

D. FERGUSSON & C. L. SHEPPY.

CARBURETER.

APPLICATION FILED JUNE 7, 1907.

943,242.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

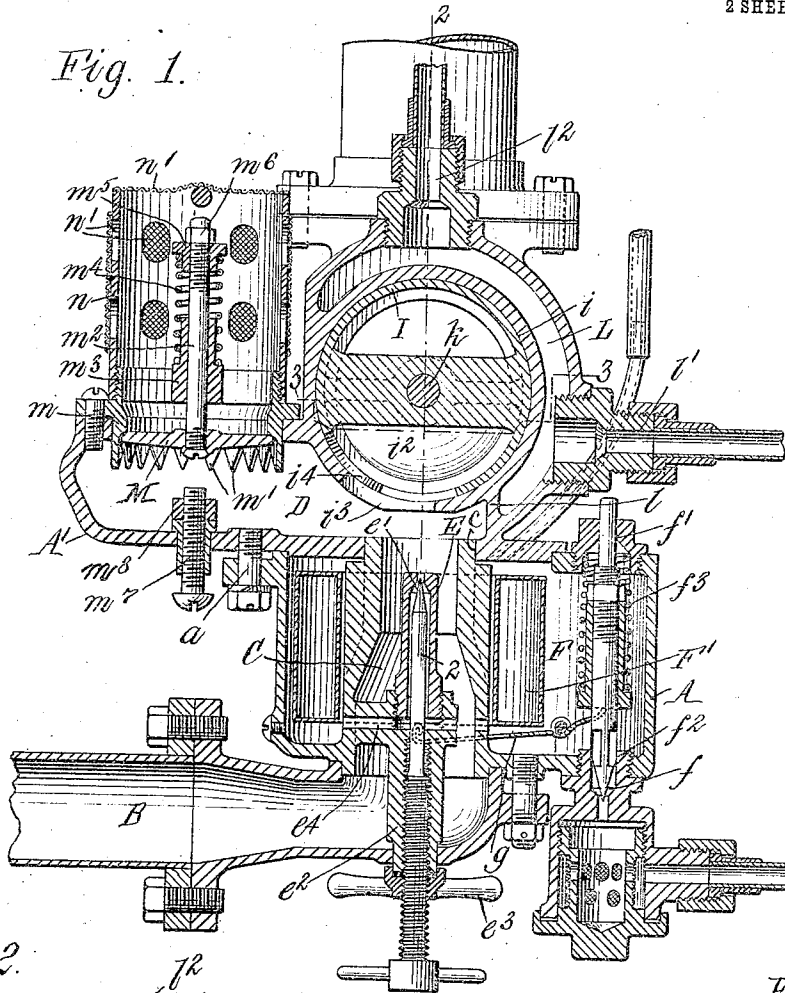


Fig. 2.

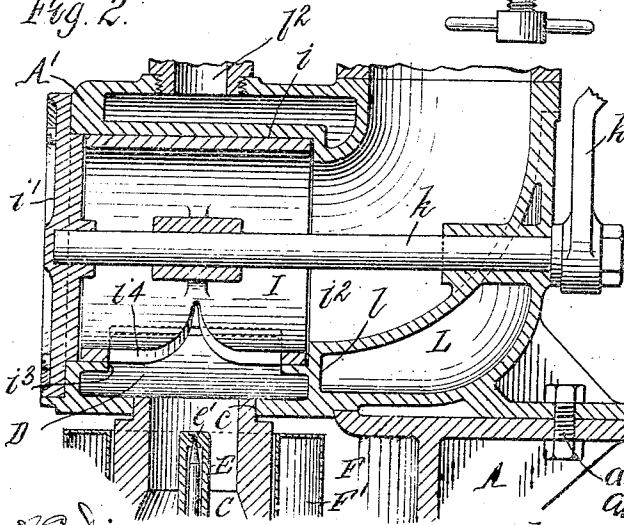
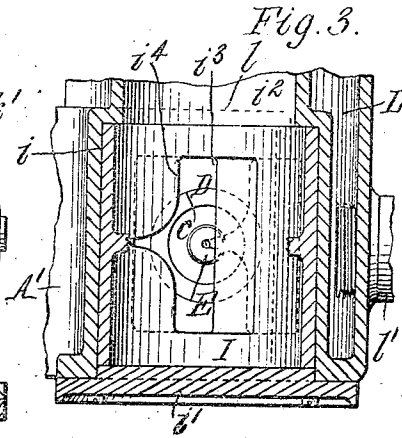


Fig. 3.



W. J. Diamond, }
E. A. Volk, } witnesses.

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2 SHEETS—SHEET 2.

Fig. 4.

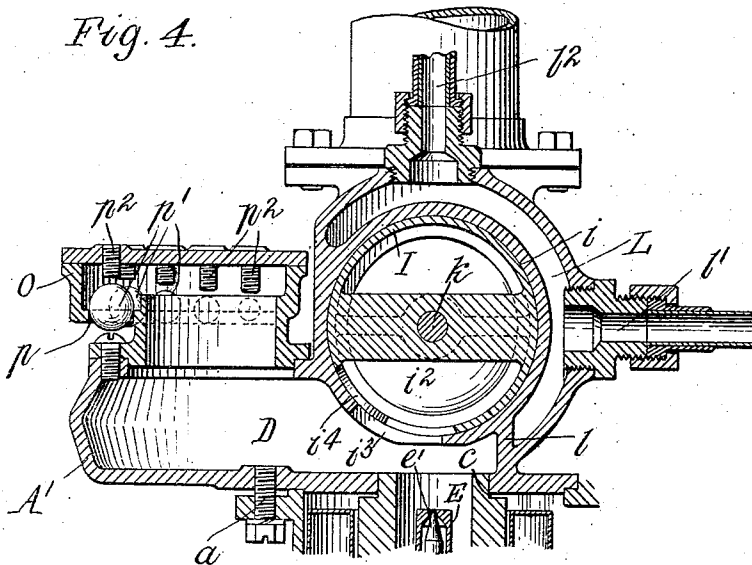
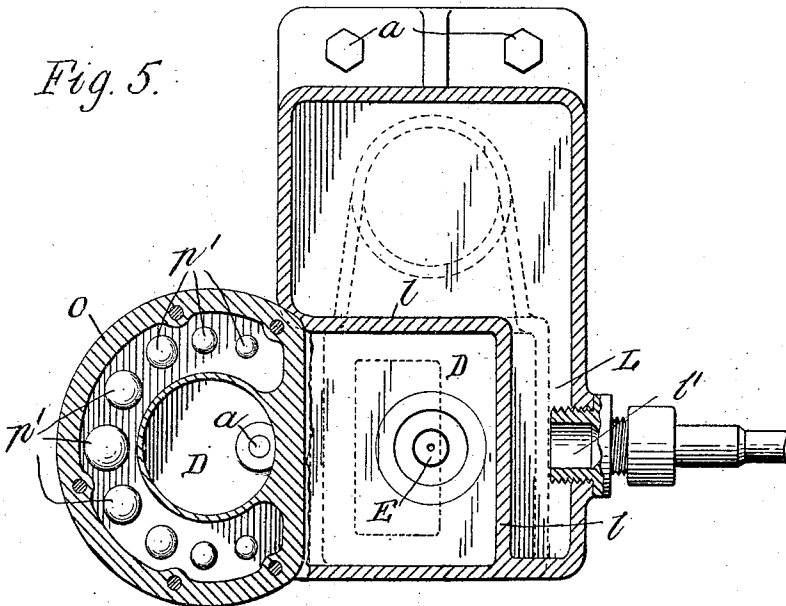


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

943,242.

Specification of Letters Patent.

Patented Dec. 14, 1909.

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To all whom it may concern:

Be it known that we, DAVID FERGUSSON and CHARLES L. SHEPPY, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Carbureters, of which the following is a specification.

This invention relates more particularly to automatic carbureters of the well known type in which the air for the explosive mixture is caused, by the suction of the engine, to flow past a spray nozzle, in which the liquid hydrocarbon, usually gasoline, is maintained at a constant level by a float feed device, and to take up and vaporize a charge of gasoline from the nozzle to commingle with the air.

In carbureters embodying the invention the charge of explosive mixture admitted to the engine is controlled by a hand-operated throttle valve and an auxiliary air valve is provided which operates automatically to increase the supply of air as required, when an increased volume of the explosive mixture is demanded in the higher speeds of the engine.

The principal objects of this invention are to produce a carbureter of this type, of compact and simple construction in which the throttle valve is so constructed and arranged that the opening thereof for the passage of the mixture will always be directly opposite and in close proximity to the spray nozzle so that a high velocity of the air past the spray nozzle will always be insured, regardless of the position of the valve and size of opening which it provides; also to so construct the throttle valve that in moving it from the closed to the full open position and vice versa, the valve opening will be gradually increased or decreased in area, enabling a very accurate and delicate control of the charge to the engine; also to so construct and position the auxiliary air valve that it will respond readily to changes in speed of the engine and will always act to gradually increase the supply of air to the mixing chamber of the carbureter even though the valve may be suddenly opened.

In the accompanying drawings, consisting of two sheets: Figure 1 is a sectional elevation of a float-feed carbureter embodying the invention. Fig. 2 is a fragmentary trans-

verse sectional elevation thereof in line 2—2, Fig. 1. Fig. 3 is a horizontal section of the throttle valve and its chamber, in line 3—3, Fig. 1. Fig. 4 is a fragmentary sectional elevation, similar to Fig. 1, showing a different form of supplemental air valve. Fig. 5 is a horizontal section in line 5—5, Fig. 4. Like characters of reference refer to like parts in the several figures.

The casing of the carbureter preferably consists of a lower part A which forms the float chamber, and an upper part A' which is secured by screws *a*, or other suitable fastenings, on the open upper end of the lower part and forms the mixing chamber and throttle valve chamber and carries the auxiliary air valve.

B represents the main air supply pipe which, as usual, preferably leads from the vicinity of the engine exhaust so that the air therein is heated and, in the construction illustrated, connects with the bottom central portion of the lower casing part A.

C represents an upright air passage connecting at its lower end with the air supply pipe and at its upper end with the mixing chamber D in the upper part of the casing. This air passage is preferably formed by an integral hollow column extending centrally up from the bottom of the lower part of the casing with its upper end entering a hole in the bottom of the upper casing part. The upper part of the air passage is contracted, as shown.

E represents the gasoline supply or spray nozzle. This extends centrally up into the air passage C with its upper end, in which is the discharge orifice, located within the contracted upper portion of the air passage, near the top thereof.

*e*¹ represents the usual needle valve for regulating the size of the discharge orifice of the spray nozzle to control the discharge of gasoline. This valve has a screw stem working in a screw-threaded bearing sleeve *e*² and extends out through the air supply pipe, having an operating handle at its lower end and a nut *e*³ for securing it when adjusted. The spray nozzle connects by one or more suitable supply passages *e*⁴ with the float chamber or reservoir F in the lower casing-part A.

F' represents the float, and *f* the valve operated thereby for automatically main-

taining the gasoline at the desired level in the spray nozzle. The float chamber is preferably annular in form, surrounding the air passage C, and the float is also annular and surrounds and is guided in its up and down movements by the column forming the air passage. A needle float valve is shown in the drawings, being arranged vertically in the float chamber and sliding in bearings f' f^2 at the top and bottom of the float chamber. The conical lower end of the valve cooperates with a seat against which it is pressed by a suitable spring f^3 surrounding the valve between an adjustable sleeve thereon and the upper bearing for the valve. The valve is moved away from its seat to admit gasoline to the float chamber, when the float descends to a predetermined extent, by a lever g pivoted in the float chamber and bearing at opposite ends against the float and the adjustable sleeve of the supply valve.

I represents the throttle valve. This valve is preferably of hollow cylindrical form and is arranged to oscillate about a horizontal axis in a correspondingly shaped chamber formed by a cylindrical wall or seat i located in the upper casing-part directly over and in close proximity to the upper end of the air passage. One end of the valve chamber is closed by a suitable cap or cover i' secured to the adjacent end of the upper casing-part, and the opposite end thereof connects with a discharge passage i^2 for the explosive mixture formed by a continuation of the valve seat i curving upwardly through the upper casing-part A'. The valve seat i has a hole i^3 in its bottom which is preferably of rectangular shape and is located with one edge nearly vertically over the discharge orifice of the spray nozzle, and the valve has a cooperating hole i^4 adapted, by turning the valve, to be placed into or out of register with the hole in the seat. The hole in the valve is substantially similar in shape and size to the hole in the seat but has a V-shaped notch in one edge thereof. By reason of this shape and arrangement of the holes in the valve and seat the valve can be turned to a position, shown by broken lines in Fig. 3, in which only the V-shaped notch of the valve opening will register with the hole in the valve seat, thus leaving a very small opening for the passage of the explosive mixture. But this opening is directly over the spray nozzle and the opening can be gradually increased to its largest area by a comparatively short movement of the valve. The valve opening is always directly over and close to the spray nozzle, and consequently a high velocity of the air past the spray nozzle is always insured. A suitable stem or rod k is secured to the valve and preferably bears at opposite ends in suitable bearing holes in the cover plate i' and opposite end of the upper casing-part,

one end of the rod extending out of the casing and being provided with a lever k' for turning the valve.

The mixing chamber D is formed in the upper casing part A' below the throttle valve chamber, and the mixing chamber is preferably separated from the space surrounding one side and the top of the throttle valve chamber and the discharge passage i^2 by a right-angular partition l . A water jacket L is thus provided partially surrounding the throttle valve chamber and discharge passage, and connections l' l^2 are provided for circulating hot water through this jacket for heating the explosive mixture.

M, Fig. 1, represents an auxiliary air supply valve. The valve shown in Fig. 1 consists of a circular disk and is arranged to move vertically within a ring or shell m which is secured by screws, or otherwise, on top of the upper casing part A' at one side of the throttle valve chamber. This ring has an internal shoulder against which the valve seats, and a skirt depending into the mixing chamber D and provided with V-shaped notches or serrations m' . The valve has a vertical stem m^2 extending upwardly through a suitable guide bearing m^3 on the valve ring, and is normally held up against the seat by a suitable spring m^4 surrounding the valve stem between its bearing and an adjusting nut m^5 screwed on the upper end of the valve stem.

m^6 is a lock nut for the adjusting nut.

m^7 represents an adjustable stop screw projecting through the bottom of the upper casing-part below the auxiliary air valve for limiting its opening movement, and m^8 a lock nut for said stop screw.

n represents a casing or shell which extends upwardly from the valve ring and has its side and end openings covered by screens n' , for the purpose of screening the air admitted to the carburetor by the auxiliary valve. The auxiliary air valve, located in this position, is close to the throttle valve opening and will respond nicely to fluctuations of suction in the mixing chamber due to changes in speed of the engine, so as to increase or diminish the air supply in accordance with the needs of the engine, but its position is such as not to obstruct in any way the passage of the charge to the engine. The V-shaped notches in the skirt of the valve ring make it impossible for the valve even though suddenly opened to suddenly admit large volumes of air. The volume of air can only be increased gradually and in proportion to the increased speed of the engine.

In Figs. 4 and 5 means of different construction but arranged in the same location are employed for similarly admitting the supplemental air gradually to the mixing

chamber. In this construction a valve casing O is secured to the casing part A' in place of the valve ring in the other construction and is provided with a series of air inlet openings *p* of graduated sizes controlled by graduated balls *p'* seated in the openings. The movement of the balls is regulated by adjustable stop screws *p*². The smallest balls being lightest will be first lifted by the suction and as the suction increases it will lift the balls one after the other, according to their size, and thus gradually increase the volume of supplemental air admitted. Still other forms of supplemental air admission valves or means could be employed.

We claim as our invention:

1. In a carbureter, the combination of a casing having a wall of circular cross-section forming a throttle valve chamber, said wall having in one side a hole for the passage of the explosive mixture, an air supply passage opposite to the hole in said valve chamber wall, and a mixing chamber having a portion which is located between said circular wall and said air supply passage and is relatively narrow in the direction of the length of the air supply passage whereby one end of the air supply passage is located close to said circular wall, a spray nozzle extending into said air passage and having a discharge orifice opposite and adjacent to said hole, an auxiliary air supply valve for admitting air to said mixing chamber, and a throttle valve in said valve chamber having a hole adapted to be moved into and out of register with the hole in said cylindrical wall by turning said valve, substantially as set forth.

2. In a carbureter, the combination of an air supply passage, a spray nozzle extending into said air passage and having a discharge orifice adjacent to the upper end thereof, a throttle valve chamber of circular cross-section arranged above and transversely with respect to said air passage and having an opening for the passage of the explosive mixture located opposite and in close proximity to the discharge orifice of the spray nozzle, and a mixing chamber having a portion located between the upper end of said air supply passage and said throttle valve chamber which is relatively narrow in the direction of the length of said air passage, a throttle valve arranged to turn in said valve chamber to place a hole in the valve into and out of register with the hole in said chamber, one of said holes having a V-shaped portion whereby the size of the opening for the explosive gas is controlled, and auxiliary air supply means for admitting air to said mixing chamber, substantially as set forth.

3. In a carbureter, the combination of a casing having a wall of circular cross section forming a throttle valve chamber, said wall having a hole for the passage of the

explosive mixture, an air supply passage having one end located opposite to the hole in said valve chamber wall, and a mixing chamber between said circular wall and said air supply passage, a spray nozzle extending into said air passage and having a discharge orifice substantially opposite to one edge of the hole in said valve chamber wall, and a hollow throttle valve in said valve chamber and having a hole which coöperates with said hole in said valve chamber wall, one of said holes having a V-shaped portion whereby the size of the opening for the passage of the explosive mixture is gradually changed by turning said valve and said opening is always kept opposite to said spray nozzle, substantially as set forth.

4. In a carbureter, the combination of an air supply passage, a spray nozzle extending into said air passage and having a discharge orifice adjacent to the upper end thereof, an annular float chamber surrounding said air passage, an annular float in said chamber for regulating the feed of the fuel to said spray nozzle, a cylindrical throttle valve chamber arranged horizontally above said air passage with a hole in its bottom over and close to the discharge orifice of said spray nozzle, a mixing chamber between the upper end of said air supply passage and said throttle valve chamber, auxiliary air supply means for admitting air to said mixing chamber, a hollow cylindrical throttle valve in said valve chamber and having a hole in its cylindrical wall adapted to be placed into and out of register with a hole in the bottom of said valve chamber by turning said valve and also having a discharge hole, and a discharge passage connecting with the discharge hole of said throttle valve, substantially as set forth.

5. In a carbureter, the combination of a main air supply passage, a throttle valve chamber arranged transversely opposite to one end of said air supply passage and separated therefrom by a space forming a mixing chamber, said valve chamber having a hole in its wall opposite to said air passage, a throttle valve arranged to turn in said chamber to control said hole, a spray nozzle for the liquid hydrocarbon having a discharge orifice in said air passage opposite and adjacent to said hole in the wall of the throttle valve chamber, and automatic auxiliary air supply means consisting of a circular disk arranged to move in a serrated ring, thus controlling the inlet opening of said mixing chamber and gradually increasing the flow of air in proportion to the suction of the engine, substantially as set forth.

6. In a carbureter, the combination of a casing comprising an upper part which is divided by a circular wall into a throttle valve chamber and a mixing chamber having an auxiliary air inlet opening at one side,

and a lower casing part which is secured to
said upper casing and which contains an air
passage communicating with said mixing
chamber in the upper casing part, an annu-
5 lar float chamber surrounding said air pas-
sage, a rotatable throttle valve in said valve
chamber having a hole adapted to register
with a hole in said circular wall, a spray
nozzle for the fuel located in said air pas-
10 sage with its discharge orifice immediately
under the hole in the throttle valve, a float
in said float chamber for regulating the sup-

ply of fuel to the spray nozzle, and means
for regulating the admission of air through
said auxiliary air inlet opening, substan- 15
tially as set forth.

Witness our hands in the presence of two
subscribing witnesses.

DAVID FERGUSON,
CHARLES L. SHEPPY.

Witnesses:

C. B. HORNBECK,
E. C. HARD.