W. M. BOWLES.

VAPORIZER.

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1,371,730.

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Fig. 1.

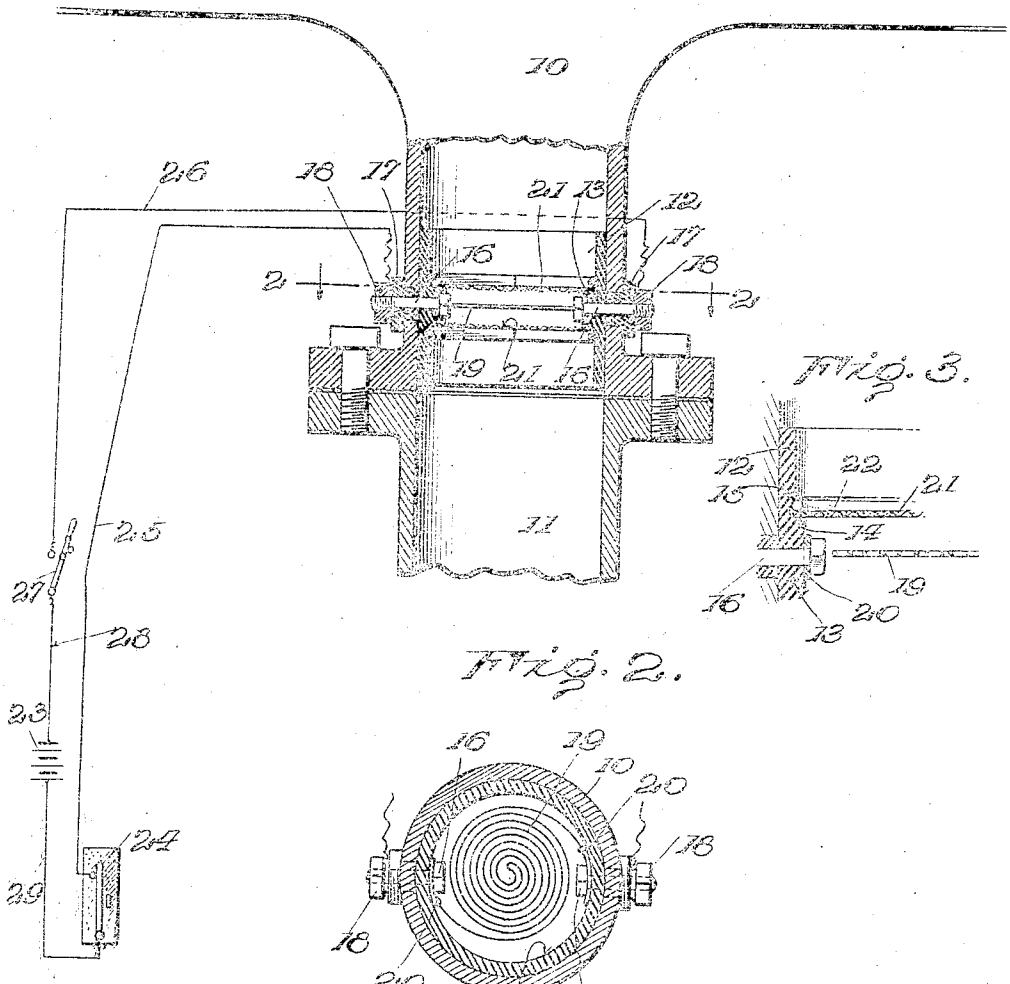


Fig. 3.

Fig. 2.

Inventor

W. M. Bowles.

By Lacey & Lacey. Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM M. BOWLES, OF SHAWNEE, OKLAHOMA.

VAPORIZER.

1,371,730. Specification of Letters Patent. Patented Mar. 15, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM M. BOWLES, citizen of the United States, residing at Shawnee, in the county of Pottawatomie and State of Oklahoma, have invented certain new and useful Improvements in Vaporizers, of which the following is a specification.

This invention relates to an improved vaporizer for internal combustion engines and has as its primary object to provide a device of this character adapted to heat the fuel mixture as it flows from the carbureter through the engine intake manifold so that the fuel of the mixture will thus be effectually transformed into vapor to become thoroughly mixed with the air of the mixture whereby the resultant homogenized and heated fuel supply will readily ignite within the engine cylinders and easy starting of the engine consequently made possible.

The invention has as a further object to provide a device of this character rendering it feasible to use liquid fuel of a much lower grade than is now practicable.

A still further object of the invention is to provide a vaporizer employing a coiled heating wire through the coils of which the fuel mixture must flow in its passage to the engine cylinders so that said mixture will be effectually preheated.

And the invention has as a still further object to provide an arrangement wherein the flow of electric current through the heating wire will be controlled by a thermostat so that after the engine has become heated and the inrushing fuel mixture will thus be heated by the heat of the engine, the flow of electric current through the heating wire will be automatically cut off.

Other and incidental objects will appear during the course of the detailed description of the invention. In the drawings, wherein I have illustrated the preferred embodiment of the invention, and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a fragmentary sectional view showing my improved device in connection with a conventional type of engine intake manifold, a portion of a conventional carbureter discharge nipple being also shown,

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows, and

Fig. 3 is a fragmentary vertical sectional view on a slightly enlarged scale.

In order that the construction, mounting and operation of my improved vaporizer may be accurately understood I have, in the drawings, shown the device in connection with a conventional engine intake manifold 10 to the trunk of which is shown attached, in the usual manner, a conventional carbureter discharge nipple 11. In carrying the invention into effect, I employ a tubular body 12 of suitable insulating material. This body is removably fitted in the manifold trunk, in the manner shown in Fig. 1, and is formed upon its inner side with an inwardly projecting rib 13 providing flat ledges 14 at opposite edges thereof. Adjacent these ledges, the wall of the body is formed with annular undercut shoulders 15. Extending through the body medially of the rib 13, are diametrically arranged binding posts 16 which project through the manifold trunk and are received by bushings 17 insulating the posts with respect to said trunk. The posts 16 are headed at their inner ends and threaded upon the outer ends of said posts are clamping nuts 18 which, as will be clear, may be adjusted for tightly clamping the body within the manifold trunk. Supported by the binding posts 16 within the body is a heating element 19 preferably formed by a coiled resistance wire, the wire being preferably first bent intermediate of its ends into overlapping relation and the overlapping strands thence wound to form the coil. At its ends, the wire is equipped with terminals 20 receiving the binding posts therethrough so that these terminals will thus be firmly clamped against the body 12 by the heads of said posts for supporting the heating coil in position. Resting upon the ledges 14 of the rib 13 of the body are disk shaped mixing screens 21 which may be formed of suitable wire gauze and engaging beneath the shoulders 15 of the body to bear against these screens are split resilient retaining rings 22 removably clamping the screens in place. In this connection, it will be observed, as best shown in Fig. 3 of the drawings, that the shoulders 15 slope toward the ledges 14 so that the rings 22 will tend to ride in-

wardly upon said shoulders and thus resiliently bind the mixing screens at their margins against the ledges 14.

For heating the coil 19, the binding posts 16 are included in circuit with a battery or other suitable source of electrical energy 23 and in this circuit I employ a thermostat as conventionally shown at 24. Leading from one terminal of the thermostat is a wire 25 which is connected to one of the binding posts 16, and leading from the other of said binding posts is a wire 26 connected to one terminal of a switch conventionally illustrated at 27. It will, of course, be understood that the wires 25 and 26 are connected with the binding posts by the clamping nuts 18 thereon. Leading from the other terminal of the switch 27 to the battery 23 is a wire 28 and leading from the battery to the terminal of the contact member of the thermostat is a wire 29. The thermostat is mounted at some convenient point adjacent the engine so that said thermostat will be subjected to the heat therefrom and the contact member of this thermostat is, as shown in Fig. 1, adapted to normally close the circuit between the wires 25 and 29. Consequently, when the switch 27 is closed, the circuit through the binding posts 16 will be closed. As will be seen, current will thus flow through the wire of the heating element 19 for heating this element. After the heating element 19 has become thoroughly heated by the passage of the electric current therethrough, the engine may then be started when fuel mixture drawn up through the manifold 10 will first be caused to flow through the lower mixing screen to be broken up thereby. The mixture as thus broken up will thence flow through the coils of the heating element so that the fuel of the mixture will be effectually vaporized when the vapors of the fuel and the air of the mixture will continue up through the upper mixing screen to be intermingled by this screen so that the resultant homogenized heated mixture, upon entering the engine cylinders, will readily ignite to thus render it easily possible to start the engine. After the engine has been started and it has become heated in such degree that the fuel mixture will be heated by the engine cylinders upon entering therein, it will then become unnecessary to supply the electric current to the device. Accordingly, the thermostat 19 is of such nature that upon being subjected to the heat of the engine, the contact member of this thermostat will expand for breaking the circuit through the binding posts 16. I thus provide an arrangement whereby the flow of current will, at a predetermined temperature, be automatically cut off. As long as the engine is running the vaporizer will, of course, act to break up and homogenize the fuel mixture and since provision is made for heating the mixture at the time the engine is initially started, it accordingly becomes possible, by employing my improved device, to use liquid fuels of a much heavier grade than is now practicable. Furthermore, the device is not only adapted for use in connection with automobile engines but, as will be at once apparent, will also prove particularly adapted for use in connection with aeroplane engines which are so frequently subjected to the low temperatures of high altitudes.

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

1. A vaporizer for internal combustion engines including a tubular insulating body provided between its ends with spaced ledges, a heating element positioned within the body in a plane between said ledges, mixing screens supported by the ledges at opposite sides of said element, and terminals for the heating element.

2. A vaporizer for internal combustion engines including a tubular insulating body provided between its ends with spaced ledges therein, a heating element supported within the body in a plane between said ledges, mixing screens resting upon the ledges at opposite sides of said element, means coacting with the body and clamping said screens in position, and terminals for the heating element.

3. A vaporizer for internal combustion engines including a tubular insulating body provided between its ends with spaced ledges therein, a heating element supported within the body in a plane between said ledges, mixing screens resting upon the ledges at opposite sides of the heating element, clamping rings coacting with the body and securing the screens in position, and terminals for the heating element.

4. A vaporizer for internal combustion engines including a tubular insulating body provided with an internal rib forming spaced ledges within the body, the wall of the body being undercut adjacent said ledges to form shoulders, a heating element supported within the body in a plane between said ledges, mixing screens resting upon the ledges at opposite sides of said element, clamping rings coacting with said shoulders and bearing against the screens for securing the screens in position, and terminals for the heating element.

5. A vaporizer for internal combustion engines including a tubular body, a heating element supported therein, mixing screens mounted within the body at opposite sides of said element, and means within the body expanding thereagainst for securing the screens in position.

6. A vaporizer for internal combustion engines including a tubular body provided

with an internal rib forming spaced ledges within the body, the wall of the body being undercut adjacent said ledges to form shoulders, a heating element supported within the body in a plane between said ledges, mixing screens resting upon the ledges at opposite sides of said element, clamping means coacting with said shoulders and bearing against the screens for securing the screens in position, and terminals for the heating element.

In testimony whereof I affix my signature.

WILLIAM M. BOWLES. [L. S.]