

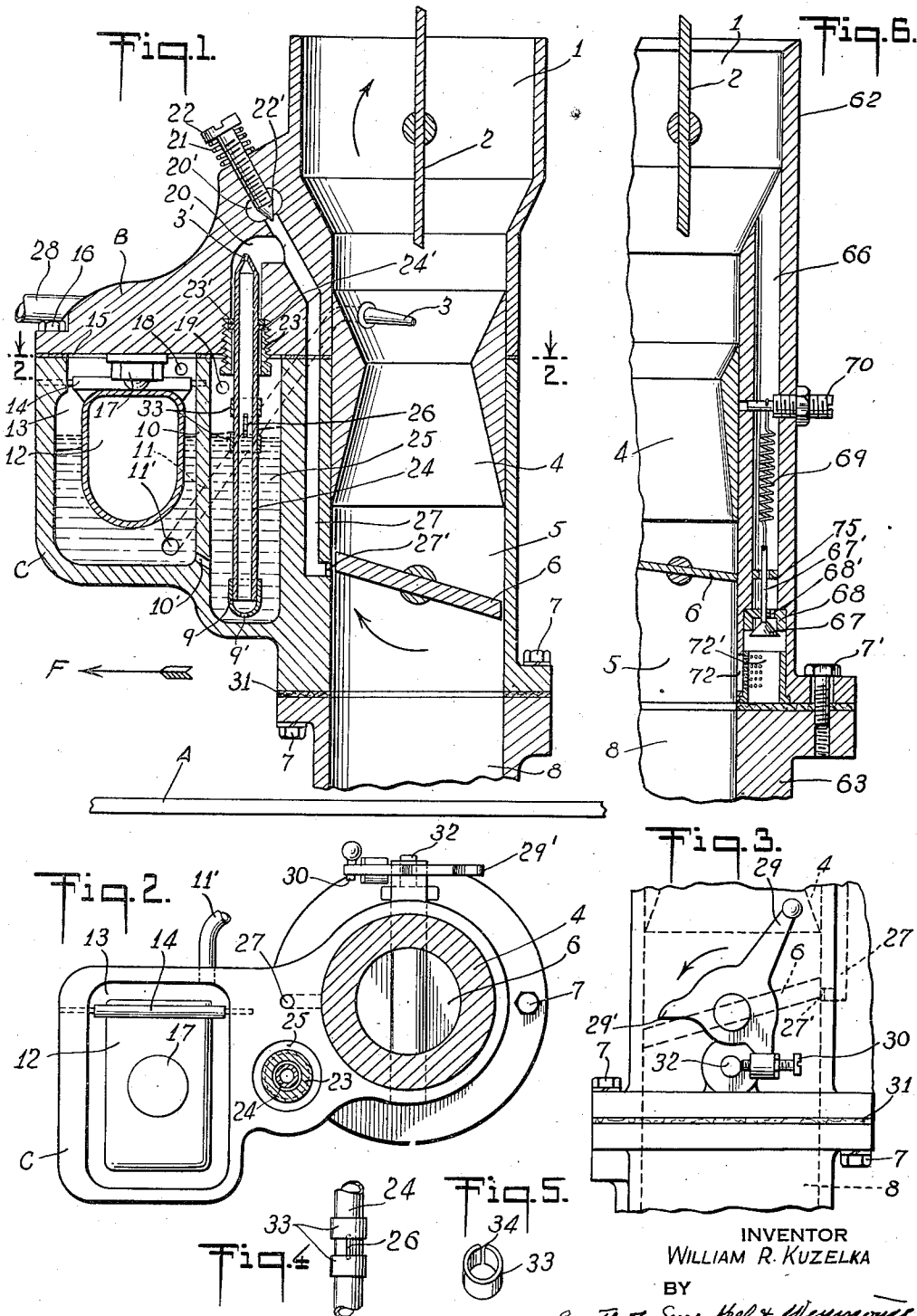
May 6, 1947.

W. R. KUZELKA

2,419,956

CARBURETING AND FUEL SUPPLY MEANS FOR MOTOR DRIVEN VEHICLES

Filed Sept. 4, 1942



INVENTOR
WILLIAM R. KUZELKA

BY

Burlett Syre Keel & Westmeyer
ATTORNEYS

UNITED STATES PATENT OFFICE

2,419,956

CARBURETING AND FUEL SUPPLY MEANS
FOR MOTOR-DRIVEN VEHICLES

William R. Kuzelka, New York, N. Y.

Application September 4, 1942, Serial No. 457,279

14 Claims. (Cl. 261-41)

1

This invention relates to vehicular engine and carburetor constructions.

One object of the invention is a novel and improved engine and carbureting structure for vehicle operation, characterized by flexibility in control and efficiency in operation under varying road conditions.

A further object of the invention is a novel and improved carburetor for an internal combustion motor used to propel a vehicle, which facilitates the maintenance of top performance of the motor during both level road operating conditions and upgrade operating conditions with a minimum loss of speed and power.

A further object of the invention is to provide a novel and improved means which will automatically effect the continued changes in the fuel mixtures of the carburetor when and as required with a high ratio of fuel economy for improved performance.

A further object of the invention is to provide a novel and improved means for automatically compensating for the lessened liquid fuel present in the carburetor mixture output at lowered suction pressures.

A further object of the invention is to provide a novel and improved means for increasing the degree of atomization of liquid fuel at idling speed of the motor and insuring smooth performance.

A further object of the invention is to provide novel and improved means of the above indicated character that are simple and economical in construction and will function with a minimum of wear and adjustment.

Further objects of the invention will hereinafter appear.

For a better understanding of the invention, reference may be had to the accompanying drawings illustrating embodiments of the invention, wherein:

Fig. 1 is a sectional view of a vehicular carburetor and engine structure embodying the invention.

Fig. 2 is a schematic plan view showing the relation between the intake and the carbureting structure.

Fig. 3 is a side elevational view of a control.

Fig. 4 is a side elevational view of a detail.

2

Fig. 5 is a perspective view of a detail of the structure, and Fig. 6 shows a modification.

Referring to the drawings I have illustrated my invention as embodied in a vehicle a part of whose frame is indicated at A. There is mounted on this vehicle a conventional internal combustion engine, this engine having a conventional intake 8 forming part of or leading to the engine manifold and functioning to convey the explosive mixture from the carbureting devices to the intake valves and cylinders of the engine (omitted for convenience in illustration). Above this intake are disposed the carbureting and mixture forming means for the engine, these means being fastened to the intake 8 in any suitable manner as for example by the bolts 7. The mixture forming means include a conventional funnel opening 1 leading downwardly to a conventional suction chamber 5 and through a conventional Venturi tube 4. A choke valve is indicated at 2 and this valve may be operated in any suitable or conventional manner, namely either manually or thermostatically. A conventional butterfly valve 6 is indicated in the suction chamber for controlling the supply of explosive mixture to the engine. The means for operating this throttle valve are manual, as shown in Fig. 3.

The invention embodies a special correlation of a conventional high speed nozzle 3 and an idling speed nozzle 3', 27', an idling speed well 25 and a float chamber or carburetor bowl 13, with a slotted bleeder 26 formed in the side wall of the conduit 24 leading to the nozzle 3'.

The arrow F indicates the direction of movement of the vehicle and it is observed that the carburetor bowl 13 is disposed forwardly of the comparatively small well 25 in which is disposed the conduit 24 supplying a fuel mixture to the nozzle 3', the bowl 13 and the well 25 being separated from each other by means of a wall 10 through the lower part of which is formed a communicating passage 10' between the float chamber 13 and the idling well 25 for the supply of liquid fuel to the well 25. The well 25 in the particular embodiment shown is illustrated as being deeper than the bowl 13 and the idling conduit 24 extends down to a point near the bottom of the well. A cap 9 is disposed on the lower end of the conduit 24 and this cap is provided with a restricted opening 9' which functions as a non-

critical compensator for wear in the dimensions of the slotted bleeder 26, the upper opening 3' in the conduit and a possible variation in the diameter of the conduit 24. The conduit 24 may be fixed in position or adjustably mounted, and in the particular embodiment shown it is held in position by means of a retaining nut 23, screw-threadedly attached to an opening above the well 25 and engaging a shoulder 24' on or about the conduit, this shoulder 24' in turn engaging a sealing gasket 23'.

A conventional float 12 is illustrated in the bowl 13 for controlling the supply of liquid fuel from any suitable source and maintaining a predetermined liquid fuel level in the chamber of bowl 13 and idling well 25. This float controls and operates a conventional valve mechanism indicated schematically at 17, as for example, of a pin valve type. At 14 is illustrated a conventional pivoted lever of the float assembly to which the float 12 is attached.

At 18 I have indicated an opening for the admission of air or fluid under pressure to the float chamber 13 for the proper operation of the mechanism. A similar opening 19 is indicated in the upper part of the well 25 for the admission of air or fluid under pressure to the upper part of the idling well to provide for the operation of the carbureting means therein. These two openings 18 and 19 are disposed above the level of the liquid fuel maintained in the chamber 13 and the well 25. Liquid fuel is supplied from the bowl or chamber 13 to the main or high speed nozzle 3 through a passage schematically illustrated at 11, this passage 11 being connected with the bowl or chamber 13 at a point near the bottom thereof as indicated at 11'. The nozzle 3' of the conduit 24 is disposed in a chamber 20 and this chamber 20 leads downwardly through an idling speed conduit or channel 27. The latter terminates in a narrowed metered opening 27' as a nozzle discharging into suction chamber 5. This metered opening 27' is controlled partly by a fixed throttle adjustment which may be set and fixed by means of an adjustable screw 30 and the accelerator pedal (omitted for convenience in illustration) operating the throttle valve 6.

At 29 I have indicated a conventional ball ended lever which is fixed to the throttle valve spindle, the ball end being a part of a universal joint in the linkage between the accelerator pedal and the throttle valve 6. A stop 32 is indicated to arrest the throttle valve 6 when in a vertical position or at the maximum opening, a lug or projection 29' formed on the lever 29, engaging this stop 32. This stop 32 also functions as a rest for the adjusted idling screw 30 at minimum speed. By adjustment of the said screw 30 the throttle valve 6 may be caused to vary the metered opening 27' for adjusting the idling speed. The adjusting screw may be fixed in the adjusted position in any suitable manner as for example by the use of a tight fitted threading or a lock nut indicated.

The idling conduit 27 leading from the nozzle 3' to the suction chamber 5 functions as a mixing chamber for the fuel and air delivery to this conduit. Air is admitted to the chamber 20 through an opening 20' and this may be air at atmospheric pressure or air under fluid pressure. The quantity of air admitted to the chamber 20 and thence to the mixing chamber 27 is controlled in part by a conventional adjusting screw 22 having a conical point for varying the opening leading from the passage 20' to the passage 20,

and a conventional coil spring 21 is shown as a locking means for the adjusting screw 22. The air admitted from the passage 20' to the chambers 20 and 27 functions further to dilute the fuel mixture entering the mixing chamber 27 from the conduit 24. The fuel charge drawn up through the conduit 24 to the nozzle 3' is a rich mixture which ordinarily requires dilution by the admission of air into the chamber 20. This rich mixture is formed by the air coming through the opening 19 and from thence through the elongated slot 26 extending longitudinally of the conduit 24. For normal level road operation the elongated bleeder slot 26 is disposed above the level of the fuel in the well 25 as for example the lower end of this bleeder slot being disposed approximately .015 above the liquid fuel level. This bleeder is subject to partial or complete immersion when climbing hills because of its location well aft of the liquid fuel level controlling float 12 or the bowl 13. For example, the dot and dash fuel level indicated at 100 shows the lower end of this bleeder slot 26 partially immersed when the car is on a steep upward incline. Of course the fuel level naturally remains level whether the car is on level road or going up hill, but for convenience in illustration the level of the fuel is changed instead of the inclination of the car. By this arrangement added power is automatically imparted to the engine by the enrichment of the fuel supply through the idling conduit 24, while the supply from the main bowl 13 and through the high speed nozzle 3 remains the same in richness or a richness which is not varied by road inclinations. The added power is thereby obtained for climbing hills entirely automatically with maintenance of the desired climbing speed and with less throttling of the engine. Thus the disposition of the idling conduit with well 25 aft of the main float chamber 13 with the bleeder slot 26 disposed on approximately level roads above the liquid level enables a richer mixture to be supplied automatically to the engine going up steep hills, while on approximately level roads or on downward inclines the mixture is not varied by the liquid level and the main speed nozzle 3 and the idling nozzle 3' cooperate and function together to produce a flexible and efficient operation desired in practice.

In the particular embodiment shown the carbureting frame structure is embodied in three parts, a Venturi part 4, an upper part B and a lower part C. The upper and lower parts B and C are fitted together with a conventional gasket 15 to seal the joint between the upper and lower halves of the housing. The upper and lower halves may be fastened together in any suitable manner as for example by conventional hexagon headed bolts, one of said bolts being indicated at 16. Fuel is admitted to the pin valve assembly 17 through a gas or liquid fuel supply line 28 leading from a suitable supply as for example a fuel pump or tank (omitted for convenience in illustration). A conventional gasket 31 is shown to seal the joint between the suction chamber element 5 and the intake 8.

The arrows adjacent the valves and mechanisms indicate the direction the choke valve 2, the throttle valve 6 and the throttle lever 29 will swing to the other extreme.

In Figs. 4 and 5 I have indicated a means for adjustably compensating for changes made in the liquid fuel level as for example due to the wear in the fuel assembly and the fuel pin valve assembly, i. e., the means as shown enable the

adjustment of the length of the bleeder slot 26 and the height of it above the liquid level. In this case the bleeder slot 26 was formed of a greater length than is necessary for adequate control, and the upper and lower ends of this bleeder slot are covered by sleeves 33 which are slid over the conduit 24 and frictionally grip in a retaining manner the tube 24. Each of these sleeves is formed with a slot 34.

Fig. 4 shows idling conduit 24 with the long slot or bleeder 26 to be adaptable for the varying conditions. The sleeves 33 are strips or bands of tempered metal tightened and slidably fitted to the conduit 24, one band partly over the top and the other partly over the lower end of the bleeder 26. The vertical slit or slot 34 of the sleeve 33 is a full width clearance and the purpose of this slit is to impart the proper functional relation of its frictional attachment to the idling conduit 24.

As indicated Fig. 2 shows the relative positions of the carburetor bowl 13, the idling well 25, and the suction chamber 5. This arrangement, as pointed out above of the idling well 25, namely its being positioned in the center rear of the carburetor bowl 13, offers the best functional results above described. It is understood, however, that the position of the suction chamber 5 is optional since it can be placed on either side of the carburetor bowl as space or other practical conditions permit.

In the modification of Fig. 6, the down draft pipe 62 forming the intake 1 is provided with an air channel 66 by-passing the Venturi pipe 4 and leading down to an opening 72 to the suction chamber 5 at a point below the throttle valve 6. The air passing down the channel 66 is controlled by a poppet valve 67 which cooperates with a valve seat member 68. The stem 67' of the valve passes up through this valve seat insert 68 and the air passes freely from the channel 66 through an opening 68' formed in the top of the valve seat and chamber member 68. A guide member 75 for the stem 67' is positioned above the valve seat and a spring 69 is attached at one end to the stem 67' and at the other end to a wrench screw 70. The valve 67 is normally held in closed position by the spring 69 and the tension of this spring may be tightened simply by turning the screw 70. A perforated sleeve 72' is disposed about the opening 72 so as to screen or filter the air admitted through the valve 67. This perforated sleeve also functions to break up the air stream injected into the chamber 5 through the valve 67. This auxiliary air supply means comprising the channel 66, the valve 67 and the perforated sleeve 72' cooperatively function with the fuel supply nozzles to give the desired flexibility in control and operation of the engine. For example, with the throttle valve 6 closed, namely, with the motor idling, an increased suction automatically opens the valve 67 against the tension of the spring to admit air for supplementing the idling mixture. This applies also to the condition when the throttle valve 6 is partially open, namely in all cases where the suction would be sufficient to open the valve 67, in which case the additional air supplied through the channel 66 would supplement the operation of the nozzles 27' and 3. A particular advantage of the auxiliary air supply through the bypass is derived in coasting on down grades when additional air is automatically supplied to provide a leaner mixture.

I claim:

1. In combination a vehicle frame, an internal combustion engine mounted on the frame, a carburetor bowl in which fuel is maintained at a predetermined level, a fuel well aft of the bowl and in communication therewith so as to maintain the same fuel level in the bowl and the well, a suction chamber in which an explosive mixture is formed, a high speed fuel supply means leading to said suction chamber, an idling nozzle supplied with a fuel mixture from the well with the air for said mixture supplied through an opening which, when the engine is horizontally disposed, is above the fluid level but when the engine is upwardly inclined is partially immersed, said idling nozzle leading to the suction chamber for supplying a fuel mixture for idling and for assisting the high speed nozzle in supplying a fuel mixture to the suction chamber at higher speeds.

2. In combination a vehicle frame, an internal combustion engine mounted on said frame, a suction chamber for said engine, a carburetor bowl in which the fuel is maintained at a predetermined level, a well aft of said bowl, a fuel communicating passage between the bowl and the well for maintaining the same level of fuel in the well as is maintained in the bowl, a conduit disposed in the well and partially immersed in the fuel, said conduit having an opening for the maintenance of the level of fuel in the conduit at the level maintained in the bowl and the well at all times, an air opening in the conduit disposed above the level of fuel in the well when the engine is approximately level but at least partially closed when the vehicle is on a steep upgrade to vary the richness of the mixture responsively to the inclination but to return to normal fuel charge instantly upon the vehicle reaching a horizontal position, an idling speed nozzle and mixing chamber communicating with said conduit above the air passage and leading to said suction chamber, and means controlling the flow through said suction chamber.

3. In a carburetor for internal combustion motors for vehicles, a means to contain liquid fuel, a float assembly for maintaining therein a predetermined amount and level of fuel, a means for supplying fluid under pressure to said means to contain fuel, a means to supply fuel for the idling or primary speed of the motor comprising an upwardly extending fuel conduit extending into said means to contain fuel at the extreme aft position therein, the fuel in said conduit being maintained at all times at the level of the fuel in the container, a slotted bleeder being formed longitudinally in the wall of said conduit and normally unsealed by the fuel level but subject to a fluid seal at low suction pressure, said conduit being positioned aft of the float assembly whereby the effective length of the said slotted bleeder will be immersed and positively sealed accordingly as the vehicle is rearwardly inclined, and thereby resulting in a liquid fuel mixture richer than normal with instant return to normal mixture upon the motor assuming a horizontal position.

4. In a carburetor for internal combustion motors for vehicles, a float chamber, a float assembly for maintaining therein a predetermined amount and level of liquid fuel, a well placed rearwardly of and communicating with the liquid fuel of said float chamber, a means for supplying fluid under pressure to said float chamber and well, a means to supply fuel for the idling or primary speed of the motor comprising a fuel conduit ex-

7

tending downwardly into said fuel well and being maintained with fuel at all times at the level of the fuel in the float chamber, a slotted bleeder being formed longitudinally in the wall of said conduit and normally unsealed by the fuel level of said well, whereby the effective length of the said bleeder will be immersed accordingly as the vehicle is rearwardly inclined, thereby resulting in a liquid fuel mixture richer than normal with instant return to normal mixture upon the motor assuming a horizontal position.

5. In a carburetor for internal combustion motors for vehicles, a float chamber, a float assembly for maintaining therein a predetermined amount and level of liquid fuel, a well placed rearwardly of the center of and communicating with the liquid fuel in said float chamber, a means for supplying fluid under pressure to said float chamber and well, a means to supply fuel for the idling or primary speed of the motor comprising a fuel conduit extending into said fuel well and being maintained with fuel at all times at the level of the fuel in the float chamber, a slotted bleeder being formed longitudinally in the wall of said conduit and normally unsealed by the fuel level of said well, whereby the effective length of the said bleeder will be immersed accordingly as the vehicle is rearwardly inclined, thereby resulting in a liquid fuel mixture richer than normal, with instant return to normal mixture upon the motor assuming horizontal position.

6. In a carburetor for internal combustion motors for vehicles, a float chamber, a float assembly for maintaining therein a predetermined amount and level of liquid fuel, a well placed rearwardly of and communicating with the liquid fuel of said float chamber, a means for supplying fluid under pressure to said float chamber and well, a means to supply fuel for the idling or primary speed of the motor comprising a fuel conduit extending into said fuel well and being maintained with fuel at all times at the level of the fuel in the float chamber, a slotted bleeder being formed longitudinally in the wall of said conduit, a dimension of said slotted bleeder being larger than precision, a slidable means on said fuel conduit to retain precision dimension of said slotted bleeder, wherewith changes in the liquid fuel level due to wear in the float assembly will be compensated for, said slotted bleeder being at least partially closed when the vehicle is on a steep upgrade to provide a richer mixture than normal but with an instant return to normal mixture upon horizontal position being reached.

7. In a carburetor for internal combustion motors for vehicles, a float chamber, a float assembly for maintaining therein a predetermined amount and level of liquid fuel, a well placed rearwardly of and communicating with the liquid fuel of the said float chamber, a means for supplying fluid under pressure to said float chamber and well, a means to supply fuel to the idling or primary speed of the motor comprising a fuel conduit extending into said fuel well and being maintained with fuel at all times at the level of the fuel in the float chamber, a slotted bleeder being formed longitudinally in the wall of said conduit, a dimension of said slotted bleeder being larger than precision, a slidable tempered metal band retaining the upper precision dimension and another slidable tempered metal band retaining the lower precision dimension of the said slotted bleeder on the said fuel conduit, wherewith changes in the liquid fuel level due to wear in said float assembly will be compensated for, said slotted bleeder being

8

at least partially closed when the vehicle is on a steep upgrade to provide a richer mixture than normal but with an instant return to normal mixture upon horizontal position being reached.

8. In a carburetor for internal combustion motors for vehicles, a means to contain liquid fuel, a float assembly for maintaining in said liquid fuel container a predetermined amount and level of fuel, a means for supplying fluid under pressure to said means to contain fuel, a suction chamber communicating with the valves and the cylinders of the motor, a means to supply fuel to the said suction chamber comprising a fuel conduit extending into said means to contain fuel and being maintained with fuel at all times at the level of the fuel in the float chamber, a slotted bleeder extending longitudinally in the wall of said conduit and normally unsealed by the fuel level, said conduit being aft of the said float assembly whereby the effective length of the said bleeder will be immersed accordingly as the vehicle is rearwardly inclined and thereby resulting in a richer liquid fuel mixture than normal with instant return to the normal mixture upon the vehicle reaching a horizontal position.

9. In an arrangement of the character set forth in claim 2 wherein an auxiliary air supply means leads to the suction chamber with means responsive to the suction pressure in the chamber for controlling the supply of air.

10. In an arrangement of the character set forth in claim 1 wherein an auxiliary air supply means leads to the suction chamber with means responsive to the suction pressure in the chamber for controlling the supply of air.

11. An explosive mixture supply means for vehicular motors comprising a fuel chamber and means for forming an explosive mixture in combination with means responsive to inclination of the vehicle for enriching the mixture by reducing the portion of air when the vehicle is going upgrade and comprising a conduit in said chamber which is maintained with fuel at the level of the fuel in said chamber at all times, the mixture being instantly reduced to normal when the vehicle assumes a horizontal position.

12. An explosive mixture supply means for internal combustion engines comprising a fuel chamber, means for maintaining a fuel supply to said chamber, a conduit within said chamber wherein fuel is maintained at all times at the level maintained in said chamber, said conduit being in the extreme aft part of the chamber, a high speed nozzle supplied with fuel from said chamber, a second nozzle supplied with fuel from said conduit and means supplying air to said second nozzle including means responsive to the inclination of the engine for varying the air supply to the second nozzle, the fuel mixture supplied to the second nozzle being thereby richer upon upgrades, with an instant return to normal richness when the engine returns to horizontal position.

13. In the combination of claim 2 wherein the well is provided with a closing wall at the top and said conduit is suspended from said wall so as to project downwardly into the well below the level of the fuel therein.

14. An explosive mixture supply means for internal combustion engines comprising a fuel chamber, means for maintaining a fuel supply to said chamber, a conduit suspended at its upper end from the upper wall of the chamber and projecting down into the chamber, fuel being maintained at all times in said conduit at the level normally maintained in the chamber, a high

speed nozzle supplied with fuel from said chamber, a second nozzle supplied with fuel from said conduit and means responsive to the inclination of the engine for varying the air supply to the said second nozzle comprising a bleeder opening in said conduit whose area is varied responsively to inclinations of the engine and responsively to a return to horizontal position for returning the air supply to the normal supply.

WILLIAM R. KUZELKA. 10

REFERENCES CITED

The following references are of record in the file of this patent:

Number
2,232,035
2,093,011
2,209,511
2,102,846
1,661,943
2,139,506

Number
9,765

UNITED STATES PATENTS

Name	Date
Mennesson -----	Feb. 18, 1941
Grosz -----	Sept. 14, 1937
Coffey -----	July 30, 1940
Hunt -----	Dec. 21, 1937
Hayes, Jr. -----	Mar. 6, 1928
Kuzelka -----	Dec. 6, 1938

FOREIGN PATENTS

Country	Date
British -----	Apr. 21, 1910