

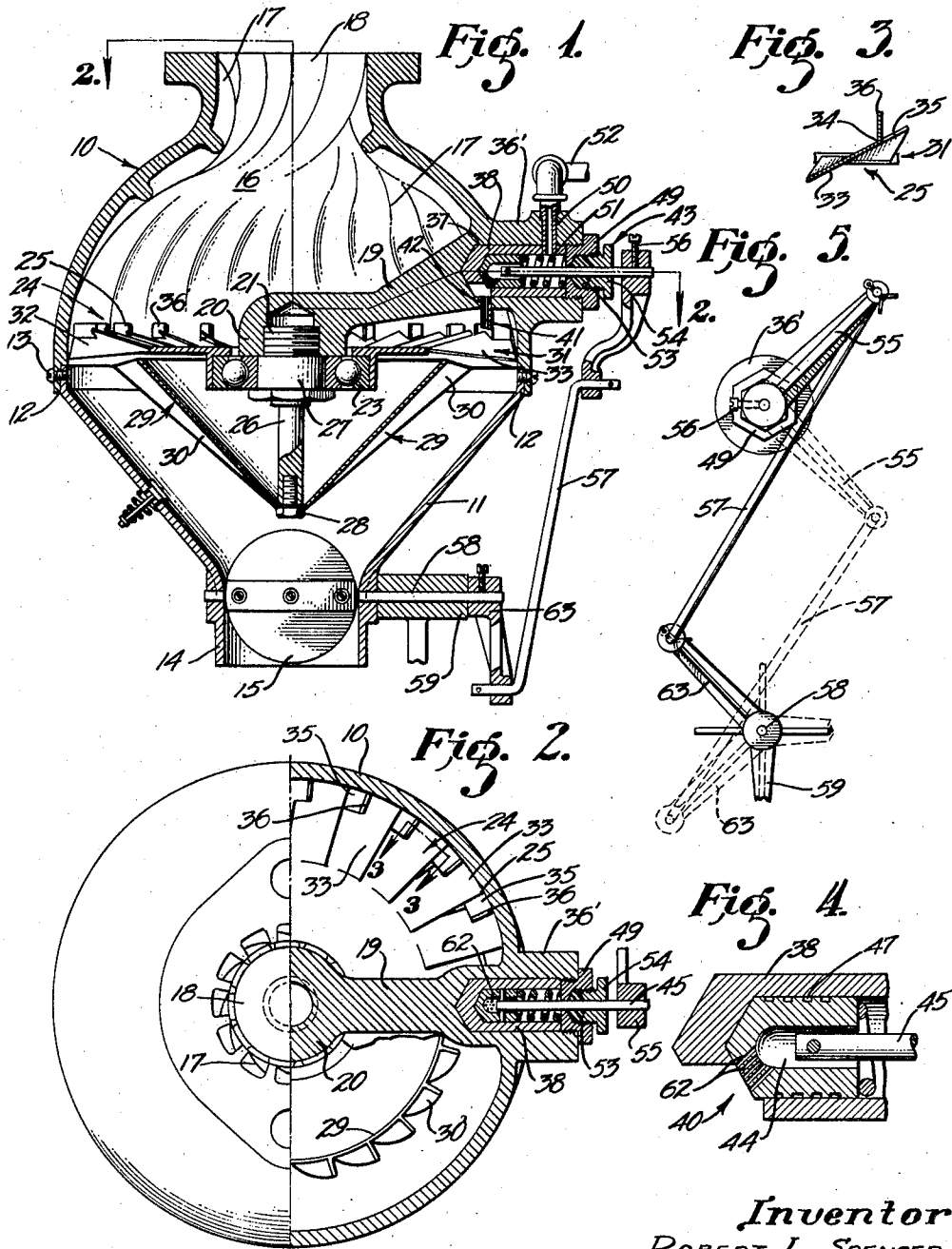
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CARBURETOR FOR INTERNAL COMBUSTION ENGINES

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CARBURETOR FOR INTERNAL COMBUSTION
ENGINES

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59,924. Divided and this application March 3,
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5 Claims. (Cl. 261—83)

The invention relates to a carburetor for producing fuel vapors and particularly pertains to a carburetor for use in internal combustion engines and is a division of my co-pending application
5 entitled Carburetors for internal combustion engines, filed January 20, 1936, Serial No. 59,924 and eventuating in U. S. Letters Patent No. 2,150,296, dated March 14, 1939.

The conventional carburetors now in use in connection with internal combustion engines are adapted to function by reason of the special conditions which are created by the action of the pistons of the engine cylinders so that the flow of air caused by the atmospheric pressure is allowed to pass through the carburetor jet or jets
15 thus allowing the liquid hydrocarbon fuel to mix with said air. This forms a gaseous fuel or gas and air mixture which is caused to pass into the engine cylinders. Such a mixture of gases in many instances is not sufficiently complete to assure complete combustion of the fuel in the cylinders which results in comparatively low efficiency in the horse power development. It has also been found that the resultant residue which
25 is formed by the incomplete combustion of the fuel creates carbon deposits upon the essential operating parts of the cylinders and also develops an excess of poisonous carbon monoxide gases. It will thus readily be seen that in many of the present conventional forms of carburization the
30 potential efficiency of an engine is greatly reduced.

It is, therefore, the principal object of the present invention to provide a combustive fuel generator which will substantially vaporize a liquid hydrocarbon fuel for use in an internal combustion engine and which in its operation will mechanically combine the vaporized fluid with a given volume of air and which will force through
40 the resultant gaseous mixture into the cylinders at a pressure above atmospheric thus increasing the efficiency of the power developed by the engine while eliminating the carbon monoxide gas emanating therefrom as waste gas and also eliminating the carbon deposits within and upon the
45 working parts of the cylinders of the engine.

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 other suitable apparatus and which structure embodies the use of means whereby fluid may be mechanically disseminated into minute particles and to thereafter
50 be mechanically introduced into a stream of air whereby the particles in impact with said air stream will be uniformly and minutely commingled as they pass through the conduits so as to produce a complete mechanical carburization of the liquid fuel without necessitating heat
55 treatment of the air or fuel particles previous

to their introduction into the carburetor while insuring that the resulting gaseous fuel will be maintained at a relative low temperature after carburization.

The present invention contemplates the provision of a carburetor housing through which air is drawn by suction within the path of which mechanical means are provided for disintegrating the particles of liquid fuel and co-mingling said disintegrated fuel particles with the air stream
10 whereby a desired carburization of the liquid will be produced, the carburetor structure including means whereby a variation of the relative proportions of liquid fuel will take place automatically in proportion to the requirements of the device upon which the carburetor is in association.
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The invention is illustrated by way of example in accompanying drawing in which:

Figure 1 is a view in cross-section of the carburetor embodying my invention.

Figure 2 is a view in partial cross-section and elevation of the carburetor as indicated on line 2—2 on Figure 1.

Figure 3 is a view in cross-section of the converting plates as shown on line 3—3 Figure 2 of the drawing.

Figure 4 is an enlarged view in cross-section of the floating fuel valve.

Figure 5 is a diagrammatical view showing the operating levers of my carburetor.

Referring more particularly to the drawing, 10 indicates a housing, mounted upon the lower side of the housing is an air concentrator 11 which is attached to the housing at 12 by means of bolts or screws 13, the air concentrator is preferably frusto-conical in configuration, the lower end of said frusto-conical air concentrator terminating in a cylindrical air intake 14, this intake is provided with a suitable air control valve or damper 15, the internal face 16 of the housing 10 has formed thereon a plurality of spirally formed flutes 17 symmetrically arranged thereon concentrating at the discharge opening 18
45 whereby the volume of gas or vaporized fuel passing through the discharge opening will be given a twisting and whirling action and particularly during the period when it emerges from the discharge opening. Positioned within the housing 10 and formed as a part thereof is a transverse supporting member 19 which terminates centrally of said housing and has formed therein a suitable boss 20 which boss is internally threaded to accommodate a stud 21, said stud has a shoulder 22 formed thereon to accommodate a frictionless bearing 23 upon which a fan 24 is mounted, said fan carries a plurality of vanes 25 formed on its circumferential face. The stud 21 is provided with an extension pin 26 one end of which is threaded within opening 27 in the outside of
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stud 21, the other end of said extensible pin being provided with a screw 28 whereby a suitable fluid diverting means 29 may be held in place within the housing 10 and beneath the fan 24. The fluid diverting means is preferably frusto-conical in shape to match the configuration of the air concentrator 11 and is provided with a plurality of fins 30 formed on the outer face thereof, the fins 30 may be formed on the exterior of the fluid diverting means in any suitable arrangement and in curved or straight lines. The fins are provided for the purpose of diverting the passing volume of air within the air concentrator 11 against the fan vanes 25 of the fan 24. The fan vanes 25 comprise blade section members 31 which are of substantially an inverted V-shape, the two sloping sides of which are indicated at 32 and 33, the member 33 being turned upwardly at its midsection 34 to form a jet 35 which will in turn allow the external edge of the member 33 to be bent upwardly to a vertical position to form a fin 36 which may, if so desired, be formed in any desired configuration depending upon the practicability of its use with the particular device with which the carburetor is in association so that the volume of air passing from the outside of the fan against the vanes 25 will cause the air currents to concentrate at the jets 35 to cause the fan member to revolve at a speed in proportion to the volume of air allowed to enter the air concentrator 11 and to there be supported in its action by the angular deflection of the fins 30 of the fluid diverting member 29 whereby a complete mechanical co-mingling of the air with the fluid will be accomplished during the operation of the fan 24.

The transverse supporting member 19 is also provided with an external boss 36' having a central bore 37 which accommodates a bushing 38, the bushing 38 has a tip 39 provided with a cutaway portion indicated at 40, the cutaway portion 40 provides a passage for the fuel into the distributing jet 41 which is equipped with a suitable opening 42 adapted to direct fuel against the fan tip pin 36, the bushing 38 is also provided with a suitable bore 61 wherein a float valve structure 43 is positioned, this valve structure 43 comprises an internal passageway 44 within which a valve rod 45 is positioned. The end wall 46 of the valve structure 43 has a plurality of fuel jets formed therein which communicate with the cutaway portion 40 of the boss 39 and which jets allows the fuel to pass through the float valve and into the distributing member 41.

In order to prevent the fuel from passing around the outside wall of the float valve structure 43 and through the bore 61 of the bushing 38 the exterior surface of the valve member is provided with a plurality of grooves 47 while still allowing the valve structure to be properly seated within the bushing 38.

A suitable spring member is positioned within the bore 61 of the bushing and against the float valve member 43 and is held in position thereagainst by means of a threaded plug 49 which is threaded into the external opening of the central bore 37 of the bushing 38, the flange of the plug 49 when the plug is positioned within the external opening of the bore rests against the outer face of the bushing 38.

A fuel passageway 50 is formed through the boss 36' and is in association with the opening 51 in the valve structure 43, the outer end of said opening 50 is connected with a suitable fuel supply pipe 52. In order to prevent leakage around

the valve member 43 a suitable packing 53 is positioned around the valve rod 45 and a packing gland 54 is provided to be positioned in a bore of plug 49 to hold the packing in position around the valve rod 45, the external end of valve rod 45 is provided with a lever 55 which is held in position by means of a set screw 56. This lever is in turn connected with a synchronizing rod 57 which is connected at its other end to a lever 63 mounted upon the outer end of shaft 58 of the air control valve 15, these levers are in turn operated by a suitable control lever 59 which is more particularly shown in Figure 5 of the drawing.

The air control valve or damper 15 of the concentrator 11 is mounted within the cylindrical air intake 14 and carries a shaft 58 so that by operating the control lever 59 the opening 14 may be closed or opened to vary and regulate the volume of air passing therethrough to insure that the ratio of air and liquid fuel will be in the proper proportion to meet the particular needs and requirements of the fuel mixture desired under the immediate operating conditions.

In the operation of the present invention the carburetor structure is mounted upon the conventional intake manifold of an internal combustion engine. Due to the fact that the intake manifold is of the conventional type it is, therefore, not shown. The discharge opening 18 is, of course, in alignment with the intake opening of the manifold. When the pistons of the engine are moved a suction action is formed through the intake manifold which draws a sufficient predetermined amount of air in through the intake opening 14 of the carburetor structure which flows upwardly through the air concentrator against fins 30 of the fluid diverting member 29, the air then passes along the face of the fins 36 and is concentrated at the lower side of the fan member 24. Due to the arrangement of the fan vanes 25 of the fan member this concentration of air causes the fan member to rotate upon its frictionless bearing 23. As the rotating action of the fan is started a predetermined amount of gasoline or hydrocarbon fuel will enter the float valve structure 43 through the fuel supply pipe 52 and will pass around valve rod 45 and through the fuel jets 62 of the end wall 46 of the float valve structure. This fuel then passes through the cutaway portion 40 of the bushing 38 which carries the valve structure and downwardly through the distributing jet 41, the end of which is positioned just above the fins 36 of the fan vanes 25. The rotation of the fan 24 causes the fins 36 to pass successively beneath the distributing jet 41 and which in turn causes these tip members to impact against the inflowing stream of liquid through the distributing jet. This mechanical action tends to mechanically disintegrate the liquid fuel by impact. As the fan member 24 rotates the incoming air from the air intake and the air concentrator forces itself upwardly through the openings or jets 35 and the upper face of the blade section members 31. The upwardly moving air through the jets 35 is commingled with the disintegrated fuel as it passes through the jets and partial vaporization takes place, further vaporization of the fuel is accomplished by the upturned tip members 36 and the inverted V-shaped section members 31 as the fan rotates to more thoroughly co-mingle the air with the disintegrated and partially vaporized liquid fuel thus the air and gaseous mixture is completely vaporized and the suction action through the discharge opening draws the vapor-

ized fuel upwardly through the housing 10 where it is given a twisting and whirling movement by means of the spirally formed flutes 17 on the inside of the housing. This twisting and whirling motion insures that the air and fuel particles will remain in a completely vaporized condition. This vaporized fuel then passes outwardly through the discharge opening 13 and into the intake manifold of the engine. The vaporized fuel enters the manifold at a pressure greater than atmospheric due to the added impetus given the gas by the action of the fan 24. The proper proportion of air and liquid fuel is obtained by the arrangement of the lever 55 which is positioned on the outer end of the valve rod 45 and the synchronizing rod 57 which is connected at one end to the lever 55 and at its other end to lever 63 which is mounted upon the outer end of shaft 58 of the air control valve 15 which is positioned within the cylindrical air intake opening 14 of the air concentrator. The levers are so arranged as to work in direct relation to each other and they have been set to maintain a predetermined ratio of air and liquid fuel. In the operation of the device if an increased amount of vaporized fuel is necessary to develop additional horse power in the engine the levers and the synchronizing rod are operated by a control lever 59. This control lever when operated moves the damper 15 to increase the air intake opening and move the valve rod 45 of the valve structure 43 to allow an increased amount of liquid to pass through the valve and into the distributing jet 41 thus the arrangement of the levers here shown with their control lever insures that a proper predetermined ratio will always exist between the inflowing air and the incoming liquid fuel. It will thus be seen from the foregoing that I have provided a carburetor structure for use in connection with internal combustion engines which provides a complete mechanical carburization of a liquid fuel to insure that the resultant gas which has been formed in the carburetor will be completely carbureted by mechanical means whereby a gaseous hydrocarbon fuel is formed which when used in an internal combustion engine will be completely combusted and the heretofore objectionable carbon monoxide gases and carbon deposits resulting from incomplete combustion will not exist and that I have provided a simple, inexpensive mechanical structure to obtain this result and to overcome the objectionable features of the conventional type of carburetor now in use. While I have shown the preferred form of my invention as now known to me it will be understood that various changes may be made in the combination, construction, and arrangement of parts by those skilled in the art without departing from the spirit of my invention as claimed.

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

1. In the carburetors of the class described adapted to be used in connection with the internal combustion engines, comprising, a housing having a hemispherical upper portion with a discharge opening leading centrally therefrom, said housing having its internal surface provided with spirally ridged means concentrating at the housing discharge opening, an air intake and concentrating means connected to said housing adapted to control a volume of air passing internally into said housing and vertically therethrough, an air diverting means positioned internally within said

housing adapted to divert the flow of air outwardly against the sides of the said air intake and concentrating means and the said internal wall surface ridged with said spirally arranged means, thus causing said volume of air to whirl when passing through the said intake means and emerging from the said discharge opening, fuel mixing means revolvably positioned within said housing in a plane at right angles to the path of the air causing the said passing volume of air to be mixed with fuel said means having vertical fins traveling in said plane, a fuel jet introducing fuel into the path of said fins, thus forming combustible fuel vapor, and controlling means connected externally of said housing in juxtaposition to said fuel mixing means and the said air intake means, to control the quantity of fuel passing into said fuel mixing means and proportionately controlling the volume of air entering the said intake means of the said carburetor, substantially as 20 described.

2. A carburetor of the class described, comprising a shell-like housing having an air inlet centrally of its lower end and a gaseous fuel outlet centrally of its upper end and in longitudinal alignment with the air inlet, a fuel mixing device forming a partition within the housing and intermediate said inlet and outlet, said mixing device freely rotating around the central axis of the housing and in a plane at right angles thereto, the mixing device being formed with blades between which air from the inlet side of the housing passes in transit to the outlet side of the housing and whereby the mixing device is impelled to rotate upon its axis, vertically disposed fins spaced around the circumference of the mixing device, and projecting upwardly from the mixing device, and means for introducing a jet of liquid fuel into the path of travel of said fins, whereby the fuel will be atomized to thereafter commingle with the flow of air and produce a gaseous fuel.

3. Same as claim 2, adding the following: and means for diverting the flow of air outwardly and upwardly whereby it will pass through the circumferential area of the mixing means.

4. Same as claim 2, adding the following: and means controlling the volumetric flow of air through the housing and the volumetric feed of liquid fuel thereto.

5. A carburetor of the class described, comprising a shell-like housing having an upper hemispherical portion with a fuel outlet centrally thereof, an inverted conical portion therebeneath with an air inlet centrally thereof, the air inlet and the fuel outlet being in axial alignment and the two portions of the housing joining along the equatorial portion of the top, a bearing member supported centrally of the housing, a rotary fan mounted upon the bearing member to rotate upon the central vertical axis of the housing and to divide the housing along its equatorial plane, said fan being characterized as having inclined blades adjacent its circumferential margin, vertically extending tips projecting from the upper surfaces of the blades, and means for introducing a jet of liquid fuel into the path of the tips on the blades, whereby the fuel will be atomized and will commingle with the air passing between the blades to produce a gaseous fuel.

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