Aug. 2, 1932.

A. COLEMAN

1,869,798

CARBURETOR

Filed Oct. 31, 1930

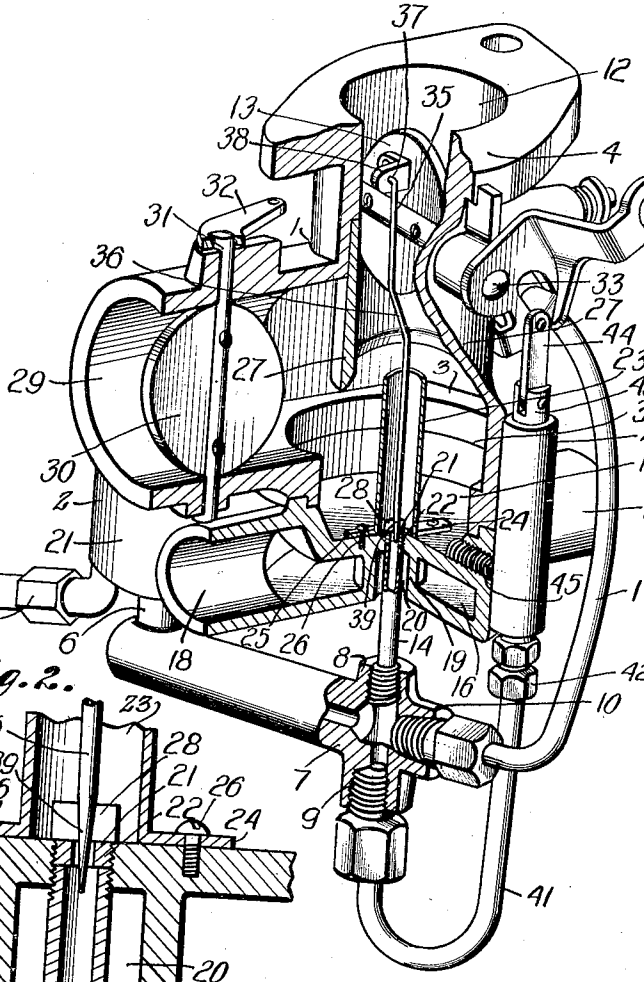


Fig. 1.

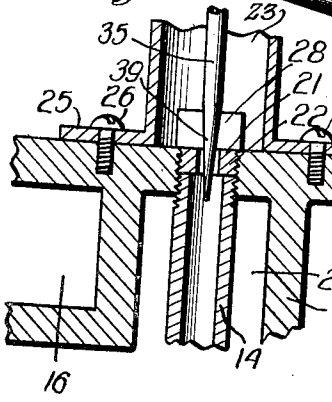


Fig. 2.

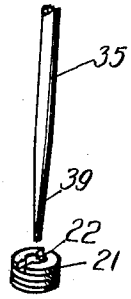


Fig. 4.

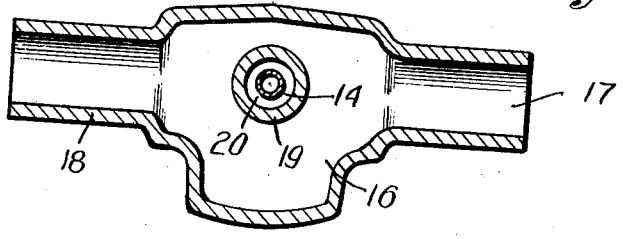


Fig. 3.

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Patented Aug. 2, 1932

1,869,798

UNITED STATES PATENT OFFICE

ARTHUR COLEMAN, OF KANSAS CITY, KANSAS

CARBURETOR

Application filed October 31, 1930. Serial No. 492,465.

My invention relates to carburetors, and more particularly to those of the heater type wherein the fuel is vaporized by exhaust gases from the engine supplied by the carburetor, the principal object of the invention being to control the fuel flow and its rate of vaporization in proportion to the fuel demand of the engine.

Another object of the invention is to apply the heat in such a manner as to provide for substantially instant vaporization of the fuel directly on its admission to the mixing chamber of the carburetor.

Other important objects of the invention are to prevent clogging of the fuel jet and to provide an initial air vapor mixture, and positive injection of the mixture into the major air supply.

In accomplishing these and other objects of the invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective sectional view through a carburetor constructed in accordance with my invention.

Fig. 2 is an enlarged fragmentary sectional view through the fuel jet, particularly illustrating the needle for controlling effective port area of the jet.

Fig. 3 is a horizontal sectional view through the heater chamber for vaporizing the fuel passing through the carburetor.

Fig. 4 is a detail perspective view of the lower end of the jet needle and the jet through which fuel is admitted to the mixing chamber of the carburetor.

Referring more in detail to the drawing: 1 designates a carburetor casing including a float chamber 2, a mixing chamber 3, and a fuel outlet connection 4 adapted to be connected to the intake manifold of an internal combustion engine.

Fuel is admitted to the float chamber through an inlet connection 5, the flow being controlled by a float mechanism of any preferred construction, as it forms no part of the present invention. The fuel is discharged from the float chamber through a neck 6 connecting the chamber with a T-shaped fitting 7 having vertical connections 8 and 9 and a horizontal connection 10, the connection 10 being connected by a pipe 11 communicating with the bore 12 in the fuel outlet member 4 at a point above the throttle 13, (hereinafter described), to permit idling of the motor when the throttle is in closed position.

The upper connection 8 is located in axial alignment with the mixing chamber 3 and connected therewith is a tube 14 or jet threaded into the bottom wall 15 of the mixing chamber, and through which the major portion of the fuel is admitted into the carburetor.

Formed integrally with the bottom wall of the mixing chamber is a heater chamber 16 having a heat inlet 17 adapted to be connected with the exhaust pipe of an internal combustion engine for supplying heating medium to the chamber 16, and having an outlet connection 18 through which the exhaust gases are adapted to be returned to the exhaust pipe.

Formed in the heater chamber in axial alignment with the tube 14 is an annular wall 19 having an inner diameter larger than the diameter of the tube 14 to provide an annular air space 20 surrounding the tube 14 to prevent gasifying of the fuel in the tube, which I have found from actual experiments seriously interferes with the action of the carburetor.

I have therefore provided for applying the heat to the fuel during its admission to the mixing chamber, which heat is transferred by conduction through the bottom wall and is localized about the zone of the fuel jet as now described.

The fuel jet preferably comprises a nipple

21 threaded into the bottom wall of the mixing chamber and provided with a port 22 of sufficient diameter to pass fuel necessary to maintain the engine at its maximum speed.

Supported on the wall 15 of the mixing chamber in concentric alignment with the jet and extending upwardly therefrom is a tube or nozzle 23 having laterally extending feet 24 and 25 at its lower end through which fastening devices 26 are extended to secure it to the bottom of the mixing chamber. The tube or nozzle 24 is of sufficient length to project within the lower end of a Venturi member 27 and its lower end is provided with air inlet ports 28 through which air is drawn for initially mixing with the vapor fuel emitted from the jet by siphoning action of the major air supply passing through the venturi 23. The major air supply is admitted to the mixing chamber through a tubular inlet 29 forming an integral part of the carburetor housing and is controlled by a butterfly valve 30 fixed to a shaft 31 rotatably mounted in the member 29 in response to an actuating lever 32 which may be controlled in any suitable manner.

The throttle valve 13 previously mentioned is fixed to a shaft 33 pivotally mounted in the member 4 and is actuated by a lever 34 exteriorly of the carburetor.

In order to control vaporization and amount of fuel passing through the jet, I provide a longitudinally reciprocable adjusting needle 35 having an offset upper end 36 terminating in a hook 37 which is connected to an ear 38 projecting from the face of valve 13, so that when the lever 34 is actuated to move the throttle valve 13 a pointed end 39 on the needle will move through the jet port to control its effective port area, that is, when the valve 13 is in open position, the maximum amount of fuel is admitted through the jet, and when the valve 13 is moved to closed position the needle tends to close the port to reduce the amount of fuel passing therethrough.

As above pointed out, the heat supplied is centered around the nozzle and top of the jet so that the fuel is vaporized during its passage therethrough. Attention is also directed to the fact that the shape of the adjusting needle spreads the fuel outwardly in thin sheet form into contact with the heated surface, and that the hot needle extending into the center of the flow aids in the vaporization.

It is also apparent that when the throttle valve 13 is actuated, the needle is reciprocated through the jet to prevent foreign matter and carbon from stopping the flow.

In order to provide for quick acceleration of the engine, I provide a pump 40 supported on the side wall of the mixing chamber and having its lower end connected by a conduit 41 so that when the piston 43, which is operably connected with the throttle lever by a link 44, is moved downwardly, the fuel trapped in the piston cylinder is discharged through a nipple 45 communicating with the interior of the mixing chamber slightly above its bottom 15. The fuel being discharged onto the hot surface is quickly vaporized and drawn through the ports 28 to supplement the fuel supplied by the jet.

What I claim and desire to secure by Letters Patent is:

1. In a carburetor including a casing having a mixing chamber provided with a fuel outlet, a vertical tube within said chamber and carried by the bottom thereof, a jet having a port for admitting fuel through the tube to the mixing chamber, means for supplying fuel to the jet, a chamber in said casing below the mixing chamber for heating the jet and tube to vaporize fuel passing therethrough, and a valve controlling the outlet from the mixing chamber.

2. In a carburetor including a casing having a mixing chamber provided with a fuel outlet, a heating chamber below said mixing chamber for heating the same, a fuel supply pipe for admitting fuel to the mixing chamber, said fuel supply pipe adapted to be heated at its upper end by conduction from said heating chamber so as to vaporize fuel passing therethrough, a valve controlling the outlet in the mixing chamber, and a needle valve associated with the fuel supply pipe and operably connected with the first named valve for controlling fuel passing through the fuel supply pipe.

3. In a carburetor including a casing having a mixing chamber provided with an outlet, a heater below and forming the bottom of the mixing chamber, a tube mounted on the heater and extending into the mixing chamber and heated by conduction of heat from the heater to vaporize fuel passing therethrough, a jet for supplying fuel to the tube extending through the heating chamber, there being an air space between the major portion of the jet and heater for insulating the tube from the heating effect of the heater and prevent vaporization of fuel in the jet.

4. In a carburetor including a casing having a mixing chamber provided with a fuel outlet, a valve controlling the outlet, a fuel jet in the mixing chamber, means for admitting fuel to the jet, a nozzle surrounding the jet and having air ports for admitting air to provide an initial air and fuel mixture, means for heating the nozzle and jet by conduction from a source of heat, said source of heat also heating the air passing through the air ports thereby vaporizing the fuel, and means controlling passage of fuel through the jet operable in synchronism with the valve controlling the outlet.

5. In a carburetor including a casing having a mixing chamber provided with a fuel

outlet and an air inlet, a venturi associated with the outlet of the mixing chamber, a fuel jet in the mixing chamber, a nozzle having parts in its lower end associated with the jet and extending within the venturi, a heating chamber below the mixing chamber for heating the same and the nozzle and jet to vaporize fuel passing from the jet through the tube, valves for controlling said fuel outlet and air inlet, and means for operating said valves independently of each other.

In testimony whereof I affix my signature.

ARTHUR COLEMAN.