Aug. 4, 1942. J. WYSS 2,291,671

CARBURETOR

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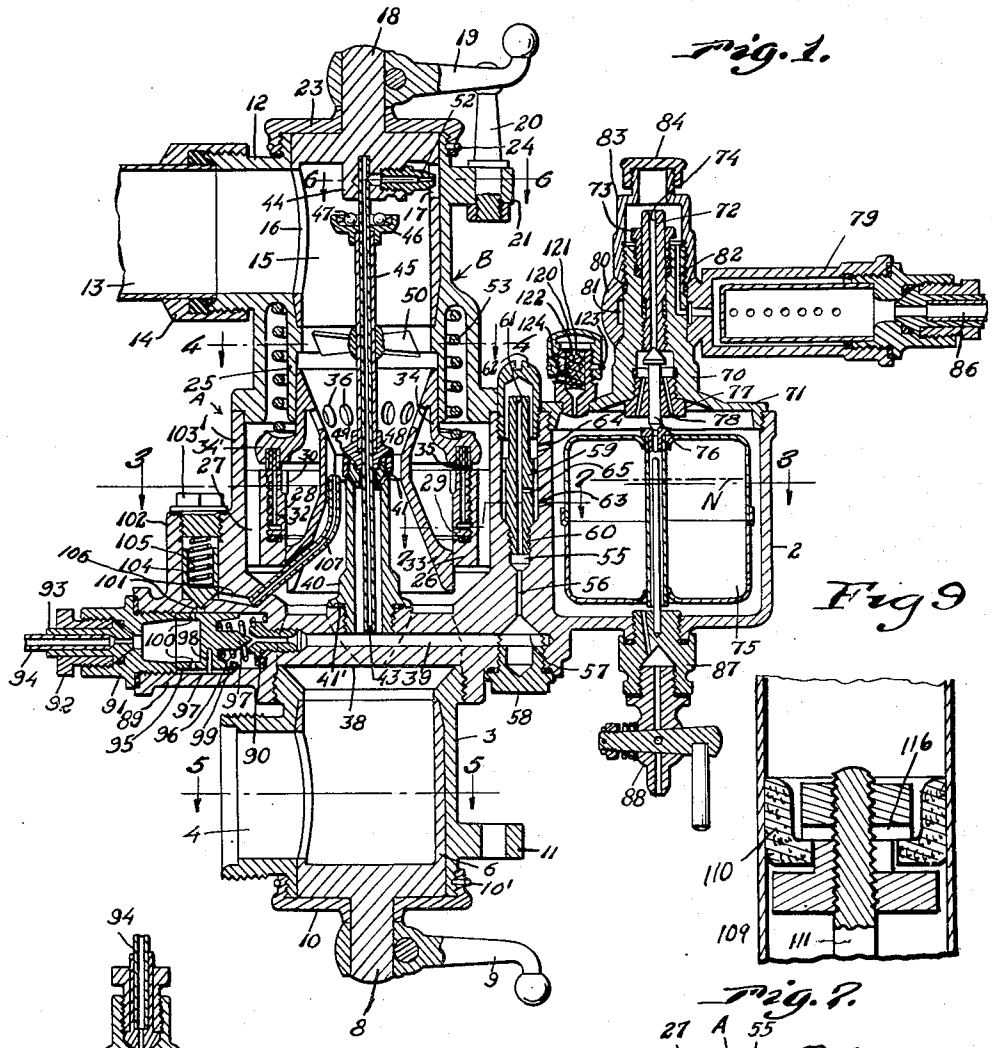


Fig. 1.

Fig 9

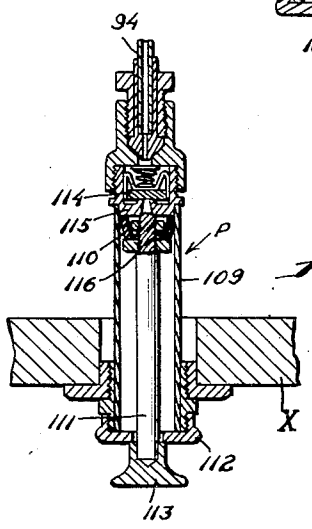


Fig. 8.

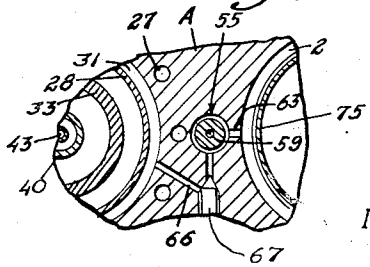


Fig. 7.

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Fig. 2.

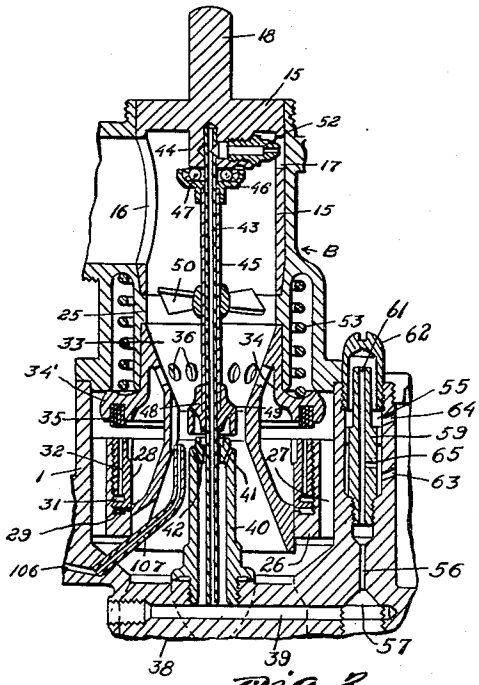


Fig. 5.

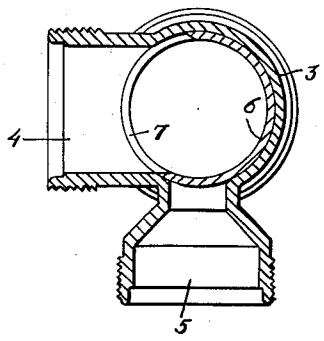


Fig. 6.

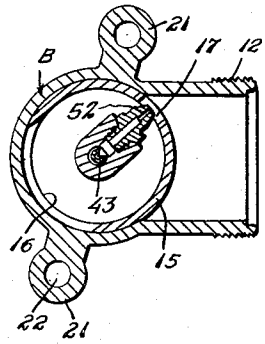


Fig. 3.

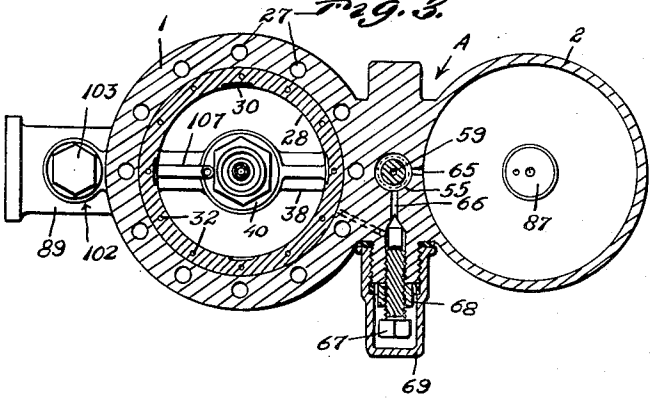
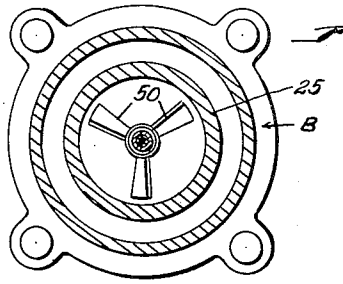


Fig. 4.



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CARBURETOR

Joseph Wyss, Zurich, Switzerland

Application November 28, 1940, Serial No. 367,635

2 Claims. (Cl. 261—41)

This invention relates to a carburetor, the general object of the invention being to provide a carburetor which will be extremely economical in the use of fuel and which will prevent to a great degree waste of fuel into the exhaust of the motor so that there will be practically no unburned surplus gases discharging into the atmosphere from the exhaust.

Another object of the invention is to provide an auxiliary fuel supply and air supply with means for regulating the flow thereof through the engine by the speed of the engine and also to provide means whereby the fuel supply is not effected by atmospheric conditions.

Another object of the invention is to provide means for providing a small amount of fuel when the engine is idling or running at slow speed with means for closing the supply when the throttle is adjusted to cause the engine to operate at a greater speed.

A still further object of the invention is to automatically control the flow of mixture to the engine in accordance with the speed of the engine.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a vertical sectional view through the carburetor with the parts in closed position.

Figure 2 is a fragmentary vertical sectional view with the parts in open position.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a section on the line 5—5 of Figure 1.

Figure 6 is a section on the line 6—6 of Figure 1.

Figure 7 is a section on the line 7—7 of Figure 1.

Figure 8 is a longitudinal sectional view through the air pump for the starter mechanism.

Figure 9 is a detail view of the air pump.

In these views the letter A indicates a one piece body which forms the main chamber forming member 1 and the float chamber forming member 2. A tubular member 3 is threaded into the lower end of the member 1 and is provided with the hot air inlet nipple 4 and the cold air nipple 5, the air entering the nipple 4 being heated in any suitable manner and the nipple 5 being connected to any suitable form of air conduit. A tubular control member 6 is rotatably arranged in the member 3 and has an opening 7 therein for communication with either one of the nipples or both, as desired. A stem 8 depends from the control member 6 and has a handle 9 thereon for operating the control member and this stem depends through a bottom closure member 10 fastened to the bottom of the member 3 by a spring latch 10'. Suitable stop members depend from the member 3 for limiting movement of the handle 9, these stop members being located in holes in projections 11 carried by the member 3.

A tubular member B is suitably fastened to the upper end of the member 1 and has a laterally extending nipple 12 extending therefrom which is adapted to be connected to a pipe 13 by a packing gland 14, this pipe 13 being connected to the inlet manifold of an engine. A control member 15 of tubular form is located in the upper portion of the member B and has a large opening 16 therein for controlling communication between the member 15 and the nipple 12 and it also has a small opening 17 therein which is arranged opposite to the opening 16, this opening 17 is placed in communication with the nipple when the control member is adjusted to a certain position. The top of the control member 15 is closed and a stem 18 rises therefrom and is connected to a handle 19 operating between a pair of posts 20 for limiting movement of the control member and its handle 19. Only one of these posts 20 is shown but they are carried by the lateral projections 21 on the upper portion of the member B and each post extends into a hole 22 in the lateral projection, as shown in Figure 1. The projections 11 of the member 3 carry similar posts 20 but these posts are not shown. A cover member 23 covers the upper end of the member B and is held in place by a spring latch 24 and the stem passes through this cover member. An internal tubular part 25 extends downwardly from the lower part of the member B which contains the control member 15 and the lower end of the control member has a rotary fit in the upper portion of this member 25 and said member 25 is spaced from the outer wall of the lower portion of the member B to provide a space for a spring hereinafter referred to. The member 25 forms a portion of the passage for the mixture flowing from the carburetor into

the pipe 13. The member 1 intermediate its ends is provided with an internal thickened part 26 of annular shape with its upper and lower ends flat and this member is provided with the vertically arranged air-holes 27 which are arranged in an annular row in the same and adjacent the point where this thickened part joins the internal wall of the member 1. The internal wall of this thickened part 26 has an annular recess therein which extends from the top of the thickened part to a point spaced from the bottom thereof and a ring member 28 is threaded in this recess, a gasket 29 being engaged by the lower end of the member 28 and the bottom wall of the recess. The ring member is provided with notches 30 on the upper end of its inner wall for receiving a suitable tool whereby this ring member can be threaded into place or removed. The ring member is provided with an annular channel 31 adjacent its lower end and small vertically arranged passages 32 are formed in the ring member and extend from the top thereof to the channel. A combined Venturi tube and valve 33 is vertically arranged in the main part of the carburetor body and is supported for sliding movement and has its lower portion slidingly engaging the lower part of the internal wall of its thickened part 26 with its upper end slidingly engaging the member 25. The upper portion of the tube 33 has a depending portion 34 formed with a lateral or outwardly extending enlargement 34' which has a channel therein for receiving a valve forming ring 35, this ring, when the tube 33 is in lowered position closing the upper ends of the passages 32 and also closing communication between the air passages 27 and the Venturi tube 33 which has holes 36 therein, in its upper portion, for the passage of this air and fuel from the passages 27 and 32 when the Venturi tube is raised to raise the valve ring 35 from the upper end of the thickened part 26, as shown in Figure 2.

The Venturi tube is moved upwardly when the suction from the engine in the upper part of the carburetor reaches a certain degree. A bridge piece 38 extends across the lower end of the member 1 and contains a longitudinally extending bore or passage 39 for receiving fluid as will be hereinafter described and a main spray pipe 40 has its reduced lower end threaded in the bridge piece with the lower end of the pipe in communication with the passage 39. A gasket 41' is located between a shoulder formed on the lower part of the pipe 40 and a seat forming portion on the top of the bridge piece. The upper end of the spray pipe 40 terminates adjacent the smallest part of the Venturi tube and said upper end of the pipe 40 is closed and is formed with the upwardly and outwardly sloping jets 41 and the inner jets 42 which open upwardly into a socket formed in the top of the pipe 40. A tube 43 has its upper end welded or otherwise fastened in a depending centrally arranged part 44 on the top of the control member 15 and said tube extends downwardly through the tube 40 to a point flush with the lower end of the tube 40 so that this tube 43 is in communication with the passage 39. A shorter tube 45 is slidably and rotatably arranged on the tube 43 and carries a race 46 at its upper end for the balls 47 which engage the lower end of the projection 44 when the tube 45 is in raised position and the lower end of the tube 45 carries a valve cap 48 at its lower end which has a skirt portion for fitting around the upper portion of the tube 40 to close the jets 41 and 42 when the tube 45 is in lowered position and said cap 48 is also provided with a central lower portion for engaging the socket at the upper end of the tube 40 when in lowered position. Upwardly and outwardly sloping jets 49 are formed in this cap and communicate with the space between the skirt and the central depending portion thereof. Blades 50 are attached to an intermediate portion of the tube 45 to cause the same to rotate when the mixture is passing through the carburetor under a certain amount of suction produced in the manifold of the engine. A horizontally arranged low speed jet 52 is carried by the projection 44 and is in communication with the upper end of the tube 43 and the outer end of this jet is located in the small opening 17 of the control member 15 so that this jet will not be acted upon by the suction of the engine when the opening 17 is out of communication with the passage formed by the parts 12 and 13 to the manifold of the engine.

A spring 53 is located in the space formed by the depending part 25 and a part of the exterior wall of the member B and bears against the enlargement 34' of the Venturi tube and tends to press the tube downwardly to cause the valve ring 35 to close the passages 32 and the air passages 27.

As will be seen the air entering either one of the nipples 4 or 5, or both, will pass into the lower end of the member 1 and then pass through the Venturi tube into the control member 15 and then through the nipple 12 and pipe 13 to the engine and in its passage it will be mixed with liquid fuel and some of the air will flow through the passages 27, when the Venturi tube is in raised position and into the upper portion of the Venturi tube through the holes 36.

A small vertically arranged chamber 55 is formed in the body A between the float chamber and the member 1 and has an intermediate reduced part which is threaded and a small passage 56 connects the lower end of this chamber with a sump chamber 57 which is connected with the passage 39 and the lower end of the chamber 57 is closed by a cap nut 58. An elongated and bored plug 59 has a reduced lower end threaded in the threaded part of the chamber 55, as shown at 60 with the bore of the member 59 forming a continuation of the passage 56 and said plug is spaced from the walls of the chamber 55. The upper end of the plug is formed with a kerf 61 for receiving a screw-driver or the like and a screw cap 62 closes the upper end of the chamber 55 and is spaced from the upper portion of the plug. A fuel port 63 connects an intermediate part of the chamber 55 with the float chamber 2 and an air port 64 connects the upper portion of the chamber 55 with the top of the chamber 2 and a port 65 connects an intermediate portion of the bore of the plug 59 with the chamber 55 above the port 63, these ports being located slightly below the fuel level N in the chamber 2. As will be seen the plug 59 can be removed and by providing a plurality of plugs having different sizes of ports 65 therein the desired amount of liquid from the chamber 2 can be supplied to the parts of the carburetor. The air passing from the top of the chamber 2 through the port 64 will pass upwardly through the cap 62 and flow down the bore of the plug to provide a proper flow of the liquid fuel to the parts.

A forked conduit 66 connects the channel 31 in

the ring member 28 with the chamber 55, see Figure 7, and this conduit is controlled by a screw 67 thread in an enlarged part of the conduit and held in adjusted position by a nut 68, the parts being enclosed in a screw cap 69 as shown in Figure 3. Thus by adjusting the screw 67 the flow of fuel through the conduit 66 can be regulated.

A tubular neck 70 is formed on a cap 71 of the float chamber 2 and a tube 72 is threaded in this neck and has a valve seat at its lower end and a gland 73 is provided for the upper portion of the tube, the upper end of the tube having a kerf 74 therein for a screw-driver or the like for adjusting the tube so as to regulate the position of the valve seat to regulate the fuel level in the float chamber. The float is shown at 75 and the valve which is controlled by the float at 76, the upper end of the valve engaging the seat of the tube 72 and the valve slides in a nut 77 threaded in the lower part of the neck and has the ports 78 therein for permitting the passage of the fuel from the neck into the float chamber. A filter chamber 79 has a circular part 80 at one end thereof which is swivelled on the neck and said part 80 has a channel 81 therein for receiving fuel from the filter chamber and a conduit 82 is formed in the neck and leads from the channel 81 to the top of the neck and into a chamber formed by a cap member 83 threaded to the top of the neck and having its upper end closed by a small cap 84. Thus the fuel flowing from the filter chamber will flow into the member 83 and then pass through the tube 72 into the float chamber when the float lowers to open the valve 76. Of course, if the valve is raised by upward movement of the float the flow of fuel is stopped. The fuel supply pipe is shown at 86 and leads from a supply tank into the filter chamber, as shown in Figure 1.

A drain plug 87 is threaded into the bottom of the float chamber and a drain cock 88 is threaded into the plug so that the float chamber can be drained whenever desired.

A laterally extending chamber forming member 89 is formed on the lower part of the body A and the chamber thereof is in communication with the passage 39 through means of a calibrated plug 90. A tubular member 91 is threaded in the outer end of the member 89 and has a chamber in its inner end forming a continuation of the chamber in the member 89 and its outer end is threaded to receive a screw cap 92 which holds a nipple 93 in place, this nipple receiving one end of a tube 94. This tube has its outer end connected to an air pump P shown in Figure 8 and a piston 95 is arranged in the chamber of the member 89 and is normally held against the inner end of the member 91 by a spring 96 and said piston has a valve part 97' for engaging a seat formed on the plug 90 when the piston is pressed to the right in Figure 1. A longitudinally extending passage 97 is formed in the inner wall of the member 89 and a pin 98 is carried by the piston and extends into the passage to prevent rotary movement of the piston. A port 99 is formed in the inner end of the piston to communicate with the passage 97 and ports 100 are formed in the outer part of the piston, one port communicating with the passage 97 with the other port located in the top of the piston for communicating with a port 101 in the member 89 when the piston is moved to the right in Figure 1. This port 101 is formed in the bottom of a chamber formed by a tubular upright part 102 on the member 89, the top of which is closed by a cap 103 and a valve 104 closes the port 101 by a spring 105 in the chamber forming member 102. A passage 106 leads from the chamber of the member 102 to a tube 107 which extends upwardly into the Venturi tube 33 and terminates at the center of the Venturi tube, the tube 33 having notches therein for the passage of the tube 107 as shown in Figure 1.

The air pump P is carried by the instrument board X or any other suitable part of the vehicle, as shown in Figure 8 and includes a cylinder 109 having a cup piston 110 therein which is connected to the inner end of a rod 111 passing through the cap 112 of the cylinder and the rod has a knob 113 at its outer end. A spring-pressed valve 114 normally engages a seat 115 in the inner end of the cylinder and a port 116 is uncovered when the rod 111 is pulled outwardly by means of the knob 113. Thus when the rod 111 is pulled outwardly a vacuum is created in rear of the piston 110 so that air will enter through the port 116 and then when the rod is pushed inwardly this air will be forced by the valve 114 and will pass through the tube 94 into the chamber of the member 89. This chamber in the member 89 contains fuel which flows from the passage 39 through the plug 90, through the port 99, passage 97 and lower port 100 into the chamber formed by the piston and the inner end of the member 91. Then when the air is pressed into this chamber the piston is moved to the right in Figure 1 which causes the valve 97' to engage the plug 90 which also moves the port 99 out of register with the passage 97 and places the upper port 100 in communication with the port 101 so that the air pressure will force the fuel through said port 101 raising the valve 104 so that the fuel will pass through the passage 106 into the tube 107 which sprays the fuel upwardly through the upper portion of the Venturi tube 33 and thus it enters the cylinders of the engine to provide a charge for initially starting the engine. Of course, air mixes with the fuel charge from the air chamber 3 which passes upwardly into the Venturi tube 33. This provides easy starting in cold weather.

When the engine is running at low speeds the throttle or control member 15 is turned to place the port 17 and the nozzle 52 at the nipple 12 and with the parts in this position fuel will pass from the passage 39 through the tube 43 and nozzle 52 into the nipple 12 and pipe 13 and thus to the cylinders of the engine and air from the member 3 will pass up through the Venturi tube and through the port 17 to mix with this fuel and during this operation of the engine the Venturi tube 33 will be held in its lowest position by the spring 53, as shown in Figure 1.

Of course, the air pump need be operated but a few times to provide enough fuel for the initial starting of the engine and as soon as manipulation of the pump is stopped the starter valve or piston 95 is moved back by its spring to the position shown in Figure 1 so that the upper port 100 is out of register with the port 101 and the valve 104 closes so that no more fuel will pass through the pipe 107.

When it is desired to have the engine run at a high speed the throttle or control member 15 is turned to the position shown in Figures 1 and 2 so that the large opening 16 will be in communication with the nipple 12 and the position of the opening 16 relative to the nipple 12 will regulate the speed of the engine, the engine run-

ning at full speed when the opening 16 is in full communication with the nipple 12.

Air is admitted to the top of the float chamber 2 by a hollow plug 122 threaded into the cap 71 of the float chamber and containing a filter member 121 and the air to the plug is regulated by a screw cap 120 which is held in adjusted position by the spring catch 123, the air ports being shown at 124.

After the engine is started by the operation of the air pump P forcing a mixture through the tube 107, the suction created by the engine acts on the propeller blades 50 and starts the outer tube 45 rotating and also raises this outer tube so that fuel flows from the main supply tube 40 from the passage 39 through the ports 41 and 42 and mixes with the air coming from the air supply member 3 and flowing through the Venturi tube 33. Of course, the rotating blades act to thoroughly mix the fuel with the air and the rotating cap 48 with the jets 49 also acts to thoroughly mix the fuel with the air. When the suction increases the outer tube 45 raises to an extent where the ball bearing 47 will engage the lower end of the member 44. When the suction from the engine reaches a certain degree the Venturi tube 33 will raise against the action of the spring 53 and thus an additional mixture will flow to the engine from the air passages 27 and the ports 32 in the ring member 28 as the valve parts 34' and 35 raise. The additional air passing from the passages 27 will flow over the upper ends of the ports 32 so that the air and additional fuel will be thoroughly mixed and then this mixture will pass through the holes 36 in the upper part of the Venturi tube and be further mixed by the blades 50.

As before stated the flow of fuel to the passages 32 can be regulated by the screw 67 and by substituting one member 59 for the member previously used the calibrated port 65 can be changed to suit the specific condition under which the motor is operating. Also by arranging the ports 63 and 65 a slight distance below the fuel level and by providing the controlled air supply to the top of the float chamber the fluid passing through the calibrated port 65 is not effected by atmospheric pressure or the suction of the engine and this is also true of the fuel flowing into the passages 32. The outer tube 45 will move upwardly and downwardly as the suction from the engine varies so that the flow of fuel from the main supply tube 40 is automatically controlled as is the additional supply of air and fuel from the passages 27 and 32.

If the engine should stop suddenly the parts return to the position shown in Figure 1 so that there is no waste of fuel or contamination of the air from the exhaust when the motor starts up again.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts provided that such changes fall within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. In a carburetor, a vertically arranged body having a passage therethrough having an air inlet at one end, means for connecting the other end of the passage to an engine, an internal enlargement in the body adjacent the inlet end thereof and the internal walls of which form part of the air passage, said enlargement having vertically arranged air passages therein opening out through the top and bottom of the enlargement, an annular row of jets in the enlargement opening out through the top thereof and said jets being placed inwardly of the air passages in the enlargement, a Venturi tube slidably arranged in the passage of the body and having its outer end sliding in the enlargement and with the Venturi tube having that part above its outer end spaced from the enlargement, an annular member connected with the inner end of the Venturi tube and having its major portion spaced from an intermediate part of the tube, a valve member carried by the annular member for closing the jets and the air passages in the enlargement, spring means for holding the Venturi tube in position with the valve seated on the enlargement and closing the jets, said Venturi tube being moved in an opposite direction by the suction created in the passage of the body by the engine, a main fuel supply pipe extending into the tube from the inlet end thereof and means for connecting the said pipe and the jets to a supply of liquid fuel.

2. In a carburetor, a body having a vertical passage therethrough having an air inlet at one end, means for connecting the other end of the passage to an engine, a main supply pipe extending into the passage through the inlet end thereof, means for connecting the supply pipe to a source of liquid fuel, the inner end of the pipe having jets therein for the escape of liquid fuel, a shaft rotatably and slidably supported in the body and passing longitudinally through the passage, blades on the shaft acted on by the flow of air through the passage for imparting rotary movement to the shaft and also a sliding movement thereto, a valve member carried by the shaft for closing the jets of the supply pipe when the shaft is in normal position and opening the jets when the shaft is raised by the flow of air through the passage, the jets extending upwardly and outwardly at an angle and the valve member having upwardly and outwardly sloping jets through which passes some of the fuel escaping from the jets of the supply pipe.

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