

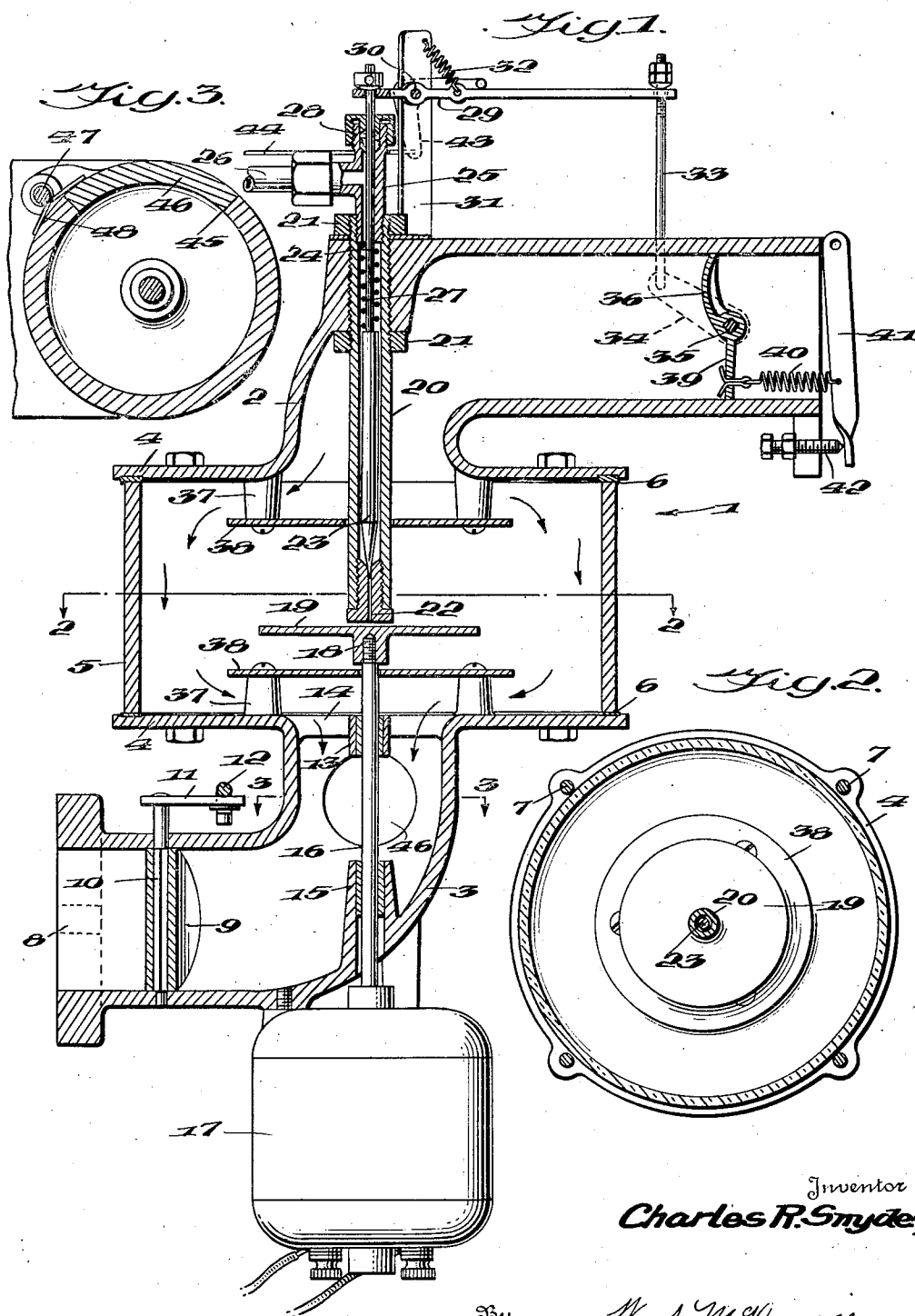
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CARBURETOR

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CARBURETOR

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1 Claim. (Cl. 261—50)

This invention relates to carburetors for use with internal combustion engines to gasify the liquid fuel used in the operation of said engines. The invention is particularly directed to a carburetor which will mechanically break up or reduce liquid fuel into finely divided particles in order that it may be more readily and completely vaporized to secure more perfect combustion and a consequent conservation of fuel. A carburetor of this general type has been illustrated in my co-pending application, Serial No. 119,477, filed January 7, 1937, of which this application is a continuation-in-part.

The primary object of this invention resides in the provision of a carburetor having a casing in which a mixing chamber is formed, there being an inlet for air to enter the mixing chamber and an outlet for the carbureted fuel, the latter being adapted for connection to the intake manifold of an internal combustion engine, a rotary disk being provided in the mixing chamber to receive liquid fuel and reduce it by centrifugal force into a fine mist which will combine with air passing through the mixing chambers to produce an explosive mixture, an electric motor being connected with said disk to cause its rotation at the speed most conducive to a complete vaporization of the fuel.

By the provision of mechanical means for vaporizing the liquid fuel, many of the parts of a conventional carburetor may be eliminated, such as the float and its chamber, and improved engine performance attained.

An outstanding example of an instance where a marked improvement will be shown is in aeroplane engine operation; with the proposed carburetor in which the fuel is fed directly to the carburetor under pump pressure the engine will operate equally well in any position, even inverted, for the carburetor does not depend upon the maintenance of a certain level of liquid or the flow of fuel by gravity to the carburetor.

Other objects and advantages will become apparent from the following description of the single form of the invention disclosed in detail in the accompanying drawing.

Fig. 1 is a vertical longitudinal sectional view taken through a carburetor formed in accordance with the present invention;

Fig. 2 is a horizontal sectional view taken through the mixing chamber of the carburetor on the plane indicated by the line II—II of Fig. 1;

Fig. 3 is a similar view taken through the outlet tube leading from the mixing chamber on the plane indicated by the line III—III of Fig. 1.

Referring more particularly to the drawing, the numeral 1 designates the carburetor in its entirety which is formed to include a casing composed of a pair of tubular inlet and outlet connections 2 and 3, each having an enlarged flange 4 at one end. The flanges of the connections are disposed in registration and are spaced by a cylindrical glass body 5 which, together with the flanges, forms the mixing chamber of the carburetor. Gasket rings 6 are disposed between the ends of the glass cylinder and the flanges to preclude the escape of liquid fuel at these points. The outer peripheries of the flanges 4 are provided with ears through which bolts 7 pass to hold the flanges in engagement with the ends of the glass cylinder. The outlet conduit is elbow-shaped and has the end opposite that on which the flange 4 is formed provided with a smaller flange having openings 8 through which bolts extend to secure the carburetor to the intake manifold of an engine. The horizontal portion of the connection 3 has a throttle valve 9 positioned therein and secured to a transversely extending shaft 10, the body of the shaft being squared to cause the throttle valve to rotate therewith.

The outer end of the shaft 10 is provided with an arm 11 which is connected to the end of a rod 12 extending to the accelerator pedal or other carburetor controlling device. The outlet connection is also provided with an axially disposed bearing 13 at the end on which the flange 4 is provided. The bearing 13 is supported by a web 14 extending from the sides of the body 3. The outer wall on the outside of the elbow 3 is also formed with a bearing 15 in alignment with the bearing 13. A shaft 16 is rotatably supported by these bearings. The outside of the connection has a plurality of bosses formed thereon for the purpose of connecting an electric motor 17 thereto. The shaft 16 may be a continuation of the armature shaft of the motor as shown, or it may be a separate shaft coupled with the armature shaft. The upper inner end of the shaft 16 is threaded as at 18 for connecting a smooth flat disk 19 thereto. The disk extends parallel to the flanges 4 and rotates in a plane extending transversely of the glass cylinder.

When the motor receives electric current, the disk will be revolved at the same rate of rotation as the motor. The inlet connection 2 is also elbow-shaped and has its outer wall provided with an opening in axial alignment with the shaft 16. A fuel supply pipe 20 extends through the opening in the inlet connection and is secured

in position therein by lock nuts 21 threaded on the tube and engaging the inner and outer surfaces of the boss. The lower end of the pipe 20 is threaded on its interior to receive a nozzle 22 formed at its inner end with a valve seat. A small orifice extends from the valve seat to the outer end of the nozzle. The nozzle is spaced a slight distance from the upper surface of the disk 19 and is disposed in registration with the center of rotation of the disk. A needle valve 23 engages the valve seat on the nozzle and extends longitudinally through the pipe 20 and has its reduced upper end 24 extending through a T-fitting 25 secured to the upper end of the pipe.

A fuel supply line 26 is connected with one branch of the T-fitting for supplying fuel to the carburetor. The needle valve is resiliently held in engagement with the nozzle seat by a coil spring 27 disposed between the inner end of the T-fitting and the shoulder produced by reducing the valve stem. Where the reduced end of the valve stem extends beyond the confines of the T-fitting, the latter is provided with a packing gland 28 to prevent the escape of liquid fuel. In this instance, the fuel is fed to the carburetor under pressure to insure flow to the carburetor regardless of the position with respect to the horizontal.

To actuate the valve in opposition to the spring 27, the outer end of the valve passes through a lever 29 pivoted as at 30 to a bracket 31 secured to the inlet fitting by the outer nut 21. A tension spring 32 extends between the bracket 31 and the lever to resist movement to a valve opening position. The opposite end of the lever 29 is connected by a link 33 with a lever 34 secured to an end of a shaft 35 extending transversely of the horizontal portion of the inlet connection. Within the inlet connection, the shaft 35 is provided with a flapper valve 36 which is engaged by air moving into the inlet connection and moved in proportion to the speed thereof. When the flapper valve is moved inwardly, the outer end of the arm 34 will move downwardly, drawing with it the link 33. As the upper end of the link is connected to the lever 29, the latter will move with the link and the opposite end of the lever will cause the needle valve to raise and move away from the seat in the nozzle, permitting the fuel to flow onto the disk 19. Due to the rotation of the disk, the fuel will be broken up and thrown by centrifugal force against the inner surface of the cylinder 5. As the outlet of the carburetor is connected to the intake manifold of the engine, the vacuum in the latter will be transmitted to the mixing chamber of the carburetor and air will be drawn through the inlet and mixed with the vaporized fuel thrown from the edge of the disk 19.

To cause the air passing through the mixing chamber to move downwardly along the inner walls of the cylinder, the flanges 4 are provided with bosses 37 to the outer ends of which are secured baffle plates 38. The bosses 37 serve to hold the baffles spaced from the flanges 4 and provide circular passageways through which the air will move toward the inner surface of the

cylinder. When the air reaches the inner surface of the cylinder, it will be guided downwardly until it engages the lower end of the mixing chamber. Then the air will move toward the center and the outlet formed therein.

To provide for a flow of air for idling purposes, the shaft 35 also supports a second valve section 39 which is resiliently held in a closed position by a coil spring 40 which extends from the valve plate 39 to a pivoted lever 41. The tension of the spring 40 is varied by moving the end of the lever 41 through the adjustment of a set screw 42 extending through a boss formed on the connection 2. The bracket 31 is also provided with a bell crank lever 43 which is operated by a choke wire 44 to move the valve 23 to an open position when it is desired to feed an increased amount of fuel to the disk 19. This operation is performed when the motor is started in cooler weather.

To prevent injury to the carburetor in the event the motor backfires, the wall of the outlet connection is provided with a port 45. This port is normally closed by a disk 46 pivoted as at 47 to the outlet connection. The disk is held closed by a spring 48 which will permit the plate 46 to swing to an open position when the super-atmospheric pressure occurs in the carburetor. Ordinarily the pressure in the carburetor is slightly below atmospheric pressure due to the suction induced therein by the motor and the plate 46 will tend to remain closed enabling a very light spring 48 to be used.

From the foregoing, it will be apparent that a carburetor has been provided which will mechanically break up liquid fuel into a fine mist which may be readily absorbed by air passing therethrough. Due to the fact that the mechanism for breaking up the liquid fuel is motor driven, a uniform vaporization will be secured as well as better motor performance.

What is claimed is:

In a carburetor, a pair of elbow-shaped sections, each provided with a flange at one end, said flanges being arranged in opposed relationship, a sleeve-like element disposed between said flanges and cooperating therewith to form a mixing chamber, a power driven shaft journaled in one of said elbow-shaped sections and extending axially into said chamber, a disk-shaped vaporizing element secured for rotation with said shaft, a tubular conductor carried by the second section and projecting into said chamber, said conductor terminating adjacent said disk, a valve disposed for longitudinal movement in said conductor, spring means for holding said valve in a normally closed position, said valve being formed with an exteriorly projecting portion, a line for conveying liquid fuel under pressure to said conductor, air actuated means movably supported in said second section, lever means pivotally supported by said second section, and means connecting said air actuated means and the exterior projection of said valve to said lever whereby movement will be imparted to said valve in proportion to the movement of said air operated means.

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