P. M. BLOM.

CARBURETER.

APPLICATION FILED APR. 10, 1909.

1,013,983. Patented Jan. 9, 1912.

Fig. 1.

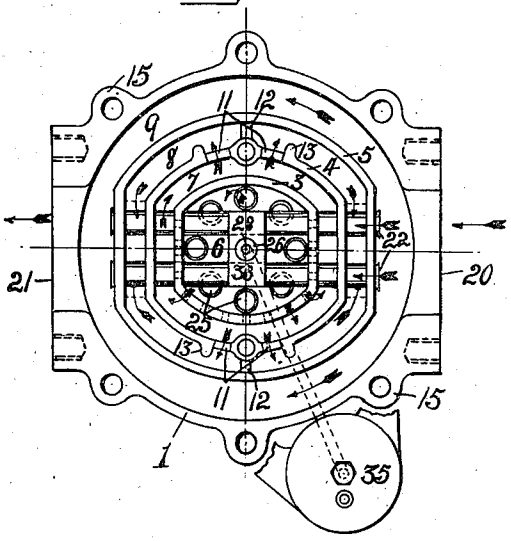


Fig. 2.

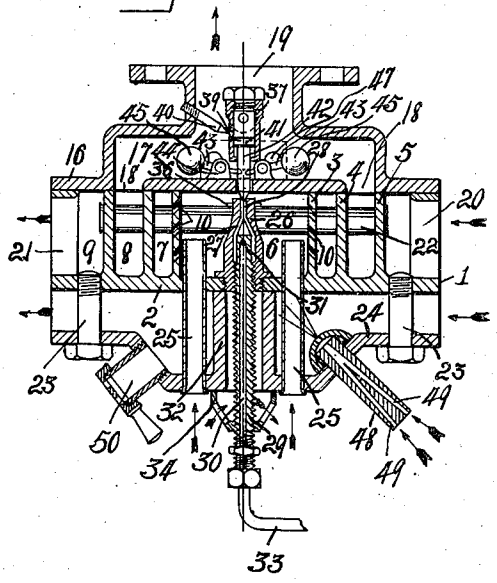
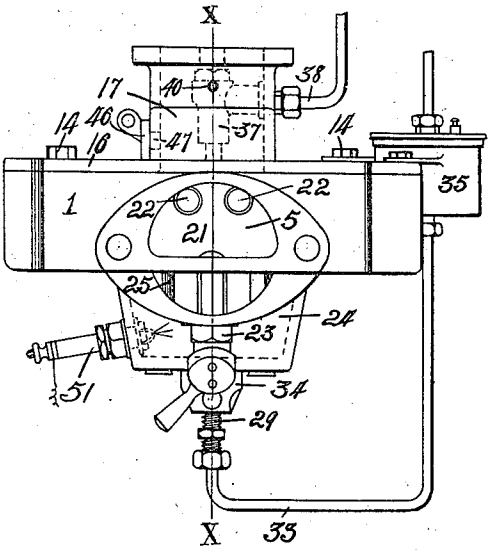


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PEHR MARTIN BLOM, OF ABO, RUSSIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO JACOB BRUUN AND ONE-THIRD TO FRANK SPARKS, BOTH OF TOLEDO, OHIO.

CARBURETER.

1,013,983. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed April 10, 1909. Serial No. 489,225.

To all whom it may concern:

Be it known that I, PEHR MARTIN BLOM, a citizen of Finland, and a resident of Abo, Finland, Russia, have invented a certain new and useful Carbureter; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to carbureters of the class particularly adapted for the use of either gasolene or kerosene as a fuel.

The object of my invention is the provision of an improved and highly efficient carbureter of this class which is easy and simple of operation, economical in the consumption of fuel, and capable of being readily and quickly changed to either a gasolene or a kerosene feed, and in which the exhaust from an engine is utilized to heat the air supplied to the mixing chamber and also to heat the walls of such chamber to a high temperature to facilitate the vaporization of kerosene when used as a fuel.

A further object of my invention is to provide a simple and cheap carbureter which is so constructed as to effect a thorough mixing of the air and kerosene and a thorough and efficient vaporization of the kerosene to make a highly inflammable mixture.

The operation, construction, and arrangement of the parts of the invention are fully described in the following specification, and a preferred embodiment thereof illustrated in the accompanying drawings, in which,—

Figure 1 is a top plan view of my carbureter with the upper deck removed. Fig. 2 is a central vertical section of the same on the line *x x* in Fig. 3, and Fig. 3 is a side elevation of the carbureter and attached float chamber.

Referring to the drawings, 1 designates the casing forming the body of the carbureter, said casing being preferably of substantially circular form. Rising from the bottom 2 of this casing within the side wall thereof in spaced relation to said wall and to each other are the partition walls 3, 4 and 5, which are shown as being of oval form with flattened end portions and concentrically arranged, but may be of any other suitable form, and equal in height to the outer casing wall 1. These partition walls form the central carbureting and vaporizing chamber 6 for air and kerosene, the annular channels 7, 8 and 9, around the two former of which the fuel mixture passes after leaving the central chamber 6. The partition 3 is provided, preferably on the ends and one side thereof, with a plurality of perforations 10 through which the fuel mixture passes from the chamber 6 to the chamber 7, and the partition 4 is provided at opposite sides thereof with openings 11 for the passage of the fuel between the chambers 7 and 8. The passage of the fuel through the perforations 10 causes the particles of kerosene to be broken up and atomized, this being facilitated by inclining the perforations, as shown, to cause the fuel to take a downward course in passing therethrough. The chamber 8 is divided into two compartments by partitions 12, 12, which are disposed at opposite sides thereof, each between a pair of openings 11. To baffle the fuel vapor and cause it to have a whirling action as it is discharged into the chamber 8 and passes around the same whereby to more thoroughly mix the air and kerosene vapor and break up the particles of kerosene, the sides of the openings 11 opposed to the associated partitions 12 are formed with outwardly projecting flanges or lips 13, as shown in Fig. 1.

Mounted on the top of the body 1 and secured thereto by screws 14 threading into bosses 15 of said body, or in any other suitable manner, is the upper deck or cap-piece 16, which fits down closely upon the top of the casing 1 and the partition walls 3, 4 and 5. This deck or cap-piece is provided on its top with a turret-chamber 17, which is broadened transversely of the body, preferably at right angles to the transverse line of the partitions 12, and has its outer end portions communicating with the channel 8 at opposite sides thereof or intermediate

the partitions 12 through ports 18, 18 in its bottom, see Fig. 2. The top of this chamber is provided with the outlet passage or opening 19 for the vaporized mixture, to the outer end of which a conduit leading to the motor may be attached in any suitable manner.

The exhaust from the associated engine is communicated to the annular channel 9 of the carbureter body through an opening 20 in one side thereof, to which suitable piping connects, thence divides and passes around the opposite portions of said channels and finds an exit from the opposite side thereof through an opening 21 in the casing, see Fig. 2. A portion of the exhaust also passes through the tubes 22, which transversely intersect the chamber 6 and channels 7 and 8 and have their ends opening into the channel 9 adjacent the openings 20 and 21, thus causing said chambers and channels to be heated both by radiant heat from the channel 9 and the pipes 22.

Secured to the under side of the bottom 2 of the carbureter body by screws 23, or in any other suitable manner, is the casing part 24, which combines with the bottom 2 to form a conduit for the passage of exhaust gases of the engine. This conduit extends transversely of the bottom 2 with its ends opening adjacent the openings 20 and 21 to enable the feed and take-off pipes communicating, respectively, with said openings to also serve as feed and take-off pipes for such conduit.

The exhaust passing through the conduit 24 serves to heat both the bottom 2 of the body 1 and the air-tubes 25, which pass through the central portion of such conduit and open communication between the atmosphere and the carbureting chamber 6, as shown.

26 designates a nozzle, which stands upright in the center of the chamber 6 to near the top thereof and has its lower end threaded in an opening in the bottom 2 of such chamber as shown in Fig. 2. The bore of this nozzle is conically reduced at its upper end, as at 27, and terminates in a restricted discharge orifice 28. Threaded into the lower end of the nozzle 26 is a hollow plug 29, which has its upper end of conical form to seat within the conical portion 27 of the nozzle and has its channel 30 provided near the upper end of the plug with a lateral outlet 31 for ejecting liquid into the space between the plug end and the nozzle wall, as shown in Fig. 2. The plug 29 projects down through an inclosed portion 32 of the conduit 24 and connects at its lower end to a pipe 33 leading to a source of kerosene supply. The plug 29 is threaded at its lower end through a centering or bracing member 34 having openings for the passage of air therethrough. The wall 32 is spaced from the plug 29 to prevent heat from being communicated to the plug from such wall, and the circulation of air through the openings in the member 34 further prevents such heating.

35 designates a float-chamber with which the pipe 33 connects, and 36 designates a plate which rests on the tubes 22 within the chamber 6 and surrounds the upper end of the nozzle 26. This plate becomes heated to quite a high temperature, and tends to vaporize the kerosene as it flows thereon from the nozzle 26.

To enable the motor to be started by the use of gasolene the turret-chamber 17 is provided in the center thereof with a pendent chamber 37, which communicates near its upper end with a source of fuel supply through a pipe 38. The gasolene is discharged from such chamber into the turret-chamber 17 through a port 39, the quantity of discharge being regulated by a cone valve 40, which is threaded through the casing of the chamber 17. Mounted for vertical movements in the chamber 37 is a piston 41, which has a stem 42 projecting downwardly therefrom through registering openings in the bottoms of the chambers 17 and 37. The lower end of the stem registers with the upper end of the nozzle 26 and is fashioned to form a cone valve for seating therein. The stem 42 is normally held unseated from the nozzle end due to the action thereon of a pair of levers 43, 43, which are fulcrumed to lugs 44 rising from the bottom of the chamber 17 and have their inner ends weighted, as at 45. As the gasolene is turned on and enters the chambers 37 its pressure on the piston 41 effects a lowering thereof and a consequent closing of the discharge orifice in the nozzle 26. When the gasolene is turned off the weighted levers 43 automatically act to raise the stem 42 to uncover the nozzle orifice.

46 designates a slide valve which is adapted to be moved to close or uncover air-admission openings 47 in the wall of the chamber 17, whereby air may be admitted to such chamber as desired.

If desired to initially heat the carbureter by other than the exhaust from the associated engine, a hydrocarbon burner 48 of any suitable form may be tapped through the casing 24. In this burner 49, 49 designate the communicating air and oil passages therethrough.

50 designates a valve closed tube, which is tapped into the casing 24 and through which matches may be inserted for igniting the gas ejected from the burner 48, and 51 designates an electric spark-plug for the same purpose.

In the operation of my invention the carbureter is initially heated either by the use of the hydrocarbon-burner 48 or by employ-

ing gasolene to run the associated engine until the carbureter has become sufficiently heated by the exhaust from the engine to thoroughly vaporize kerosene injected into the carbureting chamber 6. To employ gasolene as a fuel it is only necessary to open the gasolene valve, not shown, thus admitting gasolene to the chamber 37, from which it is ejected through the port 39 into the turret chamber 17, where it mixes with air taken in through the openings 47 in sufficient quantity and then passes to the cylinder of the engine. The gasolene entering the chamber 37 acts on the piston 41 to lower it whereby to seat the conical end of the attached stem 42 in the discharge orifice of the kerosene nozzle 26 so as to prevent a discharge of kerosene from such nozzle should it be turned on. The carbureter having become heated to the desired temperature, the kerosene is turned on so that when the gasolene is turned off the nozzle 26 will be automatically opened to permit the injection of the kerosene into the chamber 6 and the vaporization of such fluid due to its contact with the heated surface of the plate 36. The heated air which is admitted to the carbureting chamber 6 through the heated air tubes 25 commingles with the kerosene thus vaporized in said chamber and passes therewith through the perforations 10 into the channel 7, around which it passes and finds an exit therefrom into the channel 8 through the openings 11. The mixture then divides and passes in opposite directions around the channel 8 and then enters the chamber 17 through the openings 18, 18 provided in its bottom. The passing of the fuel through the perforations 10 and around the channels 7 and 8 and past the lips 13 in said latter channel causes the particles of kerosene to be thoroughly broken up and vaporized before reaching the chamber 17, from whence it passes to the engine. The manner employed for utilizing the exhaust to heat the carbureter is quite an important feature, as by causing a portion of the exhaust to pass around the channel 9, a portion through the tubes 22 which intersect the chamber 6 and channels 7 and 8, and a portion to pass beneath the vaporizing chambers and channels through the conduit 24, it is apparent that the walls of these several chambers and channels are quite highly heated, thus effecting a thorough vaporization of the kerosene.

I wish it understood that my invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In a carbureter, a carbureting chamber, and outlet chamber, a plurality of walls surrounding the carbureting chamber in spaced relation thereto and to each other, the spaces between the walls being in communication with each other and with the carbureting and outlet chambers, and passages through the carbureting chamber for the exhaust from an engine.

2. In a carbureter, an initial carbureting chamber, passages around through and below said chamber for exhaust gases from an engine, and air-tubes leading to said carbureting-chamber from the atmosphere and heated by such exhaust.

3. In a carbureter, a carbureting chamber, means for injecting fuel therein, air-tubes leading to such chamber, channels arranged around such chamber and in communication therewith, and means for directing the exhaust from an engine around said air-tubes and around said chamber and channels.

4. In a carbureter, a casing having a central chamber and annular passages thereabout, said chamber and a portion of said passages being intercommunicating, conduits for directing exhaust gases around the outer of said passages and through said passages and chamber and under the same, tubes heated by said exhaust for the passage of air from the atmosphere to said chamber, and means for injecting the liquid fuel into said chamber.

5. In a carbureter, a body having a carbureting-chamber therein, a chamber above said body, means for admitting air to said carbureting-chamber, means for injecting liquid fuel into said chamber, means for causing the fuel mixture to have a circuitous course in passing from said carbureting-chamber to said other chamber, and conduits provided through and around said carbureting-chamber for the passage of exhaust gases.

6. In a carbureter, a body divided by partitions into a carbureting-chamber and a plurality of surrounding passages, said passages being intercommunicating and the wall between the chamber and inner passage being perforated, an outlet-chamber in communication with the outer of said passages, means for discharging liquid fuel into said chamber, air-tubes leading to said chamber, and conduits around and below said passages for the passage of exhaust gases for heating said partitions and tubes.

7. In a carbureter, a carbureting-chamber, an outlet-chamber, a circuitous passage between said carbureting-chamber and outlet chamber, and tubes extending through said carbureting-chamber for the passage of the exhaust from an engine.

8. In a carbureter, a carbureting-chamber, an outlet-chamber, a circuitous passage between said carbureting-chamber and outlet-chamber, and conduits extending through

and around said carbureting-chamber and passages for the passage of the exhaust from an engine.

9. In a carbureter, a body part having a plurality of partitions dividing said part into a carbureting-chamber and a plurality of surrounding passages, the wall dividing said chamber from the inner passage being perforated and the wall between the two inner passages being provided with communicating openings having lips at their outer edges, an outlet-chamber having communication with opposite sides of the outer of said communicating passages, tubes passing through said passages and chambers for the passage of the exhaust from an engine, means for injecting liquid fuel into said carbureting-chamber, air-tubes leading to said mixing-chamber, and means for directing exhaust gases around said air-tubes.

10. In a carbureter, a carbureting-chamber, passages arranged around such chamber for the passage of the mixed fuel, and conduits through both said chamber and said passages for the exhaust from an engine.

11. In a carbureter, a carbureting chamber, tubes extending therethrough for the passage of the exhaust from an engine, a nozzle for injecting liquid fuel into said chamber and a hot-paste resting on said tubes in position for the liquid ejected from such nozzle to flow thereon.

12. In a carbureter, a carbureting-chamber, a circuitous outlet around said chamber for the mixed fuel, air-tubes opening into said chamber, tubes passing through said chamber for the passage of the exhaust from an engine, means for injecting liquid fuel into said chamber, and a hot-plate associated with said nozzle onto which the liquid flows as it is ejected from the nozzle.

13. In a carbureter, a carbureting-chamber, means for injecting kerosene into said chamber, air-tubes leading to said chamber, a conduit for directing the exhaust gases from an engine around said tubes, and means employing kerosene as a fuel for initially heating such tubes.

14. In a carbureter, a vaporizing-chamber, a conduit associated therewith for the passage of the exhaust from an engine, air-tubes passing through said conduit and opening communication between the atmosphere and said chamber, a hydrocarbon burner tapped through the wall of said conduit, and means for igniting the hydrocarbon gases injected into said conduit by the burner.

15. In a carbureter, a vaporizing-chamber, a conduit associated with said chamber for the passage of the exhaust from an engine, air-tubes passing through said conduit to said chamber, a hydrocarbon burner tapped through the wall of said conduit, a port provided in said conduit, and a valve capable of movement to open said port to permit the insertion of lighting means therethrough.

16. In a carbureter, two carbureting-chambers, means for feeding a hydrocarbon liquid to one chamber, means for feeding gasolene to the other chamber, means for admitting air to said chambers, and means actuated by the flow of gasolene for stopping the kerosene discharge.

17. In a carbureter, an upper deck forming a vaporizing chamber for gasolene, a lower deck forming a passage for the exhaust from an engine, an intermediate deck forming a vaporizing-chamber for kerosene, said latter chamber communicating with said first chamber, conduits passing through said intermediate deck for the passage of the exhaust from an engine, air-inlet means for the kerosene vaporizing-chamber, and gasolene and kerosene feeding means for the respective chambers.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

PEHR MARTIN BLOM.

Witnesses:

C. W. OWEN,

CORNELL SCHREIBER.