J. R. JOHNSON.

CARBURETER.

APPLICATION FILED OCT. 12, 1914.

1,204,029.

Patented Nov. 7, 1916.

Fig. 1.

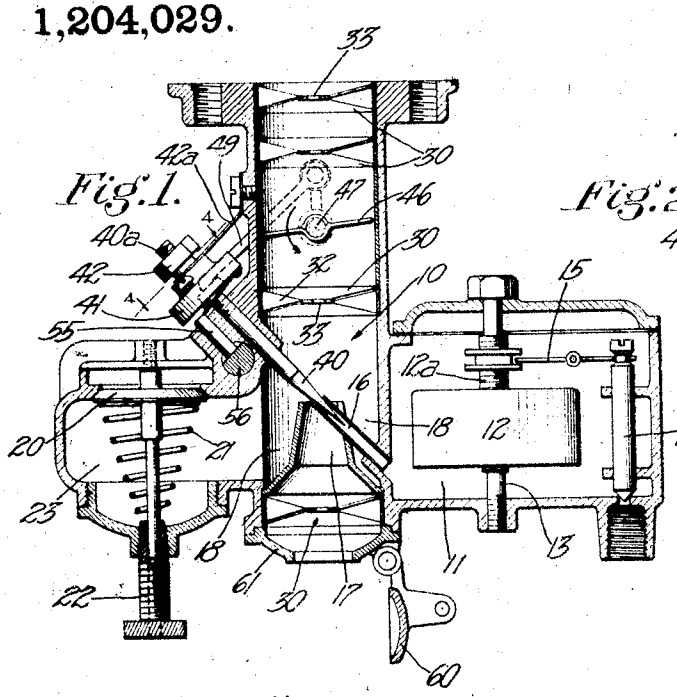


Fig. 2.

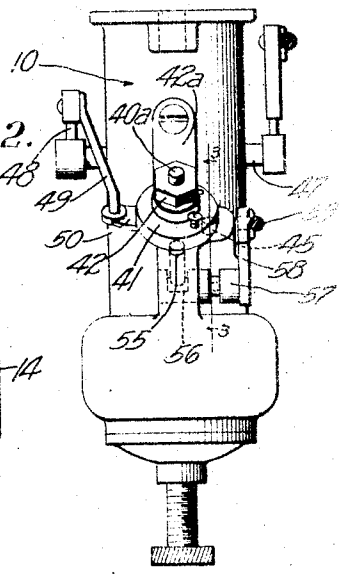


Fig. 3.

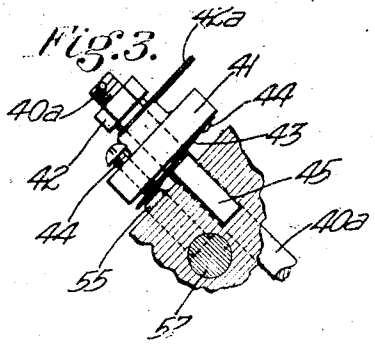


Fig. 4.

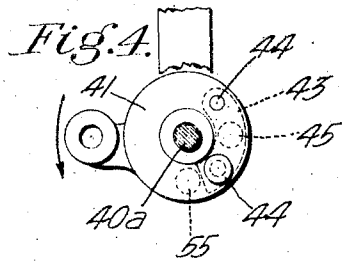


Fig. 5.

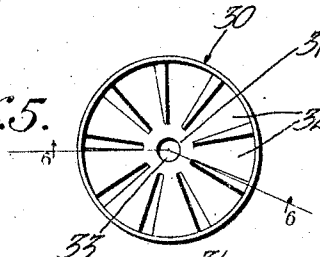
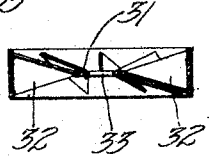


Fig. 6.



Witnesses

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CARBURETER.

1,204,029. Specification of Letters Patent. Patented Nov. 7, 1916.

Application filed October 12, 1914. Serial No. 866,248.

To all whom it may concern:

Be it known that I, JOHN R. JOHNSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to improvements in carbureters, and particularly to improvements in carbureters of the class in which there is a primary air inlet the air from which acts directly upon the liquid fuel supply, and an auxiliary air inlet the air from which mixes with the carbureted air from the primary air inlet; and the invention consists in certain particulars and combinations as hereinafter pointed out.

There are several specific and particular features of my invention to which I wish to call attention, among which are: (1) the peculiar relation of the carbureting device with the air inlet nozzle and liquid fuel valve, and the auxiliary air inlet which supplies air as the suction becomes greater, when the engine is running at higher speed; (2) the combination with the aforesaid parts of a mixer which has a peculiar function in coöperation therewith; (3) novel means for automatically adjusting the opening of the liquid fuel valve to supply the proper amount of liquid fuel at whatever speed the air is being drawn through the carbureter; (4) simple means for raising the valve to flood the carbureter for a rich mixture when starting; and (5) the general arrangement and combination of the various parts adapting this carbureter particularly to the use of heavy fuel.

My carbureter is designed primarily to use comparatively heavy fuel, such as engine distillate or stove distillate, without the necessity of heating the fuel. It is well known that greater efficiency can be had from a cool fuel than from a heated one; and this is particularly true of heavy oil fuels.

It is a particular object of my invention to provide a carbureter which will carry all of the fuel, and all of its heat value, into the engine cylinders in such form that the combustion may be complete and highly efficient.

It is also an object to provide a carbureter which is simple in design and construction and action; and which performs its functions within a small space,—is small and compact in comparison with other carbureters.

I have shown a preferred form of my carbureter in the accompanying drawings; and in the following specification I set forth the details of such preferred form.

In said drawings, Figure 1 is a vertical section of my preferred form of carbureter, Fig. 2 is an end elevation of the same, Fig. 3 is an enlarged sectional detail taken as indicated by line 3—3 of Fig. 2, Fig. 4 is an enlarged detail taken as indicated by line 4—4 of Fig. 1, Fig. 5 is a plan of my improved form of mixer which I use in my carbureter, and Fig. 6 is a section of the same.

In the drawing the numeral 10 may designate generally a carbureting chamber which is preferably in the form of a vertical tube, as illustrated. At one side of this carbureting chamber I provide the liquid fuel reservoir of float chamber 11, containing a float 12 which slides on a vertical rod 13 and operates a fuel valve 14 through the medium of lever 15. The level of the fuel in the float chamber 11 may be regulated as desired by regulating the position of the sleeve 12^a carried by the float which slides on the rod 13. From the float chamber 11 a fuel inlet tube 16 extends into the carbureting tube 10, the inner discharge end of the tube 16 being preferably central of the carbureting tube 10 and central of the primary air inlet nozzle 17. This primary air inlet nozzle is arranged in the lower end of the carbureting tube 10, projecting up into the carbureting tube as indicated, with an annular space 18 around the nozzle in the lower part of the tube 10. I wish to particularly draw attention to this construction as certain advantageous operative features of my invention depend thereupon. The upper end of the liquid fuel inlet tube 16 is preferably at the center of the upper end of the nozzle 17, in the position shown in Fig. 1. The tube 16 extends diagonally through one wall of the nozzle 17; and the current or jet of air drawn upwardly through the nozzle passes around the liquid tube 16 and draws the liquid fuel through that tube by suction.

The auxiliary air inlet comprises means for introducing air to the space 18 around the nozzle 17. I have shown a preferred form of this inlet in the drawings. A valve 20, of suitable size, is normally seated by a

spring 21 whose pressure is adjustable by adjusting screw 22. When the valve 20 opens in a downward direction, air enters a chamber 23 and passes thence to the space 18 around the nozzle 17. The upwardly moving jet of air drawn through the nozzle 17 has an inductive action on the air in the space 18, inducing that air to travel up the outer portions of the carbureting tube 10 along with the central jet of carbureted air coming from the nozzle 17. Thus, I have a central jet of carbureted air and an exterior enveloping volume of pure air traveling upwardly together through the chamber 10. In order to cause the thorough mixing of these two bodies of air, I put the whole body of gases, or practically the whole body of gases, into a spiral motion as it passes up the tube 10. This spiral motion tends to throw the carbureted air outwardly; and the general agitation following causes a thorough mixing of the two bodies of air. The feature and constructions of my invention which make possible this mode of action are features to which I particularly call attention. My preferred means of causing spiral motion of the air is shown in Figs. 1, 5 and 6. I employ mixers embodying a diaphragm 30 which has a central portion or hub 31 about which are arranged a number of radial stationary fan blades 32. These fan blades cause the spiral rotation of the outer portions of the air passing upwardly through the mixing tube 10. The central or hub portion 31 of the diaphragm has a central opening 33 which passes a central jet of air through the fan diaphragm. I preferably use a number of mixers, showing three above the nozzle 17 and one below it in my preferred arrangement. These mixers all preferably rotate the gas in the same direction. I have set forth the peculiar advantages of my specific form of mixer in an accompanying application S. N. 866,249, filed Oct. 12th, 1914; but in so far as the diaphragms accomplish spiral or rotary movement of the carbureted air, they enter into present combination—specifically by entering into the action heretofore described, said action including the formation of an interior jet of carbureted air, an exterior envelop of pure air, and the rotary or spiral movement of the two bodies of air to cause their thorough mixture.

The flow of fuel through the fuel tube 16 is controlled by a suitable needle valve 40. This needle valve has a stem 40^a extending out through the body of the carbureter to its exterior and carries a cam disk 41 screw threadedly adjustable on the stem 40^a, a lock nut 42 being provided for locking the cam disk 41 in any desired location. A flat spring 42^a normally presses the needle valve toward the closed position; and the minimum opening to which the needle valve may be forced by spring 42^a is regulated by regulating the position of the disk 41 on the stem 40^a. On the under side of the cam disk 41 there is a cam member 43 formed of a piece of spring metal secured at one end at 44 to the cam disk, the other end of the member 43 being depressed by an adjusting screw 44 as illustrated. A stationary pin 45 is set in the body and its outer end bears upwardly against the cam member 43. Depending upon the angle to which the member 43 is adjusted, the cam disk 41 and the needle valve 40 will be raised and lowered by rotation of the cam disk. Rotation of the cam disk is effected in coöperation with opening and closing of the throttle 46. The throttle 46 is mounted upon a shaft 47 and on one end of this shaft a connecting arm 48 is rigidly mounted. A connecting rod or wire 49 connects between the arm 48 and an arm 50 on the cam disk 41, in such manner that when the throttle is opened by movement in the direction indicated by the arrow in Fig. 1, the cam disk will be rotated in the direction indicated in Fig. 4, causing the member 43 bearing upon the pin 45 to raise the disk 41 and with it to raise the needle valve 40 and open the discharge of the fluid tube 16.

In order to provide a comparatively heavy charge of fuel when starting, I have provided a movable pin 55 which may be raised against the cam disk 41 to open the fuel inlet valve while the engine is being started. The lower inner end of this pin 55 may rest on a cam 56 formed in a short stud shaft 57 carrying an arm 58 at its outer end. A connecting rod or wire 59 may afford means for moving this shaft 57 to raise the pin 55 and thus to open the fuel inlet valve to supply a comparatively large amount of fuel on the first few suction strokes of the engine. When the engine is being started, or is running at low speed, air is only drawn through the nozzle 17, or is drawn through the valve 20 in very small quantities. The pressure of spring 21 is adjusted so that, as the speed and the suction of the engine increase, the valve 20 will open to supply the necessary amount of air. Of course, as the speed and suction increase, the amount of air drawn through the nozzle 17 will also increase, but not in so great a ratio as the amount of air drawn through the valve 20 will increase. In order to cut down the amount of air drawn through the carbureter when the engine is being started, I may use a cap 60 which may be thrown loosely against the ring or collar 61 at the lower end of the carbureting tube 10, to approximately close the opening therein and to greatly restrict the amount of air passing through the carbureting tube. I may use this provision in combination with the mechanism for raising the needle valve 40

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by hand, or I may use either of them separately; but I prefer to use, by itself, the mechanism for raising the needle valve to increase the flow of liquid fuel, without cutting down the amount of air which may pass through the nozzle 17.

It will be understood that my invention is not limited to the details of construction herein set forth; they may be varied according to knowledge common to the art of carbureters.

Having described my invention, I claim:

1. A carbureter of the class described, comprising a vertical carbureting tube, a primary air inlet embodying a nozzle of less diameter than the tube projecting upwardly into its lower end so that there is an annular space around the nozzle in the lower end of the carbureting tube, fuel inlet means embodying a fuel inlet tube extending diagonally upwardly and across the carbureting tube to a point at the center of the upper end of the nozzle, a needle valve to control discharge of fuel from said tube, auxiliary air inlet means for admitting air to the space around the nozzle, a throttle across the carbureting tube above the nozzle, and means whereby movement of the throttle causes cooperative movement of the needle valve to vary the discharge of fuel from the fuel inlet tube.

2. A carbureter of the class described, comprising a vertical carbureting tube, a primary air inlet embodying a nozzle of less diameter than the tube projecting upwardly into its lower end so that there is an annular space around the nozzle in the lower end of the carbureting tube, fuel inlet means embodying a fuel inlet tube extending diagonally upwardly and across the carbureting tube to a point at the center of the upper end of the nozzle, a needle valve to control discharge of fuel from said tube, auxiliary air inlet means for admitting air to the space around the nozzle, a throttle across the carbureting tube above the nozzle, and means whereby movement of the throttle causes coöperative movement of the needle valve to vary the discharge of fuel from the fuel inlet tube, and manually operable means for moving said needle valve to open the discharge of the fuel inlet tube.

3. A carbureter of the class described, comprising a carbureting chamber, a primary air inlet thereto embodying a nozzle projecting into the chamber with an annular space in the chamber around the nozzle, a fuel inlet discharging at the inner end of said nozzle, an auxiliary air inlet admitting air to the space around the nozzle, and means for causing agitation of the stream of air drawn through the carbureting chamber.

4. A carbureter of the class described, comprising a vertical carbureting tube, a primary air inlet at the bottom of the tube embodying a nozzle concentric with and projecting up into the lower end of the tube, the nozzle being smaller than the tube so that there is an annular space in the lower part of the tube around the nozzle, fuel inlet means discharging centrally at the upper end of the nozzle, said means embodying a fuel nozzle projecting diagonally upwardly and across the nozzle to the center of its upper end, an auxiliary air inlet means admitting air to the space around the nozzle.

5. In carbureters, a carbureting and mixing tube, a primary air inlet at the bottom of the tube embodying a convergent nozzle projecting up into the tube being of smaller diameter than the tube so as to leave an annular space around the nozzle within the tube, an auxiliary air inlet means for admitting air to the annular space surrounding the nozzle, and a fuel inlet means embodying a fuel nozzle projecting diagonally across and upwardly through the upper part of the air nozzle to the center of its upper end, and a valve stem coöperating with the fuel nozzle projecting diagonally downwardly and across above the upper end of the air nozzle in line with the fuel nozzle.

In witness that I claim the foregoing I have hereunto subscribed my name this 5th day of October 1914.

JOHN R. JOHNSON.

Witnesses:
E. B. Armstrong,
James T. Barkelew.