(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 408 227 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.04.2004 Bulletin 2004/16

(51) Int Cl.[7]: **F02M 27/04**

(21) Application number: **02425617.4**

(22) Date of filing: **11.10.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SK TR
Designated Extension States:
AL LT LV MK RO SI

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(54) Anti-pollution economiser device for fluid fuels

(57) Anti-pollution economiser device for fluid fuels, of the type comprising a conduit (2), able to be coupled along a fuel supply pipe, as well as a magnetic field generator (3), able to generate a magnetic field affecting the fuel that flows inside the conduit (2), the conduit (2) identifying, in its interior, a path of the fuel that is repeatedly deviated, relative to the longitudinal axis (33) of the supply pipe, in such a way as to maximise the exposure to the magnetic of the fuel located between its inlet (21) and its outlet (22) of the device (1), keeping the size down to a minimum.

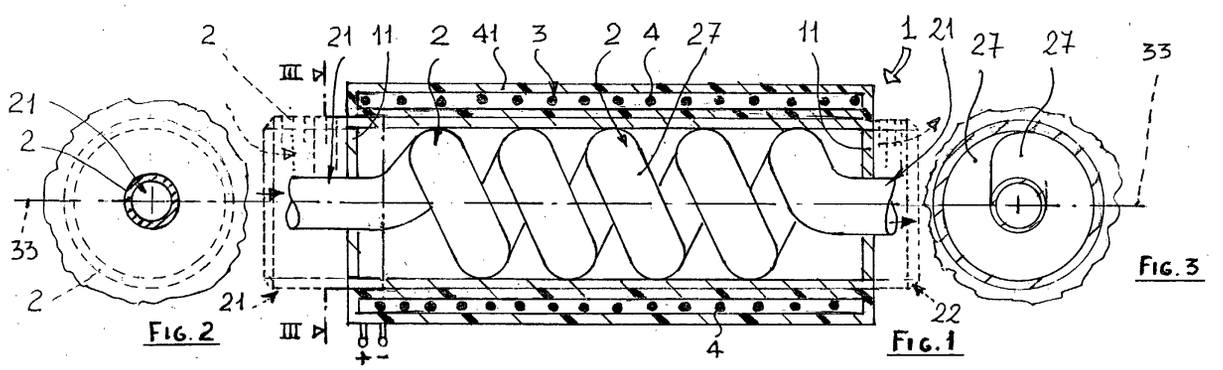

FIG. 2

FIG. 1

FIG. 3

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Description

[0001] The invention relates to an anti-pollution economiser device for fluid fuels, whose longitudinal dimension is predetermined by the distance between its inlet and its outlet and of the type comprising a conduit, able to be coupled along a fuel supply pipe in correspondence with said inlet and outlet, and comprising a magnetic field generator, able to generate a magnetic field affecting the fuel that flows inside the conduit.

[0002] Device of this kind have been known for a long time: for instance, as disclosed in US Patent 3,116,726, where the magnetic field is produced by solenoids traversed by a current and where it is noted that, in fact, subjecting a fuel to a magnetic field appears to entail at least a considerable improvement in the combustion properties of the fuel.

[0003] Device also exist where the magnetic field is produced directly by magnets, for instance in US Patent 3,349,354, which states that use of said fields, applied to fuel, leads to beneficial results.

[0004] In another document, US Patent 3,989,017, the magnetic field, also produced by solenoids wound about the device, traversed by the fuel, is used to reduce consumption and pollution.

[0005] The aim of the present invention is considerably to increase the beneficial influence of the magnetic field on fuels in general, with substantial size parity with known devices or even with smaller size both in terms of length and cross section.

[0006] The subject device, as it is claimed below, allows considerably to increase, in a particular fashion, the path of the fuel under any condition of use, so as to subject it to a constant increase of exposure to the magnetic field, for the same longitudinal size.

[0007] The subject device is normally usable along the pipe for supplying a fluid fuel or hydrocarbons, between the pump and the carburettor, for fixed or automotive internal combustion engines, but it can also be used for any other fluid fuel in general, for instance methane gas (in this case, for burners and boilers) or fuel oil (Diesel engines) etc.

[0008] According to various trials and tests conducted by the Applicant, the subject device allows considerable energy savings and pollution abatement, thanks to the improved combustion, which also allows an improved efficiency, in terms of increased power (for instance in engines) or heating efficiency (for instance in boilers).

[0009] Lastly, it allows less maintenance on the plant that uses it, since internal deposits are limited or eliminated altogether. It therefore allows a longer working life of the plant that benefits therefrom.

[0010] Further aims and advantages, which shall become more readily apparent from the description that follows, are achieved, in accordance with the present invention, by the subject tank, structured and devised as set out in the claims.

[0011] The invention is described in greater detail hereafter with the aid of the drawings, which show an embodiment provided purely by way of non limiting example:

- figure 1 shows a lateral schematic view, in partial longitudinal section, of a first embodiment of the subject device, drawn with continuous lines, and of a second embodiment thereof, drawn partially in dashed lines;
- figure 2 shows a partial front view of the device of figure 1;
- figure 3 shows a partial cross section of the subject device, according to the section line III-III of figure 1;
- figure 4 shows a lateral schematic view, partially in longitudinal section, of a third embodiment of the subject device;
- figure 5 shows a partial cross section of the subject device, according to the section line V-V of figure 1;
- figure 6 shows a lateral schematic view, partially in longitudinal section and partially in section plane, of a fourth embodiment of the subject device.

[0012] With reference to the accompanying drawings, the subject device 1 has standard longitudinal size, predetermined by the distance between its inlet 21 and its outlet 22.

[0013] It comprises a conduit 2, interposed between the inlet 21 and the outlet 22, able to be coupled directly in sealed fashion along a pipe for supplying a fuel (for instance by simply tightening a common locking clamp) and comprises a magnetic field generator 3, able to generate a magnetic field affecting the fuel that flows inside the conduit 2.

[0014] One of the characteristics of the device 1 resides in the fact that the conduit 2 identifies, in its interior, a path of the fuel that is repeatedly deviated, relative to the longitudinal axis 33 of the supply pipe.

[0015] A first practical embodiment is shown in figures 1, 2 and 3 in continuous lines. In this case, the conduit 2, whose inlet 21 and outlet 22 are preferably coaxial to the supply pipe, is mainly applied to fuel supply pipes for vehicles or engines, whose diameters are relatively small. The conduit 2 is advantageously shaped according to a spiral conduit 27, preferably having very tight coils with reduced internal clearance, in order to minimise size and maximise exposure to the field.

[0016] If the device is used for fixed installations, for instance boilers, the fuel supply pipe normally has considerably larger diameter. In this case, however, the conduit 2 advantageously contains a second spiral conduit 27, with the same characteristics as the one illustrated above, having smaller cross section than the conduit 2 that contains it. It is also visible, drawn in part with dashed lines, in figures 1, 2 and 3, where this second embodiment is illustrated. Obviously, in this case the extreme lateral walls 11, which in the first case may also not be necessary, are not present, or have appropriate and large openings, to allow the free flow of the fuel both

inside of the conduit 2, with the conditioning of the conduit 27, and inside the conduit 27 itself.

[0017] In a third embodiment, shown in figures 4 and 5, the conduit 2, also preferably destined to supplying fuel for vehicles, is shaped according to a conduit 23 having a reiterated forward-backwards path, interposed between its inlet 21 and its outlet 22, mutually offset and able to be directly coupled in sealed fashion along the supply pipe, also in a very simple manner, as illustrated above.

[0018] In an additional embodiment, the conduit 2 can have, in its interior, a labyrinth path. It can be undulatory, according to sinusoids, or be conditioned, as in the practical example of figure 6, by multiple concentric conduits. The conduit 2 can also contain only a second inner conduit 24, provided with superficial openings 25 and with baffles 26 in such a way as to determine in any case a tortuous fuel flow.

[0019] In particular, the baffles 26 comprise first baffles 261 inside the innermost conduit 24 and second more exterior baffles 262, all longitudinally offset from each other, the first baffles 261 having shape corresponding to the cross section of the innermost conduit 24 (for instance, discoidal shape, if the conduit 2 has circular cross section) able to delimit separate inner compartments of the innermost conduit 24, whilst the second baffles 262 having centrally hollow shaped (for instance shaped according to annuli, if the conduit 2 has circular cross section), able to delimit gaps identified externally to the innermost conduit 24. This holds true for any number of concentric conduit present and in particular for three conduits, as shown in figure 6.

[0020] At this point it should be pointed out that, advantageously, for minimum size purposes, irrespective of the embodiment, the subject device 1 can use conduits 2 whose cross section corresponds to that of the supply pipe, or is even smaller, as in the cases of employment for engine fuels, where the inlets 21 and 22, whose diameter is equal to that of the conduit 2 interposed between them would be coupled inside the fuel supply pipe.

[0021] Lastly, it is pointed out that the magnetic field, whose direction is the same as the flow of the fuel, is produced by solenoids 4 powered with direct current, with substantially cylindrical development, electrically isolated from the conduit 2, by means of isolating sleeves 41, and enveloping the conduit 2, in its various forms illustrated above, coaxially to the axis 33 of the supply pipe.

[0022] Advantageously, a direct current power supply in the order of 12 or 24 is sufficient, with appropriate cross sections of the coils of the solenoids, normally connected in series and with a corresponding battery, which in the case of vehicle engines may coincide with the battery with which they are already equipped.

[0023] The invention thus conceived can be subject to numerous modifications and variations, without thereby departing from the scope of the inventive concept that characterises it. Moreover, all components can be replaced with other technically equivalent elements.

Claims

1. Anti-pollution economiser device for fluid fuels, with longitudinal size predetermined by the distance between its inlet (21) and its outlet (22) and of the type comprising a conduit (2) able to be coupled along a fuel supply pipe in correspondence with said inlet (21) and outlet (22), and comprising a magnetic field generator (3), able to generate a magnetic field affecting the fuel that flows inside the conduit (2), **characterised in that** the conduit (2) identifies a path of the fuel that is repeatedly deviated, relative to the longitudinal axis (33) of the supply pipe.

2. Device as claimed in claim 1, **characterised in that** the conduit (2) is shaped according to a spiral conduit (27), interposed between the inlet (21) and the outlet (22), able to be coupled directly in sealed fashion along the supply pipe.

3. Device as claimed in claim 1, **characterised in that** the conduit (2) contains at least a second spiral conduit (27), whose cross section is smaller than that of the conduit (2) that contains it.

4. Device as claimed in claim 1, **characterised in that** the conduit (2) is shaped according to a conduit (23) that has a reiterated forwards-backwards path, interposed between the inlet (21) and the outlet (22), able to be coupled directly in sealed fashion along the supply pipe.

5. Device as claimed in claim 1, **characterised in that** the conduit (2) has a labyrinth path in its interior.

6. Device as claimed in any of the previous claims, **characterised in that** the conduit (2) has its cross section corresponding to that of the supply pipe (3).

7. Device as claimed in claim 5, **characterised in that** the conduit (2) contains at least a second inner conduit (24), provided with superficial openings (25) and with baffles (26) in such a way as to determine a tortuous path of the fuel.

8. Device as claimed in claim 7, **characterised in that** the baffles (26) comprise first baffles (261) interior to the innermost conduit (24) and second outer baffles (262), all longitudinally offset from each other, the first baffles (261) having shape corresponding to the cross section of the innermost conduit (24), able to delimit separate inner compartments of the innermost conduit (24), whilst the second baffles (262) have centrally hollow shape, able to delimit

gaps identified externally to the innermost conduit (24).

9. Device as claimed in any of the previous claims, **characterised in that** the magnetic field is produced by solenoids (4) with substantially cylindrical development, electrically insulated by the conduit (2) and enveloping the conduit (2) coaxially to the axis (33) of the supply pipe.

10. Device as claimed in claim 9, **characterised in that** the solenoids (4) are powered with direct current and produce a magnetic field having the same direction as the flow of the fuel.

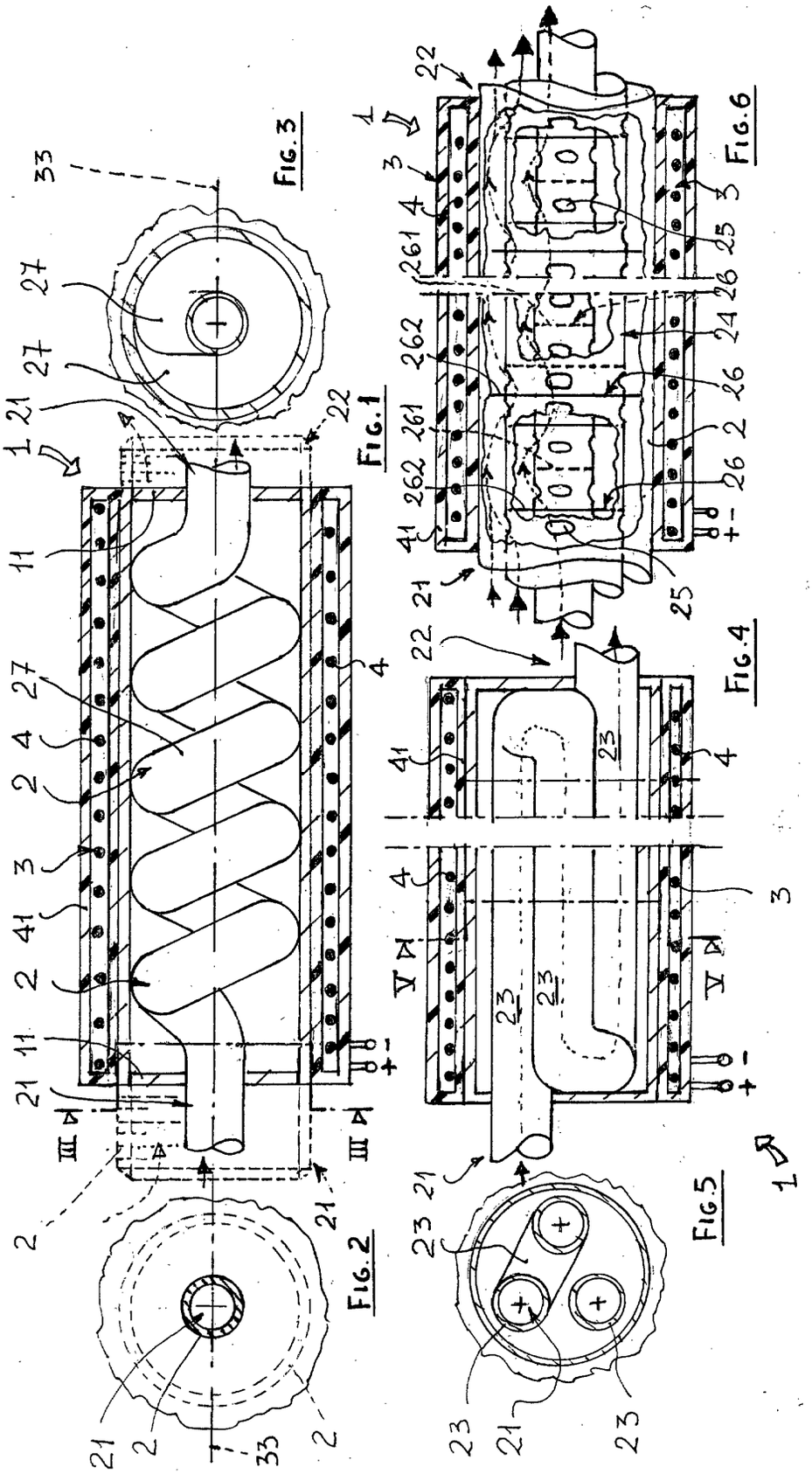
Fig.1
Fig.2
Fig.3
Fig.4
Fig.5
Fig.6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5617

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	WO 97 01702 A (ZULIANI FABIO ;ZULIANI ADRIANO (IT); REM 95 DI DEIANA M L & C S A) 16 January 1997 (1997-01-16) * page 3, line 17 - line 21 * * page 10, line 30 - line 34; figure 1 *	5,9	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

F02M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	7 March 2003	Pileri, P

CATEGORY OF CITED DOCUMENTS

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