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FUEL MIXTURE VAPORIZING AND HEATING DEVICE.

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1,359,983. **Patented Nov. 23, 1920.**

Fig. 1.

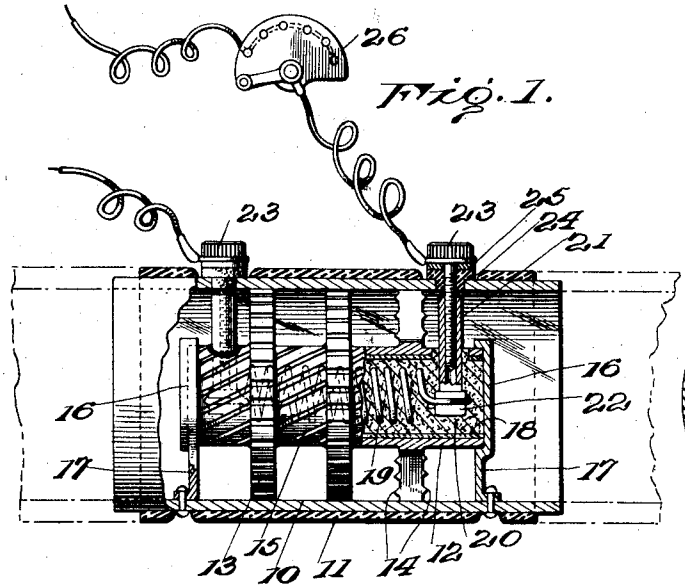


Fig. 2.

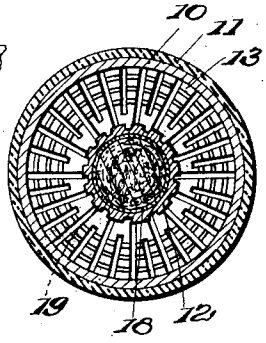
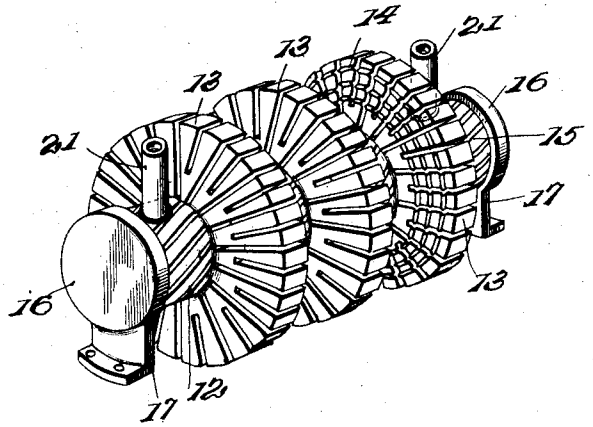


Fig. 3.



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UNITED STATES PATENT OFFICE.

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FUEL-MIXTURE VAPORIZING AND HEATING DEVICE.

1,359,983. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed March 28, 1919. Serial No. 285,785.

To all whom it may concern:

Be it known that I, WILLIAM WALLACE GRANT, citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Fuel-Mixture Vaporizing and Heating Devices, of which the following is a specification.

This invention relates to an improved fuel mixture vaporizing and heating device for internal combustion engines and has as one of its principal objects to provide a device of this character which may be interposed at any suitable point in the path of flow of fuel mixture from an engine carbureter to the engine for effectively vaporizing all of the fuel of the mixture and heating the mixture to accordingly increase its combustibility and potential energy.

The invention has as a further object to provide a device of this character employing an electric resistor as a heating element and wherein a maximum heating effect upon the fuel mixture will be had from said element.

And the invention has as a still further object to provide heat diffusing elements in connection with the resistor and wherein the fuel mixture will be caused to flow over and around said elements to be effectually heated thereby.

Other and incidental objects will appear hereinafter. In the drawings:

Figure 1 is a view of my improved device showing parts in elevation and parts in section,

Fig. 2 is a transverse sectional view taken through the device, and

Fig. 3 is a perspective view showing the heating mechanism of the device in detail.

In carrying the invention into effect I employ a preferably cylindrical metal shell or fuel mixture conductor 10 adapted to be interposed in the connection between an engine carbureter and the engine. Surrounding this shell is a heat retaining jacket 11 of suitable insulating material. Mounted within the shell axially thereof is a longitudinally extending tube or casing 12 which, at suitably spaced points, is formed with annular heat diffusion plates or baffles 13 snugly fitting within the shell and centering the casing with respect thereto. As particularly shown in Fig. 3 of the drawings, each of these plates is provided with slots therethrough and between adjacent slots with notches, both the slots and notches opening through the periphery of the plate. Preferably, the slots and notches of each successive plate are staggered with respect to the slots and notches of the preceding plate and, as will be clear, these plates serve as partitions dividing the shell into a plurality of heating compartments. Formed on the side faces of the plates is a plurality of heat radiating lugs or spurs 14 and extending helically around the casing 12 are spaced heat radiating fins 15. Closing the casing at its ends are removable caps 16 from which extend arms 17 riveted or otherwise secured to the wall of the shell for rigidly connecting the casing therewith as well as holding the end caps upon the casing.

Fitting snugly within the casing 12 is a lining of mica or other approved insulating material 18 and surrounded by this lining is a resistor 19. This resistor may, as shown in the drawings, be formed from a length of suitable resistance wire bent to provide a coil or may be of any other approved type and, as particularly illustrated in Fig. 1, the resistor is embedded within a preferably insulating filler 20 contained within the casing and supporting the resistor to extend axially therein. Projecting from the casing adjacent its ends are tubular terminals 21 embedded at their inner end portions within the filler 20 and provided with oblong heads 22. The heads 22 are formed with grooves in which the ends of the resistor are electrically engaged. Received through the shell 10 and threaded at their inner ends into the terminals 21, are binding screws 23. These binding screws are freely fitted through thimbles 24 insulating the binding screws with respect to the shell and overlying said thimbles are washers 25 around the binding screws.

As will now be clear, suitable conductors may, as shown in the drawings, be connected with the binding screws for including the resistor 19 in circuit with a suitable source of electrical energy. A rheostat, conventionally illustrated at 26, is preferably included in this circuit. The purpose of this rheostat will be self-evident. Thus, when the circuit through the resistor is closed, the resistor will, of course, be heated, when the heat from said resistor will be radiated to the casing 12 therefor, to the diffusion

plates 13, the lugs 14 and the fins 15. Consequently, a relatively large area of heated metal surface will be presented to the fuel mixture currents flowing through the shell. Suction from the engine will, of course, set up a flow of fuel mixture from the engine carbureter through the shell and through the intake manifold to the engine cylinder. Currents of fuel mixture upon entering the shell will thus impinge against the first of the diffusion plates 13 and will then flow through the slots and openings in this plate into the adjacent heating chamber within the shell. From this point the fuel mixture currents will then, in a similar manner, flow through the next diffusion plate into the succeeding heating chamber and from this heating chamber through the final diffusion plate to then be carried to the cylinder of the engine. Thus, the fuel mixture will be caused to flow through and around the diffusion plates as well as through the heating chambers within the shell so that the fuel of the mixture will be effectually vaporized and the mixture thoroughly heated. The combustibility of the fuel mixture will accordingly be materially increased and its effectiveness accordingly enhanced. In this connection, it is to be observed that since the slots and openings of the suceeding diffusion plates are staggered with respect to each other, the currents of fuel mixture flowing through the device will be caused to take a circuitous course. Furthermore, the helical fins 15 around the casing 12 will tend to impart a whirling motion to the fuel mixture currents. Thus, the device will, simultaneously with the heating of the mixture, act to thoroughly commingle the atoms of the mixture so that a heated homogenized fuel supply will issue from the device.

In the drawings, I have shown the heating mechanism of the invention inclosed within an individual shell therefor. However, as will be at once appreciated, this heating mechanism could well be interposed directly in the discharge pipe of a carbureter or directly in an engine intake manifold. Further, the slots and notches in the heat diffusion plates 13, may, if desired, terminate short of the peripheral edges of said plates while the lugs 14 and fins 15 could, if deemed expedient, be omitted. Heating plates of a greater or lesser number than shown may be employed. The heating compartments, when so desired, may be omitted and replaced by heating plates of the character described; in which event, instead of multiplicity of heating plates, for heat diffusion, the heat diffusing member may consist of an undivided whole, with the slots and notches therewith correspondingly continuous and undivided. Thus, while I have illustrated the invention in all of its details, it will be clear that various minor changes, such as indicated, may be made without departing from the spirit of the invention and I, therefore, reserve the right to make all such changes as fall within the scope of the appended claims.

Having thus described the invention, what is claimed as new is:

1. In a device of the character described, a shell having a passage therethrough, a closed metallic casing having integral heat radiating baffles fitting the wall of the shell for supporting the casing within said passage, said baffles dividing the passage into heating compartments and each having a series of radial slots therethrough establishing communication between said compartments, a resistor housed within the casing, and a filler of insulating material within the casing embedding said resistor.

2. A fuel vaporizer and heating device for internal combustion engines including a shell having a passage therethrough, a closed tubular casing supported within said passage and provided between its ends with a radial annular baffle fitting the wall of the shell and slotted to form a plurality of heat radiating segments, a filler within the casing, and a resistor embedded in said filler.

3. A fuel vaporizer and heating device for internal combustion engines including a shell having a passage therethrough, a longitudinally disposed casing arranged within the passage and provided with an integral heat radiating baffle snugly fitting the wall of the shell for centering the casing within the passage, said baffle being provided with a plurality of lateral heat radiating lugs, and a resistor disposed within the casing.

4. A fuel vaporizer and heating device for internal combustion engines including a shell having a passage therethrough, a longitudinally disposed casing mounted within the passage and provided with an integral heat radiating baffle extending toward the wall of the shell, the casing being further formed with a series of external heat radiating fins extending helically about the casing, and a resistor disposed within the casing.

5. A fuel vaporizer and heating device for internal combustion engines including a shell having a passage therethrough, a baffle located within said passage to extend transversely thereof, a casing integral with the baffle extending longitudinally within said passage and axially through the baffle, the baffle being provided with a multiplicity of slots extending radially from the casing through the periphery of the baffle, the peripheral parts of the baffle between the slots being in close fitting engagement with the wall of said passage, and means within the casing for heating the baffle.

6. In a device of the character described, the combination of a shell, a tubular casing disposed axially of the shell and provided

between its ends with spaced annular baffles lying transversely within the shell, and a resistor disposed within the casing.

7. In a device of the character described, the combination of a shell, a casing extending longitudinally of the shell axially thereof and having spaced integral annular baffles extending radially therefrom and abutting the wall of the shell, a resistor disposed within the casing, and a filler embedding the resistor and contained by the casing.

In testimony whereof I affix my signature.

WILLIAM WALLACE GRANT. [L. S.]