

Nov. 2, 1937.

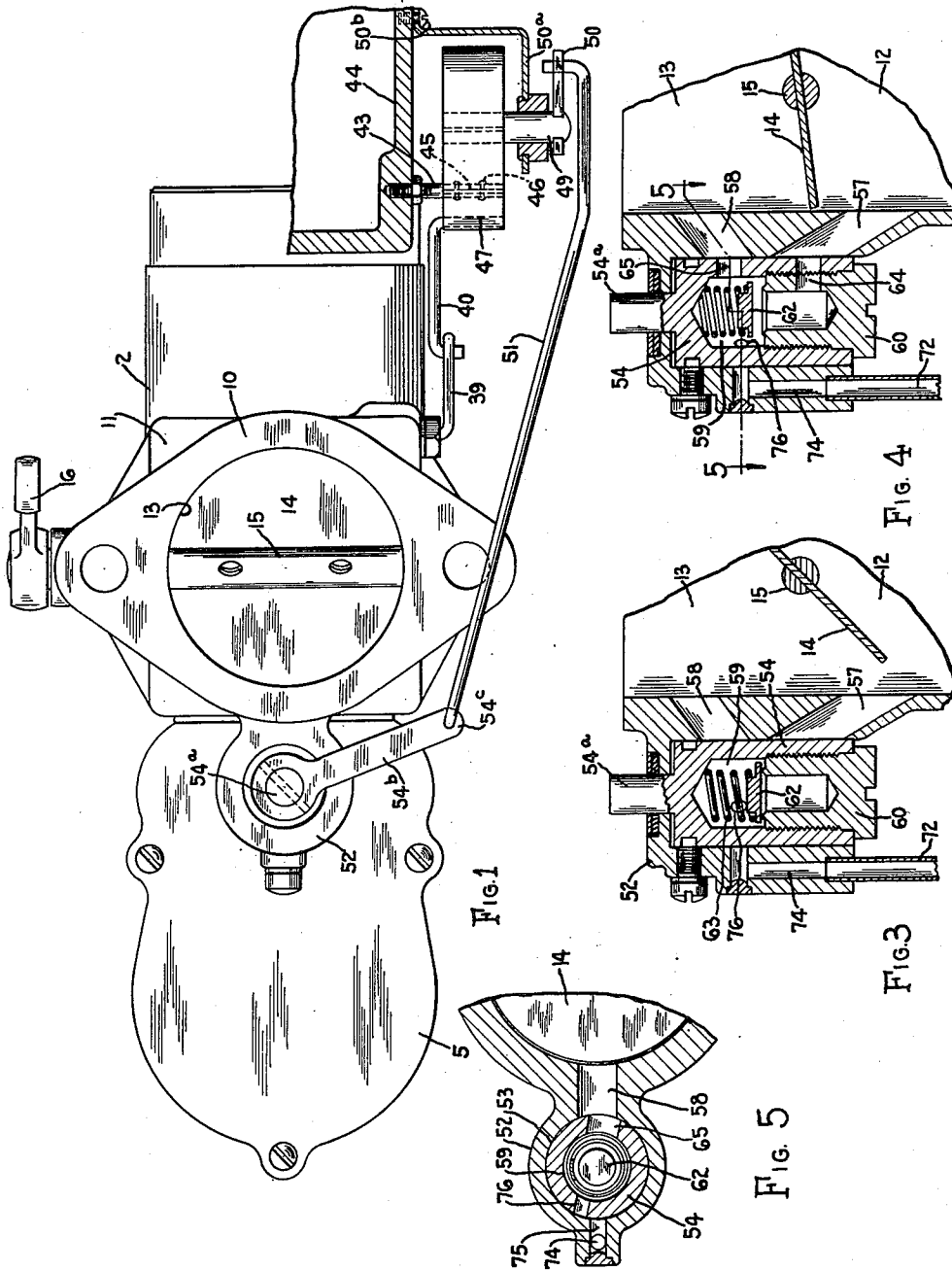
W. H. WEBER

2,098,202

CARBURETOR

Filed April 3, 1934

2 Sheets-Sheet 1



INVENTOR
Walter H. Weber
BY
Andrew K. Foidke
his ATTORNEY

Nov. 2, 1937.

W. H. WEBER

2,098,202

CARBURETOR

Filed April 3, 1934

2 Sheets-Sheet 2

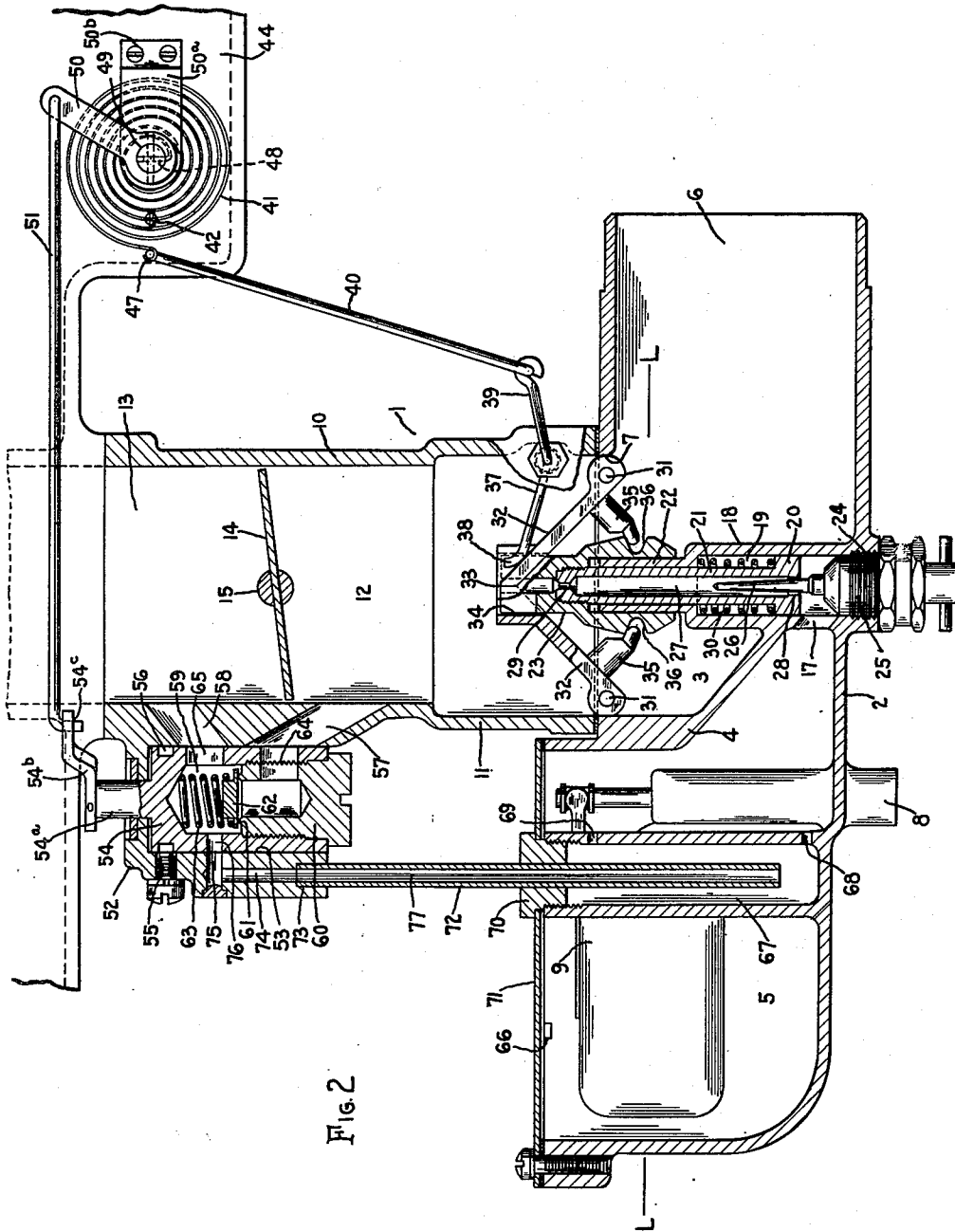


Fig. 2

INVENTOR
Walter H. Weber
BY
Andrew K. Foulds
ATTORNEY

UNITED STATES PATENT OFFICE

2,098,202

CARBURETOR

Walter H. Weber, Detroit, Mich., assignor to
Detroit Lubricator Company, Detroit, Mich., a
corporation of Michigan

Application April 3, 1934, Serial No. 718,800

25 Claims. (Cl. 261—39)

My invention relates to new and useful improvements in carburetors for supplying a mixture of fuel and air to an internal combustion engine.

5 An object of my invention is to provide a carburetor having automatic means responsive to temperature for controlling the ratio of fuel to air supplied by the carburetor to the engine.

10 Another object is to provide a carburetor having means to supply the necessary rich fuel mixture for engine starting operation and which will act automatically to decrease the ratio of fuel to air supplied by the carburetor when the engine has fired and is operating under its own power.

15 Another object is to provide throttle by-pass means for supplying fuel mixture from the main air and fuel inlets to the engine when the throttle valve is in substantially closed position.

20 Another object is to provide thermostatic means for controlling the by-pass means and for controlling the fuel-air ratio supplied by the main air and fuel inlets.

25 Another object is to provide a thermostat of novel construction for controlling the carburetor operation.

30 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—

35 Figure 1 is a top plan view of a carburetor and the thermostatic control means of my invention;

40 Fig. 2 is a view of the carburetor in vertical central section, but with the thermostat and a portion of the inlet and exhaust manifolds in elevation;

45 Fig. 3 is a detail view in vertical central section, showing the position of certain of the parts when the engine has warmed up to normal running or operating temperature;

50 Fig. 4 is a detail view in vertical section, showing the position of certain of the parts with the engine running when the engine has been partially warmed up to normal running temperature, and

55 Fig. 5 is a detail view in section on the line 5—5 of Fig. 4.

Referring to the drawings by characters of reference, 1 designates generally a carburetor casing or body having a hollow bottom member 2 containing an air inlet chamber 3 separated by a

wall or partition 4 from a constant level fuel reservoir or chamber 5. The air inlet chamber 3 has a substantially horizontal air inlet 6 opening laterally thereinto and has a substantially rectangular outlet opening 7 in the top wall of the member 2. The reservoir 5 is provided with a fuel inlet connection 8 controlled by the usual float operated valve mechanism 9 which serves to maintain the liquid level in the reservoir substantially at the line L—L, Fig. 2. Supported on the top wall of the air inlet member 2 there is a throttle body member 10 having an internally rectangular lower portion 11 which registers with and conforms to the opening 7. The members 2 and 10 are rigidly secured together in any suitable manner as by bolted cooperating flanges or the like, not shown. The rectangular throttle body portion 11 forms the lower or inlet part of the mixing chamber 12 having an outlet 13. Within the upper internally cylindrical part of the throttle body member 10 there is a throttle valve 14 of the disk or butterfly type mounted on a shaft 15 journaled in the side walls of the member 10. One end of the shaft 15 projects through the wall of member 10 and is provided with an operating lever 16. The reservoir 5 communicates through a port 17 in the wall 4 with the interior of a hollow housing member 18 which extends upwardly from the bottom wall of member 2 within the air inlet chamber 3 and concentric with the mixing chamber 12. The housing member 18 contains a dash-pot chamber 19 within which there is a dash-pot piston 20 having a hollow stem or rod 21 which extends upward through the top wall of the chamber 20 and through a tubular guide sleeve 22 which extends upward from the top wall of the housing member 18. The upper end portion of the rod 21 which extends above the upper end of the guide sleeve 22 has a nozzle head 23 rigidly fixed thereon. The bottom end of the housing 18 opens, as at 24, through the bottom wall of the member 2 and receives a closure plug 25 in which is adjustably mounted a tapered metering pin or fuel controlling valve 26. The piston rod 21 has a longitudinally extending fuel passage 27 which opens downward through the bottom face of the piston 20 and which receives the metering pin 26, the passage being restricted at its inlet end, as at 28, to provide a fuel port cooperable with the metering pin 26. The upper end of the passage 27 is provided with a main fuel jet or orifice 29 which determines the maximum fuel flow through the passage 27. Within the dash-pot chamber 19 there is a helical coil spring 30 which

surrounds the rod 21 and which is held under compression between the top face of the piston 20 and the upper end wall of the dash-pot chamber so that the spring resists upward movement of the nozzle member comprising stem 21 and head 23 relative to metering valve 26. Positioned in the air outlet opening 7 adjacent the opposite side walls thereof transverse to inlet 6, there are parallel shafts 31 supported at their opposite ends in the side walls of casing member 2. Journalled on the shafts 31 there are cooperable suction operated, upward opening valve members 32 which are substantially rectangular and which extend upward toward each other for cooperable edge engagement, as at 33, to substantially close communication between the air inlet chamber 3 and the mixing chamber 12. The valve members 32 have their vertical side edges which are transverse to shafts 31 in substantial engagement with their adjacent front and rear side faces of the rectangular portion 11 to prevent air flow around the sides of the valve members. The nozzle head 23 extends into an aperture 34 through the meeting edges of the valve members 32. The cross-sectional area of the aperture 34 is slightly larger than the portion of the head 23 which extends thereinto so as to permit a minimum amount of air to pass from the chamber 3 to the chamber 12 around the discharge end of the nozzle member when the valve members are in closed position. Each of the valve members 32 is provided with an operating arm 35 projecting from its underface adjacent its supporting shaft 31. The arms 35 extend toward each other and have their free ends engaged in a circumferential recess 36 formed in the nozzle head 23 so that the nozzle member and dash-pot piston 20 are operatively connected to the valve members for movement thereby. The dash-pot piston 20 and spring 30 act jointly to resist upward opening movement of the valve members 32 in response to suction in the mixing chamber 12 so that the desired ratio of fuel to air from the main inlets 29 and 6 will be maintained for normal operation. Journalled through a side wall of the throttle body portion 11 there is a loading lever 37 having one end 38 engageable with the top face of one of the valve members 32 so as to oppose opening movement of the valve members which are operatively connected together by their arm engagement with the nozzle head 23. The external end 39 of lever 37 is connected by a link or rod 40 to temperature responsive means 41. In its preferred embodiment, the means 41 comprises a spiral coil bimetal thermostat which is rigidly supported intermediate its ends, as at 42, by a post 43 which is preferably rigidly secured at one end in a wall of the exhaust manifold 44. The post 43 may be slotted, as at 45, to receive one of the intermediate convolutions of the coil which may then be riveted, as at 46, or otherwise secured in the slot. The link or rod 40 is connected, as at 47, to the end of the outer turn or convolution of the coil so that the resilience of the coil acts through the lever 37 to exert a spring load on the valve members 32 in accordance with temperature. The inner free end of the thermostat coil is secured, as at 48, to a shaft 49 having an operating arm or crank 50 fixed thereon. The outer end portion of the shaft 49 between the lever 50 and the thermostat 41 is journalled in a bracket arm 50^a which is rigidly secured, as at 50^b, to the wall of the exhaust manifold 44. The arm 50 is provided with a connecting rod or link 51 for a purpose to be described.

The throttle body member 10 supports a housing 52 which projects externally from the side wall of member 10. The housing 52 contains a vertically positioned, cylindrical valve chamber 53 in which a hollow valve member 54 is fitted and supported for rotary movement. The valve member 54 has an operating stem 54^a projecting concentrically from its upper end face through an aperture in the top wall of the housing 52. Rigidly secured on the external top end of the stem 54^a there is a lever arm or crank 54^b which is pivotally secured, as at 54^c, to the end of the thermostat connecting rod 51. The valve member 54 is supported and held in chamber 53 by a screw 55 which is threaded through the wall of the housing 52 and has its inner end projecting into a circumferential groove 56 in the upper portion of the valve member 54. The bore of the valve chamber 53 is in communication with the mixing chamber 12 by a by-pass inlet conduit 57 having its inlet end opening into the mixing chamber below or on the inlet side of the throttle plate 14 and preferably midway between the ends of the throttle shaft 15. The bore of chamber 53 is also in communication with the outlet 13 by means of a by-pass outlet conduit 58 opening into the outlet 13 on the discharge side of the throttle valve 14 and preferably vertically above the inlet to conduit 57. The valve member 54 has an internal vertical fluid chamber 59 closed at its lower end by a hollow plug 60 having its upper inner end open so that the interior of the plug forms the lower or inlet part of the chamber 59. The upper annular end face of the plug 60 within chamber 59 is provided with an annular rib or bead defining a valve seat 61. Within the upper or outlet portion of the chamber 59 there is a valve 62 preferably a light circular plate or disk which is adapted to seat on the valve seat 61 and to cut off communication between the lower and upper portions of the chamber 59. The valve 62 is normally urged to its seat by a helical coil spring 63 positioned in the upper portion of the chamber 59 and bearing at one end against the upper end wall of chamber 59 and at its other end on the top face of the valve disk 62. The valve member 54 has through its side wall and the wall of plug 60 a by-pass inlet port 64 which opens into chamber 59 below or on the inlet side of the valve disk 62, the port 64 being movable into and out of registry with the outlet conduit 58 upon rotation of the valve member 54. The side wall portion of the valve member 54 adjacent the port 65 serves as a valve to control the outlet conduit 58. The ports 64, 65 are preferably of substantially the same flow area and are simultaneously movable out of communication with conduits 57, 58 respectively upon rotation of the valve member 54. The fuel reservoir 5 is open to atmosphere through an inlet passage 66 above the normal liquid level. Within the reservoir 5 there is an atmospheric fuel well 67 having a calibrated fuel inlet port 68 through its side wall adjacent its lower end and supplied with fuel from the reservoir 5. Through the side wall of the well 67 above the normal liquid level and adjacent its upper end, there is an air bleed port or inlet 69 from the reservoir 5 so that the surface of the liquid in the well 67 is subjected to atmospheric pressure. The open top end of the well 67 is closed by a plug member 70 which extends through an aperture in the fuel reservoir cover member 71. A supplemental fuel discharge tube 72 extends downward through the plug member 70 into the well 67 and has its bottom end which

is open terminating adjacent the bottom wall of the well and above the fuel inlet port 68. The tube 72 extends upward from the reservoir 5 and has its upper end fitting tightly, as at 73, within the inlet end of a duct 74 in the wall of housing 52. The outlet end 75 of duct 74 opens into the bore of chamber 53 above the plane of the valve seat 61. Through the side wall of the valve member 54 there is a fuel port 76 which opens into chamber 59 above valve seat 61 and which is registerable with the duct outlet 75, preferably being positioned diametrically opposite the outlet port 65. The side wall portion of the valve member 54 adjacent the port 76 serves as a valve to control discharge from duct outlet 75 into the chamber 59. The open ended bore 77 of tube 72, the duct 74, and the outlet conduit 58 together provide a supplemental fuel supply conduit leading from the well 67 and discharging into the carburetor outlet 13, this conduit being controlled by the valve member 54. Rotation of the valve member 54 will close the duct outlet 75 during the first part of its rotation and substantially before the valve ports 64 and 65 have begun to move out of full registry with their respective conduits 57 and 58, see Fig. 5.

The operation of my carburetor is as follows: In the position of the parts shown in Figs. 1 and 2, the engine which is not running is cold so that the thermostatic means 41 has moved the valve member 54 to establish communication through the supplemental fuel supply conduit including the valve chamber 59 between the well 67 and the outlet 13 and to open the by-pass conduits 57, 58 to the chamber 59 respectively below and above the closed valve 62 from the mixing chamber 12 and to the outlet 13 respectively. The thermostatic means 41 has also pulled upward on rod 40 to resiliently urge the loading lever end 38 into engagement with the top face of its closed valve member 32. If the engine is now cranked for starting with the throttle valve 14 in substantially closed warm engine idling position, the suction induced in the mixing chamber 12 beneath the throttle valve will be substantially ineffective to draw any fuel from the main fuel inlet 29. However, this engine cranking suction will be transmitted through by-pass outlet 58, the open valve ports 65 and 76, duct 74 and tube core 77 to the fuel well 67 and will draw solid liquid fuel from the well into the outlet 13 where it will mix with such air as can pass through aperture 34 and around the edge of the substantially closed throttle valve for discharge to the engine cylinders. The spring 63 holds the valve 62 closed at low or cold engine cranking speeds so that no air can pass to outlet 13 through the by-pass passage 57, 59, 58. This exceedingly rich priming charge or mixture will continue to be supplied to the engine until the well 67 has been emptied to the level of the bottom inlet end of tube 72 unless prior thereto the engine starts running so that the suction in the outlet 13 and acting on closed valve 62 is sufficient to lift valve 62 against the force of spring 63 to open the by-pass passage around the throttle valve 14, so that the volume of mixture will be increased and the ratio of fuel to air will be decreased to the proper ratio to maintain cold engine idling operation. When the well 67 is emptied to the bottom inlet end of tube 72, then the well will discharge an emulsion of fuel entering through port 68 and air entering through bleed port 69 whether or not the engine has started running and until the duct outlet 75 is closed. As soon as the engine fires and is

operating under its own power or the suction induced in chamber 59 reaches say two inches of mercury vacuum for which spring 63 is preferably set, then the valve 62 will be lifted from its seat to open the by-pass passage around the throttle valve. The mixing chamber will now be open through the by-pass to engine suction so that a mixture of fuel from the main inlet 29 and air from aperture 34, the valve members 32 being held closed by the loading lever 37, will pass into chamber 59 through by-pass inlet 57 and mix in chamber 59 with the supplemental fuel from the well 67 to decrease the richness of the fuel charge supplied to the engine sufficiently to prevent stalling thereof. The thermostatic means 41 will respond quickly to engine operation as it is positioned closely adjacent the exhaust manifold and when the thermostat has warmed up to say sixty or seventy degrees F., the thermostat end 48 will have rotated sufficiently in a counterclockwise direction facing Fig. 2 to act through the rod 51 to turn valve member 54 to close duct outlet 75. This operation of the thermostat effects a gradual tapering off of the quantity of supplemental fuel supplied from the well 67 with a consequent decreasing of the richness of the fuel mixture supplied to the engine. Simultaneously with the operation of valve member 54 by the thermostat to close duct outlet 75, the tension in the outer turns or convolutions of the thermostat coil will decrease, so that the valve members 32 can open more freely against the decreasing resilient force of the thermostat end 47 on lever 37 which will result in an increase in the quantity of air admitted to the mixing chamber from inlet 6 and a decrease in the ratio of fuel to air supplied to the mixing chamber 12 from air inlet 6 and fuel inlet 29 for a given mixing chamber suction. The position of the by-pass control means when the thermostatic means has acted as above described is shown in Figs. 4 and 5. As the temperature of the thermostatic means 41 increases due to running of the engine, the thermostat end 48 will continue its counterclockwise movement pushing on rod 51 and gradually rotating the valve member 54 to close the by-pass passage, as shown in Fig. 3. As the by-pass passage has its effective flow area gradually decreased, the quantity of fuel mixture from the main air and fuel inlet supplied to the engine will be decreased until the engine reaches normal operating temperature, when the by-pass passage will be closed by rotation of valve member 54 so that the fuel mixture supplied to the engine will be only that passing around the edge of the substantially closed throttle valve 14. During the rotation of the valve member 54, the outer turns or convolutions of the thermostat coil will also be warming up, so that the tension of the thermostat end 47 on rod 40 and lever 37 will be gradually decreasing. The resilient spring load of thermostat end 47 will continue to be exerted on the closed valve members 32 after valve member 54 has been rotated to close the by-pass passage; but with a few degrees increase of temperature after the by-pass passage is closed, the thermostat end 47 will begin to move downward and lift lever end 38 away from its valve member 32. If the throttle valve is opened while the thermostat end 47 is acting through its lever 37 to resiliently load the valve members 32 and oppose with piston 20 and spring 30 the opening movement of the suction responsive valve members 32, then the ratio of fuel to air supplied to the mixing chamber 12 from the main fuel inlet 29

and air inlet 6 will be increased to provide a mixture which is richer in fuel than the normal operating mixture. As the valve members 32 swing outwardly away from each other in response to mixing chamber suction to open communication between the air inlet chamber 3 and the mixing chamber 12, the arms 35 will lift the hollow rod 21 relative to the fuel metering pin 26 so that the fuel supplied to the jet 29 will be increased as the air admitted to the mixing chamber is increased. The resistance of thermostatic means 41 to opening movement of the valve members 32 in response to engine suction will be gradually decreased as the engine warms up so that the richness of the mixture from the main inlets will gradually decrease for any given mixing chamber suction.

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

1. A carburetor of the character described, comprising a casing having a mixing chamber with main air and fuel inlets and a mixture outlet, valve means responsive to mixing chamber suction and controlling admission of air to said chamber, a thermostatically controlled supplemental fuel supply means operable to discharge fuel at sub-normal engine operating temperatures, a thermostatically controlled loading means for said valve means, said first-named and said second-named thermostatically controlled means acting simultaneously to regulate the ratio of fuel to air discharging from said outlet, the resistance exerted by said loading means decreasing upon engine temperature increase as discharge from said supplemental means is decreased, and said loading means being so constructed as to resist opening movement of said valve means after discharge ceases from said supplemental means.

2. A carburetor of the character described, comprising a casing having a mixing chamber with main air and fuel inlets and a mixture outlet, valve means responsive to mixing chamber suction and controlling admission of air to said chamber, means engageable with said valve means to resist opening movement thereof, a thermostat rigidly supported intermediate its ends, means operatively connecting one end of said thermostat to said resisting means, supplemental fuel supply means discharging into said outlet, a valve controlling said supplemental means, and means operatively connecting the other end of said thermostat to said last-mentioned valve.

3. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a thermostat supported intermediate its ends, one end of said thermostat controlling the ratio of fuel and air supplied by said main inlets, and supplemental fuel supply means discharging into said passageway, the other end of said thermostat controlling said supplemental means.

4. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a throttle valve controlling the outlet from said passageway, said casing having a by-pass passage around said throttle valve, a valve member controlling said passage, a suction responsive valve controlling said passage, and supplemental fuel supply means discharging into said passageway on the outlet side of said throttle valve, said valve member also controlling said supplemental means.

5. A carburetor of the character described, comprising a casing having a passageway there-

through with main air and fuel inlets, a throttle valve controlling the outlet from said passageway, said casing having a by-pass passage around said throttle valve, a thermostatically operated valve member controlling said passage, a suction responsive valve controlling said passage, and supplemental fuel supply means discharging into said passageway on the outlet side of said throttle valve, said thermostatically operated valve member also controlling said supplemental means.

6. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a throttle valve controlling the outlet from said passageway, said casing having a by-pass passage around said throttle valve, a valve member controlling said passage, a suction responsive valve controlling said passage, supplemental fuel supply means discharging into said passageway on the outlet side of said throttle valve, said valve member also controlling said supplemental means, and a thermostat controlling said valve member.

7. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets and a mixture outlet, a throttle valve controlling said outlet, a fuel reservoir supplying said fuel inlet, a fuel well open to atmosphere and supplied with fuel from said reservoir, a conduit leading from said well below the normal fuel level and discharging into said passageway on the outlet side of said throttle valve, a by-pass passage leading from and to said passageway around said throttle valve, a valve member controlling said passage and fuel flow through said conduit, said valve member acting to stop discharge through said conduit prior to complete closure of said passage, and a suction responsive valve controlling flow through said passage.

8. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets and a mixture outlet, a throttle valve controlling said outlet, a housing having a valve chamber, an inlet conduit to said chamber from said passageway on the inlet side of said throttle valve, an outlet conduit from said chamber to said passageway on the outlet side of said throttle valve, a suction responsive valve in said chamber and controlling flow from said inlet conduit to said outlet conduit, a fuel reservoir, a fuel supply conduit leading from said reservoir to said chamber on the outlet side of said suction responsive valve, and valve means in said chamber operable to close said fuel conduit and subsequently to cut off communication between said inlet conduit and said outlet conduit.

9. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets and a mixture outlet, a throttle valve controlling said outlet, a housing having a chamber and supported externally by said casing adjacent said throttle valve, a conduit leading from said passageway on the inlet side of said throttle valve to said chamber, a conduit leading from said chamber to said passageway on the outlet side of said throttle valve, a hollow valve member in said chamber and having ports simultaneously registerable with said conduits, a suction operated valve in said valve member and controlling flow from said inlet conduit to said outlet conduit, a fuel supply conduit opening into said chamber, said valve member having a port on the outlet

side of said suction operated valve and registerable with said fuel conduit, and an atmospheric fuel well supplying said fuel conduit.

10. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet and a mixture outlet, means to supply fuel to said passageway, valve means responsive to engine suction and controlling flow through said passageway, an arm journaled in and extending through a wall of said casing and having a portion movable into the path of and engageable with said valve means to resist opening movement thereof, and temperature responsive means operable to move said arm into position to resist opening movement of said valve means.

11. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a bimetal thermostat rigidly supported intermediate its ends, one end of said thermostat controlling the ratio of fuel and air supplied by said main inlets, and supplemental fuel supply means discharging into said passageway, the other end of said thermostat controlling said supplemental means.

12. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, fuel supply means discharging into said passageway, a valve controlling said fuel supply means, valve means responsive to engine suction and controlling said air inlet, and a thermostat responsive to engine temperature and supported intermediate its ends, one end of said thermostat cooperating with said valve means to regulate the admission of air to said passageway, the other end of said thermostat cooperating with and operable to regulate said fuel valve.

13. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a throttle valve controlling the outlet from said passageway, said casing having a by-pass passage around said throttle valve, a valve controlling said passage, a suction responsive valve controlling said passage, supplemental fuel supply means discharging into said passageway on the outlet side of said throttle valve, a valve controlling said supplemental means, and a bimetal thermostat rigidly supported intermediate its ends, one end of said thermostat being operable to control said second-named valve, the other end of said thermostat having operative connection to and for actuating said supplemental valve.

14. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets and a mixture outlet, means to regulate the air-fuel ratio supplied by said main inlets, a throttle valve controlling said outlet, a housing having a valve chamber, an inlet conduit to said chamber from said passageway on the inlet side of said throttle valve, an outlet conduit from said chamber to said passageway on the outlet side of said throttle valve, a suction responsive valve in said chamber and controlling flow from said inlet conduit to said outlet conduit, a fuel reservoir, a fuel supply conduit leading from said reservoir to said chamber on the outlet side of said suction responsive valve, valve means in said chamber operable to close said fuel conduit and subsequently to cut off communication between said inlet conduit and said outlet conduit, and a thermostat responsive to engine temperature, means operatively connecting said thermostat and said ratio regulating means,

and means operatively connecting said thermostat and said last-named valve means.

15. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets, a throttle valve controlling discharge of mixture from said passageway, said casing having a by-pass passage around said throttle valve, a suction responsive valve controlling flow through said passage, a fuel supply conduit discharging into said passage on the outlet side of said suction valve, and valve means in said passage operable on movement to close said conduit and subsequently to cut off flow through said passage.

16. A carburetor of the character described, comprising a casing having a passageway there-through with main air and fuel inlets and a mixture outlet, a throttle valve controlling said outlet, a housing having a chamber and supported externally by said casing adjacent said throttle valve, a conduit leading from said passageway on the inlet side of said throttle valve to said chamber, a conduit leading from said chamber to said passageway on the outlet side of said throttle valve, a hollow valve member in said chamber and having ports simultaneously registerable with said conduits, a suction operated valve in said valve member and controlling flow from said inlet conduit to said outlet conduit, a fuel supply conduit opening into said chamber, said valve member having a port on the outlet side of said suction operated valve and registerable with said fuel conduit, and means to supply fuel to said main fuel inlet and to said fuel conduit.

17. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel to said passageway, a throttle valve in said passageway, said casing having a chamber and spaced ducts opening through said casing and communicatively connecting said chamber to said passageway on opposite sides of said throttle valve, a valve member in said chamber and operable to control flow through said chamber from and to said passageway around said throttle valve, and means to supply fuel to said chamber for discharge through one of said ducts to said passageway, said valve member having a portion controlling admission of fuel from said last-named fuel supply means to said chamber.

18. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel to said passageway, a throttle valve in said passageway, said casing having a chamber and ducts communicatively connecting said chamber to said passageway on opposite sides of said throttle valve, a valve member in said chamber and operable to control flow through said chamber from and to said passageway around said throttle valve, means to supply fuel to said chamber for discharge through one of said ducts to said passageway, said valve member having a portion controlling admission of fuel from said last-named fuel supply means to said chamber, and temperature responsive means controlling said valve member.

19. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel to said passageway, a throttle valve in said passageway, said casing having a chamber and ducts communicatively connecting said chamber to said passageway on opposite sides of said throttle valve, a valve member in said chamber and op-

erable to control flow through said chamber from and to said passageway around said throttle valve, means to supply fuel to said chamber for discharge through one of said ducts to said passageway, said valve member having a portion 5 controlling admission of fuel from said last-named fuel supply means to said chamber, and temperature responsive means operable when cold to hold said valve member in position to maintain communication around said throttle 10 valve through said chamber.

20. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel 15 to said inlet, a liquid fuel reservoir supplying said means, a throttle valve controlling flow through said passageway, said casing having a by-pass passage around said valve, said passage including intermediate its ends a chamber, a fuel supply 20 conduit opening from said reservoir below the liquid level therein and discharging into said chamber in spaced relationship to said passageway, and a valve member movable in said chamber, said valve member having one portion oper- 25 able to close said conduit and having another portion spaced from said one portion and operable to close said passage.

21. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel 30 to said inlet, a throttle valve controlling flow through said passageway, said casing having a by-pass passage around said valve, said passage including a chamber, a fuel supply conduit dis- 35 charging into said chamber, a valve member movable in said chamber, said valve member being operable to control discharge from said conduit to said passageway and to control flow through said passage, a valve controlling admission of air 40 from said inlet to said passageway, and temperature responsive means controlling said air inlet valve and said valve member.

22. A carburetor of the character described, 45 comprising a casing having a passageway there-through with main air and fuel inlets, a throttle valve controlling discharge of mixture from said passageway, said casing having a by-pass pas- 50 sage around said throttle valve, a suction responsive valve controlling flow through said passage, a fuel supply conduit discharging into said passage on the outlet side of said suction valve, and valve means controlling discharge from said con-

duit and being operable to cut off flow through said passage.

23. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel 5 to said passageway, a throttle valve in said passageway, said casing having a by-pass passage around said throttle valve and including a chamber, a valve member in said chamber having a passageway therethrough cooperable with and 10 controlling said passage, a valve in and controlling said valve member passageway and responsive to suction, and a conduit for supplying fuel to said chamber, said valve member having a port operable to establish communication be- 15 tween said conduit and said chamber.

24. A carburetor of the character described, comprising a casing having a passageway there-through with an air inlet, means to supply fuel 20 to said passageway, a throttle valve in said passageway, said casing having a by-pass passage around said throttle valve and including a chamber, a valve member in said chamber having a passageway therethrough cooperable with and 25 controlling said passage, a valve in and controlling said valve member passageway and responsive to suction, and a conduit for supplying fuel to said chamber, said valve member having a port opening into said chamber on the outlet side of 30 said suction valve and registerable with said conduit.

25. A thermostatic carburetor control comprising a casing having a mixture passageway there-through with air and fuel inlets, valve means 35 controlling said air inlet, a throttle valve controlling the outlet from said passageway, a conduit opening from and to said passageway around said throttle valve, means controlling flow 40 through said conduit, supplemental fuel supply means discharging into said passageway posterior to said throttle valve, means controlling said supplemental means, and temperature respon- 45 sive means controlling said valve means, said conduit controlling means and said supplemental supply controlling means, said responsive means acting on decreasing temperature to resist with 50 increasing force the opening movement of said valve means and simultaneously to move said conduit controlling means to establish flow through said conduit and also to move said supply controlling means to provide supplemental fuel discharge.

WALTER H. WEBER.