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L. ANDERSON.

CARBURETER.

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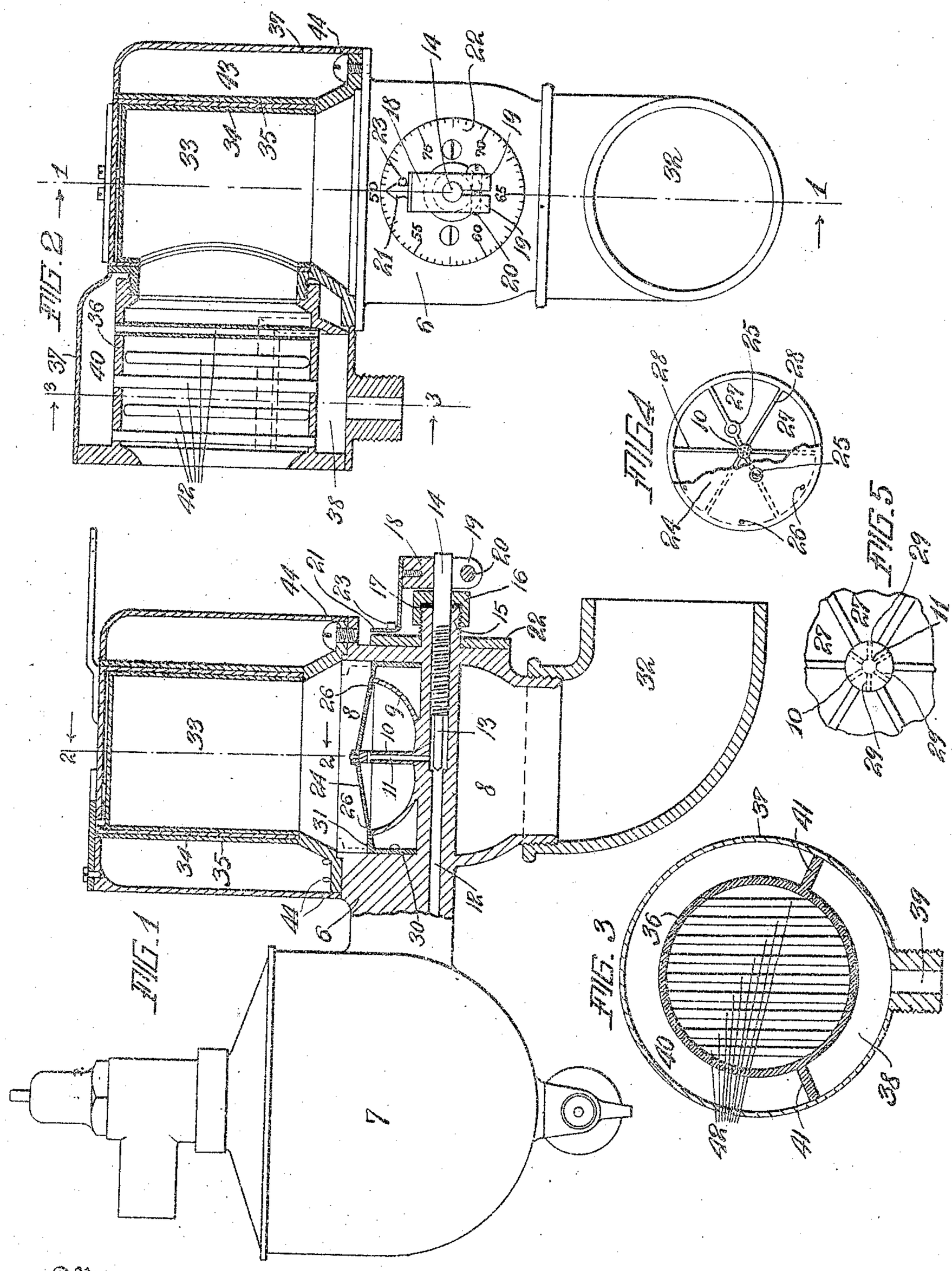

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CARBURETER.

No. 859,719. Specification of Letters Patent. Patented July 9, 1907.

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To all whom it may concern:

Be it known that I, LARS ANDERSON, a citizen of the United States, at present residing at New York, county of New York, and State of New York, have made a certain new and useful Invention in Carbureters, of which the following is a full, clear, and exact specification.

This invention relates to carbureters, and, more particularly, to that type of carbureter in which a liquid fluid is atomized and mixed with air to form the explosive charge for an engine or for other purposes.

The object of the invention is to simplify and improve the construction of devices of this nature and to render the same more efficient in operation.

A further object of the invention is to provide a construction of carbureter of the type referred to wherein the liquid fuel is supplied to the air with which it is to be mixed, in fine sprays, as by an atomizer, and wherein the atomized sprays are maintained substantially central with relation to the current of air, notwithstanding any increase or diminution in the volume of air resulting from the manipulation of the air controlling valve, thus insuring at all times a uniform or thorough mixture of the air and fuel.

A further object of the invention is to provide means for adjustably regulating the supply of fuel according to the specific gravity thereof.

A further object of the invention is to provide an auxiliary reservoir in the atomizing apparatus adapted to contain the liquid fuel and to furnish a supply of the same for immediate action of the atomizer.

A further object of the invention is to provide means for concentrating the suction effort, in starting up, upon the atomizer, thereby insuring the formation of an explosive charge at once, and also clearing out any obstruction that may exist in the atomizer.

A further object of the invention is to provide means for maintaining the mixing chamber of the carbureter in heated condition, thereby preventing interruption of the apparatus by reason of condensation, and also facilitating and increasing the efficiency of the admixture of air and fuel to form the explosive charge.

Other objects of the invention will appear more fully hereinafter:

The invention consists substantially in the construction, combination, location and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

Referring to the accompanying drawing and to the various views and reference signs appearing thereon,—Figure 1 is a view in elevation, showing a fuel supply reservoir and a carbureter, the carbureter being in central longitudinal section and embodying a construction embraced within the spirit and scope of my invention, the parts in section being on the line 1, 1, Fig. 2, looking in the direction of the arrows. Fig. 2 is a view in elevation, looking toward the right-hand side of Fig. 1, parts in section on the line 2, 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a view in section, on the line 3, 3, of Fig. 2, looking in the direction of the arrows. Fig. 4 is a view in top plan of the auxiliary reservoir chambers, a portion of the cap or cover therefor being broken out. Fig. 5 is a fragmentary view similar to Fig. 4, showing the ducts or passages from the fuel supply pipe into the auxiliary reservoir chambers or pockets.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

In the drawing, reference sign 6, designates a casting forming a casing and including a fluid supply reservoir 7, and an atomizing chamber 8. Formed within the atomizing chamber 8 is a cup 9, having a central boss 10, longitudinally through which is a duct or passage 11, with which communicates a duct or passage 12, from the fuel receiver or reservoir 7. The supply of of fuel from the receiver or reservoir 7, to the cup 9, or rather, to the duct or passage 11, is controlled by a needle valve 13.

In the practical operation of apparatus of the class to which my invention relates, it frequently happens that the fuel employed, such as oil for instance, varies in the weight or specific gravity thereof. If the supply of the fuel to the carbureter is regulated or adjusted so as to permit a given quantity of the fuel to be delivered to the carbureter of one weight or specific gravity, then if a different weight or specific gravity of fuel should be supplied to the reservoir or receiver, there is at once introduced a variation in weight or specific gravity of the fuel supply. It is among the special purposes of my present invention to provide means whereby the supply of fuel to the carbureter may be regulated varied and controlled according to the specific gravity of the fuel employed, so that the apparatus is adapted for use with fuels of varying specific gravities, and the supply thereof may be regulated according to the specific gravity of the fuel to maintain a constant character and quality of explosive charge notwithstanding such variation in the specific gravities of the fuels, and in accordance with the principles of my invention I propose to employ an index and dial in association with each other, so as to indicate at a glance the proper adjustment for any desired specific gravity of fuel employed. This idea may be embodied in a wide variety of specific constructions. While, therefore, I have shown and will now describe one construction embodying the principles thereof, and which I have found practical and efficient, I do not desire to be limited or restricted thereto. In the form shown, the needle valve 13, is provided with a shank or stem 14, screw threaded, for a portion of its length and tapped

into a boss 15, in the main casting 6, the end of stem 14 extending outside of the casting. In order to avoid leakage of fuel through the bearing for stem 14, I screw a nut 16, upon the end of boss 15, which is exteriorally threaded, and I interpose a packing 17, between the nut 16, and the end of boss 15, thereby forming a stuffing box! Upon the projecting end of stem 14 I mount the block 18, having one end divided to form clamp jaws 19, adapted to receive a clamp screw 20, whereby said block 18 may be removably clamped and secured upon the stem 14. Carried by the block 18, is a pointer or index finger 21, adapted to coöperate with a graduated dial plate 22, suitably mounted and secured upon the exterior face of the case 6. A pin or stud 23 serves to limit the extent of rotative movement of the pointer 21. The plate 22 is graduated according to the varying specific gravities of various kinds of oils or other fuels employed. In practice I arrange the construction so that when the pointer 21 bears against the stop pin 23, in the position shown in Figs. 1 and 2, the needle valve 13 is set to accommodate or to control the supply of fuel having a specific gravity of say, 50. Now, by turning the clamp block 18 in a direction contrarywise to the travel of the hands of a clock the pointer may be set to correspond with any desired specific gravity of oil employed from 50 to 75, or more, as may be desired. The rotation of the clamp block 18 effecting an axial rotation of the stem of needle valve 13, thereby backing the same out of its threaded socket in boss 15, and hence increasing or varying accordingly the degree of opening of passage 12 into passage 11.

While I have described as an illustrative embodiment of my invention one form of graduated plate and associated pointer, I desire it to be understood that the illustration and description is merely illustrative, and variations and changes therein may readily occur to persons skilled in the art, and still be included within the spirit and scope of my invention. The main feature of my invention in this respect being that I am enabled to readily set and adjust the valve so as to control the supply of fuel to the atomizer or to the carbureter according to the specific gravity of the oil employed, thereby adapting the apparatus for ready use in connection with any particular grade, quality or weight of fuel.

From the duct or passage 11, the fuel is delivered into the cup 9, which thereby constitutes an auxiliary reservoir adapted to contain a supply of the fuel in close proximity to the atomizer and ready to be drawn upon at the instant such supply is required in the proper starting up, working or operation of the device. This I regard as another important and valuable feature of my invention for the reason that I thereby avoid irregularities in the operation of the engine due to the space of time required to draw a supply of fuel from the reservoir to the atomizer, as is frequently the case, in the practical operation of machinery of this class. By providing the cup 9 it will be seen that I maintain an auxiliary supply of the fuel at a point closely adjacent the atomizer and which supply may be drawn upon for instant use, and consequently enables me to operate an engine equipped with a carbureter of my invention smoothly and evenly and without irregularities due to interrupted supplies of the fuel. The auxiliary reservoir or cup 9, is closed by a perforated top or cover 24; said top or cover being bolted or otherwise secured in place to close the auxiliary reservoir in any suitable or convenient manner, as for instance, by means of the screw bolts 25, see Fig. 4. The perforations 26 are preferably formed through the top or cover 24 closely adjacent the peripheral edge thereof, and through these perforations the fuel is drawn, in the operation of the apparatus, in very fine sprays or jets, whereby such fuel becomes atomized for admixture with air to form the explosive charge.

In order to facilitate the atomizing of the fuel I prefer to make the perforations in the top of cover 24 very fine, the size of such perforations depending upon the size of the air intake, and to facilitate the atomizing process I prefer to make the perforations of contracting diameter from the inside outwardly, as clearly shown in Fig. 1.

I have found it desirable in practice to divide the cup or auxiliary reservoir or chamber 9, into a plurality of separated chambers or pockets indicated at 27, by means of partitions 28, extending radially from the central boss to the inner wall of cup 9, the cup or cover 24 serving to complete the isolation of each pocket or chamber from the others, and I provide a duct or passage 29, see Fig. 5, delivering from the passage 11, into each one of the pockets or chambers 27, and, similarly, I provide a perforation 26, in the cap or cover 24, over or communicating with, or delivering from each of the pockets or recess 27. I regard this construction and arrangement as a valuable feature of my invention, for the reason that thereby I am enabled to avoid irregularities in the action of the engine, in connection with which a carbureter embodying my invention is employed, due to irregularities in supply of the fuel to the carbureter where the engine is employed on moving vehicles or vessels, the rocking or rolling motion of which causes the carbureter to tilt or rock, due, for instance, to the action of wave motion on vessels, or to vehicles passing over rough or uneven ground, or up or down declivities. With a construction embodying my invention the fuel supply of one chamber or pocket cannot flow to another pocket or chamber when the carbureter stands in an inclined position, and therefore a constant supply of fuel for atomizing purposes is provided and maintained in each pocket or chamber in whatever position of inclination the carbureter may stand.

In starting up an engine from a state of rest it is desirable to supply an explosive charge as quickly as possible. Frequently it requires repeated revolutions by hand of the fly wheel in order to set the carbureter into operation, due to the fact that the supply for the first explosive charge must be drawn, in starting up, from the main reservoir. Moreover, air may be contained in the atomizer, which in the initial stage of starting up must become exhausted before a sufficient supply of oil is furnished to make a proper explosive charge. Again, the perforations in the atomizer may have become clogged or filled through accumulations of oil or other sediment therein. It is among the special purposes of my present invention to avoid these various objections and to provide an arrangement whereby in the initial operation of starting up the engine, a suffi-

cient supply of oil or fuel is furnished to complete the initial explosive charge, and, at the same time, to clear out any obstruction of the perforations in the atomizer. To this end I propose to provide means whereby in starting up the suction effort of the vacuum produced in the engine by the initial turning of the engine crank, or otherwise, may be concentrated upon the atomizer to draw the required supply of oil therefrom and with sufficient force to clear out any obstructions of the perforations. This idea may be accomplished in many specifically different constructions. While, therefore, I have shown, and will now describe one construction which is exceedingly simple and efficient, I do not desire to be limited or restricted thereto, as variations therefrom, and in the details of construction thereof might readily occur to persons skilled in the art and still fall within the spirit and scope of my invention.

In the particular construction and arrangement which I have disclosed I arrange the cup or auxiliary reservoir 9 in the center of the carbureter chamber 8, and I arrange within the carbureter chamber a loose sleeve 30, having an inwardly projecting flange 31, of sufficient length to surround the cup 9, and for the edge thereof to come within close proximity of the peripheral edge of the top or cover 24 of the cup, when the sleeve 30 is in its lowermost position, as shown in full lines in Fig. 1. This sleeve 30 is free to move longitudinally of the carbureter chamber 8, but normally, or when the machine is out of operation, occupying the position shown in Fig. 1. Now, in starting up the engine the crank shaft thereof is given a turn which thereby creates a vacuum and a consequent suction effort in the carbureter. By reason of the flange 31, substantially closing the passage of the air intake the suction effort is concentrated upon the atomizer, and with sufficient power and force not only to withdraw from the reservoir 9, a supply of oil or other fuel, but also sufficient to clear out any obstruction in the perforations of the top or cover 24. Of course, the continued suction effort will cause the sleeve 30 to rise into the position shown in dotted lines in Fig. 1, but before this sleeve begins to rise it will have accomplished its function of causing the suction effort initially to be concentrated upon the atomizer, with the result that I am enabled to start up the engine without difficulty and with a minimum amount of effort in the starting operation, and I secure immediately a sufficient supply of oil to form the first explosive charge. After the machine is once in operation the sleeve 30 is maintained in its raised position.

The carbureter chamber 8 is designed to communicate with the outer air through any suitable or convenient intake opening or connection. I have shown an intake pipe or connection 32, through which air is drawn into the carbureter chamber 8, and through such chamber and around the atomizer and into the valve chamber 33, which also constitutes the mixing chamber for the explosive charge, and by locating the atomizer in the center of the chamber 8, I am enabled to maintain the sprays of fuel in substantially central relation to the current of air notwithstanding any increase or diminution in the volume of the air resulting from the manipulation of air controlling valves, thus insuring at all times a uniform or thorough mixture of the air and fuel.

The supply of mixed air and atomized oil forming the explosive charge is delivered from the mixing chamber or valve chamber 33 to the engine cylinder in any suitable or convenient manner. I have shown valves 34, 35, arranged within the chamber 33, the purpose, and function of which is to control the supply of explosive mixture to the engine cylinder, thereby controlling the speed of the engine, and hence constituting throttle valves. The particular construction and arrangement of these valves is not of material consequence so far as the present invention is concerned, and therefore a specific description and illustration thereof is unnecessary.

Difficulty has been experienced in the practical operation of hydrocarbon engines by reason of the condensation of any water constituent of the oil employed, or of the moisture contained in the air, and due to variations in temperature of the atmosphere, or of the seasons of the year in which the engines are used. This has proven a source of considerable practical annoyance, and it is among the special purposes of my present invention to provide means for overcoming this difficulty, and whereby not only is condensation prevented, but any condensation occurring by reason of the engine remaining idle may be quickly overcome in starting up. In carrying out my invention I propose to utilize the exhaust from the engine and to circulate the heated gases from the engine cylinder around the passage through which the charge of mixed air and fuel passes to the engine before the charge thereof enters the engine cylinder, and also around the mixing chamber, thereby not only preventing condensation of any mixture content of the oil or the air employed, but also facilitating the proper admixture of the air and fuel, since a better and more ready admixture thereof is effected in the presence of heat than without the presence of heat. Many specifically different constructions and arrangements for accomplishing this object might readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. While I have, therefore, shown and will now describe one construction and arrangement embodying the principles thereof, I do not desire to be limited or restricted to the specific construction which I have shown.

In the particular form which I have selected for illustration I arrange a chamber 36 within the passage through which the mixed air and fuel passes from the carbureter to the engine, such chamber being inclosed within the shell or casing 37, forming part of the shell or casing which surrounds the mixing chamber 33. Into the space 38, see Fig. 3, surrounding the chamber 36, and inclosed within the shell or casing 37, I conduct the exhaust from the engine cylinder through a connection 39, or otherwise as may be convenient. This space 38, is separated from the space 40, in any suitable or convenient manner, as for instance, by means of the partition plates 41, thereby in effect forming two heads, 38 and 40, in the space surrounding the chamber 36. Through chamber 36 I arrange a number of open ended tubes 42, communicating from one head 38 to the other head 40. Through these tubes

42 the heated products of combustion forming the exhaust from the engine circulate from head 38 to head 40, and from the space 40 such heated gases circulate freely through the space 43 within the casing 37, and around the mixing chamber 33, and finally escaping through perforations 44 to the outer air. By suitably regulating the amount of exhaust permitted thus to be supplied to the head 38, the temperature of the carbureter may be regulated and controlled. The mixture of air and oil in passing through the chamber 36 circulates around the pipes 42 while the heated gases from the exhaust of the engine circulates through such pipes, and also around the chambers 36 and 33, thereby not only more perfectly mixing up the air and oil by reason of the obstructions which the pipes 42 present, but also expanding and attenuating the oil vapor and the air by reason of its becoming heated, and consequently forming a more perfect and uniform explosive charge, while at the same time eliminating or evaporating any moisture content of the air or oil, and preventing the deposit of any condensation within the carbureter. By this preliminary heating a more thoroughly mixed explosive charge is finally delivered into the explosion chamber of the engine cylinder and in better condition to perform its work when the charge is exploded, and by circulating the explosive charge around and between the pipes 42 such charge is heated throughout the entire body thereof instead of merely upon the exterior surface of the current, as would be the case where merely a heating jacket for the passage is employed.

In practice and in order to facilitate the manufacture of a carbureter embodying my invention, and as above noted, the casting 6, in which is formed the fuel reservoir 7, and the carbureter, is formed in one integral piece, and, for the same reason, the casing 37, which incloses the valve chamber and the heating chamber, is also made in one piece, and adapted to be bolted or otherwise secured to the casting 6.

If desired the air intake 32 may be connected to the carbureter chamber in any convenient manner adapted to permit such air intake to be swung or directed in any desired direction. I have shown a simple arrangement wherein the air intake 32 is screw threaded on to the carbureter chamber.

It is believed that the operation of a carbureter embodying the principles of my invention will be readily understood from the foregoing description taken in connection with the accompanying drawings.

It is obvious that many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but

Having now set forth the object and nature of my invention and a construction as an operative embodiment thereof, and of the best mode in which I at present contemplate carrying out my invention, and having explained such construction, its purpose, function and mode of operation, what I claim as new and useful and of my own invention and desire to secure by Letters Patent, is:—

1. In a carbureter a casing having an atomizing chamber a closed cup arranged within said chamber, said cup having separated pockets, means for supplying fuel to said pockets, the cover of said cup being perforated.

2. In a carbureter a casing having an atomizing chamber, a cup arranged within said chamber and having a perforated top or cover therefor, said cup being separated into pockets, the perforations of said top or cover registering with each of said pockets, and means for delivering fuel into each of said pockets.

3. In a carbureter a casing having an atomizing chamber, a cup arranged within said chamber and having a central boss, said boss having a passage therethrough adapted to communicate with a source of fuel supply, a perforated top or cover for said cup, partitions arranged within said cup to divide the same into pockets, a duct leading from the passage in said boss into each of said pockets, a perforation of such top or cover registering with each of said pockets.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 4th day of June A. D. 1906.

LARS ANDERSON.

Witnesses:
E. H. MILLER,
S. E. DARBY.