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(54) **GAS-SAVING DEVICE**

(57) The present invention consists of a saving gas device which, being placed downstream of the pressure regulator and upstream of the consuming devices, in a natural gas or liquefied petroleum gases supply facility, improves the gas consumption efficiency by means of a recirculation, filtering and centrifugation process.

The action exerted on the steam trap of the device, retains the impurities the gas contains, thus improving retention of particles and achieving the gas to come out substantially pure, as well as achieving gas molecules rearrangement by means of a centrifugation coil, obtaining flow stabilization and improving the circulation thereof.

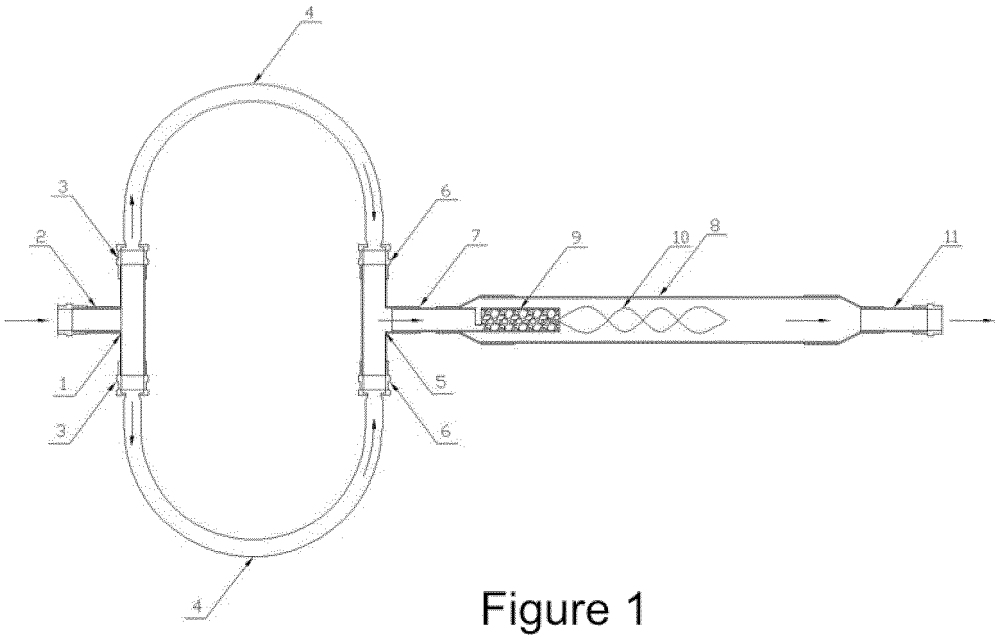

Figure 1

EP 3 147 572 A1

Description

Object of the invention

[0001] The object of the present invention is a device which, being placed downstream of the pressure regulator in a facility for the supply of liquefied petroleum gases or natural gas, improves fuel consumption efficiency in the facility, through loss recovery and impurities removal, by means of a filtering process, and stabilization of the gas flow by rearranging the molecules thereof.

Background of the invention

[0002] It is well known in the state of the art the use of liquefied petroleum gases that are present in natural gas, which is used as fuel in domestic, commercial and industrial environments.

[0003] Liquefied petroleum gases are a mixture of butane and propane, the main component of natural gas being methane which represents between 70% and 90% of the composition thereof. Both can be supplied for consumption in tanks either fixed or portable; in the case of fixed tanks the filling thereof is carried out by means of tankers, and in the case of portable tanks the filling thereof is carried out in industrial plants and its supply to the final user is carried out by replacing the empty tank for a full one.

[0004] The facility is similar both for natural gas and for liquefied petroleum gases, and it comprises a storage tank, a pressure regulator which reduces the fuel pressure inside the tank and controls the outgoing flow, the conveying pipeline which conveys the gas up to the devices consuming said fuel and among which there can be mentioned heating or household hot water boilers, cookers having gas burners or even fridges which use gas as an energy source.

[0005] The efficiency of these facilities depends on the flow rate and the supply pressure and on the impurities percentage the natural gas or liquefied petroleum gases contain. The supply pressure and flow rate are reduced by the pressure drop produced by the facility pipes and connections, such as shut-off cocks.

[0006] On the other hand, the supplied gas has certain impurities, such as other hydrocarbons, sulphur, water and other type of substances which, in its combustion process, produce highly polluting emissions or reduce the efficiency thereof.

[0007] The invention disclosed solves the aforementioned drawbacks by means of a device which features easy mounting and maintenance, cheap manufacturing costs, which improves combustion efficiency and which reduces polluting emissions.

Description of the invention

[0008] The gas saving device for liquefied petroleum gases or natural gas object of the present invention, is of the type which are mounted downstream of the pressure regulator and upstream of the devices consuming the liquefied petroleum gases or the natural gas, such as, among others, boilers, cookers, fridges, etc...

[0009] The gas saving device comprises the following elements:

- A first inlet three-way T-fitting, having a central passage as a gas inlet and two side passages as a gas outlet, wherein the inlet central passage is connected to the pipe coming from the pressure regulator;
- A second outlet three-way T-fitting, having two side inlet passages and a central outlet passage, and wherein the central passage is connected to the first end of the steam trap;
- Two flexible or rigid pipes which connect the side outlet passages of the first fitting to the side inlet passages of the second fitting.
- A steam trap having a cylindrical shape and with the inner diameter thereof being longer than the inner diameter of the passages of the first and second fittings.
- Inside the steam trap, the gas is first passed through an activated carbon filter, through which all the impurities carried in the gas are eliminated.
- Next, the gas is passed through a copper coil which causes a centrifugation by means of which the rearrangement of the molecules thereof is achieved.
- A flow rate regulator, wherein the end thereof situated downstream of said flow rate regulator is connected to the second end of the steam trap, and the end thereof situated upstream of the flow rate regulator is connected to the supply pipe of the consuming devices.

[0010] By means of the gas filtering, using activated carbon, practically all particle and impurities are removed, thus improving the effect of the steam chamber as far as filtering is concerned. Furthermore, by using the copper centrifugation coil the rearrangement of gas molecules is achieved, improving the stability of the flow rate throughout the whole facility and reducing the friction loss.

Description of the drawings

[0011] Figure 1: Plan view of an outline of the saving gas device.

List of references

[0012]

1.- First inlet three-way T-fitting
2.- Central inlet passage of the first fitting
3.- Side inlet passage of the first fitting
4.- Flexible or rigid pipes
5.- Second outlet three-way T-fitting

6.- Side inlet passage of the second fitting
7.- Central outlet passage of the second fitting.
8.- Steam trap
9.- Activated carbon filter
10.- Copper centrifugation coil
11.- Flow rate regulator

Preferred embodiment of the invention

[0013] Figure 1 shows a preferred embodiment of the gas saving device.

[0014] The gas saving device shown in figure 1 is connected downstream to the natural gas or liquefied petroleum gases inlet pipe. The gas enters through a central inlet passage (2) into the first three-way T-fitting (1), and the flow thereof splits going out through the two side outlet passages (3) towards the side inlet passages (6) of the second three-way T-fitting (5), through the flexible or rigid pipes (4). Both flows coming from the first three-way T-fitting (1) are joined in the central outlet passage of the second fitting (7), increasing the gas pressure. Then, the gas flows into the steam trap (8) where the impurities contained therein are deposited; furthermore, the gas flows into said steam trap through an activated carbon filter (9), improving the particle and impurities capture, thus achieving the gas to come out substantially pure. Still inside the steam trap (8), the gas flows through a copper centrifugation coil (10), wherein the gas molecules rearrangement is achieved, obtaining flow stabilization in the facility and improving the circulation thereof. And after said step, the gas flows towards the consuming devices, through the flow rate regulator (11) which regularizes the gas flow to the consumption requirements.

[0015] It is well known by those skilled in the art that the connections among the different elements of the invention and the supply facility are hermetically connected by means of the corresponding fittings and connections, such as gaskets, sealing elements, to guarantee the tightness of the facility and therefore to avoid gas leaks which can cause dangerous explosions.

[0016] The gas saving device disclosed in the present invention, increases the gas pressure and supply flow rate so as to fulfil the requirements of the devices consuming said gas, eliminates the impurities it contains and prevents the problem of freezing by insufficient gas vaporization, thereby causing the combustion to produce a less amount of polluting emissions and particles, and making said combustion be more efficient.

[0017] Another one of the multiple advantages of the invention is that the mounting thereof does not require modifications in the general facility already installed, but only the connection thereof to the inlet pipe for the gas supply.

Claims

1. **Gas saving device.-** of the type being mounted downstream of the pressure regulator and upstream of the consuming devices **characterized in that** it features a steam trap (8) having a cylindrical shape containing inside first an activated carbon filter (9) and then a copper centrifugation coil (10), and a flow rate regulator (11) connected to the supply pipe for the consuming devices.

2. **Gas saving device.-** according to claim 1, **characterized in that** it comprises a steam trap (8) the diameter of which is longer than the inner diameter of the passages of the first and second fitting.

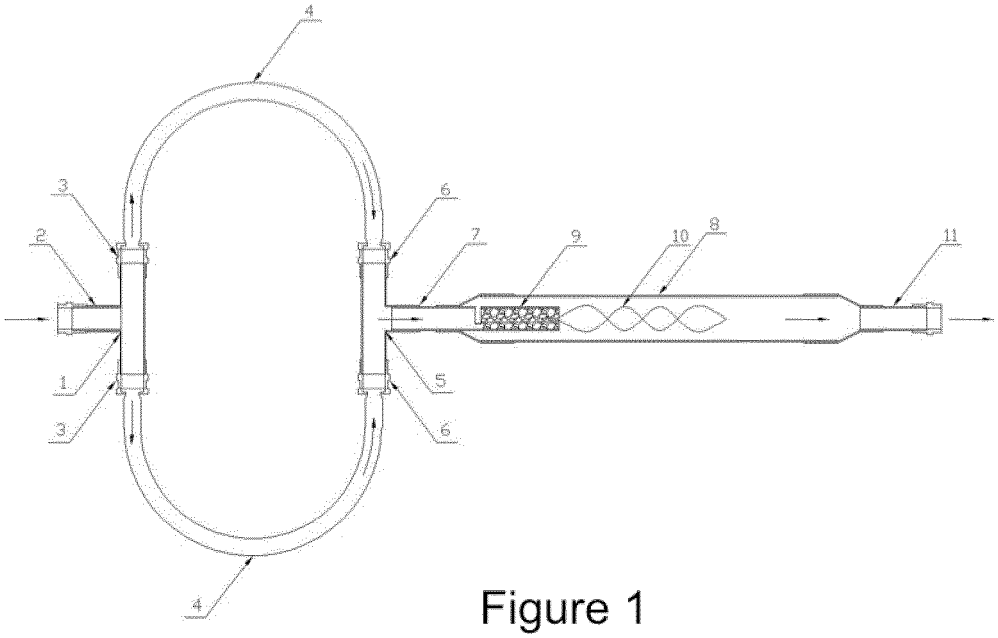

Figure 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/070175

A. CLASSIFICATION OF SUBJECT MATTER

F24C3/12 (2006.01)
F23K5/18 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24C, F23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP H10227442 A (TOKYO GAS CO LTD) 25/08/1998, the whole document.	1
A	JP 2001004126 A (RI ONU) 12/01/2001, the whole document.	1
A	CN 2131047Y Y (XITAN ZHOU) 28/04/1993, the whole the document.	1
A	CN 201715535U U (SHANXI YANGMEI FENGXI FERTILIZER INDUSTRY GROUP CO LTD) 19/01/2011, the whole document.	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18/05/2015	**(18/05/2015)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer J. Celemín Ortiz-Villajos Telephone No. 91 3495493

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
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