

(19)



(11)

EP 3 147 572 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
13.01.2021 Bulletin 2021/02

(51) Int Cl.:
F24C 3/12 (2006.01) **F23K 5/18** (2006.01)
F23K 5/00 (2006.01) **F23D 14/68** (2006.01)

(21) Application number: **15777344.1**

(86) International application number:
PCT/ES2015/070175

(22) Date of filing: **12.03.2015**

(87) International publication number:
WO 2015/155388 (15.10.2015 Gazette 2015/41)

(54) **GAS-SAVING DEVICE**

GASSPARVORRICHTUNG

DISPOSITIF ÉCONOMISEUR DE GAZ

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **08.04.2014 ES 201430523**

(43) Date of publication of application:
29.03.2017 Bulletin 2017/13

(73) Proprietor: **Gonzalez Quintana, Alfredo
35300 Santa Brigida (Las Palmas) (ES)**

(72) Inventor: **Gonzalez Quintana, Alfredo
35300 Santa Brigida (Las Palmas) (ES)**

(74) Representative: **Urizar Anasagasti, Jesus Maria
C/ Segre 27- 1°
28002 Madrid (ES)**

(56) References cited:
**CN-U- 201 715 535 CN-Y- 2 131 047
DE-B- 1 132 876 ES-U- 1 079 980
ES-U- 1 142 356 GB-A- 191 317 972
JP-A- H10 227 442 JP-A- 2001 004 126
US-A- 3 394 533 US-A- 4 911 143**

EP 3 147 572 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

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] ES 1 079 980 U discloses a gas saving device according to the preamble of claim 1.

[0008] DE1132876B refers to a security device for autogenous welding, which includes a system for cutting off gas supply, when water and waste/dirt accumulates inside the filter.

[0009] US3394533A refers to a device for separating liquid and gaseous components of a fluid by means of a non-humid cone-shaped screen disposed in the flow path of the fluid. The capacity of separating fluid components

with the device allows its use in controllable humidity systems.

[0010] The invention disclosed solves the aforementioned drawbacks by means of a device according to the appended claim 1, which features easy mounting and maintenance, cheap manufacturing costs, which improves combustion efficiency and which reduces polluting emissions.

Description of the invention

[0011] 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...

[0012] 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.
- A flow rate regulator, the flow rate regulator being connectable to a supply pipe of said consuming devices.
- Inside the steam trap, the gas flow is defined, wherein 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.
- Then, through said 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.

[0013] 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

[0014] Figure 1: Plan view of an outline of the saving gas device.

List of references

[0015]

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

[0016] Figure 1 shows a preferred embodiment of the gas saving device.

[0017] 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 speed. 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.

[0018] 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.

[0019] The gas saving device disclosed in the present

invention, increases the gas speed 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.

[0020] 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.

15 Claims

1. Gas saving device configured for gas consuming devices such as furnaces, stoves and heating boilers, of the type being mounted downstream of a pressure regulator and upstream of said consuming devices, said gas saving device comprising:

a first inlet three-way T-fitting (1), having a central passage as a gas inlet and two side passages as a gas outlet, wherein the inlet central passage is connectable to a pipe coming from said pressure regulator;

a second outlet three-way T-fitting (5), having two side inlet passages and a central outlet passage, and wherein the central passage is connected to the first end of a steam trap (8); the steam trap (8) having a cylindrical shape and with the inner diameter thereof being longer than the inner diameter of the central passages of said first T-fitting (1) and second T-fittings (5); two flexible or rigid pipes (4) which connect the side outlet passages of the first fitting (1) to the side inlet passages of the second fitting (5); a flow rate regulator (11), the flow rate regulator (11) being connectable to a supply pipe of said consuming devices; and

characterized in that,

inside the steam trap (8), a gas flow is defined, wherein the gas is first passed through an activated carbon filter (9) through which all the impurities carried in the gas are eliminated; next, through a copper coil (10) which causes a centrifugation by means of which the rearrangement of the molecules thereof is achieved; then, through said flow rate regulator (11).

Patentansprüche

1. Gassparvorrichtung, konfiguriert für Gasverbrauchervorrichtungen wie Herde, Öfen und Heizkessel des Typs, die stromabwärts eines Druckreglers und stromaufwärts der Verbrauchervorrichtungen mon-

tiert sind, wobei die Gassparvorrichtung umfasst:

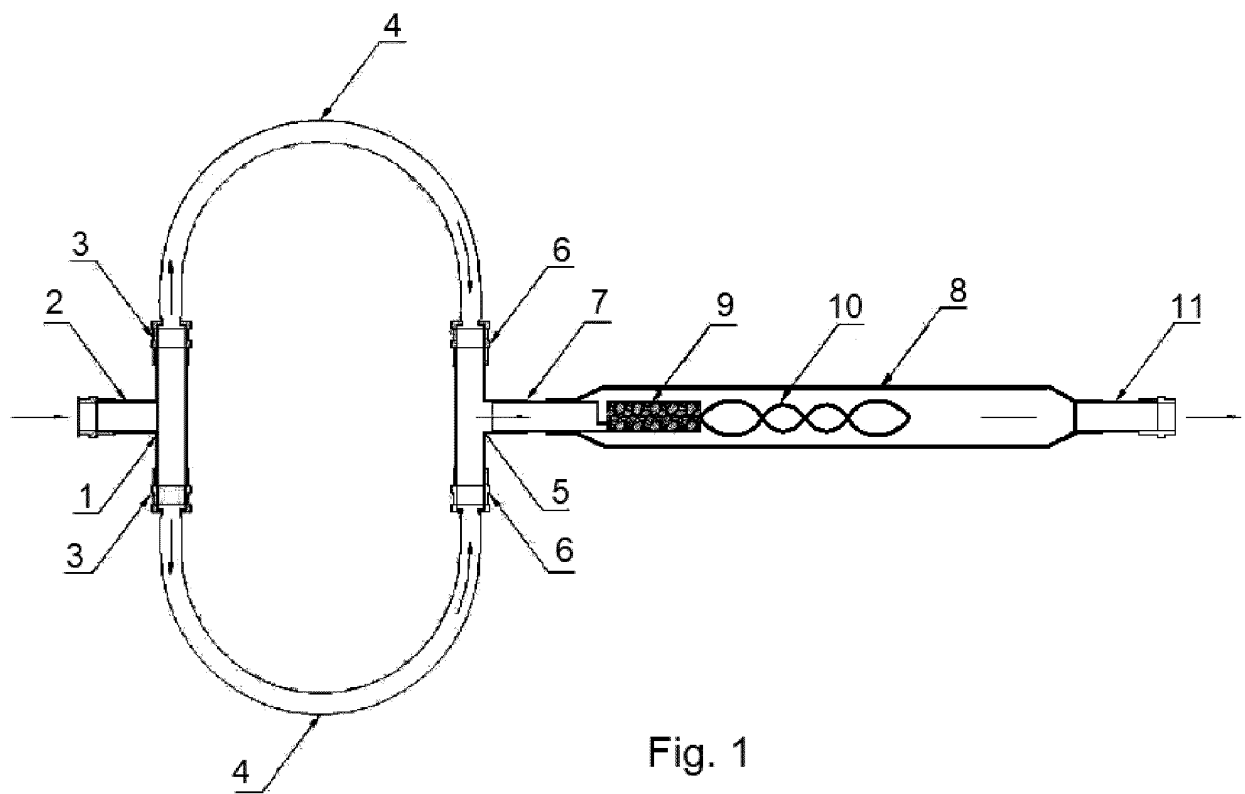
eine erste Dreiwege-Einlass-T-Fassung (1), die einen zentralen Durchgang als einen Gaseinlass und zwei Seitendurchgänge als einen Gasauslass aufweist, wobei der zentrale Einlassdurchgang mit einem Rohr verbunden werden kann, das von dem Druckregler kommt; 5
eine zweite Dreiwege-Auslass-T-Fassung (5), die zwei Seiteneinlassdurchgänge und einen zentralen Auslassdurchgang aufweist, und wobei der zentrale Durchgang mit dem ersten Ende eines Dampfabseiders (8) verbunden ist; wobei der Dampfabseider (8) eine zylindrische Form aufweist und wobei der Innendurchmesser davon länger als der Innendurchmesser der zentralen Durchgänge der ersten T-Fassung (1) und zweiten T-Fassungen (5) ist; 10
zwei flexible oder starre Rohre (4), welche die Seitenauslassdurchgänge der ersten Fassung (1) mit den Seiteneinlassdurchgängen der zweiten Fassung (5) verbinden; 15
einen Durchflussratenregler (11), wobei der Durchflussratenregler (11) mit einem Zufuhrrohr der Verbrauchervorrichtungen verbunden werden kann; und 20
dadurch gekennzeichnet, dass,
innerhalb des Dampfabseiders (8), ein Gasfluss definiert ist, wobei das Gas zuerst durch einen aktivierten Kohlefilter (9) geleitet wird, durch den alle Verunreinigungen, die in dem Gas getragen werden, beseitigt werden; 25
danach durch eine Kupferspule (10), die eine Zentrifugation bewirkt, mit der die Neuordnung der Moleküle davon erreicht wird; dann durch den Durchflussratenregler (11). 30 35

Revendications

1. Dispositif économiseur de gaz configuré pour les dispositifs consommateurs de gaz tels que les fours, les poêles et les chaudières, du type étant monté en aval d'un régulateur de pression et en amont desdits dispositifs consommateurs, ledit dispositif économiseur de gaz comprenant : 40 45

un premier raccord en T à trois voies d'entrée (1), ayant un passage central comme entrée de gaz et deux passages latéraux comme sortie de gaz, dans lequel le passage central d'entrée peut être connecté à un tuyau provenant dudit régulateur de pression ; 50
un deuxième raccord en T à trois voies de sortie (5), ayant deux passages d'entrée latéraux et un passage de sortie central, et dans lequel le passage central est connecté à la première extrémité d'un purgeur de vapeur (8) ; le purgeur 55

de vapeur (8) ayant une forme cylindrique et dont le diamètre interne est plus grand que le diamètre interne des passages centraux desdits premier raccord en T (1) et deuxième raccord en T (5) ;
deux tuyaux flexibles ou rigides (4) qui connectent les passages de sortie latéraux du premier raccord (1) aux passages d'entrée latéraux du deuxième raccord (5) ;
un régulateur de débit (11), le régulateur de débit (11) pouvant être connecté à un tuyau d'alimentation desdits dispositifs consommateurs ; et **caractérisé en ce que,**
à l'intérieur du purgeur de vapeur (8), un débit de gaz est défini, dans lequel le gaz passe d'abord à travers un filtre à charbon actif (9) à travers lequel toutes les impuretés transportées dans le gaz sont éliminées ;
ensuite, à travers une bobine de cuivre (10) qui provoque une centrifugation au moyen de laquelle la restructuration de ses molécules est réalisée ; puis, à travers ledit régulateur de débit (11).



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- ES 1079980 U [0007]
- DE 1132876 B [0008]
- US 3394533 A [0009]