Nov. 19, 1946. J. GRAZIANO 2,411,204

FUEL VAPORIZER

Filed Nov. 8, 1943

Fig. 1.

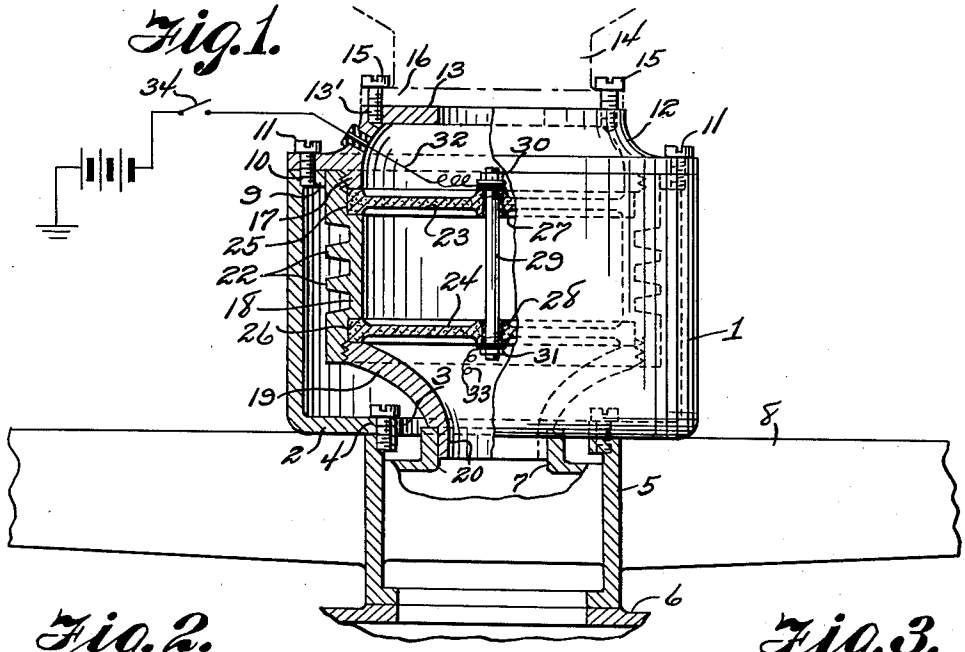


Fig. 2.

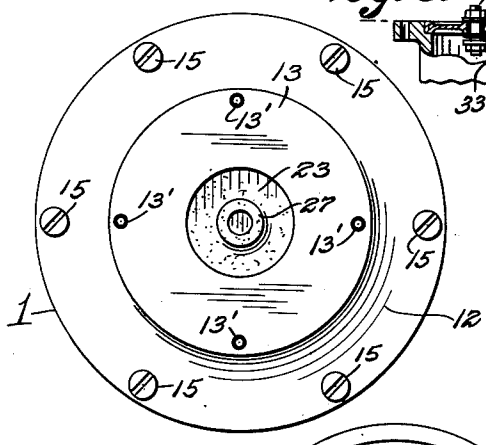


Fig. 5.

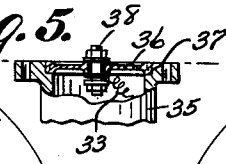


Fig. 3.

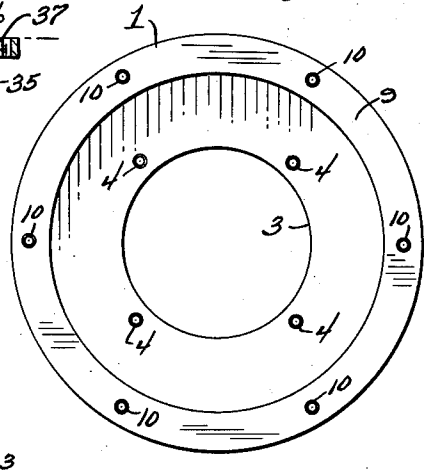
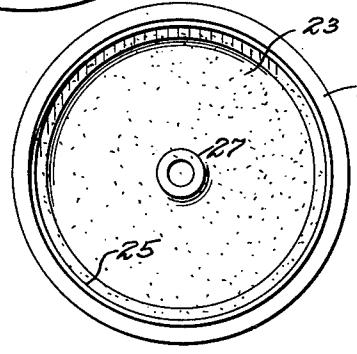


Fig. 4.



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FUEL VAPORIZER

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5 Claims. (Cl. 123—122)

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This invention relates to a fuel heater and vaporizer and it is one object of the invention to provide a device adapted to be mounted between a carburetor and the intake manifold of an engine where it will serve very effectively to heat the combustible mixture flowing to the manifold and cause better vaporization of the fuel mixture and also furnish a preheated supply of fuel to a cold engine.

Another object of the invention is to provide a device of this character wherein the fuel mixture discharged from the carburetor passes through a drum enclosed in a casing mounted upon the heating chamber which projects from the exhaust manifold of the engine, the casing having communication with the intake manifold, and there being heating members in the casing with which the fuel mixture makes contact as it flows through the casing.

Another object of the invention is to provide a device of this character wherein the heating members in the drum consist of metal discs of sufficient porocity to permit the combustible mixture to pass through them, an electric heating circuit being associated with the discs so that by closing a switch they may be heated prior to starting the engine and warm fuel supplied to the engine.

Another object of the invention is to so form the drum that it may be easily mounted within the casing or housing and firmly, but detachably, mounted therein in spaced relation to the walls and bottom of the casing.

Another object of the invention is to provide the drum with upper and lower end portions which are in threaded engagement with the body portion of the drum so that by removing them the heating discs may be easily inserted or removed for cleaning or replacement when necessary.

Another object of the invention is to provide a fuel heater which also serves as a filter for preventing dust or other foreign matter from reaching the intake manifold, and to prevent backfiring.

Another object of the invention is to provide a fuel heater which is simple in construction, very compact, and consists of a small number of parts which may be easily assembled or taken apart.

The invention is illustrated in the accompanying drawing wherein—

Fig. 1 is a sectional view taken vertically through the improved fuel heater and vaporizer and showing the same mounted in position for use.

Fig. 2 is a top plan view of the heater and vaporizer.

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Fig. 3 is a view looking down upon the casing with the drum removed.

Figure 4 is a top plan view of the heating drum.

Fig. 5 is a fragmentary view showing a heating disc mounted in a discharge neck of an intake manifold.

This improved fuel heater and vaporizer has a casing 1 formed of strong metal and having its bottom 2 formed with an opening 3 at its center. Openings 4 are formed through the bottom 2 to receive screws 5 by means of which the casing is secured upon the neck 5 which projects from the exhaust manifold 6 of an internal combustion engine of conventional construction and constitutes a heating chamber for the inlet neck 7 and adjoining portions of the intake manifold 8. These manifolds are of conventional formation and constitute standard elements of internal combustion engines.

About the upper end of the casing is formed an internal annular flange 9 having threaded openings 10 formed in circumferentially spaced relation to each other and intended to receive screws 11 by means of which a head 12 is detachably secured to the casing. This head or cap tapers upwardly and at its upper end is an inwardly projecting annular flange 13 constituting a support for a carburetor 14 which is secured to the flange by screws 15 passed through the flange 16 of the carburetor and into the threaded openings 13' formed through flange 13. A depending externally threaded neck or flange 17 is carried by the cap and is screwed into the internally threaded upper end portion of a drum 18 which is also internally threaded at its lower end in order to receive the externally threaded upper end of a downwardly tapered cap or head 19. The head or cap 19 forms a throat for the lower end of the drum and has its lower end portion externally reduced in thickness to form a neck 20 of such diameter that it fits snugly within the neck 7 of the intake manifold. It will thus be seen that when the engine is started and suction created through the intake manifold combustible mixture withdrawn from the carburetor will pass through the drum in order to reach the manifold. Also since the bottom 2 of the casing 1 is secured to the upper end of the heating chamber, the space 21 within the casing surrounding the drum will form a continuation of the heating chamber and since the drum is enclosed in the casing and the drum is formed with fins 22 the drum may be heated by action of exhaust gases.

When the engine is started it is desired to quickly heat the combustible mixture discharged from the carburetor, in order to do so there have been provided heating discs 23 and 24 which are

formed of metal alloy of such porosity that the fuel mixture may pass through them. These discs fit into annular recesses or seats 25 and 26 formed in upper and lower portions of the drum and when the drum is screwed upon the flange 17 and the head or throat 19 is screwed into the lower end of the drum pressure will be applied to hold the discs firmly in place. At their centers the discs are formed with bosses 27 and 28 which are bored to form openings through which a rod or post 29 is passed with its ends protruding and threaded to receive nuts 30 and 31 so that by tightening the nuts the rod may be firmly held in place. A conductor wire 32 is clamped under the nut 30 at the upper end of the rod and a ground wire 33 is clamped to the rod by the lower nut 33 and it will be readily understood that when the switch 34 is closed current will pass through the rod 29 which acts as a resistance and the discs will be heated. Therefore the combustible fuel mixture entering the drum and passing through the discs will be heated before it enters the intake manifold and delivered to the cylinders of the engine as warm fuel instead of cold to the end that a cold engine will start more quickly. After the engine has been running a sufficient length of time for the drum to become heated by hot exhaust gases passing through the exhaust manifold and entering the heating chamber the switch 34 may be opened and heat picked up from the exhaust gases by the drum depended upon to heat the discs.

As additional means for heating the fuel mixture the discharge necks 35 of the intake manifold are each provided with a heating disc 36 mounted in a recess or seat 37 at the end of the neck. This disc is of the same formation as the discs 23 and 24 and at its center is formed with an opening to receive a rod or terminal post 38 corresponding to the rod or post 29. By providing the outlet necks of the intake manifold with the discs 36 fuel which may not have been sufficiently heated by the discs 23 and 24 or become cooled while passing through the cold intake manifold will be reheated just prior to entering the cylinders of the engine and quick ignition of the fuel will occur.

Having thus described the invention, what is claimed is:

1. A fuel heater and vaporizer comprising a casing open at its lower end and adapted to be secured to a heating chamber of an exhaust manifold of an engine, a cap for the upper end of said casing having an upstanding open throat adapted to be secured to the outlet of a carburetor, a depending annular flange carried by said cap about the lower end of the throat, a drum in said casing spaced from walls thereof and having its upper end in threaded engagement with said flange, a head in threaded engagement with the lower end of said drum, said head being tapered downwardly and having an open lower end constituting a neck adapted to fit within the inlet of the intake manifold of an engine, said drum being formed with internal annular seats adjacent its upper and lower ends, discs of porous metal mounted in said seats and held firmly in place by the flange and the head, a rod of conductive material extending between said discs with its end portions passing through openings at centers of the discs, and nuts carried by protruding upper and lower ends of said rod for holding the rod in place and clamping conductor wires of a heating circuit to ends of the rod.

2. A fuel heater and vaporizer comprising a casing having a bottom adapted to be detachably secured to a heating chamber of an exhaust manifold of an internal combustion engine and formed with an opening for establishing communication between the casing and the heating chamber, a cap for the upper end of said casing detachably secured thereto and adapted to be detachably secured about the outlet of a carburetor, a drum in said casing spaced from walls thereof and having its upper end detachably connected with said cap, a neck detachably connected with the lower end of said drum and extending downwardly therefrom for communication with the inlet of the intake manifold of an internal combustion engine, discs of porous metal mounted in upper and lower portions of said drum, and a rod of conductive material extending longitudinally in the drum between said discs with its end portions mounted through the discs.

3. A fuel heater and vaporizer comprising a casing having one end adapted to be secured about a heating chamber of the exhaust manifold of an internal combustion engine and formed with an opening for establishing communication between the casing and the heating chamber, a cap for the other end of said casing adapted to be secured about the outlet of a carburetor, a drum in said casing spaced from walls thereof and having one end open and detachably connected with said cap, said drum having outstanding circumferentially extending ribs, and a head for the other end of said drum constituting a throat adapted to be detachably engaged with the inlet of the intake manifold of an internal combustion engine.

4. A fuel heater and vaporizer comprising a casing having one end adapted to be secured about an open end of a heating chamber carried by the exhaust manifold of an internal combustion engine, a cap for the other end of said casing adapted to be secured about the outlet of a carburetor, an externally threaded flange carried by said cap, a cylindrical drum in said casing having open ends internally threaded and adjoining the threaded portions internally recessed to form annular seats, discs of porous metal mounted in said recesses, one end of said drum being screwed into engagement with said flange to detachably mount the drum and hold the disc in the said end portion of the drum firmly in place by abutting engagement with the flange, and a neck screwed into the other end of said drum and having binding engagement with the disc therein to firmly hold the disc in place, said neck projecting from the drum and adapted for connection with the inlet of the intake manifold of an internal combustion engine.

5. A fuel heater and vaporizer comprising a casing having one end adapted to be secured about one end of a heating chamber carried by the exhaust manifold of an internal combustion engine, a cap for the other end of said casing adapted to be secured about the outlet of a carburetor, a drum in said casing spaced from walls thereof and having one end engaged with said cap for communication with the carburetor through the cap, the other end of said drum being adapted for communicating with the inlet of an intake manifold of an internal combustion engine, and discs of porous metal mounted in said drum in spaced relation to each other longitudinally thereof.

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