June 17, 1930. E. L. H. PEPINSTER ET AL 1,765,175

CARBURETOR

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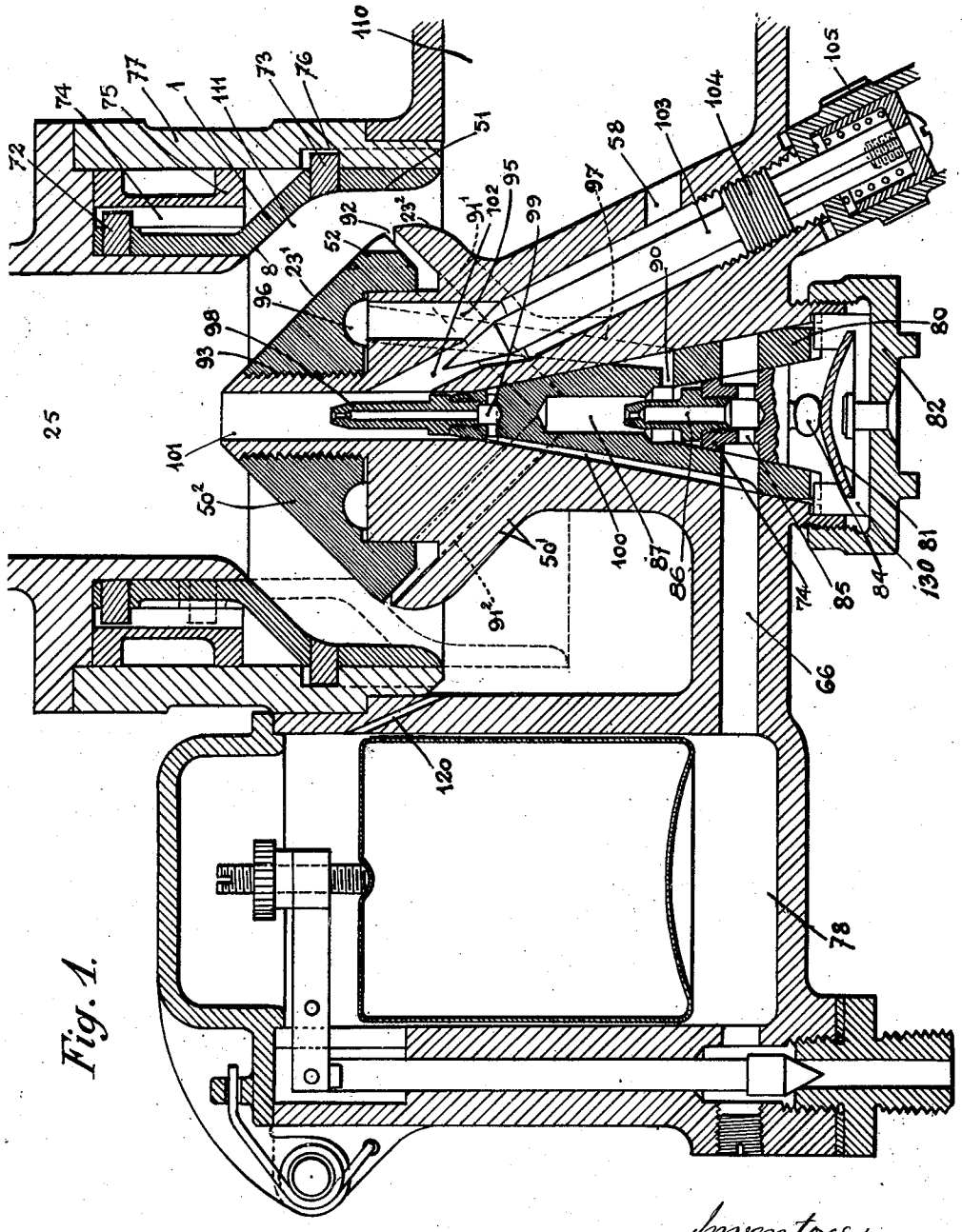


Fig. 1.

Inventors:
Ernest Louis Henri Pepinster
and Frederic Geneve
By Atty.

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Fig. 2

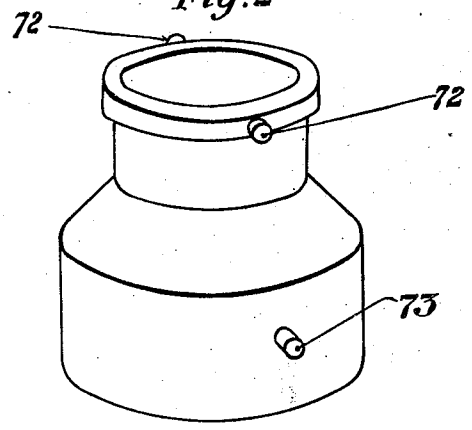


Fig. 3

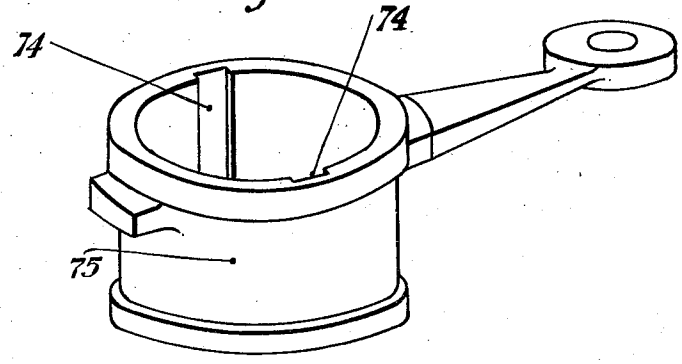
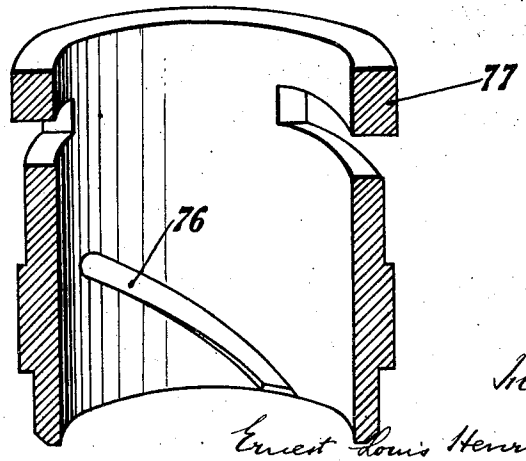


Fig. 4



Inventors:
Ernest Louis Henri Pepinster
and Frederic Geneve
By
Atty.

Patented June 17, 1930

1,765,175

UNITED STATES PATENT OFFICE

ERNEST LOUIS HENRI PEPINSTER AND FRÉDÉRIC GENÈVE, OF PARIS, FRANCE

CARBURETOR

Application filed February 17, 1928, Serial No. 255,070, and in France June 15, 1927.

Our invention relates to carburetors for internal combustion engines.

The present carburetors do not enable sufficiently rapid speed recovery of the engine, that is to say, do not permit the motor to pass sufficiently quickly from slow speed to normal speed, except by an excessive increase in the richness of the explosive mixture. This disadvantage results from the general disposition adopted for the member regulating the admission of the explosive mixture as well as from the dispositions adopted for controlling the explosive mixtures at various speeds with the view to expediting the recovery.

The object of the present invention is to eliminate the above disadvantages and to enable the motor rapidly to pick up speed, that is to say, to pass rapidly from slow speed to normal speed, without it being necessary to excessively increase the richness of the explosive mixture under normal operating conditions.

An object of the invention is also to easily and precisely proportion the amounts of air and fuel in the explosive mixture at the various speeds.

A preferred embodiment of the invention is illustrated by way of example on the accompanying drawing in which Fig. 1 is a vertical axial section through the carburetor, Fig. 2 a perspective view of the control valve, Fig. 3 a similar view of the rotary sleeve therefor and Fig. 4 a section through the intermediate body provided with the helicoidal groove.

The carburetor comprises a bell-shaped valve 1 having two internal profiles 8 and 51 and adapted to slide freely on the upper tubular body 25 of the carburetor, said body having flanges which enable it to be attached to the induction pipe which feeds the internal combustion engine with explosive mixture.

The valve 1 is provided with two keys 72 and 73, one engaged in a vertical groove 74 of a rotary sleeve 75 and the other in a helicoidal groove 76 of an intermediate body 77, which disposition enables the valve 1 to be raised more or less. The carburetor also has a core 50 having the inclined surfaces 23^1, 23^2 which combined with the corresponding inclined surfaces 8 and 51 of the valve 1 adjust on the one hand the cross-section of the passage for air admitted through inlet pipe 110, and on the other hand the cross-section of the passage for the explosive mixture.

The core 50 has a port 58 for the admission of primary air and a port 66 connecting the core 50 with the constant level feed chamber 78 of the carburetor, which feed chamber is of a well known type.

A cone 80 is removably mounted in the core 50 and is maintained in place by a blade spring 81 which bears on an intermediate part 130, the latter abutting, on the one hand, against the body portion of the carburetor and, on the other hand, against the base of cone 80, whereby the correct position of the cone is insured. The intermediate part 130 rests on a screw-cap 8 on which is screwed a screw threaded nipple of the carburetor body and on the other hand against a knob 83 of a nozzle carrier 84; the latter has a conical external surface by which it is seated in a conical space of the cone 80.

A port 85 for the admission of liquid fuel is provided in the nozzle carrier and opens into the main nozzle 86. The latter opens into an initial mixing chamber 87 into which opens also an inlet 90 for primary air which induces the flow of liquid fuel from the main nozzle 86, mingling therewith in the chamber 87 and entraining it by way of 91^1, 91^2 towards the annular orifice 92 constituting the outlet of the atomized liquid fuel. These orifices are provided between the two parts 50^1, 50^2 which being screwed together constitute the core of the carburetor. It is apparent that by the cap 50^2 being more or less screwed on the base 50^1, the cross-section of the orifices 92 can be regulated at will.

Longitudinal slits 52 can be provided in the cap 50^2 of the core 50 to enable fine streams of atomized liquid fuel and air constantly to traverse the carburetor even when the valve 1 is closed, for enabling the motor to be driven at slow speed.

Primary air is admitted through the port 58 and a passage 95, both formed in the core 50, said port connecting with the tubular inlet pipe 110, whilst the passage 95 opens into an annular recess 96 hollowed out in the cap 50^2 and from which recess is branched off a passage 97 opening at 90 toward the main nozzle 86.

The cone 80 can also carry at its top a slow speed nozzle 98 screwed into the cone and supplied with liquid fuel by the passages 100 and 99; this slow speed nozzle opens into a passage 101 disposed in the axis of the cone 80.

Nozzle 98 is supplied with primary air by a passage 102 connecting with the air inlet port 58 and controlled by a needle valve 103 having a screw threaded portion 104 and a milled operating head 105.

The above described construction permits the easy removal of the cone 80 and thereby the two nozzles 86 and 98 thus greatly facilitating the inspection and cleaning of the carburetor.

Moreover, the core 50 being made in two parts 50^1, 50^2 permits very easy adjustment of the free cross-section of the orifice 92 for the discharge of atomized liquid fuel, also facilitating manufacture of the core and the boring of the various passages therein.

It should also be observed that due to the above described construction, the air for the main nozzle 86 as well as the air for the slow speed nozzle 98 are taken from the same current of air 110, which is an evident convenience if the apparatus comprises an air purifier or a compressor. In the latter case it will be of advantage to provide intercommunication by a passage 120 between the air supply 110 and the upper portion of the constant level feed chamber 78 above the level of the liquid fuel in such chamber. Thus pressures will be balanced within the carburetor.

The action of the valve in the carburetor is as follows: First on the valve being raised, the section left free for secondary air between the inclined surfaces 23^2 and 51 formed respectively on the core 50 and on the valve, is adjusted at will. At the same time, the section left free for the explosive mixture between the surfaces 23^1 and 8 of the core 50 and of the valve 1 is modified.

Thus a chamber 111 is formed between the section 23^2—51 and the section 23^1—8 wherein the suction of the engine is exerted, such suction obviously varying according to the position of the valve 1. It will easily be perceived that, the larger the section 23^1—8 the more the suction of the motor exerted through 25 acts on the above chamber, and therefore, the lower the pressure in such chamber; the suction thus induces a very active flow of the liquid fuel, atomized or not, through the orifice 92 which opens into the chamber 111 between the two adjustable sections 23^2—51 and 23^1—8.

If on the contrary the valve 1 is lowered, inverse phenomena occur, that is to say, the free cross-section 23^1—8 is reduced and in consequence the suction on the chamber 111 and also the induced flow of liquid fuel atomized or not.

When the valve 1 seats itself against the core 50, its inclined surface 8 coming in contact with the inclined surface 23^1 which forms also the seat of the valve, the carburetor only operates for slow speed. Such operation at slow speed is ensured by two means: First by the slow speed nozzle 98, as has been above explained, and then by the slits 52, which permit a certain quantity of air and liquid fuel, atomized or not, to be entrained at 25 into the upper body of the carburetor, which ensures the feed of the engine at slow speed.

Obviously, one or the other of the two means 98—52 permitting the slow operation could be suppressed.

To ensure speed recovery of the engine, that is to say, from slow speed to normal, it suffices to raise anew the valve 1; the two variable sections 23^2—51 and 23^1—8 being in immediate proximity to the orifice 92, that is to say, to the point of contact between the atomized fuel and the secondary air 110, very rapid speed recovery of the engine is obtained; the flow induced by the engine is indeed very forcibly exerted in the narrow section 23^1—8 and in consequence against the orifice 92 which is in immediate proximity to this narrow section. There is therefore a formation of a very rich explosive mixture very useful for starting up the engine. The valve 1 then continuing to rise, the minimum section 23^1—8 of the carburetor is no longer just above the orifice 92, but is appreciably above the same with the result that the suction effect of the engine is less intense on said orifice so that the explosive mixture decreases in richness, which is logical since the starting of the motor has terminated.

We claim:

1. In a carburetor for internal combustion engines, in combination, a liquid fuel chamber, a carburetor body, a core located within said body and having a valve seat, means connecting said body to said liquid fuel chamber, a conical member engaged in a conical recess of said core, means ensuring the removable maintenance of said conical member in said core, a nozzle holder of conical shape engaged in a conical recess of said conical member, removable means maintaining said nozzle holder in said recess, a main nozzle mounted in said nozzle holder, means conducting liquid fuel from said liquid fuel chamber to said main nozzle, means conducting primary air to said main nozzle, means conducting the atomized liquid fuel from

said nozzle to the exterior of said core, means conducting secondary air toward said fuel conducting means so as to ensure the formation of an explosive mixture, a valve disposed over said core and mounted in said carburetor body for controlling said means admitting secondary air and seating in its closed position on the seat of said core in proximity to the means for conducting the atomized liquid fuel, mechanical means enabling said valve to be displaced relative to said body and said core and providing a free cross-section in immediate proximity to said fuel conducting means and toward which the suction of the engine acts, thus enabling a rich explosive mixture and an easy speed recovery of the engine to be obtained.

2. In a carburetor for internal combustion engines, in combination, a liquid fuel chamber, a carburetor body, a core located within said body having a valve seat and constituted by an interconnected cap and base providing between them an outlet orifice for atomized liquid fuel, means connecting said body to said liquid fuel chamber, means for atomizing liquid fuel carried by said core and conducting the atomized liquid fuel to said outlet orifice, means conducting liquid fuel from said liquid fuel chamber to said atomizing means, means conducting secondary air toward said atomizing means so as to ensure the formation of an explosive mixture, a valve disposed over said core and mounted in said carburetor body for controlling said means admitting secondary air and seating in its closed position on the seat of said core in proximity to said outlet orifice for atomized liquid fuel, mechanical means enabling said valve to be displaced relative to said core, said valve then moving away from the seat of said core and providing a free cross-section in immediate proximity to said outlet orifice toward which the suction of the engine acts, thus enabling a rich explosive mixture and an easy speed recovery of the engine to be obtained.

3. In a carburetor for internal combustion engines, in combination, a liquid fuel chamber, a carburetor body, a core located within said body having a valve seat and constituted by a cap and a base providing between them an outlet orifice for atomized liquid fuel, means connecting said cap to its base and enabling said cap to be adjusted relative thereto and thereby to said outlet orifice, means connecting said body to said liquid fuel chamber, means for atomizing liquid fuel carried by said core and conducting atomized liquid fuel to said outlet orifice, means conducting liquid fuel from said chamber to said atomizing means, means conducting secondary air toward said atomizing means so as to ensure the formation of an explosive mixture, a valve disposed over said core and mounted in said carburetor body for controlling said means admitting secondary air and seating in its closed position against the seat of said core in proximity to said outlet orifice, mechanical means enabling said valve to be displaced relative to said body and to said core, said valve then moving away from the seat of said core and providing a free cross-section in outlet orifice and toward which the suction of the engine acts, thus enabling a rich explosive mixture and an easy speed recovery of the engine to be obtained.

4. In a carburetor for internal combustion engines, in combination, a liquid fuel chamber, a carburetor body, means connecting said body to said liquid fuel chamber, a main nozzle mounted in said carburetor body, a slow-speed nozzle mounted in said carburetor body, means conducting a current of air into said carburetor body, means provided in said carburetor body for conducting a portion of said current of air to said main nozzle, means provided in said carburetor body and conducting a portion of the same current of air to said slow-speed nozzle, a valve mounted in said carburetor body and controlling the outlet section of the explosive mixture, and mechanical means enabling said valve to be displaced relative to said body.

5. In a carburetor for internal combustion engines, in combination, a liquid fuel chamber, a carburetor body, means connecting said body to said liquid fuel chamber, a main nozzle mounted in said carburetor body, a slow-speed nozzle mounted in said carburetor body, means conducting a current of air into said carburetor body, means provided in said carburetor body and conducting a portion of said current of air to said main nozzle, means provided in said carburetor body and conducting a portion of the same current of air to said slow-speed nozzle, means provided in said carburetor body and conducting a portion of the same current of air to the upper part of said liquid fuel chamber, a valve mounted in said carburetor body and controlling the outlet section of the explosive mixture, and mechanical means enabling said valve to be displaced relative to said body.

In testimony whereof we affix our signatures.

ERNEST LOUIS HENRI PEPINSTER.
FRÉDÉRIC GENÈVE.