Nov. 14, 1933. C. H. CLAUDEL 1,934,840

CARBURETOR

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Fig.1

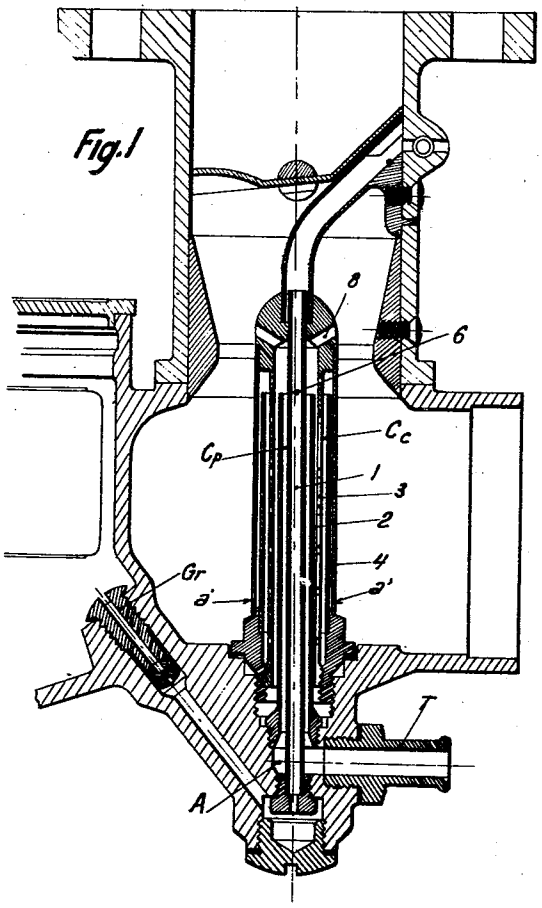

Fig.2

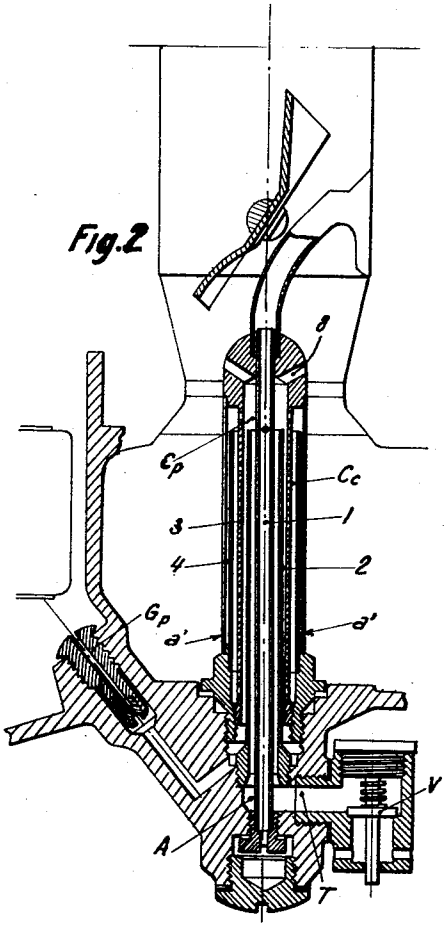

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Fig.3

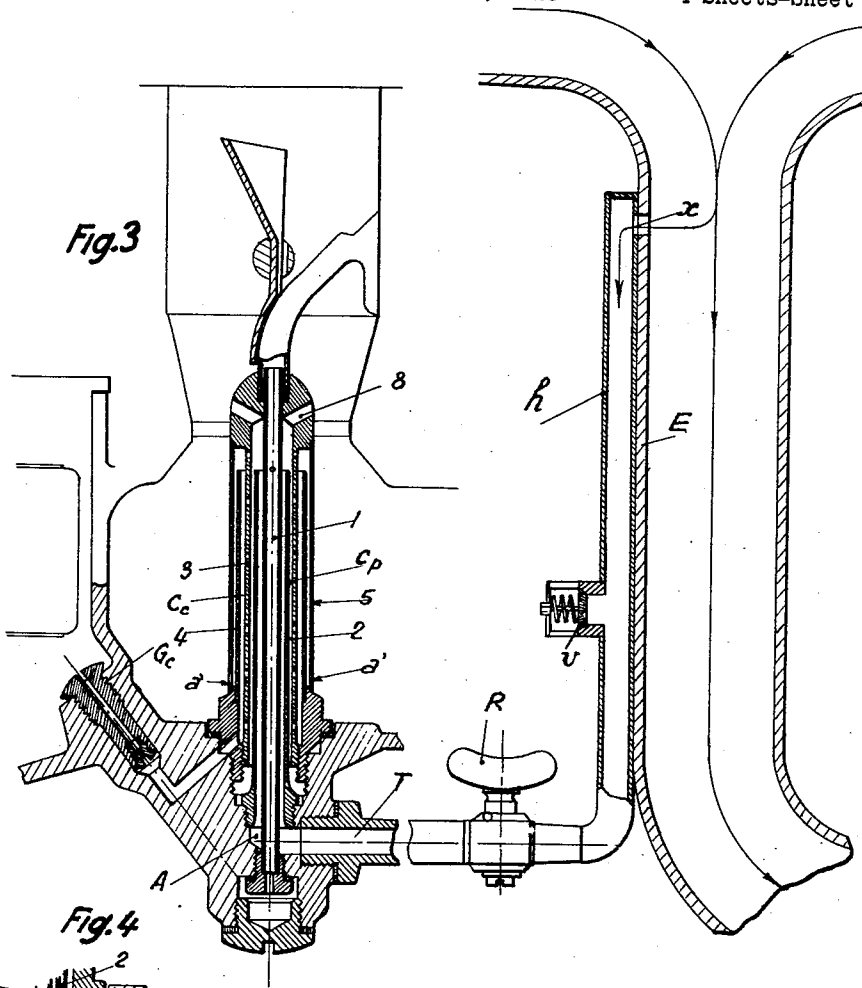

Fig.4

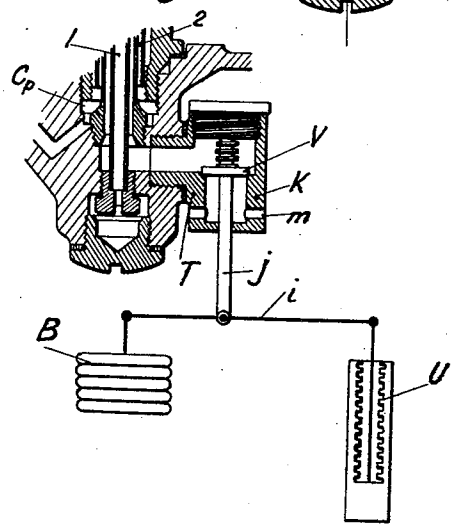

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Fig. 5

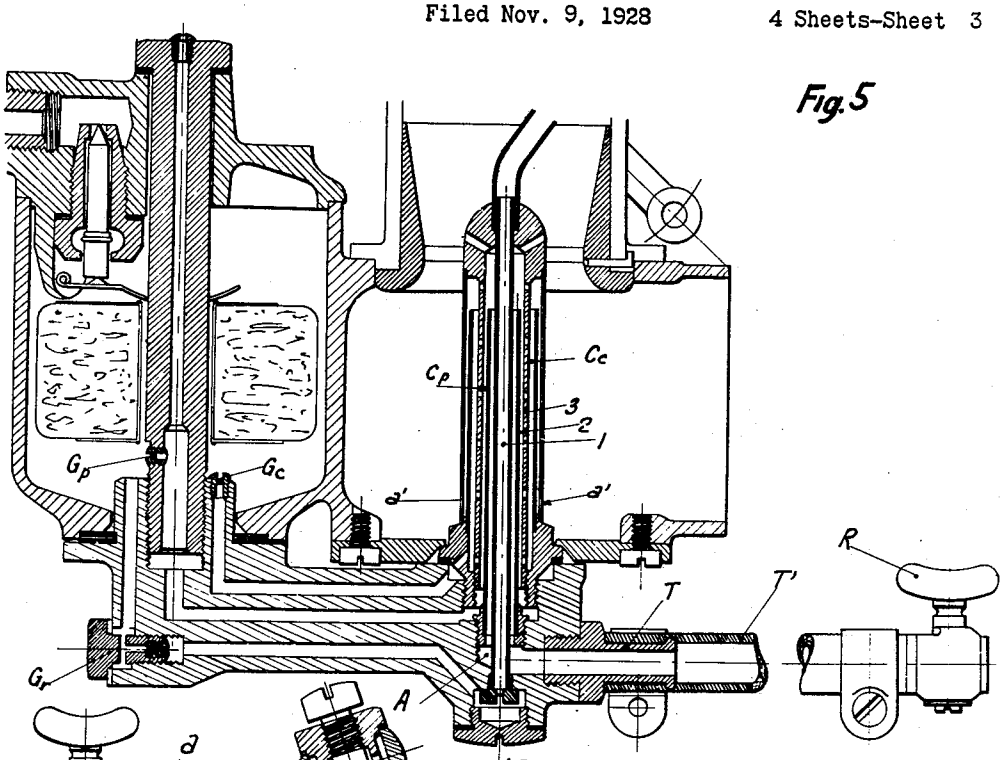

Fig. 6

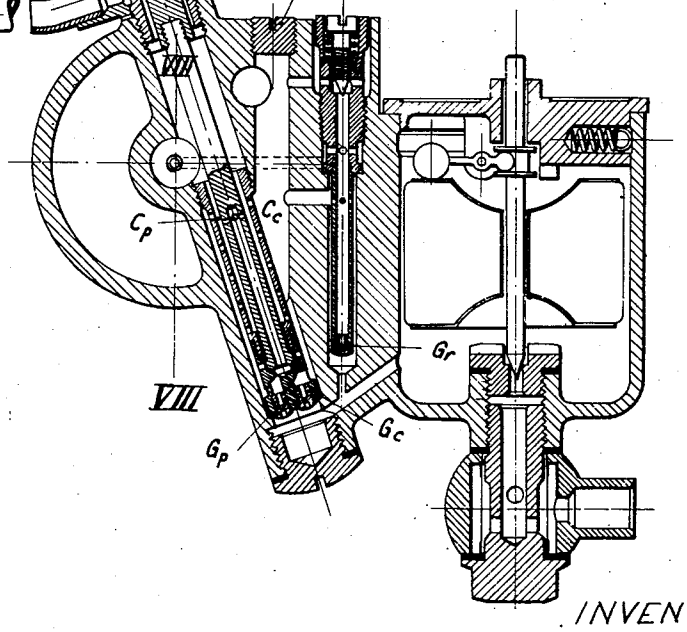

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Fig.7

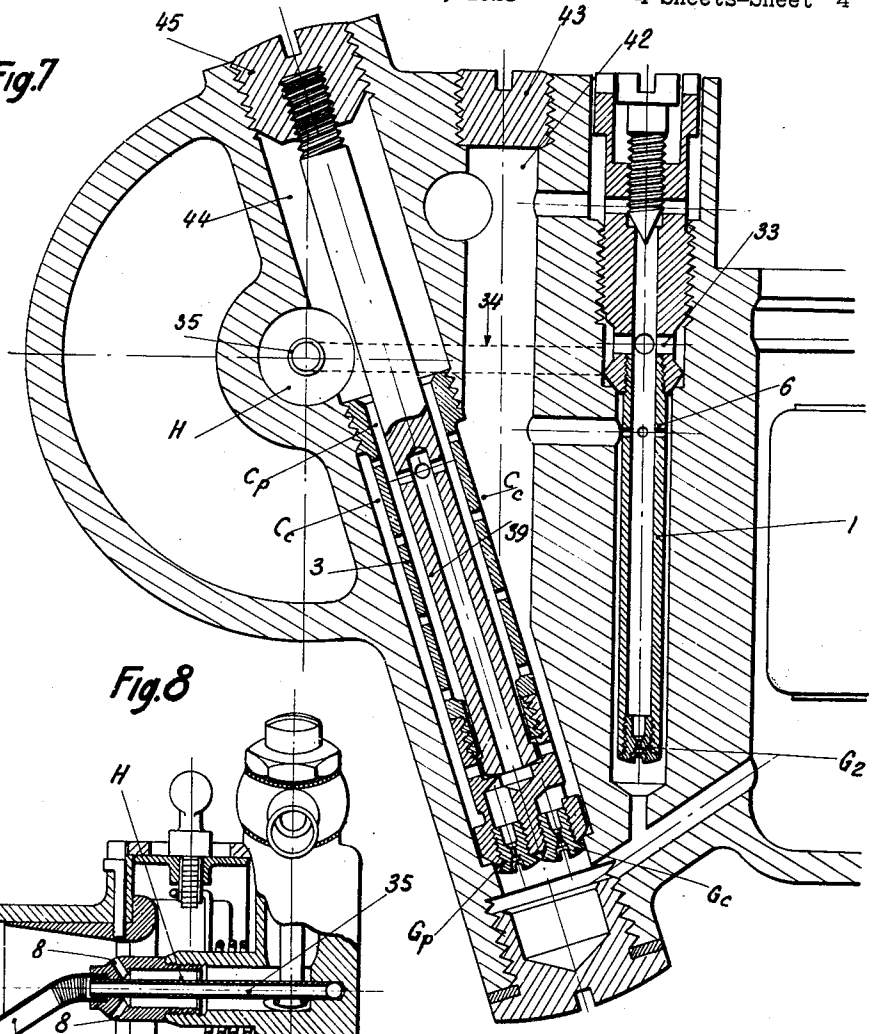
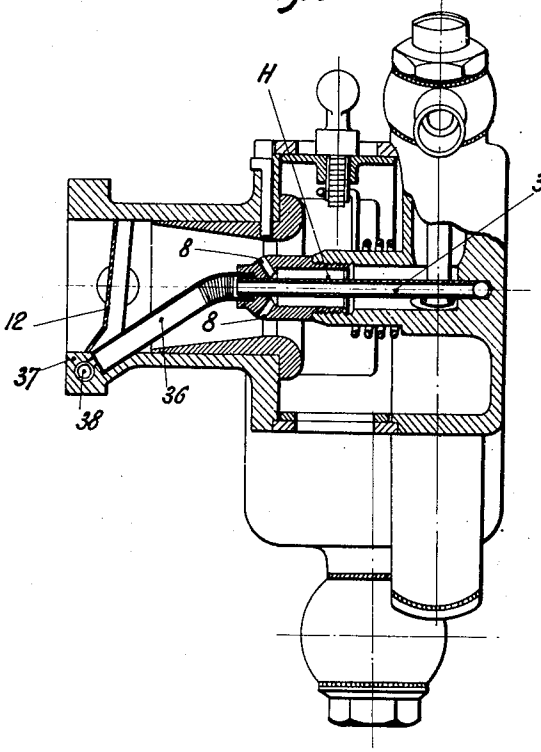


Fig.8



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Patented Nov. 14, 1933

1,934,840

UNITED STATES PATENT OFFICE

1,934,840

CARBURETOR

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Application November 9, 1928, Serial No. 318,157, and in France March 31, 1928

2 Claims. (Cl. 261—121)

The present invention relates to improvements in carburetors, and it has for its object a device by which I may supply a correcting fluid such as air, hot gas or an oxidizing fluid, directly into the interior of the emulsion.

When in operation, the emulsion device of a carburetor is in fact a source of great cold, and particularly if the engine is supplied by gasoline or other light fuel, due to a very rapid evaporation of the gasoline. The air supplied to the emulsion chamber always contains a greater or less amount of moisture, and if the external temperature is very low, as is often the case for airplanes, the usual heating means become insufficient, so that the great cooling due to the evaporation of the gasoline in the emulsion chamber will cause the formation of frost which obstructs the orifices and causes the stopping of the engine. This is a serious defect in aeroplane operation. In my said invention, I supply a hot fluid directly into the emulsion-producing chamber, thus counteracting the cold which is produced in said chamber, whereby all of the aforesaid drawbacks will be eliminated.

If an oxidizing fluid is to be added to the emulsion, either to provide for the ready use of heavy fuel, or to increase the power of the engine, the supply of such oxidizing fluid to the center of the said emulsion chamber will afford greater and more complete effects upon this emulsion which is being formed, than in the case in which it is subsequently added to the emulsion or to the principal mixture.

The apparatus according to the invention preferably comprises a tube disposed in the interior of the emulsion-producing chamber and freely communicating with this chamber by its open upper part which is disposed above the constant level of the fuel, in such manner that the said tube will also form a guard tube. In the case of a combined emulsion-producing device comprising a central nozzle for the slow-speed emulsion surrounded by concentric tubes forming the normal operating emulsion; the said guard tube, placed in the emulsion chamber around the said slow-speed emulsion, will also heat by conduction the said slow-speed nozzle which it surrounds for a great length, and also supplies it with the hot or oxidizing fluid which serves to correct the said fluid.

The said internal guard tube is connected to the source of said correcting fluid preferably by a regulating valve under manual or automatic control. I may employ a combination automatic control for the said valve, for instance comprising a barometric corrector and a thermometric corrector.

In certain cases, I may supply the correcting fluid by a tube surrounding the diffusing tube, so that the correcting fluid will enter the emulsion chamber through the holes of the said diffusing tube.

The invention is applicable to all carburetors provided with an emulsion-producing device, and I herein represent solely by way of example, in the appended drawings, various embodiments of the invention applicable to carburetors comprising three sprayers, as specified in my co-pending patent application Serial No. 318,156 entitled "Improvements in carburetors".

Figs. 1 to 3 are partial views showing the emulsion-producing device of a vertical carburetor as specified in the said patent application, these figures being axial sections through the same vertical plane in right part and through three different vertical planes angularly displaced in left part thereof showing various means for regulating the admission of the correcting fluid. Fig. 4 shows a section through the same plane as Fig. 2, a special automatic control for this regulation adapted to the same carburetor. Fig. 5 shows in axial section a modified construction of a vertical carburetor to which the invention is applied.

Figs. 6, 7 and 8 show the use of the invention with a horizontal carburetor of the type specified in said co-pending patent application, Fig. 6 being a vertical section, Fig. 7 an enlarged view of a part of Fig. 6, and Fig. 8 a view part in elevation and part in section through the line VIII—VIII of Fig. 6.

The carburetor, whose gas-mixing or emulsion arrangement is shown in Figs. 1, 2 and 3, has mounted in the chamber three sprayers comprising the speed-reducing sprayer G_r, the normal high-speed sprayer G_p, and the slow-speed sprayer G_c. The first of these sprayers supplies the central speed-reducing nozzle 1 into which the mixing air enters through the hole 6. The second sprayer supplies the emulsion chamber C_p situated between the central nozzle 1 and the diffusing tube 3. The third sprayer supplies the chamber C_c situated between the diffusing tube 3 and a guard tube 4, which is surrounded by an external tube 5 having at its lower part the holes a' for the admission of the primary air.

I provide in the emulsion chamber C_p itself, and between the central nozzle 1 and the perforated diffusing tube 3, a guard tube 2 opening at the bottom into a chamber A which communicates by a suitable conduit T with the source of the correcting fluid, so that the said fluid is brought directly into the mixing chamber, and it is added to the emulsion supplied by any one of the three sprayers. The supply of the correcting fluid may be controlled by hand, for instance by a cock R as shown in Fig. 3, or automatically by a positively controlled cock or clack valve, or as shown in Fig. 2, by an automatic clack valve, V, placed in a casing adapted for the admission of the fluid.

In Fig. 4, the clack valve V is under a combined control comprising on one side a barometer capsule B and on the other a thermometer capsule U combined either in cooperation or by differential action and acting by means of a common controlling bar *i* to which is pivoted the rod *j* of the valve V. The thermometer device U may be mounted on the engine cylinder itself in order to receive conducted heat therefrom, or it may be subjected to the action of a hot fluid supplied from the engine. A correction might be made by means of a second thermometric correcting device of like nature which is placed in the air of the space supplying the engine, with or without contact with the engine cylinders or with the hot fluid from the engine. In this manner, I may obtain a differential action between the action of the temperature of the surrounding space and the action of the temperature of the engine. The chamber *k* of the conduit T in which is situated the said valve V, instead of communicating through the orifices *m* with the atmosphere as herein represented, may communicate with a source of air, hot gas, or oxidizing fluid.

In particular, I prefer to use hot gas from the exhaust conduit of the engine. The arrangement is shown in Fig. 3. The conduit T is connected, through the medium of a regulating valve (of any kind and under any control) such as R, to a small tube *h* which is preferably placed against the discharge pipe E for the whole or a part of its length. The end of the tube *h* is closed, and a hole is pierced at *x* in both tubes *h* and E, thus connecting them together. Due to this simple arrangement, when the engine is started, and during the first few turns of the engine, and before the parts become heated by conduction, the highly heated exhaust gas is at once supplied to the emulsion chamber.

To prevent over-pressure at the exhaust from disturbing the operation of the carburetor, I may employ a valve V which opens to the inside and the outside of the tube *h*, or one or more orifices may be provided, connecting said tube with the atmosphere and thus reducing such over-pressures to a suitable degree. A certain over-pressure, which however reduced and made regular, may be employed to advantage to reduce the value of the gas mixture at high speeds, according as the pressure increases in the exhaust conduit.

Fig. 5 shows a carburetor whose construction is somewhat different as concerns the sprayers, but whose principle and functioning remain the same. The conduit T is herein connected by flexible hose T' to the valve R for regulating the admission of the correcting fluid.

Figs. 6, 7 and 8 show a horizontal carburetor with three sprayers G_r, G_p, G_c, according to the aforesaid co-pending patent application. Fig. 6 is a transverse axial section. Fig. 7 is a partial view on a larger scale, and Fig. 8 is a lengthwise section.

The correcting fluid may be supplied by a conduit which can be substituted for the plug 43 or for the plug 45. In the latter case, the correcting fluid is brought by the conduit 44 directly into the chamber H and also into the internal chamber C_p between the outer diffusing tube 3 around which is supplied the liquid from the slow-speed sprayer G_c, and the inner diffusing tube 39 into whose interior is delivered the liquid supplied by the said sprayer G_p. When the correcting liquid is brought through the conduit 42, it is supplied to the chamber G_c around the diffuser 3 and proceeds through the spaced holes in said diffuser into the chamber C_p, then passing together with the emulsion into the suction chamber H which is common to the two sprayers G_p and G_c. In this second case, the correcting fluid is also supplied to the slow-speed nozzle 1 into which it enters through the orifices 6 and proceeds thence through the orifices 33 and the conduit 34 into the nozzle 35 for the exit of the slow-speed emulsion.

Obviously, the supply of the correcting fluid can be regulated by any suitable means, and chiefly by the devices shown in Figs. 1 to 4.

I have already referred to the great importance of the direct supply of a hot correcting fluid to the emulsion chamber, and chiefly of the exhaust gas, itself, in order to prevent the formation of frost in the interior of the emulsion producer. This heating, in addition to the admission of a strong oxidizing agent such as ozone, also permits the use, with the greatest facility, of the very heavy fuels, whose complete combustion is assured by the ozone. In order to provide an increased power for airplanes when at high altitudes, or to increase the power of the engine at any time, I may supply strong oxidizing agents through the same conduit, so that the consumption of the fuel will be simultaneously increased, thus increasing the power of the engine.

The engine may be employed to actuate an ozone-producing apparatus furnishing the ozone which is drawn by a vacuum (or the like) into the emulsion-producing apparatus. The invention covers this addition of ozone, not only as the correcting fluid which is brought into the emulsion chamber itself, but also in a general manner, the addition of ozone to the fuel mixture.

I may provide for an additional supply of fuel corresponding to the supply of ozone, and can thus use a suitable combined control to increase the power of the engine when this is desired.

I claim:

1. In a carburetor comprising a float feed tank, a diffusing element with central nozzle for the slow-speed mixture, a chamber for the formation of the normal speed mixture surrounding said slow-speed nozzle and discharge orifices delivering both mixtures towards a motor and comprising means for supplying to said chamber the liquid fuel and the air for the normal speed mixture, a tube surrounding said central nozzle, disposed in the interior of said chamber the open end of which is situated above the level of said float feed tank, and means for supplying said tube with a correcting fluid distinct from the air for the primary mixture.

2. In a carburetor comprising a float feed tank, a diffusing element with central nozzle for the slow-speed mixture, a chamber for the formation of the normal speed mixture surrounding said slow-speed nozzle and discharge orifices delivering both mixtures towards a motor and comprising means for supplying to said chamber the liquid fuel and the air for the normal speed mixture, a tube surrounding said central nozzle, disposed in the interior of said chamber the open end of which is situated above the level of said float feed tank, a conduit leading to said tube exhaust gases and regulating means to prevent over-pressure at the exhaust from disturbing the operation of the carburetor.

CHARLES HENRI CLAUDEL.