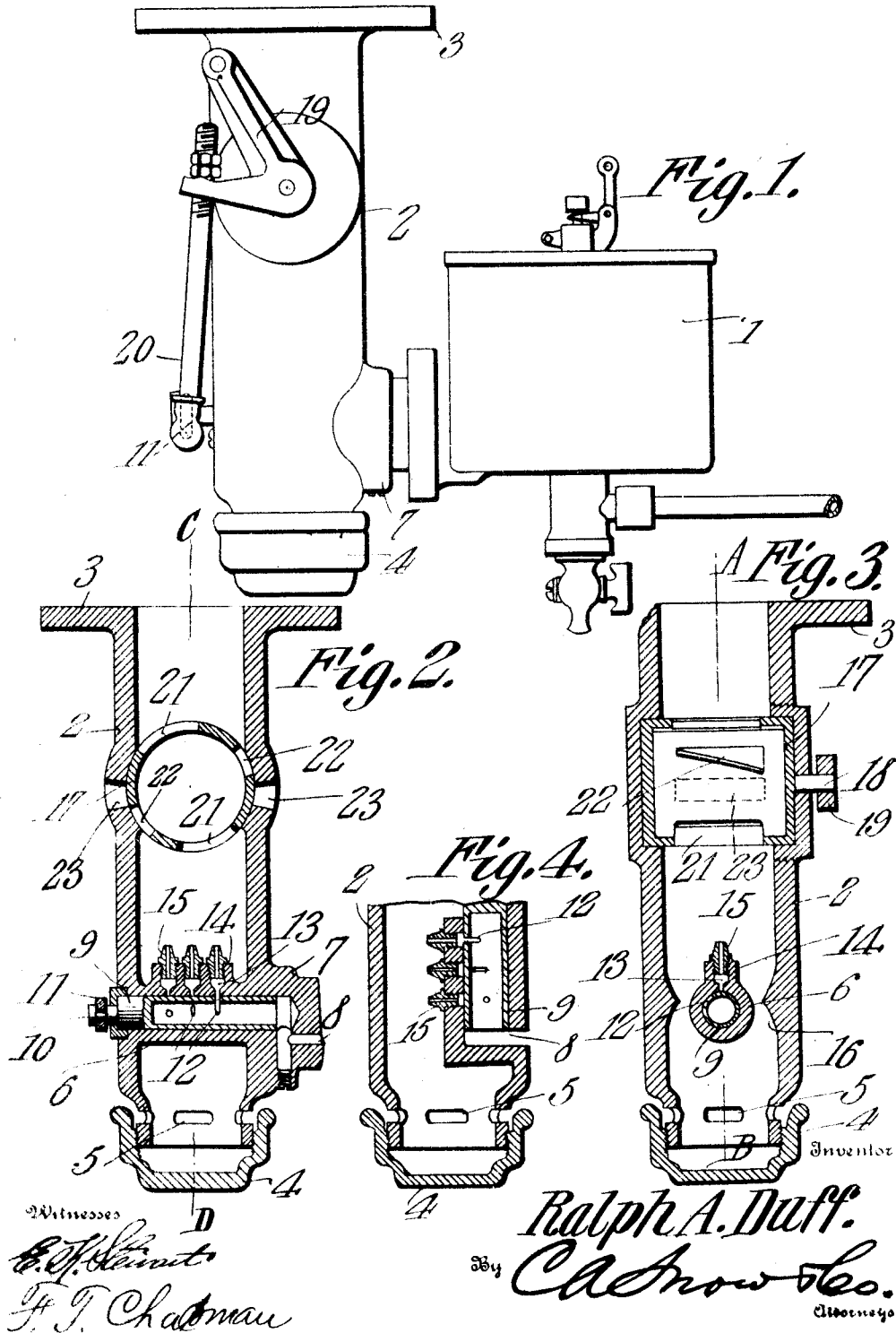


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CARBURETER.
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1,120,183.

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UNITED STATES PATENT OFFICE.

RALPH A. DUFF, OF NEBRASKA CITY, NEBRASKA.

CARBURETER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RALPH A. DUFF, a citizen of the United States, residing at Nebraska City, in the county of Otoe and State of Nebraska, have invented a new and useful Carbureter, of which the following is a specification.

This invention has reference to improvements in carbureters designed more especially for the production of explosive mixtures of air and hydrocarbon gas for use in explosion engines.

It is the object of the present invention to provide a carbureter which will automatically control the gas mixture in accordance with the demand of the engine, automatically increasing the supply of gas and the supply of air for producing the explosive mixture, as the demand for the fuel increases.

In accordance with the present invention the hydro-carbon, which latter may be of any type suited for the purpose, although for convenience of description the hydro-carbon will be considered as gasoline, is fed to the device through a suitable float chamber which in itself forms no part of the present invention. The gasoline flows to a valve from which it is fed in quantities determined by the position of the valve, to one or more nozzles from which the gasoline may issue in fine streams. The nozzles or jet tips are located in a conduit through which air is directed in a manner to traverse the streams of gasoline so as to cause a thorough intermingling of the air with the volatilized gasoline, after which the mixture flows through a valve into which air may be admitted in quantities depending upon the demand so that the mixture already produced is diluted to an extent by fresh streams of air entering the fuel stream beyond the point of initial volatilization and intermingling.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification of which drawings,

Figure 1 is an elevation of the improved carbureter including the float chamber. Fig. 2 is a section on the line A—B of Fig. 3. Fig. 3 is a section on the line C—D of Fig. 2. Fig. 4 is a section illustrating a modifi-

cation of the structure shown in Figs. 2 and 3.

Referring to the drawings there is shown a float chamber 1 which may be of any suitable construction, but as the construction of this float chamber does not enter into the present invention, the exterior only is shown and further description is not necessary. This float chamber is designed to maintain a certain level of the gasoline supply, gasoline being taken as typical of any carbureting fluid. In communication with the float chamber is a casing 2 which is usually, in operation, upright as indicated in the drawing, but this does not prevent its use in any other suitable position. For convenience of description the casing 2 will be considered as having its longitudinal axis vertical, and reference in the following description to the position of parts will be with the understanding that the longitudinal axis of the casing is vertical, but may without affecting the invention be horizontal or at any suitable angle. The upper end of the casing is formed with a flange 3 for coupling it to a pipe or conduit leading to the inlet port or ports of the engine to which the carbureter is to supply fuel. Such engine is not shown in the drawing since it forms no part of the present invention, and the connections of carbureters to the inlet ports of such engines is well understood. The lower end of the casing 2 is normally closed by a screw cap 4 and above this cap the casing is formed with a circular series of air inlet ports 5, the effective area of which may be controlled by screwing the cap 4 to a greater or less extent onto the corresponding end of the casing. A short distance above the lower end of the casing it is formed with a horizontal tubular portion 6 in the particular showing of Figs. 2 and 3 and this tubular portion opens at one end into a boss 7 from which there leads a conduit 8 to the float chamber 1.

Housed within the tubular member 6 is a cylindrical hollow valve 9 having one end open and in communication with the conduit 8 while the other end is closed and is provided with a stem 10 projecting from beyond the outer wall of the casing where it has secured to it an arm 11 by means of which the valve may be turned on its longi-

tudinal axis for a purpose which will hereinafter appear. Through the walls of the hollow valve are formed ports 12 of different lengths in a direction about the axis of rotation of the valve and these ports may be brought into communication with corresponding passages 13 through a thickened portion 14 of the tubular member 6 on the side of the latter remote from the air inlet end of the casing 2. In each passage 13 there is a nipple 15 having a passage longitudinally through it, which passage may be of small dimensions, so that but a fine stream of material will flow therethrough. These nipples 15 in the structure shown in Figs. 2 and 3 are directed toward the upper end of the casing along a diameter thereof. On each side of the tubular member 6 the inner walls of the casing are thickened from the lower end upward so as to curve inward toward the outer walls of the tubular member into closer approach thereto than would be the case were the side walls of the casing the same distance from the central axis thereof throughout. These inwardly curved walls are indicated at 16 and the center of curvature is nearer to the center line of the casing than are the walls thereof, thus causing the air entering the casing to flow up around the outer walls of the tubular member 6 into close relation to the open ends of the nipples 15, which latter constitute jet nozzles for the gasolene, so that the incoming currents of air tend to traverse the jets of gasolene thus quickly volatilizing them and thoroughly intermingling with the gas so produced.

At an appropriate distance above the nozzles 15 there is mounted in the conduit 2 so as to traverse the same, a hollow cylindrical valve 17 having a stem 18 extending to the exterior of the casing and to this stem there is secured a bell crank lever 19 connected by a link 20 to the arm 11 of the valve 9. The two valves 9 and 17 will therefore move together and may be controlled from a moving part of the engine connected to the arm of the lever 19, remote from that connected to the link 20, so as to respond to varying conditions, such as variations in load. The valve 17 is formed with diametrically opposite ports 21 of sufficient size to give free passage of the mixture to the outlet end of the casing 2 connected to the engine, in different positions of the valve about its axis of rotation. Between the ports 21 the walls of the valve are pierced by other ports 22 at diametrically opposite points and these valves may be wider at one end than the other and in the rotative movement of the valve 17 these ports will, in one position match other ports 23 leading through opposite sides of the casing 2 to the external atmosphere.

The structure shown in Fig. 4 differs from

that shown in Figs. 2 and 3 in that the valve 9 instead of being in a position transverse to the length of the casing 2 is located parallel with the longitudinal axis of the casing 2 so that the incoming stream of air through the ports 5 will flow laterally across the discharge ends of the nozzles 15.

In the operation of the device gasolene is fed in continuous quantities through the passage 8 to the interior of the valves 9. If now one of the ports 12, say the longest port in the direction of rotation of the valve 9, be opposite an appropriate one of the nozzles 15 gasolene will flow through such nozzle to the interior of the casing 2, especially under the suction produced by the operation of the engine being supplied with the explosive mixture. The suction of the engine also sets up an inflow of air through the port 5 and this air finds its way up through the casing 2 being directed across the nozzles 15 in a manner to tend to traverse the stream or streams of gasolene issuing from the nozzles. If it be assumed that the conditions present are such as to demand but a moderate quantity of the explosive mixture, and one rather lean in hydro-carbon gas, then the valve 9 is so positioned that but one of the nozzles 15 will receive gasolene while the others are cut off. If now the demand be for a greater quantity of the mixture, then the valve 9 is turned until the second one of the ports 12 is brought into coincidence with the second one of the nozzles and a greater supply of gasolene follows to meet the increasing inrush of air through the ports 5. When the greatest demand occurs then the third port 12 is opened to the corresponding nozzle 15 and the full supply of gasolene issues. During this time the valve 17 has been turning on its axis to bring the port 22 toward coincidence with the ports 23. By the time the second nozzle 12 is in operation then the narrower ends of the ports 22 are opened to the ports 23 and a certain amount of air is indrawn through the ports 23. When the third nozzle is in action the ports 22 may be in their fullest communication with the ports 23. It will be noted that one of the ports 12 is sufficiently long to remain in communication with its nozzle while the other two ports are coming into service while the second port is sufficiently extensive to remain in service until the third port is opened, that is, the first port is in service while the second and third ports are brought into service and the second port is in service while the third port is brought into service. By this means the supply of fuel in properly regulated proportions of hydro-carbon gas and air is furnished to the engine in accordance with the demand, and this may be automatically regulated by a suitable governor responsive to

engine speed and coupled up to the bell crank lever 19.

What is claimed is:

1. A carbureter, comprising a casing, a valve, a valve casing having jet nozzles within the casing, and the valve being adapted to open the nozzles in order, an air inlet for the casing at one end thereof, an independent mixing valve for the casing between the outlet of the casing and the inlet nozzle for the fuel, and means connecting the valves for simultaneous action.

2. A carbureter, comprising a casing, a valve, a valve casing having jet nozzles within the casing, and the valve being adapted to open the nozzles in order, an air inlet for the casing at one end thereof, an independent mixing valve for the casing between the outlet of the casing and the inlet nozzle for the fuel, and adjustable means for connecting the valves for simultaneous action.

3. A carbureter, comprising a casing having a lower air admitting port, an elongated valve and inclosing member therefor transversely of the casing, a series of jet producing outlets carried by the inclosing member for delivering streams of fuel into the casing, said valve having a plurality of varying sized ports for registering with the

ports of the inclosing member, whereby fuel is delivered successively to the outlets, said casing being provided with air admitting ports above the fuel outlets, a valve for controlling the air admitting ports, and means connecting the fuel controlling and air controlling valves for movement in unison, whereby the air valve is operated to increase the admission above the fuel outlets as the fuel supply is increased and vice versa.

4. A carbureter comprising a suitable casing, a rotatable valve traversing the same, a valve casing having jet nozzles thereon within the casing, the valve being adapted to open the nozzles in order, an air inlet for the casing at one end thereof, an independent, mixing valve for the casing between the outlet of the casing and the inlet nozzles for the hydro-carbon fluid, and adjustable connections between the valves for causing their simultaneous action.

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

RALPH A. DUFF.

Witnesses:

H. D. WILSON,
CHAS. G. BENNETT.