drawn along the lower part of the tube 17 and seeps downward through the lower set of holes. As it passes through the lower holes, the fuel comes in contact with the coil and the outer tube 10. The fuel is then vaporized and rises and passes back through the upper holes in the tube and as vapor passes down along the tube 17 to the outlet end thereof. The interior tube 17 is shorter than the tube 10 so that any vapor left in around the coil that is not passed back through the holes in the tube may pass from the coil directly into the outlet end of the tube 10 without restriction. The length of this entire generator may, of course, vary but in actual practice, this generator has a length of about 8".

I have illustrated a fuel tank A discharging into a float chamber B such as is commonly found on carburetors and from this float chamber leads a pipe b leading into a strainer C from which a pipe line c leads to the valve chamber 14. In this pipe line is a shut-off valve D. The generating tube 10 is disposed entirely within an exhaust manifold, one leg of which is designated E. The opposite end of the generator 10 from the inlet pipe 12 is connected by a $\frac{1}{8}$ " pipe 16 to the Venturi end of the intake F of the engine. This intake F is ordinarily connected directly to the carburetor. The intake F has a Venturi-form

portion *f* in its length and the pipe 16 enters the intake F at this Venturi-form portion. Passage through the intake F is controlled by the usual butterfly or choke valve V. The mixed air and vapor is discharged from the intake F into the inlet manifold G in the usual manner. Of course, it is to be understood that the pipe 16 terminates in a small spray nozzle 16a so that the vaporized fuel is sprayed into the inlet pipe and drawn by the suction of the engine into the inlet manifold in the usual manner. Also entering into the intake F inward of the Venturi-form portion *f* is a low speed jet H.

The exhaust manifold may be of any suitable type but as shown, this exhaust manifold has a medially disposed leg E' which extends downward parallel to the vertical leg of the inlet manifold and then extends at right angles, as at E. The exhaust manifold also is shown as having a vertical leg E'' which extends downward and intersects the leg E and the exhaust manifold is provided with a by-pass valve I for controlling heat regulations.

A carburetor having this generator tube uses less fuel and burns without any smoke or soot for the reason that the fuel does not reach the carburetor jets until it has gone through the generator and has been fully vaporized, so that it will readily mix with air. A carburetor provided with a generator of this character needs no pumps or any working parts except the usual butterfly valve which governs the engine speed. The fuel is drawn through the generator by the suction of air as the air passes the Venturi passage and is mixed with the right amount of air after the fuel has been vaporized by the action of the heat of the exhaust gases.

This generator is preferably placed in the hottest part of the exhaust manifold as the hotter the temperature surrounding the generator, the better it will operate. This generator becomes red-hot when the engine is running and this is true also of the coil inside the generating tube. I have found in actual practice that this interior coil 11 more than doubles the vaporizing power of the generator, and that by using the interior tube 17, the liquid fuel is distributed more evenly along the generator, making the vaporization of the fuel steady. If this tube is taken out, I have found that the motor will alternately slow up and then race.

My carburetor under test has shown that by first vaporizing the raw or whole fuel before it is mixed with air reduces the consumption of fuel by from a $\frac{1}{4}$ to a $\frac{1}{3}$ and permits the use of any of the low-priced fuels and gives the same power as high octane gasoline does.

In starting an engine having my carburetor, valve D is first turned off to stop the motor. Then the valve *a* on the main fuel tank A is turned off, preventing the flow of fuel from the tank A from passing to the float chamber B. Then whatever fuel is within the float chamber B and the filter chamber C is allowed to drain out through the drain valve *c*. This leaves the carburetor drained

dry of all fuel and ready for starting. Now to start the motor, fuel is allowed to flow from the auxiliary tank A', which fills the float chamber B and the filter C with gasoline or like fuel. The valve D is now turned on and this allows the gasoline from tank A' to pass into the generator and up to the level of the top of jet H and the top of jet 16a. Then the cylinders are primed with gasoline and in actual practice it has been found that the motor will usually start on the first turn-over. The motor is then left running until the generator is hot. Then the valve controlling flow from the gasoline tank A' is turned off and the valve *a* turned on and the motor will operate on whatever kind of fuel is carried within the tank A. It requires about five minutes to heat up the generator on gasoline in order to make the generator hot enough to vaporize the lower grades of fuel for which this particular generator is particularly designed.

While I have illustrated the application of my generator to a particular form of exhaust manifold, it is to be understood that this generator may be used in conjunction with any carburetor and with any engine having an exhaust manifold in which the generator may be placed.

What is claimed is:—

1. A vapor generator for internal combustion engines including a relatively thin-walled elongated metallic tube having an inlet pipe at one end and an outlet pipe at the other and having a metallic helix disposed within the tube, the coils of which touch the walls of the tube, the tube being adapted to be disposed within the exhaust manifold of an engine, and an internal tube disposed within the helix and uniformly perforated, the internal tube being open at its opposite ends.

2. A vapor generator for internal combustion engines, including a relatively thin-walled elongated metallic tube having an inlet opening at one end and an outlet opening at the other, an internal tube disposed within the first-named tube and uniformly perforated, the internal tube being open at its opposite ends and receiving fuel from the inlet opening of the external tube, and means supporting the internal tube at intervals within the external tube and centering it therefrom.

3. A vapor generator for internal combustion engines, including a relatively thin-walled elongated metallic tube having an inlet opening at one end and an outlet opening at the other, an internal tube disposed within the first-named tube and uniformly perforated, the internal tube being open at its opposite ends and receiving fuel from the inlet opening of the external tube, means supporting the internal tube at intervals within the external tube and centering it therefrom, and heat conductive means supporting the internal tube in spaced relation to the external tube, said centering means permitting the passage of vaporized fuel ejected through said perforations into the space between the external and internal tubes.

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