A. KUGLER.

CARBURETER.

APPLICATION FILED MAR. 17, 1909.

1,006,663.

Patented Oct. 24, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

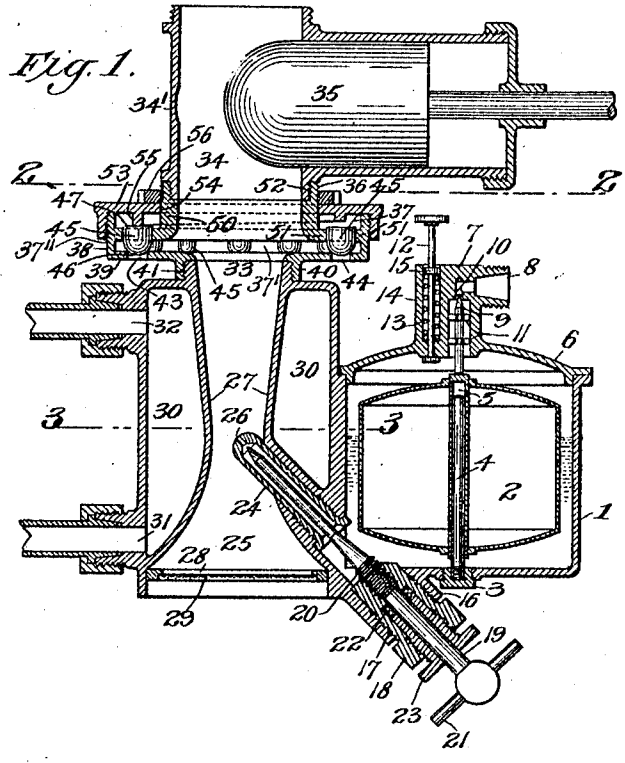


Fig. 2.

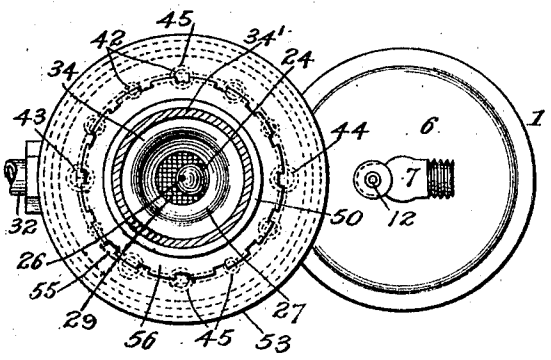
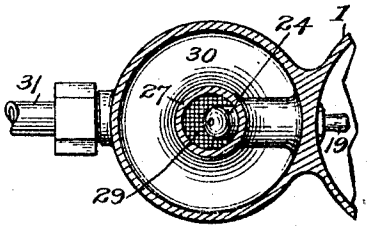


Fig. 3.



Witnesses:
P B Philipp
Geo H Botts

Inventor:
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By his Attys:
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2 SHEETS—SHEET 2.

Fig. 4.

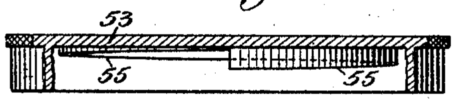


Fig. 6.

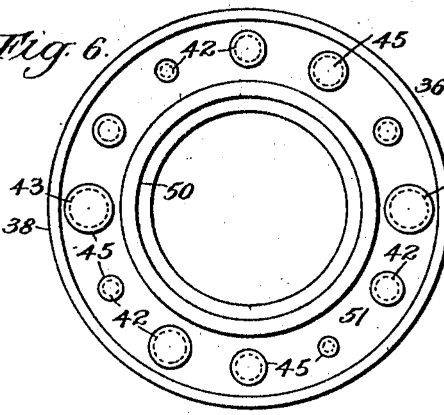


Fig. 5.

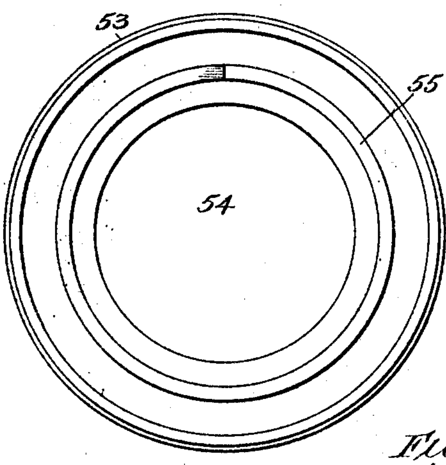


Fig. 7.

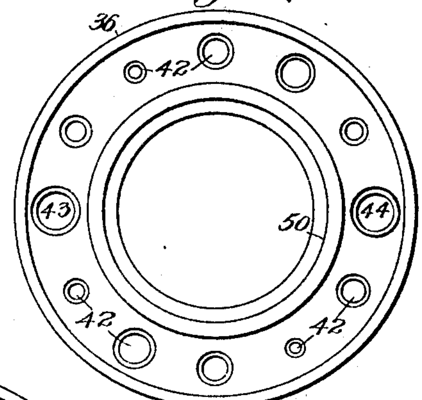


Fig. 8.

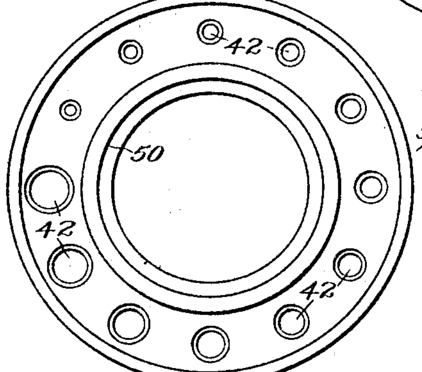
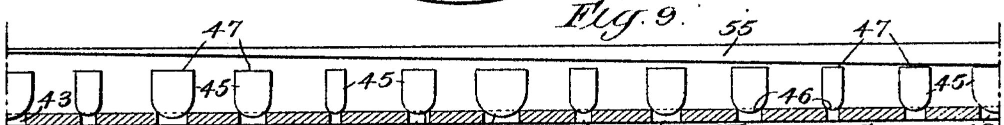


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALBERT KUGLER, OF NEW YORK, N. Y.

CARBURETER.

1,006,663. Specification of Letters Patent. Patented Oct. 24, 1911.

Application filed March 17, 1909. Serial No. 483,985.

To all whom it may concern:

Be it known that I, ALBERT KUGLER, a citizen of the French Republic, residing at New York city, county of New York, and State of New York, have invented certain new and useful Improvements in Carbureters, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates generally to certain improvements in carbureters for internal combustion engines, which have a regular air inlet and a suction outlet to the engine, and relates more particularly to an improved supplemental or auxiliary air inlet construction for such carbureters.

It is one object of the present invention to provide a supplemental air inlet of such construction that springs, diaphragms and like parts, which are liable to get out of order and are easily injured, are eliminated.

It is a further object of the invention to provide such a supplemental air inlet which can be readily adjusted to permit the quantity of air passing therethrough to be varied as may be necessary or desired, to insure the proper operation of the engine, and which when once adjusted will remain in position without requiring constant attention.

It is a further object of the invention to provide such a supplemental inlet which will be simple and cheap to construct, and which will be durable.

In the accompanying drawings—Figure 1 is a sectional view of a carbureter showing the improved supplemental air inlet; Fig. 2 is a longitudinal section taken on line 2—2 of Fig. 1; Fig. 3 is a similar section taken on line 3—3 of Fig. 1; Fig. 4 is a view, partly in section, of a part of the supplemental air inlet; Fig. 5 is a plan view of the construction shown in Fig. 4; Figs. 6 and 7 are plan views of parts of the supplemental air inlet showing the arrangement of ports; Fig. 8 is a similar view showing a modified arrangement of ports, and Fig. 9 is a view illustrating the development of the cam surface by which the valves are adjusted and controlled.

Referring now to said drawings, which illustrate the invention as applied to carbureters of the constant level type, 1 indicates the float chamber and 2 the float therein, which controls the feed of the gasolene or other hydrocarbon to the mixing chamber. This float chamber and float may be of any desired construction. In the construction shown, the float chamber is cast integrally with the mixing chamber portion of the carbureter, and has provided in its bottom a removable plug 3 in which plug is formed a socket, this socket having positioned therein a spindle 4, on which spindle the float 2 works as it rises and falls in the float chamber, a socket 5 being provided in the float into which the spindle 4 fits, the spindle thus acting as a support and guide for the float. The float chamber 1 is provided with a removable top or cover 6 to permit the assemblage of the parts, and this cover 6 has a projection 7 which has an opening 8 through which the gasolene or other hydrocarbon is fed from a suitable source of supply (not shown) to the chamber. The admission of the gasolene to the chamber is controlled by a gravity needle valve 9 working in a socket 10 in the projection 7, which socket has a restricted opening communicating with the opening 8. This valve 9 is guided in the socket by ribbed disks 11. This valve 9 rests at its lower end on the float 2, and when a sufficient amount of gasolene has been fed to the chamber, it is raised by the float 2 and closes the gasolene inlet, falling with the float as the gasolene lowers in the chamber, and opening the inlet. In order that the float 2 may be forcibly moved downward to force a larger supply of gasolene to the mixing chamber of the carbureter for starting purposes, a rod 12 is provided, which rod may be forced down on the float against the action of a spring 13 located in a socket 14 in the part 7 of the top or cover of the float chamber. The spring 13 acts against a disk 15 on the rod 12 to force the rod back into position when the pressure thereon is removed. From the float chamber the gasolene or other hydrocarbon passes through the needle or vaporizing valve to the mixing chamber, where it is mixed with air. The construction of the needle valve may be somewhat varied. As shown, there is formed integral with the mixing chamber and the float chamber, a projection extending downward therefrom, so as to be easily accessible. This projection 16 is hollow,

forming a socket which at its inner end opens into the float chamber. This socket is interiorly threaded at 17, and has screwed therein a plug 18, in which plug is positioned the spindle 19 of the needle valve. The needle valve is adjustable, and, for adjusting it, there is formed on the spindle 19 a threaded portion 20, the threads of which co-act with the interior threads on the inner end of the plug 18, the spindle being turned by a handle 21. To prevent leakage of gasolene from the valve, there is provided in the outer end of the plug 18 a socket in which is placed packing 22, held in position by gland 23. In the wall of the mixing chamber 25 is screwed, or otherwise securely positioned, a hollow plug 24, this plug being so positioned that it is in axial alinement with the plug 18 before referred to. This plug 24 is open at one end, and is in communication with the float chamber, and opens at the other end into the mixing chamber. This plug 24 is smaller than the plug 18, and is inserted into the wall of the mixing chamber through the hollow projection 16 when the parts are assembled. The end of the plug which opens into the mixing chamber is provided with a restricted vaporizing opening 26. The needle end of spindle 19 extends into this hollow plug 24, and with the restricted opening 26 vaporizes the gasolene which passes through said opening into the mixing chamber.

The mixing chamber 25 may be of any usual or desired construction. As illustrated, the mixing chamber has converging inner walls 27, the vaporized gasolene entering preferably at the point of greater convergence of the walls and about centrally thereof. The chamber is provided with a main or regular air inlet 28, which is in direct communication with the outer air and through which the main or regular air supply is admitted to the carbureter. This inlet 28 is protected by a screen 29 for straining the air as far as possible of dust and other extraneous matter. The mixing chamber 25 is provided with a water jacket 30, this water jacket being provided so that the mixture may be kept at proper temperature, water circulating through pipes 31 and 32. The upper portion of the mixing chamber is open, forming a suction outlet through which the mixture is conducted to the engine. This suction outlet 33 leads in the construction shown to a chamber 34, from which the mixture passes to the intake pipe (not shown) of the engine. The passage of the mixture through chamber 34 to the engine may be controlled in any suitable manner, as by throttle 35, operated in any desired manner.

The supplemental or auxiliary air inlet, by which an additional supply of air may be added to the mixture when increased speed of the engine and other conditions require such additional supply, and the construction of which forms the novel and important feature of the invention, will now be described.

The particular construction and arrangement of the parts of the supplemental air inlet may be somewhat varied. In the particular construction shown, this supplemental air inlet includes a casing 36. This casing 36 has a fixed part 37'' and a part movable relatively thereto, hereinafter described. In the fixed part 37'' there is a valve chamber 37 and an inlet chamber 37' in communication with the suction outlet 33 of the mixing chamber and chamber 34 leading to the intake pipe of the engine. In the construction shown, the fixed part 37'' of the casing is circular and is provided with side walls 38 and bottom 39, from which extends a central flange 40, interiorly threaded, which is adapted to be screwed to a correspondingly threaded flange 41 formed on the upper part of the mixing chamber 25, and when so screwed on the flange 41 to remain fixed in position. The bottom 39 extends radially beyond the central flange 40, and has near its outer periphery a plurality of openings or ports 42 opening into the inlet chamber 37', these openings or ports being provided at suitable intervals around the bottom of said chamber and in communication with the outer air. In order that a wide variation in the amount of air passing through the ports 42 may be obtained, these ports are not all of equal area, the area of the ports relatively to each other, and their position in the casing, and their number, being somewhat varied. Preferably, the area of the ports and their position will be such that the areas of two adjacent ports will be different. In the construction shown in Fig. 7, there are shown twelve ports so arranged that ports such as 43, 44, directly opposite each other, are of the same area, but of different areas relatively to the other ports, this construction giving a wide variation in the amount of air which may pass through the ports. In Fig. 8 a modification of this arrangement is shown, in which each succeeding port is of different area from the next succeeding one. This arrangement also gives a wide variation in air which may be passed through the ports.

In order to eliminate springs, the valves employed for controlling the passage of air through the ports 42 are gravity valves, these gravity valves being in the form of weights 45. One of these weights 45 is provided for each one of the ports 42, and the areas of these weights 45 correspond to the areas of the ports which they are to close, the arrangement of the weights being therefore similar to that of the ports hereinbefore described. These weights 45 may be of any

suitable configuration, but are, for a purpose hereinafter referred to, all of the same height. In the particular construction shown, these weights 45 are shown as having rounded bottoms 46, so that they may fit or seat snugly in the openings or ports in the casing and have squared upper portions 47, these squared upper portions forming bearing surfaces, the function of which is hereinafter referred to.

In order to hold the valves in their seats in the ports 42, and to guide them as they are lifted by the suction of the engine, guides are provided. In the particular construction shown, the fixed part 37'' of the casing 36 is provided with an inner wall 50, this inner wall 50 being located centrally of the casing and extending downward toward the bottom thereof as shown in Fig. 1. This inner wall does not reach the bottom 39, but extends laterally to and joins the side walls, being preferably formed integrally therewith, forming a flange 51, which is provided with openings arranged concentric with the parts 42, the areas of each of the openings corresponding to the area of the port over which it is located. The weights 45 are placed in position through this opening, and when seated extend slightly above the flange 51, the sides of the openings thus forming guides for the valves. The height of the inlet chamber 37' between the bottom 39 and the flange 51 may, of course, be varied. It will be sufficient, however, to permit the desired maximum amount of air to pass through ports 42 and to the suction chamber 37' when the valves are lifted by the suction of the engine. The interior wall 50 extends somewhat above the plane of the top of the side walls 38 of the casing, and this part of the wall 51 is interiorly threaded as at 52 and adapted to receive the threaded end of pipe or casing 34' inclosing chamber 34 leading to the engine.

The adjustable means provided, by which the lift of the valves may be limited and controlled to permit varying quantities of air to pass through the ports will now be described. These means may be somewhat varied, but will include a bodily movable member adapted to contact with the valves and positively control the extent of their lift, this member being adjustable relatively to the valves, so that the lift of all the valves may be varied and controlled by it. In the particular construction illustrated, the periphery of the side walls 38 of the fixed part 37'' of casing 36 are threaded, and there is screwed thereon a flanged disk 53, which has a central opening 54, this central opening being of such dimensions that it may admit the interior walls 50 of the fixed part of the casing 36, before referred to, around the outer side of which it fits snugly. This flanged disk 53 forms the movable part of casing 36 and is rotatable relatively to the fixed part. This flanged disk is provided on its inner or lower surface or face with a circular rib or ring 55, so located on the face of the disk as to be over the valves. Preferably this rib 55 is a cam rib, the rib forming a cam surface rising from a minimum continuously to a maximum, and as shown developed in Fig. 9. The flanged disk 53 which carries this cam rib being, as before stated, rotatable relatively to the fixed part 37'' of the casing 36, in which the valves are positioned, the cam may be moved into any desired relation to the valves by rotating the disk, and the amount of air supplied through the valves may be varied as desired. As before stated, the valves are gravity valves, and are held seated and close the ports controlled by them by their own weight, and are lifted by the suction of the engine. The flanged disk carrying the cam rib may be screwed down until the maximum or high part of the cam comes into contact with one of the seated valves, the valve with which it is thus in contact being held close in its seat by the cam against the suction of the engine and no air enters through the port thus closed by this valve. The cam rib is shown in this position in Fig. 1, holding one of the valves 45 close on its seat against the suction of the engine and closing the port controlled by that valve. In this position, the cam surface is free of all of the remaining valves which may lift from their seats and admit air through the ports controlled by them. The distances the valves may lift, or the lifting movement of the valves, is varied according to the incline of the cam. The ports are so arranged and proportioned that when the disk is screwed down as shown in Fig. 1, that is, until the high part of the cam holds one of the valves in its seat, the minimum amount of air is being admitted through the remaining ports. Now, if the disk 53, carrying the cam rib, be rotated to lift the maximum or high part of the cam so that it is clear of all the valves, the valve previously closed is allowed to lift from its seat, the distance it can so lift, or this lifting movement, being according to the distance the cam surface has been moved away from it. The lifting movement of all the other valves has at the same time been altered, and owing to the inclined surface of the cam, each valve has been given a different lifting movement relatively to the remaining valves, so that a different amount of air is now admitted through the ports. By further rotating the disk, a still different amount of air can be admitted through the ports, and so on. Thus the ports can be adjusted to admit any desired amount of air from the minimum up to any desired maximum, and the amount required, once determined, is maintained constantly, since the

lifting movement of the valves is limited by a position stop,—the cam rib,—and does not depend on springs and the like, which weaken, or vary in strength, and render an adjustment uncertain or unreliable. By the use of the cam rib the lifting movement of all the valves is varied at the same time. And further, the lifting movement of each valve relatively to the others is different. This results in a very much finer and more varied adjustment being possible than if the lifting movement of all the valves was the same. To hold the disk in proper position after adjustment, a locking device is employed for securely locking it in such position. This locking device in the particular construction shown comprises a locking ring 56, this locking ring being provided with threads which engage with threads on the upper part of the wall 50 of the casing.

With the construction as hereinbefore described, it is obvious that the supplemental supply of air may be varied within any limits, and that by the elimination of springs, diaphragms and the like, a construction is obtained by which a positive control of such air is obtained, and a construction in which the parts are not liable to get out of order or be easily damaged.

What is claimed is:—

1. In a carbureter, the combination with a mixing chamber having a regular air inlet and suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet having ports of different area in communication with the outer air, valves closing said ports and arranged to be lifted by the suction of the engine, and an adjustable bodily movable member common to said valves for positively controlling their lifting movement whereby the quantity of air passing through the ports may be varied.

2. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet having ports in communication with the outer air, valves closing said ports and arranged to be lifted by the suction of the engine, and a bodily movable member common to said valves for positively controlling their lifting movement, said member being adjustable, whereby the quantity of air passing through the ports may be varied.

3. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet having ports in communication with the outer air, valves closing said ports and arranged to be lifted by the suction of the engine, and a bodily movable member adapted to contact with one of said valves to hold it in its seat and clear of the remaining valves for limiting the lift of the remaining valves, said member being adjustable, whereby the quantity of air passing through the valves may be varied.

4. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing having a fixed portion and a portion movable relatively thereto, ports in said fixed portion in communication with the outer air, valves seated in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, and a cam surface on the movable portion arranged to contact with the valves to limit their lift, whereby the quantity of air passing through the ports may be varied.

5. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a circular casing having a fixed portion and a portion rotatable relatively thereto, ports in said fixed portion in communication with the outer air, valves seated in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, and a cam surface on the rotatable portion arranged to contact with said valves to limit their lift, whereby the quantity of air passing through the ports may be varied.

6. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing having a fixed portion and a movable portion, ports in said fixed portion in communication with the outer air, valves having seats in the fixed portion closing said ports and arranged to be lifted by the suction of the engine, and a rib on the movable portion having a cam surface arranged to contact with the said valves to limit their lift, whereby the quantity of air passing through the ports may be varied.

7. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a circular casing having a fixed portion and a portion movable relatively thereto, ports in said fixed portion in communication with the outer air, valves having their seats in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, and a circular rib on the rotatable portion having a cam surface arranged to contact with said valves to limit

their lift whereby the quantity of air passing through the ports may be varied.

8. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing having a fixed portion and a portion movable relatively thereto, ports in said fixed portion in communication with the outer air, valves having their seats in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, a member on the movable portion common to the valves for limiting the lift of said valves, said member being adjustable, whereby the quantity of air passing through the ports may be varied, and a locking device for locking the adjustable means in position when they have been adjusted.

9. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing having a fixed portion and a portion movable relatively thereto, ports in said fixed portion in communication with the outer air, valves having their seats in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, a cam surface on the movable portion arranged to contact with said valves to limit their lift, whereby the quantity of air passing through the ports may be varied, and a locking device for locking the cam surface when it has been moved to the desired position.

10. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing having a fixed portion and a portion movable relatively thereto, ports in said fixed portion in communication with the outer air, gravity valves of different areas but of equal heights having their seats in said fixed portion closing said ports and arranged to be lifted by the suction of the engine, and a cam surface on the movable portion arranged to contact with said gravity valves to limit their lift, whereby the quantity of air passing through the ports may be varied.

11. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a circular casing having a fixed portion and a portion rotatable relatively thereto, ports in said fixed portion in communication with the outer air, gravity valves of different areas but of equal height closing said ports and arranged to be lifted by the suction of the engine, and a circular rib on said rotatable portion arranged to contact with said valves to limit their lift, whereby the quantity of air passing through the ports may be varied.

12. In a carbureter, the combination with a mixing chamber having a regular air inlet and a suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet including a casing comprising a valve chamber and an inlet chamber, ports in said inlet chamber in communication with the outer air, valves in said valve chamber for closing said ports and arranged to be lifted by the suction of the engine, and a cam surface movable relatively to the valves for limiting their lift, whereby the quantity of air passing through the ports may be varied.

13. The combination with a carbureter, of a plurality of suction operated valves for supplying auxiliary air and an adjustable member having an inclined surface common to the valves for positively controlling their lifting movement.

14. The combination with a carbureter, of a plurality of suction operated valves for supplying auxiliary air, a casing having ports closed by the valves, and a rotary member having a cam surface common to the valves for positively controlling their lifting movement.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

ALBERT KUGLER

Witnesses:
MARCEL TUCCI,
W. S. THOMPSON.