Feb. 2, 1932. M. R. WOLFARD 1,843,186

CARBURETOR

Filed Dec. 16, 1929 2 Sheets-Sheet 1

Fig.1.

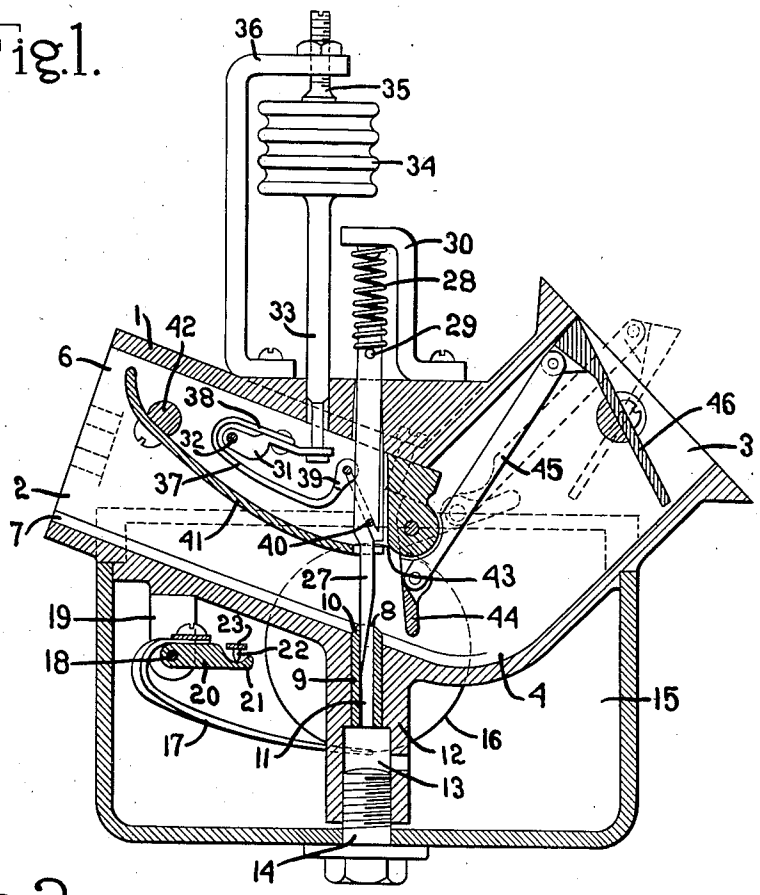
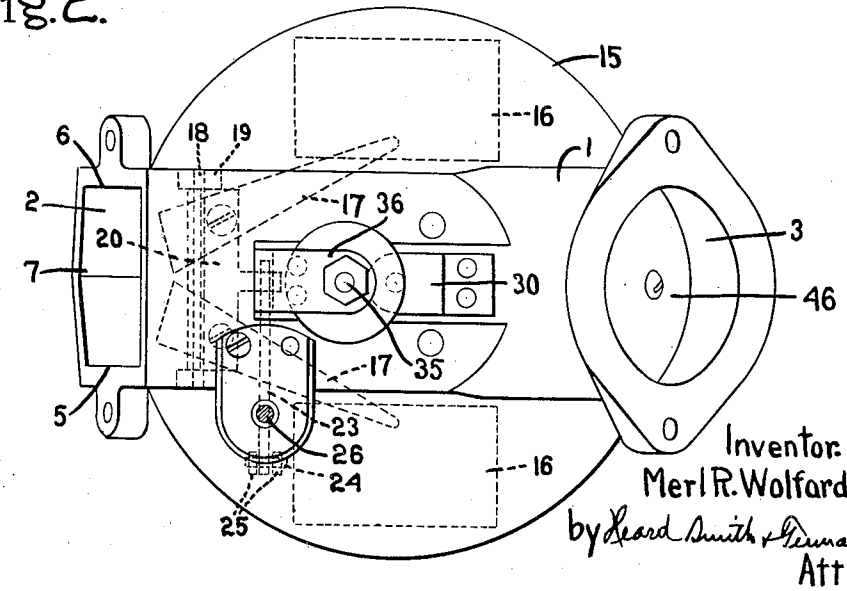


Fig.2.



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CARBURETOR

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Fig.3.

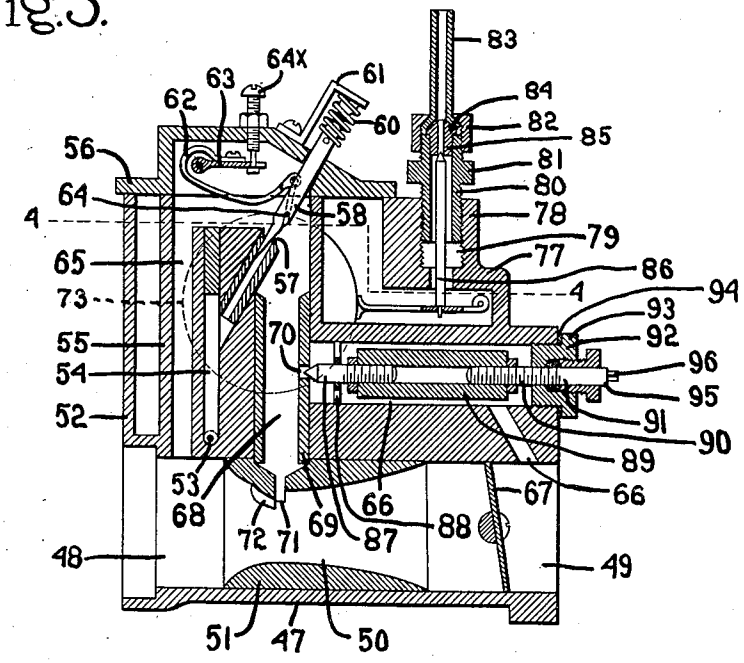
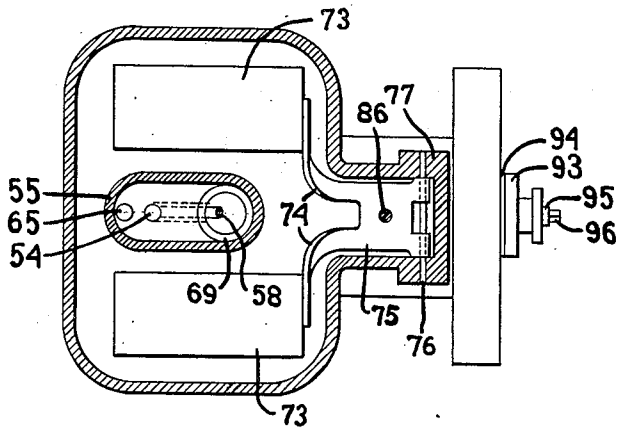


Fig.4.



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Patented Feb. 2, 1932 1,843,186

UNITED STATES PATENT OFFICE

MERL R. WOLFARD, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO HOPEWELL BROTHERS, OF WATERTOWN, MASSACHUSETTS, A COPARTNERSHIP COMPOSED OF CHARLES F. HOPEWELL AND HELEN C. HOPEWELL

CARBURETOR

Application filed December 16, 1929. Serial No. 414,300.

This invention relates to improvements in carburetors for internal combustion engines and the principal object of the invention is to regulate accurately the flow of fuel during idle and light load operations of the engine in correlation to the viscosity of the liquid fuel supplied to the carburetor as varied by changes in temperature.

In usual carburetor constructions, means are provided for regulating the supply of liquid fuel to the mixing passage in response to various demands of the engine without taking into consideration the greater influence of viscosity in reducing the flow of fuel during extremely low heads.

It is, of course, well known that the viscosity of the liquid fuel increases with decreases in the temperature of the fuel, and consequently the flow of fuel through the small orifice or orifices, through which it is delivered to the carburetor, becomes more sluggish with such decrease in temperature, and this sluggishness of flow has a relatively greater retarding effect upon the supply of fuel during idle and light load operations of the engine than during the normal operation of the engine when a greater quantity of fuel is caused to flow through the fuel orifice by increased suction of the engine.

A further object of the present invention is to provide thermostatic means responsive to variations in temperature, preferably within the carburetor, operable to regulate the height of the head of fuel delivered from the fuel inlet to the mixing passage during idle and light load operations of the engine, to regulate the height of the head acting to force the liquid through the fuel inlet into the mixing passage during idle and light load operations of the engine in such manner as to increase the head in response to decreasing temperatures, thereby supplying the proper amount of fuel irrespective of its viscosity.

The invention relates more particularly to carburetors for internal combustion engines comprising a mixing passage having a metering section with means for controlling the flow through the mixing passage and having an inlet communicating with the mixing passage subject to a suction head substantially proportional to the suction head at the metering section, with means to produce a low flowing head at the fuel inlet during idle and light load operations of the engine in addition to that produced by the suction head in the metering section, and thermostatic means operable to regulate the height of the low flowing head.

A further object of the invention is to provide a carburetor for an internal combustion engine having a mixing passage provided with a depression intermediate of its length and a fuel inlet communicating with said passage in front of and above the lower portion of said depression, and having a fuel reservoir communicating with the fuel inlet, and having means for maintaining the liquid level in the reservoir at a height slightly above the fuel inlet to produce continuously a low flowing head during idle and light load operations of the engine, with the thermostatic means responsive to variations in temperature of the fuel within the fuel reservoir operable to regulate the height of the low flowing head.

A further object of the invention is to provide a more delicate control by providing a fuel reservoir surrounding the fuel inlet and communicating therewith, with means for supplying fuel to the reservoir, including a regulating valve, float sections in said reservoir symmetrically positioned relatively to the fuel inlet, and lever mechanism intermediate of the float sections and said regulating valve having the thermostatic means connected to the float sections and responsive to variations in temperature of fuel within the reservoir to cause said lever mechanism to regulate the height of the liquid level in the reservoir relatively to the fuel inlet.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

Illustrative embodiments of the invention are shown in the accompanying drawings as applied to the carburetor construction disclosed in my prior applications for Letters Patent, Serial Number 293,371 filed July 17, 1928, and Serial Number 391,567 filed Sep-

tember 10, 1929. It will, however, be understood that the invention may be embodied in other types of carburetors within the spirit and scope of the claims.

In the drawings:

Fig. 1 is a vertical longitudinal sectional view of a carburetor embodying the invention;

Fig. 2 is a plan view partially in horizontal section;

Fig. 3 is a vertical sectional view of a modified form of carburetor construction; and,

Fig. 4 is a sectional view on line 4—4 Fig. 3, viewed downwardly.

The preferred embodiment of the invention illustrated in Figs. 1 and 2 comprises a casing 1, preferably of die-cast metal, having a mixing passage therethrough, with an inlet portion 2 restricted to form an air metering section and an outlet portion 3 relatively inclined thereto and forming at their junction a depression 4. The inlet section 2 desirably is of approximately rectangular cross section having vertical side walls 5 and 6 and a bottom wall 7 inclined downwardly from the side portions toward its middle to form a shallow V-shaped channel. A fuel inlet 8 communicates with the inlet section in front of and above the lower portion of the depression.

Desirably the fuel inlet is formed by inserting a tube 9 having a conical upper end 10 into a suitable bore 11 in a downwardly extending boss 12 on the casing, the lower end of said boss being provided with a larger bore 13 having a screw threaded wall to receive a cap screw 14 for clamping the fuel reservoir 15 upon the casing. The conical upper end 10 of the tube 9 desirably extends somewhat above the bottom wall 7 of the inlet section.

The height of the liquid fuel in the reservoir is controlled by floats 16 which act through suitable lever mechanism to control an inlet valve in the conduit leading to the reservoir to maintain the level of liquid in the reservoir slightly above the fuel inlet 8, thereby providing a continuous low flowing head, during idle and light load operations of the engine in addition to the head produced by the suction in the air metering section of the carburetor.

In the present construction the lever mechanism, which thus controls the height of the level of fuel in the reservoir, includes thermostatic means responsive to changes in temperature within the reservoir to vary the action of the lever mechanism in such a manner as to increase the height of the head in correlation to decrease in the temperature of the liquid fuel within the reservoir, and conversely to decrease the height of the head in response to increases in temperature of said liquid.

In the particular construction illustrated the reservoir 15 surrounds the fuel inlet and the lower portion of the inlet and outlet sections 2 and 3 of the casing, and the floats 16 are located symmetrically upon opposite sides of the fuel inlet. The floats are secured to the lower ends of bi-metallic thermostatic members 17 which extend around a pivotal support 18 which is carried by bosses 19 extending downwardly from the lower wall 7 of the casing, and are connected at their other ends to a horizontally extending arm 20 having a depression 21 adapted to receive a knife edge 22 extending downwardly from one end of a lever 23 extending horizontally and approximately at right angles to the arm 20 and which is fulcrumed at its other end upon a shaft 24 carried by bosses 25 on the casing 1. The lever 23 engages the lower end of a needle valve 26 which extends into a casing having a valve seat located at the lower end of the fuel supply pipe.

Inasmuch as such valve construction is of a usual character and is fully illustrated in my prior application Serial Number 293,371, further illustration, therefore, is unnecessary.

The weight of the float sections 16, and partially the weights of the thermostatic members 17, and the arm 20, the lever 23, and the needle 26, are supported by the liquid fuel in the reservoir. Increase in density of the fuel, caused by dropping in temperature, causes the floats to rise higher, thereby reducing the height of the fuel reservoir relatively to the fuel outlet, and thus causing a reduction of flow of fuel through the fuel orifice in addition to the reduction in flow of fuel through the fuel orifice caused by the increase in viscosity of the fuel. By providing the thermostatic members 17, which are subject to variations in temperature of the fuel in the reservoir, compensation is made for such reduction in flow by increasing the height of the level in the fuel reservoir due to the fact that the thermostatic members 17 permit the floats to rise relatively to a predetermined position of the regulating valve 26. This increase in height may be regulated so as to give any desired increase in head at the fuel outlet by properly proportioning the length and thickness of the thermostatic members 17.

It is a well known fact that where liquids flow from an orifice or port under very low heads, the coefficient of discharge from the orifice decreases more rapidly than directly proportional to the increase in viscosity. By reason of the present invention this abnormal increase in coefficient of flow as the head decreases is compensated. Conversely, increase in temperature causes a reduction of the height of the low flowing head in such a manner as to maintain at all times, during idle operation of the engine, a proper supply of fuel to the carburetor, and in combination with other features of the carburetor con-

struction functions to decrease the proportional influence of the flowing head upon the total supply of fuel delivered to the carburetor as the load increases beyond idle.

The carburetor illustrated in Figs. 1 and 2 of the drawings also includes other thermosatic regulating mechanism and features of construction which co-operate with the mechanism heretofore described to maintain uninterrupted mixture flow during idle and light load operations of the engine.

The area of the fuel-metering port or inlet is controlled by a regulating valve 27 having a wall complementary to the wall of the inlet and chamfered upon the opposite downstream side with means for maintaining light engagement between the complementary walls of the regulating valve and the fuel inlet and thermostatic mechanism for adjusting the regulating valve. The regulating valve extends upwardly through a slightly converging aperture in the upper thickened wall of the cover and is slidably mounted therein to have a slight lateral movement to permit the complementary walls of the regulating valve and fuel inlet to be maintained in continuous light engagement.

A spring 28, interposed between a pin 29 in the upper end of the valve 27 and a bracket 30 which is secured to the casing, tends to close the regulating valve. The valve, however, is held against the tension of the spring by a thermostat which is subject to manual and preferably also to barometric regulation. A thermostat-supporting arm 31 is pivotally mounted at one end upon a cross shaft 32 extending through the walls of the inlet section and is connected at its other end to the lower end of a stem 33, the upper end of which is secured to an expansible bellows 34 which in turn is secured by an adjusting screw 35 to the bracket 36 which is mounted upon the upper wall of the casing.

The thermostat comprises a bi-metallic strip 37 having one end 38 connected to the thermostat-supporting arm 31 and extending around the pivoted end thereof and out of contact therewith, thence forwardly and downwardly with its actuating end 39 turned upwardly and forked, so that the supporting prongs thereof may pass upon either side of the regulating valve 27. A link 40, which is pivotally connected to the forked end 39, engages an upwardly inclined slot in the regulating valve.

By reason of this construction the angularity of the freely moving link 40 with the regulating valve may be adapted to give any desired pressure between the complementary walls of the regulating valve and the fuel inlet without being affected by changes of adjustment in the position of the thermostatic member.

In the construction illustrated in Fig. 1 the metering section of the mixing passage is determined by a choke valve 41 which is connected to a shaft 42 pivotally mounted in the side walls 5 and 6 of the inlet section, and has a bifurcated end extending beyond the regulating valve 27 and engaging a shoulder upon a bridge wall 43 which is secured to the upper wall of the casing at approximately the junction between the inlet and outlet sections of the mixing passage.

The thermostatic member 37 is subject to the temperature of the air which passes through the inlet section of the mixing passage and raises and lowers the regulating valve 27 in response to variations in temperature of the air passing through the mixing passage, thereby varying the area of the fuel-metering port, and in combination with the thermostatic mechanism, which regulates the height of the low flowing head, provides a proper proportion of fuel to air during idle and light load operations of the engine.

The action of these co-operating thermostats together produces a unique result during the change of load from idle toward middle load, in that the thermostat, which controls the height of the low flowing head, compensates for the decreased flow resulting from increased density and viscosity of the liquid. The proportional effect of this definite increase in the low flowing head is gradually decreased as the suction head produced by the air metering section acts directly upon the fuel-metering port. This is precisely what is desired to compensate the tendency of the coefficient of discharge from the fuel-metering port to decrease more rapidly than directly proportional to the increase in viscosity when a very low flowing head is approached as the suction head produced by the metering section deceases toward idle operation of the engine.

It is to be noted that during the operation of the engine at heavier loads, the amount of fuel drawn from the fuel reservoir through the fuel inlet 8, in response to the suction created in the air metering section, will cause the floats 16 to drop appreciably in order to permit a sufficient quantity of fuel to flow through the port which is controlled by the needle valve 26 to supply the demand of the engine; as full load is approached the fuel level in the reservoir may even drop below the fuel inlet 8. It, therefore, follows that the utility thermostatic regulation of the low flowing head obtains only during idle and light load operations of the engine.

An intimate mixture of the fuel with all of the air flowing through the mixing passage at a point immediately beyond the fuel inlet is accomplished by providing a throttling valve 44 which is pivotally mounted upon the bridge wall 43 and when in idling position extends downwardly into proximity to the lower wall 7 of the casing and also in proximity to the fuel inlet.

The throttling valve may operate automatically in response to the current of air flowing through the mixing passage, or it may be manually controlled. As illustrated in Fig. 1 it is connected by a link 45 to a throttle valve 46 which regulates the flow through the mixing passage. In the construction thus illustrated substantially all the air passing through the inlet section is concentrated and deflected downwardly by the throttle valve 44 into the depression 4, thereby insuring intimate mixture of all the air with the fuel in proximity to the fuel inlet during idle and light load operations of the engine and before any lifting of the fuel is required.

Another embodiment of the invention is illustrated in Figs. 3 and 4 and comprises a casing 47 having an inlet section 48 and an outlet section 49 with a metering section 50 therebetween of predetermined fixed area. This metering section is formed by providing a filler 51 having a Venturi passage therethrough. In this construction a reservoir is formed by a wall 52 mounted upon or integral with the wall of the casing 47 preferably symmetrically surrounding the fuel inlet. The reservoir communicates through a passage 53 located near the bottom of the reservoir with a vertical inlet conduit 54 in a boss 55 which extends upwardly from the bottom of the reservoir into engagement with the lower face of the cover 56. The central portion of the boss, however, terminates below the cover.

The upper end of the passage 54 is plugged and a sleeve, which communicates with the passage 54, extends upwardly at an angle to the passage and is provided with an upper conical end forming a fuel inlet 57.

The area of the fuel-metering port or inlet is controlled by a regulating valve 58 which extends into and has a wall complementary to the wall of the sleeve forming the inlet port 57 and chamfered upon the opposite downstream side with means for maintaining light engagement between the complementary walls of the regulating valve and fuel inlet and thermostatic mechanism for adjusting the regulating valve.

The regulating valve extends upwardly through a slightly converging aperture in the upper thickened wall of the cover 56 and is slidably mounted therein to have a slight lateral movement to permit the complementary walls of the regulating valve and sleeve to be maintained in continuous light engagement while the wall of the upper end of the aperture closely engages the perimeter of the valve stem to prevent inflow of air. A spring 60 is interposed between a pin extending through the upper end of the valve stem and the arm 61 of a bracket which is secured to the cover. The spring 60 tends to force the valve into the sleeve in such a manner as to close the fuel-metering port. The valve 58, however, is held against the tension of the spring by a thermostat which is subject to the temperature of the air flowing through the suction passage.

The thermostat, as illustrated, comprises a bi-metallic strip 62 having one end connected to a thermostat-supporting arm 63 which is pivotally mounted at one end upon a cross shaft extending through the walls of a chambered portion of the cover. The thermostat 62 extends around the pivoted end of the thermostat-supporting arm and out of contact therewith, thence forwardly and downwardly with its actuating end upturned and forked so that the supporting prongs thereof may pass upon either side of the regulating valve 58. A link 64, which is pivotally connected to the forked ends of the thermostat, engages an upwardly inclined slot in the regulating valve 58 in a manner heretofore described in connection with the construction illustrated in Figs. 1 and 2.

By reason of this construction the angularity of the freely moving link 64 with the regulating valve may be adapted to give any desired pressure between the complementary walls of the regulating valve and the sleeve without being affected by changes of adjustment in the position of the thermostatic member. A suitable adjusting screw 64x, which extends through the cover and engages the thermostat-supporting arm, provides means by which the position of the thermostat may be adjusted initially to position the regulating valve 58 which determines the area of the fuel-metering port 57.

The suction passage 65, which extends upwardly from the inlet section, thence horizontally around the thermostat and thence downwardly across the fuel-metering ports 57, is so branched that one branch 66 communicates with the outlet passage beyond the throttle 67, while the other branch 68 communicates with the mixing passage at the metering section 50 thereof. Desirably a sleeve 69 is pressed in the vertical portion of the passage 68 and is provided with a restricted opening 70 which communicates with the branch 66 which leads to the outlet section beyond the throttle 67. The lower end of the sleeve 69 desirably extends through the wall of the casing 47 and seats in a recess in the filler 51, thereby holding the filler in place. The filler 51 is provided with a transverse slot 71 which extends through a considerable arc of the upper wall of the filler. The filler desirably is provided with a segmental boss 72 in front of the slot 71 thereby forming a shield at the end of the branch 68 of the suction passage 65 which communicates with the metering section.

In the construction illustrated in Figs. 3 and 4 means are provided for maintaining a

liquid level in the fuel reservoir slightly below the fuel inlet 57.

Float sections 73, symmetrically disposed relatively to the fuel inlet 57, are connected respectively to branches 74 of a yoke 75 which is pivotally mounted upon a pin 76 in a hollow extension 77 of the wall 52 of the reservoir. The extension 77 is provided with an upwardly extending boss 78 which is bored vertically to supply a fuel passage 79 leading to the reservoir.

The upper portion of the wall of the bore is screw threaded to receive complementary screw threads of a valve cage 80 which desirably has an angular or hexagonal enlargement 81 at a distance from its upper end. The upper end of the valve cage is provided with external screw threads to receive a coupling 82 for the end of the supply pipe 83. A valve seat member 84 is interposed between the coupling 82 and the upper end of the valve cage 80 and comprises a head which rests upon the upper end of the valve cage and a downwardly extending cylindrical portion 85 which desirably is pressed into the upper end of the vertical cylindrical passage of the valve cage.

The valve seat member has a vertical bore, the lower end of the wall of which is tapered to form a conical seat complementary to the conical upper end of a regulating valve 86 which extends axially of the passage through the valve cage and is provided at its lower end with a reduced extension which passes through a suitable aperture in the yoke 75.

By reason of the adjustability of the valve cage 80 the vertical position of the valve seat may be varied to establish the liquid level in the reservoir slightly below the fuel inlet 57 by reason of the action of the floats 73 and the yoke lever 75 which control the position of the valve 86.

The construction herein described may be and desirably is similar to that disclosed in Figs. 7 and 8 of my prior application Serial Number 293,371 aforesaid.

In this construction the low flowing head is maintained during idle and light load operations by the suction from beyond the throttle through the branch 66 and the aperture 70.

The present invention provides means responsive to variations of the temperature within the carburetor to regulate the height of said low flowing head. This is accomplished by providing thermostatic means within the branch 66 having a valve adapted to regulate the size of the aperture 70. The particular construction shown comprises a valve 87 which is slidably mounted in a spider 88 located in proximity to the aperture 70 and provided with a conical end which extends into the aperture. The valve 87 is screwed, or otherwise fixedly secured in the end of a thermostatically expansible member, such as a gutta-percha cylinder 89, the opposite end of which is connected by a screw threaded connection 90, or otherwise, to a screw threaded stem 91 which is mounted in a plug 92 which is screwed into the end of a wall of the branch 66 and is provided with a head 93 which overlies the end of said wall and clamps a packing gasket 94 therebetween. The end portion 95 of the rod 91 is cylindrical and is provided at its extremity with a square or other angular portion 96 adapted to be engaged by a wrench or pliers.

By rotating the stem 91 the thermostatic member and valve may be adjusted longitudinally of the passage 66 initially to position the conical end of the valve relatively to the aperture 70. The cylindrical portion 95 of the valve stem is provided with a stuffing box 97 to prevent leakage of air therethrough.

In the normal operation of the invention as above described during idle operation of the engine with the throttle valve 67 in approximately closed position, as illustrated in Fig. 3, the suction of the engine produces a partial vacuum in the branch 66 of the suction passage, thereby causing air to flow through the suction passage 65 inducing the fuel to flow through the inlet 59 and to mix with the air in the suction passage 65. The mixture thereupon passes through the aperture 70 and branch 66 to the engine. During such idle operation air is also caused to flow upwardly through the slot 71 in the filler 51 into the lower end of the passage 68 and out through the aperture 70 to mingle with the fuel-air mixture drawn through the suction passage.

The effective area of the aperture 70 is so controlled by the thermostatically operated valve 87 that the suction upon the fuel inlet will maintain a flow of fuel from the fuel inlet at a flowing head of a proper height to produce satisfactory operation during the idling of the engine irrespective of the temperature within the carburetor.

The flow of air upwardly through the slot 71 from the metering section of the mixing passage toward the aperture 70 will be gradually reduced as the throttle valve is open and a positive downward flow of fuel-air mixture will be induced through the slot 71 into the metering section 50 of the mixing passage. As the suction head in the metering section 50 increases, a gradual lessening of flow toward the aperture 70 is produced; then a gradually increasing positive flow downwardly through the slot 71 is produced which builds up gradually from idle an increased suction at the fuel inlet, thus inducing a greater flow of fuel from the fuel inlet 57.

By reason of this construction the mixture flow is continuous and uninterrupted from the fuel inlet and therebeyond.

As the temperature of the mixture flowing through the branch 66 decreases during idle and light load operations of the engine, the thermostatic member 89 will shorten and will withdraw the valve from the aperture 70, thereby increasing the suction head upon the fuel inlet, thus increasing the effective low flowing head at the fuel inlet as the viscosity of the fuel increases, and conversely increase in temperature of the mixture in the branch 66 causes the thermostatic member to expand and force the valve 87 further into the aperture 70, thereby decreasing the suction at the fuel inlet during idle and light load operations of the engine.

In the construction disclosed in Figs. 3 and 4, as in that disclosed in Figs. 1 and 2, the thermostat 89 controls the height of the low flowing head during idle operation and acts to compensate for the decreased flow resulting from increased density and viscosity of the liquid fuel. This definite increase in low flowing head gradually decreases its proportional effect as the suction head produced by the metering section acts directly upon the fuel-metering port.

The thermostatic member 62 is subject to the temperature of the air which passes through the suction passage 65 and raises and lowers the regulating valve 58 in response to variations in temperature of the air passing through said suction passage, thereby varying the area of the fuel-metering port, and in combination with the thermostatic mechanism, which regulates the height of the low flowing head, provides a proper proportion of fuel to air during idle and light load operation.

The action of these co-operating thermostats is similar to that heretofore described in respect to the co-operating thermostats in Figs. 1 and 2 in that during the change of load from idle toward middle load the thermostat, which controls the height of the low flowing head, compensates for the decreased flow resulting from increased density and viscosity of the liquid.

The proportional effect of this definite increase in the low flowing head is gradually decreased as the suction head produced by the metering section acts directly upon the fuel-metering port. This is precisely what is desired to compensate the tendency of the coefficient of discharge from the fuel-metering port to decrease more rapidly than directly proportional to the increase in viscosity when a very low flowing head is approached as the suction head produced by the metering section decreases toward idle operation.

The thermostat 62 changes the area of the fuel-metering port directly in proportion to the temperature change in the air flowing through the suction passage 65 and, therefore, regulates the area of the fuel-metering port which controls the fuel supplied to the carburetor at and near full load operation. During about half load operation the area of the fuel-metering port still controls primarily the amount of fuel delivered to the carburetor, but as the load decreases toward idle the influence of the thermostat controlling the low flowing head gradually increases as idle operation is approached.

It will be understood that the particular embodiments of the invention disclosed herein are of an illustrative character and are not restrictive of the scope and meaning of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A carburetor for an internal combustion engine comprising a mixing passage having a metering section, means for controlling the flow through the mixing passage, a fuel inlet communicating with the mixing passage and subject to a suction head substantially proportional to the suction head at said metering section, means to produce a low flowing head at said fuel inlet during idle and light load operations of the engine in addition to that produced by the suction head in the metering section, and thermostatic means operable to regulate the height of said low flowing head.

2. A carburetor for an internal combustion engine comprising a mixing passage having a metering section, means for controlling the flow through the mixing passage, a fuel inlet communicating with the mixing passage and subject to a suction head substantially proportional to the suction head at said metering section, means to produce a low flowing head at said fuel inlet during idle and light load operations of the engine in addition to that produced by the suction head in the metering section, and thermostatic means operable to regulate the height of said low flowing head, said fuel inlet and said controlling means being positioned relatively to each other and co-ordinated with said mixing passage in such a manner as to produce uninterrupted mixture flow from said inlet and therebeyond.

3. A carburetor for an internal combustion engine comprising a mixing passage having a metering section, a throttling valve with its lower end portion below and beyond said metering section, a fuel inlet positioned above the lower portion of said mixing passage and subject to a suction head substantially proportional to the suction head in said metering section, means to produce a low flowing head at said fuel inlet during idle and light load operations of the engine in addition to that produced by said suction head in said metering section, and thermostatic means operable to regulate the height of said low flowing head.

4. A carburetor for an internal combustion

engine having a mixing passage provided with a depression intermediate of its length, a fuel inlet communicating with said passage in front of and above the lower portion of said depression, a fuel reservoir communicating with said fuel inlet, means for maintaining the liquid level in said reservoir at a height slightly above said fuel inlet during idle and light load operations of the engine, and thermostatic means responsive to variations in temperature of the fuel within the fuel reservoir operable to regulate the height of said low flowing head.

5. A carburetor for an internal combustion engine having a mixing passage provided with a depression intermediate of its length, a fuel inlet communicating with said passage in front of and above the lower portion of said depression, a fuel reservoir surrounding said fuel inlet and communicating therewith, means for maintaining the liquid level in said reservoir at a height slightly above said fuel inlet during idle and light load operations of the engine, and thermostatic means responsive to variations in temperature of the fuel within the fuel reservoir operable to regulate the height of said low flowing head, and means for throttling said passage at said depression and below the level of said fuel inlet.

6. A carburetor for an internal combustion engine comprising a mixing passage having relatively inclined inlet and outlet sections forming at their junction a depression, a metering section of fixed area in said inlet section adjacent to said depression, a fuel inlet communicating with said mixing passage, a fuel reservoir therefor surrounding said fuel inlet and said depression, a regulating valve for said fuel inlet, thermostatic means in said mixing passage controlling said regulating valve, means for maintaining the liquid level in said reservoir at a height slightly above said fuel inlet during idle and light load operations of the engine, and thermostatic means responsive to variations in the temperature of the fluid in said fuel reservoir operable to regulate the height of said low flowing head.

7. A carburetor for an internal combustion engine having a mixing passage and a fuel reservoir and having a fuel-metering port interposed between said mixing passage and said reservoir, thermostatically controlled means operable to regulate the effective area of said fuel-metering port, and other thermostatically controlled means operable as the temperature decreases to increase the flowing head at the fuel-metering port during idle operation and functioning to decrease the proportional influence of the flowing head on the total supply of fuel delivered to the carburetor as the load of the engine increases beyond idle.

8. A carburetor for an internal combustion engine having a mixing passage provided with a depression intermediate of its length, a fuel inlet communicating with said passage in front of and above the lower portion of said depression, a fuel reservoir surrounding said fuel inlet and communicating therewith, means for supplying fuel to said reservoir including a regulating valve, float sections in said reservoir symmetrically positioned relatively to said fuel inlet, lever mechanism intermediate of said float sections and said valve including thermostatic means connected to said float sections responsive to variations in temperature of the fuel within said fuel reservoir to cause said lever mechanism to regulate the height of the liquid level in said reservoir relatively to said fuel inlet.

9. A carburetor for an internal combustion engine having a mixing passage provided with a depression intermediate of its length, a fuel inlet communicating with said passage in front of and above the lower portion of said depression, a fuel reservoir surrounding said fuel inlet and communicating therewith, means for maintaining the liquid level in said reservoir at a height slightly above said fuel inlet during idle and light load operations of the engine, thermostatic means responsive to variations in temperature of the fuel within the fuel reservoir operable to regulate the height of said low flowing head, means for throttling said passage at said depression and below the level of said fuel inlet, a valve for said fuel inlet, and thermostatic means subject to the temperature of the air flowing through the mixing passage acting upon said valve to vary the effective area of the fuel inlet in response to changes in temperature.

In testimony whereof, I have signed my name to this specification.

MERL R. WOLFARD.