W. OTTAWAY.

CARBURETER.

APPLICATION FILED SEPT. 29, 1906.

959,066.

Patented May 24, 1910.

4 SHEETS—SHEET 1.

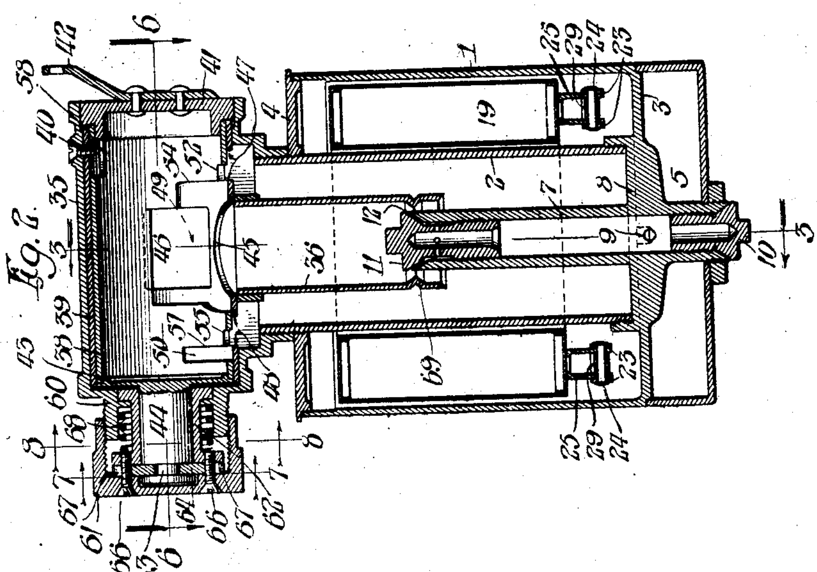


Fig. 2.

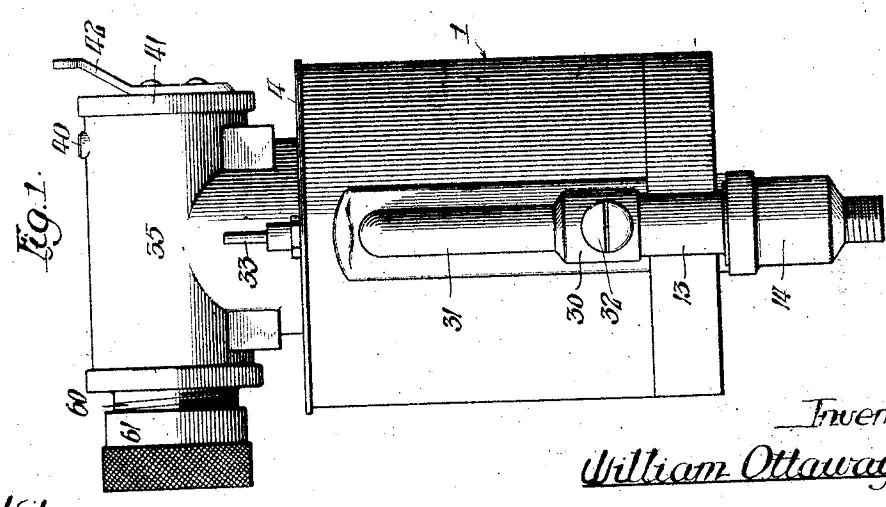


Fig. 1.

Witnesses:

P. H. Alfreds

W. L. Hall

Inventor:

William Ottaway

by Poole & Brown

his Attys.

W. OTTAWAY.

CARBURETER.

APPLICATION FILED SEPT. 29, 1906.

959,066. **Patented May 24, 1910.**

4 SHEETS—SHEET 2.

Fig. 3.

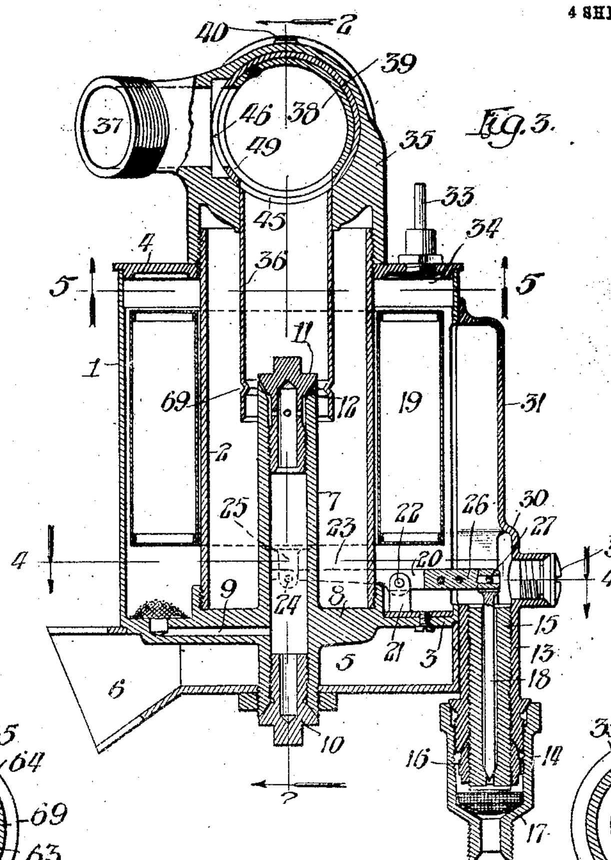


Fig. 7.

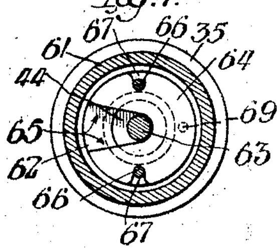


Fig. 8.

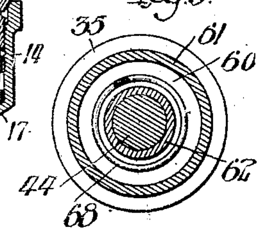
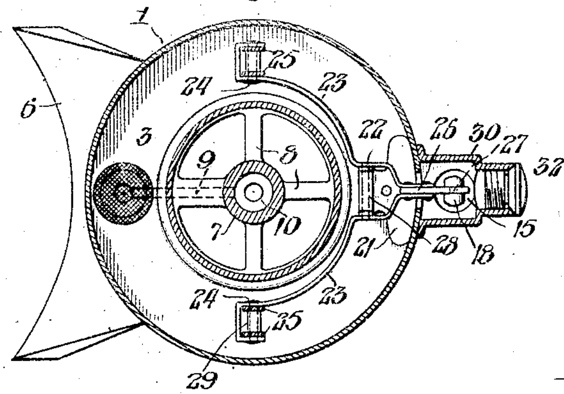


Fig. 4.



Witnesses:

F. H. Alfreds

W. L. Hall

Inventor:

William Ottaway.

by Poole & Brown

his Attys.

W. OTTAWAY.

CARBURETER.

APPLICATION FILED SEPT. 29, 1906.

959,066. Patented May 24, 1910.

4 SHEETS—SHEET 3.

Fig. 5.

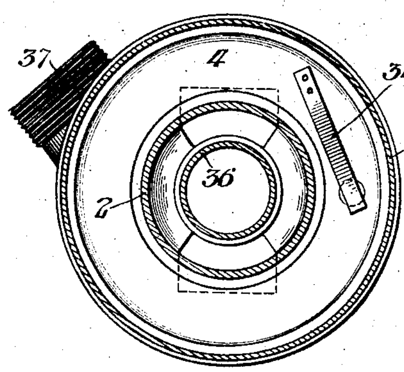


Fig. 6.

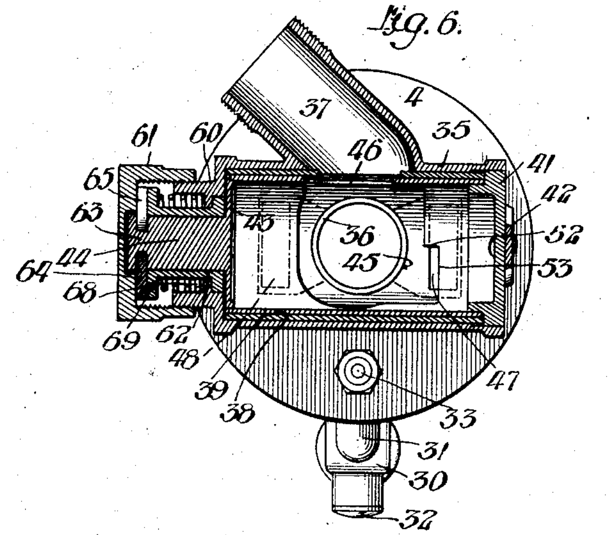
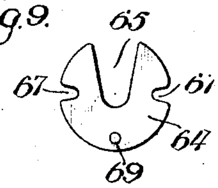


Fig. 9.



Witnesses:

F. H. Alfreds

W. L. Hall.

Inventor

William Ottaway

by Poole & Brown

his Attys.

W. OTTAWAY.

CARBURETER.

APPLICATION FILED SEPT. 29, 1906.

959,066. Patented May 24, 1910.

4 SHEETS—SHEET 4.

Fig. 10.

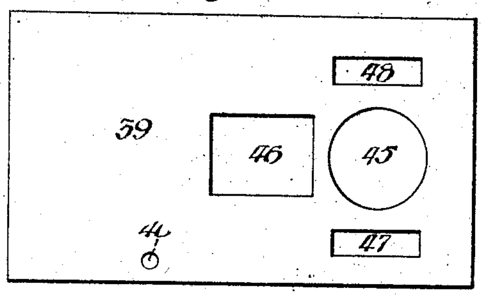


Fig. 11.

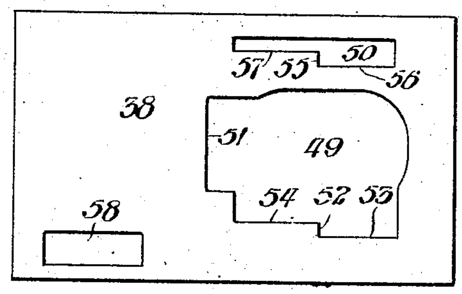


Fig. 12.

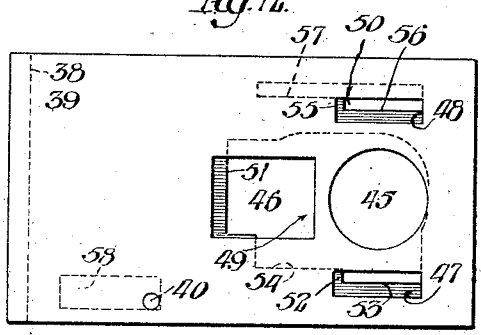


Fig. 13.

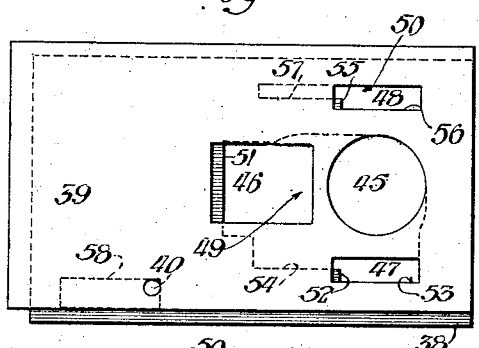


Fig. 14.

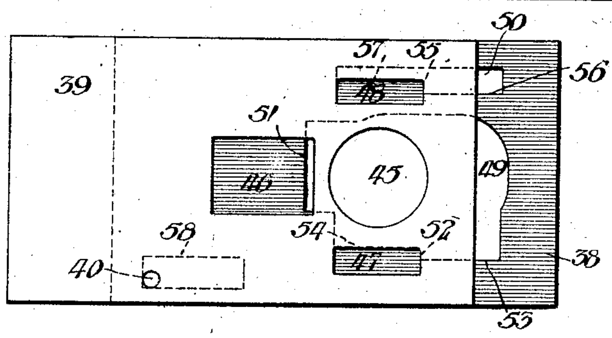
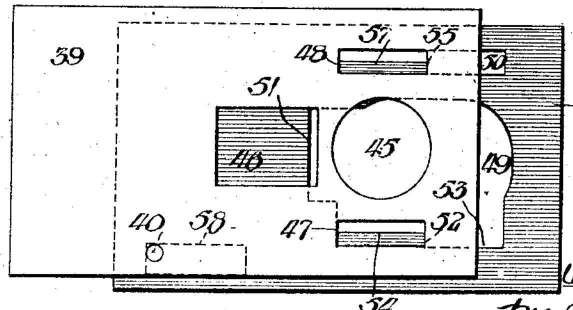


Fig. 15.



Witnesses:

G. A. Alfred [signature]

W. L. Hall

Inventor

William Ottaway

by Poole & Brown

his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM OTTAWAY, OF AURORA, ILLINOIS, ASSIGNOR TO AURORA AUTOMATIC MACHINERY COMPANY, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

CARBURETER.

959,066. Specification of Letters Patent. Patented May 24, 1910.

Application filed September 29, 1906. Serial No. 336,685.

To all whom it may concern:

Be it known that I, WILLIAM OTTAWAY, a citizen of the United States, of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Carbureters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in carbureters such as are employed in connection with internal combustion motors, and more especially to means for regulating or controlling the proportion of air and vapor in the explosive mixture produced in the operation of the carbureter.

The invention consists in the matters hereinafter described and set forth in the appended claims.

In the accompanying drawings which form part of this specification,—Figure 1 is a view in side elevation of a carbureter embodying my invention. Fig. 2 is a view in central, vertical section thereof, taken on line 2—2 of Fig. 3. Fig. 3 is a view in central vertical section thereof, taken on line 3—3 of Fig. 2. Fig. 4 is a plan section, taken upon line 4—4 of Fig. 3. Fig. 5 is a sectional view looking upwardly, taken on line 5—5 of Fig. 3. Fig. 6 is a plan section, taken upon line 6—6 of Fig. 2. Fig. 7 is a detail section, taken upon line 7—7 of Fig. 2. Fig. 8 is a detail section, taken upon line 8—8 of Fig. 2. Fig. 9 is a face view of a disk shown in Figs. 2, 6 and 7. Fig. 10 is a view of the valve bushing as developed upon a plane surface. Fig. 11 is a view of the rotative cylindric valve member likewise developed on a plane surface. Figs. 12, 13, 14 and 15 are like views of the said bushing and cylindric valve member in superposed relation, showing different relative positions of said parts.

As shown in the said drawings, 1 indicates the outer cylindric wall and 2 the inner cylindric wall of an annular chamber or reservoir for the liquid hydro-carbon. The said inner wall 2 consists of an upright tube or cylinder arranged centrally within the outer wall 1, which latter is provided with an inwardly extending annular flange 3, which forms the bottom wall of the reservoir and to which the bottom of the cylinder 2 is connected by a screw-joint. The top of the cylinder 2 extends above the top of the reservoir, which latter is provided with an annular top wall or cover 4. The cylinder 2 opens at its bottom into a horizontally disposed air chamber 5 which is located below the reservoir and which has at one side a flaring mouth-piece 6 forming the air inlet opening of the carbureter and the upper and lower walls of which are made of concave form at their edges to fit the outer surface of the power cylinder of the motor, to which the carbureter is usually attached. Such air inlet opening formed by the mouth-piece is located closely adjacent to the wall of the motor cylinder so that the air drawn into the carbureter may be heated by contact with said cylinder. Centrally of the lower part of the cylinder 2 is located a hollow upright post or feed tube 7 which is supported at its lower end from the bottom wall 3 of the reservoir by means of radial arms 8 (Fig. 4). The outer cylindric wall 1, and the bottom wall 3 of the reservoir, together with the feed tube 7 and its supporting arm 8, are preferably cast in one piece or integral with each other.

The interior of the feed tube 7 is connected at its lower part by means of a radial passage 9, passing through one of the arms 8, with a hole in the bottom of the reservoir, said passage 9 with the feed tube forming a conduit by which the liquid is conducted from the reservoir to exit openings at the top of said feed tube where the liquid is discharged and vaporized. Said feed tube 7 is shown as extended at its lower end downwardly through the bottom wall of the air chamber 5 and as provided at its lower end with a screw-plug 10 which closes the bottom of the said feed tube and may be removed for cleaning the interior thereof. Said feed tube 7 is provided at its upper end with a screw-plug 11 having a conical head which fits a conical seat in the upper end of the feed tube 7. In the outer face of said conical head are provided a plurality of small grooves forming passages 12 through which the liquid is discharged. Said plug 11 is shown as having screw-threaded engagement at its lower part with the interior of the post and as provided with a bore or passage extending upwardly from its lower end and communicating by radial holes with an annular space formed between the upper part of the plug and the surrounding feed tube.

The details of construction in the upper part of the feed tube 7 and plug 11, above referred to, are not in themselves novel, having been heretofore employed in carbureters.

At one side of the reservoir is located a vertical tube 13 which opens at its upper end into the reservoir and depends from the bottom wall thereof. With the lower end of said tube 13 is connected, by a screw-threaded connection, a coupling member 14 the lower end of which is centrally apertured and adapted for attachment of a supply pipe through which the liquid is supplied to the carbureter. Within said tube 13 is located a hollow or tubular plug 15 having near its lower end an internal, upwardly facing, conical valve seat. Said plug 15 has screw-threaded engagement with the interior of the tube 13 and is thereby made adjustable vertically in said tube. On the lower end of said plug 15, below the tube 13, is located a nut or screw-collar 16 having a conical upper end adapted to enter a conical seat formed in the lower end of the plug 15. Said screw-collar is provided with flat faces for the application of a wrench and constitutes a jam-nut which, when screwed upwardly on the plug into contact with the lower end of the said tube 13, serves to hold or lock the plug from turning in the tube. The tubular coupling member 14 is made of sufficient size or diameter at its upper part to receive the lower end of said plug and the sleeve thereon. The inlet opening at the bottom of the coupling member is shown as provided with a wire screen 17 of fine mesh to constitute a strainer to prevent the passage from the supply pipe to the reservoir of particles of dirt or the like.

Within the screw-plug 15 is located a valve stem 18 having a conical lower end which forms with the valve seat within the plug 15 a valve by which the admission of liquid to the reservoir is controlled. The valve stem 18 is flattened at its sides or fluted longitudinally to permit the passage of liquid between the same and the surrounding wall of the plug.

Within the annular reservoir is located a hollow, cylindric float 19 having free vertical movement therein. In the lower part of the reservoir is located a lever 20 which is pivotally connected by means of a horizontal pivot pin 22 with a bracket 21 which is attached to and rises from the bottom wall of the reservoir. Said lever 20 is provided with two curved arms 23, 23 that extend at opposite sides of the cylinder 2 and are pivotally connected by means of transverse horizontal pivots 24, 24, Fig. 4, with depending arms or brackets 25 on the bottom of the float 19. At a point outside of the pivot 22, the said arms 23, 23 of the lever 20 are secured to a single horizontal arm 26, the outer end of which is connected with the upper end of the valve stem 18 by means of a horizontally arranged, longitudinal slot in the end of said arm 26, which is engaged by a pivot pin 27 passing through the forked upper end of the said valve stem. The bracket 21 is provided with a horizontal base-plate which is secured to the bottom wall of the reservoir by means of a screw inserted through said bottom wall, as clearly seen in Fig. 3. Said bracket 21 consists of two arms formed on or bent upwardly from the base-plate, and which are connected by a horizontal tube 28, through which the pivot 22 passes; the ends of said pivot being secured in the parts of the arms 23, 23 which are located at opposite sides of the said bracket. The bracket 21 thus formed by the base-plate, the two upright arms thereon and the tube 28 connecting said arms, afford a laterally extended bearing for the pivot 22, of considerable length, adapted to hold the lever 20 from tipping or tilting sidewise, and forming a pivotal support for the lever of durable character. Each of the brackets 25, 25 on the float also consists of a base-plate which is attached to the float and has two depending parallel arms laterally separated from each other and connected by a horizontal tube 29 (Fig. 2). The pivot pin 24 passes through said tube 29 and is secured at its ends in parts of the arm 23, which latter is bent at its end into U-form so as to extend at the inner side of the bracket 25, and then outwardly around said bracket, with its outer end bent back into a position parallel with the main part of the arm and outside of the bracket, as clearly seen in Fig. 4. The arm 23 is thus arranged to embrace the bracket; the pivot pin 24 being secured in the parts of the arm which extend inside and outside of the bracket at the ends of the tube 29.

The outer wall 1 of the reservoir is provided, above the tube 13, with a lateral chamber 30 which communicates with the body of the reservoir by a slot in the cylindric outer wall of the latter and is adapted to receive the upper end of the valve stem 18 and the adjacent end of the lever 20. Said chamber 30 is extended upwardly, in the form of a semi-cylindric wall 31, to a point near the top of the reservoir, the said side wall of which is provided with a slot between the side edges of the wall 31, so that the latter affords a vertical groove or channel extending upwardly from the inlet passage outside of the float 19. The chamber 30 is provided with an opening opposite the end of the lever 20, which opening is closed by a screw-plug 32, by the removal of which access may be had to the joint between the upper end of the valve stem and said lever.

The normal level of the liquid in the reservoir is approximately at the discharge passages of the feed tube 7. The float 19 is so arranged that when the liquid in the reservoir falls below the normal level, the weight of the float, acting on the lever 20, lifts the valve stem 18 and opens the admission valve for the entrance of an additional supply of liquid. As soon as the level of the liquid reaches the desired height, the upward pull of the float on the lever 20 effects the closing of the valve through downward movement of the valve stem 18.

Located in the top wall 4 of the reservoir is a vertically sliding pin 33, the lower end of which rests on one end of a leaf spring 34, (Fig. 5) which is attached at its opposite end to said top wall and holds the pin normally elevated. By pressing down on the upper end of said pin, the lower end thereof will force downwardly the free end of the spring 34, which, by acting on the top of the float, will depress the latter. The float and connected parts may thus be moved to ascertain if they be in working condition, or for admitting an additional supply of liquid to the reservoir when desired for starting the motor or at other times.

35 indicates a valve casing which is attached to the top of the reservoir preferably by connection with the end of the inner tube 2 which projects above the top wall 4 of said reservoir. The upper part of said valve casing has the form of a horizontally arranged cylinder, while its lower part consists of an upright cylindric part or neck which surrounds and has screw-threaded engagement with the upper end of the cylinder 2. Attached to the said valve casing 35 and projecting downwardly therefrom, concentrically within the cylinder 2, is a cylindric tube 36. The lower end of said tube 36 surrounds the upper end of the feed tube 7; thereby forming an annular space or passage between the lower end of said tube 36 and the top of the said feed tube, through which air is drawn upwardly from the interior of the cylinder 2 into the tube 36, which latter forms the vaporizing or mixing space or chamber of the carbureter. Vaporization of the hydro-carbon discharged from the passages 12, 12 at the top of the feed tube takes place by reason of the air being drawn upwardly through said annular space around the top of the feed tube and past the discharge openings 12, 12 thereof. Said tube 36 is provided, at a point below the discharge passages 12, with an inwardly projecting annular rib 69 preferably formed by depressing the metal of the said tube from the exterior thereof. Such annular rib serves to throw or deflect the air which rises between the tube 36 and feed tube 7 inwardly against the upper part of the said feed tube at which the openings of said discharge passages are located, with the effect of producing better or more rapid vaporization of the liquid hydro-carbon as it issues from said discharge passages.

At one side of the valve casing 35 the latter is provided with a laterally extending pipe 37 which is connected with the inlet port of the motor cylinder and communicates with the interior of the valve casing. Within the valve casing is a horizontally arranged cylindric valve member 38 having ports which coöperate with ports in the valve casing to control the quantity of the explosive mixture drawn from the carbureter to the motor cylinder and also to control or regulate the admission of an auxiliary air supply for varying the proportions of air and vapor in the mixture. The said valve-member 38 has turning or rotative movement in the casing for the purpose of controlling the passage of the mixture from the valve casing to the pipe 37 and for varying the auxiliary air supply to correspond with the quantity of the mixture delivered to the motor, and said valve member also has endwise adjustable movement in the said casing for the purpose of varying the auxiliary air supply to give a greater or less proportion of vapor in the mixture. The ports in the valve casing, as shown in the accompanying drawings, are not formed in the valve casing itself, but in a cylindric bushing 39 which is fitted and secured immovably in the upper or cylindric part of said casing, such separate bushing being employed for convenience in making or forming the ports and in order to enable repairs to be easily made in case of the parts becoming worn. As shown in the drawings, the cylindric bushing 39 is shown as held in place within the valve casing by means of a screw-stud 40 (Fig. 2) inserted through the casing and the bushing. Said stud 40 is shown as also adapted to form a stop to limit the movement of the valve member 38, the stud for this purpose being extended inside of the surface of the bushing into a slot 58 formed in the valve member. To permit both rotating or oscillatory and endwise sliding movement of the valve member 38 in the valve casing, the said slot 58 is extended both lengthwise and circumferentially of the valve member, or in other words, is made of a length and width required for giving the maximum endwise and oscillatory movement in said valve member. The said valve member 38 is closed at one end by a head 41 which is rigidly attached thereto and fits at its margin within a cylindric seat formed in the end of the valve casing. Said head 41 is provided with a rigidly attached operating arm 42 through which rotative movement is given to the valve. At its opposite end the valve member 38 is closed by a rigidly attached disk or head 43, provided with a central, outwardly extending stem 44 through the medium of which endwise movement is given to the said valve member.

The valve bushing 39, as more clearly seen in Fig. 10, in which the said bushing is developed on a plane surface, is provided with four ports or openings, to-wit, a circular port 45 communicating with the interior of the tube 36, as clearly seen in Fig. 2, a port 46 preferably of rectangular form, which communicates with the exit pipe 37, as clearly seen in Fig. 6, and two ports 47 and 48 arranged in endwise alinement with the port 45 and which communicate with the upper end of the annular space between the cylinder 2 and the tube 36, as clearly seen in Fig. 2. The mixture of air and vapor produced in the tube 36 by the vaporization of the liquid issuing from the feed pipe, is drawn into the valve chamber through the port 45, which is always open. The ports 47 and 48 constitute the auxiliary air supply ports; air from the interior of the cylinder 2 being drawn through the same and being intermingled in the valve casing with the mixture drawn from the tube 36.

The cylindric valve member 38 is provided with two ports 49 and 50. The port 49 coöperates with the port 46 and is made of such length circumferentially as to always leave uncovered or open the port 45. Said port 49 is extended laterally or endwise of the valve member so as to also coöperate with the air supply port 47. The port 50 is arranged to coöperate with the air supply port 48. The margin 51 of the port 49 is adapted to overlap to a greater or less extent the port 46, when the valve member is turned, to afford a larger or smaller opening or area for the passage of the explosive mixture from the curbureter to the engine. This action of the valve is not affected by the endwise adjustment of the valve member 38; the end of the port 49 adjacent to the said margin 51 being made so much wider than the port 46 as to enable the valve member to be shifted endwise to the maximum extent of its adjustment without narrowing the opening of said port 46. The lateral extension of the port 49 which coöperates with the port 47 has its side margin stepped or offset to form a transverse edge 52 parallel with the margin 51 and equal in length to the extent of the endwise adjusting movement of the valve member. Said port 49 has two longitudinal or circumferentially extending margins 53 and 54 located at opposite sides of the transverse edge 52, and so disposed laterally that the margin 53 coincides with the outer margin of the port 47 in one extreme adjusted position of the valve member, while the margin 54 coincides with the inner edge of said port 47 at the opposite extreme adjusted position of said valve member. The port 50 is narrower at one end than the other, being provided at its side corresponding with the stepped side of the port 49 with an intermediate transverse edge or shoulder 55, in line with the shoulder 52, and longitudinal margins 56 and 57 corresponding with the margins 53 and 54 of the port 49. The margin 56 is adapted to coincide with the inner margin of the port 48 when the valve member is at the extreme limit of its endwise adjustment in one direction, while the margin 57 is adapted to coincide with the outer margin of the said port 48 when the valve member is at the extreme limit of its endwise adjustment in the opposite direction. The stepped margins 52, 53 and 54 of the port 49 may constitute one side of a third port, separate from the port 49, and corresponding in shape with the port 50; the construction illustrated, by which the central port 49 is combined with one of the lateral or auxiliary air ports, being used merely for compactness and convenience of construction. In the turning of the valve to vary the effective opening of the port 46, and thereby regulate the quantity of explosive mixture passing to the motor, it opens or closes to a corresponding extent the auxiliary air supply ports 47 and 48, so that the same proportions of vapor and air are maintained in the mixture in all positions to which the valve may be turned. Endwise adjustment of the valve member, by the shifting of the margins 53 and 54 of the port 49 relatively to the port 47, and by the like shifting of the margins 56 and 57 of the port 50 with respect to the port 48, operates to give greater or less auxiliary air supply through said ports 47 and 48, to vary the proportions of air and vapor in the mixture.

Figs. 12 and 13 show the valve member and the bushing in superposed relation in both cases with the valve member turned to its nearly open position; Fig. 12 shows the valve member adjusted to one limit of its endwise movement to give maximum auxiliary air supply, and Fig. 13 shows the valve adjusted to the opposite limit of its endwise movement to give maximum auxiliary air supply. Fig. 14 shows the valve member when turned to its closed position and adjusted endwise to give minimum air supply, and Fig. 15 shows the valve member adjusted to give maximum auxiliary air supply and in its closed position. As will be readily seen from Figs. 12 and 14, when the valve member is adjusted endwise to give minimum auxiliary air supply, the transverse edges 52 and 55 of the ports 49 and 50 will, as the valve member is turned, overlap to a greater or less extent the ports 48 and 47, thereby increasing or decreasing the effective areas of said ports 47 and 48, and increasing or decreasing the auxiliary air supply to correspond with the degree of opening of the main or exit port 46. The same operation takes place when the valve member is shifted or adjusted to the position giving maximum auxiliary air supply, as seen in Figs. 13 and 15. In this case, when the port 46 is open, or nearly open, the ports 47 and 48 will also be nearly open, as seen in Fig. 13, and when said port 46 is closed, or nearly closed, the effective areas of the auxiliary ports will be such as to give the maximum proportionate air supply required for such nearly closed position, as seen in Fig. 15. In intermediate adjusted position of the valve member 38, the effective areas of the auxiliary air supply ports 47 and 48, at intermediate points in the turning movement or throw of the valve member, will be determined by the lateral relation of the margins 54 and 57 to the opposite edges of the said ports 47 and 48; the advance or return movement of the margins 52 and 55 along or over said ports 47 and 48 having the effect of increasing or decreasing the effective areas thereof to correspond with the increase or decrease of the effective area or opening of the main port 46. When the valve member is adjusted endwise to the position shown in Fig. 12, giving minimum air admission, the turning of the valve from the fully open to the closed position of the outlet port, will have the effect of reducing the air admission ports from an intermediate effective area to complete closure, and when said valve member is adjusted to its position shown in Fig. 13, like turning movement of the valve will reduce the air admission ports from maximum effective area to an intermediate effective area, leaving them partially open when the outlet port is fully closed. Moreover, when the valve is adjusted endwise to the position giving maximum air-supply, or to a position giving intermediate air-supply, a portion of the area of each air-supply port will be constantly open or unaffected by the movement of the margin of the valve member over the said air port, and the amount of air-port area affected by the turning movement of the valve will be different in its different positions of endwise adjustment. It follows that, while the rate of enlargement and contraction of each air supply port will be uniform for any one position of endwise adjustment, yet such endwise adjustment will increase and decrease the total effective air-port area uniformly, or will affect the air-port area to an equal extent, in all positions of rotative adjustment of the valve. In other words, rotative adjustment of the valve to give increased air-supply will afford uniform increase for all positions of such rotative adjustment, while endwise adjustment to give greater air supply will afford equal increase of air-supply in all positions of rotative adjustment, from the fully opened to fully closed condition of the outlet port.

Now referring to the means illustrated for effecting endwise adjustment of the valve member 38, devices for this purpose are provided as follows; the same being more clearly shown in Figs. 2, 3, 6, 7, 8 and 9. The end of the valve casing 35 adjacent to the head 43 is provided with a neck or cylindric extension 60 which is externally screw-threaded to receive a screw-threaded cap 61. Within the neck 60 and cap 61 is located a cylindric sleeve 62 which surrounds the stem 44 on said head 43, and within which said stem is adapted to freely turn when the valve member 38 is turned in the valve casing. Said sleeve 62 is connected with the cap 61 so as to rotate and move endwise therewith and is held from endwise movement relatively to the stem by a connection affording free rotative movement of the sleeve relatively to said stem. The said sleeve 62, at its inner end, slides in a central opening in the casing head and has an outwardly extending annular flange which, by its contact with an annular seat on the casing head, limits the outward endwise movement of said sleeve. Said sleeve 62 is also provided at its outer end with an outwardly extending annular flange. The outer end of the stem 44 projects beyond the outer end of the sleeve 62 and is provided with an annular groove 63 which is adapted to be engaged by a plate or disk 64 (Fig. 9) having a radial notch or slot adapted to receive the reduced part of the stem 44 formed by the said groove 63. The cap is attached to the sleeve by means of screws 66, 66 inserted through the said cap and passing through notches 67, 67 formed in the opposite sides of the disk 64 and into the flange at the outer end of said sleeve. Said disk is, by the said screws 66, 66, firmly held or clamped between the outer end of the sleeve 62 and the inner face of the cap 61. Between the reduced central part of the sleeve 62 and the parts of the neck 60 and cap 61 surrounding the same, is located an expansively acting coiled spring 68 that is held in compression between the inwardly facing shoulder on the sleeve formed by the flange at the outer end thereof, and an outwardly facing shoulder formed within the neck 60. Said spring 68 is thus arranged so as to exert constant outward pressure on the sleeve 62 and the cap 61, to which said sleeve is attached, tending to force the said cap outwardly and thereby produce frictional resistance to the turning of the cap on the casing. The cap will, therefore, always remain in its adjusted position and will not partake of the turning movement of the valve member 38 and its stem 44, which is engaged with said cap through the medium of the disk 64. Said disk 64, provided with the notch 65, may be readily engaged with and disengaged from the end of the stem 44 in assembling and disconnecting the parts. In assembling the parts, said disk is slipped laterally into engagement with the stem after the latter has been inserted through the sleeve 62, and the cap 61 is then applied to the neck 60, and the screws 66, 66 inserted through the parts. The plate 64 is preferably provided with a stud 69 adapted to enter a hole in the flanged outer end of the sleeve 62 so as to hold the notches of the said disk in register with the screw-holes in the sleeve, to facilitate the insertion of the said screws 66, 66.

Endwise movement of the valve member 38 is effected by the turning of the screw cap 61 on the screw-threaded neck 60, inward and outward movement of said cap being transmitted to the valve stem through the medium of the disk 64, which is secured to the cap by being clamped between the same and the outer end of the sleeve 62, and which is engaged with the groove in the outer end of said stem 44 in the manner hereinbefore described. The spring 68, exerting constant outward pressure on the cap, not only serves to prevent the cap from turning with the valve member 38, but also from being accidentally turned or shifted by the jarring of the parts in the operation of the motor to which the carbureter is attached.

It will be observed, from the construction described, that the main feature of my invention, so far as the feature of air regulation or control is concerned, is a throttle or controlling valve having turning or rotative movement for effecting regulation to give greater or less supply of explosive mixture to the motor, and corresponding variation in the auxiliary air supply to the carbureter, which valve has adjustment in the direction of its axis of rotation for the purpose of varying the proportion of the auxiliary air supply admitted to the carbureter.

The features of construction hereinbefore described and shown in the drawings in connection with means for regulating or controlling the supply of liquid hydrocarbon to the space or chamber of the apparatus in which the liquid is vaporized constitutes the subject of a separate application for Letters Patent, filed by me on the 10th day of May 1907, Serial Number 372,846.

I claim as my invention:—

1. In a carbureter, a valve embracing a valve casing provided with an outlet port and an air supply port, and a hollow cylindric valve member in said casing adapted to turn therein for simultaneously increasing and decreasing the effective areas of said outlet and air supply ports and having endwise adjustment therein for varying the effective area of the air supply port without changing that of said outlet port; the part of said cylindric valve member which cooperates with the admission port being provided with circumferentially and axially extending working margins, so arranged as to increase and decrease the area of said airport, in the rotative adjustment of the valve member, to correspond with the increase and decrease of the outlet port, and acting by the endwise adjustment of said valve member, to afford an increased or decreased effective area in said air-port, in all positions of rotative adjustment of said valve member.

2. In a carbureter, a valve comprising a valve casing having an outlet port and an auxiliary air supply port, and a hollow cylinder valve member in said casing adapted to turn therein for simultaneously varying the effective areas of said outlet and air supply ports, and having endwise adjustment in said valve casing for varying the effective area of said air supply port without changing the effective area of the said outlet port; the port of said valve member which cooperates with the admission port having a plurality of circumferentially extending working margins located at a distance apart in a direction endwise of the valve member and acting to give either an intermediate or minimum effective area to the auxiliary air supply port when the outlet port has minimum effective area and to give either an intermediate or maximum effective area to the auxiliary air supply port when the outlet port has maximum effective area.

3. In a carbureter, a valve embracing a valve casing provided with an outlet port and with an auxiliary air supply port and a cylindric valve member in said casing apertured to co-act with said ports, and having its part which coacts with the said auxiliary air supply port stepped or offset at its margin to form two working margins extending in a direction circumferentially of the cylindric valve member and located at a distance apart in a direction endwise of said valve member, said valve member having turning movement in the valve casing to simultaneously open and close said ports, and endwise adjustment in said valve casing for shifting or moving said stepped or offset marginal part relatively to the auxiliary air supply port, and to thereby vary the effective area of said port.

4. In a carbureter, an upright tube constituting a carbureting chamber, a valve casing provided with a port connecting the interior of said casing with the top of said tube, with an outlet port and with an auxiliary air supply port opening to a space outside of said tube, and a rotative cylindric valve member in the said casing having its axis of rotation transverse to the central axis of said upright tube and adapted to turn in said casing for simultaneously increasing

and decreasing the effective areas of said outlet port and auxiliary air supply port, said valve member having endwise adjustment in said valve casing for varying the effective area of the auxiliary air supply port, without changing that of said outlet port; the part of said cylindric valve member which coöperates with the admission port being provided with circumferentially and axially extending working margins, so arranged as to increase and decrease the area of said air-port, in the rotative adjustment of the valve member, to correspond with the increase and decrease of the outlet port, and acting by the endwise adjustment of said valve member, to afford an increased or decreased effective area in said air-port, in all positions of rotative adjustment of said valve member.

5. A carbureter comprising an upright cylinder open at its bottom, an upright feed tube in the lower part of said cylinder, a tube constituting a carbureting chamber located in the upper part of said cylinder, open at its lower end and surrounding said feed tube at its said lower end, a valve casing to which said cylinder and the tube are attached at their upper ends, said valve casing being provided with an outlet port, with an inlet port communicating with the interior of said tube at its upper end, and with an auxiliary air supply port communicating with the upper end of the space between the said cylinder and tube, and a cylindric valve member in said casing adapted to turn therein for simultaneously opening and closing said outlet port and said auxiliary air supply port and having endwise adjustment therein for varying the effective area of the auxiliary air supply port.

6. In a carbureter, an upright cylinder open at its bottom, a tube constituting a carbureting chamber located at the upper part of said cylinder, a valve casing to which the cylinder and tube are attached, said valve casing being of cylindric form and arranged with its longitudinal axis transverse to the said cylinder and tube and provided with an inlet port communicating with said tube, with an outlet port and with an auxiliary air supply port communicating with the space between the upper end of said cylinder and tube, and a cylindric valve member in said casing adapted to turn therein to simultaneously vary the effective areas of the outlet port and said auxiliary air supply port and having endwise adjustment therein for varying the effective area of the auxiliary air supply port.

7. In a carbureter, a valve embracing a valve casing provided with an outlet port and with an auxiliary air supply port, a cylindric valve member in said casing adapted to turn therein for simultaneously increasing and decreasing the effective areas of said ports and having endwise adjustment therein for varying the effective area of the auxiliary air supply port, and means for giving endwise adjustment of said valve member in the casing embracing a rotative and endwise movable part mounted on the exterior of the said casing, and means connecting said rotative part with the valve member permitting relative rotation of said rotative member and the valve member.

8. In a carbureter, a valve embracing a valve casing, provided with an outlet port and with an auxiliary air supply port, a cylindric valve member in said casing adapted to turn therein for simultaneously opening and closing said ports and having endwise adjustment therein for the purpose of varying the effective area of the auxiliary air supply port, a rotative cap for accomplishing said endwise adjustment of the valve member, said cap having screw-threaded engagement with said casing and being connected with the valve member by means permitting relative rotation of the valve member and cap.

9. In a carbureter, a valve embracing a valve casing provided with an outlet port and with an auxiliary air supply port, a cylindric valve member in said casing adapted to turn therein for simultaneously opening and closing said ports and having endwise adjustment therein for varying the effective area of the auxiliary air supply port, a rotative cap for accomplishing said endwise adjustment of the valve member, said cap having screw-threaded engagement with said casing and being connected with the valve member by means permitting relative rotation of the valve member and cap while preventing relative endwise movement of said parts, and means affording frictional resistance to the turning of the cap on the said casing.

10. In a carbureter, a valve embracing a valve casing having an outlet port and an auxiliary air supply port, a rotative, cylindric valve member in said casing adapted to turn therein for simultaneously opening and closing said ports, and having endwise adjustment therein for varying the effective area of the auxiliary air supply port, a rotative cap on said casing for accomplishing the endwise adjustment of said valve member, said cap member being connected with the valve member by means permitting the turning of the valve member relatively to the cap, for producing endwise movement to the valve member with the cap, and a spring interposed between the valve casing of the cap and acting on the latter to afford frictional resistance to the turning of said cap on the valve casing.

11. In a carbureter, the combination of a valve casing having an outlet port and an auxiliary air supply port, a rotative and

endwise movable, cylindric valve member in said casing adapted to turn in said casing for simultaneously opening and closing said ports and having endwise adjustment therein for varying the effective area of the auxiliary air supply port, said valve member being provided at one end with an axially extending stem, a rotative cap for effecting the endwise adjustment of said valve member, said cap having screw-threaded engagement with one end of said valve casing, a connection between the said cap and the outer end of the stem permitting relative rotation of said parts, and a coiled spring interposed between the said cap and the adjacent end of the valve casing.

12. In a carbureter, the combination with a valve casing, of a cylindric valve member having rotative and endwise movement in said valve casing and means for effecting endwise adjustment of the valve member in the casing embracing a rotative cap applied to one end of said valve casing and having screw-threaded engagement therewith, an axial stem on the valve member provided with an annular groove, and a disk secured to the inner face of said cap and having a radial notch for engagement with the groove of the valve stem.

13. In a carbureter, the combination with a valve casing, of a cylindric valve member having rotative and endwise movement in said valve casing, and means for effecting endwise adjustment of the valve member in the casing embracing a rotative cap on said valve casing having screw-threaded engagement therewith, an axial stem on the valve member provided with an annular groove, a sleeve surrounding said valve stem and having sliding engagement with the valve casing, said sleeve being provided with a flange at its outer end, a disk provided with a radial notch for engagement with the groove in said stem and having its marginal part located between the outer end of said sleeve and the inner face of the cap, and screws securing said cap and disk to the said sleeve.

14. In a carbureter, the combination with a valve casing, of a cylindric valve member having rotative and endwise movement in said valve casing, and means for effecting endwise adjustment of the valve member in the casing embracing a rotative cap on said valve casing having screw-threaded connection therewith, an axial stem on the valve member having rotative connection with said cap, a sleeve surrounding said valve stem and having sliding engagement with the valve casing, said sleeve having a flange at its outer end and being attached at said outer end to said cap, and a coiled spring surrounding said sleeve between an outwardly facing shoulder on the valve casing and the flange on the sleeve.

15. In a carbureter, the combination with a valve casing, of a cylindric valve member having rotative and endwise movement in said valve casing, a rotative cap on said valve casing for effecting such endwise movement of the valve member, said cap having screw-threaded engagement with the casing, an axial stem on the valve member provided with an annular groove, a sleeve surrounding said valve stem and having sliding engagement with the valve casing, said sleeve being provided with a flange at its outer end, a disk provided with a radial notch for engagement with the groove in said stem and having its marginal part located between the outer end of said sleeve and the inner face of the cap, screws securing said cap and disk to the said sleeve, and a coiled spring surrounding the said sleeve between an outwardly facing shoulder on the valve casing and the flange on the outer end of said sleeve.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 25th day of September A. D. 1906.

WILLIAM OTTAWAY.

Witnesses:
EDW. GUSTAFSON,
N. J. LINDEN.