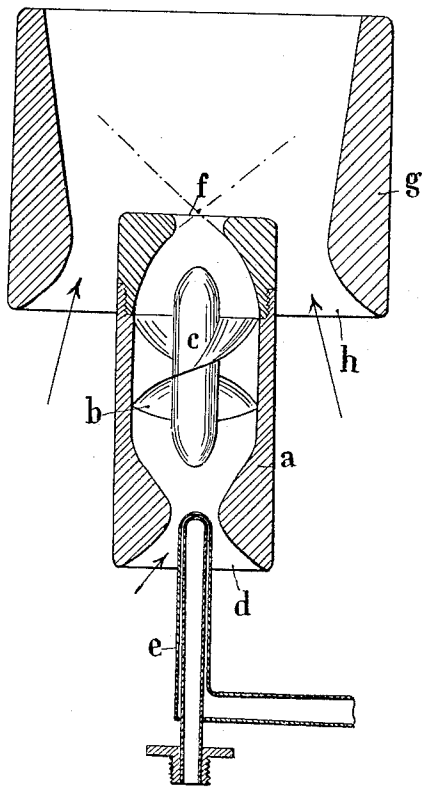
April 1, 1930. F. C. F. PORTAIL 1,752,506

CARBURATION DEVICE

Filed Nov. 2, 1926 2 Sheets-Sheet 1

Fig. 1.



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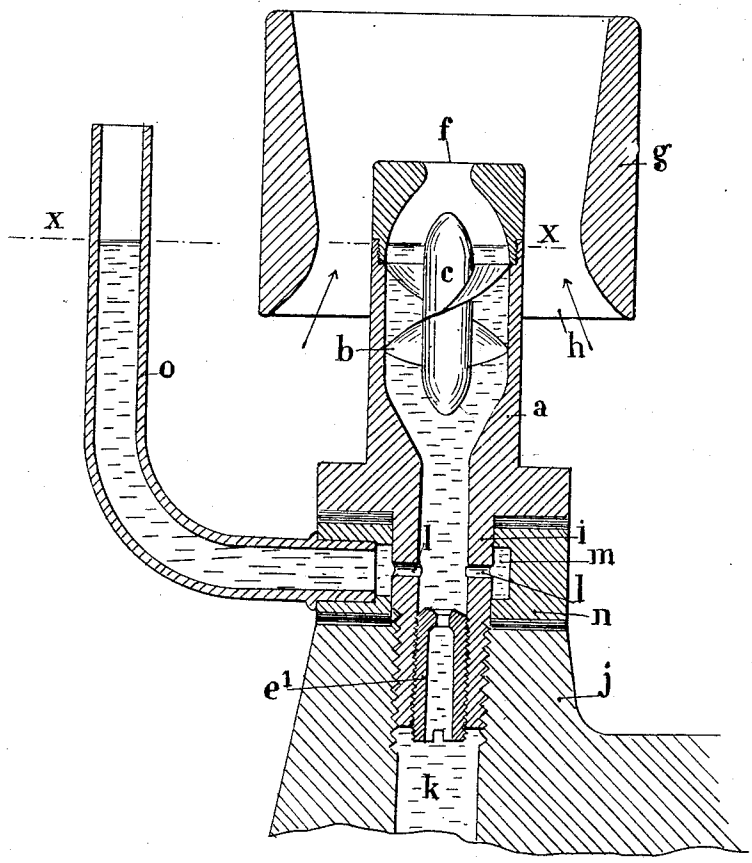
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Fig. 2.



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UNITED STATES PATENT OFFICE

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CARBURATION DEVICE

Application filed November 2, 1926, Serial No. 145,800, and in France November 28, 1925.

The efficiency of explosion engines and internal combustion engines, in general, is a function, as is known, of the degree of atomization of the fuel.

Numerous methods have been proposed in view of producing, either at the outlet of the carburetor in the case of an explosion engine, or at the outlet of the injector in the case of an internal combustion engine, the spraying of the fuel and the stirring of the latter with the air supporting the combustion, so that the mixture of this fuel and of this air forms a kind of tenuous mist. However the methods actually known do not allow of obtaining a perfect homogeneity of the mixture of air and fuel: in most of the existing apparatus the spraying of the fuel is produced by means of air entering, through one or more holes, opposite the inlet orifice of the liquid fuel; these devices ensure but an incomplete spraying or atomization and the mixture of air and fuel obtained in these conditions always contains in suspension small drops of liquid fuel which are deposited on the walls of the carburetor or of the piping leading to the engine and flow down this wall without having been used; this causes an excessive consumption of fuel as well as a diminution of efficiency of the engine.

The present invention has for object a spraying device or atomizer remedying the above-mentioned inconveniences.

This invention is substantially characterized by the application, in front of the spraying nozzle or of the injector for the liquid fuel, of a device imparting to the liquid fuel and to the air, a rapid helical movement so that this mixture forms a very thin sheet having a gyratory movement, opposite the main air intake feeding the engine.

The sheet thus formed contains a fuel in an extremely divided condition and, moreover, owing to its gyratory movement, is encountered at all its points by the air being supplied; in these conditions, the mixture of air and fuel admitted to the engine, has a perfect homogeneity and no loss of fuel through trickling down can take place.

In order that the invention may be clearly understood, two forms of construction of the device forming the subject matter of the said invention will be described hereinafter with reference to the accompanying drawing, in which:

Fig. 1 shows in vertical section a form of construction of the invention as applied to any type of carburetor.

Fig. 2 illustrates, also in vertical section, a modification showing the application of the invention to a carburetor provided with a flooded spraying nozzle.

As shown in Fig. 1, the spraying device, forming the subject-matter of the invention, comprises a tubular body *a*, open at both ends, and enclosing a fixed helix or screw *b*, of suitably determined pitch, this helix or screw, frictionally fitted in the tubular body *a*, is carried by a core *c* the ends of which are of round shape.

At its lower part, the tubular body *a* is provided with an opening *d*, in which opens the spraying nozzle *e* of any type of carburetor, and through which enters the air adapted to produce the atomization of the liquid fuel when it issues from the spraying nozzle *e*; this opening has, preferably, a flared shape in order to facilitate the entrance of this atomizing air.

The tubular body internally presents at its upper part, an ogive profile and opens through a calibrated orifice *f*, in a Venturi tube *g* at the point where the carbureted mixture is admitted in ordinary carburetors.

Between the tubular body *a* and the Venturi tube *g* is provided an annular space *h* through which enters the primary air feeding the engine.

Under the action of the suction created by the engine within the Venturi tube *g* and the tubular body *a*, the liquid fuel supplied by the spraying nozzle *e* and the atomizing air admitted through the tubular body *a* by following the helix or screw *b*, which latter imparts to the fuel and air an extremely rapid helical movement promoting their stirring and this mixture of fuel and air issues through the upper calibrated orifice *f* of the tubular body *a* in the form of a very thin conical sheet having a gyratory movement.

The diameter and the pitch of the screw

b, the profile of the round upper end of the core c, the profile of the upper part of the inner face of the tubular body a and the diameter of the calibrated outlet orifice f, which determine the conicity of the sheet of fuel and air are preferably so devised that the angle at the apex of this conical sheet is very great and as near as possible to 180°; in this case, the primary feeding air entering into the annular space h encounters the sheet of fuel and air according to a direction approximately at right angles to this sheet.

Moreover, owing to its gyratory movement, this sheet is encountered at all its points by the primary air entering the Venturi tube g through the annular orifice h.

Fig. 2 shows a form of construction of the invention when it is applied to a carburetor having a flooded spraying nozzle.

In this case, the tubular body a is extended, at its lower part, in a tube i screwed, or secured in any other manner, on the body j of the carburetor, in a pipe k in communication with a constant level tank; the spraying nozzle e^1 is mounted at the lower part of this tube i.

The atomizing air is admitted into the tubular body a through one or more orifices l provided in the tube i and opening in an annular chamber m formed in a block n mounted on the tube i; this annular chamber m can be put in communication with the atmosphere through a curved tube o, the upper end of which opens in the atmosphere above the normal level X—X of the fuel in the constant level tank of the carburetor.

When the carburetor is not in action, the liquid fuel fills the tubular body a and the tube o up to the level X—X of the fuel in the constant level tank.

Upon picking up, all the fuel situated above the spraying nozzle e^1 in the tubular body a and in the tube o is sucked by the engine as in the case of the known carburetors having a flooded spraying nozzle, then the spraying nozzle e^1 continues to deliver fuel whilst the air admitted through the tube o enters through the orifices l in the tube i of the tubular body a. At this moment, the atomizing air thus admitted and the liquid fuel supplied by the spraying nozzle, sucked by the engine, pass through the tubular body a receiving a helical movement imparted to the same by the screw e, and issue in the form of an extremely thin conical sheet as above stated.

It is to be understood that the forms of construction above described are given by way of example only, and that the shape, dimensions and details of construction of the constituent elements of the atomizing device forming the subject-matter of the invention as well as the number of turns of the helix or screw of this device can vary according to the applications.

Claims:—

1. In a carburation device, a fuel nozzle, an atomizer located in advance of the nozzle in the path of the fuel and consisting of a tubular body in the lower end of which the nozzle opens and through which enters only the air adapted to atomize the fuel, a screw mounted on an extended core in the tubular body, the upper end of the core and the outlet opening of the tubular body being so shaped as to cause the atomized fuel to issue therefrom in the form of a flattered conical sheet, and a main air supply tube provided with an opening arranged and shaped so that the main air supply passes through the aforesaid flattened conical sheet of fuel.

2. In a carburation device, a fuel nozzle, an atomizer located in advance of the nozzle in the path of the fuel and consisting of an open-ended tubular body in the lower opening of which the nozzle opens and through which enters only the air adapted to atomize the fuel, a screw mounted on an extended core in the tubular body, the upper end of the core and the outlet opening of the tubular body having an ogival shape so as to cause the atomized fuel to issue therefrom in the form of a flattened conical sheet, and a main air supply tube provided with an opening arranged and shaped so that the main air supply passes through the aforesaid flattened conical sheet of fuel.

The foregoing specification of my "Carburation device" signed by me this 19th day of October, 1926.

FERNAND CHARLES FREDERIC PORTAIL.