

[54] CARBURETOR ALTITUDE
COMPENSATION ASSEMBLY

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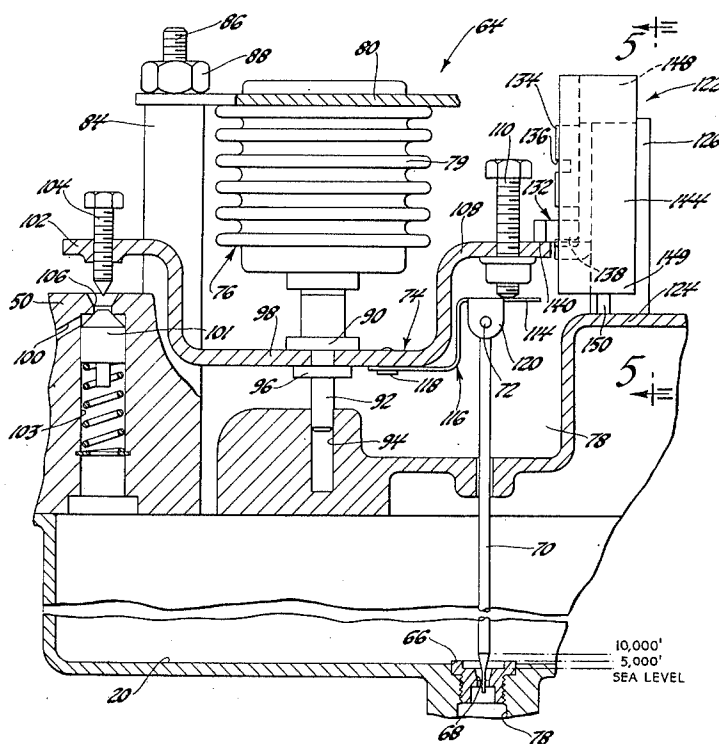
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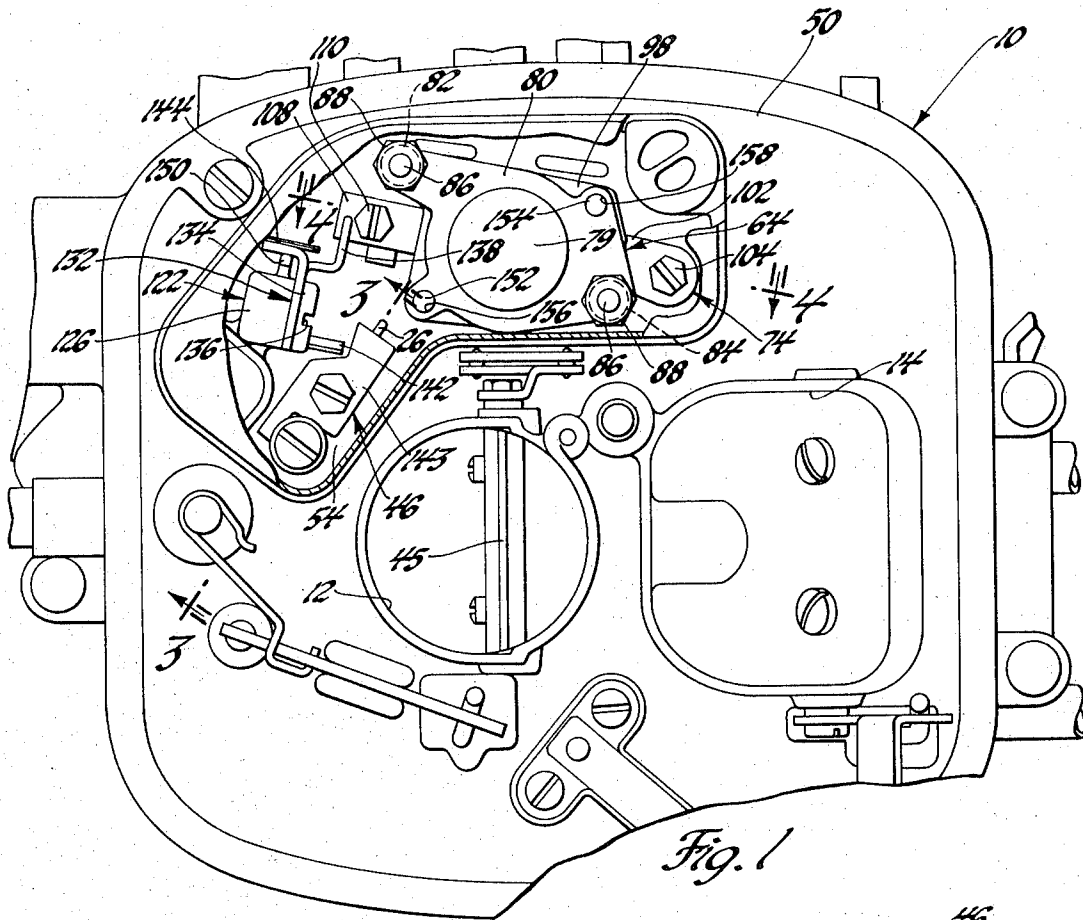
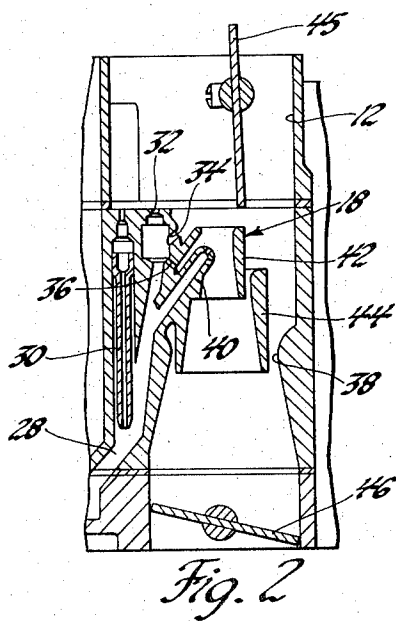
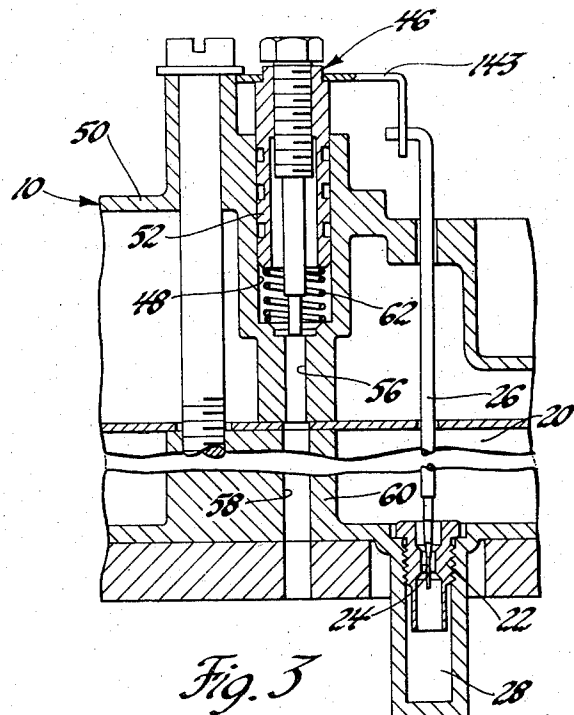
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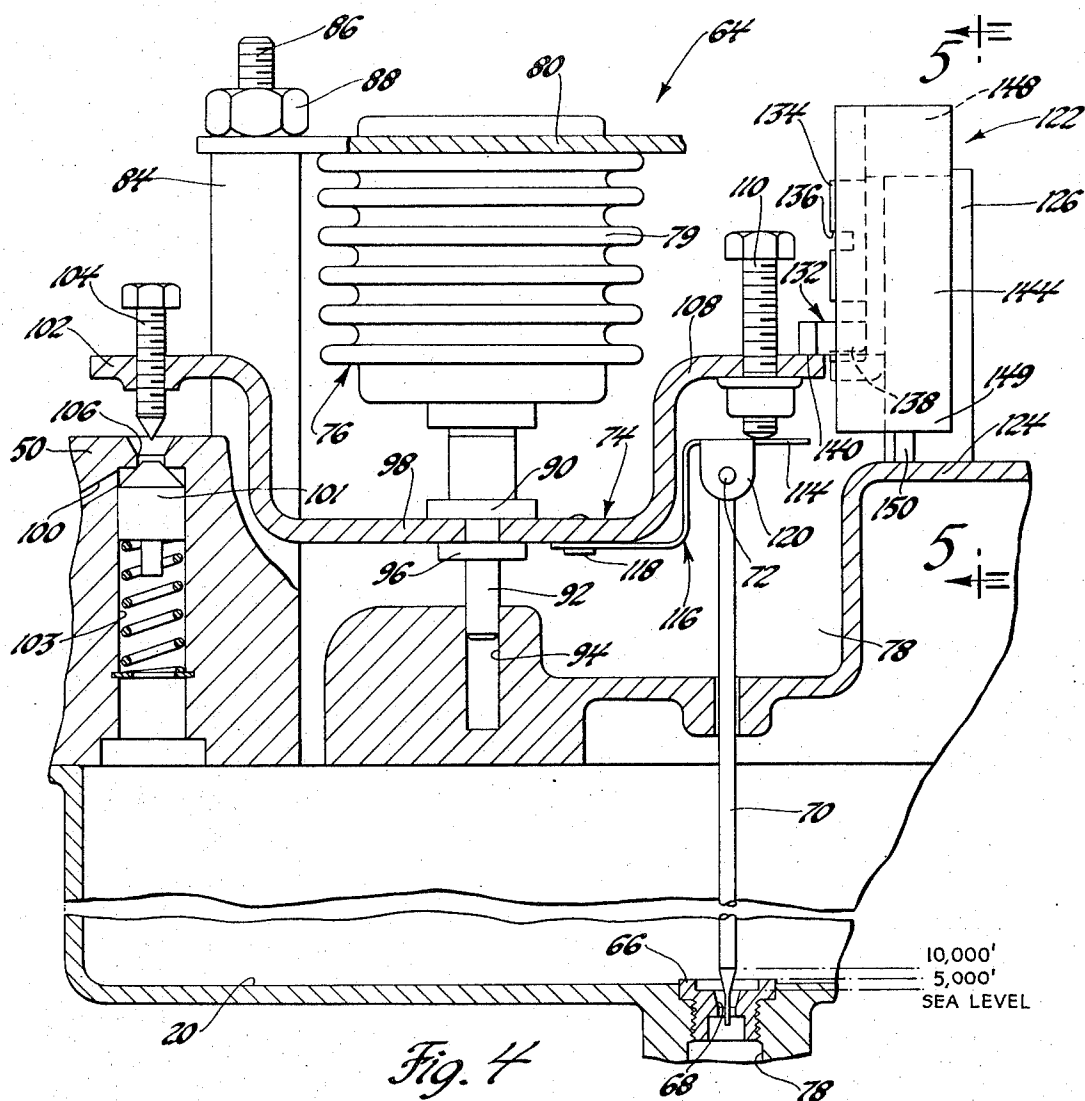
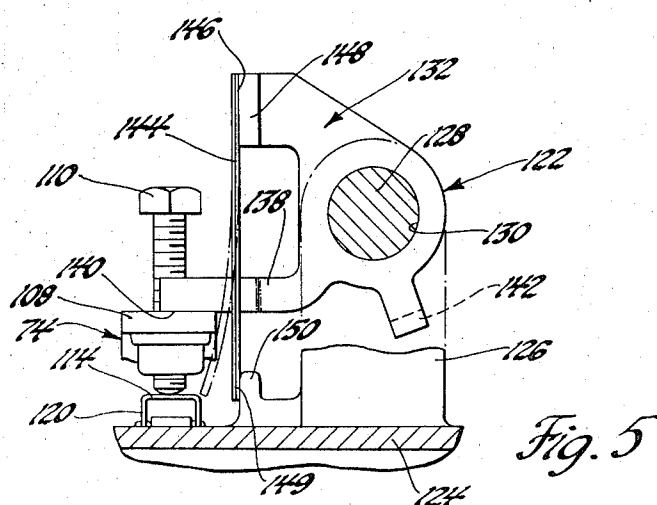
[57] ABSTRACT

An altitude compensation assembly for controlling the air-fuel ratio through a carburetor bore including a pair of metering orifices in parallel between a fuel supply and the bore; a main metering rod is moved with respect to one of the orifices under the control of a power position between a normal fuel supply position and a fuel enrichment position, a second metering rod is controlled by an altitude responsive aneroid to produce a control fuel flow to the carburetor bore to change the fuel input thereto in accordance with reduction in air density due to increases in altitude to compensate for changes in altitude so as to maintain a desired air-fuel ratio to the vehicle engine and altitude power lockout means are provided to control the action of the power piston operated main metering rod to prevent fuel enrichment when a predetermined altitude is attained, the assembly further including a snap action bimetal element that is responsive to the air inlet temperature to the carburetor bore to disable the altitude power lockout below a predetermined temperature of air flow into the carburetor bore.

6 Claims, 5 Drawing Figures







CARBURETOR ALTITUDE COMPENSATION ASSEMBLY

This invention relates to carburetors having a power piston for positioning a main metering fuel control rod with respect to a main metering orifice between normal fuel positions and a fuel enrichment position and more particularly to such arrangements wherein means are provided to compensate for fuel flow between a fuel supply and the throttle bore of a carburetor in accordance with changes in air density flow therethrough due to changes in the altitude of vehicle operation.

In vehicle carburetors, control means are present to control the rate of fuel flow to a carburetor bore to maintain an air-fuel ratio therein that will produce a desired engine operation.

In certain cases, it is desirable to maintain a control of the air-fuel ratio in accordance with changes in the elevation of the vehicle. In such cases, when the vehicle is operated at sea level, a predetermined air-fuel ratio is maintained to produce desirable vehicle operation. When the vehicle is operated at higher altitudes, the density of the air flowing through the carburetor bores will be reduced and the air-fuel ratio will change in accordance with changes in the altitude.

To compensate for such changes, carburetors include means to control the air-fuel ratio so as to compensate for increases in altitude by reducing the fuel flow to the vehicle in accordance with changes in the altitude so as to compensate for a reduction in the air density flowing through the bores of a carburetor.

In many carburetor arrangements a power piston is included to control the main metering rod between a normal fuel position and a fuel enrichment position. When a vehicle is operated at higher elevations, the power piston may respond to reduced manifold vacuum to cause fuel enrichment at the carburetor bore so as to cause undesirable enrichment of the air-fuel ratio. Under conditions where the air flowing through the main carburetor bore is below a predetermined temperature, it is preferable to have a predetermined amount of fuel supplied to the carburetor bore by the power piston operated metering rod.

An object of the present invention therefore, is to provide an improved altitude compensation assembly for use in a carburetor comprising a supplementary fuel metering orifice in parallel with a main metering orifice controlled by means of a rod that is coupled to pressure responsive aneroid means to produce a predetermined fuel flow through both the main metering orifice and the second metering orifice at a predetermined altitude to establish a desired air-fuel ratio through the main bore of a carburetor and wherein the altitude responsive aneroid means will position the second control rod in response to changes in altitude to reduce fuel flow when the altitude of the vehicle increases so as to reduce the fuel flow in accordance with a reduction in the density of air flow to the main bore of a carburetor so as to maintain a desired air-fuel ratio to the engine.

Still another object of the present invention is to maintain a fuel flow control as set forth in the preceding object wherein the main metering rod is controlled by a power piston that operates in accordance with engine vacuum to maintain a main metering rod between a normal fuel control position and a fuel flow enrichment position and wherein altitude power lockout means is provided to interlock with the power piston to prevent movement thereof into the fuel flow enrichment

position when the vehicle is operated at altitudes in excess of a predetermined elevation so as to prevent undue enrichment of the air-fuel ratio when the vehicle is operated at higher elevations.

Still another object of the present invention is to provide an altitude compensation fuel supply system as set forth in the preceding object wherein a thermally responsive element senses the air inlet temperature to the air-fuel supply bore of a carburetor and is operative below a predetermined temperature to disable the altitude power lockout means to permit the power piston fuel enrichment function to occur below a predetermined air inlet temperature irrespective of changes in the altitude of operation of the vehicle.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

IN THE DRAWINGS

FIG. 1 is a top elevational view of a carburetor including the altitude compensation system of the present invention;

FIG. 2 is a fragmentary elevational view showing a main metering fuel system for association with the present invention;

FIG. 3 is a vertical cross-sectional view taken along the line 3—3 of FIG. 1 looking in the direction of the arrows;

FIG. 4 is a vertical sectional view taken along the line 4—4 of FIG. 1 looking in the direction of the arrows;

FIG. 5 is a view in vertical section taken along the line 5—5 of FIG. 4.

Referring now to the drawings, FIG. 1 shows the top of a carburetor assembly 10 including a primary bore 12 therein for supplying a predetermined air-fuel ratio into the induction passages of a vehicle engine.

The carburetor 10 further includes a secondary bore 14 on one side of the bore 12.

The carburetor includes a main metering system 18 for supplying fuel to the bore 12. The system 18 includes a fuel bowl 20, as shown in FIG. 3, which has a main metering jet 22 with an orifice 24 therethrough. Fuel is metered under the control of a main metering rod 26 from the float bowl 20 into a main fuel well 28 formed to underlie the metering jet 22 and to extent in part, vertically on one side of the bowl 20. As seen in FIG. 2, an idle tube 30 depends downwardly within the well 28. Fuel flowing into the main fuel well 28 is mixed with air from a vent opening 32 at the top of the main well and side bleed ports 34, 36 the side bleed 34 bleeding from the primary bore 12 above the carburetor venturi 38 and the bleed port 36 bleeding from the main fuel cavity around the main fuel nozzle 40 in the well 28. The air fuel mixture then passes through the main discharge nozzle 40 into a boost venturi 42 thence through the main venturi 44 in the bore 12 through induction passageways into an engine of the vehicle. A choke valve 45 is located in the top of the bore 12 and a throttle plate 46 in the bottom thereof. Both are operated by suitable linkage in response to accelerator position to produce a desired fuel flow at different vehicle speeds.

The carburetor 10 further includes a power piston assembly 46 including a bore 48 in an air horn member 50 and a piston 52 that has its upper end exposed to at-

mosphere at 54 and the lower end thereof in alignment with a vacuum port 56 leading to the interior 58 of a pedestal 60 which is in communication with the intake manifold of the vehicle to provide a variable source of vacuum reflecting engine load. From off idle to wide open throttle operations, the high engine manifold vacuum holds the piston 52 downwardly in the bore 54 against a spring 62. This positions the main metering rod 26 in the orifice 24 to meter fuel flow to the afore-described main metering system 18 to produce a first control of the air-fuel ratio through the bore 12.

Under heavy acceleration or high speed operation of the engine, the vacuum acting on the piston 52 is reduced and the spring 62 will move the piston 52 upwardly in the bore 48 to cause the metering rod 26 to move outwardly of the orifice thereby to provide a richer mixture through the main metering system the primary and secondary sides of the carburetor.

In present day fuel supply systems, it is desirable to closely regulate the air-fuel ratio under all conditions of vehicle operation.

When the vehicle is operated at higher elevations, the density of air flowing through the primary and secondary bores of the carburetor will be reduced. In order to maintain a desired air-fuel ratio, the present invention includes an altitude compensation assembly 64 that will work in conjunction with the metering action of the power piston 52 so as to reduce fuel flow to the carburetor bores when the vehicle is operated at higher elevations where the air density is reduced.

The altitude compensation assembly of the present invention includes a supplementary metering jet 66 in the base of the fuel well 20. It includes an orifice 68 communicating the bowl with the main fuel well 28 as best seen in FIG. 4. A supplementary metering rod 70 has the lower end thereof located in the orifice 68 and the upper end thereof connected to an aneroid control lever assembly 74. The control lever assembly 74 is associated with a pressure responsive aneroid element 76 located within a chamber 78 of the air horn member 50 as best seen in FIG. 4. The aneroid includes a bellows 79 having the upper end thereof secured to a bracket 80 that is fixedly secured to spaced apart pedestals 82, 84 on the air horn by suitable fastening means such as screws 86 and nuts 88. The opposite end of the aneroid bellows 79 has a connection plate 90 thereon with a guide shaft 92 depending therefrom which is supportingly received in a bore 94 on the base of the chamber 78. The bore 94 has a depth which cooperates with the guide stem 92 to define a stop to limit expansion of the aneroid to a predetermined elevation, which in one working embodiment was 10,000 feet.

A lock member 96 secures a base portion 98 of the control lever assembly 74 to the connection portion 90 on the aneroid 76.

Accordingly, the lever assembly 74 is moved upwardly and downwardly within the air horn member 50 to control the position of the supplementary metering rod 70 with respect to the orifice 68.

At lower altitudes, the supplementary control rod 70 is positioned by the aneroid 76 so as to provide a predetermined amount of fuel flow from the bowl 20 in bypassed relationship to the main metering rod. The combined flow through the orifice 68 and the orifice 24, at a predetermined minimum elevation such as sea level, will produce a regulated flow of fuel into the main metering system that will produce a predetermined air fuel

ratio based on the density of air at sea level passing into the bore 12.

As the vehicle is operated at higher elevations where the air density is reduced, the main metering rod 26 will provide a first amount of fuel flow and the supplementary metering rod 70 will be moved downwardly in the orifice to reduce bypass fuel into the main metering system so as to produce an overall reduction in fuel supply to the carburetor bores in accordance with reductions of air density that occurs at higher elevation. Accordingly, a desired air-fuel ratio will be maintained.

A bleed passage 100 in the carburetor housing leads to a metering system of the type set forth in U.S. Pat. No. 3,322,408. A valve element 101 in bore 103 is biased upwardly to close passage 100 at low altitudes. An upwardly bent end 102 on lever 78 has a valve pin 104 threadably directed therethrough in alignment with an opening 106 in the air horn. At higher altitudes, pin 104 operates valve 101 to regulate the air bleed to the top of the metering well (not shown) to prevent an increase in fuel enrichment of the secondary air-fuel ratio through bore 14 that might otherwise occur due to a decrease in air density due to an increase in altitude.

Additionally, the control lever assembly 74 includes an upwardly bent end 108 opposite to the end 102. It carries an altitude flow adjustment screw 110 threadably directed through the end 108 so as to locate the end 112 of the screw in abutment with the upper surface of a free end 114 of a spring element 116 that has the opposite end thereof fixedly secured to the base 98 of the assembly by means of rivets 118. The spring 116 includes a dependent tang portion 120 thereon through which the upper end 72 of the supplementary rod 70 is directed. Adjustment of the screw 110 will regulate the sea level relationship of the rod with respect to the orifice 68 to calibrate the combined fuel flow through the main metering orifice and the supplementary orifice under sea level conditions.

The present invention further includes an altitude lockout assembly 122 supported on a base portion 124 of the air horn member 50. The altitude lockout assembly includes means to be described, that will operate in response to changes in pressure to control operation of the power piston 46 to prevent movement thereof into the fuel enrichment position when the vehicle is operated at increased altitudes thereby to prevent undesirable enrichment of the fuel under these conditions.

More particularly, the lockout altitude assembly 122 includes a support 126 extending upwardly from the base portion 124. It includes a screw 128 threaded into support 126 through a bore 130 in an altitude lockout lever 132.

The screw 128 includes a head 134 with an adjustment slot 136 therein. The lever 132 is thereby supported for pivotal movement about the axis of the screw 128 between a lockout position and a release position.

The lever includes a first tang 138 thereon bent outwardly of the shaft supported portion thereof in the direction of the end 108 of the control lever 74. The tang 138 has an edge 140 thereon located against the upper surface of the bent end 108 whereby movement of the lever 74 will cause a second tang 142 on the lever 132 to rotate between a lockout position and a release position. The second tang 142 is arranged to overlies a top bracket 143 of the power piston 52 when in the lockout position thereby to prevent movement of the power pis-

ton 52 into a fuel enrichment position when the aneroid 76 has positioned the control lever assembly 74 downwardly within the chamber 58. Accordingly, at high altitudes, the lockout lever 132 will serve to prevent undesirable enrichment of fuel flow to the carburetor bores and will thereby maintain a desirable air-fuel ratio which takes into account the fact that air density is reduced at higher altitudes.

Under cold conditions of operation, when the air temperature is below a predetermined temperature for example below 80°F., it is desirable to retain fuel enrichment for satisfactory engine performance. Accordingly, in the present invention a thermally responsive device, in the preferred embodiment a bimetallic element 144, is provided in association with the altitude power lockout lever 132 to prevent the lockout lever from moving into its lockout position during periods where the air temperature into the bore is below the predetermined temperature.

More particularly, as seen in FIG. 4, the bimetallic element 144 is formed in a rectangular configuration and has a fixed end 146 thereon welded to an upper bent leg portion 148 of the lever which is bent in an opposite direction to the tang 138 and the second tang 142. The bimetal depends downwardly from the leg portion 148 so as to locate a free end 149 thereon above the base portion 124 and in alignment with an air horn casting stop 150. When the bimetallic element 144 is cold it assumes the solid line position shown in FIG. 5 which blocks movement of the lockout tang 142 into overlying relationship with the power cylinder bracket 143.

When the temperature of the inlet air to the carburetor is above a predetermined level, as for example 100°F., it will snap into the dotted line position shown in FIG. 5 thereby to enable the lever 132 to be rotated upon downward movement of the control lever 74 by the aneroid which occurs upon a reduction in pressure, so as to move the lockout tang 142 upwardly and across the top of bracket 143 to prevent fuel enrichment. The bimetal will assume its solid line position when the air temperature reaches 80°F. and move from the dotted line position to the solid line position to retain the lever 132 in its release position shown in FIG. 1.

In FIG. 1, the top of a pair of rods 152, 154 are shown each having the lower end thereof supported on the upper surface of the base 98 of the control lever 74 and the opposite end thereof slidably mounted in holes 156, 158 in the bracket 80. The rods serve as a weight to calibrate the aneroid once it has been assembled in association with the carburetor.

To summarize, when the vehicle is operating under sea level conditions at elevated ambient temperature conditions, the supplementary metering rod 70 will have the end thereof located inwardly of the orifice 68 and flow therethrough will pass from the bowl 20 in bypass relationship to the main metering orifice 24 to provide a concurrent fuel flow into the fuel well 28 for supply to the main metering system. The combined flow through the orifices at sea level conditions will produce a desired air fuel ratio for operation of the vehicle. When the air temperature is above a predetermined temperature, for example 80°F., and the vehicle is operated at a higher altitude, for example in the order of 5,000 feet of operation, the aneroid bellows 76 will expand to move the control lever 74 downwardly within the chamber 78. This will cause the supplementary flow

rod 70 carried thereon to have an enlarged diameter portion on the tip thereof located within the orifice to restrict fuel flow from the hole into the main metering system so as to compensate for a reduction in air density and thereby maintain a desired air-fuel ratio. Greater reduction occurs at greater elevations. Eventually, guide pin 92 hits the bottom of bore 94 to produce a limit stop to further altitude compensation.

Under conditions where the air temperature is above the predetermined minimum temperature, the altitude power lockout lever 132 will move with the bent end 108 of the lever 74 so as to cause the lever 132 to rotate in a counterclockwise direction as shown in FIG. 5 so as to locate the lockout tang 142 above the power piston bracket to prevent fuel enrichment by the power cylinder at high altitude operations.

At lower temperatures of operation where the ambient air is below 80°F., the operation of the altitude power lockout lever is affected by the snap action bimetallic element 144 since it will snap into the solid line position when the air is cold to engage the stop 150 thereby to prevent the aforementioned rotation of the lever so that fuel enrichment by the power piston 52 will be maintained as long as the air inlet temperature is below a point where lack of power enrichment might affect engine performance.

Once the air temperature has increased, for example to 100°F., element 144 will snap into the dotted line position to permit the follower tang 138 to move downwardly against the upper surface of the bent end 108. This will cause the lockout tang 142 to move into its interlock position.

In one working embodiment the aneroid 76 has a stroke of 0.070 inches from 29 inches to 25 inches of mercury absolute pressure and a stroke of 0.160 inches from 29 inches to 20 inches of mercury absolute pressure. The external stop prevents travel below 20 inches of mercury absolute. The bellows 78 is brass and includes a 3½cc partial oil fill or a 0.6 gram charge of silicone lubricant sold by Dow Corning as No. 11 Silicone Compound. The evacuated aneroid has a 10 per cent minimum helium content. The bimetallic element 144 is formed as a rectangle 1.10 inches by 0.42 inches and produces snap action travel in both directions of movement as provided by a cold override bimetal of the type supplied by Texas Instrument as model P-675.

These multiple functions of control are all attained within the limited confines of an air horn member 50 and are structurally related to known power piston operating metering rod arrangements without requiring substantial modifications to the dimensional characteristics thereof.

While the embodiments of the present invention, as herein disclosed, constitute a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A carburetor altitude compensation assembly for use on a carburetor having a main metering system for supplying fuel to a primary carburetor bore through means including a main metering orifice and a power piston operated primary main metering rod wherein the power piston is operative in response to engine manifold vacuum to position the primary main metering rod in a fuel enrichment position as the intake manifold vacuum is reduced in response to increased engine loads comprising: fuel supply means including a supplementary metering orifice disposed in parallel with the

main metering orifice, a supplementary metering rod located with respect to said supplementary metering orifice and movable therein to control flow there-through to bypass a selected amount of fuel around said main metering orifice into the carburetor bore, altitude responsive aneroid means responsive to changes in atmospheric pressure due to changes in altitude, means coupling said aneroid means to said secondary metering rod to decrease bypass fuel flow through said supplementary metering orifice upon a reduction in pressure due to an increase in altitude to compensate for enrichment of air-fuel ratio through a carburetor bore as produced by a decrease in air density due to increases in altitude, lockout means coupled to said aneroid means and movable thereby between first and second control positions, said lockout means being positioned by said aneroid means in its second control position in response to a preset altitude to interlockingly engage the power piston to prevent operation thereof into a fuel enrichment position thereby to prevent enrichment of air fuel mixture because of manifold vacuum reductions due to decreases in atmospheric pressure, and thermally responsive means responsive to temperature of air flow into the carburetor bore for conditioning said lockout means to prevent operation thereof into its second control position for permitting operation of the power piston into a fuel enrichment mode of operation when cold air flows through the inlet of the bore until the carburetor inlet air temperature reaches a predetermined level at which said bimetal means is operated to condition said lockout means to control the power piston in response to altitude pressure changes.

2. A carburetor altitude compensation assembly comprising: fuel supply means including a supplementary metering orifice for supplying fuel to a carburetor bore in parallel relationship to fuel flow through a main metering orifice, a supplementary metering rod movable with respect to said supplementary orifice, an air horn on said carburetor including a control chamber therein, pressure responsive aneroid means located within said control chamber having a first portion thereon fixedly secured to said air horn and a second portion thereon movable with respect to said air horn, a bracket secured to said aneroid means for movement therewith, means coupling said supplementary metering rod to said bracket to position said rod within said supplementary metering orifice in accordance with altitude pressure conditions, said supplementary rod having a sea level location with respect to said metering orifice to supply a greater amount of fuel to the engine, a power piston bore within said air horn, a power piston located in said bore having one end thereof exposed to atmosphere, means for exposing the opposite end of said power piston to intake manifold vacuum, said power piston adapted to operate a main metering rod with respect to a main metering orifice for producing an enrichment of fuel supply to an engine upon increases in engine load, lockout means connected to said air horn including a first portion thereon in engagement with said bracket and a second portion thereon movable with respect to said power piston means between a first position and a second position, said second lockout means portion engageable with said power piston means upon a predetermined expansion of said aneroid means to prevent said power piston from moving into a fuel enrichment position to prevent

enrichment of the air-fuel mixture upon a decrease in atmospheric pressure, said supplementary metering rod being located by said bracket with respect to said supplementary metering rod to reduce fuel flow to the engine to maintain the predetermined air-fuel ratio upon decreases in atmosphere density to the engine, and temperature responsive means located within said air horn movable with respect to said lockout means and engageable therewith at carburetor inlet air temperatures below a predetermined temperature to position said lockout means in a first control position to allow said power piston means to assume its power enrichment position irrespective of movement of said bracket in response to changes in atmospheric pressure under low temperature conditions.

3. A carburetor altitude compensation assembly for regulating fuel flow between a fuel supply and an intake bore to an engine comprising: means including a main metering orifice communicating the fuel supply with a main fuel well, a supplementary metering orifice communicating the fuel supply with the main fuel well in parallel relationship with the said main orifice, a main metering rod located within said main metering orifice, an air horn having a bore therein, a power piston located within said bore having one end thereof exposed to atmosphere, means for exposing the opposite end of said power piston to intake manifold pressure, means coupling said main metering rod to said power piston for controlling the position thereof within said main orifice in accordance with intake manifold pressure, a supplementary metering rod located in said supplementary orifice, pressure responsive means located on said air horn having a first portion thereof fixedly secured thereto and a second portion thereon movable with respect to the air horn in accordance with changes in altitude of the vehicle, said supplementary metering rod being located within said metering orifice at reduced elevations to provide a bypass flow in conjunction with flow through said main metering orifice to provide a predetermined air-fuel ratio to the engine, said pressure responsive means responding to reductions in air pressure due to increases in altitude to move said supplementary rod with respect to said supplementary orifice to reduce bypass fuel between the fuel supply and the intake bore to maintain a desirable air-fuel ratio upon decreases in air density due to increases in altitude, altitude lockout means operated by said pressure responsive means between a first and second control position, said altitude lockout means engaging said power piston when in its second control position to prevent movement thereof in a direction to cause enriched flow of fuel from the fuel supply to the engine when said pressure responsive means senses a predetermined decrease in pressure due to increases in altitude, and thermally responsive means responsive to a predetermined reduction in temperature of air flow to the engine to disable said lockout means thereby to permit said power piston means to respond to a predetermined reduction in intake manifold pressure to cause fuel enrichment below a predetermined intake air temperature irrespective of changes in altitude.

4. A carburetor altitude compensation assembly for regulating fuel flow between a fuel supply in a carburetor and an air fuel supply bore therein to the engine to maintain fuel supply to the bore in accordance with changes in the air density flowing therethrough so as to control air-fuel ratios therein comprising: a pair of me-

tering orifices each having the inlet thereof in communication with the fuel supply, means for communicating the outlets of each of the orifices with the carburetor bore, said metering orifices being in parallel flow relationship with one another, an air horn assembly located above said metering orifices including a bore therein, a power piston located within said bore, means communicating one end of said power piston with atmosphere and the opposite end thereof with a vacuum source responsive to changes in engine load, a first metering rod carried by said power piston and movable thereby with respect to one of said metering orifices to provide a first control of fuel flow to the bore, said power piston locating said first metering rod in a part throttle position and a fuel enrichment position in accordance with changes in vacuum conditions acting thereon, a second metering rod located in the other of said metering orifices, pressure responsive means located within said air horn including means thereon movable with respect to said air horn in accordance with changes in pressure due to changes in vehicle altitude, means coupling said second metering rod to said pressure responsive means, said pressure responsive means positioning said second rod with respect to said other metering orifice between a reduced altitude position and an increased altitude position, said first metering rod and said second metering rod providing a predetermined quantity of fuel flow from the supply to the carburetor bore when the vehicle is at a predetermined base altitude to produce a predetermined air-fuel ratio in the bore, said pressure responsive means responding to decreases in pressure due to increases in altitude to cause movement of said second rod to reduce fuel flow through said other metering orifice to reduce fuel flow into the throat in accordance with reductions in air density because of increased altitude to control the air-fuel ratio so as to prevent excessive fuel enrichment due to increased altitude, a lockout lever pivotally connected to said air horn having a first portion thereon coupled to said pressure responsive means and a second portion thereon movable between first and second control positions, said lockout lever in its second control position engaging said power piston to prevent movement thereof into its fuel enrichment position to prevent excessive flow of fuel from the fuel supply to the bore when said pressure responsive means senses a predetermined increase in altitude, and temperature responsive means for maintaining said lockout lever in its first control position to permit fuel enrichment flow from the fuel supply to the carburetor bore in response to predetermined reduced inlet air temperatures at the inlet throat of the bore.

5. A carburetor altitude compensation assembly for regulating fuel flow from a fuel supply in a carburetor to an air fuel bore therein comprising: a pair of metering orifices located in the base of a fuel supply in the carburetor, an air horn cover on said carburetor including a chamber therein having an aneroid element therein, means for fixedly connecting the top of the aneroid with respect to the air horn, a guide rod on the opposite end of said aneroid, a guide slot in said air horn receiving said guide rod for defining a maximum altitude stop, a control lever having a base connected to said guide rod extending outwardly thereof including opposite end portions thereon bent upwardly with respect to the base of said aneroid, a spring element having one end thereof fixedly secured to the base of said

control lever and the opposite end thereof underlying one end of said control lever including a rod support portion thereon, an adjustment screw threadably received in said one end of the said control lever engageable with said spring element for adjustably positioning said rod support portion vertically with respect to said control lever, a first metering rod connected to said spring element portion depending downwardly from said control lever, one of said metering orifices located below said rod and cooperating therewith to provide a predetermined flow area from the fuel supply to the carburetor bore at a predetermined base altitude, said aneroid element responding to increases in altitude to move said bracket in a direction to cause said first rod to move within said orifice to produce a predetermined reduction of fuel flow in accordance with increases in altitude, air bleed valve means in said air horn for bleeding air into a secondary fuel metering system, valve operator means carried by the opposite end of said control lever to increase air flow through said bleed when the rod is in a reduced flow position thereby to further control air-fuel ratio so as to prevent altitude responsive enrichment thereof, a lockout lever pivotally secured to said air horn having a tang thereon located in contact with said one end of said control lever to be moved thereby so as to cause pivotal movement of said lockout lever, a bimetal element connected to said lockout lever, a stop surface on said air horn casting engageable with said bimetal to control pivotal movement of said lockout lever in accordance with the inlet air temperature to the carburetor, a bore in said air horn located on one side of said aneroid, a power piston located in said bore having one end thereof exposed to atmosphere, means for exposing the opposite end of said power piston to a load responsive vacuum source on an engine to cause said power piston to move between a normal fuel supply position and a fuel enrichment position upon changes in vacuum produced by increases in engine load, a second metering rod connected to said power piston for movement therewith, said second metering rod movable with respect to the other of said metering orifices to produce a first control of fuel flow from the fuel supply to the carburetor bore when the power piston is in its normal fuel supply position and to increase fuel flow from the fuel supply to the bore when the power piston is in its fuel enrichment position, said lockout lever having a second portion thereon movable with respect to said power piston, said control lever in response to a predetermined decrease in pressure positioning said lockout lever to locate said second portion thereon in interlocked relationship with said power piston to prevent movement thereof into its fuel enrichment position thereby to prevent fuel enrichment flow to the carburetor bore when the aneroid senses a predetermined pressure decrease, said bimetal engaging said stop to prevent movement of said lockout lever into interlocked relationship with said power piston when air flow to the carburetor is below a predetermined temperature, said bimetal flexing away from said stop surface above said predetermined temperature to permit pivotal movement of said lockout lever in response to pressure changes in air temperature to the bore is above said predetermined temperature.

6. A carburetor altitude compensation assembly for regulating fuel flow from a fuel supply in a carburetor to an air fuel bore therein comprising: a pair of meter-

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ing orifices located in the base of a fuel supply in the carburetor, an air horn cover on said carburetor including a chamber therein having an aneroid therein, means for fixedly connecting the top of the aneroid with respect to the air horn, a guide rod on the opposite end of said aneroid, a guide slot in said air horn receiving said guide rod for defining a maximum altitude stop, a control lever having a base connected to said guide rod extending outwardly thereof including an end portion thereon bent upwardly with respect to the base of said aneroid, a spring element having one end thereof fixedly secured to the base of said control lever and the opposite end thereof underlying one end of said control lever including a rod support portion thereon, an adjustment screw threadably received in said one end of the said control lever engageable with said spring element for adjustably positioning said rod support portion vertically with respect to said control lever, a first metering rod connected to said spring element portion depending downwardly from said control lever, one of said metering orifices located below said rod and cooperating therewith to provide a predetermined flow area from the fuel supply to the carburetor bore at a predetermined base altitude, said aneroid element responding to increases in altitude to move said bracket in a direction to cause said first rod to move within said orifice to produce a predetermined reduction of fuel flow in accordance with increases in altitude, a lockout lever pivotally secured to said air horn having a tang thereon located in contact with said one end of said control lever to be moved thereby so as to cause pivotal movement of said lockout lever, bimetal means for controlling pivotal movement of said lockout lever in accordance with the inlet air temperature to the carburetor,

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a bore in said air horn located on one side on said aneroid, a power piston located in said bore having one end thereof exposed to atmosphere, means for exposing the opposite end of said power piston to a load responsive vacuum source on an engine to cause said power piston to move between a normal fuel supply position and a fuel enrichment position upon changes in vacuum produced by increases in engine load, a second metering rod connected to said power piston for movement therewith, said second metering rod movable with respect to the other of said metering orifices to produce a first control of fuel flow from the fuel supply to the carburetor bore when the power piston is in its normal fuel supply position and to increase fuel flow from the fuel supply to the bore when the power piston is in its fuel enrichment position, said lockout lever having a second portion thereon movable with respect to said power piston, said control lever in response to a predetermined decrease in pressure positioning said lockout lever to locate said second portion thereon in interlocked relationship with said power piston to prevent movement thereof into its fuel enrichment position thereby to prevent fuel enrichment flow to the carburetor bore when the aneroid senses a predetermined pressure decrease, said bimetal means operative to prevent movement of said lockout lever into interlocked relationship with said power piston when air flow to the carburetor is below a predetermined temperature, said bimetal means flexing above said predetermined temperature to permit pivotal movement of said lockout lever in response to pressure changes when air temperature to the bore is above said predetermined temperature.

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