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(54) Fuel supply tube for internal combustion engine

(57) A device for reducing contaminating components in the exhaust gases of combustion engines, that comprises an airtight chamber (1) equipped with an entrance and exit orifice (6,7), located opposite one another, between whose orifices there are arranged, within the chamber (13), two pistons (8,9) and an intermediate compression spring (12). Each piston has an axial through hole (10,11). The diameters of both pistons are different from each other and the diameter of their respective through hole (10,11) is smaller than the diameter of the entrance and exit holes.

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Description

[0001] The present invention relates to a device for reducing the contaminating components in exhaust gases from combustion engines, especially contaminating components due to poor combustion.

[0002] As is well known, during the operation of a combustion engine, certain changes in the operating conditions take place, for different reasons, which may induce modifications in the characteristics of the mixture supplied to the motor. At certain times, this may give rise to imperfect or incomplete combustion. The result will be an increase in contaminating components in the exhaust gases and as a result, a loss of fuel and, in short, a reduction in the performance of the engine.

[0003] The present invention has the object of eliminating the problems stated above by means of a device that ensures a suitable fuel supply or with the smallest possible deviations at all times, such that a perfect or almost perfect combustion is attained.

[0004] Another object of the invention is a device for the stated aim, which is of a simple constitution, cheap, of safe operation and easy installation.

[0005] The device of the invention comprises a housing that defines an airtight chamber equipped with an entrance orifice and another exit orifice, both located opposite one another. Within this chamber are arranged, between the aforementioned orifices, two end pistons and an intermediate compression spring. Each one of the aforementioned pistons has an axially drilled hole, the holes of the two pistons being of different diameters and both holes being of a smaller diameter than the diameter of the entrance and exit orifices of the chamber. The hole for the piston next to the exit orifice will be of a smaller diameter than that of the piston next to the entrance hole.

[0006] The device of the invention is applicable to any machine that runs on the combustion of oil derivatives.

[0007] The device described is designed to be installed in the admission tubing from the fuel tank to the fuel pump, so achieving with this device a modification of the rate, pressure and flow of the fuel as a function of the fuel requirement by the pump.

[0008] In short, the object of the invention is to supply the engine or machine with the sufficient quantity of fuel required by the pump to generate the desired effects in said machine, maintaining the optimum power of the machine or engine at all times, regardless of increases or decreases of pressure before the pump.

[0009] In the device of the invention, with the aforementioned constitution, between the two pistons, a space in which the compression spring is to be placed is established. The fuel reaches this space through the axial hole of the first of the pistons, in which there is an increase in the speed of the fuel, as this hole has a much smaller cross-section than that of the entrance orifice of the chamber. This hole, on reaching an intermediate space, causes a reduction in the rate and turbulence, as well as an increase in pressure, because the axial hole of the second of the pistons is of a smaller diameter than that of the first piston. On the basis of these operating conditions and the fuel pump, a partial displacement of the pistons may take place, against the force of the compression spring mounted between the two. In this fashion, depending on the conditions required by the pump, the device of the invention will modify the rate, pressure and flow of the fuel, adapting it to the demands of the engine to achieve the best possible combustion.

[0010] In order to understand the characteristics, workings and advantages of the device of the invention, a more detailed description thereof is made, with the help of the attached drawing, in which a possible non-limiting embodiment is shown as a schematic cross-section along the axis.

[0011] The device shown in the drawing comprises a body or housing 1 that defines an axial chamber, with a circular cross-section, composed in the given example of three consecutive parts of different diameters, a first part 2 of larger diameter, an intermediate part 3 and an end part 4 of smaller diameter. Part 2 of greater diameter can be threaded to allow attachment of a closing lid 5, in which there is an axial entrance conduct 6. From part 4, the body or housing 1 has an orifice and exit conduct 7.

[0012] Within the housing two pistons referenced with numbers 8 and 9 are housed, the first one of them in the intermediate part 3, with an external diameter coinciding with the that of said part, while the piston 9 is housed in the end part 4 of smaller diameter. The pistons 8 and 9 have other axial through holes referenced with numbers 10 and 11, each with a different diameter, much smaller than the diameter of the conducts of the entrance 6 and exit 7. The hole 11 of the piston 9 is of a smaller diameter than the hole 10 of the piston 8.

[0013] Between the pistons 8 and 9 there is also mounted a compression spring 12.

[0014] With the aforementioned constitution, between pistons 8 and 9 there is defined an intermediate space 13, in which the spring 12 is placed.

[0015] The described device is designed to be mounted on the admission tubing of fuel, between the tank and the fuel pump, such that the fuel is displaced in the direction of the arrow, from the orifice and entrance conduct 6 to the orifice and exit conduct 7.

[0016] Once the device of the invention has been installed in the engine or apparatus that runs on combustion of petroleum derivative, the fluid penetrates the conduct 6 and reaches the hole 15 of the piston 8, of a much smaller cross-section, producing as a result an increase in the speed of the fuel. At high speed the fuel reaches the chamber or intermediate space 13, where turbulence is produced and there is an increase in pressure, because the axial hole 11 of the piston 9 is of a smaller diameter than the hole 10, which forces the fuel through hole 11 at great speed to finally emerge through the conduct 7.

[0017] Depending on the conditions of the fuel pump and the running of the engine, overpressure can be produced from the conduct of exit 7, just as at the entrance of the fuel through the conduct 6, which leads to displacements of the pistons 8 and 9 against the tension of the spring 12, with regulation as a function of overpressure that remains in the chamber or intermediate space 13.

[0018] Thus, an auto-regulation is achieved such that the amount of fuel supplied through conduct 7 corresponds to the operating conditions of the engine at each moment. This means that the necessary amount of fuel will reach the combustion chamber at all times, thus ensuring a good combustion with the result of a reduction in the contaminating product in the combustion gases.

[0019] The circumstances described in the running of the device of the invention cause a change in the parameters of speed, flow and pressure of the fuel. At the beginning of the outlet, new fuel turbulence is produced by the pressure and speed of the fuel. These varied parameters in the feed circuit to the filter ensure that the necessary quantity of fuel reaches to the injection pump to perform the work cycle of the engine without alterations, supplying the injection pump with the necessary flow of fuel to achieve a perfect combustion.

[0020] In short, it is possible to reduce the emission of CO_2 and the opacity of contaminant gases to the atmosphere.

[0021] As a side effect, by achieving a better combustion, there is a reduction in fuel consumption, and, in short, the performance of the engine improves.

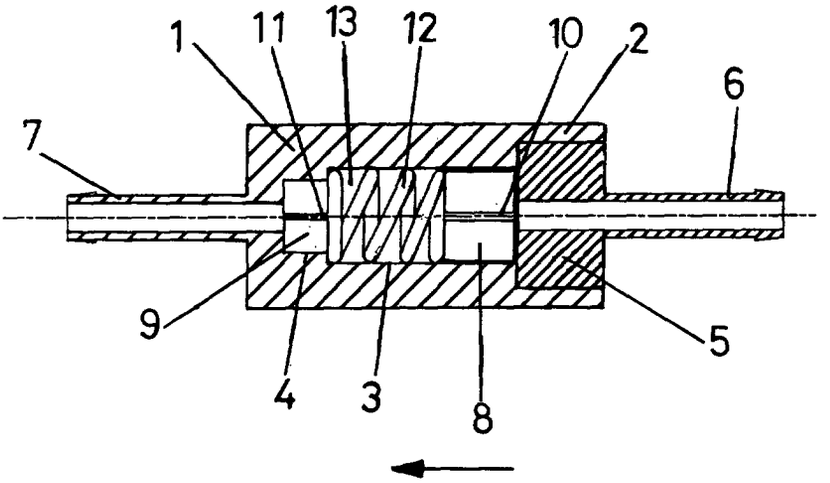
[0022] As can be understood, the device may adopt a different configuration to that described, provided that the body or housing define a chamber with an entrance and exit orifice, between which two pistons are housed with an intermediate spring, the pistons having axial through holes with the characteristics of the diameters described hereinabove.

Claims

1. A device for reducing contaminating components in the exhaust gases of combustion engines, **characterised in that** it comprises an airtight chamber equipped with an entrance and exit orifice, located opposite one another, between whose orifices there are arranged, within the chamber, two pistons (8, 9) and an intermediate compression spring (12), each piston having an axial through hole (10, 11) and the diameters of both pistons being different from each other and smaller than the diameter of the entrance and exit holes.

2. A device according to claim 1, **characterised in that** the aforementioned chamber includes two consecutive parts (3, 4) of different diameter, in which two pistons of different diameter fit tightly, part (4) next to the exit orifice and the piston (9) being of smaller diameter.

3. A device according to claims 1 and 2, **characterised in that** the hole of the piston next to the exit orifice is of a smaller diameter than that of the piston next to the entrance orifice.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