J. A. McHARDY & C. A. POTTER.

CARBURETER.

APPLICATION FILED MAR. 27, 1909.

985,431.

Patented Feb. 28, 1911.

Fig.5.

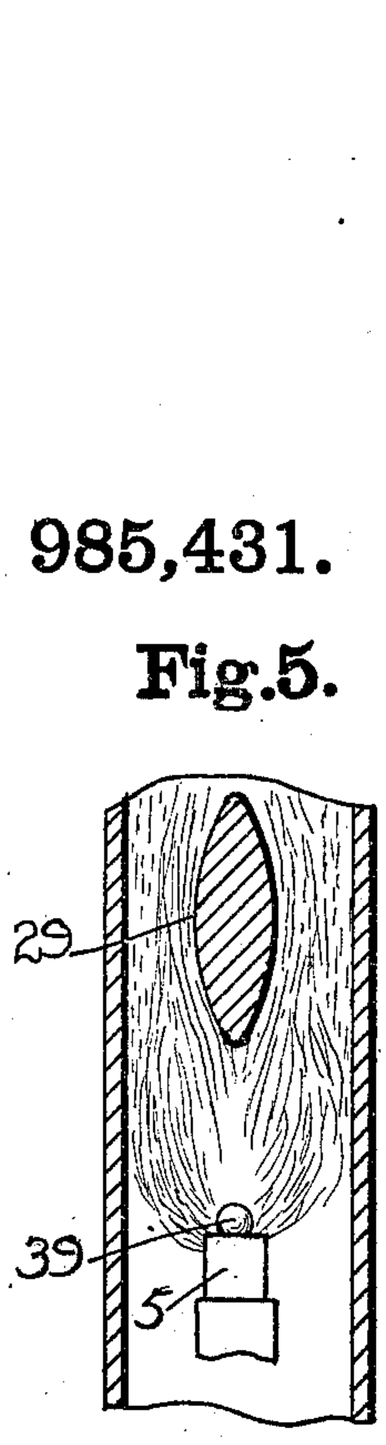


Fig.1.

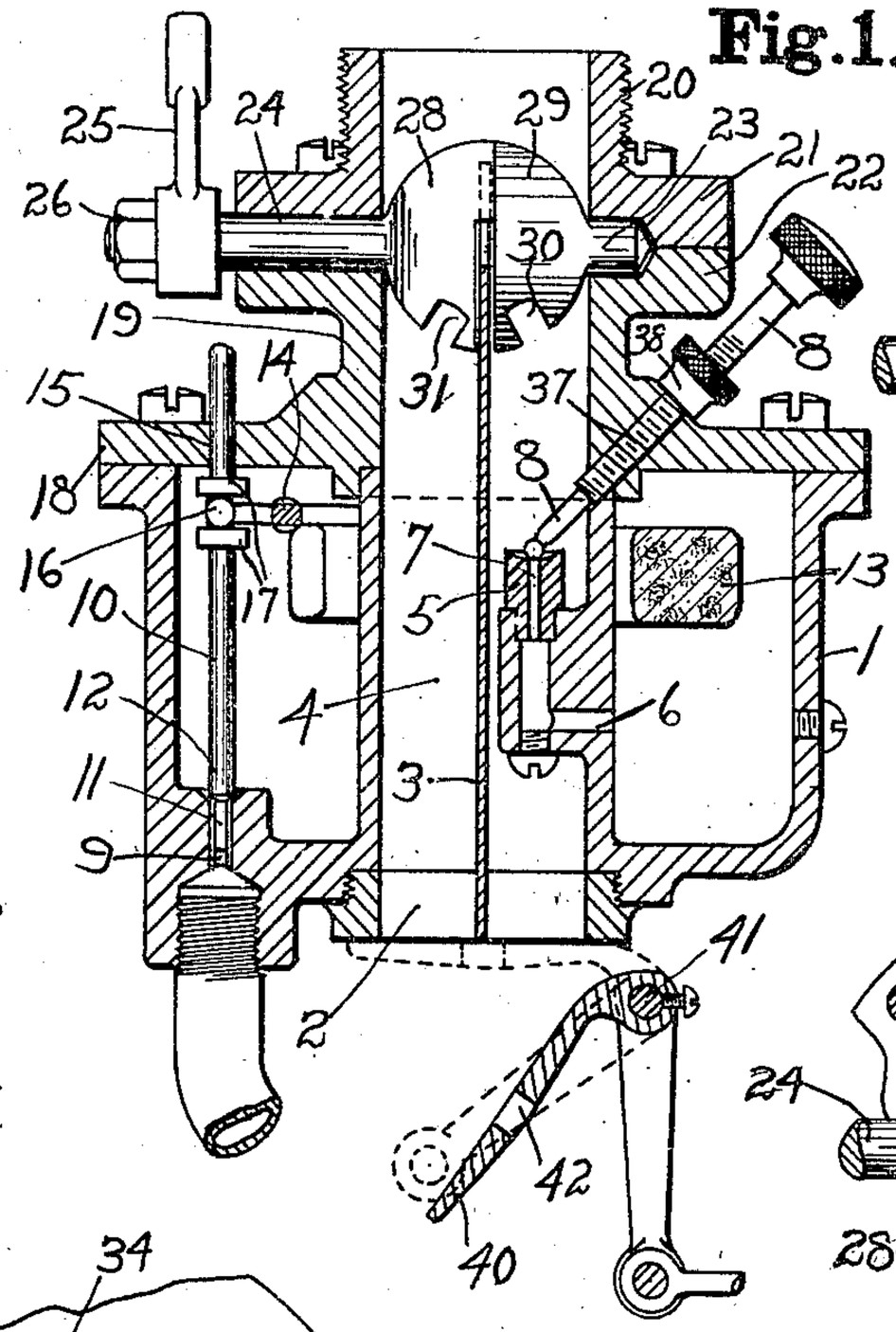


Fig.3.

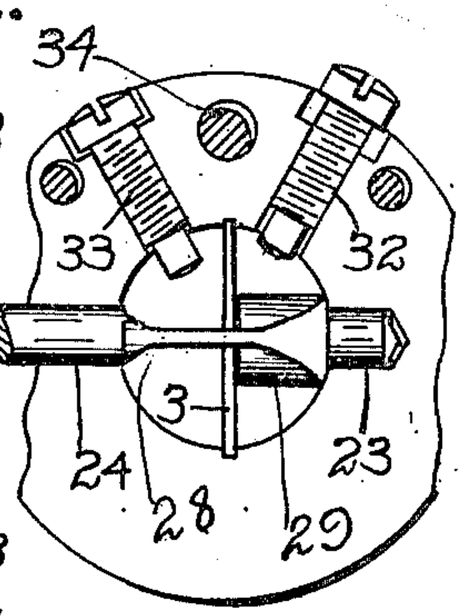
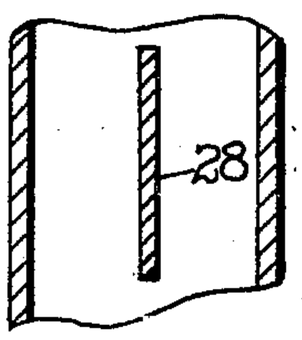


Fig.6.



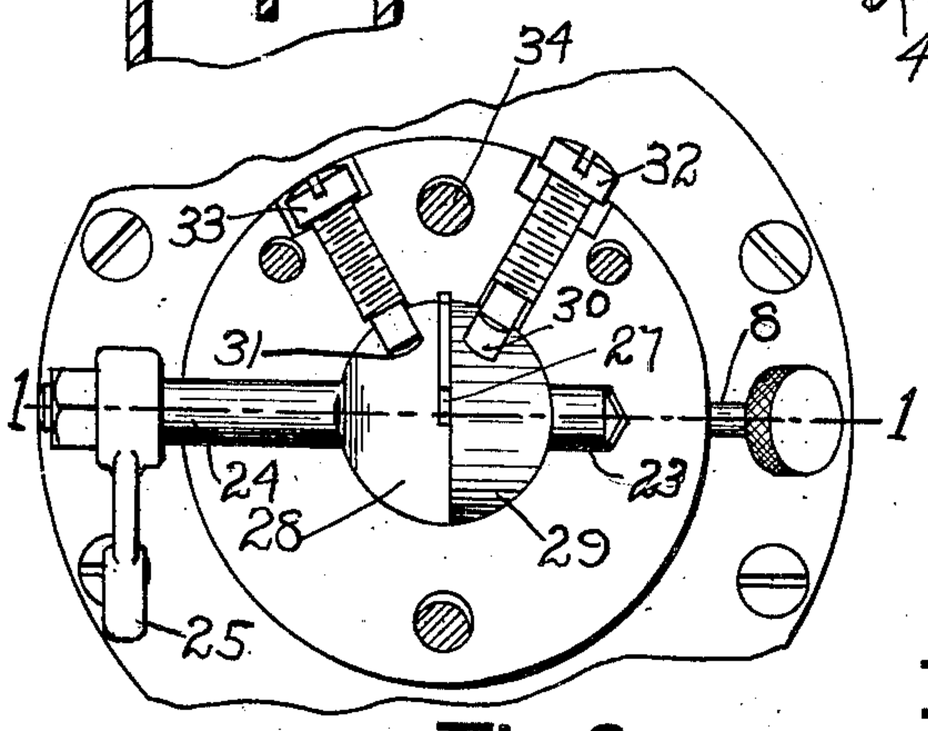


Fig.2.

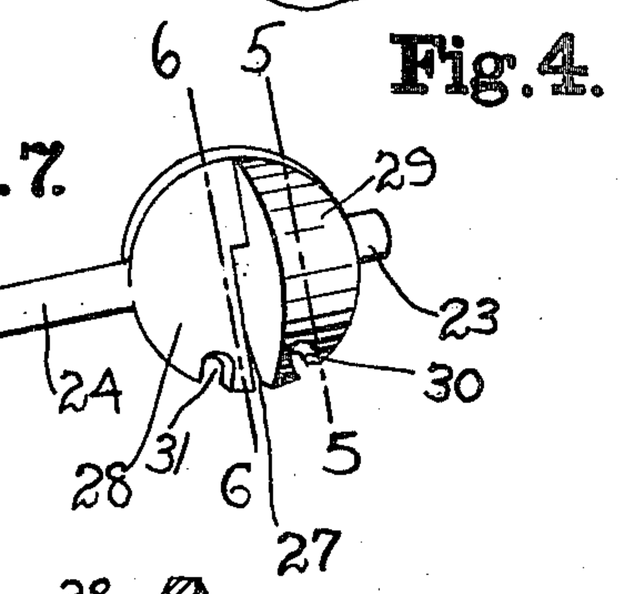


Fig.4.

Fig.7.

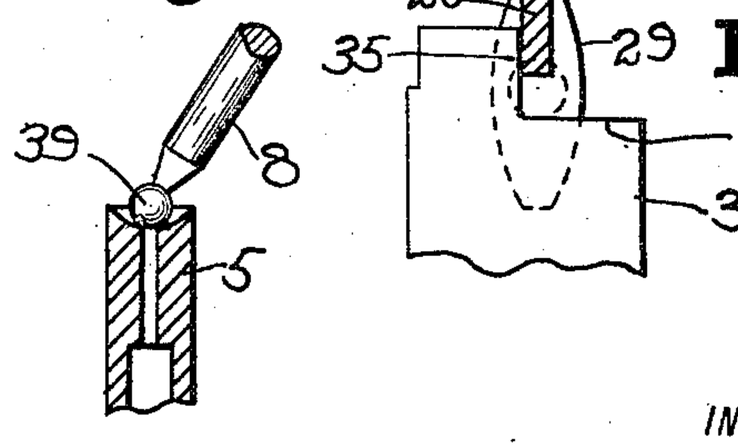


Fig.10.

Fig.8.

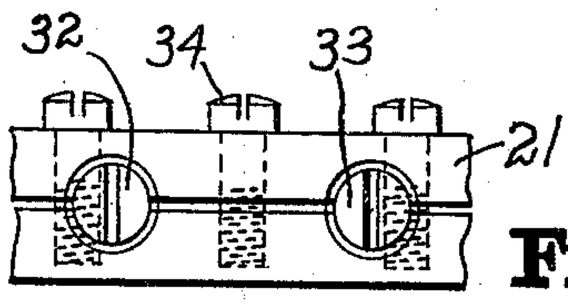


Fig.9.

WITNESSES

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UNITED STATES PATENT OFFICE.

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CARBURETER.

985,431. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed March 27, 1909. Serial No. 486,075.

To all whom it may concern:

Be it known that we, JAMES A. McHARDY and CHARLES A. POTTER, citizens of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to carbureters of the class employed for vaporizing light hydrocarbon oil, such as gasolene and the like, as it is fed to an internal combustion engine, and the object of the invention is to control the flow of both the air and gasolene through the carbureter and automatically increase or decrease the proportion of air at a predetermined ratio to the gas by the operation of but a single valve.

A further object of this invention is to provide perfectly straight air and gas passages through the carbureter when the valve is open, so as to reduce to a minimum the work of the engine in drawing the mixture into the cylinder.

It is an understood fact in the operation of motor car engines, that as the speed increases the percentage of gas required to economically operate the same decreases and the percentage of air increases in a given ratio, the reverse requirement taking place as the speed is reduced, the slower the engine runs the richer the mixture required.

In carrying out our invention we employ a float mounted in a gasolene chamber, which latter is provided with a central tubular draft flue through it, the same being divided lengthwise through its center by a thin partition into two separate passageways, one for the air supply and one for the gas, both being controlled by a single rotatable valve. An essential feature of this valve is that the portion which controls the gas passageway is considerably thickened on both of its faces rendering the same practically oval in cross section for the purpose of partially closing the gas passageway when the valve is in its open position, while the other half of this valve that controls the air passage is very thin so as to offer the minimum amount of resistance to the passage of air when the valve is open.

Another feature of our invention is that the end of a ball valve which controls the inlet jet of gasolene is made in a spherical shape whereby the supply may be nicely regulated or shut off completely when desired. It is found in practice that when a valve of this form is used that the liquid in spurting from the opening strikes the rounded face of the ball and is at once broken up into fine particles whereby it will more readily mix with the air and become converted into the explosive mixture desired.

In order to adjust this carbureter to work most effectively on different classes of engines we have provided two adjusting screws adapted to enter corresponding notches in the valve disk whereby the proportion of gasolene and air may be nicely regulated to secure the best results.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— is a central sectional side elevation of our improved carbureter taken on line 1—1 of Fig. 2. Fig. 2— is a top view with the top plate removed, showing the valve in its closed position, also showing a portion of the float chamber. Fig. 3— is a top view of the top plate removed showing the valve in its open position, also showing the supply regulating screws. Fig. 4— is the same as Fig. 3 with the valve partially open. Fig. 5— is a longitudinal section through the central flue showing a section through that portion of the valve which controls the gas passageway, said section being taken on line 5—5 of Fig. 7. Fig. 6— is a longitudinal section through the central flue showing a section through that portion of the valve which controls the air passageway, said section being taken on line 6—6 of Fig. 7. Fig. 7— is a perspective view of the controlling valve. Fig. 8— shows the upper end of the central partition illustrating the valve as bringing up against the same to form a stop. Fig. 9— illustrates the supply regulating screws and the means for binding and holding the same in the desired position. Fig. 10— is an enlarged view illustrating the spherical end of the ball valve and its application to the gasolene inlet jet pipe.

Referring to the drawings, 1 designates

a bowl-shaped float chamber, and 2 a pipe or tubular portion extending up through its center to form a draft flue. This flue is centrally divided by means of the thin partition 3, one side 4 being entirely free for the admission of air, while in the opposite side is located the supply nozzle 5, which is attached to the wall of the tubular portion. The lower end of this nozzle communicates through the passage 6 into the float chamber, the upper end being provided with a reduced outlet 7 into which a regulating ball valve 8 is adapted to fit so as to control the supply therefrom. The inlet passage 9 to the float chamber is controlled by the spindle valve 10. The lower end of this valve is reduced at 11 to enter said inlet hole and form a guide to insure the seating of the valve or closing portion 12, the upper portion of this spindle being guided at 15 through the cover or plate 18. This spindle valve is actuated by means of a float 13, which may be constructed of cork, or any other suitable material, said float being pivoted at 14 on a suitable shaft that extends transversely across the chamber, the same being connected to said spindle 10 by means of the fingers 16 which are held between the collars 17—17. The top plate or cover 18 of the float chamber is provided with an upwardly extending neck portion 19 forming a continuation of the tubular passageway 2. An externally threaded gas outlet neck 20, provided with a flange at its lower end, 21, is adapted to be secured by means of screws to a corresponding flange 22 on the upper end of the neck portion 19. In order to control both the gas and the air passageways through this device a rotatable disk valve has been provided and is supported between the two flanges 21 and 22, a bearing being obtained on one side of the disk by means of the outwardly projecting teat 23, while the bearing on the opposite side is obtained by the shaft 24 which extends through between said flanges and out beyond the edge thereof. The outer end of this shaft is reduced and threaded at its end to receive the arm 25 which is secured in position thereon by the nut 26. This valve disk is split or slotted at 27 from its lower edge up a little over one-half of its diameter for the purpose of receiving and operating over the upper edge of the dividing partition 3. One-half 28 of this valve disk is made very thin so as not to obstruct the air passageway 4 which it controls, the other half 29 of the valve is thickened on its two opposite faces, into substantially an oval shape in cross section for the purpose of partially closing or reducing the area of the gas passageway which it controls as the valve approaches its open position. In other words, the portion of the valve disk which is located in the gas passageway, is formed to present a barrier to partially obstruct the flow of gas, when the valve is open, to a greater degree than the presence of the thin portion 28 of the valve offers to the flow of air. This barrier, in the embodiment of the invention illustrated, is presented by the thickened middle portion of the half 29 of the valve, and it serves as a checking barrier to reduce the area of the gas passageway below that of the air passageway. Therefore, the opening through both of the passageways is controlled simultaneously so as to alter each in a predetermined ratio one to the other as the valve is operated.

In order to control the quality and richness of the mixture when the engine is throttled down or running on a reduced speed, notches, ports or apertures 30 and 31 are provided in the edge of the disk, one in the gas passage and the other in the air passage. Each of these apertures are independently controlled by supply regulating screws 32 and 33, the inner ends of which are adapted to be adjusted either in or out to close or open said apertures and so regulate and control the mixture by admitting either more or less gas or air as required so that the carbureter may be perfectly adjusted to the exact requirements of each engine to which it may be applied, said control being effective only when the valve is closed or in a nearly closed position. These supply regulating screws are tapped in on the dividing line between the flanges 21 and 22 and are securely bound and held firmly in the desired position by the binding screws 34 through said flanges which may be loosened when it is desired to adjust said regulating screws.

Owing to the fact that the apertures or openings 30, 31 are not located in line with the axis of the valve but are at one side of said axis, said openings in no wise affect the flow when the valve is open. The inner ends of the screws 32—33, however, present barriers to the flow of fluid which become more and more effective as the valve is turned so that the portion having the openings approaches the screw ends. Consequently either one of the screws 32—33, presents a barrier which is adapted to coöperate with its respective opening 30 or 31 so as to vary the mixture as said opening approaches said barrier provided by the screw tip.

The thin dividing portion 3 is provided with an angular notch on its upper end which forms a stop at 35 against which the flat surface of the disk valve may bring up when the same is in its wide open position, also forming a stop at 36 against which this flat surface may rest when the valve is in its complete closed position.

The ball valve 8 is set on an angle and threaded at 37 through the plate or cover 18, the same being provided with a locking

nut 38 to retain this valve in the desired position. The lower end at 39, see Fig. 10, of the valve is made in a spherical form so that when the gasolene spurts from the end of the supply nozzle against the rounded surface of the ball 39 it has the effect of breaking up the liquid into a fine spray, causing the same to more readily mix with the air and be converted into a gas of the most effective explosive mixture. By the use of this ball valve the supply may be entirely shut off, if desired, or nicely regulated and controlled in proportion to the amount of air admitted when the engine is running either on the high or on the low speed, whereby the most effective mixture may be obtained, in which position the valve is locked and permanently held by its locking nut 38. In adjusting this carbureter to operate on different engines the ball valve is first set so as to give the maximum speed to the engine when the rotatable controlling valve is in its open position, and then to obtain the minimum speed the supply regulating screws 32 and 33 are adjusted either in or out to close or open the apertures in the valve and so control the inflow of gas and air and regulate the mixture when said controlling valve is at or near its closed position.

Difficulty is often experienced in trying to crank or start a gasolene engine, which is largely due to the fact that the cylinders do not receive a mixture of sufficient richness to ignite readily when all the parts are cold. To obviate this difficulty and provide a mixture of sufficient richness for this purpose a plate or shutter 40 is pivoted at 41 at the lower end of the draft flue, the same being provided with one or more inlet holes 42, thereby shutting off a large proportion of the supply of air, which proportionally increases the supply of gasolene or richness of the mixture, thus enabling the operator to start the engine without difficulty.

The essential features of our improved carbureter are first, its adjustability; second, its effectiveness in operation and third, its simplicity in construction. By the adjustability of the carbureter we are able to readily and nicely regulate the same to obtain the maximum efficiency from the engine to which it is applied. The effectiveness of the carbureter is due, first, to its adjustability whereby it is regulated to obtain the very best results under the conditions at which the same is obliged to operate, and second, the straight passageways through the carbureter offer a minimum resistance thus requiring the minimum amount of power to draw the charge into the cylinder. The extreme simplicity in construction of the device lies in the fact that it is made up of very few parts, and after the same is once adjusted to meet the conditions under which it is to operate the device is completely controlled by the movement of but a single lever, whereby a mixture is obtained the richness of which varies at a predetermined ratio to the speed of the engine whereby the maximum efficiency is produced.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A carbureter provided with a main outlet passageway, a pivoted disk valve for controlling said passageway having an opening at one side of its axis, and a barrier adapted to coöperate with said opening in the valve for varying the mixture as said opening approaches said barrier.

2. A carbureter provided with a main outlet passageway, a pivoted disk valve for controlling said passageway, said valve being provided with openings at one side of its axis and adjustable barriers adapted to vary the effective areas of said valve openings as the openings approach said barriers.

3. A carbureter provided with separate gas and air passageways having a partition between them, a single rotatable valve adapted to control the opening through both of said passageways simultaneously and alter each in a predetermined ratio one to the other at each movement of said valve, and means for controlling the flow of gas and air when said valve is near and in its closed position.

4. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously, the portion of said valve which is in the gas passageway having a checking barrier to reduce the area of said gas passageway below that of the air passage so as to alter each in a predetermined ratio one to the other as the valve is operated.

5. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously, that portion of the valve located in the gas passageway having a checking barrier to reduce the area of said passage below that of the air passageway as the valve approaches its open position, said valve disk being provided with openings through it in both the gas and air supply passageways, and means for regulating the flow of the air and gas through said openings when said valve is nearly closed.

6. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable valve extending

across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously, that portion of the valve located in the gas passageway having a checking barrier to reduce the area of said gas passageway below that of the air passageway as the valve approaches its open position, said valve being provided with openings through it in both the gas and air supply passageways, and adjustable screws adapted to enter said openings for regulating the flow of the air and gas through said openings when said valve is near or in its closed position.

7. A carbureter provided with separate gas and air passageways having a partition between them, a single rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously and alter each in a predetermined ratio one to the other at each movement of said valve, said valve being also provided with ports in both the gas and air passageways, and means for regulating the flow of the air and gas through said ports when said valve is near or in its closed position.

8. A carbureter provided with separate gas and air passageways having a partition between them, a single rotatable valve extending aoross both passageways whereby it is adapted to control the opening through both of said passageways simultaneously and alter each in a predetermined ratio one to the other at each movement of said valve, said valve being provided with openings through it in both the gas and air supply passageways, and adjustable screws located in position to co-act with said openings when said valve is near or in its closed position to regulate the flow of the air and gas

9. A carbureter provided with separate gas and air passageways having a partition between them, a single rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously and alter each in a predetermined ratio one to the other at each movement of said valve, a fuel supply nozzle in said gas passageway, means for regulating the flow through said nozzle to produce the maximum engine speed when said valve is in its open position, and adjustable means for controlling the mixture when the valve is near or in its closed position to regulate the minimum engine speed.

10. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously, that portion of the valve located in the gas passageway having a checking barrier to reduce the area of said passageway below that of the air passageway as the valve approaches its open position, a fuel supply nozzle in said gas passageway, means for regulating the flow through said nozzle to produce the maximum engine speed when said valve is in its open position, and adjustable means for controlling the mixture when the valve is at or near its closed position to regulate the minimum engine speed.

11. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable valve extending across both passageways whereby it is adapted to control the opening through both of said passageways simultaneously, that portion of the valve located in the gas passageway having a checking barrier to reduce the area of said passageway below that of the air passageway as the valve approaches its open position, a fuel supply nozzle in said gas passageway, means for regulating the flow through said nozzle to produce the maximum engine speed when said valve is in its open position, said valve being provided with openings through it in both the gas and air supply passageways, and adjustable screws adapted to enter said openings for regulating the flow of the air and gas through said openings when said valve is near or in its closed position to regulate the minimum engine speed.

12. A carbureter provided with separate gas and air passageways having a partition between them, a rotatable disk valve adapted to straddle said partition and control the opening through both of said passageways simultaneously, one portion of said valve having a checking barrier to reduce the area of the gas passage when said valve is in open position, a gas inlet nozzle in the gas passage, an adjustable ball and valve engaging the discharge opening of said nozzle to regulate the flow therethrough, and means cooperating with said disk valve for controlling the mixture when the valve is near or in its closed position.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES A. McHARDY.
CHARLES A. POTTER.

Witnesses:
HOWARD E. BARLOW,
E. I. OGDEN.