F. W. BORKES.

FUEL ATOMIZING AND HEATING DEVICE FOR INTERNAL COMBUSTION ENGINES.

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1,320,523. Patented Nov. 4, 1919.

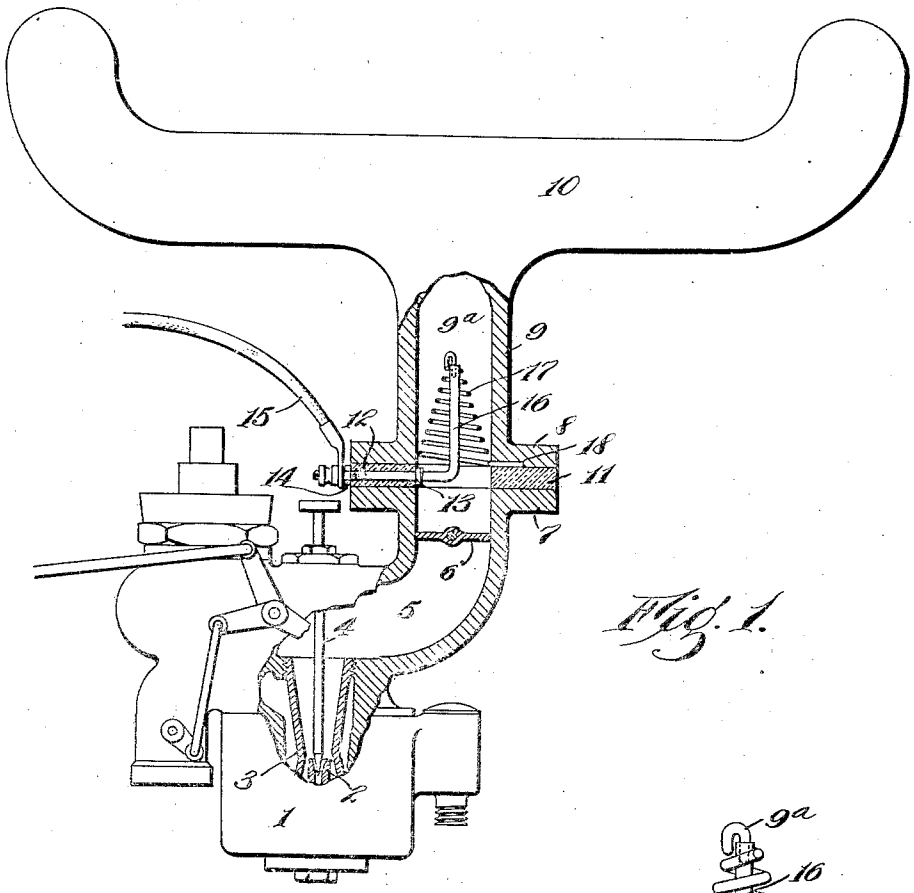


Fig. 1.

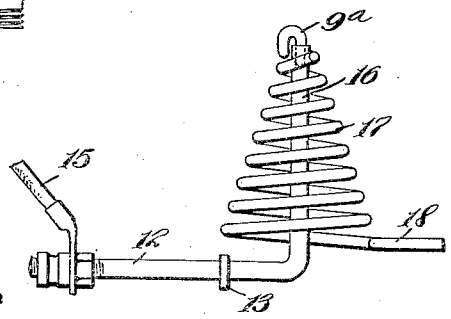


Fig. 2.

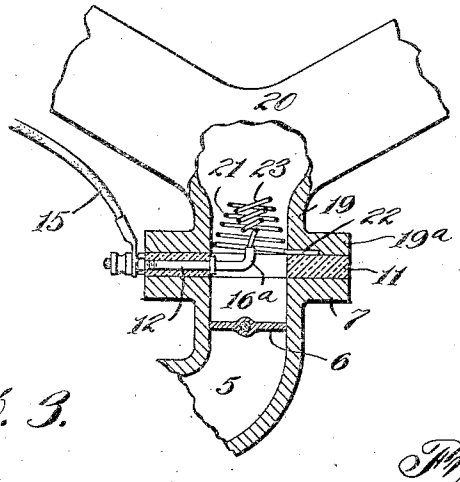


Fig. 3.

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UNITED STATES PATENT OFFICE.

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FUEL ATOMIZING AND HEATING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

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Application filed January 2, 1919. Serial No. 269,182.

To all whom it may concern:

Be it known that I, FRANCIS W. BORKES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Fuel Atomizing and Heating Devices for Internal-Combustion Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to devices for atomizing and heating the fuel supplied to internal combustion engines and has for its general objects to provide a device of this character which is simple in construction, economical of production, which may be conveniently installed in connection with existing types of motors and carbureters, and which is extremely efficient in operation. I accomplish the foregoing objects in and through the construction and arrangement of parts shown in the drawings forming part hereof,, wherein:—Figure 1 represents an elevation, with parts broken away, of a carbureter and the manifold of a multicylinder engine, showing my invention applied thereto; Fig. 2 a detail in elevation of my atomizing and heating device; and Fig. 3 a modification, in section and elevation, of the construction shown in Fig. 1.

Describing by reference characters the parts shown in Figs. 1 and 2, 1 denotes a carbureter of standard construction having the jet nozzle 2, Venturi tube 3, needle valve 4 and mixing chamber 5 provided with the usual butterfly valve 6 and having at its upper end a flange 7 coöperating with a flange 8 on the bottom of the vertical branch 9 of an intake manifold 10 leading to a motor (not shown).

Interposed between the flanges 7 and 8 and secured in place by the bolts (not shown) which connect said flanges, is a gasket 11 of non-conducting material, said gasket having a bore adapted to register with the bore of the conduit formed by the mixing chamber 5 and the vertical branch 9 of the manifold.

Projecting radially through one side of the gasket is a post 12 of conducting material, said post having a shoulder 13 adapted to bear against the inner wall of the gasket and a threaded end 14 projecting through and beyond the outer wall of the gasket for the reception of the terminal of an electrical conductor 15, which terminal may be secured to the threaded end of the post in the usual manner. The post 12 is shown as projecting radially inwardly substantially to the center of the bore 9^a, where it is bent to extend upwardly and axially of said bore, as indicated at 16. To the upper end of the post there is secured a resistance wire which is formed into a spiral coil 17 extending downwardly from the top of the post and surrounding the same, the lower end of the wire being inserted between the bottom of the branch 9 of the manifold and the gasket, whereby the circuit may be grounded through the said manifold and the metal parts connected thereto. If desirable, the bottom of the vertical branch 9 of the manifold may be recessed for the reception of the end 18 of the resistance wire.

The resistance wire will preferably be coiled in such manner that the outer edge of any portion of each convolution will preferably slightly overhang the inner edge of the corresponding portion of the convolution therebeneath and the lowermost convolution will be in substantial engagement with the bore 9^a. By this arrangement, any liquid fuel drawn through the coil into the manifold will be effectively broken up by impact against the convolutions of said coil, thus atomizing the fuel, mixing the same with the air, and insuring an efficient mixture for the motor. In addition, by connecting the conductor 15 with a storage battery or dry cell, the coil will be heated thereby to vaporize or gasify more or less the fuel passing therethrough. This enables me quickly to start a motor in cold weather; after the motor has been warmed, the current may be cut off from the coil, but the coil will assist in the production of an intimate mixture of fuel and air, which will contribute to the efficient operation of the motor.

In Fig. 3 there is shown a modification of my invention which is designed for use in installations where the vertical branch 19 of the manifold 20 is so short as to prevent the employment, or interfere with the efficient operation, of a heating device having the length shown in Figs. 1 and 2. In such case, the vertical branch 16^a of the post 12 is short and the resistance wire is formed into a short upwardly expanding spiral 23, the upper end of said spiral merging with

a frusto-conical coil 21 which surrounds the coil 23, the lower end 22 of the wire being inserted between the flange 19ª at the base of the manifold and the upper surface of the gasket 11 which is interposed between said flange and the flange 7. In this case, the coil 23 is so constructed that the outer edge of any portion of a convolution will preferably slightly overhang the inner edge of the portion of the convolution immediately thereabove and the outer edge of each convolution of the coil 21 will preferably overlap or overhang the corresponding inner portion of the convolution therebeneath. This will insure effective atomization of any fuel in liquid condition that may pass through the coils 23 and 21 as well as the vaporization or gasification of such fuel through the heat imparted thereto by said coil when current is supplied to the coil through the conductor 15.

Having thus described my invention, what I claim is:—

1. In combination with a carbureter and a conduit extending therefrom for supplying a mixture of fuel and air to a motor, a heating and atomizing coil in said conduit having the convolutions thereof arranged to progressively intercept the mixture supplied through said conduit.

2. In combination with a carbureter and a conduit extending therefrom, a post insulatingly supported with respect to said conduit, a spiral coil connected with the end of said post in said conduit, a frusto-conical coil connected with and surrounding the spiral coil, and connections for supplying electric current through said post and said coils.

3. In combination with a carbureter and a conduit extending therefrom to an internal combustion motor, a post within and extending axially with respect to the said conduit, a spiral heating and atomizing coil connected with the said post, an insulating support for said post, and connections for supplying an electric current through said post and said coil, the convolution of said coil which is of greatest diameter being of substantially the same external diameter as the internal diameter of said conduit.

4. In combination with a carbureter and a conduit extending therefrom to an internal combustion motor, a heating and atomizing device in said conduit comprising an inner spiral coil and an outer frusto-conical coil surrounding the spiral coil, and connections for supplying electric current through said coils.

In testimony whereof I hereunto affix my signature.

FRANCIS W. BORKES.