

R. H. WHITE.

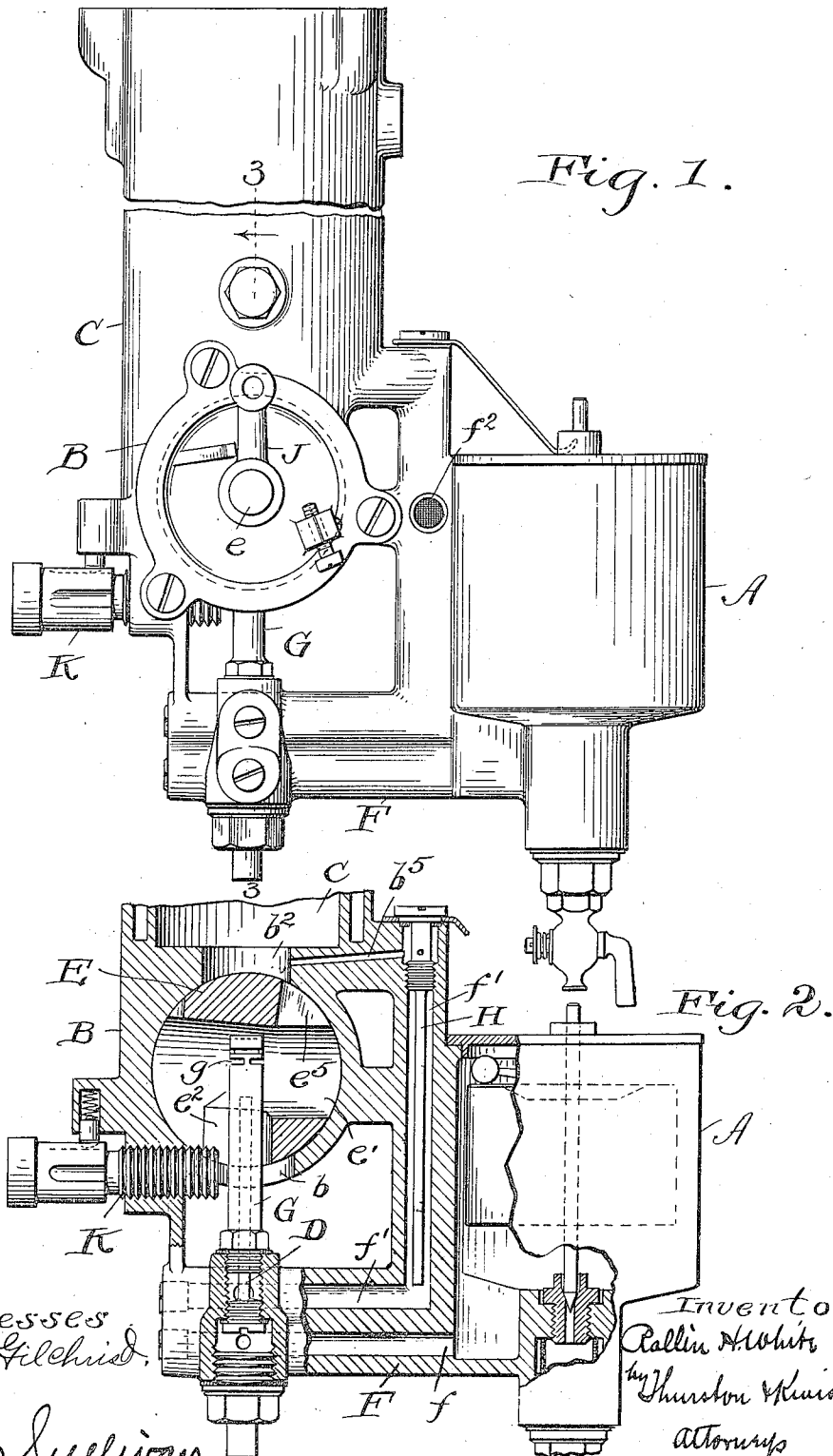
CARBURETER.

APPLICATION FILED FEB. 14, 1912.

Patented Jan. 21, 1913.

2 SHEETS—SHEET 1.

1,051,041.



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2 SHEETS—SHEET 2.

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Fig. 3.

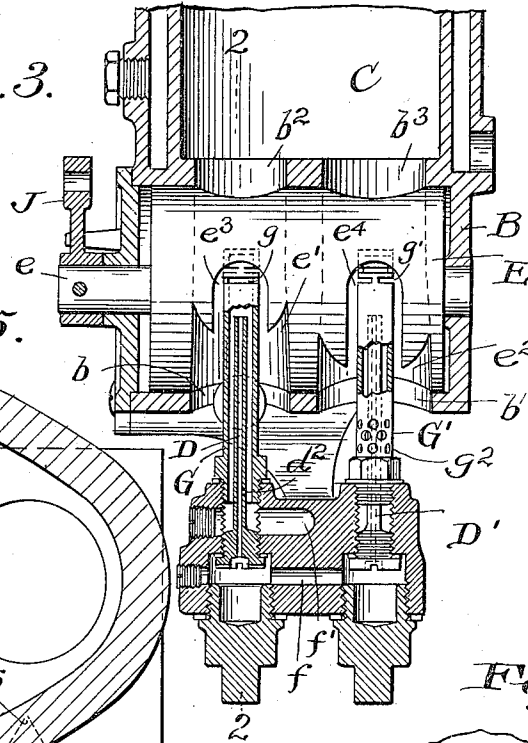


Fig. 5.

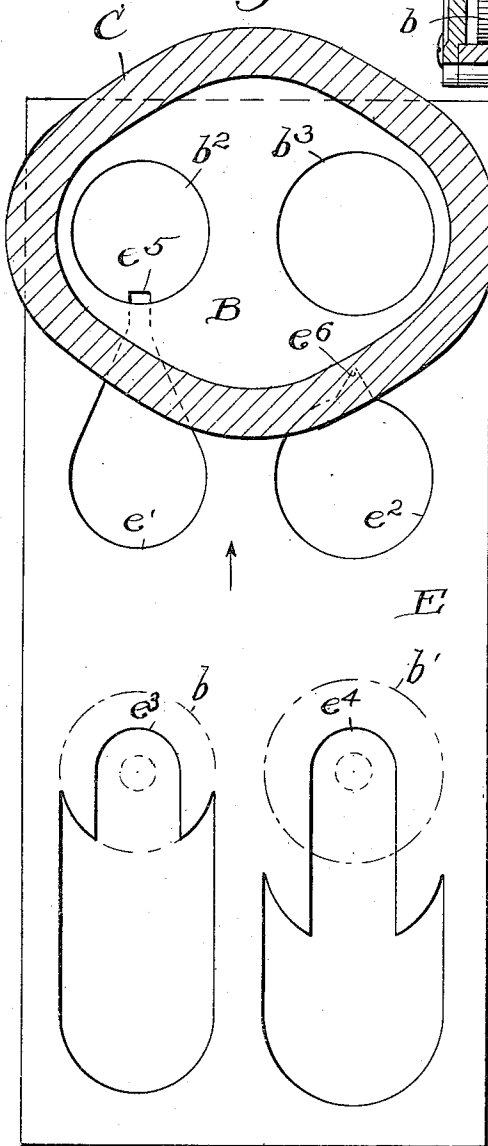
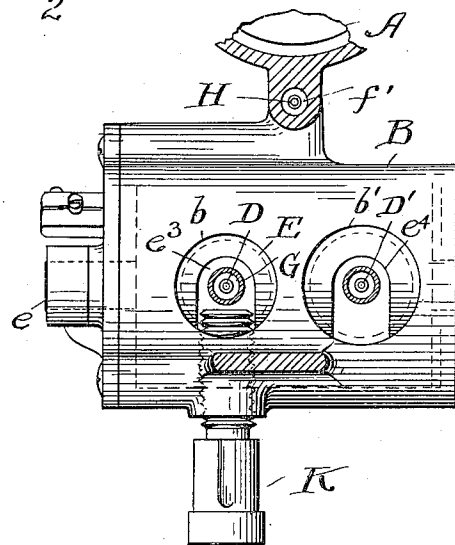


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,051,041.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed February 14, 1912. Serial No. 677,510.

To all whom it may concern:

Be it known that I, ROLLIN H. WHITE, a citizen of the United States, residing at Cleveland Heights Village, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, and exact description.

The object of this invention is to provide a carbureter, especially suitable for use on high powered multi-cylinder motor cars, which will supply an adequate volume of the explosive mixture, substantially uniform in quality at all times, to enable the engine to efficiently and economically perform its work under all the varying conditions of road service.

The invention involves, as its primary novel features, the use of plural feed nozzles, an air intake tube of variable size associated with each fuel nozzle and within which the associated fuel nozzle is disposed, and valve mechanism by which one of these air intake tubes may be opened and gradually enlarged before the other is opened at all, and by which, thereafter, both may be gradually enlarged until they assume their maximum size.

The invention also includes as a novel feature, but subordinate to the main feature referred to, a single valve which will, by its movement, control in the manner stated the opening and enlarging of said air tubes, and their gradual restriction and the complete closing of one in advance of the other.

The invention also includes certain subordinate but novel features of construction which contribute to the efficiency of the device; all of which are shown in the drawing, and hereinafter described and definitely pointed out in the appended claims.

In the drawing, Figure 1 is a side elevation of a carbureter, in which the invention is embodied. Fig. 2 is a vertical section thereof in the plane of line 2—2 on Fig. 3. Fig. 3 is a vertical section in the plane of line 3—3 on Fig. 1. Fig. 4 is a bottom view of the valve casing,—the fuel nozzles being shown in section; and Fig. 5 is a development of the valve showing its relation to the openings in the valve casing.

Referring to the parts by letters, A represents the usual float controlled fuel chamber.

B represents the valve casing.

C represents the mixing chamber which is above the valve casing and is adapted to be connected with the manifold of the engine.

F represents an arm to which the two nozzles D, D' are screwed so as to communicate with the fuel duct *f* in said arm, through which fuel may flow unrestrictedly from the fuel chamber A to said nozzles.

In the construction shown, all of the elements specified, except the nozzles, are parts of a single casting, although this is not an essential.

The valve casing B as shown, is cylindrical with its axis disposed horizontally. It has two openings *b*, *b'*, preferably circular in form in its lower wall, and two openings *b*², *b*³, similar in form and located directly over the openings *b*, *b'* respectively. It is through the openings *b*, *b'* that air may flow into the valve casing, and it is through the openings *b*², *b*³ that the air and fuel vapor or spray may flow from the valve casing into the mixing chamber C.

E represents a cylindrical valve which is nicely fitted in the valve casing, and is capable of being turned therein. It has at one end a stem *e* which passes out through the end wall of the valve casing. Suitable mechanism by which the valve may be turned may be connected to an arm J, which is fixed to this projecting stem. There are two air passages *e'*, *e*² extending diametrically through this valve. These holes are slightly venturi shaped, and the hole *e*² is of slightly larger diameter than the hole *e'*. So also are the holes *b'* and *b*³ slightly larger than the holes *b*, and *b*². When the valve is in its wide open position, these holes form parts of the air tube through which air entering through the openings *b*, *b'* may flow to and through the openings *b*², *b*³ into the mixing chamber.

The two fuel nozzles D, D' stand vertically and project respectively through the two openings *b*, *b'*, being placed substantially central therein, and projecting part way through the holes *e'*, *e*² in the valve. The lower ends of these two holes *e'*, *e*² are circumferentially enlarged to form what may be termed slots *e*³, *e*⁴. The function of these slots is to furnish an opening through which the nozzles may project into

the valve, even when the valve is in the closed position as shown in Fig. 2. A screw K, which screws through the wall of the valve chamber in alinement with the slot e^3 is provided in order to restrict to the required degree the size of the opening around the nozzle D through which air may flow into the hole e' . Each of the holes e' , e^2 is also circumferentially enlarged at its upper end. The circumferential enlargement e^5 of the hole e' extends a considerably greater distance circumferentially from the hole than does the circumferential enlargement e^6 of the other hole e^2 . These two enlargements e^5 and e^6 have sides which converge as they recede from the holes; and the enlargement e^5 is continued to its end in the form of a narrow slot with parallel sides. When the valve is in the closed position, as shown in Fig. 2, and as shown diagrammatically in Fig. 5, the enlargement e^6 of the hole e^2 is entirely covered by the upper wall of the valve casing, so that no air whatever can flow through the hole e^2 . The circumferential enlargement of the hole e^6 , however, slightly overlaps the hole b^2 in the valve casing, so as to provide, even when the valve is closed, a very small opening through which air may pass. It is, of course, not essential that the valve can never be entirely closed, because the same effect can be produced, even if the enlargement e^6 were wholly covered when the valve is closed by merely turning the valve slightly in the opening direction.

It is obvious that when the valve is turned in the opening direction, the size of the passageway through the valve through which air flows past the nozzle D will be gradually enlarged, and will assume considerable proportion, before there is any uncovering of the upper end of the hole e^2 , such as will permit air to flow through said hole past the nozzle D'. Until, therefore, the throttle valve is open so as to begin to uncover the enlargement e^6 of the valve hole e^2 all of the air flowing through the carbureter will, of necessity, pass through the hole e' . Therefore all of the fuel drawn into the carbureter will come from the nozzle D. A carbureter such as is shown in the drawing, when employed with a six cylinder, sixty H. P. internal combustion motor on a motor car will provide a sufficient volume of the explosive mixture to enable the car to run at approximately thirty miles an hour on a level road before any part of the hole e^2 is opened at all to the opening movement of the valve E. To get a larger volume of the explosive mixture to enable the engine to run faster, or do more work, the valve will be still further turned in the opening direction, so as to begin to uncover the upper end of the hole e^2 and allow air to flow through the valve hole e^2 ,—thereby

drawing the fuel from the nozzle D'. As the valve continues to move in the opening direction, the effective size of the hole through which air flows past the nozzle D' increases more rapidly than does the size of the other hole. As before stated, the holes b' , b^3 and e^2 are larger than the holes b , b^2 and e' . The capacity of the two nozzles is, however, substantially the same. Therefore there will be more air in proportion to fuel vapor in the stream which flows into the mixing chamber through the hole b^2 , than in the stream which flows through the hole b . This plays a not unimportant part in maintaining the uniformity of the mixture at high speeds. In fact, with the parts proportioned substantially as shown in the drawings, the explosive mixture formed and supplied to the engine will be fairly uniform at all times, and its volume will vary in accordance with the position of the valve. The arrangement is additionally extremely economical, since it is such as furnishes a carbureter of comparatively small capacity when the work which the engine is called upon to do is light, but which increases the capacity of the carbureter in accordance with the demands upon the engine for power.

There are certain additional features which are not new at the present time which are shown in the drawing, and which probably add to the general efficiency of the device. For example, the nozzles are respectively embraced by sheaths G, G' having lateral openings g , g' in their upper ends. The sheath G is in communication with a duct f' in the casting, and the upper end of this duct communicates with the atmosphere through the screened openings f^2 . The nozzle D' has likewise a small drip opening d^2 through which gasoline may, when the engine is idle, drip and flow into and partly fill the duct f' . An air tube H is arranged within the vertical part of the duct f' and extends down nearly to the bottom thereof, and its upper end is arranged so that any fuel drawn up through said tube may be discharged into a duct b^5 in the wall of the valve chamber whose inner end is just over the center of the circumferential enlargement e^5 of the hole e' . After the engine has been at rest for some time a considerable quantity of gasoline will accumulate in the duct f' . When the engine is started, there will be a small stream of air flowing through the hole e' , and out of the end of the circumferential enlargement thereof e^5 past this duct d^5 , and this air stream will draw the fuel from duct f' up through the tube H and duct b^5 , so as to furnish a small starting charge of the explosive mixture. By the time the fuel so drawn from the duct f' has been exhausted, the valve should be slightly opened, wherefore fuel

will be drawn from the nozzle D in sufficient quantities to make an explosive mixture which will keep the engine going.

The features of construction described in the foregoing paragraph are adaptations to the present structure of characteristics of construction which are shown and claimed in Patent No. 998,123, granted to Scaife July 18, 1911.

10 The sheath g' is not in communication with the duct f' . It is, however, provided with a plurality of perforations g^2 through which air will be drawn when the valve has been opened sufficiently wide to cause an air stream to flow through the valve hole e^2 . This increases to a slight extent the proportion of air to fuel which flows out of the hole b^2 ,—and also helps vaporize the fuel spray.

20 Having described my invention, I claim:

1. In a carbureter, the combination of a mixing chamber, a valve casing below said mixing chamber having two openings in its top wall communicating with the mixing chamber and two openings through its lower wall communicating with the atmosphere, a movable valve in said casing having two holes through it adapted to be brought into registering relation with said upper and lower holes in the valve casing, the holes through the valve being unequally enlarged at their discharge ends in the direction of the movement of said valve whereby as the valve moves in the opening direction the uncovering of one of said holes will be begun in advance of the other, and two fuel nozzles which project up through the lower holes in the valve casing and partly through the holes in the valve.

40 2. In a carbureter, the combination of a mixing chamber and below that a horizontal cylindrical valve casing which has in its upper wall two openings which communicate with the mixing chamber, and in its lower walls two openings which communicate with the atmosphere, a rotatable cylindrical valve in said casing having through it two holes which are enlarged circumferentially unequal distances at their discharge

ends, and two fuel nozzles which respectively project through the lower openings in the valve casing and into the holes which pass through the valve.

3. In a carbureter, the combination of a mixing chamber and below that a horizontal cylindrical valve casing which has in its upper wall two openings which communicate with the mixing chamber and in its lower wall two openings which communicate with the atmosphere, a rotatable cylindrical valve in said casing having through it two holes which when the valve is wide open will register with the holes in the upper and lower walls of the valve casing, each of said holes through the valve having at their discharge ends circumferential enlargements of decreasing width, one of said enlargements being materially longer than the other, and two fuel nozzles which respectively pass through the lower openings in the valve casing and into the holes through the valve.

4. In a carbureter, the combination of a mixing chamber, a cylindrical valve casing having in its upper wall leading to said mixing chamber two holes of unequal size and having in its lower wall two holes of unequal size which are respectively associated with the two upper holes, a rotatable cylindrical valve in said casing having through it two holes of unequal diameter of which the smaller hole is adapted to register with the two small holes in the casing, and the larger is adapted to register with the two large holes in the casing, both of the holes in the valve being circumferentially enlarged at their discharge ends, the enlargement of the smaller hole being longer than the other, and the fuel nozzles which project through the two lower holes in the casing and into the holes through the valve.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ROLLIN H. WHITE.

Witnesses:

H. R. SULLIVAN,
E. B. GILCHRIST.