A. P. BRUSH.

CARBURETER.

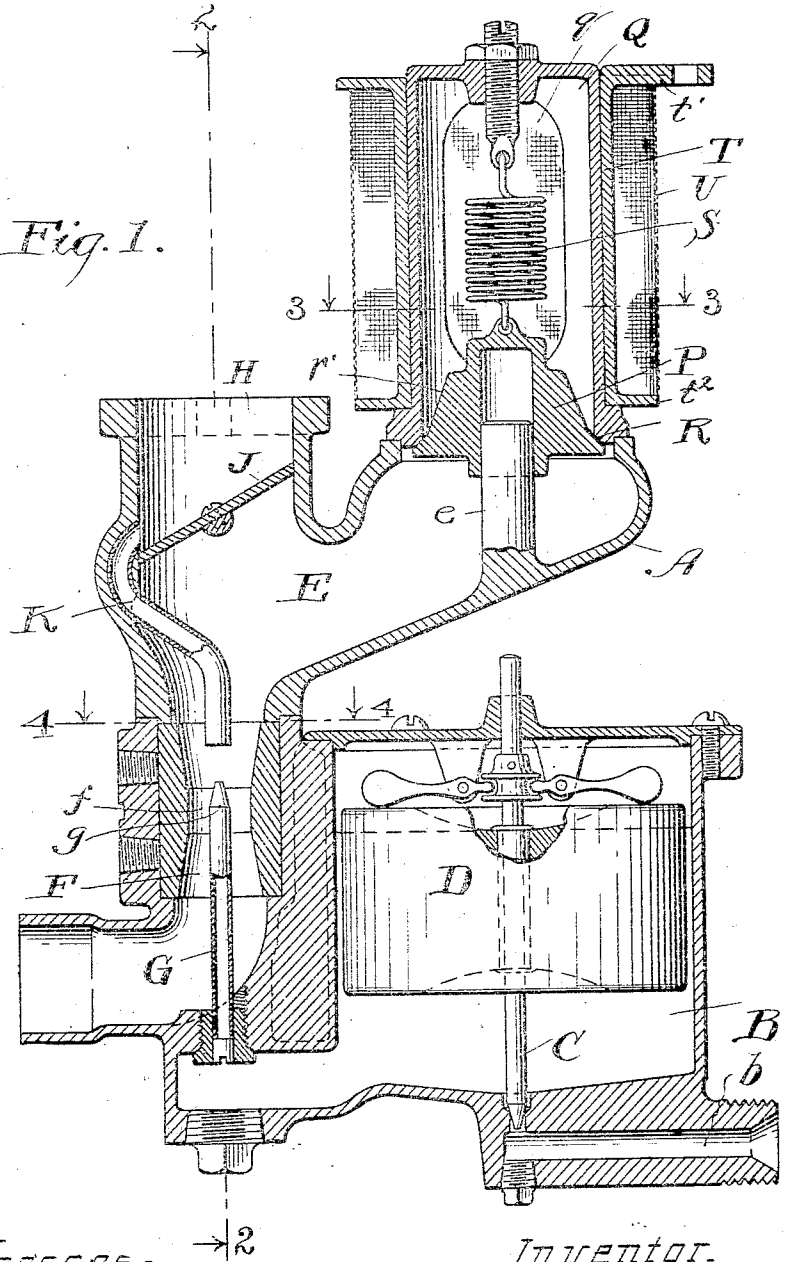
APPLICATION FILED JAN. 12, 1910.

1,069,671.

Patented Aug. 12, 1913

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

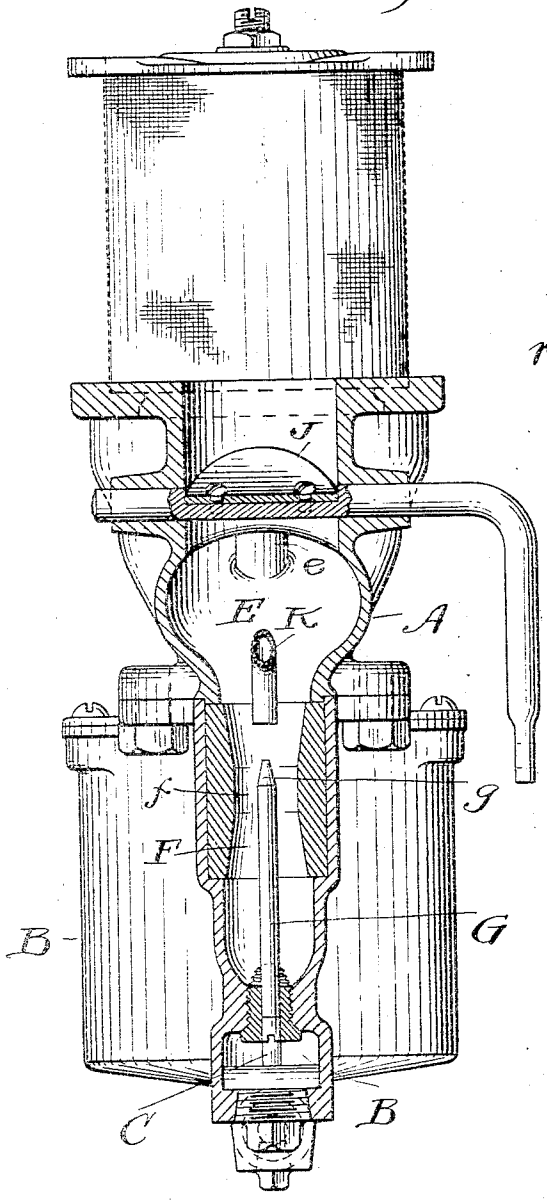


Fig. 3.

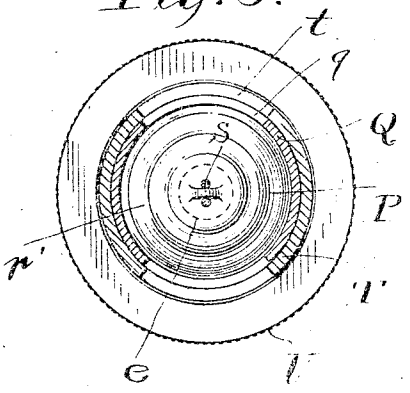
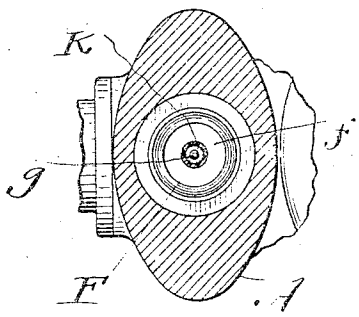


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,069,671. Specification of Letters Patent. Patented Aug. 12, 1913.

Application filed January 12, 1910. Serial No. 537,627.

To all whom it may concern:

Be it known that I, ALANSON P. BRUSH, a citizen of the United States, residing at Flint, in the county of Genesee and State of Michigan, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, and exact description.

This invention relates particularly to the kind of carbureters which are intended for use with so-called gasolene engines.

Among the objects of the invention are to facilitate the running of such engines at low speed; to prevent the accumulation of unvaporized gasolene in the carbureter casing, or, in other words, to prevent the flooding of the carbureter while the engine is running at low speed; and to provide an efficient auxiliary air valve adapted to supply with close approximation the proper volume of air when the engine is running at various rates of high speed.

The novel features of the invention consist in the disposition, above the gasolene nozzle, of a tube which extends upward therefrom around the throttle valve and discharges into the passageway which leads therefrom to the engine; and also in the shape of the auxiliary air valve; and in some subordinate and relative features of construction which will be hereinafter particularly described.

The invention is shown in the drawing, and described in the following specification and definitely pointed out and distinguished from the prior art by the appended claim.

In the drawing, Figure 1 is a sectional side view of a carbureter embodying the invention. Fig. 2 is a sectional elevation of said carbureter in the plane indicated by line 2—2 on Fig. 1. Fig. 3 is a sectional plan of the auxiliary valve casing in the plane indicated by line 3—3 on Fig. 1; and Fig. 4 is a sectional plan in the plane indicated by line 4—4 on Fig. 1.

The carbureter is like carbureters now in use in that it includes a built-up casing A which includes a float valve chamber B, the inlet *b* to which is controlled by a valve C operated by a float D, all of which parts, together with the mechanism through which the float controls this valve, may be of conventional form. Within the carbureter casing also is a chamber E, into which air may be drawn through an induction tube F, the vertical part *f* of which is of restricted cross sectional area, and forms what is sometimes called the throat of the carbureter. This throat communicates with the bottom of the chamber E. The bottom of this chamber inclines toward this throat, so that if any unvaporized gasolene is deposited within said chamber it will flow by gravity toward said throat and either flow out of the chamber through the same tube, or else will be vaporized while in said throat by means of the air flowing rapidly therethrough.

G is a nozzle arranged vertically within the throat communicating at its lower end with the float valve chamber and having at its upper end a restricted discharge opening,—said tube and its location being of conventional construction.

Above the throat is the outlet passageway H adapted to be connected up with the engine; and across this outlet passageway is the throttle valve J, which valve may be of any suitable form, as for example, the ordinary butterfly form, as shown.

K represents a tube open at both ends. Its lower end is located above and within a short distance from the discharge end of the nozzle, G. This tube is curved and set into the wall of the carbureter casing and its open upper end communicates with the outlet passageway H above the throttle valve, and is so placed that gas discharged therefrom is discharged in a direction across said passageway.

When this carbureter is connected with an engine, said engine on its suction stroke produces a partial vacuum within the chamber E and within the outlet passageway H; and to supply this vacuum, air flows in through the induction tube F and throat *f*, and the passage of this air through the throat draws gasolene from the nozzle. The stream of gasolene so drawn from the nozzle is directed toward the open lower end of the tube K; and under all conditions of use of this device, a very considerable [illegible] gasolene, either as spray [illegible] together with air, [illegible]

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pass through it and be discharged into the outlet H in a direction across the same and above the throttle valve, and, of course, across the air current flowing past the throttle valve and through said outlet. Some portion of the gasolene will, when the throttle valve is fairly well opened, pass into the chamber E and be there vaporized and mixed with the air. But, as stated, a considerable quantity of the gasolene will also flow through the tube K, together with some air; and this gasolene and air will, as it flows across the current of air or mixed air and vapor which is passing the throttle valve, be completely vaporized and thoroughly mixed. The great advantage, however, which flows from the use of this tube K will be experienced when the throttle valve is very nearly closed. Under such conditions, with carbureters as heretofore constructed, the suction-stroke of the engine produces a very slight vacuum in the chamber E, wherefore the air drawn through the large induction tube into and through the mixing chamber, will move so slowly that it will not vaporize all of the gasolene drawn from nozzle G; wherefore the liquid gasolene will accumulate in the mixing chamber; and moreover an insufficient supply of the mixture even to keep the engine running slowly, would be produced and carried forward toward the same. With the construction herein shown, however, the upper end of the tube K is in direct communication, above the throttle valve, with the outlet passage H, where there is a greater degree of vacuum than in chamber E. The result will be, even if the throttle valve be entirely closed, that some air will be drawn into and through tube K, and this air will move rather rapidly, and will pick up and carry along with it the stream of gasolene spray coming from the nozzle, will vaporize such gasolene and mix with it, and the mixture will be delivered into passageway E crosswise of the same, and above the throttle valve. The result of so delivering the air and vapor across the passageway H will be a more complete mixing of said air and vapor,—which mixture will be delivered to the engine. With the construction shown, it is true that the entire closure of the throttle valve will not cause the engine to stop. The engine can, however, be stopped by proper manipulation of the ignition mechanism so that no serious objection grows out of this fact. The employment in the position and manner stated of the tube K will, however, enable a gasolene engine to run more slowly than it is possible to run it with such carbureters as have heretofore been constructed, and will prevent flooding of the carbureter when the engine is running slowly. When the throttle valve is well open, and air and vapor is flowing past it, the delivery into the upwardly flowing current of the cross current from tube K, will produce a very complete commingling of the air and vapor. Moreover, the shape of the floor of the mixing chamber is such, being inclined in all directions toward the throat that if any unvaporized gasolene shall accumulate in said chamber, such gasolene will flow into the throat where it will either be vaporized by the action of the inflowing air current, or else will run out of said induction tube and do no harm.

P represents the supplemental air valve, past which, when it is opened, air may flow into chamber E. This valve is drawn toward its seat R by a single contractile coil spring S, and is forced from its seat by atmospheric pressure when there is sufficient degree of vacuum in chamber E,—a condition that comes about when the engine is running fast. Externally this valve is conical, but that portion of the valve near its base, which engages with the valve seat, is less acute than the part above it. The slant surface of the valve near the base lies at an angle of about 45 degrees, more or less, to the base; while the more acute part r' of the conical valve surface lies at an angle of 60 degrees to the base. When a valve of this external shape, controlled by a single contractile coil spring, is drawn various distances downward in accordance with the varying degrees of vacuum in chamber E produced by running the engine at various rates of high speed, the explosive mixture produced by the carbureter is more nearly uniform in character under the varying conditions than it would be if any other shaped valve were employed.

The valve seat R against which the valve P engages is at the lower end of a cylinder Q which is closed at the top, but which has slots q through its side walls. Surrounding this cylinder is another cylinder T having through its side walls vertical slots t which may register with the slots q. This cylinder T has at its upper and lower ends outwardly extended flanges t', t^2, to which is connected a cylinder of wire mesh U. The air which goes into the cylinder Q must pass through this wire mesh which will exclude much of the dirt which would otherwise go with it, and then it must pass through the slots t and q. By turning the cylinder T, the effective area of these slots may be reduced as much as desired.

Having described my invention, I claim:

In a carbureter, the combination with the casing thereof containing a chamber E and a vertical air induction tube leading thereto and an outlet passage-way leading therefrom, a vertical nozzle disposed in said induction tube, a throttle valve in the outlet

passage-way, a tube open at both ends and having at and near its lower end a vertical portion which is close to and above the nozzle and having a curved portion which is set into the wall of the carbureter casing, and whose upper portion communicates with the passageway above said valve and discharges therein in a direction crosswise of said passage-way and above the throttle valve.

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

ALANSON P. BRUSH.

Witnesses:
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E. L. THURSTON.