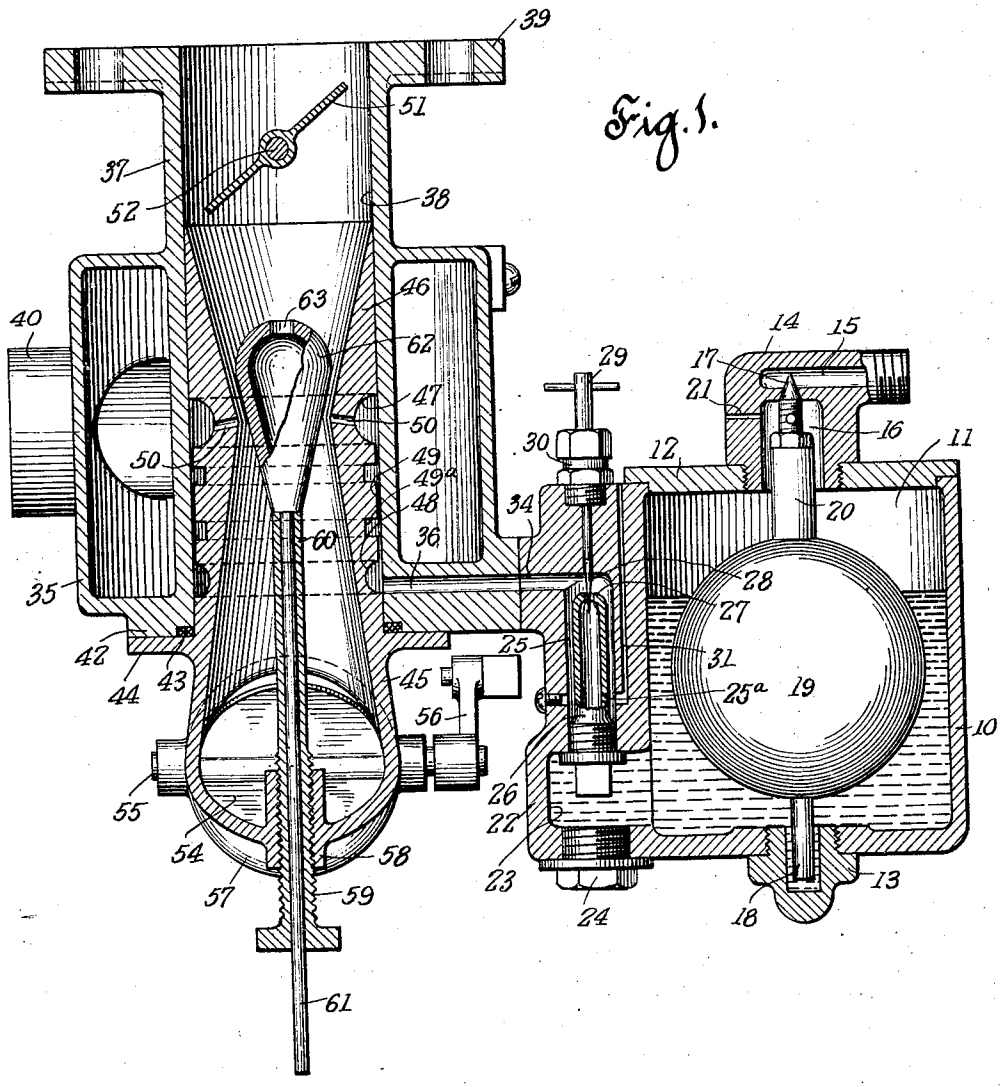
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CARBURETOR

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Fig. 1.



INVENTOR.

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CARBURETOR

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Fig. 2.

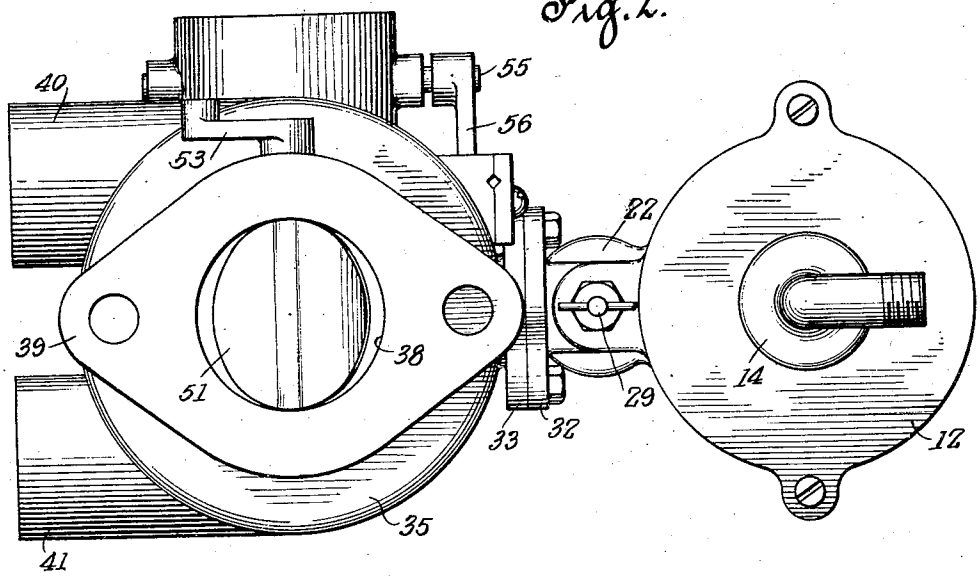
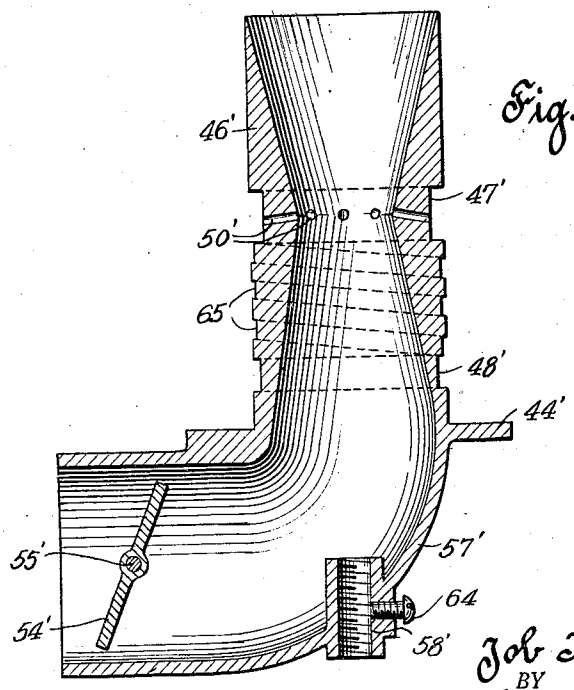


Fig. 3.



INVENTOR.
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Patented Feb. 10, 1931

1,791,623

UNITED STATES PATENT OFFICE

JOB HUTCHINSON, OF GREAT NECK, NEW YORK

CARBURETOR

Application filed February 28, 1927. Serial No. 171,469.

This invention relates to carburetors as used in conjunction with internal combustion engines utilizing liquid fuel, and is an improvement over my co-pending application filed October 27, 1925, Serial No. 65,073.

It has been found that if sufficient heat is applied at the proper place and the fuel spray is spread against such hot surfaces, the fuel can be vaporized before commingling with the air flowing through the usual Venturi tube, and, by reason of having the heat concentrated at this point, a substantially dry gaseous mixture is obtained without the application of heat to the carbureted mixture after leaving the carburetor.

The herein described method and means prevent overheating the charge, which overheating would seriously affect the efficiency of the engine.

It is therefore an object of the present invention to provide means whereby an essentially dry mixture is obtained by applying sufficient heat directly to the spray or measured portion of fuel, changing it into a vapor and passing the vapor through a plurality of small radial perforations or slits into the constricted portion of a Venturi tube to be mixed thoroughly from all sides with the air passing through the tube.

Further features are to provide an automatic air control device operative in the venturi, to surround the venturi by a heated chamber; and to more conveniently relocate the liquid fuel control with respect to the float chamber.

These advantageous features are attained by the novel design, construction and combination of parts hereinafter described and shown in the annexed drawings forming a material part of the disclosure, and in which:

Fig. 1 is a vertical sectional view taken through an embodiment of the invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is a longitudinal sectional view of a Venturi tube showing a modification from that indicated in Fig. 1.

In common with the usual type of carburetors the device consists of two main parts, one a mixing chamber attached to the engine and the other a float chamber in which a substantially constant level of liquid fuel is maintained.

In the present case a float chamber housing, designated by the numeral 10, contains a float chamber 11 over which is a cover 12 and in the bottom, at the center, is a recessed plug 13.

Set in the cover 12 is an elbow 14 by which connection is made with a supply of fuel, the same entering a reduced passage 15 leading to a recess 16 open to the float chamber 11, the passage being controlled by a needle valve 17.

The stem 18 of the needle valve passes through and is adjustably fixed in a float 19 to be guided in the recess of the plug 13, the float having a hub 20 adjusted on the stem 18 by a nut, and is loosely guided in the recess 16 of the inlet elbow; a vent 21 is provided in the elbow, allowing the passage of air to the float chamber 11.

At one side of the housing 10 is an extension 22 having a recess 23 in open communication with the float chamber 11, this recess being sealed by a flanged plug 24 in its bottom.

Above the recess 23 is a bore 25 into which extends a hollow screw 26, open to the recess and having a valve seat 27 at its inner end controlled by a fine needle valve 28 provided with an adjusting means 29 at its outer end, which extends through a gland 30, set in the upper end of the extension 22.

It is to be noted that the bore 25 presents an annular space around the main inner portion of the screw 26, in which is a minute aperture 25^a and leading from the lower portion of this space is a fine passage 31 in open communication with the atmosphere at the top of the extension.

An integral projection on the outer side of the extension 22, near its upper end, terminates in a flange 32 to be secured to a similar flange 33 on the body of the mixing chamber, generally designated 35, and leading from the upper end of the bore 25 is a passage 34 registering with a similar passage 36 in the body 35, these passages conducting the liquid fuel in an obvious manner.

The mixing chamber body consists of a hollow annulus 35 having an extension 37 at

one end, the same being a continuation of its inner wall, the inner wall and extension having a cylindrical bore 38 terminating at a flange 39 by which attachment is made to the engine.

The annulus 35 is provided with a pair of spaced tubular extensions 40 and 41, connecting respectively with the exhaust of the engine and muffler, the arrangement being such that the hot, spent gases are caused to travel circuitously through the annulus and deliver to it a very considerable proportion of their heat.

At the end of the annulus 35, opposite the flanged extension, is a seat 42 provided with a packing ring 43, and secured on the seat is a flange 44 formed on the extending portion of a right angled Venturi tube 45.

The straight main portion 46 of the venturi is close fitted to the bore 38, its divergent conical delivery end reaching past the inner wall of the annulus into the extension 37 and its restricted portion being disposed substantially central of the annulus.

At the restricted portion of the venturi is a circumferential groove 47, a similar but lesser groove 48 being formed in its body in register with the passage 36 to receive liquid fuel entering therethrough.

The outer portion of the venturi, adjacent the flange, is also fitted closely to the bore, but between the grooves 47 and 48 the body is reduced to form a thin channel 49 in which is a helical groove 49*a* through which the liquid fuel passes in a film to the groove 47, becoming heated by the inner wall of the annulus and from the groove 47 passes through a plurality of small radial openings 50 into the restricted portion of the venturi.

In the extension 37 is a butterfly throttle valve 51 fixed on a stem 52, one end of which extends beyond its bearings and is provided with a crank handle 53, thus controlling the mixture as delivered to the engine.

At the opposite, angled end of the venturi is a similar butterfly valve 54 fixed on a stem 55, controlled by a crank handle 56, thus controlling the choke or air inlet to the venturi.

Formed in the Venturi body elbow 57, at the axis of its main portion is an elongated hub 58 having an internal screw thread to receive an adjustable hollow screw 59 provided with an inreaching hollow stem 60.

Freely slidable in the screw and stem is a thin, light rod 61 fixed at its inner end in a hollow conical valve member 62, having a closed arcuate forward end containing a central aperture 63, this member being preferably of aluminum or other light material and so disposed within the venturi to cause the sprays of liquid fuel, entering in a heated condition through the passages 50, to impinge upon it becoming spread and thoroughly mixed with the influx of air entering through the venturi.

Obviously the mounting of the member 62 is such as to permit it to fluctuate and assume different positions in accordance with the entering air stream and materially assist in mixing the dry gas with air prior to discharge into the engine, this valve acting automatically to control the passage of air through the venturi and is adjustable by the screw 59, which may be held in adjustment by a set screw 64.

In the modification shown in Fig. 3 the venturi is the same as previously described and given the same numerals, distinguished by primed numerals, except that grooves 47′ and 48′, of rectangular cross section are used and a helical channel 65 is cut in the circumference, resembling in effect and appearance, a shallow square thread of coarse pitch, the same causing the liquid fuel to travel circuitously from one groove to the other and becoming a dry gas at its emergence into the interior of the venturi.

The operation of the float chamber will be clearly understood by all familiar with the art, although attention is invited to the space surrounding the hollow screw 26 and the fine vent 31, which is found in practice to materially assist in equalizing fluctuating demands on the chamber 11.

As the liquid fuel is drawn into the venturi in the form of a highly attenuated stream, it becomes rapidly volatilized by passing in direct contact with the heated inner surface of the annulus 35, eventually entering as a dry gas, readily mixed with atmospheric air passing through the venturi which is controlled in all respects in the usual manner.

Distribution of the entering air is however accomplished within the venturi in a manner believed to be novel by a floating valve member 62 so arranged as to maintain a central position relative to the wall of the venturi, irrespective of its longitudinal movement, as caused by an inrushing volume of air and restricting the opening therethrough.

The foregoing disclosure is to be regarded as descriptive and illustrative only, and not as restrictive or limitative of the invention, of which obviously an embodiment may be constructed including many modifications without departing from the general scope herein indicated and denoted in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In combination with a carburetor, a float chamber having a float controlled valve, said chamber containing a lateral recess, a tubular member disposed in the recess open at its bottom to liquid in the chamber and extending to a point substantially uniform with the liquid level in the chamber, there being an annular space surrounding said member, a manually operable needle valve

controlling an opening in the upper end of said member, and a vent in the lower portion of said member and space communicating with the atmosphere at a point above said chamber.

2. In a carburetor having a fuel supply means, a venturi and an air intake, said venturi body having a series of spaced parallel circumferential grooves, one at its restricted portion in communication with the interior and the other at the inlet of fuel, the body of said venturi being reduced in diameter between the grooves, a hollow annulus surrounding the venturi body, and means for heating said annulus.

3. A carburetor comprising a Venturi tube having a cylindrical outer surface containing two spaced circumferential grooves connected by a restricted passage and provided with a series of small orifices connecting one of the grooves with the interior of the venturi, a fuel inlet leading to the other of said grooves, and means for heating the fuel in its passage between the grooves.

4. A carburetor comprising a constant level fuel supply means, an air intake, a venturi having two spaced fuel grooves connected by an attenuated passage, one of the grooves being in communication with the interior of the venturi, a series of spaced parallel grooves of lesser area intermediate the first and last groove, and the other with the fuel inlet, and a heating chamber circumjacent the venturi to enclose the grooves.

5. In combination with a carburetor, a float chamber having an inlet at the top, a float actuated valve controlling said inlet, means to adjust said valve relative to the float, a vent in said chamber adjacently below said valve, an upright tubular member in open communication with the float chamber at its bottom, a needle valve controlling the outlet of said member, said valve being manually adjustable exteriorly the carburetor above the plane thereof, a vent in said member open to the atmosphere, said vent being in a plane parallel and remote from said member, and a connecting flange on said carburetor containing a lateral discharge passage.

6. A carburetor for internal combustion motors comprising a constant level fuel supply source, an air inlet, a venturi, a light weight hollow conical floating valve in said venturi beyond its restricted portion, said valve containing a chamber open to the space in which it floats, means to adjust said valve, a chamber surrounding said venturi, and a hollow annulus enveloping said chamber through which exhaust pass for supplying heat to said chamber.

7. A carburetor for internal combustion motors comprising a constant level fuel supply source, an air inlet, a venturi, a hollow conical floating valve in said venturi beyond its restricted portion, said valve containing a chamber open to the space in which it floats, means to adjust the closing movement of said valve, a chamber surrounding said venturi, a hollow annulus circumjacent the chamber for passing hot gases from the motor around said chamber, and annular grooves in the body of said venturi for passing a film of fuel interjacent said venturi and said chamber prior to entering the venturi.

In testimony whereof I have hereunto affixed my signature.

JOB HUTCHINSON.