O. C. FUNDERBURK.

COMBINED DASH ADJUSTMENT AND PRIMER FOR CARBURETERS.

APPLICATION FILED JUNE 28, 1915.

1,183,183.

Patented May 16, 1916.

2 SHEETS—SHEET 1.

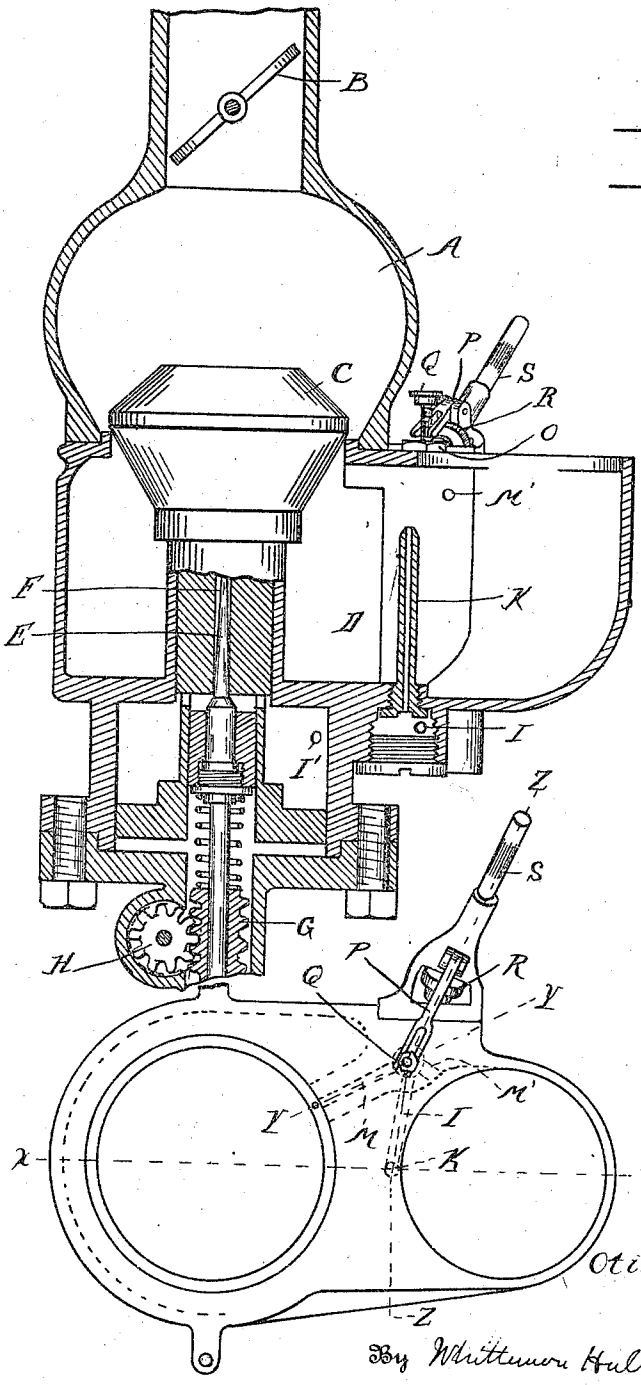


Fig. 2.

Fig. 1.

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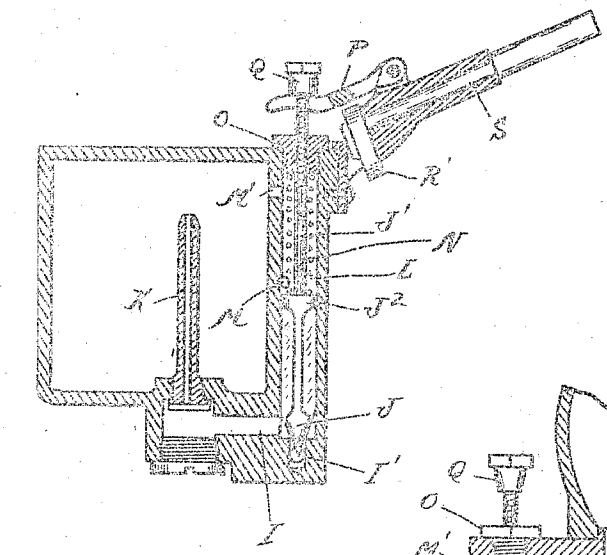


Fig. 3.

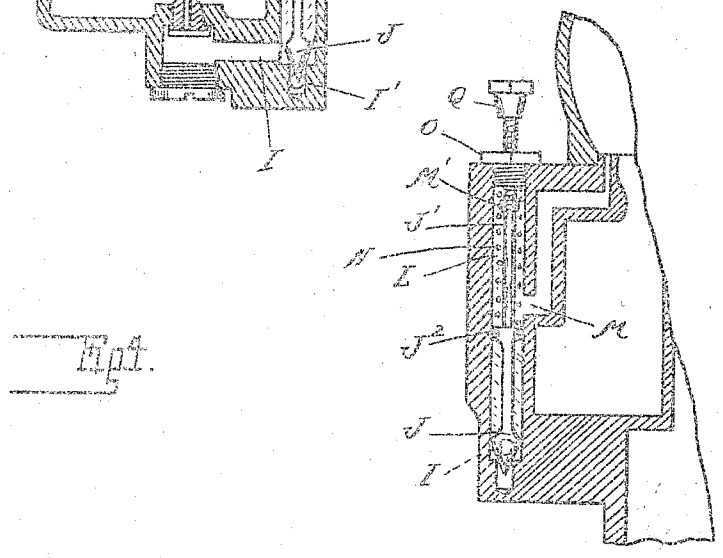


Fig. 4.

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UNITED STATES PATENT OFFICE.

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COMBINED DASH ADJUSTMENT AND PRIMER FOR CARBURETERS.

1,183,183. Specification of Letters Patent. Patented May 16, 1916.

Application filed June 28, 1915. Serial No. 36,830.

To all whom it may concern:

Be it known that I, OTIS C. FUNDERBURK, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Combined Dash Adjustments and Primers for Carbureters, of which the following is a specification, reference being had therein to the accompanying drawings.

It is the object of the invention to obtain an adjustment for carbureters by which compensation may be made for variations due to temperature conditions, variation in load, etc., and in which an adjustment suitable for one speed is equally suitable for other speeds.

A further object is to obtain this result with a simple construction and one which performs the further function of a primer.

In the drawings: Figure 1 is a plan view of a carbureter to which my improvements are applied; Fig. 2 is an enlarged vertical section; Fig. 3 is a cross-section on the line *z*—*z* of Fig. 1; and Fig. 4 is a cross-section on the line *y*—*y* of Fig. 1.

In the operation of engines under varying conditions of temperature and load, it is frequently desirable to adjust the flow of the liquid fuel. Thus, in starting with a cold engine, the increased viscosity of the oil, as well as the greater difficulty in vaporizing the same, requires an increased area of supply, and the same is true where the engine is running under increased load. On the other hand, a carbureter must respond to variations in speed of the engine, and as heretofore constructed it has been difficult to obtain any adjustment which would operate proportionately at different speeds.

With my improved construction I have overcome the difficulty by an auxiliary supply of the liquid fuel, which when adjusted to produce an increased flow at one speed will also produce a proportionate increase in the flow at different speeds,—the construction being as follows:

A is the mixing chamber of a carbureter controlled by a throttle valve B, and provided with suitable means for obtaining proportionate volumes of air and liquid fuel in different positions of adjustment of the throttle. As shown, this proportionate means comprises a valve C controlling the air inlet passage D, and coöperating with a metering pin E and aspirating tube F to vary the discharge of oil corresponding to the opening of the valve.

To adjust the flow of the oil the metering pin E is provided with means of adjustment such as the rack G and coöperating pinion H, but this adjustment when once properly set to produce a desired proportion at different speeds cannot be changed without disturbance in the ratio. I have therefore provided means for supplying additional liquid fuel which is dependent upon the velocity of the air passing through the carbureter, and is independent of the adjustment of the main metering pin. This auxiliary means preferably comprises a passage I for auxiliary oil, which is controlled by a needle-valve or metering pin J, and which is preferably located at one side of the air inlet conduit. This passage leads to an oil discharge nozzle K, which is arranged in the air inlet passage, so that the air drawn over the end of the nozzle will produce the requisite suction for the discharge of the oil. The quantity discharged will be regulated, first, by the restriction of the metering pin, and second, by the velocity of the air, and thus when an adjustment is made for one speed a proportionate discharge will be obtained at a changed speed.

As specifically shown, the needle valve J is located in a bore or cylindrical chamber L, and the stem J′ of the valve has arranged thereon a piston J^2 which fits within said cylinder. Above this piston J^2 there is a passage M which leads from the cylinder L to the mixing chamber. There is also an air vent M′ connecting with the cylinder above the passage M. N is a spring sleeved on the stem J′, one end abutting against the piston J^2 and the other end against a gland or cap O through which the stem passes out from the cylinder. P is a lever engaging a collar Q having a threaded engagement with the stem, and R is a cam upon a shaft S which is adapted to raise and lower the lever P, thereby correspondingly raising and lowering the stem J′. The shaft S extends to the dash or other convenient position for adjustment.

With the construction as described, to adjust the carbureter for any abnormal condition, as for instance where the engine is cold, the shaft S is rotated to operate the cam R,

which latter raises the lever P and lifts the stem J′ of the needle valve J. If it is desired to first prime the carbureter, the cam is adjusted to lift the stem to its fullest extent, which will open a free passage from the oil supply I′ to the cylinder L, and will also raise the piston J² above the port M and between the same and the vent port M′. This will establish communication between the mixing chamber and the cylinder L, so that the suction of said mixing chamber will raise the oil in the cylinder and discharge it directly through the passage M into the mixing chamber, thereby priming the carbureter.

If instead of priming it is merely desired to increase the flow of oil, the cam R is adjusted so as to raise the stem J′ to a lesser degree, where the piston J² will be below the passage M. The oil will thus be permitted to pass from the supply conduit I′ to the passage I and to the nozzle K, where the suction produced by the velocity of the air current across the end of said nozzle will lift the oil and discharge it into the air current. The quantity thus discharged will be regulated by the degree of opening of the needle valve J, which operates as a metering pin, and it will also be proportionate to the velocity of the air passing the nozzle K. Thus when an adjustment is made for one speed it will be suitable for every other speed, as the quantity of oil discharged will be proportionate to the velocity of air. It will be understood that this auxiliary oil supply does not interfere in any way with the operation of the main discharge nozzle of the carbureter, but is merely supplemental thereto. As a consequence the auxiliary device may be cut out completely by the closing of the valve J, and the carbureter will operate by the discharge of oil from the main nozzle. Under this condition oil is prevented from discharging through the passage M by reason of the fact that the vent port M′ neutralizes the suction from the mixing chamber and air only will pass through the passage M.

What I claim as my invention is:—

1. In a carbureter having an induction conduit and a liquid fuel inlet, of regulable means for automatically securing a proportionate mixture of the air admitted through said conduit and the fuel discharged from said fuel inlet, independently of the throttle, and independent means for supplying additional fuel proportionate to the velocity of air in said induction conduit.

2. In a carbureter, the combination with a mixing chamber and an induction conduit, of an automatic valve controlling admission of air from said conduit to the mixing chamber, a nozzle for discharging liquid fuel into said chamber and metering means for the liquid fuel controlled by said air valve, of a fuel nozzle in said air induction conduit in advance of said mixing chamber and valve, and means for variably restricting the supply of fuel to the latter nozzle.

3. In a carbureter, the combination with a mixing chamber, an induction conduit and a fuel supply nozzle, of automatic means controlling and proportioning the admission of air and fuel from said conduit and nozzle to the mixing chamber, a liquid fuel discharge nozzle in said induction conduit in advance of the mixing chamber, and manually operable means for controlling the discharge of fuel from the last-mentioned nozzle.

4. In a carbureter, the combination with a mixing chamber and a main fuel supply nozzle, of automatic means controlling and proportioning the admission of air to said chamber and liquid fuel to said nozzle, and auxiliary fuel supply nozzle located in the induction conduit in advance of said mixing chamber, and manually operable means for variably restricting the supply to said auxiliary nozzle.

5. In a carbureter, the combination with a mixing chamber and automatic means for controlling and proportioning the admission of air and liquid fuel, of an auxiliary fuel nozzle located in the induction conduit in advance of said mixing chamber and subjected to the ejector effect of the passing air, means for variably restricting the fuel supply to said nozzle, means for establishlishing a direct fuel discharge passage to said mixing chamber, and manually operable means for alternatively controlling said variable restriction and said direct fuel discharge passage.

6. In a carbureter, the combination with a mixing chamber, of means for controlling and proportioning the admission of air and fuel thereinto, including an automatic air valve, an auxiliary fuel discharge passage leading into said mixing chamber, means for venting said passage above the normal level of the liquid fuel, whereby air is normally discharged therethrough, and manually operable means for closing said vent to cause the discharge of liquid fuel.

7. In a carbureter, the combination with a mixing chamber, an automatic valve in the air inlet thereto and means controlled by said valve for controlling the supply of liquid fuel, of a combined primer and auxiliary fuel supply, comprising a nozzle in the air induction conduit in advance of said valve, a fuel supply passage leading to said mixing chamber, vented above the normal level of the fuel to normally discharge air only therethrough, and manually operable means for alternatively establishing restricted communication between the liquid fuel supply and said auxiliary nozzle and for closing said vent.

8. In a carbureter, the combination with the mixing chamber, an air inlet passage thereinto, an automatic air valve controlling the admission of fuel to said chamber, of an auxiliary fuel supply comprising a discharge nozzle in the air inlet passage, a passage connecting with said mixing chamber, a common liquid fuel supply for said nozzle and passage, a vent for said passage above the normal level of the oil, a manually operable valve controlling the supply to said nozzle and passage for variably restricting the connection with the former, said valve being adapted in one position of adjustment to cut-off said vent and open an unrestricted supply to said passage.

9. In a carbureter, the combination with the mixing chamber, of an automatic valve in the air inlet thereto controlling the normal supply of liquid fuel, and an auxiliary fuel supply comprising a cylindrical chamber having a fuel supply port at one end thereof, a valve stem in said chamber having a metering pin controlling said port and a piston for dividing said chamber into two compartments, a discharge nozzle connecting with the compartment of said chamber adjacent to said supply port, said nozzle being located in the air induction passage, a channel connecting with said chamber above the normal position of said piston and leading to said mixing chamber, a vent for said cylindrical chamber normally on the same side of said piston as said passage leading to the mixing chamber, said piston being adapted to be adjusted to establish direct communication between the fuel supply port and said passage leading to the mixing chamber, and to cut-off said vent.

10. In a carbureter, the combination with a mixing chamber, an air inlet passage and an automatic valve therebetween controlling the supply of liquid fuel thereto, of an auxiliary fuel supply comprising a nozzle in said inlet passage, a fuel passage leading to said mixing chamber, a cylindrical chamber with which said nozzle and fuel passage connect, a valve having a metering pin for regulating the supply of fuel to said chamber and also having a piston normally in a position to cut-off said passage leading to the mixing chamber, an air vent also connecting with said cylindrical chamber, and manually operable means for adjusting said valve to vary the position of said metering pin and alternatively to move said piston between said passage leading to the mixing chamber and said vent.

11. In a carbureter, the combination with a casing containing the mixing chamber, an air inlet passage and fuel supply passage of an automatic valve in said air inlet passage for controlling the normal supply of fuel to said mixing chamber, and an adjustable auxiliary fuel supply comprising a cylindrical chamber in the wall of said casing, having a fuel supply port at one end and a valve stem passing out from the opposite end, a metering pin on said valve stem for variably restricting said supply port, a piston on said stem for dividing said chamber into two compartments, a nozzle in said air inlet passage communicating with said cylindrical chamber in the compartment adjacent to the oil supply, a passage connecting with said chamber in the compartment normaly on the opposite side of said piston and leading to said mixing chamber, an air vent for said chamber, and manually-operable means for adjusting said stem to vary the metering of the fuel, also adapted to shift said piston to the opposite side of said passage leading to the mixing chamber, thereby establishing unrestricted communication with the oil supply and cutting off said vent.

12. In a carbureter, the combination with a mixing chamber and an air supply chamber, of means automatically controlling and proportioning the admission of air and liquid fuel to the mixing chamber, and means for alternatively supplying auxiliary fuel directly to the mixing chamber or to the air supply chamber.

13. In a carbureter, the combination with a mixing chamber and an air supply chamber, of means automatically controlling and proportioning the admission of air and ilquid fuel to the mixing chamber, and a valve adjustable to admit auxiliary fuel either to the air supply chamber or direct to the mixing chamber.

14. In a carbureter, the combination with a mixing chamber and means for admitting a primary supply of fuel thereto, of an auxiliary fuel discharge passage leading into said mixing chamber, said passage having an air vent, whereby air normally flows therethrough, and a valve normally closing the fuel inlet to said pasage and adjustable to open said inlet and close said air vent.

15. In a carbureter, the combination with a mixing chamber and an air supply chamber, a nozzle for discharging liquid fuel into the mixing chamber, an automatic valve controlling admission of air from said air chamber to said mixing chamber, metering means for the liquid fuel controlled by said nozzle, of means within said air chamber for supplying additional fuel.

In testimony whereof I affix my signature.

OTIS C. FUNDERBURK.