A. OSTLER.

CARBURETER.

APPLICATION FILED DEC. 20, 1907.

1,051,440.

Patented Jan. 28, 1913.

3 SHEETS—SHEET 1.

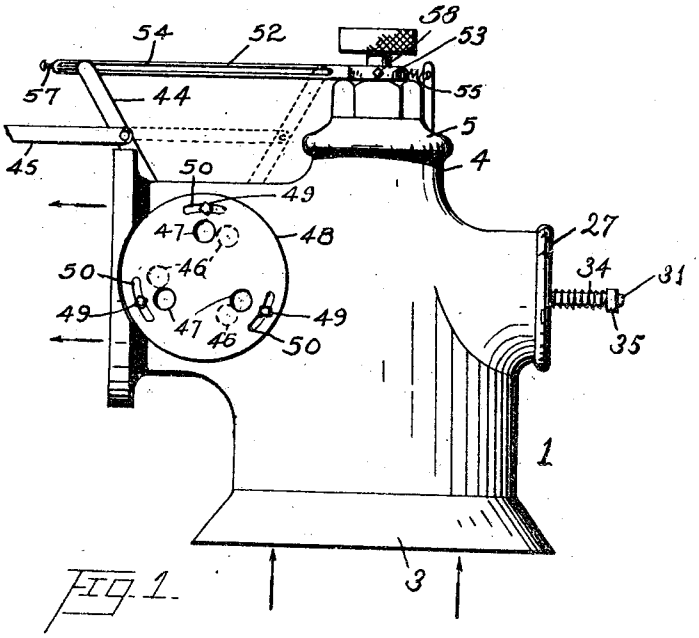

Fig. 1.

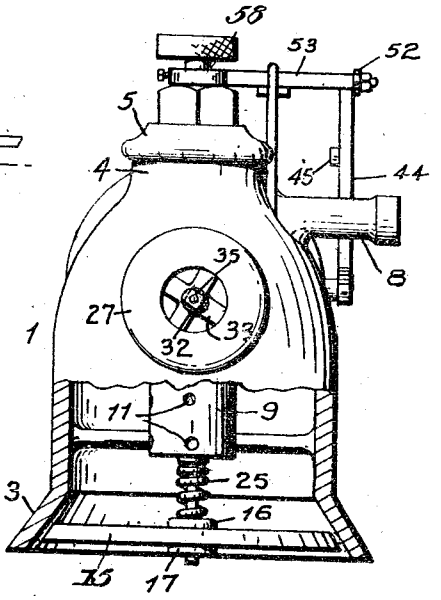

Fig. 2.

WITNESSES

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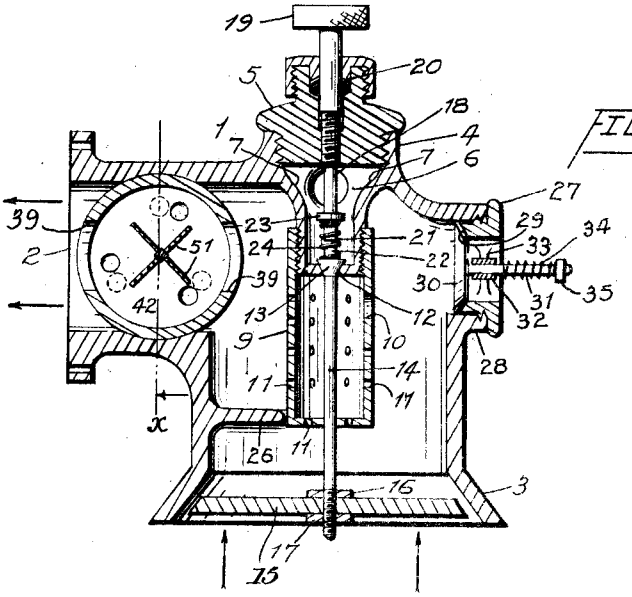

FIG. 3.

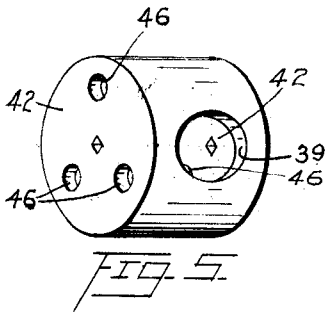

FIG. 5.

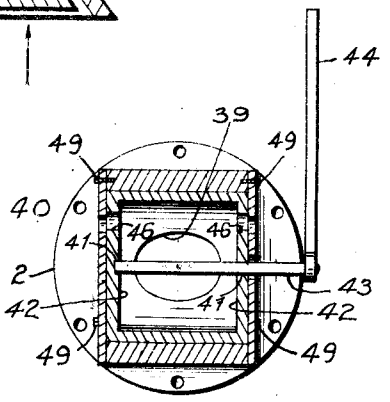

FIG. 4.

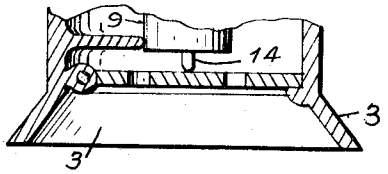

FIG. 6.

WITNESSES

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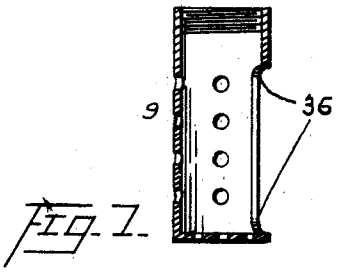

Fig. 7.

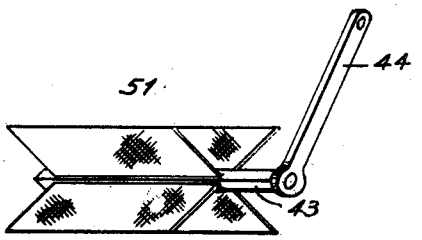

Fig. 8.

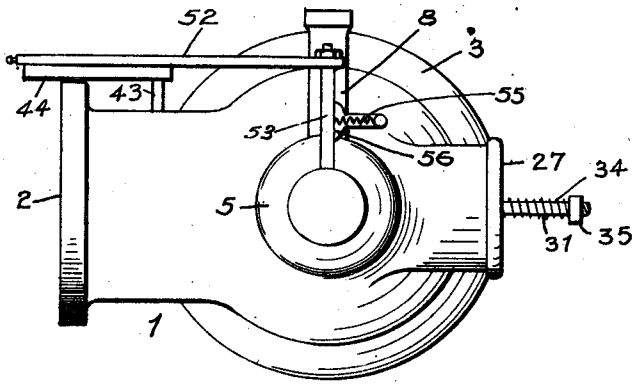

Fig. 9.

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CARBURETER.

1,051,440. Specification of Letters Patent. Patented Jan. 28, 1913.

Application filed December 20, 1907. Serial No. 407,292.

To all whom it may concern:

Be it known that I, ALEXANDER OSTLER, a subject of Great Britain, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

The objects of this invention are to provide in a carbureter a direct flow of fuel instead of through a float chamber; to secure a downward flow of the said fuel supply, by gravity; to provide means for admitting said fuel supply which means are governed by the intake of air, and to enable such admission of fuel to be regulated at will; to secure great safety, in that the fuel supply is never exposed; to secure a uniform mixture at all speeds; to provide a throttle by which the mixture can be diluted independent of the vaporization of the fuel; to provide a construction adapted to be operated by a single lever; to avoid the necessity of priming; to obtain economy of fuel, and to enable either gas or liquid to be employed; to secure a simple and compact construction, one that shall be durable and having all its parts readily accessible, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts in the several figures, Figure 1 is a side elevation of my improved carbureter with the throttle open, and showing in dotted lines the throttle lever in closed position; Fig. 2 is an end elevation of the carbureter, partly in section and illustrating a modified form of diaphragm spring; Fig. 3 is a central vertical longitudinal section of the carbureter, certain connections between the throttle lever and fuel valve stop being omitted for greater clearness; Fig. 4 is a section taken centrally through the throttle, as on line *x*, Fig. 3, looking in the direction indicated by the arrow, with certain mixing wings removed from the shaft thereof for greater clearness; Fig. 5 is a perspective view of the throttle detached; Fig. 6 is a vertical central section of the lower part of the carbureter, showing a modified form of the diaphragm; Fig. 7 illustrates in section a slightly modified vaporizing tube; Fig. 8 is a detail perspective view of the throttle shaft with its mixing wings thereon, and Fig. 9 is a plan of the carbureter.

In said drawings, 1 indicates an elbow-shaped body portion which is tubular and adapted to be connected at its end 2 to a gas engine; the other end of the body portion is open, and preferably flared as at 3 for the intake of air, said air passing through the body portion in the direction indicated by the arrows. Said body portion 1 is preferably disposed with its said open end vertically downward, and on the top of the body portion, in central alinement with said open end, is a boss 4 threaded at its upper part to receive a cap 5. The hollow interior of this boss 4 has an inward and downward cuplike extension formed by walls 7 cast integral with the body portion, and the entire chamber 6 thus formed is for the fuel, which may be gasolene, kerosene, denatured alcohol, or the like, a lateral pipe 8 leading from the side of said chamber for the inlet of said fuel from a supply tank (not shown). The lower end of said chamber 6 lies approximately in the central line of the discharge end 2 of the carbureter, and its walls are exteriorly threaded to receive a vaporizing tube 9 which extends downward substantially in central alinement with the intake end 3 of the carbureter, and has perforations 10 and 11 in its walls.

In the floor of the fuel chamber 6 is an aperture 12 for the passage of the fuel, and which aperture provides a seat for a conical valve 13 adapted to seat downwardly. The said valve 13 has a stem 14 which passes through the vaporizing tube 9 and in the open end 3 of the carbureter carries a diaphragm 15. Said diaphragm in its preferred form comprises a disk adjustably fast upon the said stem 14, as by clamping between nuts 16, 17, screwed on the threaded end of the stem. This diaphragm is adapted to be moved by the suction of air through the carbureter caused by the engine, and to open the valve 13 sufficiently to allow fuel to escape into the vaporizing tube 9, either intermittently or continuously.

Preferably a limit is provided for the upward movement of the valve 13 by an

adjustable stop 18 which screws centrally through the cap 5 of the fuel chamber, said stop having at its outer end a finger piece 19 and being surrounded at the top of the cap by a stuffing box 20. The lower end 21 of said stop lies adjacent to a projection 22 on the top of the valve 13, so as to be engaged thereby if the valve moves upward sufficiently. Thus by screwing the stop 18 in or out, regulation of the movement of the valve 13 may be had as to extent of opening, and a limit of fuel flow established. Furthermore, a flange or shoulder 23 is provided on the stop 18 back from its end 21, so that a spiral spring 24 may be placed on the meeting ends of the stop and valve projection 22, between said shoulder 23 and the valve itself. This aids in the closing of the valve, and secures a more positive and uniform action, particularly if the carbureter or engine to which it is attached is jolted, as in automobiles. Obviously, instead of placing the spring 24 as above described, a spiral spring 25 could be arranged on the stem 14 between the lower end of the vaporizing tube 9 and the diaphragm 15 or its upper clamping nut 16, as shown in Fig. 2 of the drawings.

In operation, it will be understood that when the engine is running light, vibratory up and down movements of the diaphragm 15 lift the valve 9 and intermittently admit fuel, and at the same time sufficient air passes upward around the edges of the diaphragm to vaporize the said fuel. Preferably, a deflecting plate 26 is arranged in the body portion of the carbureter close to the inlet end 3 and at the inner side of the elbow-bend, as shown, to prevent the entering current of air from passing directly to the discharge end 2, and to compel it to come in contact with the vaporizing tube. In case, however, the suction should be sufficiently great to hold the valve 13 open to such an extent that the admission of air at the intake end 3 was not enough to vaporize the fuel entering tube 9, I provide in the body portion 1 directly opposite its end 2, an auxiliary air inlet which may be of any suitable and well-known type adapted to open automatically inward. As shown for purposes of illustration, said auxiliary valve comprises a ring 27 screwing into a threaded boss 28 of the body portion and forming at its inner end a valve seat 29; a valve 30 is provided for said seat, having a stem 31, which extends slidably outward through a central bearing 32 of the ring, supported by radial arms 33, and a spiral spring 34 on said stem between its bearing 32 and a nut 35 adjustably screwed on its outer end normally holds said valve seated. In connection with this auxiliary air inlet, the adjacent openings 10 in the vaporizing tube are made larger than the others 11, and under some conditions, if desired, that side of the vaporizing tube may be provided with a longitudinal slot 36 as shown in Fig. 7, for the more free admission of air.

In the tubular discharge end 2 of the carbureter, is a throttle 40 comprising a cylinder mounted transversely in bearings 41 formed by boring through the tubular end of the carbureter from side to side. This cylindrical throttle is hollow with end walls 42, 42, and a central shaft 43 on which it is fast for purpose of turning, the outer end of said shaft being provided with a crank lever 44, to which an operating rod 45 may be connected, as shown. The cylindrical throttle has in its side walls main openings 39, 39, which are preferably opposite, and closed by being covered by the bearings of the throttle when it is turned, as will be understood. In the end walls 42 of the throttle, are also auxiliary openings 46 which are adapted to pass into or out of registration with corresponding openings 47 in plates 48 secured to the body portion 1 of the carbureter and lying flatwise against the end walls of the throttle. These plates 48 are preferably held by screws 49 passing through slots 50 curved on a circle whose center is the center of the plates, and whereby the position of the openings 47 in the plates may be varied with respect to the openings 46 in the throttle, and the extent or time of registration of said openings accordingly varied. In ordinary practice, the said plates 48 will be adjusted so that the openings coincide when the throttle is nearly open, thus furnishing additional air to the mixture when the engine is running at high speed and accordingly taking a maximum amount of fuel. I have shown such an adjustment in the drawings, but of course it could be changed, or made exactly opposite to admit additional air when the engine was running slow, if desired.

Wings 51 of wire netting are shown projecting radially from the throttle shaft 43, in order to more effectually mix the passing gases, if necessary.

If desired, a link 52 may connect the said crank lever 44 to an arm 53 fast upon the screw stop 18 and projecting radially therefrom, so that as the throttle approaches its widest open position, the stop 18 is simultaneously withdrawn to permit the fuel valve 13 to open further and admit an increased supply. To do this, the link 52 is preferably slotted, as at 54 to receive the pin of the crank lever 44, so as to allow some independent movement of the throttle, and not affect the fuel supply until the throttle is almost entirely opened, as shown. In a closed position of the throttle lever 44, as shown dotted, or in any partly closed position of the throttle, obviously there will be nothing to prevent a spring 55 closing the

stop 18 by bringing the arm 53 back against a stop 56 on the carbureter body 1. To secure greater accuracy and means of adjustment, a screw 57 is threaded through the closed end of the slot 54, to form at its inner end a contact point for the crank lever pin, and which point of contact can thus be adjusted with respect to the slotted link 52. Notwithstanding these connections thus described, by loosening the set screw 58 which clamps the arm 53 on the stop 18, independent adjustment thereof can be had by the finger piece 19.

It should be noted that by my improved construction of carbureter, gases, such as acetylene gas, illuminating gas, or the like, can be employed for fuel, as well as liquids, and properly mixed and fed to the engine.

Having thus described the invention, what I claim as new is:

1. In a carbureter, the combination of an elbow-shaped body portion having one end open to the atmosphere, a reëntrant fuel chamber at the bend of said body portion with a valve seat in the wall thereof, a valve in said seat having a stem extending centrally and longitudinally of the open-ended arm of the body portion, a diaphragm mounted transversely in said open-ended arm and adapted to be moved by the inrush of air and transmit its movement to said valve stem, a deflector arranged on the interior of the elbow shaped body portion on the opposite side of the bend from said fuel chamber and adjacent to the said open end thereof, and an auxiliary air inlet in the wall of the body portion on the opposite side of said fuel chamber from the attaching end of the body portion.

2. In a carbureter, the combination of an elbow-shaped body portion having one end open to the atmosphere and the other end adapted to be attached to a pipe or the like, a reëntrant fuel chamber at the bend of said body portion with a valve seat in the wall thereof, a valve in said seat having a stem extending centrally and longitudinally of the open-ended arm of the body portion, a diaphragm mounted transversely in said open-ended arm and adapted to be moved by the inrush of air and transmit its movements to said valve stem, a vaporizing tube secured to the fuel chamber and inclosing said valve stem and having in its walls perforations some of which face oppositely away from the attaching end of the body portion, and an auxiliary air inlet in the wall of the body portion on the opposite side of the said vaporizing tube from the attaching end of the body portion.

3. In a carbureter, the combination of an elbow-shaped body portion having one end open to the atmosphere and the other end adapted to be attached to a pipe or the like, a reëntrant fuel chamber at the bend of said body portion with a valve seat in the wall thereof, a valve in said seat having a stem extending centrally and longitudinally of the open-ended arm of the body portion, a diaphragm mounted transversely in said open-ended arm and adapted to be moved by the inrush of air and transmit its movements to said valve stem, a vaporizing tube secured to the fuel chamber and inclosing said valve stem and having in its walls perforations some of which face oppositely away from the attaching end of the body portion, and an automatic inwardly opening air valve in the wall of the body portion on the opposite side of the said vaporizing tube from the attaching end of the body portion.

4. In a carbureter, the combination of an elbow-shaped body portion having one end open to the atmosphere and the other end adapted to be attached to a gas engine and providing a tubular passage, a fuel chamber projecting into said body portion of the bend thereof and having an aperture in its walls forming a valve seat, a valve for said valve seat having a stem projecting into the intake end of the body portion, a diaphragm at said intake end adapted to be moved by the inrush of air and to transmit its movements to the valve stem, a stop screwing through outer wall of the fuel chamber and adapted at its inner end to engage the said valve, an arm upon said stop outside the body portion, a spring normally holding said arm in a predetermined position, a cylindrical throttle mounted transversely in the discharge end of the body portion and having an axial shaft projecting outside the body portion, a crank lever on said shaft, and a connecting rod pivoted to the said arm on the screw stop and having a longitudinal slot receiving a pin on the said crank lever, whereby said crank lever moves independent of the said arm to a certain extent and then actuates the arm.

5. In a carbureter, the combination of an elbow-shaped body portion having one end adapted to be attached to a gas engine and the other end open to the atmosphere and extending downwardly, a fuel chamber at the top of said body portion projecting into the interior thereof in alinement with the open end, a cap for said fuel chamber, a vaporizing tube secured to the inner end of said fuel chamber, a valve in the floor of the fuel chamber having an upward projection and a stem extending longitudinally through the vaporizing tube, a diaphragm fixed on said stem and lying transversely of the open-ended arm of the body portion, a screw stop extending through the cap of the fuel chamber, a spring normally seating the said valve, an auxiliary air inlet in the wall of the body portion opposite the attaching end of the body portion, a cylin-

drical throttle adapted to rotate in the attaching arm of the body portion having main openings in its opposite sides and auxiliary openings in its ends, adjustable plates mounted upon opposite sides of the body portion having apertures adapted to register with the said auxiliary openings of the throttle, means for turning said throttle, and means connecting said throttle with the said screw stop for the fuel chamber valve.

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In the presence of—
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ETHEL B. REED.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."