J. W. RAYMOND.

CARBURETER.

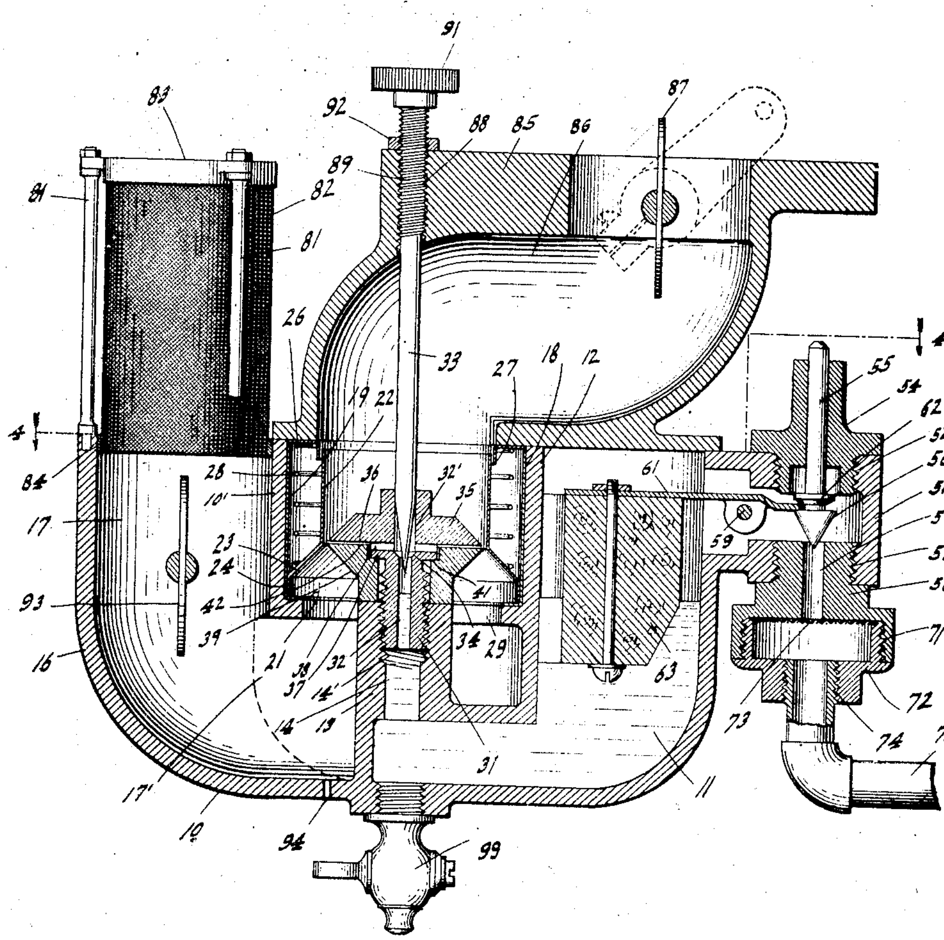
APPLICATION FILED OCT. 9, 1911.

1,037,834.

Patented Sept. 3, 1912.

SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

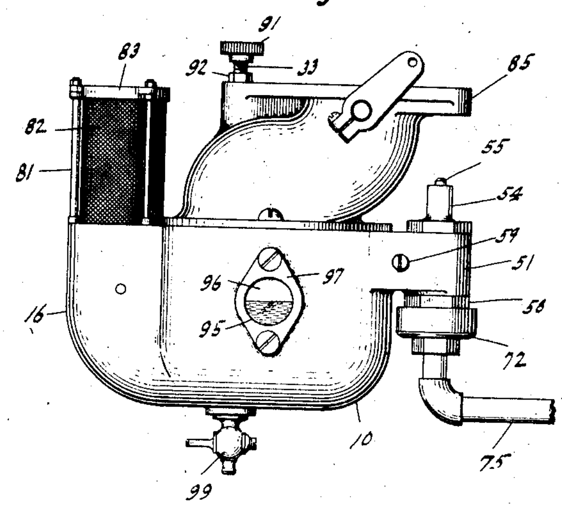


Fig. 3.

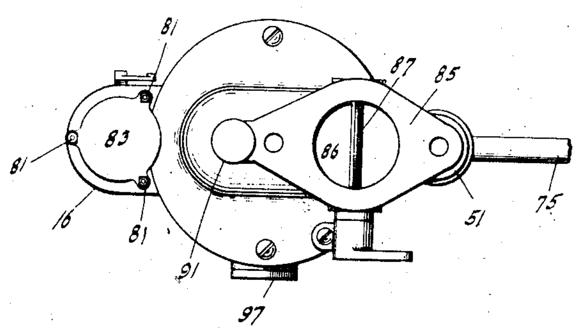
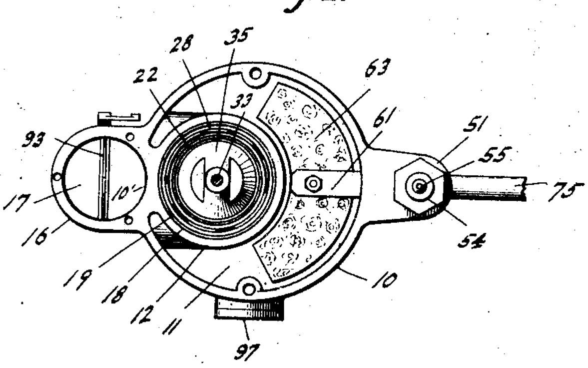


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN W. RAYMOND, OF DAYTON, OHIO, ASSIGNOR TO THE AIR FRICTION CARBURETOR COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

CARBURETER.

1,037,834. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed October 9, 1911. Serial No. 653,667.

To all whom it may concern:

Be it known that I, JOHN W. RAYMOND, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a new and useful Carbureter, of which the following is a specification.

The object of my invention is to produce a carbureter of high efficiency and uniformity of action under all conditions.

A further object of my invention is to so form the several parts that they can be manufactured and assembled at minimum expense, and be interchangeable.

The accompanying drawings illustrate my invention.

Figure 1 is a vertical section; Fig. 2 a side elevation; Fig. 3 a plan; and Fig. 4 a plan on line 4—4 of Fig. 1.

In the drawings, 10 indicates the main body of the carbureter of basin-like form in order to produce a gasolene chamber 11 of desirable capacity. Formed integrally with main body 10 within the chamber 11 is a circular partition or wall 12. Within and substantially co-axial with this partition, at the bottom of the chamber formed therein, is a central vertical spud 13 having an axial passage 14 communicating with the bottom of chamber 11. Casing 10 at the side nearest partition 12 is provided with a hollow lateral extension 16 through which is formed a substantially vertical air passage 17, which at its lower end communicates, through an opening 17′ in the intermediate wall 10′ of the casing 10, with the lower end of the chamber formed by the cylinder wall 12. The chamber 18, formed within wall 12, is open at its upper end and is preferably machined so as to receive an automatic air-flow-controlling unit. The air-flow-controlling unit is formed in the following manner: A thin shell or tube 19 freely fitting chamber 18 is provided at its lower end with an inwardly projecting annular flange 21. Freely axially slidable in shell 19 is an air-flow controlling shell 22, the main portion or upper end of which is of materially less diameter than shell 19. Near its lower end the shell 22 is outwardly and downwardly flared, as indicated at 23, and its extreme lower end is downturned, at 24, so as to form a short cylindrical portion having a free fit within shell 19. This down-turned portion 24 is not absolutely essential, but it is preferable in order that the lower edge of the outwardly flared portion 23 may not unduly wear the shell 19 by reason of the repeated reciprocations of the shell 22. Closing the upper end of shell 19 is an annulus 26, preferably provided around its interior with a down-turned flange 27 which surrounds and extends below the upper end of shell 22. The annulus 26 is preferably soldered or otherwise secured to shell 19 so as to thus produce an air-flow controlling unit which can be properly adjusted in the factory and be guarded against unskilled change and manipulation.

I have found in practice that, in order to get the best results under all conditions of weather, the shell 22 should be very light in order that its resistance to inflow of air be so light that it will be very sensitive to slight changes of velocity of flow of incoming air. By this means very small differences in vacuum in the engine will materially affect the vertical position of the shell 22.

Between shells 19 and 22, and above the outwardly and downwardly flared portion 23 of shell 22, I find it desirable to place a very light coil spring 28, the upper end of which is engaged by the annulus 26. This spring 28 should be very light and so adjusted that when the shell 22 is in its normal position, as shown in Fig. 1, there will be no material compression of the spring, it being the intention that the combined gravity resistance of shell 22 and the compressive resistance of spring 28 shall be very small.

The axial length of the air-flow controlling unit above described is substantially equal to that portion of the upper end of chamber 18 which lies above the inwardly projecting annular flange 29 formed integral with wall 12.

The upper end of passage 14 is threaded at 14′ to receive the threaded lower end of a nozzle shank 31 which is axially perforated by a fuel passage 32, the upper end of which is enlarged at 32′ to receive the lower smooth end of a needle valve 33, a needle valve seat 34 being thus formed at an intermediate portion in passage 32. Above valve seat 34 shank 32 is provided with a conical head 35, the lower face 36 of which is substantially flat. The diameter of the head 35 at its base is, in practice, in the carbureter which is shown in full size in the accompanying drawings, about three thirty-seconds of an inch less than the internal diameter of the upper part of shell 22. At the upper end of shank 31, immediately beneath head 35, is a circular enlargement 37 which is perforated by a plurality of lateral passages 38 which lead from bore 32′, immediately above valve seat 34, to the base face 36 of head 35. Sleeved over shank 31 is a sleeve 39, the upper end of the bore of which is sufficiently enlarged to receive the portion 37, said portion seating firmly upon the shoulder 41 of the sleeve. The lower end of sleeve 39 has an external diameter substantially equal to the external diameter of spud 13, but its upper end has an external diameter substantially equal to the base of head 35, the said upper end being formed in a substantially flat face substantially parallel with the base face 36 of head 35. The axial length of the circular enlargement 37 is a trifle greater than the axial depth of shoulder 41 from face 42, so that when the parts are assembled, as shown in Fig. 1, the sleeve 39 will be clamped in place by shank 32 and the face 36 will lie above face 42 such distance that the capillary action of the two faces 36 and 42 upon the fuel to be used will bring the fuel to the circumference of the capillary passage thus formed. Surfaces 36 and 42 are brought to substantially sharp outer edges and the plane of the capillary passage between the two surfaces is substantially the plane of the junction between the main body of shell 22 and the upper end of the flared portion 23, as clearly indicated in Fig. 1. By this arrangement, the resistance to outflow of fuel from the capillary passage thus formed is not materially affected by considerable changes in level of the fuel in chamber 11, and at all times there will be presented to the inflowing air, coming in through passage 17, a circular line of fuel which, in the size shown, will be nearly four inches in length, thus insuring a thorough carburetion of the air.

Opposite the extension 16, the main body 10 is provided with a small hollow extension 51, the interior of which communicates with the upper end of the fuel chamber 11. The upper and lower walls of this extension are perforated by threaded perforations 52 and 53, respectively, which for convenience in manufacture, are co-axial and threaded alike. Threaded into the upper perforation 52 is a plug 54 which is axially bored to receive the stem 55 of a valve 56 adapted to seat in the upper end of the axial bore 57 of a plug 58 threaded into perforation 53. Pivoted at 59 in the extension 51 is a float lever 61, one arm of which is projected into a circumferential groove 62 formed in valve 56 and the other end of which carries the usual float 63 arranged within the fuel chamber 11.

Fig. 58, at its lower end, is enlarged and threaded at 71 to receive a cap 72 across the upper end of which I arrange a fine screen 73, the said screen conveniently being soldered or otherwise secured across the open upper end of cap 72. Cap 72 is perforated and threaded at 74 to receive the upper end of a fuel inlet pipe 75.

Secured to the upper end of the extension 16 of body 10 are standards 81 which carry and guard an air screen 82, which is conveniently a cylinder formed of fine wire mesh carried by an upper cap 83, attached to the upper ends of standards 81, and stiffened at its lower end by a ring 84 fitting within the upper end of passage 17.

Secured to the upper end of main body 10 to form a cap or cover for the upper ends of chambers 11 and 18 is a hollow mixture outlet 85, the lower end of the mixture passage 86 registering with annulus 26 and the upper end having a suitable throttle valve 87 mounted therein. Threaded through the upper wall of the structure 85, at 88, is the threaded portion 89 of the shank of the needle valve 33, said shank being provided at its upper exposed end with a knurled head 91 by which it may be adjusted, and, if desired, with a set nut 92 by means of which it may be held in adjusted position.

An air-flow controlling valve 93 is mounted in the air inflow passage 17 and at the bottom of said passage, I provide a drain passage 94 through the bottom of main body 10.

In order that the level of fuel within the carbureter may be determined, I provide the main body 10 with a sight opening 95 closed by a transparent cover 96 and retaining cap 97.

It will be noticed that in machining the main body 10 practically the entire work may be done at a single setting of the body in a holding jig. For this purpose, the main body is clamped in its jig open end up and the entire upper face milled or turned so as to form at one operation the seat for the mixture outlet structure 85 and for plug 54. Bore 14 can be extended through the bottom of chamber 11 to provide for the reception of the drain cock 99, and when formed will serve as a center for a reaming tool by means of which the interior of the upper end of chamber 18, and the upper ends of flange 29 and spud 13 may be simultaneously faced. Threads 14′ may also be formed so as to be accurately centered with relation to chamber 18. Perforations 52 and 53 may also be formed and threaded so that valve 56 will be easily and accurately positioned with relation to box 57.

In practice, I find that the air-flow controlling unit may be very cheaply, accurately and satisfactorily formed from parts of spun or pressed sheet metal.

By various arrangements and constructions of parts I have described I have been able to produce at very low cost a carbureter which, in practice, has proven to be accurate and efficient in its operation under all ordinary ranges of weather conditions.

I claim as my invention:

1. An air-flow controlling unit for carbureters comprising a container shell having an inwardly projecting flange at one end, an axially reciprocable tubular shell mounted in the container and formed at one end with an outwardly and downwardly flaring portion terminated by a downwardly extending portion substantially parallel to the main upward portion, a retaining ring arranged at the open end of the container and surrounding the upper end of the tubular shell, and a coiled spring arranged within the container between said retaining ring and the tubular shell.

2. An air-flow controlling unit for carbureters comprising a container shell having an inwardly projecting flange at one end, an axially reciprocable tubular shell mounted in the container and formed at one end with an outwardly and downwardly flaring portion terminated by a downwardly extending portion substantially parallel to the main upward portion, and a retaining ring arranged at the open end of the container and surrounding the upper end of the tubular shell.

3. An air-flow controlling unit for carbureters comprising a container shell having an inwardly projecting flange at one end, an axially reciprocable tubular shell mounted in the container and formed at one end with an outwardly and downwardly flaring portion, a retaining ring arranged at the open end of the container and surrounding the upper end of the shell, and a coiled spring arranged within the container between said retaining ring and the tubular shell.

4. An air-flow controlling unit for carbureters comprising a container shell having an inwardly projecting flange at one end, an axially reciprocable tubular shell mounted in the container and formed at one end with an outwardly and downwardly flaring portion, and a retaining ring arranged at the open end of the container and surrounding the upper end of the tubular shell.

In witness whereof, I, have hereunto set my hand and seal at Dayton, Ohio, this 3 day of October, A. D. one thousand nine hundred and eleven.

JOHN W. RAYMOND. [L. S.]

Witnesses:
A. I. EASTMAN,
ADELE UNGER.