W. E. MARTIN.

CARBURETER.

APPLICATION FILED DEC. 27, 1911.

1,038,921.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1

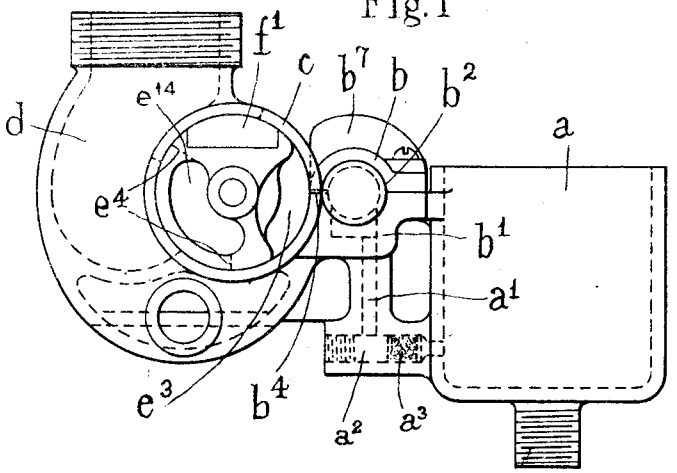
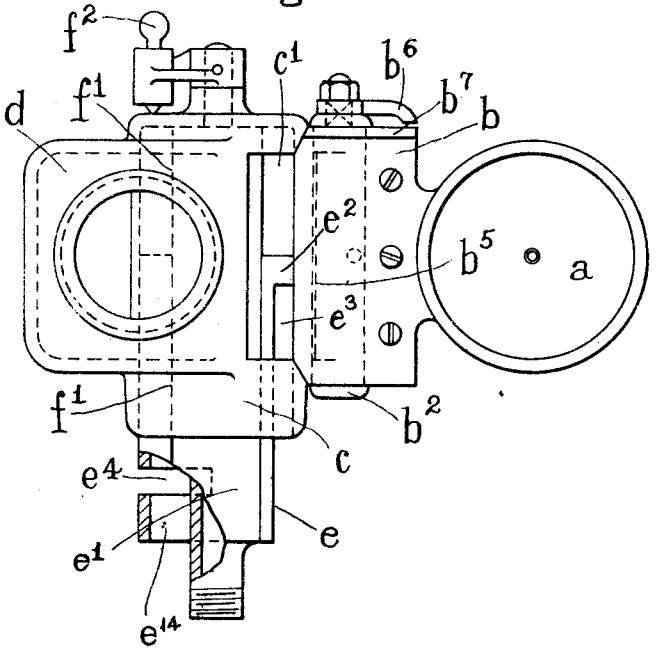


Fig. 2



Witnesses;
Chas. F. Clagett
Geo. "F. Brickney

Inventor;
William Edward Martin
By Harold Serrell
his Attorney.

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5 SHEETS-SHEET 2.

Fig. 3

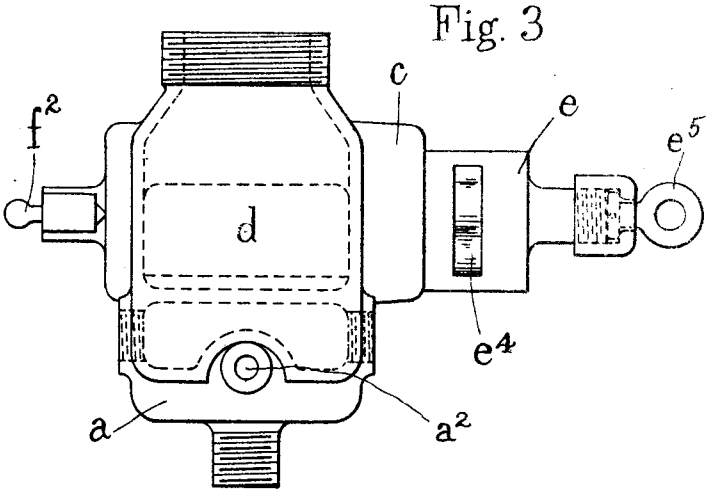


Fig. 4

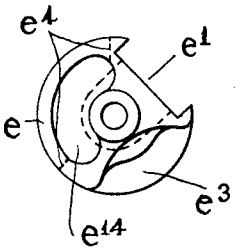


Fig. 5

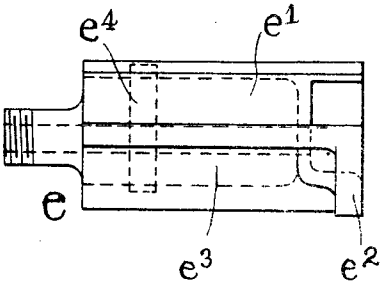


Fig. 6

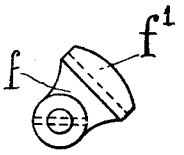
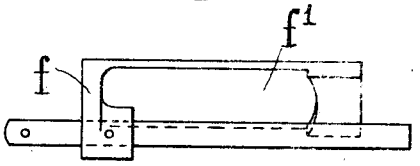


Fig. 7



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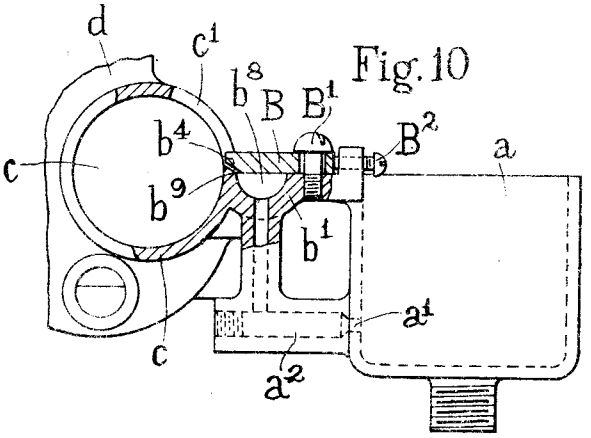

Fig. 10

Fig. 9

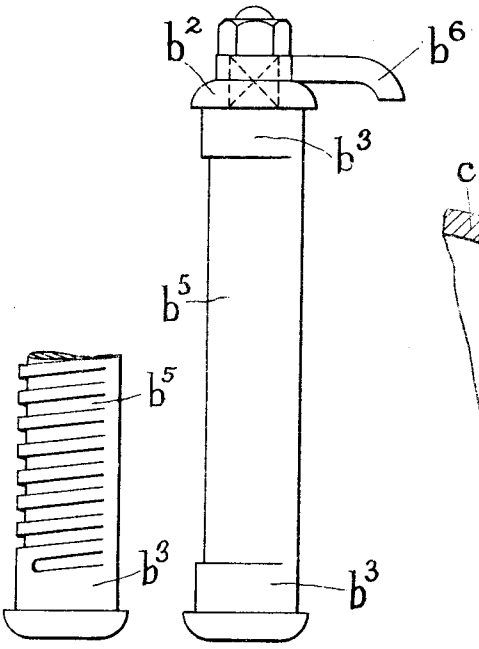

Fig. 8

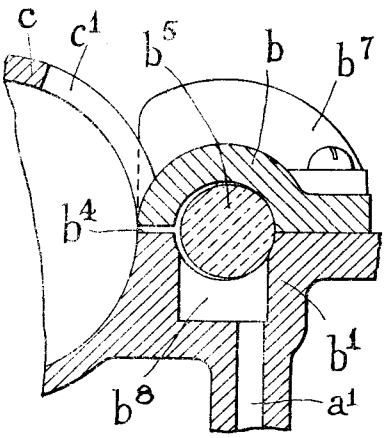

Fig. 9a

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5 SHEETS—SHEET 4.

Fig. 11

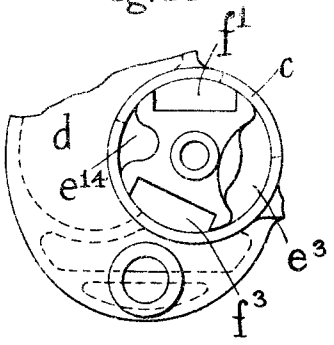


Fig. 12

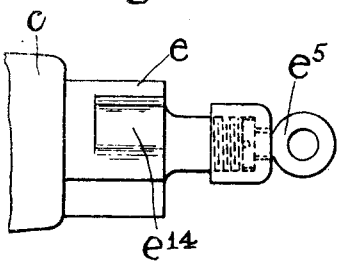


Fig. 13

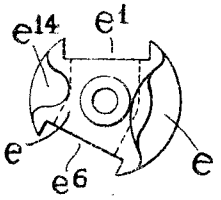


Fig. 14

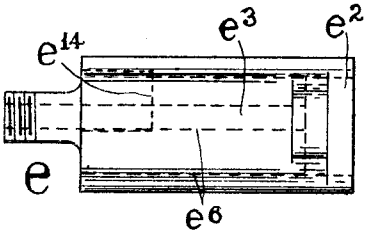


Fig. 15

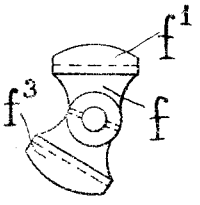
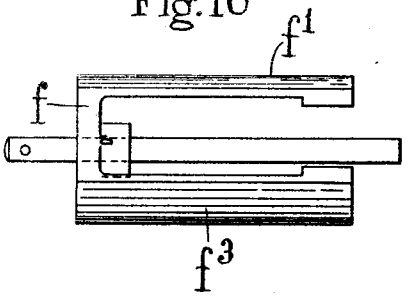


Fig. 16



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5 SHEETS—SHEET 5.

Fig. 17

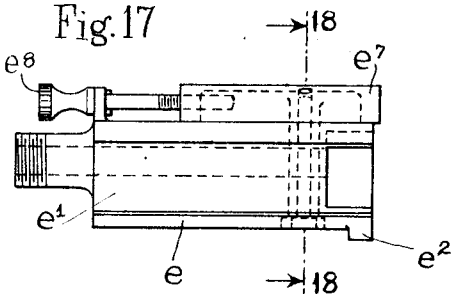


Fig. 18

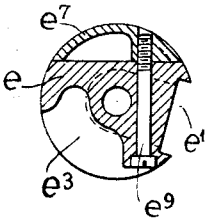
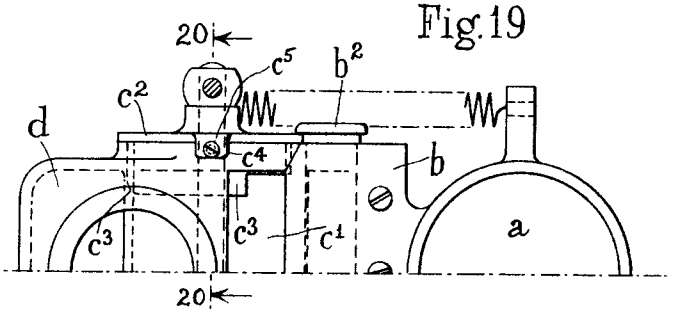


Fig. 19



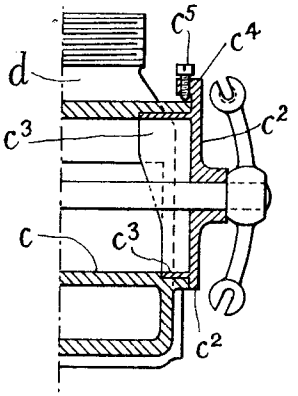


Fig. 20

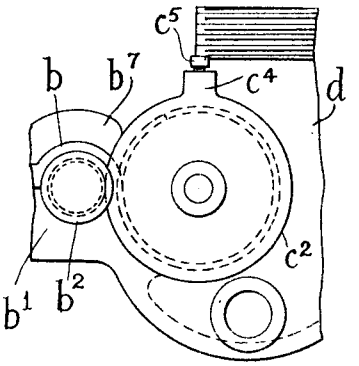


Fig. 21

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William Edward Martin
By Harold Serrell
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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD MARTIN, OF STAMFORD, ENGLAND.

CARBURETER.

1,038,921. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed December 27, 1911. Serial No. 668,191.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD MARTIN, a subject of the King of Great Britain, residing at Stamford, in the county of Lincoln, England, have invented an Improved Carbureter for Internal-Combustion Engines, of which the following is a specification.

Carbureters are already known in which the petrol issues from a series of jets arranged in a line adjacent to an elongated air opening leading into a mixing chamber, and in which some of such jets and part of the air opening may be cut off by means of a piston acting as a throttle.

The object of the present invention is to produce a simple form of carbureter in which the petrol may be adjusted to the requirements of the engine, and the air inlet may be adjusted to give a correct mixture whatever may be the position of the throttle, and to provide means whereby, when the throttle is closed and the gaseous mixture cut off, pure air may be admitted to the cylinders, and to regulate the suction according to the size of the air inlet.

The present invention consists in a combination of parts producing a carbureter in which the width of the petrol slot or the passage therethrough may be adjusted according to the engine, the width of the air inlet opening or slot may be adjusted according to the petrol slot or the passage therethrough, and the lengths of the air inlet and petrol slot may be simultaneously adjusted by means of a throttle. The throttle is provided with a passage whereby, when the throttle is completely closed to cut off the gaseous mixture, pure air may pass to the suction chamber and thence to the cylinders.

The invention is illustrated in the accompanying drawings.

Figure 1 is a side elevation of a carbureter, the float feed valve being omitted, and Fig. 2 is a plan of the same, the throttle being partly withdrawn. Fig. 3 is an end elevation showing means for moving the throttle. Fig. 4 is an end elevation, and Fig. 5 is a side elevation of the throttle. Fig. 6 is an end elevation, and Fig. 7 is a side elevation of the air shutter. Fig. 8 is a section through part of the carbureter shown in Figs. 1, 2 and 3, showing means for regulating the width of the petrol slot or jet. Fig. 9 is a plan of the jet regulating means shown in Fig. 8, and Fig. 9ª shows a modification. Fig. 10 is a vertical section through part of a carbureter showing modified means for adjusting the width of the petrol slot. Fig. 11 is an end view, and Fig. 12 a side view of parts showing a modification of the throttle and air shutters. Fig. 13 is an end view, and Fig. 14 a side view of the modified throttle, and Fig. 15 is an end view, and Fig. 16 a side view of air shutters to act in conjunction with the throttle shown in Figs. 13 and 14. Fig. 17 shows a modified throttle, and Fig. 18 is a section on line 18—18 of Fig. 17. Fig. 19 is a plan of part of a carbureter showing a further modification. Fig. 20 is a section on line 20—20 of Fig. 19. Fig. 21 is an end elevation of the parts shown in Figs. 19 and 20.

a is the float feed chamber, *b b′* is the jet chamber, *c* is the mixing chamber and *d* is the suction chamber.

The petrol enters the jet chamber *b b′* from the float feed chamber *a*. The jet chamber shown in Figs. 1, 2 and 8 is made in two parts *b b′* and has a bearing at each end for the jet regulator b^2. This latter is cylindrical at the ends b^3, where it fits the bearings, but it is formed intermediate of its ends in such a manner that in one position it completely cuts off the flow of petrol through a slot b^4 in the side of the jet chamber, but as it is turned it gradually opens the flow through the said slot. The jet regulator b^2 first has its ends b^3 turned concentric with its axis, after which the portion b^5 employed for regulating the jet is turned eccentric to the end portions and forms an adjustable side to the petrol slot, the fixed side being part of the jet chamber *b′*. The right hand side of this eccentric portion shown in Figs. 8 and 9 can close completely the outlet slot b^4, but by turning the regulator, the passage through the slot is more or less opened. Instead of turning the whole of this jet regulating portion, circumferential eccentric threads may be cut in it on one side, which threads do not extend around

the other side, as shown in Fig. 9ª. This plain side will close completely the petrol slot b^4 but as the regulator is turned, the threads will gradually open the said slot. This construction enables me to obtain a very fine slot which thoroughly breaks up the petrol.

I am aware that it has been proposed to turn grooves eccentrically around the whole circumference of a rotatable rod for the purpose of regulating the quantity of fuel passing through a slot but with such a regulator it was impossible to completely close the fuel passage or to get a fine adjustment.

One end of the regulator is provided with a pointer b^6 moving over a scale b^7 to indicate to what extent the petrol slot is open.

The jet chamber is preferably provided with a space or channel b^8 below the jet regulator b^2 which is filled with petrol.

The mixing chamber c is preferably cylindrical in form and has a longitudinal slot or air inlet c', the length of which may be regulated.

In the interior of the mixing chamber c is arranged the throttle which preferably consists of two interfitting parts, both of which may be rotated and one of which, the throttle e, may be caused to slide in the chamber c. That part which merely rotates consists of an end plate f fitting against part of the end of the mixing chamber c, and a projection or feather f' acting as an air shutter, which extends the whole length of the mixing chamber, fits against the interior of this latter and is wide enough to cover the slot c' therein.

The throttle e has a groove e' to fit the said projection or feather but is otherwise cylindrical in form and fits the interior of the mixing chamber c. The throttle has a closed inner end e^2 and a longitudinal air passage or recess e^3 leading from the exterior corresponding with the petrol slot b^4. The throttle e has also another longitudinal air passage or recess e^{14}. When the throttle is pushed fully in, air may pass into the passage e^{14} and laterally through the slot e^4 direct into the suction chamber d, and thence into the tube leading to the cylinders. In the form shown in Figs. 11 to 14, the passage e^{14} has no outer wall and consequently has no lateral slot.

In the modification shown at Figs. 11 to 16 the throttle e has in addition to the groove e', another groove e^6, and the rotating part has in addition to the shutter f', a second projection or shutter f^3, fitting within the groove e^6. This projection or shutter f^3 acts to regulate the passage between the mixing chamber c and the suction chamber d, according to the width of the air inlet slot c', by which means the suction does not vary when the air inlet is adjusted.

The carbureter is adjusted by first fixing the width of, or the passage through, the petrol slot b^4, and after pulling the throttle e fully or partly out by means of the eye e^5, the air shutter f' and throttle e are rotated until the air inlet through c' is sufficient to provide a proper mixture.

The air shutter f' may be provided with means for fixing it such as a spring pin f^2, see Fig. 2, which enters one of a series of holes after the shutter f' has been adjusted. The throttle may, however, be employed without the air shutter.

A correct mixture having been obtained, the effective length of the air slot c' and the effective length of the petrol slot b^4 are simultaneously adjusted by moving the throttle e. That portion of the petrol slot b^4 which is not subjected to suction is in communication with the atmosphere through the air-passage or recess e^3 in the throttle above described. As there will be a slight depression in the jet chamber b b', the air will enter through that part of the slot not subjected to suction and will prevent petrol escaping. The petrol passes from the float feed chamber a to the jet chamber b b', through a passage a' part of which a^2 is enlarged and contains gauze or other suitable filtering material a^3.

The jet chamber shown in Fig. 10 is in the form of a channel b^8 which contains petrol, and one edge of this channel b^8 is extended upward and laterally at b^9 and is preferably formed with an inclined or chamfered edge forming the fixed edge of the petrol slot b^4.

The cover of the petrol chamber is in the form of a plate B, the front edge of which is formed with capability of fitting against the inclined or chamfered edge above described and forms the other adjustable edge of the petrol slot b^4. This cover B is held down onto the top of the petrol chamber by screws B′ or otherwise and is capable of sliding on the top of the petrol chamber. Means are provided for moving the plate B forward to regulate the width of the petrol slot b^4, and a screw or screws B^2 may be employed for this purpose.

Any other means may be employed for adjusting the width of the petrol slot.

When the throttle e is only open to a slight extent when the engine is being started, the suction through the air inlet c' is very great and it is desirable to reduce the rush of air. With a throttle as shown in Figs. 4 and 5, 13 and 14, the passage between the mixing chamber c and the suction chamber d will be open to the same extent as the air inlet c'.

In Figs. 17 and 18, I have shown a throttle e having an adjustable part e^7 which is moved by the screw e^8 and which is locked by means of the screw e^9. As seen in Fig. 17

the end of the sliding part e^7 projects beyond the main portion of the throttle e. The part e^7 is opposite the passage between the mixing chamber c and the suction chamber d; consequently this passage is partly closed and does not open to the same extent as the air inlet c'. When the throttle is only open to a small extent the projecting part e^7 will make a considerable difference to the rush of air.

In Figs. 19, 20 and 21 I have shown another method of preventing this rush of air when the throttle is only slightly open. In this construction the end of the mixing chamber c is closed by a plate c^2 having a circular flange c^3 which is wider at one part than at another as seen in Fig. 20. By rotating the plate c^2 part of the extreme end of the passage between the mixing chamber c and the suction chamber d is closed. The plate c^2 has a lug c^4 carrying a set screw c^5 which binds onto the exterior of the chamber d.

What I claim is:—

1. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a mixing chamber, an elongated air inlet leading into the mixing chamber and adjacent to the petrol slot, means for regulating the width of the petrol slot, means for regulating the passage through the air inlet, and means for simultaneously adjusting the length of the air inlet and petrol slot substantially as set forth.

2. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber having a fixed and an adjustable side, a mixing chamber, an elongated air inlet leading into the mixing chamber and adjacent to the petrol slot, means for regulating the adjustable side of the petrol slot, means for regulating the passage through the air inlet, means for simultaneously adjusting the suction passage, and means for simultaneously adjusting the lengths of the air inlet, suction passage and petrol slot substantially as set forth.

3. In a carbureter for internal combustion engines, the combination of a jet chamber of cylindrical form, a slot in said chamber, bearings at the end of said chamber, a rotatable jet regulator having concentric parts fitting said bearings and an eccentric part to regulate the width of the jet, a mixing chamber, an elongated air inlet leading into the mixing chamber and adjacent to the petrol slot, a suction chamber parallel to the mixing chamber, a slot connecting the mixing and the suction chambers, means for regulating the width of the air inlet, means for regulating the width of the slot connecting the mixing and suction chambers, and means for simultaneously adjusting the length of the air inlet, petrol slot and slot connecting the mixing and suction chambers, substantially as set forth.

4. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a cylindrical mixing chamber, an elongated air slot adjacent to the slot in the jet chamber leading into the mixing chamber, a rotatable shutter to adjust the effective width of the air slot and a rotating and sliding throttle having a groove fitting the air shutter substantially as set forth.

5. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a cylindrical mixing chamber, an elongated air slot adjacent to the slot in the jet chamber leading into the mixing chamber, a rotatable shutter to adjust the effective width of the air slot, a suction chamber communicating with the mixing chamber, a second shutter fixed with relation to the said rotatable shutter to regulate the passage between the mixing chamber and suction chamber and a rotating and sliding throttle having grooves fitting the two shutters substantially as set forth.

6. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a cylindrical mixing chamber, an elongated air slot adjacent to the slot in the jet chamber leading into the mixing chamber, a rotatable shutter to adjust the effective width of the air slot, a suction chamber communicating with the mixing chamber, a second shutter fixed with relation to the said rotatable shutter to regulate the passage between the mixing chamber and suction chamber and a rotating and sliding throttle having grooves fitting the two shutters, an air passage in said throttle admitting air to that part of the petrol slot which is not subjected to suction and an aperture at the outer end of the throttle which, when the throttle is pushed fully in, allows air to pass direct into the suction chamber substantially as set forth.

7. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a mixing chamber, an elongated air inlet leading into the mixing chamber, and adjacent to the petrol slot, means for regulating the passage through the petrol slot, means for regulating the passage through the air inlet and means for simultaneously adjusting the length of the air inlet and petrol slot, a suction chamber, a passage between the mixing chamber and suction chamber, and means for partly closing the extreme end of said passage.

8. In a carbureter for internal combustion engines the combination of a jet chamber, a slot in said chamber, a mixing chamber,

an elongated air inlet leading into the mixing chamber, and adjacent to the petrol slot, means for regulating the passage through the petrol slot, means for regulating the passage through the air inlet, means for simultaneously adjusting the length of the air inlet and petrol slot, a suction chamber, and a passage between the mixing chamber and suction chamber the length of which is less than that of the air inlet so that the air inlet opens to a greater extent than the said passage substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM EDWARD MARTIN.

Witnesses:

CLAUDE K. MILLS,

WM. GIRLING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."