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(54) **A system for reducing fuel consumption in combustion engines**

(57) A system for reducing fuel consumption in combustion engines is described, which may be installed between the flange and the fuel filter, by means of which a reduction in the excess of pressure in the primary filter is achieved, which entails a consequent reduction of the amount of fuel going to the injection fuel pump. The system consists of three perforated plates for the passage

of fuel, a pair of pistons provided for supplying pressure to the inside of the reducer system, a safety valve for moving the piston, and a spring for each piston, which keeps each one under tension and in its position. The system is applicable with diesel or "bunker" fuel. The fuel reduction achieved is within the range of 10 to 60% in comparison with current consumption.

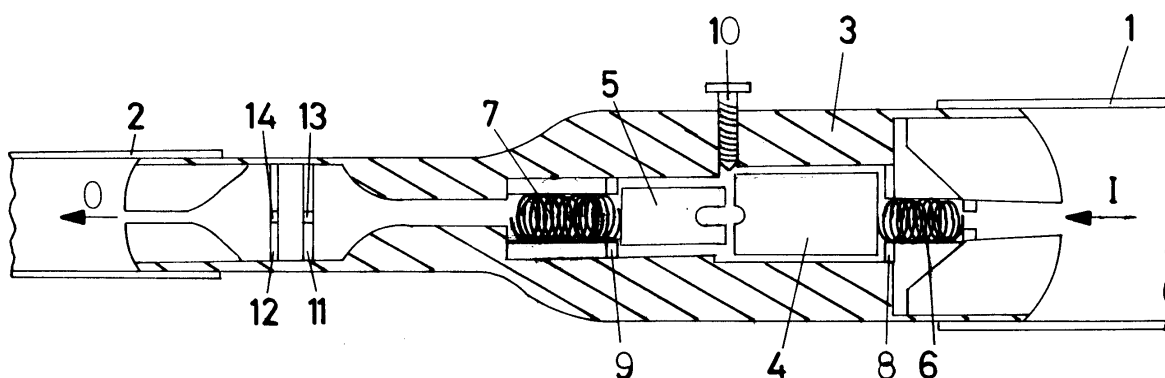


FIG.1

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Description

Object of the Invention

[0001] The present invention refers to a system for reducing fuel consumption in combustion engines, which offers essentially new characteristics and marked advantages over the means known and used for these same purposes in the current state of the art.

[0002] More specifically, the invention proposes the development of a system especially applicable to combustion engines fuelled with diesel or with another fuel of similar features, for example fuel of the type known as "bunker" (derived from asphalt), in view of the increasing tendency to use this type of engine due, on the one hand, to the fact that the fuel used is much cheaper than petrol, and on the other hand, to their characteristics of greater duration and less maintenance, which are increasingly preferred by users.

[0003] The invention's field of application is obviously included in the industrial sector which manufactures and/or assembles engines which work with diesel or "bunker" fuel, for moving any type of vehicle or machine, although with special application to automobile vehicles.

Background and Summary of the Invention

[0004] In general, the existence is known of diverse devices advertised by their manufacturers as fuel consumption reducers in combustion engines, both of the diesel type and those fueled by petrol. Generally, these devices consist of elements which may be inserted into the fuel supply conduits, whose action is based simply on limiting the passage of fuel to the engine. The use of devices known up to the present time has not allowed any of the previously indicated objectives to be achieved, since in practice, simply reducing fuel consumption, without modifying or changing any parameters or associated operating conditions, results in loss of power and a corresponding reduction in the engine's performance.

[0005] Taking the above into consideration, the present invention proposes as its fundamental objective to provide a device by means of which it will be possible to achieve a real reduction in fuel consumption, without this being translated into a loss or reduction of the engine's operating parameters.

[0006] According to numerous experimental tests, the system of the invention has proved to be highly efficient, having achieved a significant reduction with respect to the ratio of fuel consumed, with values of about 50%, while maintaining the operating conditions of the engine. In specific cases and under certain conditions the reduction in fuel consumption has reached 60%. This is possible due to the fact that the system carries out an exhaustive control of the excess of pressure in the fuel supply system, in the sections preceding the injection pump, preventing the entrance of excessive fuel into the

pump and therefore preventing the loss of this excess fuel which otherwise would be transformed into calorific energy, with a consequent excess in the emission of fumes and gases produced by inefficient combustion.

[0007] To this end, the area has been reduced by a determinate amount, thereby reducing the excess of pressure in the filters and achieving at the same time a diminution of fuel consumption without altering the pressure in the injection valve.

[0008] The system was designed as a compact unit and provides for the use of diverse elements such as three plates of different diameters, two springs and two pistons. The system is installed in the fuel supply unit, prior to the fuel filter, depending on the size of the pipes.

Fuel saving is achieved by means of the combination of plates and pistons, as there is a reduction in the excess of pressure in the primary filter, which entails a reduction in the amount of fuel going out to the pump which feeds the injectors. The said combinations of plates and pistons are able to move slightly in the event that a blockage is caused in the plate orifices, and also for the purpose of regulation. The incorporation of a safety valve, which can be operated by the user, allows the position of the pistons to be fixed in the event of breakdown or blockage, closing the fuel flow through the system and causing it to be led through a branch or by-pass, by which means fuel supply to the injectors will continue without interruption.

[0009] In accordance with all of the foregoing, the functions of the different components consists of:

- Pistons: these provide a certain pressure inside the reducer, and at the same time they perform the function of a safety system: when there is a blockage, this is automatically actuated;
- Safety valve: this moves the piston to actuate the safety system;
- Springs: these keep the pistons under tension and in their position, preventing an unnecessary blockage;
- Plates: each of these performs a determinate function. Thus, one plate controls fuel saving by means of a slight movement; another plate controls the engine's power, allowing it to maintain its initial power; finally, the third plate controls the fuel pressure in the system.

Brief Description of the Drawings

[0010] These and other features and advantages of the invention will be more clearly shown in the following detailed description of a preferred embodiment, which is given only by way of an illustrative and non-restrictive example, with reference to the accompanying drawings, in which:

Figure 1 shows a diagrammatic view of the system of the invention;

Figure 2 is a diagrammatic representation of different plates which may be used in the system of the invention, and

Figure 3 shows a view, also diagrammatic, of a fuel feed to a group of injectors of the conventional type.

Description of a Preferred Embodiment

[0011] In accordance with the drawings, throughout which the same numerical references are used to designate the same or similar parts, it may be observed that the fuel consumption reduction system of the present invention is represented diagrammatically in Figure 1, with the different elements that make it up. In this respect, the system may be seen to be inserted into the feed pipes (1,2), at a previously determined place, as indicated above, there being a body (3) which has an inlet end towards which the arrow "I" is pointing, and an outlet end from which the arrow "O" points away. The body (3) has a traversing axial orifice, passing through its entire length, which adopts different diameters according to the different elements to be housed inside. Thus, it may be observed that in the said axial orifice a pair of pistons (4,5) is incorporated, cylindrical in shape, of different diameters, aligned lengthwise, adjacent at their inner ends, and thrust towards one another by means of respective springs (6,7) which are supported at their opposite ends by seatings provided for this purpose. The stroke of the pistons (4,5) is short and limited by buffers (8,9). Moreover, it will be observed that the diameter of each piston (4,5) is smaller than the diameter of the respective portion of the orifice in which it is housed, leaving therefore an outer space around the perimeter through which fuel supplied from the inlet "I" may pass.

[0012] At an intermediate position between both pistons, an element is incorporated which serves as a safety valve, and which consists of an element (10) which the user may actuate, screwed to the body itself (3) by means of a threaded rod. This element (10) is provided to cut off the fuel flow through the system of the invention in the event of blockage, obstruction or the like. In effect, if the element (10) is operated manually in the direction of the threading, the rod of the same will descend and progressively seat itself between the said pistons (4,5). As the distance between the latter is small, they move apart, coming to rest against the respective buffers (8,9) against hermetic seals of the conventional type (not shown), thereby cutting off the passage of fuel through the system. This movement occurs against the action of the springs (6,7), so that when the element (10) is withdrawn to the initial position, the recovery of the springs (6,7) returns the pistons (4,5) to the position shown, allowing the fuel to pass freely to the outlet once more. through its entire length, which adopts different diameters according to the different elements to be housed inside. Thus, it may be observed that in the said axial

orifice a pair of pistons (4,5) is incorporated, cylindrical in shape, of different diameters, aligned lengthwise, adjacent at their inner ends, and thrust towards one another by means of respective springs (6,7) which are supported at their opposite ends by seatings provided for this purpose. The stroke of the pistons (4,5) is short and limited by buffers (8,9). Moreover, it will be observed that the diameter of each piston (4,5) is smaller than the diameter of the respective portion of the orifice in which it is housed, leaving therefore an outer space around the perimeter through which fuel supplied from the inlet "I" may pass.

[0013] At an intermediate position between both pistons, an element is incorporated which serves as a safety valve, and which consists of an element (10) which the user may actuate, screwed to the body itself (3) by means of a threaded rod. This element (10) is provided to cut off the fuel flow through the system of the invention in the event of blockage, obstruction or the like. In effect, if the element (10) is operated manually in the direction of the threading, the rod of the same will descend and progressively seat itself between the said pistons (4,5). As the distance between the latter is small, they move apart, coming to rest against the respective buffers (8,9) against hermetic seals of the conventional type (not shown), thereby cutting off the passage of fuel through the system. This movement occurs against the action of the springs (6,7), so that when the element (10) is withdrawn to the initial position, the recovery of the springs (6,7) returns the pistons (4,5) to the position shown, allowing the fuel to pass freely to the outlet once more.

[0014] As we advance towards the said outlet, the plates (11, 12) appear arranged transversely to the longitudinal axis of the body (3), and therefore restricting the passage of fuel according to the size of the orifices (13,14) made in the same. These plates are therefore responsible for reducing the excess of pressure to the primary filter, as the passage of fuel through the same can only take place through the said orifices (13,14), thereby regulating the amount of fuel pumped to the injectors. The said plates have a predetermined play by virtue of which they achieve the effective regulation desired without thereby altering the pressures in the injection valve.

[0015] Figure 2 contains a representation of the plates which take part in the system of the invention. These plates are identified by (A, B, C) and as may be seen, they consist simply of quadrangular elements, made of a suitable material such as brass or the like, made to different sizes according to their position or to the dimensions with which the system is built, depending on the particular application for which it is intended, each plate having its respective central orifice (A', B', C') for the passage of fuel. As may be deduced from this drawing, the plates have completely normal characteristics, and may have variable thicknesses.

[0016] Finally, with respect to Figure 3, a diagrammatic representation can be seen of the feed to the injectors

of an engine of the type under consideration. Installation of the system, identified in this Figure by the letter ("S"), is carried out by inserting it, prior to the filter and fuel pump elements, in the very pipe (15) which carries the fuel supply from the fuel tank. As may be observed, the return pipe (17) which runs between the injectors and the fuel tank itself (16), intended to return surplus fuel to the said tank, is retained, although in the case of the invention the return flow through the said pipe is appreciably less.

[0017] It will be understood that the system proposed by the invention is extraordinarily simple to build and apply, and capable of being installed both in newly-manufactured engines and in any already existing engine.

[0018] It is not considered necessary to prolong this description for an expert in the field to understand its scope and the advantages to be obtained from the invention, and to develop and carry into practice the object of the same.

[0019] However, it should be understood that the invention has been described according to a preferred embodiment of the same, for which reason it may be liable to modifications without this implying any alterations to the basis of the said invention; such modifications may affect especially the shape, size and/or the manufacturing materials of the unit or its parts.

Claims

1. A system for reducing fuel consumption in combustion engines, with particular application to engines of the type which use diesel or "bunker", characterised in that it consists of a group of elements such as: three plates of different sizes, provided with orifices for the passage of fuel; a pair of pistons responsible for maintaining a determinate pressure inside the system, and which at the same time fulfil a safety function since they are automatically activated in the event of a blockage; a safety valve for moving the pistons so as to fix the safety system and, finally, two springs provided to keep the pistons under tension and in their position, thereby preventing unnecessary obstructions from occurring.
2. A system as claimed in claim 1, characterised in that it may be inserted into the fuel feed pipe, prior to the fuel filter, and operate in such a way as to reduce excess pressure in the primary filter, consequently reducing at the same time the amount of fuel going out to the injector feed pump.
3. A system as claimed in either claim 1 or 2, characterised in that the level of fuel reduction achieved, while maintaining the parameters of engine efficiency and performance, are within the range of 10 to 60%, and preferably in the order of 50%, in comparison with normal consumption of these fuels.

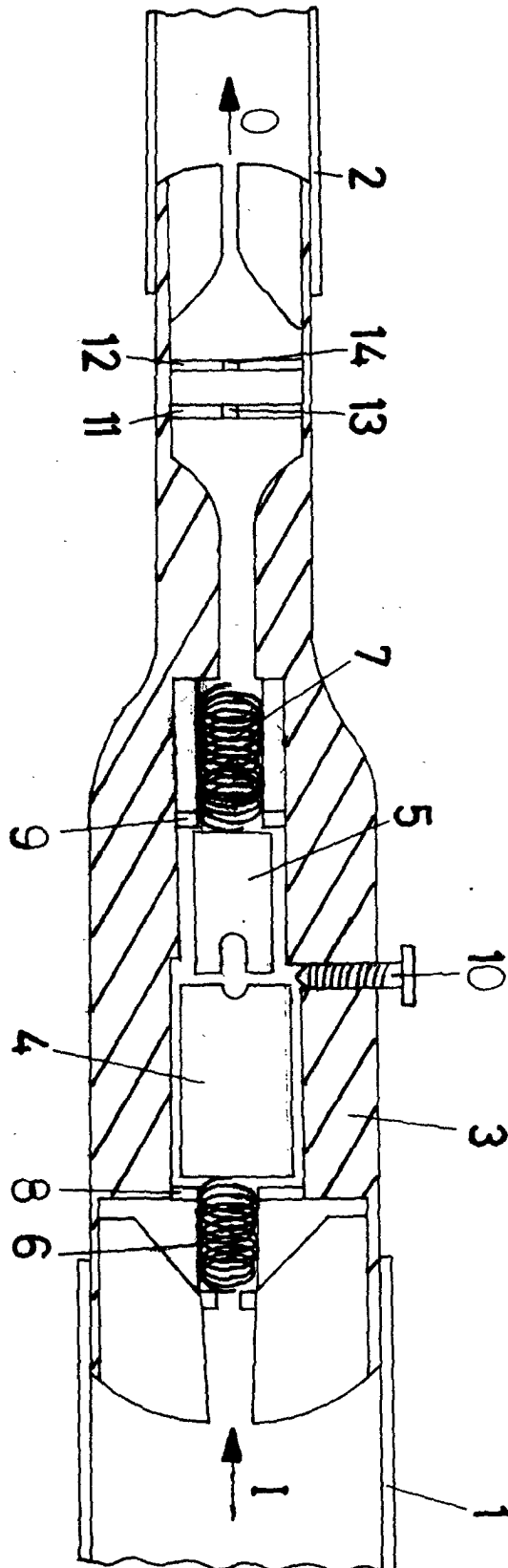


FIG.1

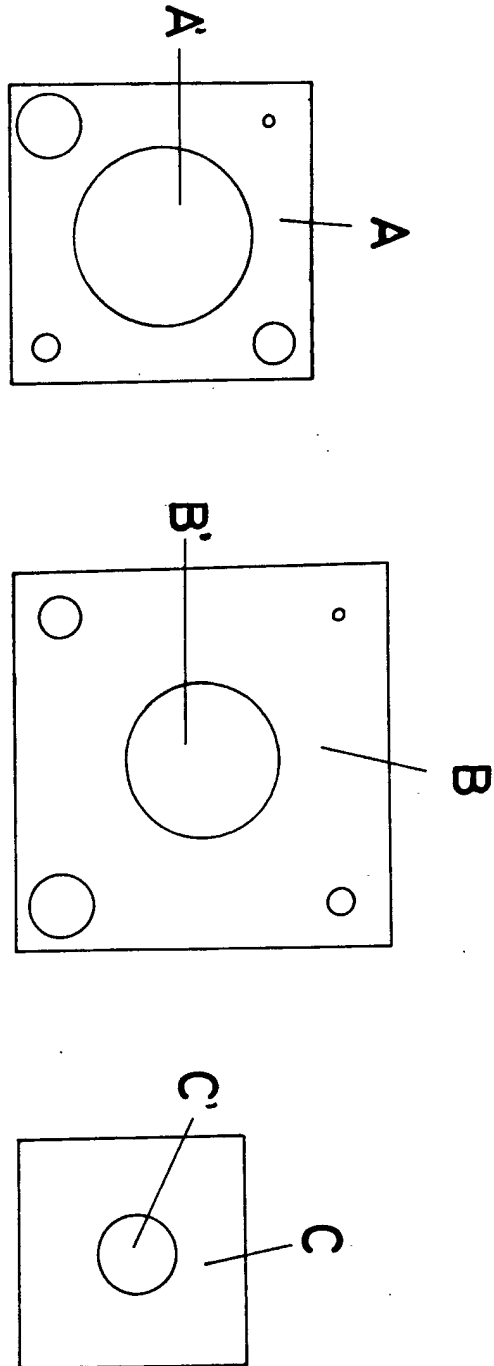


FIG.2

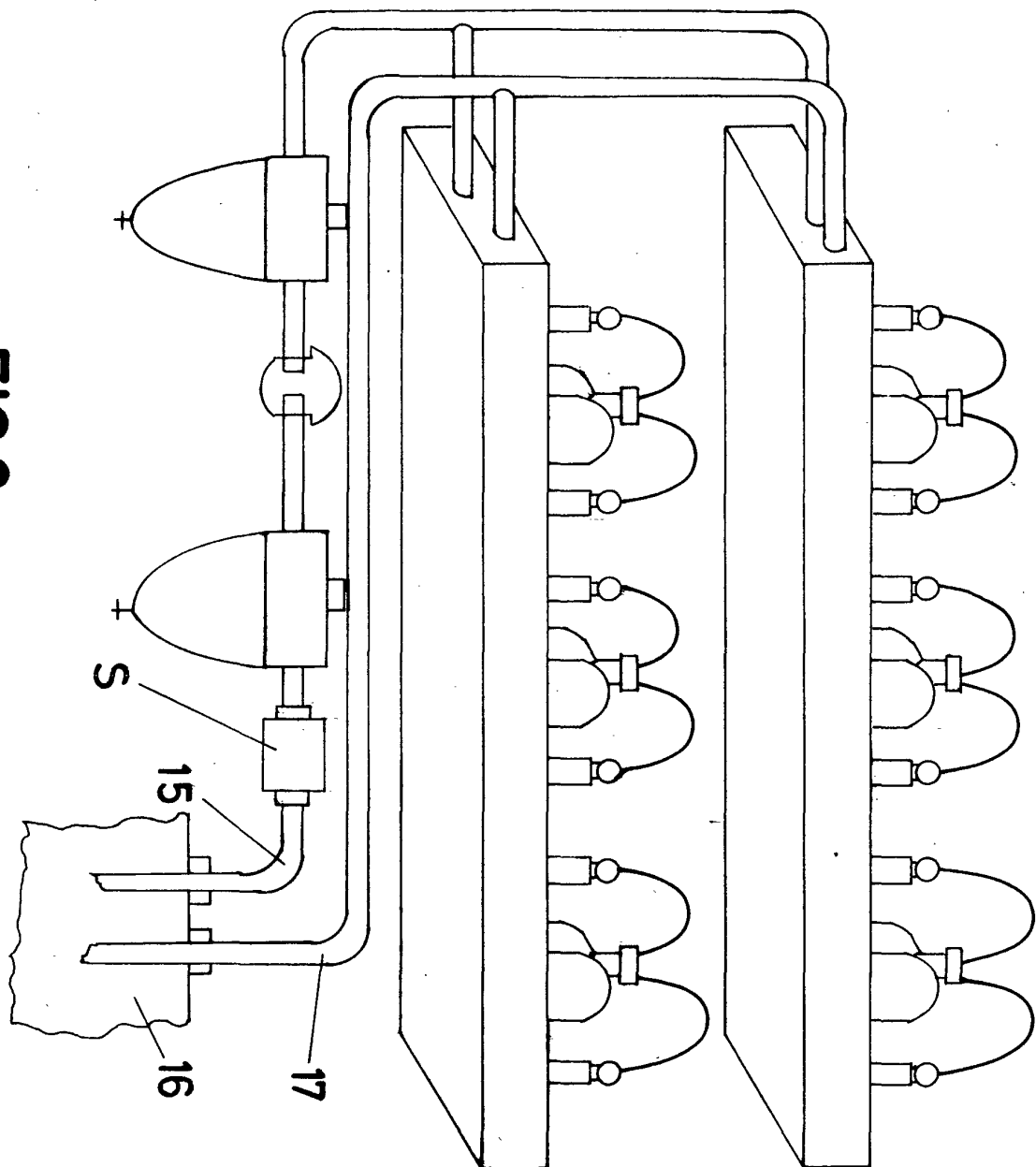


FIG.3