

March 14, 1939.

R. L. SPENCER

2,150,296

CARBURETOR FOR INTERNAL COMBUSTION ENGINES

Filed Jan. 20, 1936

2 Sheets-Sheet 1

Fig. 1.

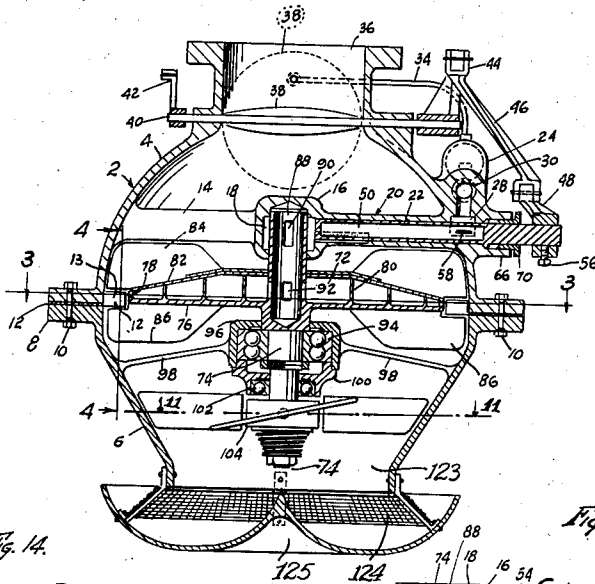


Fig. 2.

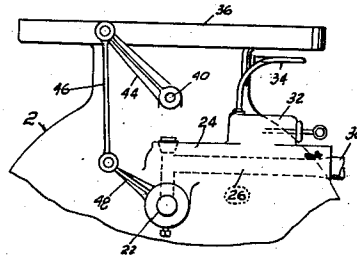


Fig. 4.

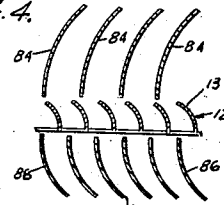


Fig. 5.

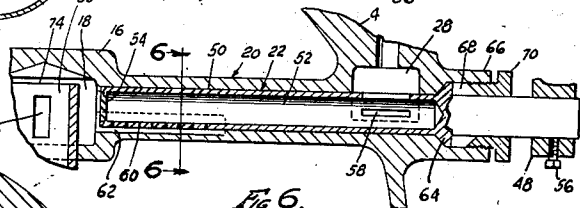


Fig. 6.

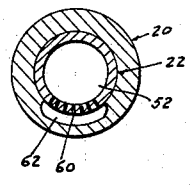


Fig. 8.

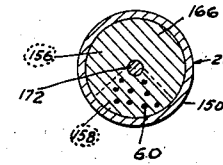


Fig. 14.

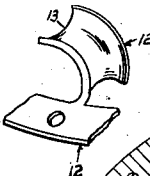


Fig. 3.

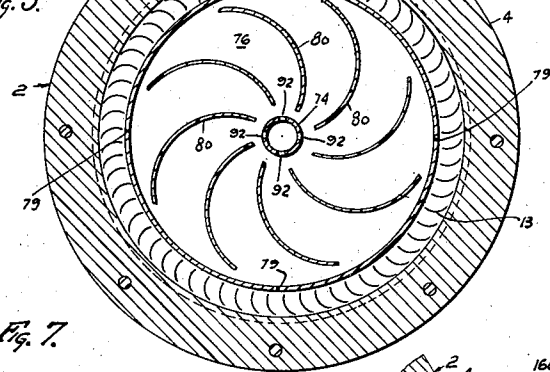
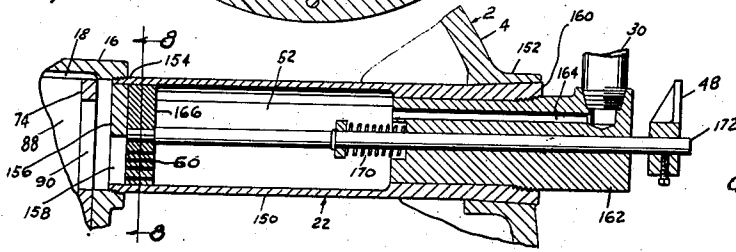


Fig. 7.



INVENTOR

Robert L. Spencer

ATTORNEY

Joseph F. M. Collins

March 14, 1939.

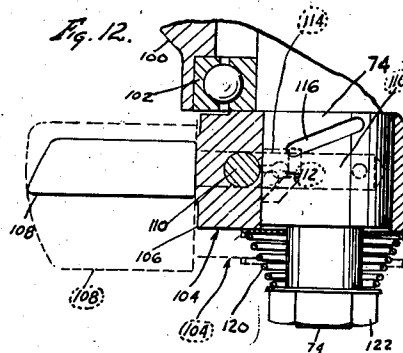
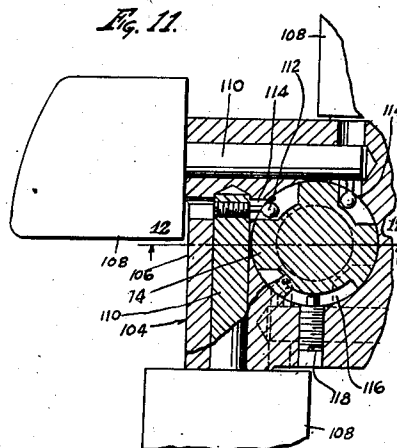
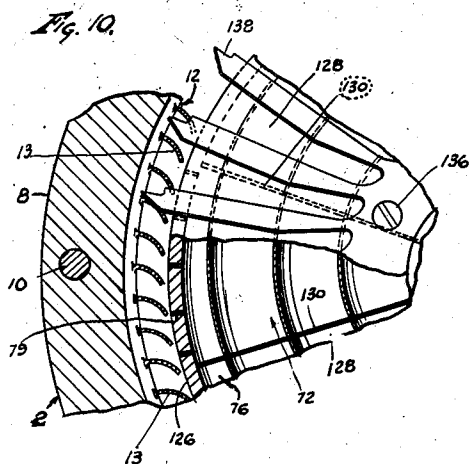
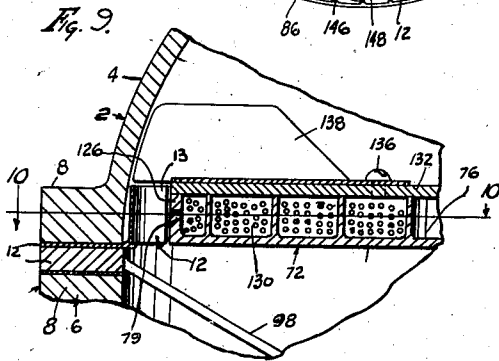
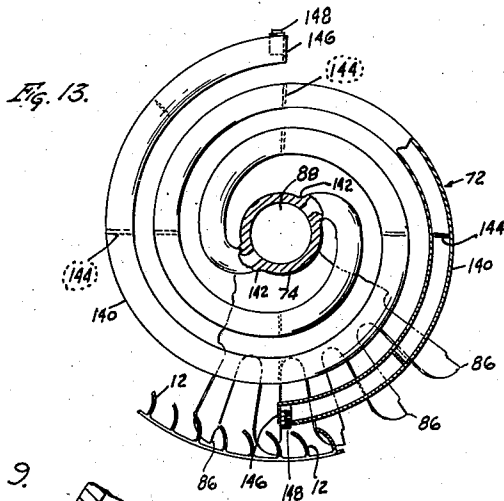
R. L. SPENCER

2,150,296

CARBURETOR FOR INTERNAL COMBUSTION ENGINES

Filed Jan. 20, 1936

2 Sheets-Sheet 2



INVENTOR
Robert L. Spencer
ATTORNEY
Joseph F. H. [Signature]

UNITED STATES PATENT OFFICE

2,150,296

CARBURETOR FOR INTERNAL COMBUSTION ENGINES

Robert L. Spencer, Los Angeles, Calif.

Application January 20, 1936, Serial No. 59,924

6 Claims. (Cl. 261-79)

This invention relates to an apparatus for producing fuel vapors and particularly pertains to a carburetor especially for use in combustion engines.

It is the principal object of the present invention to provide a carburetor structure through which air is drawn by the suction action of an internal combustion engine or apparatus, and which structure embodies the use of means whereby liquid fuel may be mechanically disintegrated into minute particles and thereafter mechanically introduced into a stream of air whereby the particles in impact with the stream and the conduits through which they pass will be uniformly and minutely commingled so as to produce a desirable mechanical carburization of the liquid fuel without necessitating heat treatment of the air or the fuel particles and while insuring that the resulting gaseous fuel will be maintained at a relatively low temperature after carburization.

The present invention contemplates the provision of a carburetor housing through which air is drawn by suction and within the path of which air mechanical means are provided for disintegrating the particles of a liquid fuel and disintegrating said fuel particles into the air stream to produce desirable carburization of the liquid. The structure including means whereby a variation in relative proportions of liquid fuel and air will take place automatically in proportion to the requirement of the invention to which the carburetor is attached.

Reference is had to the accompanying drawings, in which the similar reference characters denote the similar parts.

In the drawings:

Figure 1 is a view in central section through the combined combustion fluid generator and air charger, showing fan blades in position at the air intake port.

Fig. 2 is a fragmentary view in elevation showing the regulating valve connected to the throttle valve.

Fig. 3 is a view in transverse section showing the distributing chamber and the turbulence vanes taken on the line 3-3 of Figure 1.

Fig. 4 is an enlarged view in section showing the turbulence vanes and mixing blades connected to the top and the bottom of said distributing chamber, taken on the line 4-4 of Fig. 1.

Fig. 5 shows the regulating valve, slightly enlarged as shown in Fig. 1.

Fig. 6 is a view in transverse section showing

the regulating valve as taken on the lines 6-6 of Fig. 5.

Fig. 7 shows the regulating valve in modified form.

Fig. 8 is a view in section of the regulating valve taken on the lines 8-8 of Fig. 7.

Fig. 9 is a fragmentary vertical sectional view taken through a housing similar to that shown in Fig. 1 but illustrating a modified form of fuel distributing chamber.

Fig. 10 is a transverse sectional view taken along line 10-10 of Fig. 9.

Fig. 11 is a fragmentary transverse sectional view of the adjustable fan blades and mounting therefor shown in Fig. 1.

Fig. 12 is a fragmentary vertical sectional view of the adjustable fan blades shown in Figs. 1 and 11.

Fig. 13 is a plan view of a still further modified form of fuel distributing chamber which may be employed in the practice of my invention, and illustrating the association thereof with distributing vanes and turbulence vanes of the type shown in Figs. 1, 9 and 10.

Fig. 14 is a fragmentary perspective view of a portion of the turbulence vane member and illustrating one of the turbulence vanes thereon.

Referring to the drawings, I have illustrated my carburetor as comprising a housing designated generally by the numeral 2 and preferably comprising a pair of complementary casing members including a top casing member 4 and a bottom casing member 6, each of which is provided with radially extending flanges as shown at 8, through which bolts 10 may pass to secure the casing members together.

Internally within said housing 2 at the junction of the said top casing and the bottom casing 4 and 6, respectively, is positioned a turbulence member 12 comprising an annular plate disposed between the flanges 8 of the casing members 4 and 6 and held therebetween by means of the bolts 10, said turbulence member 12 having a plurality of inwardly convex and upwardly concaved turbulence vanes 13, the purpose of which will be presently described.

Within said top casing 4, is positioned a spider member 14 which is an integral part thereof, having a bearing hub 16 centrally positioned, which is provided with a fluid reservoir 18 to which the fluid passage, generally designated by numeral 20, is connected and wherein the regulating valve 22 is positioned as shown in Figs. 1 and 5.

Formed upon the exterior of the top casing

member 4 is a fuel inlet chamber 24, from which a fuel passage 26 extends into communication with a fuel reservoir 28 partially surrounding and communicating with the fuel regulating valve 22, fuel such as hydrocarbon fluids being fed to the chamber 24 by means of a suitable pipe as illustrated at 30 (see Fig. 2). A priming device 32 is illustrated as being mounted upon the chamber 24 and is connected by a tubing 34 to the outlet opening 36 of the carburetor through which priming fuel or idling fuel may pass to the engine or other device to which the carburetor is connected.

The outlet 36 is also provided with a throttle valve 38 which is mounted upon a shaft member 40 of which one end is provided with the operating lever 42 and the other end is provided with a regulating lever 44, which is connected by means of a link member 46 to the controlling lever 48 of the said regulating valve 22, as shown in Figs. 1, 2 and 5.

The regulating valve 22 comprises a cylindrical member 50 having a hollowed-out section 52, of which one end is closed as at 54, and the other end is adapted to receive said controlling lever 48 as previously described, and which is held in place by means of a set screw 56, as shown.

The cylindrical valve member 50 is provided with a plurality of openings 58 (see Figs. 1 and 5) which are positioned to communicate with the reservoir 28, the end 54 of the valve member 50 being closed while a plurality of fuel jets 60 are provided in the side wall of the member 50 through which fuel may pass to an enlarged section 52 of the fuel passage 26 and thence into the fluid reservoir 18 as shown.

To prevent the fluid leakage, the said cylindrical member 50 is provided with an abutment 64, which is held in place within an extension boss 66 by means of a leak-proof packing member 68 which is supported by a packing gland 70 as shown.

Internally within said housing 2 and in juxtaposition to said turbulence vanes 13 a dish-like fuel distributing chamber 72 is disposed with its periphery substantially aligned with the turbulence vanes 13. The chamber 72 comprises a bottom disc 76 having a peripheral wall 78 extending upwardly and enclosing a plurality of diffusing vanes 80, which may, if so desired, be made an integral part of said bottom disc 76; also, said chamber 72 is provided with a cover member 82 (as shown in Fig. 1) having a plurality of convex shaped blades 84 positioned upon and extending over the said turbulence vanes 13, and the said bottom disc 76 is provided with a plurality of convex shaped bottom blades 86 extending downwardly and beneath the said turbulence vanes 13, thus allowing the passing air to flow between said blades and vanes, as shown in Figs. 1 and 3.

The said shaft 74 is provided with a fluid chamber 88 having a passage 90 positioned in juxtaposition to said reservoir 18, also having a plurality of openings 92 positioned therein and leading into said distributing chamber 72. The shaft 74 is rotatably mounted within the housing 2 by means of ball-bearings 94 supported by a bearing housing 96 which is disposed substantially centrally of the housing 2 as by means of a plurality of legs 98 extending to and preferably formed as an integral part of the lower casing member 6. The bearing 94 is preferably held in place within the housing 96 by means of a cover

100, which in turn constitutes a support for a centralizing bearing 102 surrounding and engaging the lower portion of the shaft 74.

The lower end of the shaft 74 has mounted thereon an adjustable fan 104, comprising a block member 106 which is slidably mounted upon said shaft 74 and which is provided with a plurality of adjustable blades 108, comprising a shaft member 110 which is rotatably mounted within said block 106 having its ends provided with controlling pin 112 held in engaged position within the pitch regulating cavities 114, so that the downward movement of said block 106 will cause said controlling pin 112 to move upwardly (as shown more particularly in dotted lines in Fig. 12), which movement will cause said shaft 110 to pivot within its bearing, thus causing the increase of the pitch of the said blade 108 as shown.

In order to hold said block member 106 in place, said shaft 74 is provided with a controlling slot 116 to allow radial adjustment of said block 106 and which is adapted to receive a locking pin 118 held in place by means of a suitable thread provided in said block 106.

Also to prevent said adjustable fan 104 from sliding downwardly said block 106, at its bottom, is provided with a suitable spring 120 which is locked in place by means of a nut 122, the operation of which will be presently described.

To prevent the dust-laden air from entering said carburetor 2, particularly through the opening of the said bottom casing 6, the inlet 123 is provided with suitable screen 124 and a pan 125.

In the Figs. 7 and 8 I have shown another type of regulating valve 22, comprising a tube 150 which extends to and connects the boss 152 of said casing 4, having the end 154 inserted in the bearing hub 16. Said tube end 154 is provided with tube closing disc 156 which is provided with an opening 158 as shown.

The extended end 160 of said tube member 150 is provided with a plug 162 wherein the fuel passage 164 is positioned and to which the fluid pipe 30 is connected, so that the said fluid may pass freely into the chamber 52, wherein a rotatable fluid controlling disc 166 is placed, having a plurality of jet holes 60, and which is held in place against the said disc 156 by means of a spring member 170 and rotatably operable by means of a valve rod 172, passing through the said plug 162 and controlled by means of a controlling lever 48.

In Figs. 9 and 10 I have shown the distributing chamber 72 in modified form, comprising a bottom 76 and extending toward the peripheral wall 126 having a plurality of jets 79 therein, which is divided into sections 128 by means of perforated baffle plates 130 and covered by means of a cover plate 132 upon which a disc 134 is positioned and held in place by means of screws 136 having a plurality of diffusing blades 138 extending to and over the said turbulence vanes 13.

In the Fig. 13 I have shown another type of distributing chamber 72, comprising a plurality of spirally formed tubes 140, which are connected to the said fluid chamber 88 of the said shaft 74 as at 142.

The interior of said tubes 140 is provided with series of perforated baffle plates 144 and the end 146 is equipped with balancing jet member 148.

In operation, the fluid enters the generator housing 2 by means of the pipe 30, flowing through

the regulating valve 22 into the chamber 52, wherein the flow of said fluid to the said distributing chamber 72 is regulated by means of the jet holes 60, so that only a required amount of said fluid may pass into said reservoir 18 and the fluid chamber 88 of said distributing chamber 72.

The incoming air, caused by the suction action of the engine pistons, causes the fan 104 to revolve, which in turn revolves the said distributing chamber 72, thus allowing the fluid within said chamber 72 to flow outwardly toward and through the jets 79 against the said turbulence vanes 13 and through the blades 84 into the outlet 36, thus thoroughly mixing the vaporized fluid with the said volume of air.

It will be seen that as air is drawn upwardly through the carburetor a turbulent action will be imparted to it due to the movement of the propeller blades 108 and the subsequent movement of the air between the lower deflecting blades 86, then against the vanes 13 and thereafter between the upper deflecting blades 84. At the same time that the air is being thus disturbed in its travel there is introduced into it under violent force the liquid particles which are thrown off through the opening 78 in the rotating member 72 and into the zone occupied by the vanes 13. Due to this action there will be a collision between the upwardly moving air particles and the transversely moving liquid particles. This insures thorough and uniform mixture of particles to produce proper carburization and subsequent vaporization.

The rotary movement of the fan 104 imparts a rotary movement to the shaft 74 through the member 110. Such motion, being communicated to the shaft 74 through the screw 118 and slot 116, tends to move the block 106 downwardly along the shaft 74, thus causing the fan blades 108 to increase their pitch angle as the volume of air passing the blades increases, thus increasing the speed of rotation of the shaft 74 in substantial proportion to the increase in volume of air flowing through the carburetor.

While I have thus described my invention with great particularity, it will be clear that the same may be modified and changed to meet variable conditions, when using said carburetors for handling combustion mixtures, used for internal combustion engines.

I claim:

1. In the carburetor adapted to be used in connection with the internal combustion engine, a housing, a plurality of turbulence vanes internally positioned within said housing, a fluid distributing means mounted upon a shaft and rotatably positioned within said housing having a plurality of fluid jets positioned in juxtaposition to said turbulence vanes, a fluid controlling valve connected to said housing, internally extending therein and connecting with said fluid distributing tank chamber, a pair of convexly shaped fans positioned upon and beneath the said distributing chamber, extending over and under the said turbulence vanes and adjustable fan connected to said shaft adapted to revolve the said distributing chamber within said housing and induce a volume of air through said convexly shaped fan and said turbulence vanes, thus thoroughly mixing said air with hydro-carbon fluid emanating from the said distributing chamber of the said carburetor.

2. A carburetor comprising a housing through which a stream of air may flow vertically, a rotary

element mounted within the housing and disposed at right angles to said flow of air, said rotary element being disposed concentrically with the wall of the housing and with its circumferential edge spaced a distance therefrom to form an annular air flow passageway therearound, means acted upon by the stream of air flowing through the housing to revolve said rotary element, fixed vanes positioned within the housing and in the annular air flow passageway occurring around said rotary element, means for delivering liquid fuel to a point adjacent the axis of said rotary element, and means formed as part of said rotary element for uniformly diffusing said fuel particles and impelling them by centrifugal action into said air flow passageway to strike the air stream with sufficient impact to mechanically carburate the liquid fuel.

3. A carburetor comprising a housing through which a stream of air may flow vertically, a rotary element mounted within the housing and disposed at right angles to said flow of air, said rotary element being disposed concentrically with the wall of the housing and with its circumferential edge spaced a distance therefrom to form an annular air flow passageway therearound, means acted upon by the stream of air flowing through the housing to revolve said rotary element, fixed vanes positioned within the housing and in the annular air flow passageway occurring at said rotary element, means for delivering liquid fuel to a point adjacent the axis of said rotary element, and means formed as part of said rotary element for uniformly diffusing said fuel particles and impel them by centrifugal action into said air flow passageway to strike the air stream with sufficient impact to mechanically carburate the liquid fuel, and means carried by the rotary element for changing the direction of flow of the air stream passing therearound.

4. A carburetor comprising a housing through which a stream of air may flow vertically, a rotary element mounted within the housing and disposed at right angles to said flow of air, said rotary element being disposed concentrically with the wall of the housing and with its circumferential edge spaced a distance therefrom to form an annular air flow passageway therearound, means acted upon by the stream of air flowing through the housing to revolve said rotary element, fixed vanes positioned within the housing and in the annular air flow passageway occurring at said rotary element, means for delivering liquid fuel to a point adjacent the axis of said rotary element, and means formed as part of said rotary element for uniformly diffusing said fuel particles and impel them by centrifugal action into said air flow passageway to strike the air stream with sufficient impact to mechanically carburate the liquid fuel, and means acting automatically to increase the volume of air passing through the carburetor as suction force is inserted by an apparatus to which the carburetor is attached.

5. A carburetor comprising a housing through which a stream of air may flow vertically, a rotary element mounted within the housing and disposed at right angles to said flow of air, said rotary element being disposed concentrically with the wall of the housing and with its circumferential edge spaced a distance therefrom to form an annular air flow passageway therearound, means acted upon by the stream of air flowing through the housing to revolve said rotary element, fixed vanes positioned within the housing and in said annular air flow passageway occurring at said

rotary element, means for delivering liquid fuel to a point adjacent the axis of said rotary element, and means formed as part of said rotary element for uniformly diffusing said fuel particles and impelling them by centrifugal action into said air flow passageway to strike the air stream with sufficient impact to mechanically carburate the liquid fuel, and means acting automatically to increase the volume of air passing through the carburetor as suction force is inserted by an apparatus to which the carburetor is attached, and throttle means for controlling the flow of liquid flow to said rotary element.

6. A carburetor comprising a bowl shaped housing having an air inlet at one end and an air outlet at its opposite end, a rotary element disposed concentrically of said housing and combining with

the housing to form an annular air passageway between the circumference of said rotary element and the inner wall of the housing, turbulence vanes fixed within said annular passageway and acting to change the direction of flow of the air passing therethrough, said vanes having passages disposed therebetween, the passages between said vanes facing the periphery of the rotary element, means for delivering liquid fuel axially of said rotary element, diffusing means carried by the rotary element for diffusing the liquid fuel and drawing it off from the periphery thereof and into collision with the air stream flowing through the annular passageway, and means for driving said rotary element.

ROBERT L. SPENCER.