July 28, 1925. 1,547,323

L. A. A. HENNEQUIN

CARBURETOR FOR INTERNAL COMBUSTION MOTORS

Filed Sept. 1, 1920 2 Sheets-Sheet 1

Fig. 1

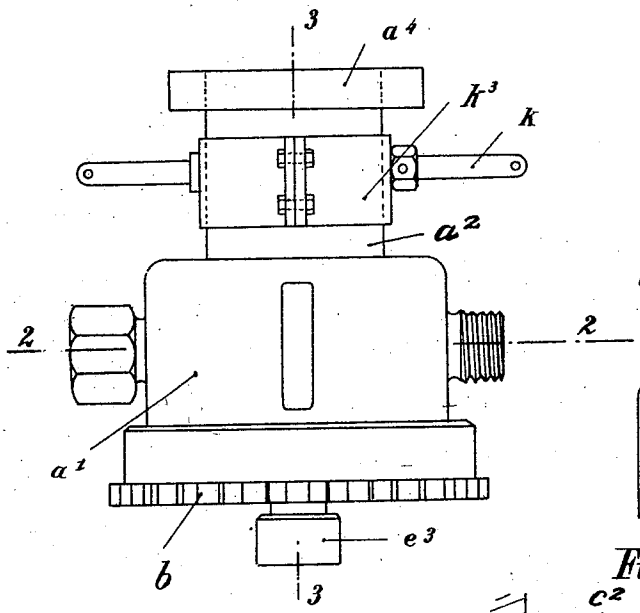


Fig. 6

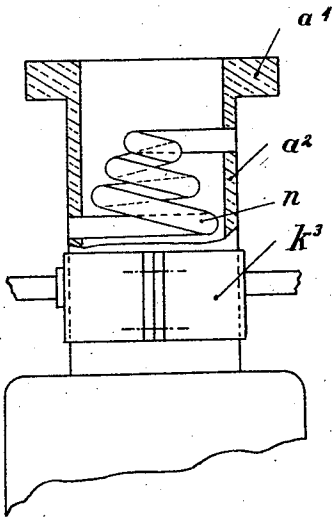


Fig. 2

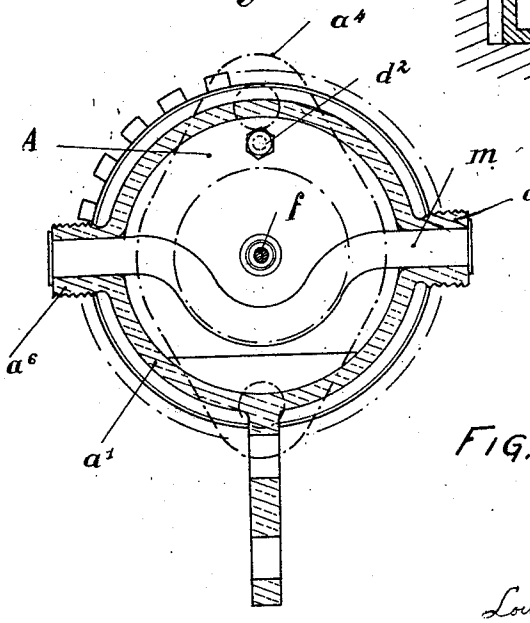
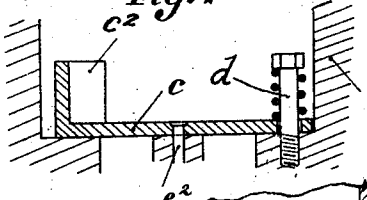


Fig. 7



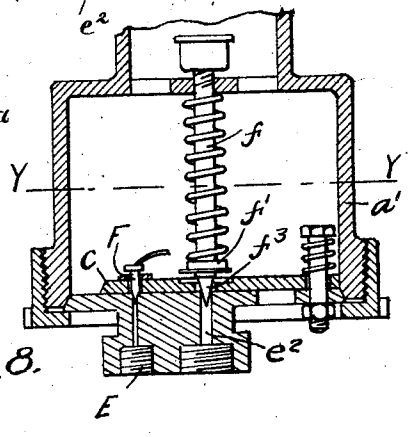


FIG. 8.

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July 28, 1925. 1,547,323

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Filed Sept. 1, 1920 2 Sheets-Sheet 2

Fig. 3

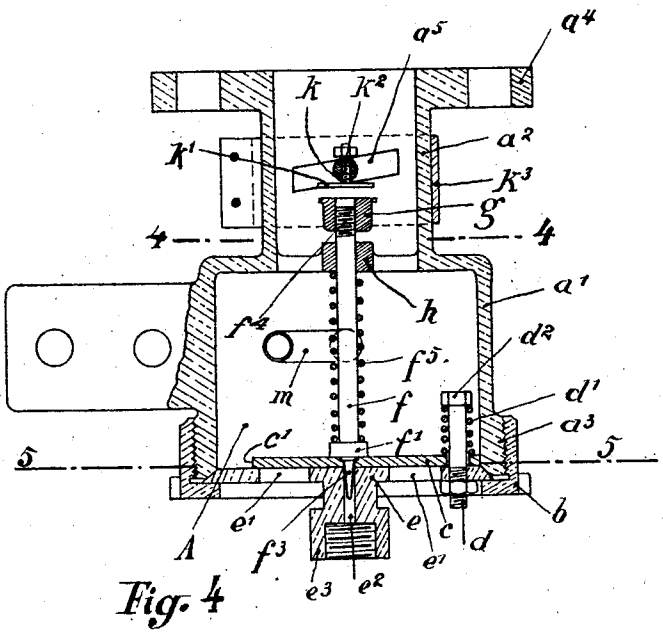
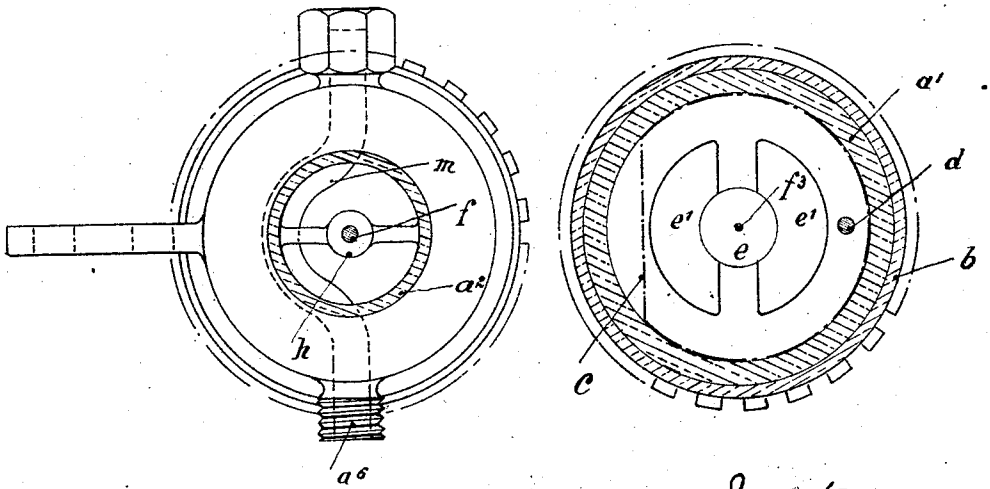


Fig. 4

Fig. 5



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UNITED STATES PATENT OFFICE.

LOUIS ANATOLE AUGUSTE HENNEQUIN, OF COMPIEGNE, FRANCE, ASSIGNOR TO GASTON FROMONT, OF LEVALLOIS-PERRET, FRANCE.

CARBURETOR FOR INTERNAL-COMBUSTION MOTORS.

Application filed September 1, 1920. Serial No. 407,287.

To all whom it may concern:

Be it known that I, LOUIS ANATOLE AUGUSTE HENNEQUIN, a citizen of the Republic of France, residing at 5 Rue Saint-Martin, Compiegne, Oise, France, have invented certain new and useful Improvements in Carburetors for Internal-Combustion Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention has for its object to provide an automatic carburetor which is devoid of a constant level supply reservoir and in which the air admission inlet is controlled by a flat smooth valve which is substantially larger than the inlet, is raised from its seat and is traversed by a fuel needle valve that controls the fuel admission, the needle valve passing through the air valve without any appreciable play and the mounting of the air valve being effected in a manner to permit only a very small lift thereof in order that the fuel may spread in a sheet or layer under the valve by the force of its injection and the action of the drawn-in current of air.

In the accompanying drawings—

Figure 1 is an elevation of a carburetor for internal combustion engines constructed according to the first embodiment of this invention. Fig. 2 is a horizontal section of the same on the line 2—2 Fig. 1. Fig. 3 is a vertical section on the line 3—3 Fig. 1. Fig. 4 is a horizontal section on the line 4—4 Fig. 3. Fig. 5 is another horizontal section on the line 5—5 Fig. 3, in which the valve is shown in broken lines. Fig. 6 is an elevation, with certain parts in section, of a device for heating the carbureted mixture. Fig. 7 is a detail section of a modified form of the valve. Fig. 8 is a vertical section of another modified form of carburetor.

The carburetor is essentially constituted by a main body whose lower part a^1 forms the central chamber of the carburetor proper, and whose upper part a^2 of smaller diameter forms the outgoing passage for the carbureted fuel. The lower part a^1 is provided with an outer screwthreaded portion a^3 having screwed thereon the closing nut b. The main body or casing of the carburetor is provided at the upper part with a flange a^4. The valve c is yieldingly held at one point by means of a spring d^1 which bears against the head d^2 of a bolt d having the said spring mounted thereon. Said valve is of substantially the same diameter as the body portion a' and has a lateral cut-away portion c' as shown in Figs. 1 and 5, which cooperates with the aperatures e' and duct e^2 to permit the passage of the carburant into the body portion a'. The valve seat e is provided with the apertures e^1 for admission of air and with a central duct e^2 for the admission of carburant, its lower part e^3 being adapted to be connected by any suitable means with the carburant piping (not shown). The needle of the valve is constituted by a rod f having a shoulder f^1 and ending at the lower part thereof in a conical portion or needle proper, f^3. The needle is given a suitable conical shape whereby the amounts of carburant and air shall have a constant ratio in all cases for a given temperature of the outer air irrespective of the positions of the valve and the needle. That is to say, as the valve c is raised and an increased amount of air passes through the apertures e' the needle f^3 is withdrawn from the duct e^2 to permit an increased amount of the carburant to be discharged through said duct. Upon the upper threaded part f^4 of the rod f is screwed the stop piece g. The needle is impelled downwardly by means of the spring f^5, and the rod thereof is slidable in a guide portion h.

The device for regulating the admission of carburant comprises a cross pin k slidable in the helicoidal slots a^5 provided in the wall a^2 of the casing. The pin k has secured thereto a stop piece k^1 by means of the screw k^2. The pin k is secured to a sleeve k^3 which may be actuated for instance by means of a rigid or flexible mechanism connected with a governor or an accelerator. It will be readily observed that the movement of the sleeve k^3 causes the pin k to move in such manner that its axis described a helix whose directrix is the axis of the rod f, thereby causing the vertical movement of the stop piece k^1 and varying the stroke available for the needle f^3. Inasmuch as the lift of the valve c is

limited by the shoulder f^1 of the needle, this device serves to regulate the stroke of the valve and the needle at the same time and it consequently regulates the automatically proportioned admission of the carbureted mixture.

The fuel under pressure is projected by the tube e^2 and spreads out in the form of a mushroom by reason of the conical end of needle f^3. The current of air which is drawn in through the orifices e' will then spread out the fuel or carburant under the flat and polished valve thereby forming a thin layer over which the current of air is caused to flow, thus effecting a good carburation of the admitted air.

The device for heating the gases admitted into the carburetor is essentially constituted by a tube m of any suitable form which passes through the central chamber A of the carburetor and is traversed by a portion of the exhaust gases. The said tube enters and leaves this central chamber by means of the threaded bosses a^6 which in the example here represented are cast with the main body a^1 of the carburetor.

The second device for heating the carbureted mixture, which is shown in Fig. 6, is constituted by a worm tube n traversed by the exhaust gases, and the latter are caused to give up a portion of their heat which is thus recovered. The said worm tube is disposed for instance in the upper part a^2 of the main body of the carburetor.

The modified form of the valve c shown in Fig. 7 comprises an extension c^2 which is perpendicular to the face c, thus increasing the path followed by the air and carburant while in process of mixing, whereby the surface of the layer of fuel which extends under the flat valve and the extension c' is increased and consequently the quality of the mixture is correspondingly increased. By increasing the surface of the valve, the surface of the carburant is increased so that the dimensions of the main body a^1 of the device may be reduced, and it will even be possible to give to the latter a diameter equal to that of the out going passage a^2.

It is evident that the above described device for heating the admitted gases will only be put in operation when the motor is already running. When heavy oils are used as carburants, it will be advantageous to facilitate the starting by heating the carburant, and this can be carried out by the use of an independent method for heating the carburant before it reaches the carburetor, for instance by means of an electric heating device. A method whereby the heating of the mixture can be obviated consists in supplying the carburetor with gasoline at the time of starting, and with a mixture of gasoline and oil or heavy carburant such as kerosene during the running of the motor. For this purpose the carburetor contains in addition to the above mentioned needle which is employed for heavy carburants, an auxiliary needle F connected to a gasoline feed pipe E. This second needle is also actuated by the valve when this latter is lifted, and it is so disposed that when the valve rises it first draws up the gasoline needle and as it continues to rise it then draws up the needle for the heavy carburant. The dimensions of the auxiliary needle should be such as to provide a proportion of about 10% kerosene or oil for 1% gasoline for the normal running of the motor. It is found that by reason of this arrangement, this carburetor will operate at slow speed almost entirely by the use of gasoline, inasmuch as the lift of the valve is small in amount and does not occasion the lifting of the oil needle.

I claim:

1. An automatic carburetor for internal combustion engines, comprising a main body having a flat bottom provided with an orifice for the admission of air into said body, a fuel feed tube opening into the latter in the plane of said orifice, a passage for the discharge of the carbureted air, a flat valve yieldingly seated on said bottom and of substantially the same area as the cross section of the main body and having a lateral cut-away portion co-operating with the admission orifice, a movable needle traversing the valve and controlling the fuel feed tube situated directly under the valve, and means for securing the valve upon its seat while enabling the upward movement thereof.

2. An automatic carburetor for internal combustion engines, comprising a main body having a flat bottom provided with an orifice for the admission of air into said body, a fuel feed tube opening into the latter in the plane of the orifice, a passage for the discharge of the carbureted air, a flat valve yieldingly seated on said bottom and of substantially the same area as the cross section of the main body and having a lateral cut-out portion co-operating with the air admission orifice, a movable needle traversing the valve and controlling the outlet of the fuel feed tube situated directly under the valve, a stationary bolt, a spring surrounding the latter adapted to press the valve upon its seat, a collar provided upon the needle whereby the lifting of the valve causes the lifting of said needle, and a separate spring for pressing the needle upon its seat when the valve is closed.

3. An automatic carburetor, comprising a main body having a flat bottom provided with an orifice for the admission of air into said body, fuel feed tubes, a passage for the discharge of the carbureted air, a flat valve yieldingly seated on said bottom and of substantially the same area as the cross section

of the main body and having a lateral cut-out portion cooperating with the air admission orifice, movable needles traversing the valve and adapted to control the outlets of fuel feed tubes situated under the valves in the plane of said orifice, means for securing the valve upon its seat while enabling the upward movement thereof, means for securing the needles on the fuel feed tubes, and means whereby one needle is caused to rise by the upward movement of the valve at any desired moment to admit a light carburant previous to admitting a heavy carburant to the carburetor.

4. An automatic carburetor for internal combustion engines, comprising a main body having a flat bottom provided with an orifice for the admission of air into said body, fuel feed tubes, a passage for the discharge of the carbureted air, a flat valve yieldingly seated on said bottom and of substantially the same cross-section as the main body and having a lateral cut-out portion cooperating with the air admission orifice, movable needles traversing the valve and adapted to control the fuel feed tubes situated under the valve, means for securing the valve upon its seat while enabling the upward movement thereof, means for securing the needles on the fuel feed tubes, and means whereby one needle is caused to rise by the upward movement of the valve prior to the second needle, to successively admit light and heavy carburants to the carburetor.

In testimony that I claim the foregoing as my invention, I have signed my name.

LOUIS ANATOLE AUGUSTE HENNEQUIN.