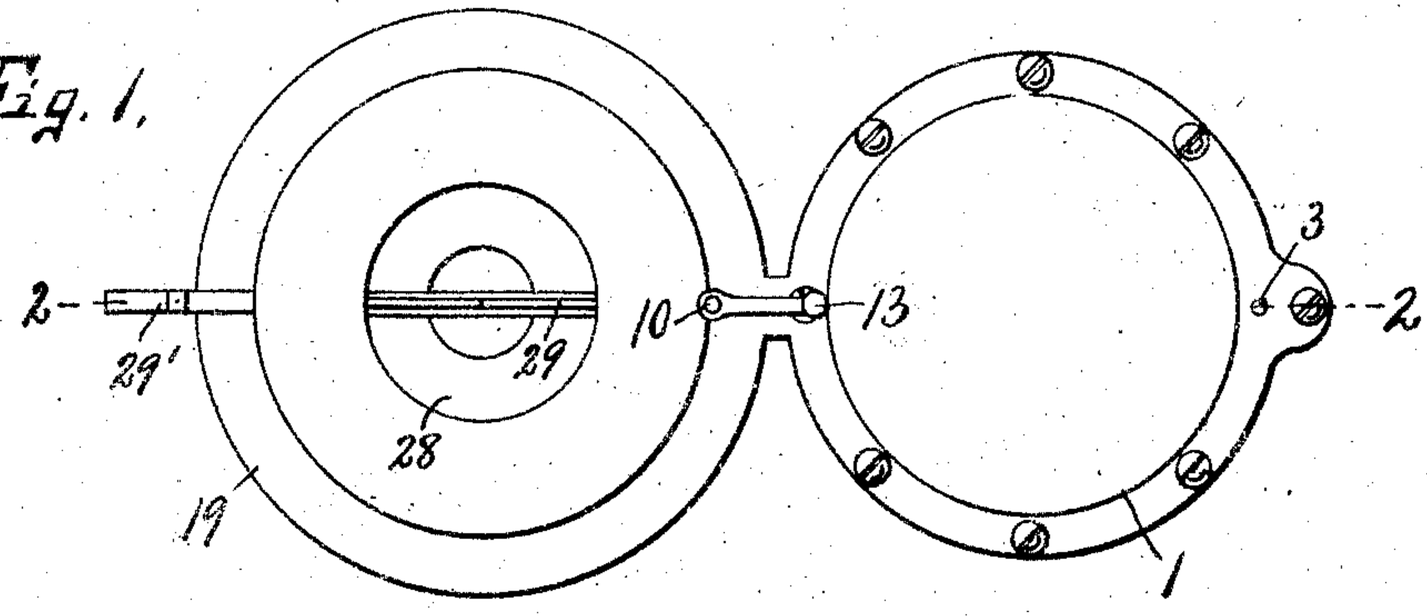
W. L. PERRY.

CARBURETER.

APPLICATION FILED MAR. 22, 1906.

907,279. Patented Dec. 22, 1908.

Fig. 1.



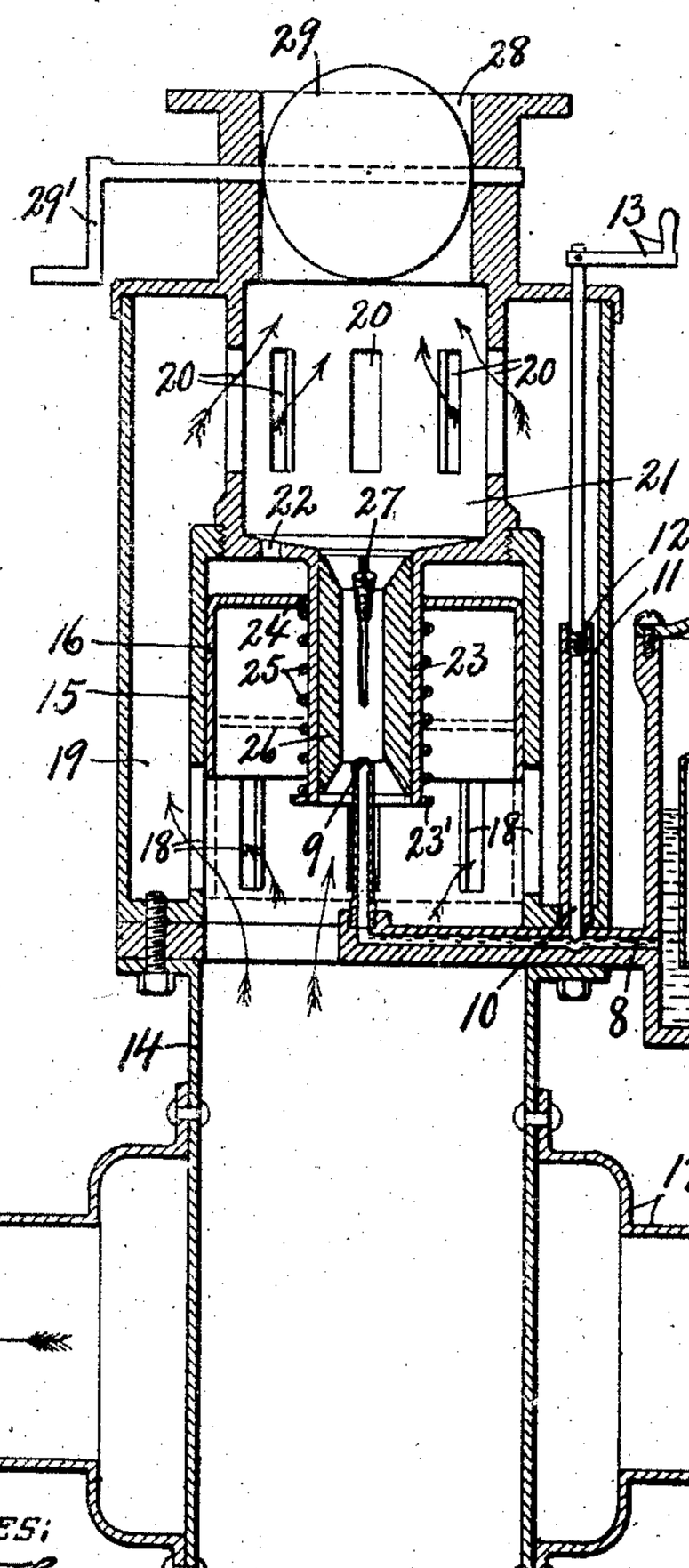


Fig. 2.

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CARBURETER.

No. 907,279. Specification of Letters Patent. Patented Dec. 22, 1908.

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To all whom it may concern:

Be it known that I, WILLIAM L. PERRY, of Scranton, in the county of Lackawanna, in the State of Pennsylvania, have invented new and useful Improvements in Carbureters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in carbureters for vapor engines and in other relations where it may be desired to employ gasolene, kerosene or other liquid hydrocarbon as a fuel.

It is well known that the quantity of inflammable vapor taken up by the air will depend largely upon the speed with which such air passes through the hydro-carbon and also upon the temperature of the air at the period of saturation, and the essential object of my present invention is to provide the carbureter with means for automatically maintaining a uniform mixture of air and vaporized hydro-carbon and to deliver such mixture to the burner for ignition, as for instance, to the cylinder of a vapor engine.

Another object is to utilize the heat of the spent gases for raising the temperature of the air passing through the intake of the carbureter and to expedite vaporization of the hydrocarbon and saturation of such vapor by the air.

A still further object is to avoid as far as practicable dangerous leakages or excess drip of the condensed vapor or liquid during its progress through the carbureter.

Another object is to provide means for maintaining a predetermined quantity of liquid-hydrocarbon in the supply reservoir.

Another object is to provide the mixing chamber with means for regulating the quantity of air admitted at the discharge end of the spray nozzle.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a top plan of my improved carbureter. Fig. 2 is a transverse vertical sectional view taken on line 2—2, Fig. 1.

In carrying out the objects stated, I provide a suitable supply-reservoir —1— into which the liquid hydrocarbon is fed from any source of supply, not shown, through an inlet —2—, having a valve —3— which is operated automatically by the inflowing liquid and a float —4— to maintain a predetermined quantity or level of the liquid in the supply-reservoir —1—.

The valve —3— is suitably guided in the reservoir —1— to automatically open and close the passage —2— as the liquid rises and falls in the chamber —1—, and for this purpose the upper end of the valve stem is connected to one end of a lever 5— which is fulcrumed at —6— and has its other end projecting into the path of the upper end of the float —4—, said float being guided in its vertical movement upon a central rod or post —7— projecting upwardly from the bottom of the reservoir —1— and as the liquid rises in said reservoir the float is actuated upwardly to engage and rock the lever —5— to close the valve —3— when the liquid reaches a predetermined level. This reservoir —1— is provided near its bottom with an outlet conduit —8— which terminates in an upright spray nozzle —9— to afford passage for the liquid from the reservoir —1— into a suitable mixing chamber presently described.

The feed of the liquid from the reservoir to the spray nozzle is controlled by the valve —10— which is guided in an upright tube —11— having its upper end extended some distance above the liquid level in the reservoir —1— and provided with interior threads for receiving a threaded portion —12— on the valve 10—, which in turn, is adjusted mechanically through the medium of a hand-piece 13—.

The particular advantage of extending the guide —11 above the liquid level is to avoid the use of glands or other stuffing boxes, thereby obviating leakage at this joint.

Atmospheric air is admitted through an intake-pipe —14— into the base of a cylinder-valve-chamber —15— in which is movable a cup-shape valve —16— for a purpose presently described. The intake-pipe —14— is in this instance, extended through or associated with a portion of a muffler or conduit —17— leading from the exhaust port of the engine for the purpose of heating the air passing through the intake —14— and thereby increasing its saturating power at the point of entrance to the mixing chamber.

The valve chamber 15— is preferably concentric with and surrounds the upright tubular nozzle —9— and is provided near its

base with a series of radial air ports —18 which are normally closed by the valve —16— except when an excessive vacuum is created in the mixing chamber, whereupon the valve is operated by the inequality of pressure at opposite ends thereof to open the ports —18— and allow an extra amount of air to enter into a surrounding chamber —19—. This latter chamber 19— communicates through ports —20— with a mixing chamber —21— which is preferably screwed into the upper end of the valve chamber 15— and communicates through a comparatively small opening —22— with the upper portion of said valve chamber above the valve —16—. This mixing chamber —21— is provided with a central pendent-tube —23— extending through a central opening —24— in the top of the valve —16— and having at its lower end an annular flange —23′.

A comparatively light coil-spring —25— encircles the tubular extension —23— and has one end resting upon the annular shoulder —23′ and its other end engaged by the top wall of the valve 16—. This spring —25— is of sufficiently light tension to allow the valve —16— to descend by its gravity to normally close the ports —18— when the air pressure is substantially uniform at both ends of the valve. In other words, the weight of the valve normally overbalances the tension of the spring to close the ports —18— under equal pressure at both ends of the valve so that when the pressure in the mixing chamber —21— is reduced by the partial vacuum therein it will be similarly reduced in the portion of the valve-chamber 15— above the valve through the connecting port —22— thereby enabling the spring —23— to elevate said valve to open the ports —18— to a greater or less degree, according to the degree of vacuum in the chamber —21—. The lower end of the tubular extension —23— is concentric with and surrounds the upper perforated end of the spray nozzle —9— and in this tubular extension is placed an adjustable bushing —26— having flaring upper and lower ends engaging the interior of the tubular extension —23— to prevent the accumulation of liquid hydrocarbon in the passage to the mixing chamber, and thereby obviating any possibility of excessively enriching the mixture, and also preventing choking of the motor.

The sleeve or bushing 26 is adjustable endwise or vertically in reference to the spray nozzle 9 for the purpose of varying the rate of flow of air past the fuel nozzle which consequently influences the flow of fuel from the nozzle, but when once adjusted it may be secured in place by suitable fastening means as an expanding screw 27, Fig. 2.

The upper end of the carbureter is adapted to be connected to the inlet port of the gas engine, and for this purpose is provided with an opening —28— of a valve —29— by which the mixture supply may be regulated at the will of the operator, said valve having a suitable hand-piece —29′— for this purpose.

In operation, the liquid hydrocarbon, as gasolene or kerosene, enters the float chamber —1— through the inlet —2— until a sufficient amount of liquid has accumulated therein to elevate the float —4— and close the valve —3—, the float —4— serving to maintain a constant level in the supply reservoir —1—. The liquid is then forced, by gravity, through the conduit —8— and is drawn through the spray nozzle —9— where it is vaporized with the inflowing air from the intake pipe —14— upwardly through the tubular bushing —26—. The valve —10— controls the feed of the liquid hydrocarbon from the reservoir —1— to the spray nozzle —9— and its operating means, as the lever 13—, is located within easy reaching distance of the operator or driver to afford means for adjusting the valve while the motor-propelled vehicle is in operation, but when this valve is properly adjusted the automatic valve —16— co-acting with the ports —18— and —20—, serves to maintain a nearly constant degree of vacuum in the mixing chamber, and thereby regulates the delivery of a uniform mixture to the ignition chamber, as the cylinder of the engine, not shown.

The lateral pressure upon the valve 16— is balanced by arranging the ports —18— diametrically opposite each other so that the radial pressure is substantially uniform on opposite sides, thereby relieving the valve from excessive friction in its sliding movement to open and close the ports —18—.

As previously stated the valve 16— normally covers the ports —18— when the pressure is uniform at both ends, but by the reduced pressure or partial vacuum in the upper end of the valve chamber above the valve, said valve is instantly elevated to partially uncover the ports —18—, allowing the air to immediately pass from the intake through the ports —18— and into the chamber —19—, and thence through the ports —20— into the chamber —21— where additional air is mixed with the excess amount of vaporized hydrocarbon which is drawn into the mixing chamber by the excessive degree of vacuum. It is now apparent that in the first instance the bushing —26— is so adjusted with reference to the spray nozzle —9— as to cause a mixture of air and liquid hydrocarbon in the desired proportions, and that if an excessive vacuum is produced in the mixing chamber which would tend to draw an excessive amount of liquid hydrocarbon, such increased vacuum would immediately elevate the valve —16— sufficiently to

allow an additional amount of the air to enter the chamber —21— through the chamber —19— and ports —18— and —20— to mix with the excessive amount of liquid hydrocarbon in the mixing chamber —21— before delivery through the throttle —29—.

Owing to the fact that the vertical passage through the bushing —26— is comparatively small and that the ends of such bushing are flaring, any drip resulting from condensation or other cause, will be immediately carried upwardly into the mixing chamber, thereby preventing the accumulation of such drip or condensation which might render the explosive mixture too rich and cause a consequent choking of the motor as in many carbureters now in use. In other words, by constructing the bushing —26— as described, I avoid the formation of pockets in which the liquid might accumulate, and thereby prevent the inflow of an excessive amount of gasolene or other liquid fuel into the motor cylinder, especially when the throttle is suddenly opened.

It is well known that the air and liquid fuel must be mixed in certain proportions to obtain a maximum degree of power with a minimum amount of fuel, and that any excess of liquid fuel delivered to the motor cylinder is not only a waste of fuel, but produces an offensive degree of smoke and reduces the efficiency of the motor.

The essential purpose, therefore, of my invention is to automatically maintain and deliver a uniform mixture of air and liquid fuel in proper proportions to the motor cylinder, thereby obtaining a maximum power efficiency with the minimum quantity of fuel and avoiding as far as practicable excessive smoke and choking so common to many vapor engines.

What I claim:

1. In a carbureter, in combination with a float chamber and float therein, a valve chamber and a mixing chamber above the valve chamber, said valve chamber having ports communicating with the mixing chamber, a valve slidable in the valve chamber across said ports and actuated by varying degrees of air pressure to regulate the quantity of air admitted to the mixing chamber, an air tube extending through the valve and connecting the valve chamber with the mixing chamber, and a nozzle communicating with the float chamber and discharging into the air tube, said air tube being adjustable relatively to the nozzle to vary the rate of flow of air past said nozzle.

2. In a carbureter, in combination with a float chamber and float therein, a valve chamber and a mixing chamber above the valve chamber, said valve chamber having ports communicating with the mixing chamber, a valve slidable in the valve chamber across said ports and actuated by varying degrees of air pressure to regulate the quantity of air admitted to the mixing chamber, an air tube communicating with the mixing chamber, and the valve chamber, and a nozzle communicating with the float chamber and discharging into the air tube, said air tube being adjustable relatively to the nozzle to vary the rate of flow of air past said nozzle, and means for holding the air tube in its adjusted position.

3. In a carbureter, in combination with a float chamber and float therein, a valve chamber having an air intake, a mixing chamber above the valve chamber, an air chamber surrounding the valve chamber and mixing chamber, ports connecting the valve chamber with the air chamber, separate ports connecting the mixing chamber with the air chamber, a valve in the valve chamber coacting with the ports of said valve chamber and actuated under varying air pressures to regulate the rate of flow of air passing from the valve chamber into the air chamber, said valve having a central opening therethrough connecting the interior of the valve chamber with the mixing chamber, and a spray nozzle communicating with the float chamber and discharging through the opening in the valve into the mixing chamber.

4. In a carbureter, in combination with a float chamber and float therein, a valve chamber having an air intake, a mixing chamber above the valve chamber, an air chamber surrounding the valve chamber and mixing chamber, ports connecting the valve chamber with the air chamber, separate ports connecting the mixing chamber with the air chamber, a valve in the valve chamber coacting with the ports of said valve chamber and actuated under varying air pressures to regulate the rate of flow of air passing from the valve chamber into the air chamber, said valve having a central opening therethrough connecting the interior of the valve chamber with the mixing chamber, and a spray nozzle communicating with the float chamber and discharging through the opening in the valve into the mixing chamber, and a fuel controlling valve in the connection between the nozzle and float chamber.

5. In a carbureter, a float chamber and float therein, a valve chamber having an air intake, means for heating the air before passing into the valve chamber, a mixing chamber above the valve chamber, a valve an air chamber surrounding and communicating with the valve chamber and mixing chamber at points below and above the valve, said valve being provided with a central opening and slidable in the valve chamber and controlled by varying air pressures for controlling the passage of air from the valve chamber to the air chamber, and a spray

nozzle communicating with the float chamber and discharging centrally through the valve into the mixing chamber.

6. In a carbureter, a float chamber and float therein, a valve chamber having an air intake, means for heating the air before passing into the valve chamber, a mixing chamber above the valve chamber, a valve an air chamber surrounding and communicating with the valve chamber and mixing chamber at points below and above the valve, said valve being provided with a central opening and slidable in the valve chamber and controlled by varying air pressures for controlling the passage of air from the valve chamber to the air chamber, and a spray nozzle communicating with the float chamber and discharging centrally through the valve into the mixing chamber, and a fuel controlling valve in the connection between the nozzle and float chamber.

7. In a carbureter, a valve chamber having an air intake, a mixing chamber above the valve chamber, an air tube connecting the valve chamber with the mixing chamber, an air chamber surrounding the valve chamber and mixing chamber, ports connecting the valve chamber with the air chamber, additional ports connecting the mixing chamber with the air chamber, a valve coacting with the first named ports to control the supply of air from the valve chamber to the air chamber, a fuel supply conduit discharging into the air tube and thence into the mixing chamber, a fuel regulating valve movable in the air chamber at one side of the valve chamber, and a tube surrounding the portion of the valve adjacent to the conduit and rising some distance from the bottom of the air chamber.

8. In a carbureter, a valve chamber having an air intake, a mixing chamber above the valve chamber, an air chamber surrounding and communicating with the valve chamber and mixing chamber at points below and above the valve, a fixed tubular guide in the valve chamber, a valve surrounding said guide a tubular bushing adjustable in said tube and connecting the valve chamber with the mixing chamber, a fuel supply nozzle discharging through the bushing into the mixing chamber, and means extending through the air chamber for controlling the supply of fuel to said nozzle.

9. In a carbureter, a valve chamber having an air intake and radial ports, a valve movable in the valve chamber and normally closing said ports, a mixing chamber above the valve chamber and communicating therewith, said mixing chamber having a second set of radial ports communicating with the first named ports, and means aided by a reduction of the pressure above the valve for elevating said valve to open said first named ports, and an atomizer discharging into the mixing chamber.

10. In a constant level carbureter, a float chamber and a float therein, said float chamber having an inlet and an outlet, a valve actuated by the float to close the inlet, a nozzle connected to the outlet, a valve for the outlet, between the float chamber and nozzle, said valve having a guide tube rising above the level of the liquid in the float chamber to avoid the use of stuffing boxes for the outlet valve, a mixing chamber above the nozzle, a tubular bushing surrounding the upper end of and adjustable relatively to the nozzle and opening into the mixing chamber, and an air chamber surrounding the mixing chamber and inclosing the tubular guide and tubular bushing.

11. In a carbureter, a valve chamber having an air intake in its bottom and radial ports in its sides, a valve normally closing said ports, a mixing chamber having radial ports communicating with the other chamber ports outside of the valve chamber and also having direct interior communication with the valve chamber above and below the valve and a spray nozzle discharging into the mixing chamber through the interior communicating passage.

12. In a carbureter, a valve chamber and a mixing chamber communicating therewith outside of the valve chamber, said valve chamber having an air intake in its bottom and the mixing chamber having an outlet for the mixture, a throttle for the outlet, an automatic valve in the valve chamber normally closing outside communication between the air intake and the mixing chamber, said mixing chamber having interior communicating passages with the valve chamber above and below the valve, means aided by the inequality of pressure above and below the valve for elevating said valve to open outside communication between the valve chamber and mixing chamber and a spray nozzle discharging into one of the interior communicating passages between the valve chamber and mixing chamber.

13. A constant level carbureter, comprising a float chamber having an inlet and an outlet, a float in said chamber, a valve actuated by the float to close the inlet, a spray nozzle connected to the outlet, a valve between the float chamber and spray nozzle, a mixing chamber having its lower end surrounding the spray nozzle and its upper end provided with radial ports, a throttle above said ports for controlling the delivery of the explosive mixture, a valve chamber having an air intake communicating with the lower end of the mixing chamber around the spray nozzle and provided with lateral ports communicating with the ports in the mixing chamber outside of the valve chamber, a

vertically movable valve guided on the lower end of the mixing chamber and normally closing the ports of the valve chamber, said mixing chamber having interior communication with the valve chamber above the valve, and means aided by a reduced pressure or partial vacuum in the mixing chamber and upper part of the valve chamber above the valve for elevating said valve to open the ports in the valve chamber.

In witness whereof I have hereunto set my hand this 14th day of March 1906.

WILLIAM L. PERRY.

Witnesses:

M. J. RUDDY,

DENNIS FANCHER.