Aug. 29, 1933. M. E. CHANDLER 1,924,595

CARBURETOR

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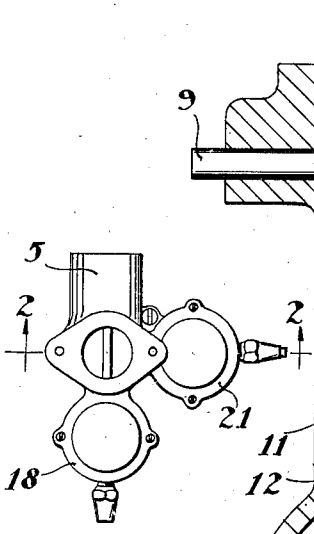


Fig. 1

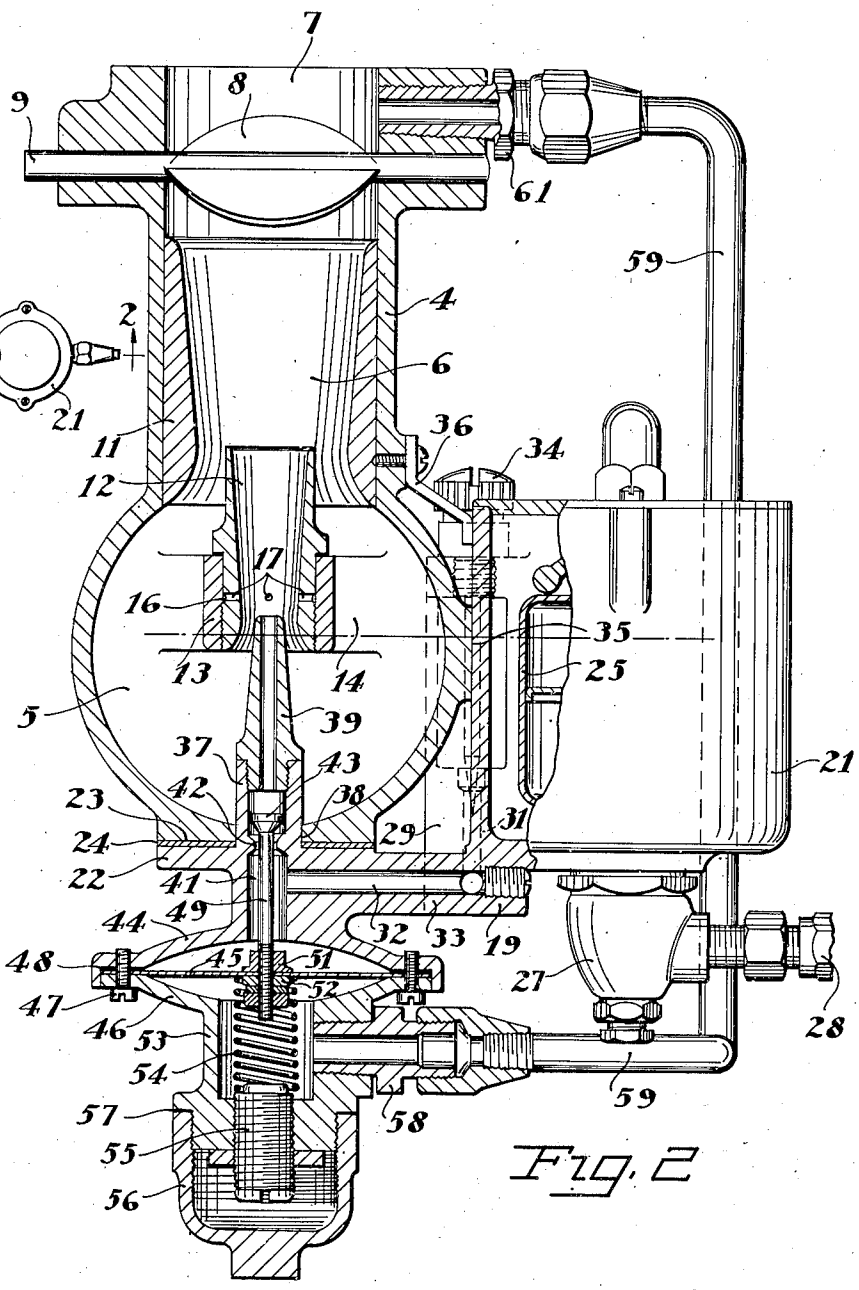


Fig. 2

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CARBURETOR

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4 Claims. (Cl. 261—69)

The present invention relates generally to carburetors, and has particular reference to carburetors designed for feeding the heavier grades of fuel.

In the use of kerosene as a fuel an objectionable knock generally occurs in the motor at wide open throttle or at throttle openings and speeds that give a relatively high or full torque of the motor. This tendency of the motor to knock is generally overcome by introducing water into the cylinders, as by injecting water into the combustion mixture. However, I have found that during restricted throttle running, or at throttle openings, and at speeds that give a relatively low torque, the use of this water is not necessary, and is even undesirable.

I have further found that the vacuum in the intake manifold of an internal combustion engine above the throttle is dependent upon the degree of throttle opening and is indicative of the load upon the engine, the vacuum decreasing as the throttle is opened or as the load increases, so that, in general it may be said that torque (load) and throttle opening on the one hand and manifold vacuum on the other vary inversely to each other. Because of these relationships, I have found that the introduction of water into the fuel-air mixture can be properly and automatically controlled by a valve responsive to the degree of throttle opening by fluctuations in vacuum in the engine manifold above the throttle.

I am aware that it is generally old to introduce water into the fuel air mixture by auxiliary valves controlled either manually or actuated by suction in the mixing chamber of the carburetor below the throttle. So far as I am aware, no one has yet proposed to control the introduction of water to the fuel-air mixture by a valve responsive to the degree of throttle opening by the vacuum in the engine manifold above the throttle.

My invention has as its fundamental object to provide a carburetor which will introduce water into the fuel-air mixture during throttle openings and speeds that give relatively high or full torque of the motor, and not during the low torque range of throttle openings and speeds.

Another object of my invention is to provide a carburetor in which the introduction of water to the fuel air mixture is controlled by the vacuum in the intake manifold above the throttle.

Still another object is to provide a carburetor in which the feed of water is entirely discontinued during the low torque range of throttle openings and speeds, but if desired, may be merely diminished during this range of the motor operation.

A still further object of my invention is to provide a device susceptible of embodiment as an integral part of the carburetor structure, or which may be embodied in the form of an accessory for attachment to carburetors of stock design.

With these and other objects in view which may be incident to my improvements my invention consists in the combination and arrangement of elements hereinafter described and illustrated in the accompanying drawing, in which:

Figure 1 is a plan view of a carburetor embodying my invention; and

Figure 2 is a vertical sectional view through the same, taken on the plane of the line 2—2, Fig. 1.

The carburetor casing 4 is formed with a horizontal air inlet 5 and a vertical carbureting chamber 6 and mixture outlet 7. Although the vertical form of carburetor is shown, it will be obvious that the invention has equal applicability to the horizontal and downdraft forms of carburetors. The customary throttle 8 is arranged in the upper end of the carbureting chamber 6 on a throttle shaft 9. In the lower end of the carbureting chamber is mounted an outer Venturi tube 11 and an inner concentric Venturi tube 12. The inner Venturi tube 12 is mounted in the hub 13 of a spider 14 extending transversely of the air opening into the carburetor chamber, and one of the spider arms or bridge members supporting the hub 13 is drilled to provide a fuel passage communicating with an annular groove 16 in the circumference of the Venturi tube 12. Extending inwardly from this groove 16 is a plurality of fuel feeding orifices 17 discharging into the air stream just above the point of maximum constriction in the inner Venturi tube. The other end of the fuel passage extending through the spider arm or bridge member communicates with a fuel supply float chamber 18 through an obvious arrangement of fuel passages. The feed of the kerosene fuel through the ports 17 in the inner Venturi 12 is merely shown for the purposes of an illustrative embodiment, it being obvious that the fuel may be fed to the air stream in any preferred manner.

For supplying water to the mixture, a casting 19 is mounted on the carburetor comprising a float chamber bowl 21 which is preferably disposed at substantially right angles or oppositely to the fuel chamber 18 relative to the axis of the carbureting chamber 6. For mounting the casting the same is formed with a plate portion 22 which is adapted to be screwed to a flat bottom surface 23 on the carburetor casing 4 with a gasket 24 interposed. The float chamber bowl 21 has a conventional arrangement of float 25 and fuel controlling needle for maintaining a predetermined height of water in the float chamber as indicated by the dash and dot line. The supply union 27 at the bottom of the float chamber connects through pipe 28 with the automobile

radiator or with any other source of water supply. The bowl 21 is formed with a chambered enlargement 29 having a vertical bore 31 communicating with a horizontal bore 32 extending through the neck portion of the casting 19. A regulating needle valve 34 threads down through the upper end of the enlargement 29 and controls the rate of discharge of water through the bore 31. The float chamber bowl bears against a lateral bearing surface 35 and is connected at its upper end by a short strap 36 with the carburetor casing 4.

Extending upwardly from the plate portion 22 is a boss 37 which enters the bottom of the carburetor casing through an opening 38. This boss is internally threaded at its upper end for receiving a conventional design of discharge nozzle 39 which terminates at or slightly above the point of maximum constriction in the inner Venturi tube 12. The bore 41 of the boss 37 is intersected by the horizontal passageway 32 and is provided with an internal flange 42 which is tapered on its upper surface to provide a valve seat for the valve 43. Below the neck portion 33 the casting 19 is formed with the upper half 44 of a diaphragm housing enclosing a diaphragm 45. The lower half 46 of this diaphragm housing is secured to the upper half by screws 47, a gasket 48 being interposed above the diaphragm to maintain a water tight joint. The stem 49 of the valve 43 threads down through a nut 51 on the upper side of the diaphragm and into a nut 52 on the under side of the same.

The lower half 46 of the diaphragm housing has a depending boss 53 which is cored out to receive a compression spring 54 bearing against the bottom of the diaphragm 45. An adjusting screw 55 threads up through the bottom of the boss 53 and receives the lower end of the spring 54, whereby the pressure of the spring may be readily adjusted. The lower end of the boss 53 is threaded externally to receive a cup or bonnet 56, a gasket 57 being interposed in the upper end of this cup and a shoulder on the boss to prevent leakage from within the cup. A plug fitting 58 is screwed into the side of the boss 53 to communicate with the area below the diaphragm 45 and this plug fitting connects with a tube 59. This tube extends upwardly and is arranged to communicate with the carburetor and manifold area above the throttle 8 through a fitting 61 which screws into the carburetor casing 4 above the level of a throttle 8.

In the operation of the device, the spring 54 normally tends to hold the valve in raised position. When the engine is running at low torque with a restricted throttle opening, a relatively high vacuum prevails in the intake manifold and in the mixture outlet above the throttle 8, and this vacuum, transmitted down through the pipe 59, acts on the under side of the diaphragm 45 and overcomes the pressure of the spring 54. As a result the valve 43 is held closed or substantially closed during this period of operation when the admixture of the water or water vapor with the fuel and air is unnecessary. As the throttle is opened, however, and the engine brought up to relatively high or full torque, the suction above the throttle 8 is reduced, with the result that the spring 54 is able to overcome the counteracting suction of the under side of the diaphragm 45 and to raise the valve 43. Thenceforth water issues from the nozzle 39 and mingles with the fuel and air passing up through the engine manifold. It is preferable to have the needle valve 34 perform primarily the metering of the water supply, and to have the suction controlled valve 43 operate primarily as a shut-off valve for controlling the period of water supply. It will be obvious, however, that by regulating the pressure of the spring 54 and the threaded adjustment of the needle valve stem 49, the valve 43 may be made to perform a metering function with the variations of operating conditions, if this is desirable. Any heating means may be associated with the present apparatus for heating water preliminary to feeding it into the carbureting chamber, or the apparatus may be arranged to discharge steam into the carbureting chamber, without departing from the scope of the invention.

Other liquids than water are known to have the same properties to different degrees of tempering the explosion and thereby avoiding the violence of detonation which produces the typical kerosene knock. For example, some of the higher grade fuels produce this action when mixed with kerosene or other lower grade fuels. It will be obvious that the use of any of these explosion tempering constituents is contemplated within the scope of the present invention.

While I have disclosed the preferred form of my invention I desire it to be understood that I do not limit myself to the constructional details shown as these may be varied and modified by those skilled in the art without departing from the spirit of my invention or exceeding the scope of the appended claims.

I claim:

1. In a carburetor having a throttle, the combination of a nozzle for injecting kerosene into an air stream, a second nozzle arranged concentric to the first nozzle for injecting a second fluid into the air stream, and means for increasing the rate of injecting the second fluid upon increase in the pressure posterior to the throttle.

2. In a carburetor for internal combustion engines, an air conduit, means for introducing fuel into the air stream at one point along said conduit, means adjacent said point for introducing a second fluid to the air stream, a throttle positioned posteriorly of said point, and means responsive to the air pressure posterior to the throttle for controlling the admission of said second fluid.

3. In a carburetor, an air conduit, a Venturi throat therein provided with a fuel inlet and adapted to produce a mixture of fuel and air, a nozzle terminating within said throat and adapted to introduce a second fluid into said mixture, and a valve controlling the flow of fluid to said nozzle and responsive to pressures posterior to the throttle.

4. In a carburetor, an air conduit, a Venturi throat therein provided with a fuel inlet and adapted to produce a mixture of fuel and air, a nozzle disposed concentrically with said throat and adapted to introduce a second fluid to the mixture, a valve controlling the flow of fluid to said nozzle, a flexible diaphragm fixed to and controlling said valve, and means connecting one face of the diaphragm to the air conduit posterior to the throttle.

MILTON E. CHANDLER.