June 10, 1930. D. E. FOWLER 1,763,508

VAPORIZING DEVICE

Filed April 12, 1929 2 Sheets-Sheet 1

Fig. 1.

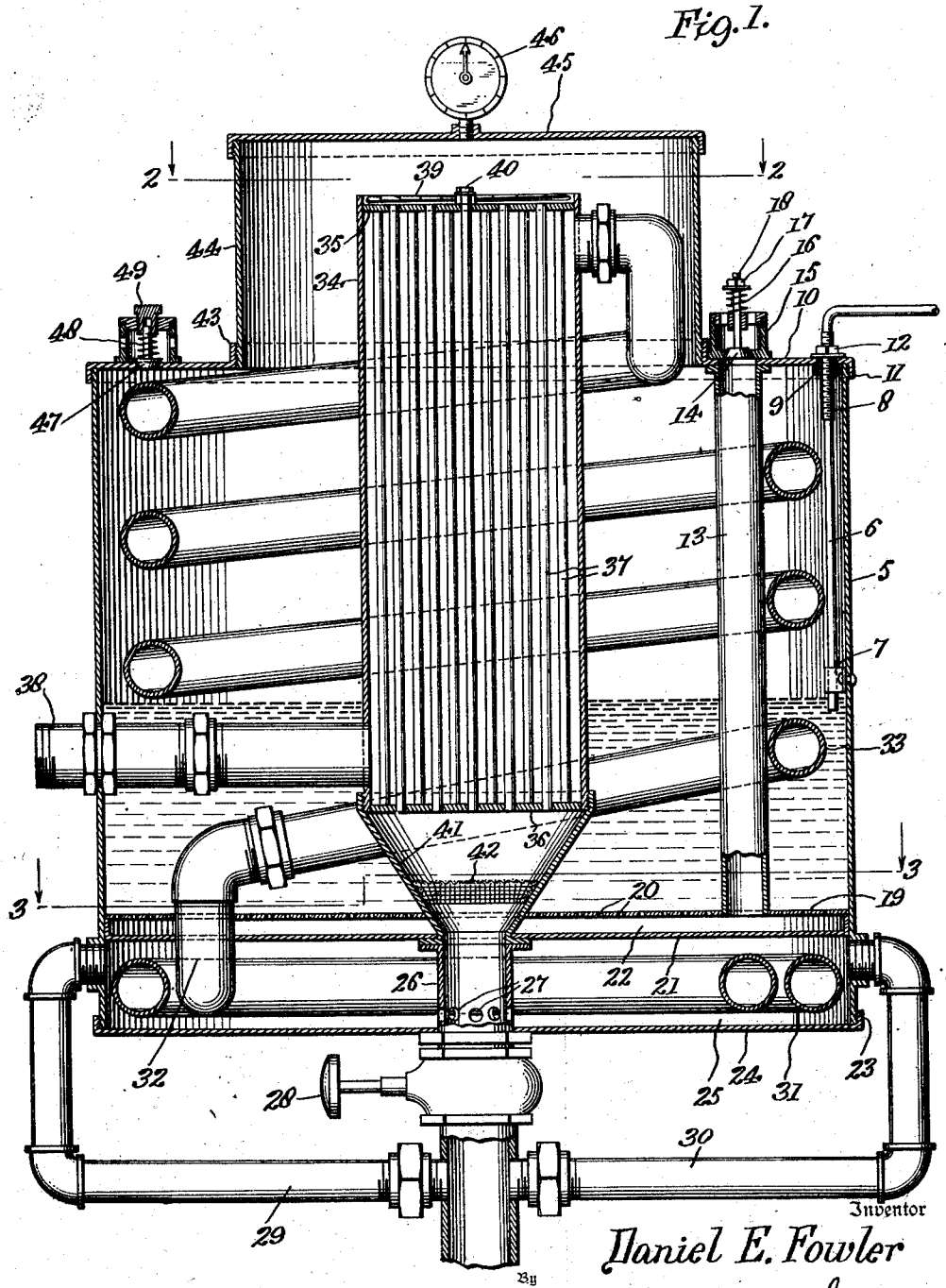

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Fig. 2.

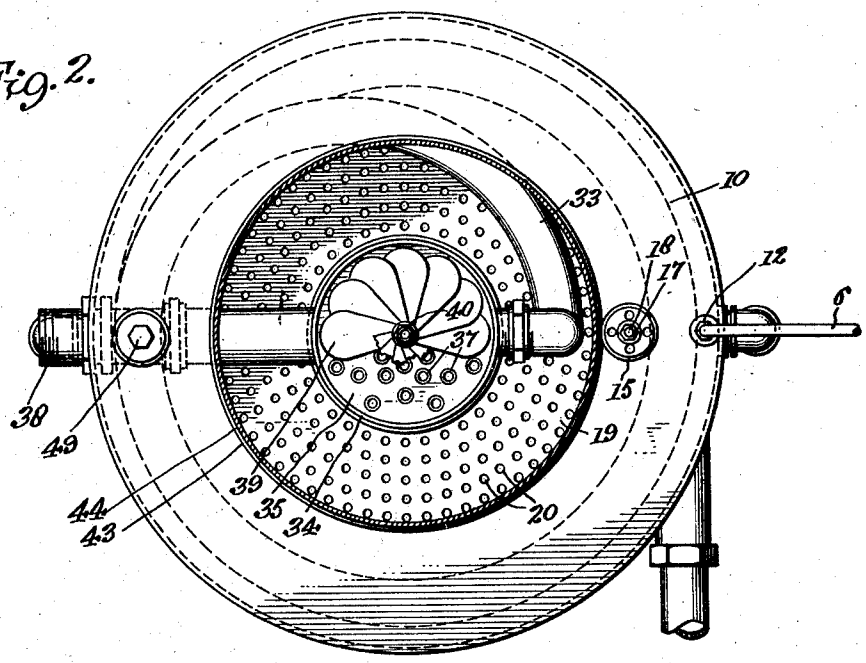
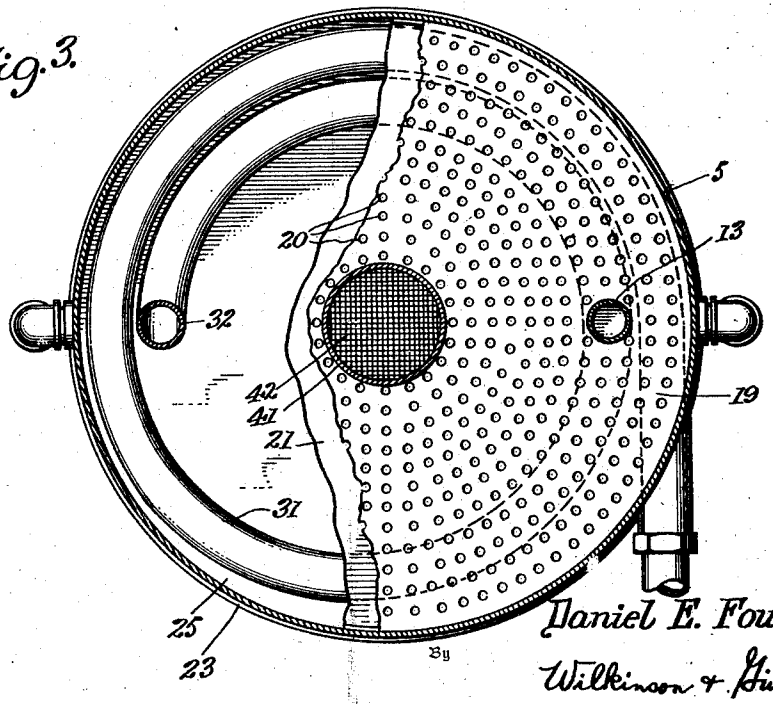


Fig. 3.



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Patented June 10, 1930 1,763,508

UNITED STATES PATENT OFFICE

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VAPORIZING DEVICE

Application filed April 12, 1929. Serial No. 354,613.

The present invention relates to improvements in vaporizing devices, and more particularly refers to an improved vaporizing device for providing a dry and invisible gas for use in internal engines.

An object of the invention is to provide an improved vaporizing device which will eliminate carbon deposits, increase fuel efficiency, and result in a sweeter running motor.

Another object of the invention is to provide an improved vaporizing device which will be useful in connection with very low grade fuel oils, which resist ready vaporization.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts through the several views,

Figure 1 is a vertical section taken through an improved vaporizing device constructed according to the present invention,

Figure 2 is a horizontal section taken on the line 2—2 in Figure 1, and

Figure 3 is a similar view taken on the line 3—3 in Figure 1.

Referring more particularly to the drawings, 5 designates a container in which a body of liquid fuel is shown, as contained up to an appropriate level. The fuel is introduced from an appropriate source, for instance, the fuel tank usually carried by automobiles through a fuel induction pipe 6, the lower end of which plays freely through a guide 7 held by the tank wall, the pipe 6 being adjustable vertically in order to shift the liquid fuel level up and down, as occasion may demand, and for this purpose, the pipe 6 is provided with threads 8 on its upper portion for engaging a similarly threaded bushing 9 in the cover 10 which is provided with the threaded flange 11 for engaging external threads upon the upper end of the tank wall 5.

A nut 12 is threaded upon the threads 8 of the pipe 6 above the cover 9, and acts to lock the pipe 6 in the adjusted position. If desired, the bushing 9 may be unthreaded, so that rotation of the nut 12 will act against said bushing by an end-wise thrust to cause the pipe 6 to shift longitudinally up and down and thus adjust the fuel level in the tank 5.

The air inlet is represented at 13, and consists of a pipe traversing substantially the entire height of the tank 5 and communicating at its upper end with the outside atmosphere whenever the suction demand opens the check valve 14, which is provided in the valve casing 15 and is under the control of a coil spring 16 which tends to hold the valve 14 in the upper closed position. A nut 17 threaded on the valve stem 18 and acting against the spring 16 is useful for adjusting the tension of the spring 16 and, consequently, the load under which the check valve 14 will open. The lower end of the air intake pipe 13 is disposed through a horizontal diaphragm or partition 19 having numerous perforations 20 therein. Below the diaphragm 19 is a bottom 21 forming with the diaphragm an air receiving chamber 22. The bottom 21 is secured in the cylindrical wall 25 of the tank above the lower end thereof, which is externally screw threaded to receive the internal threaded flange 23 of a bottom cover 24.

Between this bottom cover 24 and the bottom 21 of the fuel chamber, is comprised a heater chamber 25 surrounding the pipe 26 which communicates at its lower end with the intake manifold of the engine and which communicates with the heater chamber 25 through an annular series of openings 27 near the base of the chamber 25. The fuel pipe 26 is provided with a valve 28 therein, this valve being disposed between the openings 27 and the point of connection with the pipe 26 of other branch pipes 29 and 30 communicating with opposite side portions of the chamber 25, and preferably with upper zones of said chamber 25. In the chamber 25 is a heater coil 31 adapted to receive hot water from the water jacket of the engine, steam from an appropriate source of supply, or exhaust gases from the exhaust manifold of

the engine. This coil 31 is wound in one or more convolutions within the chamber 25, and then connects with a riser pipe 32, which is in turn coupled to a heater coil 33 disposed in the fuel chamber of the tank 5. The helices of the last mentioned coil are preferably open, and the coil is of comparatively great diameter extending out approximately to the tank wall 5, and about the air intake pipe 13. The upper end of the helix 33 connects with the interior space of a heating drum 34 having heads 35 and 36 with numerous tubes or pipes 37 carried in said heads.

An exhaust pipe 38 is connected to the lower portion of the interior space of the drum 34 for conveying off the heating medium, this exhaust pipe 38 extending outwardly through the tank wall 5 and connecting with a low point in the engine jacket, or with the radiator, or in case exhaust products are used to the atmosphere. The upper head 35 is spaced slightly below the upper end of the drum 34, and in the protecting space thus provided is mounted a rotary fan 39 having inclined blades for inducing its rotation when acted upon by the carbureted air drawn downwardly through the numerous tubes 37. The fan may be appropriately mounted for rotation as upon the shaft 40, or the extension of one of the tubes 37. The lower end of the drum detachably receives an inverted frusto conical gathering section 41 which communicates with the upper end of the engine fuel pipe 26. In the gathering section 41 is disposed one or more screens or filters 42. The tank cover 10 is provided with the upstanding internally threaded flange 43 to detachably receive the cylindrical extension wall 44 which is closed at its upper end by the flanged and threaded top cover 45. A gauge 46 may be mounted upon the top cover 45, if desired. At an appropriate point is also provided a relief valve 47 normally kept closed by a coil spring 48, the load of which may be adjusted by a nut 49.

In the use of the device, when the engine is started, suction will be set up in the fuel pipe 26, creating partial vacuum in the tank or gas generator 5 between the oil level and the top portion of the container. This condition will cause air to be drawn in through the pipe 13 and distributed evenly in the air receiving chamber 22, from which the air will be sprayed upwardly in a multitude of minute streams or jets. In this condition, the volume of the fuel is considerably expanded due to lack of normal atmospheric pressure. As the air passes upwardly in innumerable bubbles through the body of liquid fuel, the atoms and molecules are torn apart and the rate of evaporation is greatly increased, the fumes rising upward and being drawn down through the flues or tubes 37, thereby causing the fan or rotor 39 to turn very rapidly and thus churn and cut the particles of heavy matter that have not been completely vaporized.

Both the liquid fuel and the carbureted air are heated by the coils 31 and 33 and by the heating drum 34, so that the gas is dried before being finally passed to the engine fuel pipe 26.

The device is also useful with heavy oils, even with pipe line crude oil. Where crude oils are used, the valve 28 is closed, causing the gas and incompletely vaporized fuel to be drawn out through the openings 27 into the heater chamber 25, completely gassifying all atoms of the fuel, after which it is led back through the branch pipes 29 and 30 to the engine fuel pipe 26 below the valve 28.

The intake air valve 14 may be adjusted as to tension by the nut 17, and thereby control the amount of vacuum desired for best working results. Also, the fuel inlet pipe 6 may be adjusted up and down to secure the desired oil level or depth, which governs the richness of the mixture. The relief valve 47 takes care of any pressure that might develop if the engine was suddenly stopped and the heat not turned off. The fan 39 is caused to revolve rapidly, and the centrifugal force developed by same acts to throw the heavier particles out from the flues 37. They are naturally drawn back again, but in going through this action, a more complete vaporization and carburetion of the air and gas is obtained.

In the use of the device, it is found that a dry invisible gas is produced which is unproductive of any carbon deposits, provides for the even running of the motor, and increases the fuel efficiency.

It will be obvious that many changes in the construction, combination and arrangement of parts could be made, which could be used without departing from the spirit of my invention, and I do not mean to limit the invention to such details, except as particularly pointed out in the claims.

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

1. In an improved vaporizing device, a generator chamber in communication with sources of liquid fuel and air supplies, a heater chamber below said generator chamber, an engine intake pipe communicating with the vapor space of the generator chamber and extending through said heater chamber, said engine intake pipe having perforations therein setting up communication between the interior of the intake pipe and the heater chamber, a valve in the engine pipe below the heater chamber, and a pair of branch pipes connecting with upper zones of the heater chamber at opposite sides thereof, and with the engine intake pipe below said valve.

2. In an improved vaporizing device, a generator chamber in communication with sources of liquid fuel and air supplies, a heater

chamber extending below said generator chamber, heating coils in said heater and generator chamber, a heater drum in said generator chamber in communication with the heater coil therein, tubes passing through said drum, a collector section communicating with the discharged ends of said tubes, screen means in the said collector section, an engine intake pipe connected with the smaller end of the collector section and passing through said heater chamber, said intake pipe having communication at a lower point with the heater chamber, a valve in the intake pipe below said chamber, and branch pipes connecting the heater chamber with the intake pipe below said valve.

DANIEL EARL FOWLER.