W. FULTON.

CARBURETER.

APPLICATION FILED SEPT. 26, 1910.

1,003,351. Patented Sept. 12, 1911.

Fig. 1.

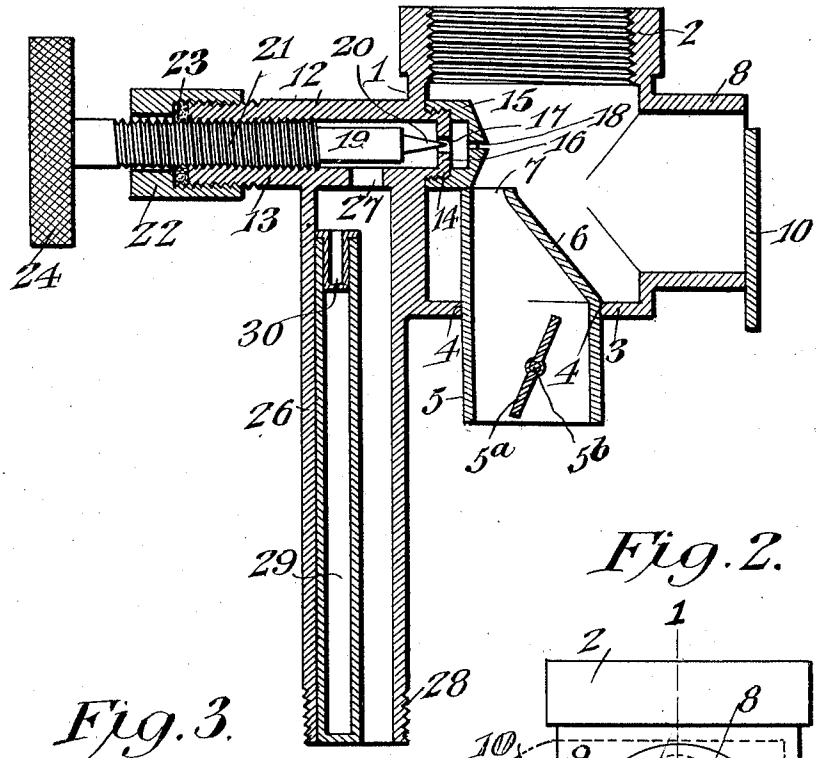


Fig. 2.

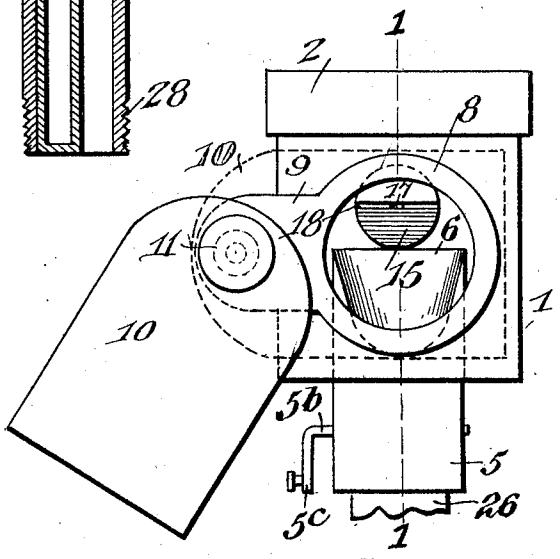
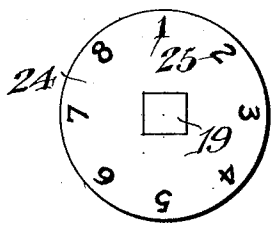


Fig. 3.



WITNESSES

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WILLIAM FULTON, OF SOUTH BELOIT, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHARLES E. SMITH, OF BELOIT, WISCONSIN.

CARBURETER.

1,003,351. Specification of Letters Patent. **Patented Sept. 12, 1911.**

Application filed September 26, 1910. Serial No. 583,959.

To all whom it may concern:

Be it known that I, WILLIAM FULTON, a citizen of the United States, residing at South Beloit, in the county of Winnebago and State of Illinois, have invented a new and useful Carbureter, of which the following is a specification.

This invention has reference to improvements in carbureters designed more particularly for explosion engines, and particularly explosion engines where the fuel is a liquid hydro-carbon, usually gasolene, although the use of the invention is not necessarily confined to gasolene as a fuel.

It is the object of the present invention to obtain complete vaporization of the gasolene or other hydro-carbon liquid and the thorough intermixing thereof with the proper amount of air to obtain the most efficient explosive mixture for the purpose, and this is done without the use of valves or springs and irrespective of the speed of the engine.

The invention is not confined to any specific manner of supplying the hydro-carbon fluid thereto, since the hydro-carbon fluid may be caused to flow to the carbureter either by the suction of the engine or by gravity, or by a pump, or by means of the usual float control.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that while the showing of the drawings is that of a practical embodiment of the invention, the latter is susceptible of various modifications and changes adapting the invention to other conditions than those for which the particular showing of the drawings is adapted, but these changes and modifications may be made without departing from the invention or omitting any of the salient features thereof.

In the drawings:—Figure 1 is a section on the line 1—1 of Fig. 2. Fig. 2 is an elevations as viewed from the right hand end of Fig. 1. Fig. 3 is an end view of the hand wheel for adjusting the needle valve.

Referring to the drawings, there is shown a body member 1 which may be of general cylindrical form, although the form is not material, since other shapes may be adopted. At one end the body member 1 is formed with an internally screw-threaded neck 2, whereby the carbureter may be connected by suitable piping to the engine to be supplied. The other end of the body member is closed by a wall 3 except that through this wall there is a passage 4 in which is secured an open air pipe 5 which at the bottom may be cylindrical but has one side 6 tapered to form the end of the pipe remote from that seated in the passage 4 into a long and comparatively narrow outlet 7 within the casing 1.

Branched off from the body member 1 about midway of its length is a cylindrical neck 8 open at the outer end and fast to this neck, or formed thereon, is a bracket 9 carrying a shutter or damper 10 which may be in the form of a simple plate of proper size, and this plate or damper is connected at one end to the outer end of the bracket 9 by means of a pivot 11 about which the plate 10 may be turned at will, and this pivot is made to fit the plate and bracket sufficiently snug to hold the plate in any adjusted position against accidental movements, but still permitting the moving of the plate or damper 10 at will when a sufficient force is applied thereto.

Branched off from the body member 1 on the side opposite to the neck 8 is a tubular extension 12 having the outer end 13 internally screw-threaded and also externally screw-threaded. The portion of the tube 12 adjacent the body member 1 is free from screw threads and in line with this tube within the body member 1 there is formed a short threaded nipple 14 upon which is screwed a short cap 15. The outer end of the casing 14 is formed with, or has inset thereinto a diaphragm 16 with a passage 17 therethrough and between this diaphragm and the outer wall of the cap 15 there is formed a small chamber. Extending diametrically across the outer end of the cap 15 is a narrow slot 18, and the relation of the cap 15 to the narrowed end of the tube 5 is such that considering the parts to be in the positions shown in the drawings, this slot 18 is above and spaced a short distance from the opening 7 at the corresponding end of the tube 5.

Extending through the tube 12 is a rod 19 having a needle valve 20 formed on one end,

and this rod is screw-threaded, as shown at 21, to fit the screw threads on the interior of the end 13 of the tube 12, while a gland 22 is applied to the outer end of the tube 12 where the latter is externally threaded, so that suitable packing 23 may be confined by the gland about the rod 19 to prevent leakage at this point. The outer end of the rod 19 beyond the gland 22 has applied thereto a milled head 24 for convenience of manipulation of the rod, and this head may have on the outer face index members 25, so that the degree of opening of the needle valve 20 with relation to the hole therefor through the diaphragm 17 may be ascertained at any time, and the valve may always be opened to the most advantageous point which may be once determined by experiment.

In the particular structure shown the body member has formed thereon, or made fast thereto, a pipe 26 communicating at one end with the pipe or tube 12 between the threaded end thereof and the diaphragm 17 by a passageway 27, while the other or free end of the pipe 26 is formed with screw threads as shown at 28 for attaching thereto of a conduit coming from a supply of liquid hydro-carbon, such as gasolene. Within the pipe 26 there is secured a small pipe 29 closed at the lower end and at the other end receiving a small cup 30 close to the passage 27.

Let it be assumed that the carbureter is connected to an engine by a suitable pipe screwed into the neck 2 and that it is connected with a supply of gasolene by a suitable conduit screwed on to the threaded end 28 of the pipe 26, and, also, let it be assumed that the needle valve 20 is in the open position to the desired extent. When the engine is turned over, as is customary, the suction of the engine will cause a flow of air outward through the neck 2 and inward through the tube 5, this suction being regulated by the position of the valve 10 with relation to the neck 8. The effect of this suction is to create a partial vacuum in the pipe 26 and gasolene or gasolene vapor will be drawn through this pipe and will pass through the opening 27 to the interior of the tube 12 and from thence through the diaphragm 17 and out through the slot 18 where it meets the air current passing through the contracted opening 7 of the tube 5. Usually one or two turns of the engine is sufficient to create a mixture of such proportions as to charge the cylinder of the engine and burn on ignition thereof by the sparker with energy enough to start the engine. As the engine runs, fluid gasolene is carried into the pipe 26 and through the opening controlled by the valve 20 into the chamber within the cap 15 and out through the long narrow slit 18 at the end thereof, this slit serving to break up the liquid gasolene into a fine spray, and this spray is caught by the rush of air through the contracted opening 7 of the pipe 5, which air thoroughly vaporizes the gasolene. Since the mixture is usually too rich it may be diluted to the proper condition by air admitted through the neck 8 by a proper adjustment of the valve 10. As the liquid gasolene flows through the pipe 26 some of it is caught by the cup 30 and there remains after the engine has stopped and serves as a priming of gasolene for the next time the engine is started. Because of the close relation of the cup 30 to the valve, the supply of gasolene in the cup is utilized when the engine is again started and less cranking is needed than would be the case were this small supply of gasolene not present.

The structure shown and described is designed for suction feed and for other types of feed, such as the gravity feed, the pump feed, or the float feed, the changes necessary to adapt the carbureter to these various types of feed being such as would be apparent to any constructing engineer and consequently need no description.

The chamber in the cap 15 permits the distribution of the gasolene or gasolene vapor entering the chamber through the diaphragm 17 to become distributed so that it will flow in a narrow stream through the slit, being drawn therethrough by the action of the air stream passing through the tube 5 and issuing from the opening 7 thereof in traversing relation to the slit in the cap 15, the constricted opening 7 causing the air stream to accelerate at this point whereby a suction action is produced, and at the same time the thin stream of gasolene or gasolene vapor is readily converted into a molecular condition and thoroughly intermixed with and absorbed by the air.

Under some conditions it is advisable to regulate the inflow of air through the pipe 5, thus controlling the suction of the fuel supply. For this purpose there is installed in the pipe 5 a valve or damper 5^a mounted on a stem 5^b provided exterior to the pipe 5 with a crank 5^c for the attachment of suitable manipulating connections which may extend to a convenient point within reach of the operator.

It is to be noted that the long narrow mouth 7 is in line with the neck 2 and opens into a comparatively large chamber inclosed by the casing 1, the mouth 7 being in line with the opening 2, so that a stream of air issuing from the mouth 7 will tend to pass directly through the neck 2, but the comparatively large chamber within the casing 1 into which the mouth 7 opens and the comparatively large area of a pipe connected to the neck 2 will quickly reduce the speed of the air stream issuing from the

mouth 7. It is to be further noted that a portion of the cap 15 on opposite sides of the narrow slit 18 recedes from such slit so that the outer end of the slit overhangs to an extent the mouth 7, the carbureter as a whole being in practice located with the neck 2 uppermost, as indicated in Fig. 1. The air stream issuing from the mouth 7, therefore, impinges against the outer inclined wall of the neck 15 and is thrown thereby toward the center line or longitudinal axis of the neck 2 and when the plate 10 is in position to admit air through the neck 8, the stream of air entering the inner chamber of the carbureter through the mouth 7, the fuel entering the same chamber through the slit 18, and the diluting air entering the same chamber through the neck 8, all meet in the one chamber and pass together through the neck 2 of the engine through the conduit assumed to be present, although not shown in the drawings. The result is that the air stream entering the carbureter through the mouth 7 is carried with comparatively great rapidity across the slit 18 in a manner to thoroughly atomize the liquid fuel, such as gasolene, while the expansion of the air after passing the mouth 7 and the intermixture therewith of the diluting air entering through the neck 8 causes a retardation of the flow contributing materially to the production of a thorough admixture of air and gasolene and the thorough gasifying of the latter for absorption by the air, so that by the time the mixture reaches the explosion chamber of the engine it is in the condition best adapted for the purpose.

What is claimed is:—

1. A carbureter provided with a casing inclosing a chamber, an air conduit entering said chamber and terminating in a long narrow mouth extended transversely to the direction of flow of air therethrough, a fuel conduit entering said chamber and provided with a long narrow orifice directed transversely to the flow of air into the chamber through the air conduit, and another air inlet besides the first named air conduit entering the same chamber in which are located the separate air and fuel inlets, and an outlet for the enriched air in line with the air conduit provided with the long narrow mouth.

2. A carbureter provided with a casing inclosing a chamber, said casing having an outlet at one side, an air inlet to the casing terminating in a long narrow mouth within the chamber inclosed by the casing and directed toward and in line with the outlet of the casing, and a fuel inlet opening into the same chamber as the air inlet and in spaced relation to said air inlet, the fuel inlet being in the form of a long narrow slit extending transversely to an air stream issuing from the mouth of the air inlet into the chamber and directed toward the outlet from the chamber.

3. A carbureter provided with a casing inclosing a chamber, said casing having an outlet at one side, an air inlet to the casing terminating in a long narrow mouth within the chamber inclosed by the casing and directed toward and in line with the outlet of the casing, and a fuel inlet opening into the same chamber as the air inlet and in spaced relation to said air inlet, the fuel inlet being in the form of a long narrow slit extending transversely to an air stream issuing from the mouth of the air inlet into the chamber and directed toward the outlet from the chamber, the fuel inlet having the outer walls receding from the long narrow slit through which the fuel enters the chamber within the casing, and the said long narrow slit terminating in overhanging relation to the long narrow mouth of the air inlet between the same and the outlet of the casing.

4. A carbureter comprising a suitable casing inclosing a chamber, an air conduit entering said chamber and open to the atmosphere at one end and within the chamber contracted into a long narrow mouth, said chamber being provided with an outlet in line with the long narrow mouth of the air inlet, a valve in said air inlet individual thereto and between the end open to the atmosphere and the said long narrow mouth, a fuel inlet to the casing between the long narrow mouth of the air inlet where entering the chamber within the casing and the outlet of said casing and directed in transverse relation to an air stream issuing into the chamber within the casing from the long narrow mouth of the air inlet, and another air inlet to the casing directly entering the same chamber within the casing entered by the first air inlet and the fuel inlet, said second named air inlet being provided with a controlling valve individual thereto.

5. A carbureter comprising a suitable body member having at one end an internally threaded neck and at the other end provided with a conduit open to the atmosphere at one end and within the body member contracted into a long narrow mouth, a neck at one side of the body member provided with a closure movable at will to open the neck to desired extent to the atmosphere, a cap member interior to the body member on the side thereof remote from the second named neck and adjacent the mouth end of the air conduit, said cap being provided with a long narrow orifice in the path of air coming from the long narrow mouth of the air conduit, and means for directing hydro-carbon fluid to the orifice in the cap member.

6. A carbureter comprising a suitable body member, a cap member therein having a long narrow orifice and a chamber within the cap member communicating with the orifice, a conduit for a hydro-carbon fluid leading to the cap member, a valve for controlling the flow of hydro-carbon fluid to the cap member, and means within the carbureter for directing a thin and wide air stream across the orifice end of the cap member in traversing relation to the said orifice.

7. A carbureter comprising a suitable body member having at one end an internally threaded neck, and at the other end provided with a conduit open to the atmosphere at one end, and within the body member contracted into a long narrow mouth, a valve within the conduit for controlling the effective area thereof, a neck at one side of the body member provided with a closure movable at will to open the neck to desired extent to the atmosphere, a cap member interior to the body member on the side thereof remote from the second named neck and adjacent the mouth end of the air conduit, said cap being provided with a long narrow orifice in the path of air coming from the long narrow mouth of the air conduit, and means for directing hydro-carbon fluid to the orifice and cap member.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM FULTON.

Witnesses:
T. R. HARPER,
I. P. CADMAN.