J. PIAT.

CARBURETER.

APPLICATION FILED JUNE 19, 1916.

1,368,451.

Patented Feb. 15, 1921

3 SHEETS—SHEET 1.

FIG_1

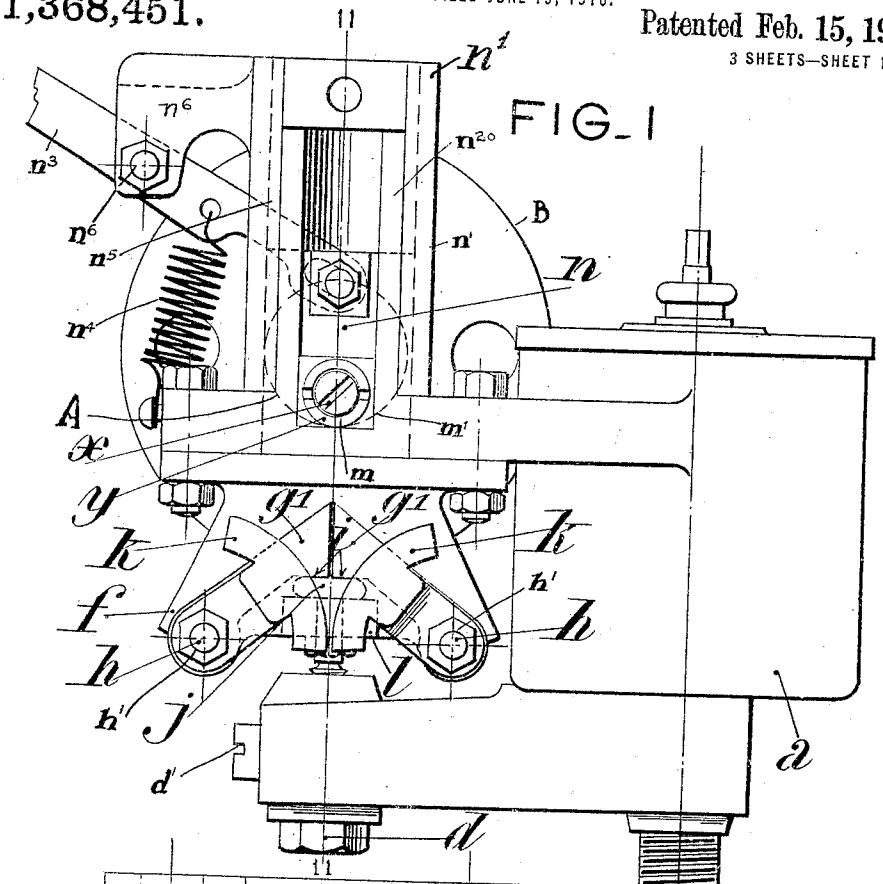
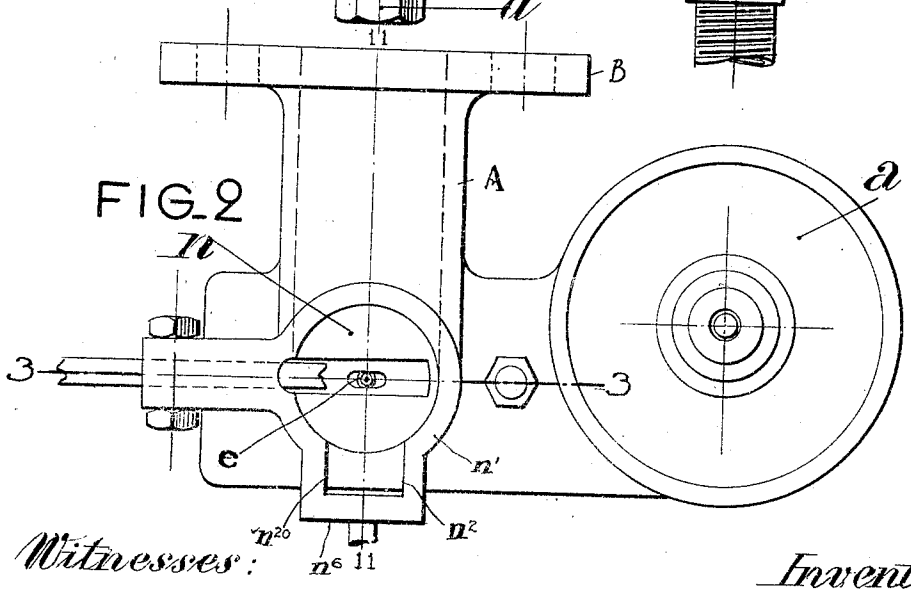


FIG_2



Witnesses:

Jean Germain

Henri Emile Dubart

Inventor:

Joannes Piat

J. PIAT.

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3 SHEETS—SHEET 2.

FIG_3

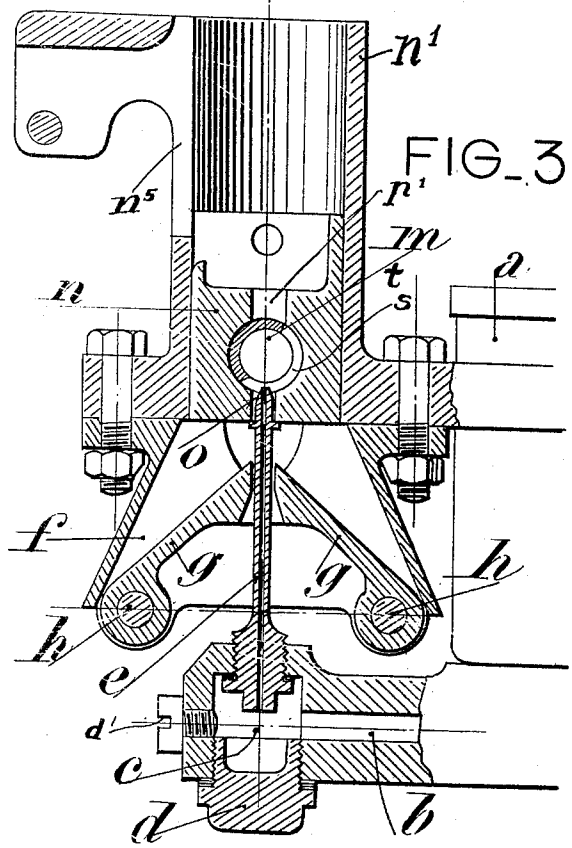


FIG_6

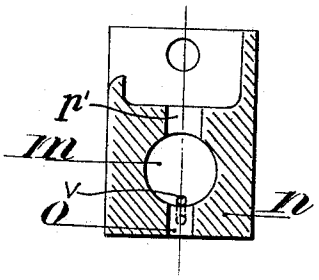


FIG_5

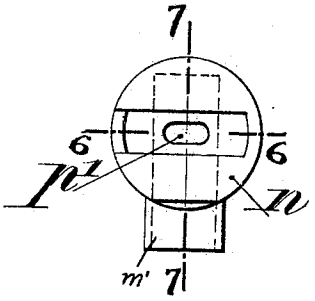


FIG_7

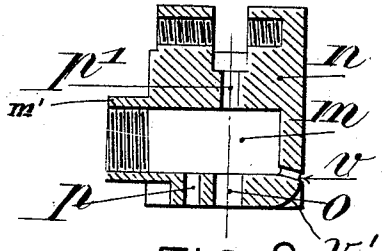


FIG_8

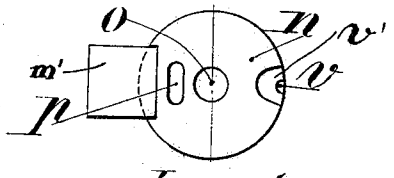
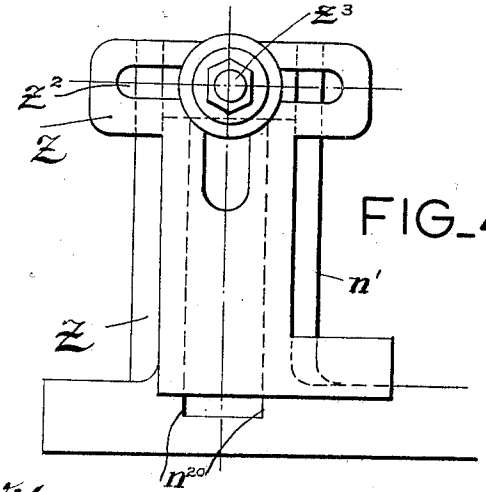


FIG_4



Witnesses:

Jean Germain

Louis Emile Dubuc

Inventor:

Joannes Piat

J. PIAT.

CARBURETER.

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3 SHEETS—SHEET 3.

FIG.11

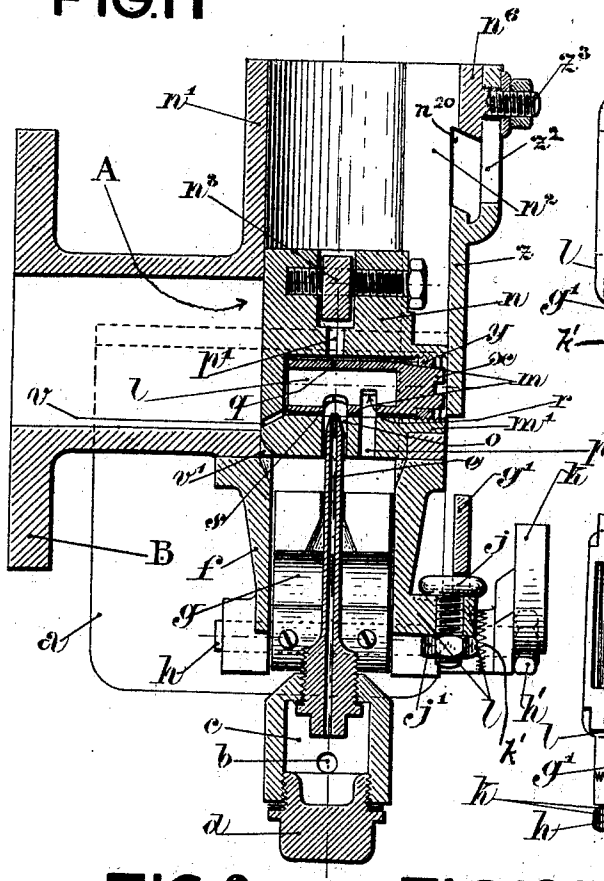


FIG.12

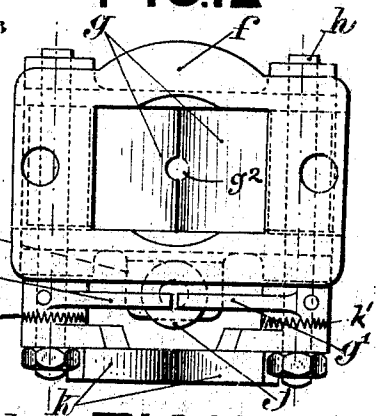


FIG.13

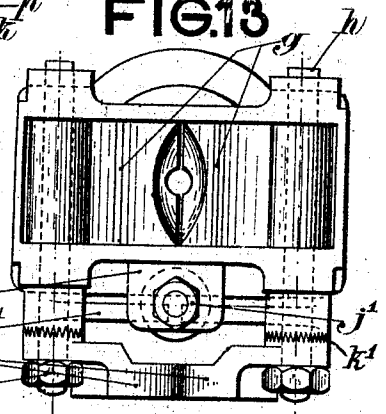


FIG.9

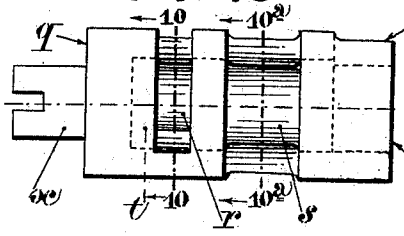
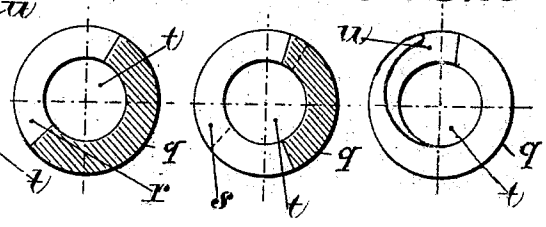


FIG.10 FIG.10ª FIG.10ᵇ



Witnesses

Inventor

Joannes Piat

by R Haddan

his Attorney.

UNITED STATES PATENT OFFICE.

JOANNES PIAT, OF LYON, FRANCE.

CARBURETER.

1,368,451. Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed June 19, 1916. Serial No. 104,412.

To all whom it may concern:

Be it known that I, JOANNES PIAT, a citizen of the French Republic, residing at Lyon, France, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters having means for automatically proportioning the air to the fuel supply, extra air inlets, and slow-running devices, and the object of the invention is to provide a carbureter of this type which is simple and cheap to produce, accurate in its functions and adjustable as regards each of these functions, the means of adjustment being accessible and regulatable from outside the carbureter and without dismantling any part thereof.

The invention is illustrated in the accompanying drawing, showing one form of construction.

Figure 1 is a front elevation of the carbureter with the extra air control plate removed.

Fig. 2 a plan view.

Fig. 3 a section on the line 3—3 of Fig. 2.

Fig. 4 is a front elevation of part of the carbureter shown in Fig. 1, but with the extra air control plate in place.

Fig. 5 is a top plan view of the throttling member.

Figs. 6 and 7 are sections on the lines 6—6 and 7—7, respectively, of Fig. 5.

Fig. 8 is a plan view of the bottom of the throttling member, showing certain of the ports therein and a notch for supplying extra air at slow speed.

Fig. 9 is a side elevation, on an enlarged scale, of a rotatable hollow plug adapted to be inserted in the cylindrical cavity, shown in Fig. 7, of the throttling member and serving as a means for adjustment of the various ports therein.

Figs. 10 and 10^a are, respectively, cross sections of the plug on the lines 10—10 and 10^a—10^a of Fig. 9.

Fig. 10^b is an end elevational view of the plug shown in Fig. 9.

Fig. 11 is a section on line 11—11 of Figs. 1 and 2.

Figs. 12 and 13 are, respectively, a top plan view and a bottom plan view of the automatic air regulating hinged flaps and the means for regulating initial position of the hinged flaps and for adjusting their counterweights.

In the drawing *a* designates the float chamber, and *b* a passage through which the fuel flows to a chamber *c* closed at the bottom and laterally by screw plugs *d* and d^1 and communicating at the top with the nozzle *e*. The latter passes upward through an air intake *f*, in which there are two hinged-flap valves *g* fixed to shafts *h*. To the latter are fixed adjustable counter weights *k* tending to press the flaps toward each other and toward the nozzle. The edges of the flaps have semicircular recesses g^2 for passage of the nozzle. The shafts *h* also have fixed to them arms g^1, whose end surfaces *i* rest upon a vertically adjustable abutment *j* formed by a screw with a rounded head screwed into a lug *l* projecting from the bottom of the outside of the choke tube *f*, so that by raising the abutment *j* the valve members *g* can be rocked away from the jet, to afford a minimum air passage that is to say, to prevent complete closure at low speeds when the suction of the engine through the partially open entrance to the manifold is not sufficient to automatically lift the valve members.

The screw *j* is adapted to be secured in its adjusted position by a lock nut j^1 beneath the lug (see Fig. 13).

The shafts *h* on which the flaps *g* and arms g^1 are fixed, project forwardly of the arms g^1 (see Figs. 12 and 13) and on these forward extensions are loosely slid the sector-shaped counterweights *k*, *k*. The rear face of the boss of each of these counterweights is radially serrated as at k^1 and the forward face of the boss of the arm g^1 is similarly radially serrated so that when the counterweights have been suitably angularly adjusted they may be fixed with regard to the arms g^1 and therefore to the flaps *g* by screwing up the nuts h^1 and thus causing the serrations to engage one another. It will be understood that the sectors *k* may be so fixed as to vary the closing moment of the flaps within wide final limits but are capable of adjustment within those limits sufficiently closely for practical purposes. The arms g^1 and the adjustable stud *j* serve for limiting the minimum opening between the flaps; the weights *k* serve for adjusting the resistance which the flaps exert against the current of air set up in the air intake by the suction of the engine and hence regulate the proportion of the air admitted in relation to the suction.

The air intake is prolonged upward in the form of a vertical guide tube n^1 which is substantially cylindrical, but has projecting on the front side of the carbureter a rectangular offset n^2 which forms a guide, and in the front wall of which is a rectangular open slot n^{20}. The side wall of the tube n^1 is also slotted longitudinally from the top for some distance down the side as shown at n^5. Adjacent this slot a lug n^6 projects and has a hole therein to receive the shaft 60 on which rocks a lever n^3 extending through the slot n^5 and connected to the throttling member n hereinafter described. Near the lower end of the back of the tube n^1 is an opening A (shown in dotted lines in Fig. 1) which is extended outward in the form of a tube with a flange B for the attachment of the carbureter to the engine admission manifold. The guide tube n^1 is open at the top.

The throttling member n operated by means of the lever n^3, slides in the vertical guide tube n^1. The valve n also has a square projection m^1 which engages in the guide n^2. A spring n^4 attached at its ends to the guide tube n^1 and to the lever n^3 tends to pull the throttling member n downward to the position shown in Fig. 3. The throttling member n opens or closes the orifice A which is closed by said member when the engine is at rest.

In the lower positions of the throttling member n the nozzle e projects into a chamber m formed in the throttling member n and its projection m^1; this chamber has at the bottom a port o for the passage of the nozzle, a port p for the inlet of the air and an outlet port v situated at its rear end and close against the lower wall of said chamber m. The latter also has at the top another port p^1 for inlet of air. Beneath the outlet port v, the bottom surface of the throttling member n can be provided, if desired, with a notch v^1 allowing extra air to pass into the opening A when the throttling member is sufficiently raised to open the said notch. To permit an adjustment of the inlet port p and the outlet port v and consequently the regulation of the amount of fuel mixed with the air when the nozzle e projects into the chamber m, this chamber is fitted with a cylindrical hollow plug q (Figs. 3 and 9) open at its rear end and having two apertures r and s in its wall.

The interior of the plug q forms a cylindrical chamber t with its axis horizontal. Adjacent to its open rear end, part of the interior surface of the cylindrical wall of the plug is cut away spirally at u to coact with the port v (Fig. 7) in the throttling member to form a passage way from the interior of chamber t to said port, so that by rotating the plug more or less in the throttling member the effective cross sectional area of the passage through the port v may be varied from zero at the commencement of the spiral up to the maximum cross sectional area of the port v at the end of the spiral. The inner wall of the spiral slot n will lie approximately on the line of section 11^e of Fig. 9. The plug q has a slotted head x, enabling it to be turned by means of any suitable tool, and by turning it, the apertures u, r and s can be adjusted in relation to the ports v, p, and p^1, in order to regulate the passage and admission of air and the outlet of mixture. The plug q is retained in the throttling member n by an externally screw-threaded ring y which surrounds the stud x and is screwed into the tapped extension of the wall of the chamber m formed in the projection m^1 of the member n.

When the throttling member n is lifted to a sufficient extent the suction of the engine is effective from A to the air intake and a small volume of air will pass in by the lifting of the flaps g, g. What is generally known as "auxiliary air" may, however, now be drawn in also through the slot n^{20} which is left more or less uncovered by cover plate z shown in Fig. 4. The cover plate z is provided with a T-shaped slot z^2 so that it may be adjusted either vertically or horizontally upon the set screw z^3. If said plate is adjusted vertically it serves to open more or less the lower end of the slot n^{20} and the "auxiliary air" is admitted in increasing measure during the initial stages of the opening of the opening A up to the point where the lower edge of the throttling member n is level with the lower edge of the plate z, after which the "auxiliary air" admission will not increase. If the plate z is adjusted horizontally to the left a small opening may be left at the bottom of the slot n^{20} but the bulk of "auxiliary air" will not be admitted until the throttle member n has risen so far that its lower edge passes above the level of the upper edge of the lateral extension z^1 of said plate, a position approximately corresponding to half opening of A, whence the admission of "auxiliary air" will increase in proportion to the further rise of the throttling member. The amount of "auxiliary air" depends on the width of opening of slot n^{20} left uncovered by the plate z. If the plate is adjusted horizontally to the right, the admission of "auxiliary air" is proportionate to the rise of the throttling member throughout its whole range of movement.

The operation and manipulation of the device are as follows:—

At slow running the hinged flaps do not come into use, the chamber m operating alone, this chamber being in the interior of the throttling member n. The mixture

formed, either in the chamber m or in the chamber t (if a plug is used as described), passes to the opening A, connected with the engine, through the outlet port v. For starting and for idle running the valve n is raised by means of the lever n^3 sufficiently for the port v to communicate with the opening A but not sufficiently to establish direct communication, below the throttling member n, between the orifice A and the chamber f containing the hinged flaps g. The latter do not effect the passage of the small quantity of air required when the throttling member has been further slightly raised, if the abutment j has been adjusted so that the minimum opening of the flaps is sufficient to supply the air that is needed for passage through the notch v^1.

When the speed of the motor is to be accelerated, it is sufficient to lower the end of the lever n^3 and raise the throttling member n so that the nozzle e ceases to be engaged in the opening o of the chamber m and the orifice of said nozzle feeds into the space below the member n formed by the chamber f between the orifice A and the flaps g. When the engine is at rest, the spring n^4, which tends to lower the small arm of the lever n^3, causes the throttling member n to assume its lowest position. In this position the throttling member n completely closes the opening A: also the port v and the notch v^1 (if any) are covered by the inner wall of the guide tube n^1 and the communication between the engine and the carbureter is cut off.

It will be seen that when the nozzle e no longer passes into the port o, the ports o and p^1 constitute means whereby air may enter the chamber f in addition to such air as enters past the flaps g g and the plate z. The air thus entering the chamber f through ports o p^1 sweeps directly upon the end of the nozzle and assists to atomize the fuel drawn from such nozzle. I find that it is necessary to provide air entrance restricting means, such as the flaps g g since otherwise the air in chamber f would be so slightly below atmospheric pressure that no fuel or only an insufficient quantity would be drawn from the nozzle when the latter debouches into that chamber.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

In a carbureter, the combination of a mixing chamber having a lateral discharge orifice, a fuel supply nozzle extending into said chamber, a valve adapted to reciprocate in said chamber in the direction of the length of the fuel nozzle, said valve having an interior chamber provided with a port extending through the wall thereof adjacent the lateral discharge orifice of the mixing chamber, a second port in alinement with the fuel nozzle, and a third port opening into the mixing chamber at one side of the fuel nozzle, a rotary hollow plug within said chamber of the valve, having ports corresponding to those in the valve, and means for holding said plug in adjusted positions to vary the effective openings of said ports.

In witness whereof I have signed this specification in the presence of two witnesses.

JOANNES PIAT.

Witnesses:
JEAN GERMAIN,
MARIN VACHON.