March 16, 1943. J. GRAZIANO 2,314,140

ENGINE FUEL VAPORIZER

Filed July 21, 1941 2 Sheets-Sheet 1

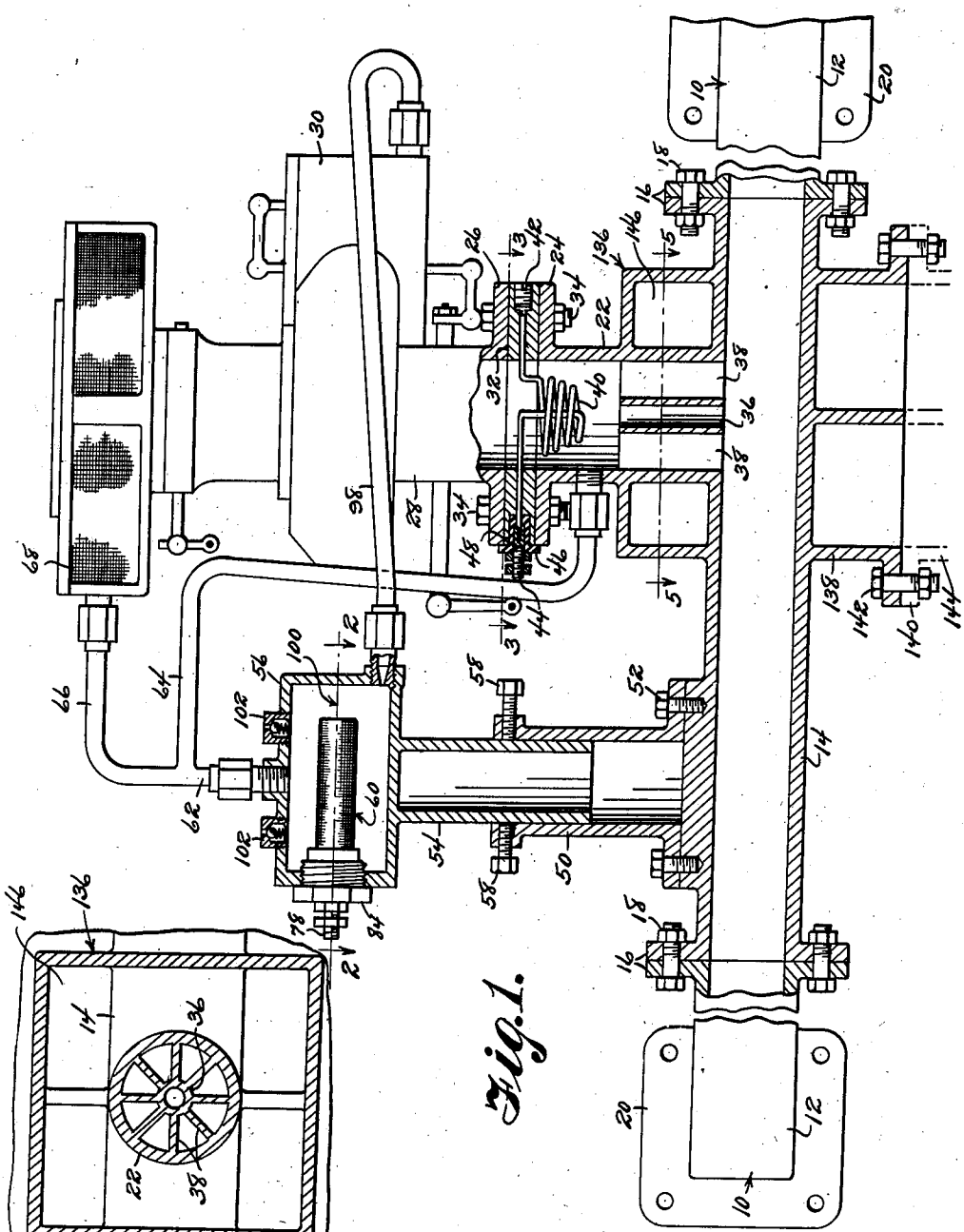


Fig. 1.

Fig. 5.

Joseph Graziano INVENTOR.

BY Victor J. Evans & Co.

ATTORNEYS

March 16, 1943. J. GRAZIANO 2,314,140

ENGINE FUEL VAPORIZER

Filed July 21, 1941 2 Sheets-Sheet 2

Fig. 2.

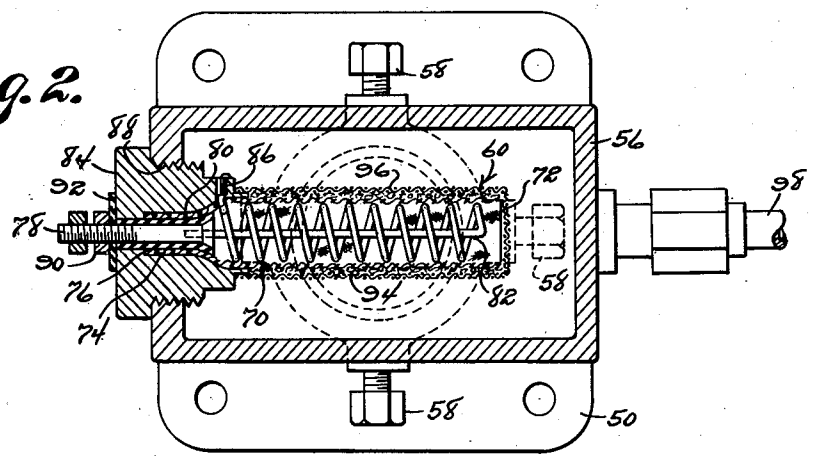


Fig. 3.

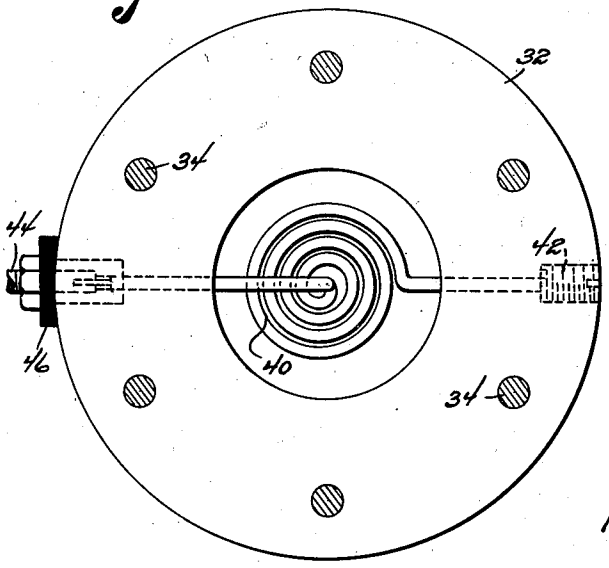
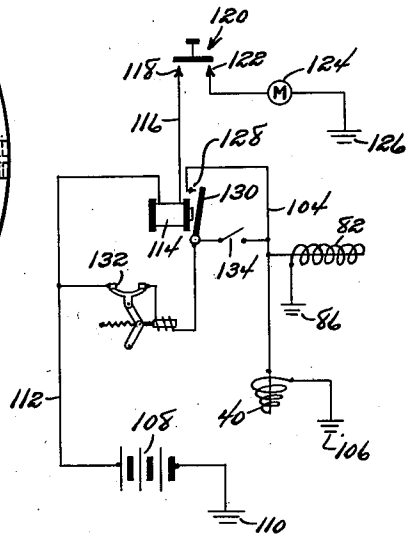


Fig. 4.



Joseph Graziano
INVENTOR.

BY
Victor J. Evans & Co.
ATTORNEYS

Patented Mar. 16, 1943 2,314,140

UNITED STATES PATENT OFFICE

2,314,140

ENGINE FUEL VAPORIZER

Joseph Graziano, Newburgh, N. Y., assignor of one-twentieth to Louis Madrazo, Flushing, and one-twentieth to Jack Russo, White Plains, N. Y.

Application July 21, 1941, Serial No. 403,453

4 Claims. (Cl. 123—122)

My invention relates to internal combustion engines, and has among its objects and advantages the provision of an improved vaporizing system for vaporizing oils preparatory to starting the engine and also for vaporizing the fuel supply to the engine for operating purposes.

In the accompanying drawings:

Figure 1 is a sectional view illustrating my invention in conjunction with a conventional carburetor;

Figure 2 is an enlarged sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a view taken from the position indicated by line 3—3 of Figure 1;

Figure 4 is a diagrammatic view of the electric circuit of the vaporizing system; and

Figure 5 is a sectional view taken along the line 5—5 of Figure 1.

In the embodiment selected for illustrating my invention, I make use of an intake manifold 10 such as is employed in the ordinary gas engine. Figure 1 illustrates the manifold as comprising end sections 12 and an intermediate section 14, the sections 12 and 14 being provided with abutting flanges 16 bolted into a unitary structure, as at 18. The sections 12 are provided with flanges 20 secured to the engine in the usual manner.

The section 14 is provided with a conduit 22 provided with a flange 24 fixedly related to a flange 26 on the conduit 28 of a conventional carburetor 30. A plate 32 is interposed between the flanges 24 and 26 and the three parts are secured into a unitary structure by bolts 34.

Conduit 22 has communication with the section 14 and is provided with a small tube 36 arranged concentrically therein and secured thereto through the medium of vertical and radial vanes 38. Immediately above the vanes 38 and inside the conduit 22 is located a fuel vaporizing coil 40. The plate 32 is in the nature of a washer having an inside diameter corresponding to the inside diameter of the conduit 22 and this plate supports the heating coil 40. One end of the heating coil is made secure by a screw plug 42, and this end of the heating coil is grounded to the plate 32. The opposite end of the heating coil 40 is secured to a terminal screw 44 supported by an insulative plug 46 secured in an opening 48 in the plate 32. Fuel supplied to the engine for operating purposes is vaporized by the heating coil 40 as it flows downwardly past the coil for delivery to the intake manifold 10.

Upon the section 14 is mounted a short tube 50 through the medium of bolts 52. A short neck 54 on a vaporizing chamber 56 is inserted in the tube 50 and fixedly related thereto by set screws 58.

Vaporized fuel for starting the engine is generated in the chamber 56. Inside the chamber 56 is located a fuel vaporizing unit 60 for vaporizing fuel preparatory to starting the engine. A conduit 62 has communication with the chamber 56 and includes a branch 64 for delivering vaporized fuel to the conduit 22 underneath the heating coil 40. Vaporized fuel flowing to the conduit 22 is mixed with air drawn in through a branch 66 extending into the air cleaner 68, which is located above the usual throttle valve associated with conventional carburetors.

In Figure 2, the heating unit 60 comprises a glass cloth tube 70 having a closed end 72 and a neck end 74 inside which is positioned an insulative sleeve 76. A headed terminal screw 78 passes through the sleeve 76 and expands the sleeve tightly against the neck 74 for pressing the neck firmly against the wall of a bore 80 into which the neck 74 is extended and through which the sleeve 76 and the screw 78 project.

Inside the tube 70 is arranged a heating coil 82, one end being electrically connected with the terminal screw 78 and its other end grounded to a screw plug 84, as at 86. A threaded opening 88 is provided in one wall of the chamber 56 for the reception of the plug 84, and a nut 90 is arranged to engage the insulative washer 92 lying against the plug 84 for fixedly securing the heating element 60 through tightening of the nut.

About the tube 70 is provided a layer of asbestos cloth 94 encircled by wire mesh 96. Fuel oil from the carburetor 30 is delivered to the chamber 56 through the medium of a pipe 98, see Figure 1, and the liquid fuel in the chamber should reach a level indicated by the line 100, so that the heating unit 56 is submerged throughout half its circumference. Air inlet valves 102 are provided for the chamber 56, which supplement the air inlet function of the branch 66.

Figure 4 illustrates the heating coil 40 and the coil 82 being electrically connected with a wire 104 and grounded at 106 and 86, respectively. The battery 108 is grounded at 110 and is connected with a wire 112 leading to a relay 114 connected with a wire 116 attached to a terminal 118 of the starter switch 120. The second terminal 122 of the starter switch leads to the starting motor 124 and the motor is grounded at 126.

Wire 104 connects with a contact 128 engage-

able by a switch arm 130 when attracted by the relay 114. A circuit breaker 132 is electrically connected with the wire 112 and the switch arm 130, and a manually actuated switch 134 is connected across the switch arm 130 and the wire 104.

In operation, the two coils 40 and 82 are heated by closing the switch 134. The coil 82 vaporizes liquid fuel in the chamber 56, while the coil 40 vaporizes liquid fuel descending in the conduit 22. It will also be noted that the circuit is closed through both coils when the starter switch 120 is closed. However, the switch 134 is independent of the switch arm 130 so that the switch may be maintained in a closed position for the desired length of time independently of the starter switch 120.

After the engine is started, fuel oil is vaporized through the medium of a heater 136 formed on the intake manifold section 14. This heater comprises a hollow neck 138 adapted to be bolted to the exhaust manifold of the engine. Figure 1 illustrates an exhaust manifold flange 140 bolted at 142 to the neck 138, and the hollow neck 138 has communication with the hollow neck 144 which communicates with the exhaust manifold. Neck 138 communicates with a chamber 146 encircling the section 14 inside the heater and about a portion of the conduit 22. Thus the heater 136 performs a vaporizing function for the fuel oil after the engine has been started independently of the electric circuit, the latter being employed only for starting purposes.

The unit 60, in being provided with a layer of asbestos cloth, facilitates vaporization of the fuel oil. It will thus be seen that I have provided a vaporizing system whereby fuel oils may be effectively vaporized for use in ordinary internal combustion engines of the gas type. The neck 54 may be shifted vertically inside the tube 50 so as to secure the proper elevation of the chamber 56 to maintain the fluid at the proper level. The heater 136 comprises the subject matter of a separate application for patent on fuel oil vaporizer filed of even date herewith.

Without further elaboration, the foregoing will so fully illustrate my invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. In an internal combustion engine having an intake manifold, a carburetor and a fuel conduit leading from the carburetor to the intake manifold, a vaporizing chamber connected with the carburetor to secure liquid fuel therefrom, conduit means leading from said vaporizing chamber to said conduit above and below said carburetor, a heating unit located inside said vaporizing chamber, and an electric circuit connected with said heating unit.

2. The invention described in claim 1 wherein said carburetor is positionally fixed with respect to said manifold and in which said vaporizing chamber is mounted for vertical adjustment to maintain a predetermined liquid level therein.

3. The invention described in claim 1 wherein said heating unit comprises a glass housing having a heating coil located therein and electrically connected with said circuit, and in which there is provided a fibrous shell about said glass housing.

4. The invention described in claim 1 wherein said heating unit comprises a glass housing fixedly secured to said vaporizing chamber, a coil inside said glass housing electrically connected with said circuit, fibrous material extending about said glass housing, mesh extending about said fibrous material, said glass housing being in the nature of a tubular formation positioned horizontally, and means for adjusting said vaporizing housing vertically to maintain a predetermined liquid fuel level therein substantially submerging one-half the circumference of the heating unit.

JOSEPH GRAZIANO.