F. McCURTAIN.

FUEL HEATER.

APPLICATION FILED SEPT. 8, 1914.

1,280,787. Patented Oct. 8, 1918.

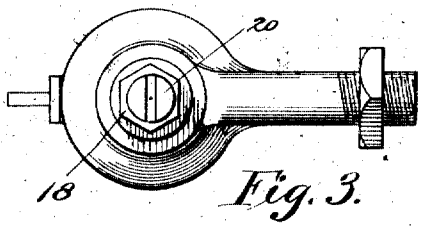


Fig. 3.

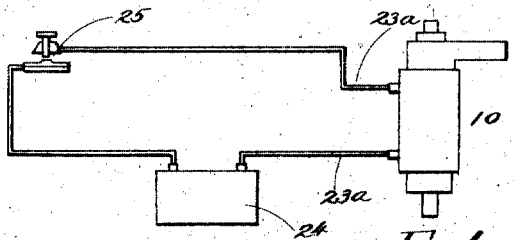
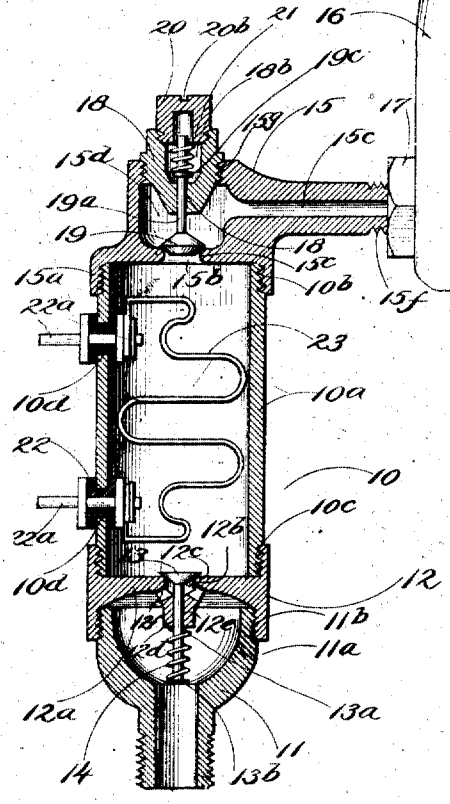


Fig. 4.

Fig. 1.



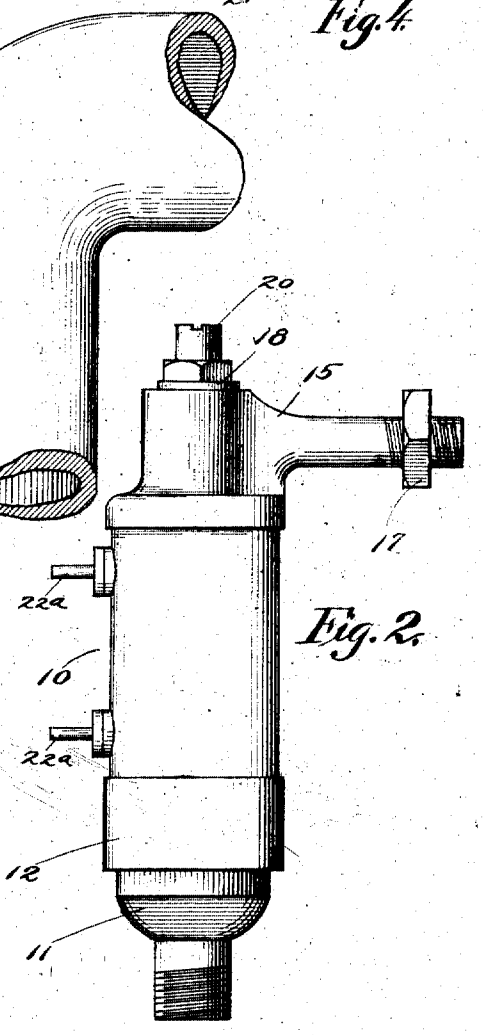


Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

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FUEL-HEATER.

1,280,787. Specification of Letters Patent. Patented Oct. 8, 1918.

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To all whom it may concern:

Be it known that I, FRANK McCURTAIN, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Fuel-Heaters, of which the following is a specification.

This invention relates to improvements in fuel heaters. The object of this invention is to provide a device for initial heating of the fuel to aid in starting a motor, such as a gas engine.

In cold weather, or in the use of fuel of a high vaporizing point, considerable difficulty is experienced in starting a gas engine and it is the object of my invention to obviate the difficulties ordinarily met with and render the starting comparatively easy.

I attain these objects by heating, preferably by an electrical heating element, a supply of the fuel, causing heated vapor to be created and when the engine is turned over this vapor is supplied directly to the intake manifold or cylinder element and from thence to the engine. Being in a heated and vaporized condition the fuel is readily ignited and starting is rendered easy. I have described one embodiment of my invention in the following specification, and have shown the same in the accompanying drawing, in which—

Figure 1 is a vertical section through my device showing it attached to the intake manifold.

Fig. 2 is a side elevation of the device.

Fig. 3 is a plan view of the same.

Fig. 4 is a diagram illustrating wiring connections.

Like numerals refer to like elements throughout the drawings, in which 10 designates generally my fuel container, or tank, comprising a hollow tube or container 10^a threaded at the top and bottom, as indicated by numerals 10^b, 10^c.

A bottom cap 11 provided with an enlarged head 11^a threaded at 11^b is located below the container 10 and is attached thereto by means of the threaded coupling 12, as shown in Fig. 1. This coupling is formed with a web or partition 12^a centrally apertured at 12^b. A valve seat 12^c is located around the top of the aperture 12^b and below the partition 12^a depends the boss 12^d centrally apertured at 12^e. Passages 12^f are formed in the boss 12^d and lead from the aperture 12^b.

A valve 13 is provided adapted to seat upon the seat 12^c. This valve is formed with a depending stem 13^a slidably mounted in the aperture 12^e. At its lower end the stem 13^a carries the collar 13^b and a coiled spring 14 is located between the bottom of the boss 12^d and the collar 13^d operating to maintain the valve 13 in position normally preventing flow through the aperture 12^b, as will be apparent.

An elbow member 15 is provided, the same having an internally threaded flange 15^a threaded on the threaded portion 10^b of container 10^a. This elbow member is provided with the aperture 15^b and valve seat 15^c therearound. Above the aperture 15^b is located the chamber 15^d and leading therefrom is the passage 15^e. The elbow 15 is provided with the threaded extremity 15^f adapted to be threaded into an intake manifold 16 and held in retaining position by the nut 17. At its upper portion the elbow 15 is apertured and internally threaded at 15^g and the plug 18 is threaded thereinto. This plug is provided with the aperture 18^a in which is slidably mounted the stem 19^a and valve 19, the latter serving to close the aperture 15^b when seated on the seat 15^c, as will be apparent. The plug 18 is further provided with the chamber 18^b internally threaded adjacent its upper portion. A cap 20 is threaded into engagement with the top of plug 18, a coiled spring 21 being provided, the latter extending between the collar 19^c on stem 19^a and the cap 20. The latter is provided with a slot 20^b at its upper portion whereby it may be engaged by a screw-driver, or the like. As is apparent this cap 20 may be screwed down or up in the plug 18 to regulate the tension of the spring 21.

The tube, or container, 10^a is provided with a pair of apertures 10^d adjacent the top and bottom thereof in the wall thereof, and in these apertures are mounted fluid tight insulating bushings 22 provided with the binding posts 22^a. An electrical heating, or resistance, element 23 extends from the upper to the lower of bushings 22 and is located in the chamber 10^a.

Wires 23^a leading from a suitable source of current, such as a battery 24, are connected to the terminals or binding posts 22^a, as is diagrammatically indicated in Fig. 4. In the circuit comprising wires 23^a is located a push-button or switch 25, which may be operated to close the circuit, whereupon a cur-

rent will flow through the wire 23 to bring the same to a heated condition.

I have shown one method of attaching my device to a gas engine and this consists of threading the elbow 15 into the intake manifold 16 to communicate with the interior thereof. The arrangement of the springs and valves is such that when the engine is normally running the valves 19 will remain closed through the action of spring 21. The lower portion of bottom cap 11 is threaded for engagement with the carbureter, or other fuel supply.

In the use of my device when it is desired to start the gas engine to which it is applied, for example, the push-button 25 is operated to close the circuit comprising wires 23^a and battery 24. This causes the wire 23 to become heated, and assuming that there is a supply of fuel in the chamber 10^a, the same will become heated and heated vapor will be created. The engine may then be turned over and the expanded vapor will raise valve 19 from its seat 15^c and permit the heated vapor to flow through duct 15^c into the intake manifold 16 and from thence into the engine cylinders, enabling the ready starting of the engine. When the same has started, or when desired, the push-button 25 may be released, whereupon the fluid fuel in the container 10^a will cool and the valve 19 will seat, allowing the engine to draw its fuel in the regular manner from the carbureter or similar device. As the fluid in the container 10^a cools the vapor becomes condensed and rarefied and a partial vacuum is set up in the container 10^a. This operates to raise the valve 13 from its seat and permits additional fuel to flow through the aperture 12^b into the container 10^a and the same is in condition for the next starting effort.

It will be apparent that my device is simple and yet effective in operation, at the same time being susceptible of modifications and changes and consequently I do not wish to be restricted to the form shown or described beyond the scope of the appended claims.

I claim:

1. A priming device for gas engines comprising a fuel chamber, means to heat the fuel in said chamber, said chamber being provided with an outlet, and means to normally prevent the flow through said outlet, said means being operable by pressure upon heating of the fuel therein to permit flow of heated fuel therethrough.

2. A priming device for gas engines comprising a fuel chamber, means to heat the fuel in said chamber, said chamber being provided with an outlet, means to normally prevent the flow through said outlet, said means being operable by pressure upon heating of the fuel therein to permit flow of heated fuel therethrough, said device being further provided with an inlet duct arranged to be connected to a source of fuel and communicating with said chamber, and means to normally close said inlet duct.

3. In a device of the class described comprising a fuel chamber, a duct member constructed and arranged for attachment to a gas engine manifold or the like, a valve mounted in said duct member and normally preventing passage therethrough of fuel from said chamber to said manifold, means to heat the fuel in said chamber when desired, said valve being operable upon such heating and during the operation of said engine to permit the heated fuel to pass through said duct member to said engine.

4. In combination with a gas engine having a fuel supply duct, a device of the class described comprising a fuel container provided with a chamber, means to vaporize the fuel in said chamber, said device being further provided with an outlet duct adapted to communicate with said engine, means to normally prevent flow through said outlet, said means being operable by gas pressure upon operation of said heating means to permit flow of heated fuel through said outlet, said device being provided with an inlet arranged to supply fuel to said chamber, and means to normally prevent said supply of fuel.

5. A priming device for gas engines comprising a fuel chamber and an outlet leading therefrom, means to heat the fuel in said chamber, and a valve normally closing said outlet, said valve being operable by pressure upon heating of said fuel to permit flow therethrough.

6. A priming device for gas engines comprising a fuel chamber and an outlet leading therefrom, means to heat the fuel in said chamber, a valve normally closing said outlet, said valve being operable by pressure upon heating of said fuel to permit flow therethrough, said device being further provided with an inlet duct, and a valve normally closing said inlet duct.

7. A priming device for gas engines comprising a fuel chamber, an electric heating element located therein and an outlet leading therefrom, a valve normally closing said outlet, and means to normally maintain said valve in closing position, said valve being operable by pressure to permit flow through said outlet when said electric heating element is utilized to heat the fuel in said container.

8. A device of the class described comprising a fuel chamber, an electric heating element located therein and an outlet leading therefrom, a valve normally closing said outlet, and means to normally maintain said valve in closing position, said valve being operable by pressure to permit flow through said outlet when said electric heating ele-

ment is utilized to heat the fuel in said container, said device being provided with means for attachment to and communication with a manifold tube.

9. A device of the class described comprising a fuel container, electric terminals mounted in said container, an electric heating element located therein and connected to said terminals, said device being provided with an outlet duct and an inlet duct, a valve arranged to close said outlet duct, and a spring coacting with said valve to normally maintain the same in closing position, said valve being operable to permit flow through said outlet when said heating element is utilized to heat the fuel in said container.

10. A device of the class described comprising a fuel container, electric terminals mounted in said container, an electric heating element located therein and connected to said terminals, said device being provided with an outlet duct and an inlet duct, a vlave arranged to close said outlet duct, a spring coacting with said valve to normally maintain the same in closing position, said valve being operable to permit flow through said outlet when said heating element is utilized to heat the fuel in said container, a valve for said inlet duct, and a spring normally maintaining the same in closing position, said valve being operable to permit flow of fuel into said container when sufficient vacuum obtains therein.

11. A device of the class described comprising a fuel containing cylinder, an electric heating element located in said cylinder, a cap member attached to one end of said cylinder and provided with a passage therethrough, a second cap member attached to the other end of said cylinder and also provided with a passage therethrough, valves normally closing said passages, the one being operable to permit flow of fuel into said cylinder upon reduction in pressure therein, and the other being operable to permit vapor or heated fuel to flow out of said cylinder.

In testimony whereof I have subscribed my name.

FRANK McCURTAIN.

Witnesses:
EDW. KREIBIEL,
F. S. HARPSTER.