Aug. 20, 1935. W. C. RAYFIELD 2,012,248

CARBURETOR

Filed Nov. 25, 1932 2 Sheets-Sheet 1

Fig. 1.

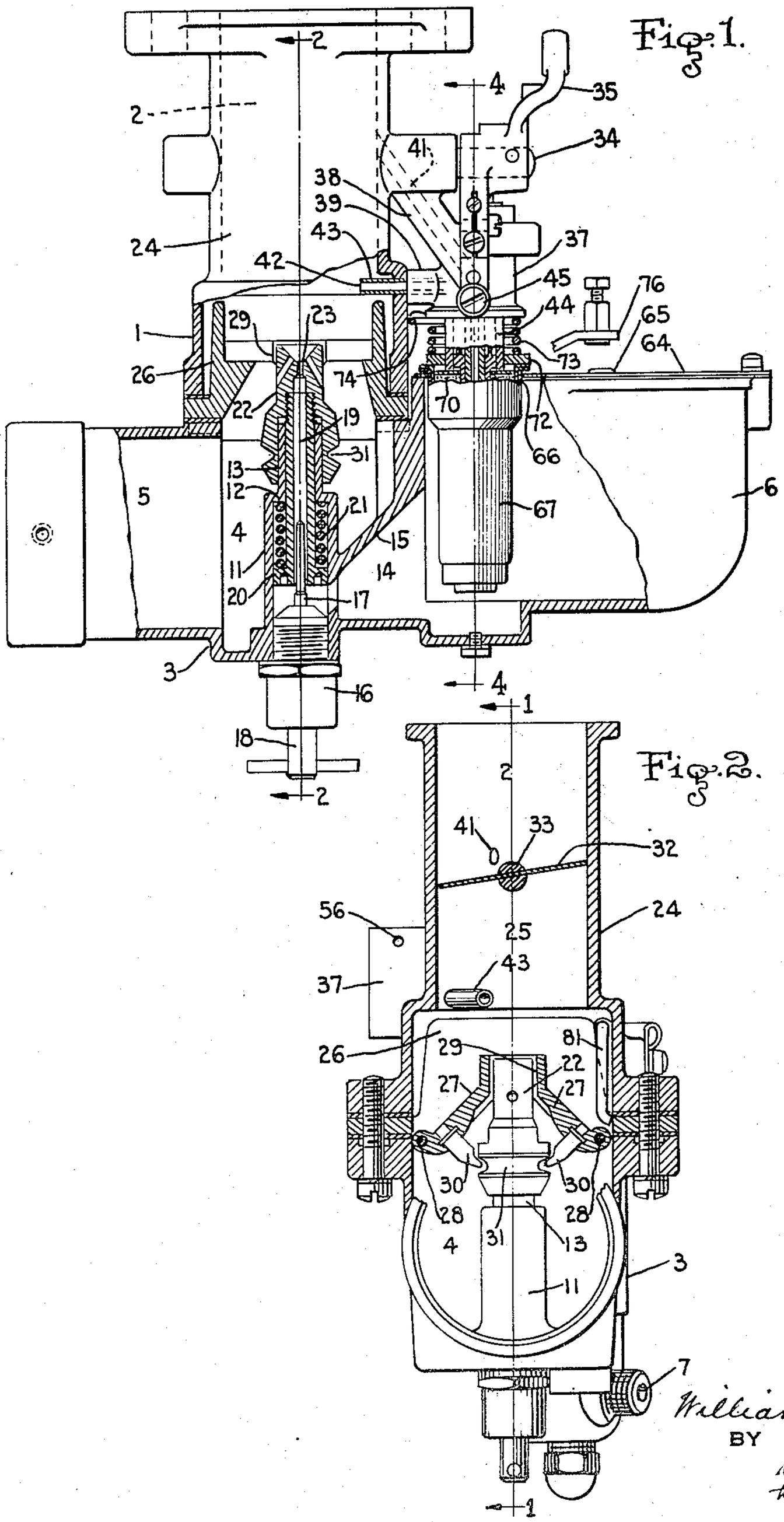

Fig. 2.

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Fig. 3.

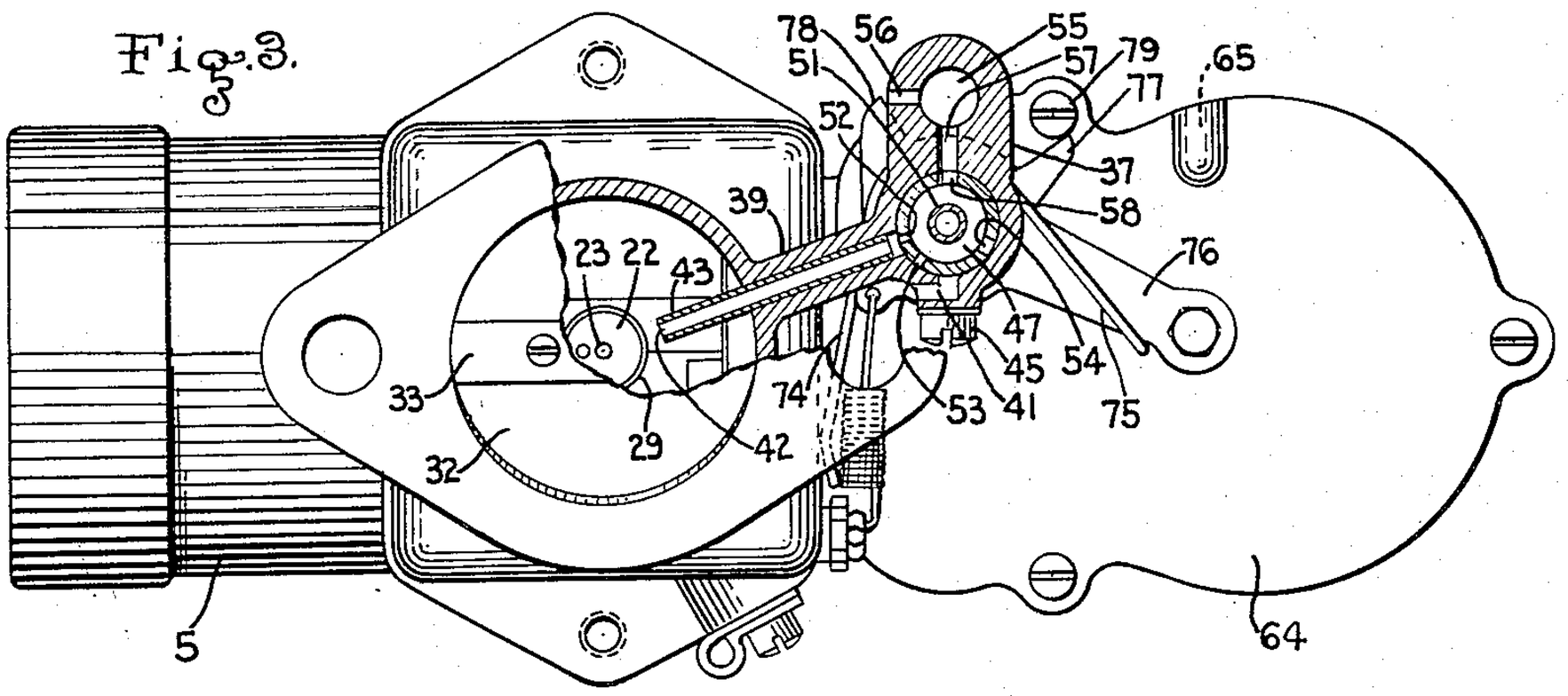
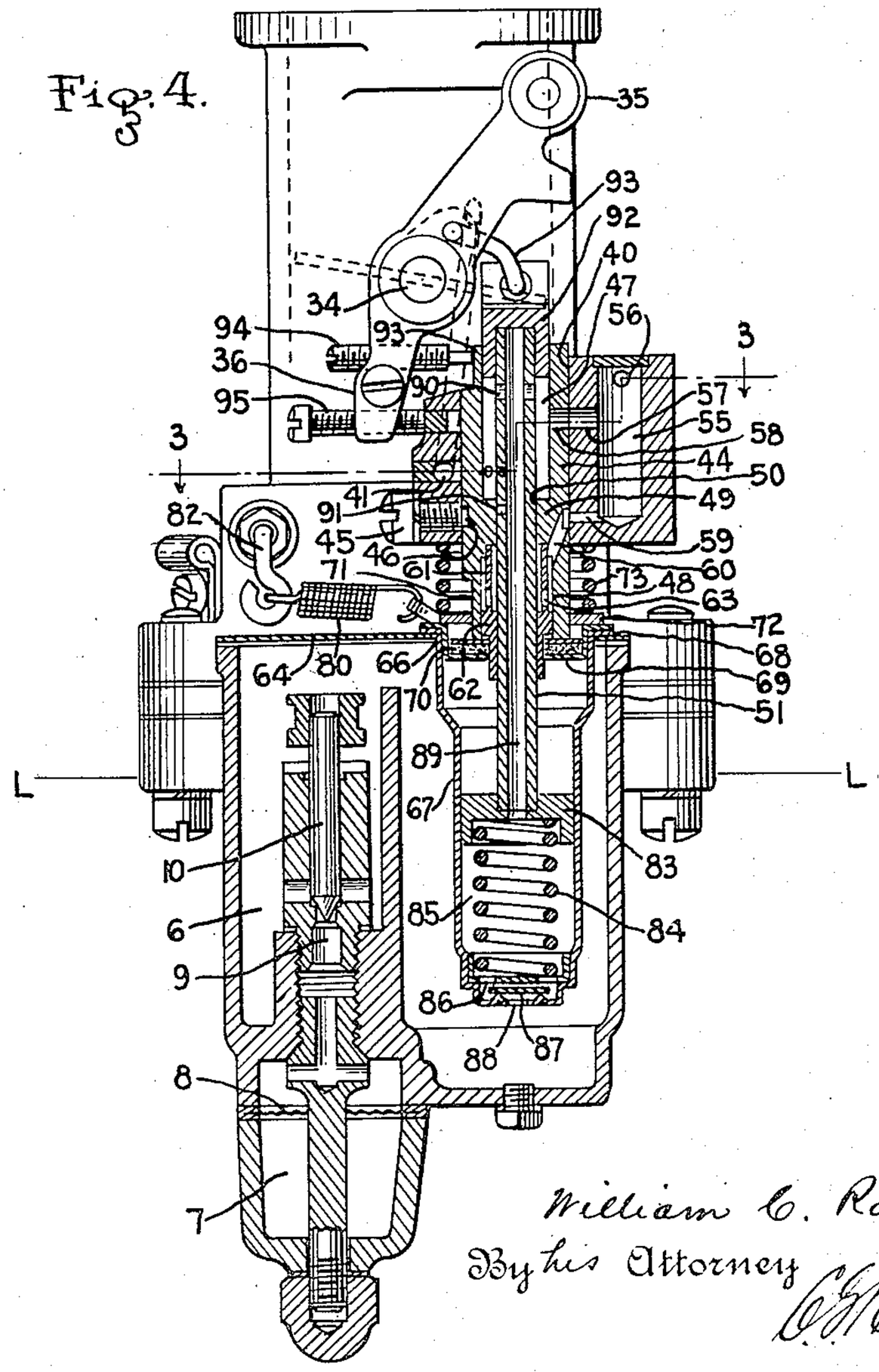


Fig. 4.



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Patented Aug. 20, 1935 2,012,248

UNITED STATES PATENT OFFICE

2,012,248

CARBURETOR

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Application November 25, 1932, Serial No. 644,143

20 Claims. (Cl. 261—34)

My invention relates to carburetors, and more particularly to a carburetor for use in supplying a desirable mixture of air and fuel to an internal combustion engine.

An object of my invention is to provide a carburetor which is of simple construction and which will be efficient in operation.

Another object is to provide a carburetor having means to supplement the normal fuel supply for acceleration.

A further object is to provide means to supply supplemental fuel under super-atmospheric pressure, and to continue the supply of supplemental fuel after termination of the discharge of supplemental fuel under super-atmospheric pressure.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings, to be taken as a part of this specification, I have fully and clearly illustrated a preferred embodiment of my invention, in which drawings—

Figure 1 is a view in elevation and partially in vertical central section on the line 1—1 of Fig. 2;

Fig. 2 is a view in section on the line 2—2 of Fig. 1;

Fig. 3 is a top plan view partially in section on the line 3—3 of Fig. 4, and

Fig. 4 is a view in section on the line 4—4 of Fig. 1.

Referring to the drawings by characters of reference, 1 designates, generally, the casing or body member of a carburetor embodying my invention, having a passageway 2 therethrough. The casing preferably comprises a base or bottom member 3, having as a part of the passageway 2 an air inlet chamber 4 and an air inlet 5 leading thereto. The member 3 also includes a constant level chamber or reservoir 6, having a fuel inlet 7 in which is a strainer element, or the like, 8. The inlet 7 opens into the interior of the chamber 6 through a port 9 controlled by a float operated valve 10 in the usual manner to maintain within the chamber 6 a substantially constant liquid fuel level, designated by the line L—L. Within the air inlet chamber 4 and rising from the bottom wall thereof, there is a hollow sleeve member or cylinder 11, having intermediate its ends an internal downward-facing shoulder 12, above which the member 11 is of reduced internal diameter, as at 13. The member 11 is in communication with the chamber 6 through a passageway 14 opening into the member 11 adjacent the bottom wall of chamber 4. The passageway 14 is provided with an inclined upper wall 15 such that the passageway diverges toward the chamber 6. This construction of the passageway 14 serves to prevent air bubbles from being carried with the fuel from the chamber 6 into the sleeve member 11. The lower or bottom end of the member 11 opens through the bottom wall of the base member 3 and is preferably internally threaded to receive a needle valve assembly 16, having a metering pin, or the like 17, which is axially adjustable within the sleeve member by means of a stem 18 which projects externally from the assembly 16. The metering pin or valve 17 projects into the bore of a tubular member 19 which is guided for reciprocation in the portion 13. The lower end of the member 19 defines a valve port which co-operates with the valve 17 to regulate or control the flow of fuel through the member 19. Surrounding the lower end of the member 19 and carried thereby, there is a lateral flange 20 within the member 11 and serving as a dash-pot piston. Also within the chamber 11, there is a spring 21, preferably of the helical coil type, which is held under compression between the shoulder 12 and the flange 20 so that the tubular member 19 is normally urged toward flow restricting position with respect to the valve 17. The tubular member 19 is provided at its other or free end, which projects from the portion 13, with a nozzle member 22 having a main fuel jet or orifice 23, preferably discharging longitudinally of the passageway 2.

The casing 1 also includes a throttle body member 24, having as part of the passageway 2 a mixing chamber 25. Positioned between the members 3 and 24 and within the passageway 2, there is a guide member 26, which is preferably substantially rectangular and within which is positioned a valve means for controlling flow through the passageway 2. The valve means preferably comprises vane members 27, which are journaled on shafts 28 supported in the base member 3, and which normally engage each other to substantially close the passageway 2. Through the members 27 at their meeting edges, there is a port 29 into which the nozzle member 22 projects, and through which the orifice 23 discharges. The port 29, when the vane members 27 are in closed position, is of sufficient cross-sectional area so that some air will pass through the port 29 around the member 22. Each of the vane members 27 is provided with a finger or operating member 30, which extends toward the member 22 and seats at its free end in a cir-

cumferential groove, or the like, 31 in the member 22 so that movement of the vane members toward open position will move the tubular member 19 relative to the valve 17 to increase the annular fuel port to the member 19. Within the member 14, there is a throttle valve 32, preferably of the butterfly type, fixed on a shaft 33 journaled in the side walls of the member 24, and projecting therethrough at one end, as at 34. Secured on the projecting shaft end 34, there is an operating lever, or the like, 35 which extends on opposite sides of the shaft 33, the end 36 preferably extending toward the reservoir 6.

Positioned at one side of the throttle body member 24 above the reservoir 6, there is a hollow casing or housing member 37 which is preferably supported by the member 24 by means of conduit members 38, 39. The bore 40 of the casing member, which preferably extends substantially vertically therethrough, is in communication through a passage 41 extending through the member 38 into the passageway 2 at a point posterior or on the engine side of the throttle valve 32. The bore 40 is also in communication with the mixing chamber 25 on the anterior side of the throttle valve 32 by a passage 42 extending through the member 39 and which preferably discharges through a substantially horizontal nozzle member 43 which projects into the mixing chamber 25. Within the bore 40 there is a valve member 44, preferably cylindrical and held against vertical or longitudinal movement by a screw 45, or the like, seating at its inner end in a circumferential groove 46 which, however, permits free rotation of the valve member. The valve member 44 projects above and below the member 37 and is provided in its upper portion with a fluid chamber 47 which opens through the top or upper end of the valve member 44. The lower end of the member 44 is provided with a fuel well 48 which is separated from the chamber 47 by a partition 49 having an aperture 50 therethrough substantially concentric with the chamber 47 and well 48, and which serves as a guide-way for an operating or plunger rod 51 which extends through the chamber 47 and well 48 for a purpose to be described. The valve member 44 is provided with a port or aperture 52 which normally establishes communication between the chamber 47 and the passage 42, and with a port or aperture 53 which is registerable with the passage 42 upon rotation of the member 44. The member 44 also has a port or aperture 54 which is movable into and out of registry with the passage 41 upon rotation of the member 44. The relation of the ports 52 and 53 with respect to the passage 42 and of the port 54 with respect to the passage 41 is such that the ports 52 and 53 are separately registerable with the passage 42 and are each out of registry with the passage 42 when the port 54 is moved into registry with the passage 41. The casing member also has a fuel chamber 55 having an air inlet or bleed 56 communicating with the outside atmosphere such that the chamber 55 normally contains air at substantially atmospheric pressure. The chamber 55 is in communication with the bore 40 by a port 57 which is registerable with a port 58 in the valve member 44. The port 58 is normally in registry with the port 57, at which time the port 52 establishes communication between the chamber 47 and the passage 42, the sizes of these ports preferably being such that there is substantially atmospheric pressure within the chamber 47 and such as to satisfy the mixing chamber or passageway suction on the passage 42. The chamber 55 is provided at its lower end with a port or passage 59 which opens into the bore 40 in the plane of the recess 46, and from the recess 46 a passage 60 opens into the upper end of the well 48. Within the well 48 there is a partition 61, preferably in the form of a sleeve member, which surrounds the plunger 51 in spaced relation thereto and to the wall of the well 48 so as to provide substantially concentric annular passages within the well. At its upper end the partition 61 is sealed to the under-side of the partition 49, preferably by the seating of the upper end of the partition 61 in a cylindrical recess in the under-side of the partition 49, as clearly shown in Fig. 4. The lower or bottom end of the well 48 is formed by an annular portion 62 on the member or partition 61, the bore of the portion 62 surrounding and having a sliding fit with the plunger rod 51. Through the partition 61 at its lower end adjacent the portion 62, there are one or more ports 63 which establish communication between the inner and outer annular chambers in the well 48. The chamber 6 is provided with a cover or closure member 64 having an air inlet 65 opening into the chamber above the normal liquid level therein to maintain atmospheric pressure over the surface of the liquid in the chamber 6. Through the cover 64 there is an aperture 66 beneath the casing 37 and through which the plunger rod 51 and the lower end portion of the partition 61 project. Within the chamber 6 there is a pump casing or housing member 67 which at its upper end projects through the aperture 66, and which terminates at its upper end in a lateral surrounding flange 68 which seats on the cover 64 to support the member 67. The upper end of the member 67 is closed by a plate, or the like, 69, preferably substantially cup-shaped, which surrounds the lower end of the portion 62 and which has a lateral flange which seats on the flange 68. Within the member 69 there is a packing or sealing medium 70 which surrounds the portion 62 and which abuts the lower end of the valve member 44. The lower end portion of the valve member 44 is provided with a flat-faced portion 71 and receives an operating member 72 which surrounds the valve member and has a portion of its inner circumference provided with a flat portion conforming with the portion 71 so as to lock the member 72 to the valve member 44. The member 72 seats on the flange of the plate member 69 and is held thereagainst by a spring 73, preferably of the helical coil type, which surrounds the valve member 44 and abuts the under-face of the casing 37. This spring also serves to hold the plate member 69 and the casing 67 in position. One end 74 of the spring 73 bears against a side wall of the throttle body member 24, and the other end 75 of the spring is hooked about an operating arm 76 rigid with the member 72 so that the spring 73 also serves to return the valve member 44 to normal position, and to hold the same in such position. The member 72 is provided with stops 77, 78 which co-operate with a stop member 79 such as a screw for the float chamber cover to limit oscillation of the valve member 44. The operating member 72 is also connected by means of a coil spring 80 to a loading means for the vanes 27. This loading means preferably comprises a substantially U-shaped member having one arm 81 positioned within the mixing chamber and oper-

able for movement into engagement with one of the vanes 27, and having its other arm 82 connected to the spring 80, the base or intermediate portion between the arms 81 and 82 passing through a wall of the mixing chamber and being journaled therein so that rotation of the member 72 will act through spring 80 and arm 82 to move the arm 81 into yielding engagement with one of the vanes 27. Within the casing or housing 67 there is a piston or plunger 83 having a substantially cylindrical recess in its upper face which receives the lower end of the rod 51. The piston 83 is normally held in raised position against the rod 51 by a helical coil spring 84 positioned within the pump chamber 85 of the housing 67, the lower end of the spring seating on a spider, or the like, 86 in the lower end of the pump chamber. The spider 86 also serves to limit opening movement of a check valve 87 controlling an inlet port 88 from the chamber 6 to the chamber 85, the valve 87 preferably being a small disc or plate acting to prevent discharge of liquid from the chamber 85 to the chamber 6. Through the piston 83 and the rod 85 there is a passageway or conduit 89 which opens at its upper end through one or more ports 90 into the fluid chamber 47. The rod 51 is also provided with a port 91 which is normally cut off or sealed by the partition 49, the partition serving as a valve means to control the port 91. The upper end of the rod 51 is rigidly fixed to a plug member 92, preferably seating in a cylindrical recess therein. The member 92 serves to close the upper end of the fluid chamber 47 and has a sliding fit therein. This member 92 is operatively connected by a link, or the like, 93, to the throttle lever 35 so that operation of the lever 35 will cause reciprocation of the member 92 and of the piston 83 by means of the rod 51. The member 92 serves as a valve to control the port 58, and the ports 58 and 91 are so related that as the member 92 cuts off port 58 the port 91 will begin to open below the partition 49 and establish communication between the well 48 and the conduit 89. The portion of the valve member 44 which projects above the casing 37 is provided with a cam face or flat 93 which co-operates with an adjustable pin 94 carried by the throttle lever end 36 to cause opening movement of the throttle valve upon rotation of the valve member 44. An adjustable stop screw 95 is preferably provided for the throttle valve and is adjustably threaded through the end 36 for co-operable engagement with the casing 37 to limit closing movement of the throttle valve.

The operation of my carburetor, when the same has been operatively connected to a source of fuel supply and to the intake manifold of the engine, is as follows: When it is desired to start the engine, the arm 76 is operated to rotate the plate 72 clockwise of Fig. 3 until the stop 78 abuts the stop member 79, which will cut off the air inlet passage 57 and communication of the fluid chamber 47 with the passage 42 and will bring the port 54 into registry with the passage 41 which opens above the throttle valve. This operation will also act through the spring 80 to move the finger or arm 81 into yieldable loading engagement with the vane members 27. Rotation of the valve member 44 by the member 76 will also act through the cam 93 and pin 94 to move the throttle toward open position so as to automatically position the throttle for the passage of the desirable quantity of air for engine priming. If the engine is now turned over or cranked, suction or subatmospheric pressure existing in the passageway 2 above the throttle valve 32 will draw solid liquid fuel from the reservoir through the pump chamber 85, conduit 89, chamber 47 and passage 41 into the passageway 2 and thence into the engine cylinder or cylinders. The liquid fuel discharging into the passageway 2 will be mixed with a minimum quantity of air passing through the annular port 29 and passing the partially opened throttle valve to provide the desirable over-rich mixture for starting purposes. As soon as the engine fires and is running, the arm 76 is returned by counter-clockwise movement until the port 53 is brought into registry with the passage 42, which will cut off the passage 41 and which will still maintain the air inlet port 57 closed. In this position of the valve member 44, which may be termed a "warming-up position", the passage 42 will discharge solid liquid fuel to supplement the discharge from the main nozzle 23 but the supplemental discharge will be less in quantity per unit of time than the discharge through the priming passage 41. The return of the arm 76 will also reduce the tension of the spring 80 acting on the vanes 27 so that if the throttle is moved toward open position the vanes will be more free to open to admit air into the mixing chamber 25. When the engine has warmed up sufficiently for normal operation, the arm 76 is returned further in a counter-clockwise direction until the stop 77 abuts the stop member 79, which will open the air inlet 57 and bring the port 52 into registry with the passage 42, which will result in cutting off the supplemental discharge of fuel through the passage 42 as the area of the ports 57, 58 is sufficient to satisfy the suction on the port 52. This movement of the arm 76 will also relieve the vanes of any load by the arm 81, the operation of the vanes being resisted only by the spring 21 and the resistance of the dash-pot piston 20. As the throttle valve 32 is gradually moved toward open position, the valve 92 will be moved downward, and when the throttle has reached an open position corresponding, say for example, to about sixty miles per hour level road car speed, the valve 92 will have cut off the port 58 and have moved the port 91 below the partition 49. The size of the port 91 is insufficient to satisfy the passageway suction on the passage 42 and, therefore, fuel will be drawn from the pump chamber up through the conduit 89 and be discharged into the mixing chamber through the passage 42 as an emulsion of fuel from the chamber 85 and air entering the conduit 89 through the port 91, the port 91 receiving its air from the inlet 56 and the passageways 59, 60 which open into the normally empty fuel well 48. This supplemental supply in the form of an emulsion will be sufficient to provide with the discharge from the main nozzle a sufficiently rich mixture for high power demands of the engine. If the throttle is opened quickly from idling position when the valve member 44 is in normal running position, as in Fig. 3, the piston 83 will discharge fuel from the chamber 85, i. e., at a super-atmospheric pressure, the discharged fuel passing upward through the conduit 89 and ports 90 into the fluid chamber 47. Due to the forcible discharge of the fuel into the chamber 47, some of the fuel will pass through the alined ports 58, 57 into the chamber 55 before the valve 92 cuts off the port 58. If the movement of the throttle is halted before the valve 92 cuts off the port 58, the fuel which has not been discharged into cham-

ber 55 will be forced through the port 52 and passage 42 into the mixing chamber by the atmospheric pressure of the air entering port 56 and ports 57, 58 to provide a discharge of solid liquid fuel into the mixing chamber to supplement the discharge from the main nozzle sufficient for part throttle acceleration. If the quick or rapid opening of the throttle is continued beyond the point at which the valve 92 cuts off the port 58, sufficient liquid fuel will be discharged through ports 58 and 57 into the chamber 55 to substantially fill the well 48, this fuel passing into the well via the passages 59 and 60. This extent of opening movement of the throttle will bring the port 91 below the partition 49 and, therefore, when the opening movement of the throttle is halted, irrespective of the position or the distance which the port 91 is below the partition 49, the liquid fuel in the well 48 will be swept into the conduit 89 by atmospheric pressure over the surface of the fuel in the well and surrounding the partition 61. The well 48 will be swept clean of fuel by the entering air due to the port or ports 63 being positioned adjacent the bottom of the well, so that the air will force the liquid fuel up between the rod 51 and the partition 61 and thence through the port 91 into the conduit 89. This fuel discharged through the outlet 91 from the chamber 55 and well 48 into the passageway 2 will supplement the fuel discharged by suction through the passageway 89 when the port 58 is closed, as above described, and will be sufficient to increase the richness of the supplemental fuel discharge to eliminate any unevenness in the engine operation which would result if the accelerating charge were not tapered off gradually to the increased richness of the fuel supply provided by normal discharge of supplemental fuel from the passageway 42, as above described for high power demands. The above operation on acceleration by quick or rapid opening of the throttle valve when the port 52 is in registry with passage 42 will also occur when the port 53 is in communication with the passage 42, it being noted that the relation of the ports 53 and 58 is such that the port 58 begins to register with the passage 57 as the port 53 begins to move out of registry with the passage 42.

It may be noted that the passage 42 which comprises the supplemental fuel supply means is normally rendered ineffective to discharge fuel into the mixing chamber by means of the supply of air at substantially atmospheric pressure to the fluid chamber 47 which satisfies the passageway suction on the passage 42. It is also to be noted that the pressure of the liquid fuel in the conduit 89 during the discharge stroke of the piston 83 is sufficient to prevent discharge of fuel from the well 48 through the port 91 into the conduit 89, and that the fuel in the chamber 55 and well 48 will supplement the discharge through passage 42 resulting from suction in the passageway 2 upon cessation of the forced discharge from the pump chamber by the pump piston. It may also be noted that the chamber 55 serves as a means to prevent the fuel which is discharged from the fluid chamber through the ports 57, 58 from being spilled over the outside of the carburetor and engine, which would result in a fire hazard. It is also to be noted that the port 91 which serves as an air bleed will be cut off for a predetermined period by the fuel in well 48 immediately following cessation of the pump stroke, which closure of the air inlet port 91 will increase the quantity of fuel per unit of time supplied from the pump chamber through conduit 89, over that normally supplied when bleed 91 is open to atmosphere.

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

1. A carburetor comprising a casing having a passageway therethrough, a throttle valve controlling flow through said passageway, means to supply air to said passageway, fuel supply means discharging into said passageway, suction operative supplemental fuel supply means discharging into said passageway, means to feed air to said supplemental means to render said supplemental means ineffective to discharge fuel into said passageway, means to control said air feeding means whereby fuel will be discharged from said supplemental means, means operable to discharge fuel under super-atmospheric pressure into said passageway through said supplemental means, and a chamber supplied with fuel during operation of said pressure means, said chamber having an outlet to said passageway and being operable upon cessation of operation of said pressure means to supplement the fuel supplied to said passageway by said first-named fuel supply means.

2. A carburetor comprising a casing having a passageway therethrough, means to supply air to said passageway, fuel supply means discharging into said passageway, a fuel reservoir operable to feed fuel to said fuel supply means, supplemental fuel supply means discharging into said passageway, means normally rendering said supplemental means ineffective to discharge fuel into said passageway, means operable to discharge fuel under super-atmospheric pressure into said passageway through said supplemental means, a fuel chamber having a normally closed discharge conduit communicable with said passageway, and means operable upon discharge operation of said last-named means to open said discharge conduit whereby to increase the supply of fuel to said passageway.

3. A carburetor comprising a casing having a passageway therethrough, a throttle valve controlling flow through said passageway, means to supply air to said passageway, fuel supply means discharging into said passageway, supplemental fuel supply means discharging into said passageway, an air inlet normally rendering said supplemental means ineffective to discharge fuel into said passageway, a valve controlling said air inlet and operable to render said supplemental means effective to discharge fuel into said passageway, means operatively connecting said throttle valve and said air inlet valve, means operable to discharge fuel under super-atmospheric pressure into said passageway through said supplemental means, and a chamber supplied with fuel during operation of said pressure means, said chamber having an outlet to said passageway and being operable upon cessation of operation of said pressure means to supplement the fuel supplied to said passageway by said first-named fuel supply means.

4. A carburetor comprising a casing having a passageway therethrough, means to supply air to said passageway, fuel supply means discharging into said passageway, supplemental fuel supply means discharging into said passageway, an air inlet to said supplemental means normally operable to satisfy the passageway suction thereon, a valve controlling said air inlet, means operable to discharge fuel through said supplemental means, said valve having connection with said last-named means for operation thereby to

close said air inlet, and a fuel chamber having an outlet to said passageway and being operable upon cessation of operation of said last-named means to supplement the fuel supplied to said passageway by said first-named fuel supply means.

5. A carburetor comprising a casing having a passageway therethrough, fuel and air supply means for said passageway, supplemental fuel supply means for said passageway, a fuel reservoir, a pump chamber supplied with fuel from said reservoir, a piston in said chamber having a hollow piston rod communicating with said supplemental means whereby operation of said piston will discharge fuel through said rod and supplemental means into said passageway, a fuel chamber for supplying fuel to said supplemental means, and valve means controlling communication between said fuel chamber and said supplemental means and movable to open position upon operation of said piston whereby fuel will be supplied from said fuel chamber to said passageway.

6. A carburetor comprising a casing having a passageway therethrough, fuel and air supply means for said passageway, supplemental fuel supply means for said passageway, a fuel reservoir, a pump chamber supplied with fuel from said reservoir, a piston in said chamber having a hollow piston rod communicating with said supplemental means whereby operation of said piston will discharge fuel through said rod and supplemental means into said passageway, a fuel chamber carried by said casing intermediate the ends of and surrounding said rod, and valve means controlling communication between said fuel chamber and said supplemental means and movable to open position upon operation of said piston whereby fuel will be supplied from said fuel chamber to said passageway.

7. A carburetor comprising a casing having a passageway therethrough, fuel and air supply means for said passageway, supplemental fuel supply means for said passageway, control means for said supplemental means, a fuel reservoir, a pump chamber supplied with fuel from said reservoir, a piston in said chamber having a hollow piston rod communicating with said supplemental means whereby operation of said piston will discharge fuel through said rod and supplemental means into said passageway, said control means having connection with said piston for operation thereby, a fuel chamber for supplying fuel to said supplemental means, and means operable to establish communication between said fuel chamber and said supplemental means whereby fuel will be supplied from said fuel chamber to said passageway.

8. A carburetor comprising a casing having a passageway therethrough, fuel and air supply means for said passageway, supplemental fuel supply means for said passageway, an air inlet to said supplemental means normally operable to satisfy the passageway suction on said supplemental means, a fuel reservoir, a pump chamber supplied with fuel from said reservoir, a piston in said chamber having a hollow piston rod communicating with said supplemental means whereby operation of said piston will discharge fuel through said rod and supplemental means into said passageway, a fuel chamber for supplying fuel to said supplemental means, and means operable to close said air inlet and to establish communication between said fuel chamber and said supplemental means whereby fuel will be supplied from said fuel chamber to said passageway.

9. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump chamber having a piston therein, a normally empty fuel chamber, said pump chamber communicating individually with said fuel chamber and with said passageway whereby operation of said piston will supply fuel to said fuel chamber and to said passageway, said fuel chamber having an air inlet and having a normally closed communication with said passageway, and means operable upon the discharge stroke of said piston to establish communication between said chamber and said passageway whereby the fuel supplied to said fuel chamber will be discharged into said passageway.

10. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump, a conduit leading from the pump and discharging into the passageway, a fuel chamber, a conduit for supplying fuel to said chamber upon operation of said pump, an air inlet to said fuel chamber, a normally closed discharge conduit connecting said fuel chamber and said passageway, and means operable to open said conduit during the discharge stroke of said pump.

11. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a fluid chamber normally open to atmosphere, a fuel chamber communicating with said fluid chamber and having a normally closed outlet for communication with said passageway, a pump operable to discharge fuel into said chambers, said fluid chamber having an outlet to said passageway, and means operable during the discharge stroke of said pump to establish communication between said fuel chamber and said passageway whereby fuel will be discharged into said passageway first from said fluid chamber and then from said fuel chamber.

12. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump, a conduit leading from said pump and discharging into said passageway, a fuel chamber open to atmosphere, a conduit for transferring part of the fuel discharged from the pump chamber to the fuel chamber upon operation of the pump, an air inlet normally satisfying the passageway suction on said first-named conduit, and means operable upon operation of the pump to close said second-named air inlet whereby the passageway suction will draw fuel from the pump chamber, said second-named conduit acting on cessation of the pump discharge stroke to supply fuel from the fuel chamber to said passageway.

13. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump chamber having a piston, a hollow piston rod for said piston having one end communicating with said pump chamber and having its other end communicating with said passageway, a fuel well open to atmosphere, a valve controlling communication between said well and the bore of said rod, a partition in said well to cause air entering said well to sweep the bottom of said well when said valve is open, and means to supply fuel to said well for discharge into the bore of said rod when said valve is open.

14. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump chamber having a piston, a hollow piston rod for said piston having one

end communicating with said pump chamber and having its other end communicating with said passageway, a fuel well open to atmosphere, a valve controlled by said piston and controlling communication between said well and the bore of said rod, a partition in said well to cause air entering said well to sweep the bottom of said well when said valve is open, and means to supply fuel to said well for discharge into the bore of said rod when said valve is open.

15. A carburetor comprising a casing having a passageway therethrough, a throttle controlling said passageway, air and fuel inlets to said passageway, a pump chamber having a piston, a hollow piston rod for said piston having one end communicating with said pump chamber and having its other end communicating with said passageway, a fuel well open to atmosphere, a valve controlling communication between said well and the bore of said rod, said throttle having operative connection with said piston and with said valve whereby to control the operation of said piston and said valve, a partition in said well to cause air entering said well to sweep the bottom of said well when said valve is open, and means to supply fuel to said well for discharge into the bore of said rod when said valve is open.

16. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a pump chamber having a piston, a hollow piston rod for said piston having one end communicating with said pump chamber and having its other end communicating with said passageway, a fuel well open to atmosphere surrounding said piston rod, a valve controlling communication between said well and the bore of said rod, a partition member in said well and surrounding said rod, said member providing around said rod a space closed at its top to atmosphere and having means to admit air to said space adjacent the bottom of said well to cause air entering said well to sweep the bottom of said well when said valve is open, and means to supply fuel to said well for discharge into the bore of said rod when said valve is open.

17. A carburetor comprising a casing having a passageway therethrough, air and fuel inlets to said passageway, a throttle controlling said passageway, a fluid chamber, a conduit leading from said chamber to said passageway, a second conduit leading from said chamber to said passageway, a valve controlling the discharge from said chamber to said conduits, an air inlet to said chamber normally operable to satisfy the passageway suction on one of said conduits, means to close said air inlet, a pump discharging into said chamber, a fuel chamber open to atmosphere and communicating with said fluid chamber and receiving fuel from the pump chamber simultaneously with the discharge of fuel into said fluid chamber, a valve operable with said pump and establishing communication between said fuel chamber and said fluid chamber for discharge of fuel from said fuel chamber into said fluid chamber, and means interconnecting said throttle and said pump.

18. A carburetor comprising a casing having a passageway therethrough, means to supply air and fuel to said passageway, suction operative supplemental fuel supply means for said passageway, an air inlet normally rendering said supplemental means ineffective to discharge fuel into said passageway, means controlling said air inlet to render said supplemental means effective, means to discharge fuel under pressure into said passageway through said supplemental means, means operatively connecting said controlling means and said pressure means, and a port operable to bleed air into the fuel discharging from said supplemental means upon cessation of operation of said pressure means, said air bleed port being sealed for a predetermined period upon cessation of operation of said pressure means whereby to provide an increased discharge of fuel per unit of time by said supplemental means during said period.

19. A carburetor comprising a casing having a passageway therethrough, a throttle valve controlling flow through said passageway, means to supply air to said passageway, a main fuel nozzle discharging into said passageway on the inlet side of said throttle valve, suction operative fuel supply means discharging into said passageway, a valve controlling discharge from said fuel supply means, means operatively connecting said throttle valve and said valve, means to supply fuel under pressure to said passageway, a chamber supplied with fuel from said last-named means and having an outlet to said passageway, means controlling discharge through said chamber outlet, and means operable to actuate said controlling means upon movement of said throttle valve whereby to discharge fuel from said outlet to said passageway.

20. A carburetor comprising a casing having a passageway therethrough, a throttle valve controlling flow through said passageway, means to supply air to said passageway, a main fuel nozzle discharging into said passageway, supplemental fuel supply means discharging into said passageway, an air inlet to said supplemental means to satisfy the passageway suction thereon, a valve controlling said air inlet, a pump operable to discharge fuel into said passageway, means operatively connecting said air inlet valve and said pump, means operatively connecting said throttle valve and said pump, and a fuel chamber supplied with fuel by said pump and having an outlet to said passageway, said chamber being operable upon cessation of operation of said pump to supplement the fuel supplied to said passageway by said main fuel nozzle.

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