E. A. HUENE.

CARBURETER.

APPLICATION FILED DEC. 14, 1916.

1,275,032.

Patented Aug. 6, 1918.

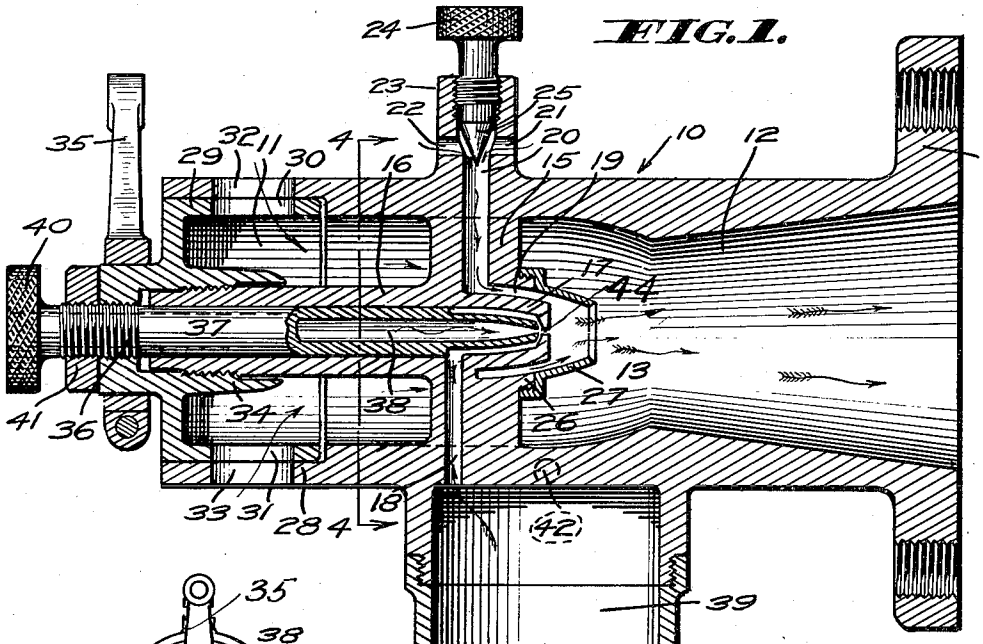


FIG. 1.

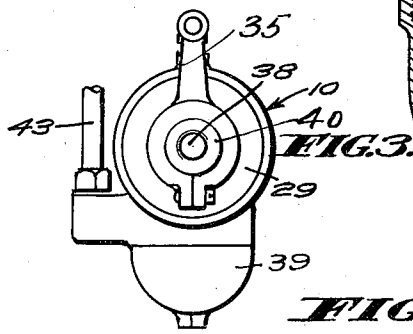


FIG. 3.

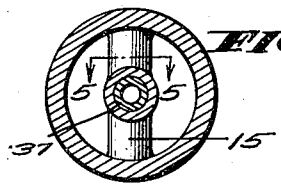


FIG. 4.

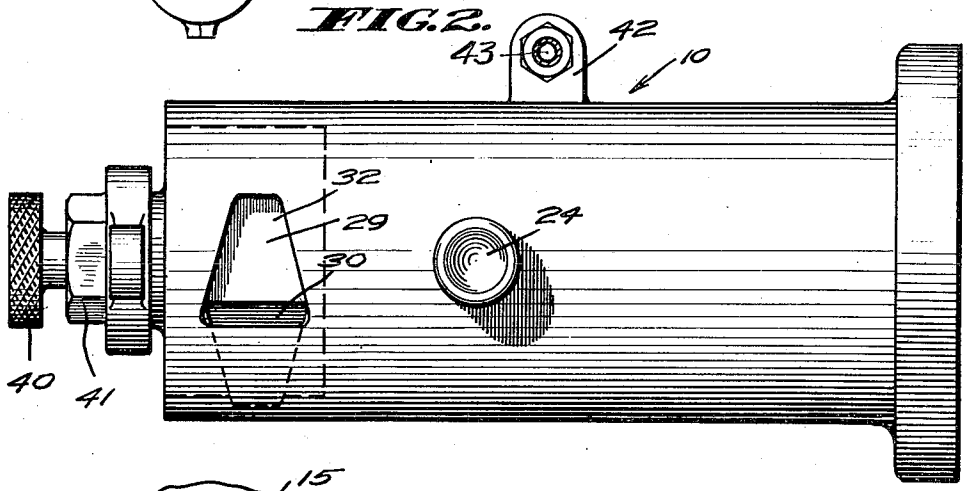


FIG. 2.

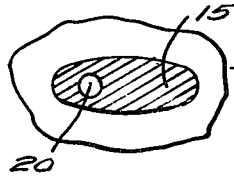


FIG. 5.

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CARBURETER.

1,275,032. Specification of Letters Patent. Patented Aug. 6, 1918.

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To all whom it may concern:

Be it known that I, EDWARD A. HUENE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters.

It is an object of this invention to provide a carbureter which will simultaneously act to directly control the inflow of air and liquid fuel in a fixed ratio to each other so that the volume of air will be increased as the quantity of liquid fuel drawn into the carbureting chamber is increased.

Another object is to provide means whereby the depression in the air pressure adjacent the liquid fuel inflow duct will be sufficient to not only permit a proper mixture of fuel and air to be made, but will permit of the liquid fuel being drawn from a fuel reservoir at a lower level.

Another object is to provide a simple auxiliary air inlet and adjustable control therefor adapted to supply air to the carbureting chamber constantly and irrespective of the opened position of the throttle valve, thereby insuring a rich fuel mixture to be carbureted at low engine speeds and facilitating in disintegrating the globules of liquid fuel passing to the carbureting chamber.

Another object is to provide means for adjustably determining the maximum richness of the fuel mixture so that the carbureter may be readily adjusted and adapted for use with engines of various fuel requirements.

Another object is to provide a carbureter so designed as to control and throttle the inflowing air prior to its contact with the liquid fuel and its entrance into the carbureting chamber, thus positively controlling the flow of gaseous fuel from the carbureter to the engine.

It is a further object to provide a carbureter of few movable parts and no parts which are adapted to vibrate or fluctuate, thereby providing a carbureter which is simple in construction and is not liable to become inoperative or objectionably worn by use.

Other objects will appear hereinafter.

The invention is illustrated, by way of example, in the accompanying drawings in which:

Figure 1 is a longitudinal sectional elevation illustrating the carbureter as assembled and disclosing in detail the correlation of the vital elements thereof.

Fig. 2 is a top plan view illustrating the assembled carbureter and particularly disclosing the peculiar formation of the air inlet opening.

Fig. 3 is an end elevation looking from the left in Figs. 1 and 2, and illustrating the carbureter upon a reduced scale and disclosing the relation of the fuel inlet pipe to the sediment bowl.

Fig. 4 is a cross sectional detail as seen on the line 4—4 of Fig. 1 viewed in the direction of the arrows and illustrates the webbed formation of the carbureter body.

Fig. 5 is an enlarged fragmentary sectional detail as seen on the line 5—5 of Fig. 4, illustrating the sectional formation of the web members.

Referring to the drawings more particularly, 10 indicates a horizontally disposed cylindrically formed body member of the carbureter. This member is formed with two horizontally alined chambers or passage-ways, an air inlet chamber 11 and a mixing chamber 12. The air inlet chamber is cylindrical and is reduced at its inner end 13 to form a throat adapted to concentrate the air as it passes outwardly into the mixing chamber. The constricted portion 13 is the dividing line between the inlet chamber and the mixing chamber. The mixing chamber is frusto-conical in shape and is enlarged at its manifold end. A bolting flange 14 is formed at the manifold end of the carbureter to facilitate in securing the entire carbureter in communication with the manifold of an internal combustion engine. Cast integral with the carbureter body and positioned diametrically across the enlarged cylindrical portion of the air inlet chamber 11 is a web 15 which is vertically disposed and acts as a support for the fuel nozzle sleeve 16 which lies concentric with the air inlet passage and in the center thereof. This sleeve is hollow and extends the length of the inlet chamber, its outer threaded end terminating flush with or slightly beyond the end of the carbureter body. The inner end of the sleeve 16 is formed with a nozzle portion 17 having a bore, said bore being in communication with a vertically disposed liquid fuel inlet duct 18 which extends through the lower leg of the web 15. An annular chamber 19 is formed around the nozzle portion 17 in the web 15 and is in

communication with a vertically extending auxiliary air duct 20 which extends through the upper leg of the web 15 and communicates with the atmosphere through passage-ways 21 and 22. The passage-ways 21 and 22 occur within a valve boss 23 which is provided with an adjusting screw 24 formed with a conical stem 25 adapted to regulate the inflow of air to the duct 20. A threaded boss 26 is formed upon the side of the web 15 toward the mixing chamber and circumscribes the end of the nozzle portion 17. This boss is provided as a mounting for a mixing nozzle 27 forming a carbureting chamber which is in alinement with and surrounding the nozzle 17 coacting therewith to produce a nebulizing effect upon the liquid fuel being drawn to the mixing chamber.

The outer end of the air inlet chamber is formed with a counter-bore 28 which is concentric with the main bore and is adapted to receive a throttle drum 29, the wall of which is of a thickness equal to the increased diameter of the counter-bore and thus maintains a single inside diameter throughout the length of the inlet chamber. This drum is formed with a pair of oppositely disposed inlet ports 30 and 31 which, by rotation of the drum, may be brought to register with complementary ports 32 and 33 formed through the wall of the air inlet chamber. These ports 30, 31, 32 and 33 are of peculiar shape as shown in Fig. 2 and for the purpose of providing a more delicate and effectual regulation of the air inflowing to the carbureting chamber. The configuration of each of these ports is substantially that of a trapezoid having parallel ends and sides which taper in relation to each other. It is to be noted that the exact contour of the tapering sides may be varied to meet the requirements of different engines. The trapezoidal ports formed through the wall of the throttle drum are disposed with their narrow ends parallel to each other and in opposition so that during the rotation of the drum the port openings formed by the registration of the two complementary ports will increase and decrease in cross-sectional area as the drum is rotated toward and away from its full registering position. It will be further noted that as the ports move toward their full registering position, the effective port opening will increase in a decreasing ratio to the amount of rotation given the throttle drum, thereby insuring a gaseous fuel of proper richness at all throttle positions. The drum 29 is formed with a central hub 34 which is internally threaded to engage external threads formed upon the fuel nozzle sleeve 16 upon which the drum is rotated by a lever 35 controlled by suitable means and secured to the end of hub 34.

The outer end of the hub 34 is formed with a central threaded bore through which the threaded end 36 of a valve needle 37 extends. The valve needle 37 is formed with a longitudinal bore 38 which extends throughout the length of the needle to effect a concentration of the air passing therethrough and thus producing a nebulizing effect within the nozzle 17 as liquid fuel is drawn from a combined fuel reservoir and sediment chamber 39, which is closed to the atmosphere, except for the fuel passage 18 and fuel inlet duct 42. The inner end of the needle is reduced in outside diameter to form an annular channel to permit free circulation of liquid fuel. The outer end of the needle is formed with an enlarged knurled head 40 by which the needle may be longitudinally adjusted within the sleeve and in relation to the end of nozzle 17 against which it is adapted to seat when in its closed position. A lock-nut 41 secures the needle in its set position and locks it to the drum 29 with which it rotates. By this arrangement the drum rotates to bring its ports 30 and 31 into full register with ports 32 and 33 and as the drum moves along the needle sleeve threads the needle point will move away from its seat within the nozzle and permit an increased quantity of liquid fuel to be drawn from the fuel reservoir. The increase in fuel will, however, be constant while the increase in inflowing air will gradually diminish as the throttle is opened.

The carbureter here shown is provided with an inlet duct 42 which connects with a fuel supply pipe 43 from the main fuel supply tank at a lower level in a manner to insure a completely filled fuel reservoir at all times solely by the suction of the motor through the carbureter. It will, however, be understood that a float may be used when the gravity system is preferred.

In operation, the carbureter is conveniently mounted by bolting flange 14 to the intake manifold of an explosive engine, and may be designed to stand either vertically or horizontally without departing from the spirit of the invention, as the fuel reservoir or sediment chamber forms no part of the necessary working combination when used as a vacuum feed system. I have used it both ways on the same cars without a single change. By looking at drawing, with bolting flange 14 at top, it will be seen that the only difference in conditions is that sediment bowl or chamber 39 does not completely fill with liquid fuel on account of an air pocket above the fuel inlet orifice 42. As previously noted, this sediment chamber is no necessary part of the working combination and the fuel line may be and is in the racing type connected direct to fuel channel 18 at orifice 42, but a chamber is desirable in that it pockets a small amount of liquid fuel in such a manner as to allow of instant

flow thereof to the mixing chamber upon the turning over of motor for starting and before the fuel comes over from the main tank. After the hollow needle 37 has been properly adjusted to meet the fuel requirements of the engine with which it is to be used, the carbureter is ready for operation. Fuel will be supplied to the reservoir 39 by the vacuum and as the engine is rotated air will be drawn in through the air inlet ports 32 and 33 to the chamber 11, from thence around the vertically disposed web 15 to the reduced inner end portion of the air inlet chamber. Simultaneous with this action, air will be drawn directly through the bore 38 of needle 37 and will create a partial vacuum within the nozzle portion 17 and adjacent the opened end of the hollow needle. The suction caused by this partial vacuum will elevate liquid fuel from the reservoir 39 through the duct 18 and when this fuel has reached the end of the needle it will be carried through nozzle opening 44 into the mixing nozzle 27 where it will be mixed with air drawn from the auxiliary air duct 20 and thereafter drawn into the frusto-conical mixing chamber 12, after which it will pass to the engine. As desired, the drum 29 is rotated to increase the effective port openings caused by the relative movement of the trapezoidal ports 30 and 31 in relation to the fixed ports 32 and 33. Simultaneous with this action, the drum 29 will move along the needle sleeve in an outwardly direction due to the threaded mounting of the drum hub thereover and will cause the end of the needle 37 to move away from the end of the nozzle 17, thus permitting the fuel and air volumes to increase in a proper ratio, as will be understood.

It will thus be seen that the carbureter here provided will operate in a simple and effective manner without involving the movement or manipulation of a multiplicity of parts, will effect a saving of liquid fuel, due to the manner in which the inflowing air is throttled prior to its mixture with the liquid fuel, and provides a vacuum fuel feed as well as insures an efficient mixture of the liquid fuel and air prior to its passage from the carbureter.

I claim:

1. A carbureter for internal combustion engines, comprising a body portion having an air inlet chamber in one end and having a mixing chamber in longitudinal alinement and in communication with the air inlet chamber, a fuel nozzle mounted within the mixing chamber and having its outlet orifice at the axial center of the mixing chamber; there being an annular carbureting chamber in the body surrounding the outlet orifice; an air tube mounted within the fuel nozzle and longitudinally adjustable; there being a fuel passage around the inner end of the tube within the nozzle so that the adjustment of the tube regulates the flow of fuel; an air valve controlling the inlet chamber, manual means for operating the valve, and means connecting said valve to the tube so that on the opening movement of the valve the tube is moved away from the outlet orifice to open the fuel passage.

2. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber communicating therewith, a fuel supply comprising a fuel nozzle having its orifice at the entrance of said mixing chamber, a hollow metering pin controlling the orifice of said nozzle and discharging air to the center of the nozzle, and an air inlet valve controlling the admission of air to said air inlet chamber and operatively connected to said pin, so that said pin is longitudinally moved away from the orifice of said fuel nozzle during the opening of said air inlet valve.

3. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber communicating therewith, a fuel supply comprising a nozzle opening into said mixing chamber, a hollow fuel metering pin controlling the orifice of said fuel nozzle, means for longitudinally adjusting said pin, said air inlet chamber being provided with an air port, a rotary valve controlling said air port and operatively connected to said pin, means whereby said pin is moved away from the fuel nozzle as said air port is uncovered, said air port being so designed that it is uncovered in a diminishing ratio on the uncovering movement of said valve, while the longitudinal movement of said pin is constant.

4. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber in longitudinal alinement therewith, a liquid fuel reservoir adjacent to said chambers, a fuel nozzle communicating with said reservoir, a metering pin controlling said fuel nozzle and having a constantly open air passage coaxial with the axis of said air chamber, and terminating immediately adjacent to said fuel nozzle, a manually controlled valve through which air is supplied to said air chamber, an auxiliary air duct leading to an annular chamber surrounding said fuel nozzle, means for adjustably regulating the flow of air through said auxiliary air duct, a conical fuel and air mixing nozzle in advance of said fuel nozzle, and means whereby said pin is opened or closed in relation to said fuel nozzle, as the air inlet valve is opened or closed.

5. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber connected therewith, a fuel supply comprising a nozzle opening into said carbureting chamber, a hollow fuel metering pin controlling the orifice of said fuel

nozzle, means for longitudinally adjusting said pin, said air inlet chamber being provided with an air port, a rotary valve controlling said air port and operatively connected to said pin, means whereby said pin is moved away from the fuel nozzle as said air port is uncovered, said air port being so designed that it is uncovered in a diminishing ratio on the uncovering movement of said valve, while the longitudinal movement of said pin is constant, an annular chamber surrounding the orifice end of said fuel nozzle, an auxiliary air passage connected thereto and means for controlling said auxiliary passage.

6. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber in longitudinal alinement therewith, a liquid fuel reservoir adjacent to said chambers, a fuel nozzle communicating with said reservoir and opening into said mixing chamber, a pin controlling the outlet orifice of said nozzle and having a constantly open air conduit coaxial with the axis of said air chamber, means for longitudinally adjusting said pin, a manually controlled valve supplying air to said air chamber, means whereby said pin is advanced or retracted in relation to said nozzle as said air inlet valve is opened or closed, the air ports controlled by said valve being so designed that they are uncovered in a diminishing ratio on the opening movement of said valve, while the longitudinal movement of said pin is constant, an annular chamber surrounding said fuel nozzle, an auxiliary air duct leading thereto, manual means for controlling the air passing through said auxiliary air duct, and a conical air and fuel mixing nozzle in advance of said fuel nozzle.

7. A carbureter for internal combustion engines, comprising an air inlet chamber, a mixing chamber in communication and in axial alinement therewith, a fuel supply nozzle extending longitudinally of the air inlet chamber and concentric therewith, a carbureting chamber forming a restricted area around the sides and the end of the nozzle and communicating with the mixing chamber, an air inlet passage-way in communication with said carbureting chamber, a hollow metering pin extending longitudinally of the fuel nozzle and adapted to simultaneously regulate the flow of fuel through the nozzle and a flow of auxiliary air to the nozzle through the pin, and a variable air inlet by which air may pass through the inlet chamber around the wall of the carbureting chamber and there unite with the carbureted mixture passing through the mixing chamber.

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

EDWARD A. HUENE.