



12 **EUROPEAN PATENT SPECIFICATION**

45 Date of publication of patent specification :
28.06.95 Bulletin 95/26

51 Int. Cl.⁶ : **F24C 3/10**

21 Application number : **91500040.0**

22 Date of filing : **26.04.91**

54 **Gas appliance.**

30 Priority : **27.04.90 ES 9001218**

43 Date of publication of application :
30.10.91 Bulletin 91/44

45 Publication of the grant of the patent :
28.06.95 Bulletin 95/26

84 Designated Contracting States :
BE DE DK FR GB IT NL

56 References cited :
DE-B- 1 946 588
US-A- 3 544 247
PATENT ABSTRACTS OF JAPAN vol. 13, no.
14 (M-784)(3362) 13 January 1989, & JP-A-63
226525 (RINNAI CORP) 21 September 1988

56 References cited :
PATENT ABSTRACTS OF JAPAN vol. 13, no.
143 (M-811)(3491) 07 April 1989, & JP-A-63
306311 (HAAMAN) 14 December 1988
PATENT ABSTRACTS OF JAPAN vol. 13, no.
60 (M-796)(3408) 10 February 1989, & JP-A-63
263322 (HITACHI CHEM) 31 October 1988

73 Proprietor : **Bertomeu Martinez, Francisco**
Palleter, n 13, 4 8a Escalera,
Derecha
E-46008 Valencia (ES)

72 Inventor : **Bertomeu Martinez, Francisco**
Palleter, n 13, 4 8a Escalera,
Derecha
E-46008 Valencia (ES)

74 Representative : **Gomez-Acebo y Pombo, José**
Miguel
c/o CLARKE, MODET & Co.
Paseo de la Castellana 164
E-28046 Madrid (ES)

EP 0 454 613 B1

Note : Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

This invention deals with a gas appliance according to the preamble of claim 1.

Certain safety valves based on flame control are already familiar. These valves are used in household appliances running on gaseous fuel, are of the thermoelectric type, and utilize electrical energy generated by the heating of a thermocouple, either by the flame of a pilot light, or by the burner itself.

The electrical energy generated flows through the coil of an electromagnetic assembly, and this action makes it possible for safety valve to remain open, allowing for the flow of the gas to the burner it controls. The absence of a flame and the outflow of gas that is not burned, make it impossible for the thermocouple to remain hot, and therefore no electrical energy allowing for the activation of the electromagnet is produced. As a result, the valve controlling the flow of the gas closes.

It must be kept in mind that the electromagnetic system does not generate sufficient energy to attract the safety valve on the assembly. It produces only enough energy to keep the valve closed, which therefore must be activated manually to overcome the force of the built-in spring. This spring is activated, shutting off the gas, when the temperature is not high enough to obtain the thermoelectric energy necessary to maintain the safety valve open.

In reality, the magnetic force of attraction should only be slightly greater than the force of the tension caused by the spring of the safety valve; this level of force is achieved with very low consumption of electricity.

Japanese publication JP-A-226525 shows how to ensure ignition by burner, prevent the releasing of unburnt gas and to contrive safety, by incorporating a timer circuit continued igniting operation for a predetermined period of time necessary for the ignition of a burner even when the igniting operation is instantaneous, into an igniting circuit.

When a burner is ignited instantaneously by the spark of an igniting circuit, a flame detecting circuit is operated to supply the voltage of a battery to the coil of a solenoid safety valve through a transistor and hold the safety valve in the given time valve opening condition of a first timer circuit while a solenoid safety valve is held in the valve opening condition by the conduction of the coil affected by a predetermined electromotive force from a thermocouple heated by the burner, whereby the combustion of the burner is continued. When the burner is not ignited instantaneously by the spark of the ignited circuit, a flame rod does not carry current, and a flame detecting circuit is not operated, whereby the voltage of the battery is not supplied to the coil, the solenoid safety valve is closed quickly and the burner may be maintained in the condition of shut-off.

Through U.S.A. patent no. 3 544 247 we know that a fuel burner is operatively connected to a burner primary control means and operates in response to the condition of a controller. The burner primary control means is of a type that includes a direct current power supply means to supply all of the necessary operating power for its amplifiers and control relays. Connected to the burner primary control means is a power storage means that obtains direct current power from the direct current power supply means of the burner primary control means and which stores this power over a period of time. In the event of a momentary power loss to the burner primary control means, the power storage means feeds direct current power back to the primary control means keeping it energized for a short interval.

Through Japanese publication no. JP-A-63306311 we know how to surely keep safety and enable positive combustion in a combustion device such as hot water heater by a method wherein a fuel valve is kept open during a desired auxiliary time after ignition and this auxiliary time is extended by desired time when ignition of a burner is confirmed.

First and second fuel valves are opened under a pushing operation of a hot water feeding member to its deepest position and then a pilot light burner is ignited. At this time, an initial opening valve holding circuit of a control circuit may output an auxiliary time until the opened valve of a first fuel valve can be kept with an electromotive force of a first thermocouple heated by a pilot burner so as to assure the opened valve of the fuel valve. If the ignition is confirmed with a flame rod within this auxiliary time, a forced valve opening holding electrical power is supplied, for a desired time. With this arrangement it is possible to make a positive ignition while keeping safety characteristics.

Finally, from German patent no. 1946588 we know of a security means for the electric ignition of domestic apparatus which are heated by gas through an electromagnetic valve which controls the gas feed to the point of its combustion, the winding of the electromagnetic valve being in the manner of a transformer for the igniting means, a timer being connected in the primary circuit of the current of the magnetic valve for gas, which can be connected (jumped) thermoelectrically, and in that the spark igniting means can be control through high tension, located on the valve secondary circuit, through a flame controller by ionization, already known.

The invention covers a gas appliance with the features detailed in claim 1. The dependent claims deal with further embodiments of the gas appliance according to claim 1.

To allow for easier understanding, not only of the construction, but also of the correct use of the instant lighting device of the invention, a practical example of operation is provided below, just as is shown in the

corresponding schematic diagram. This explanation is merely illustrative and operation is not in any way restricted to the example given.

The device (1) consists of a printed circuit (2) which includes a set of pushbuttons (3) by means of which the valves controlling the flow of gas to the burner (not shown for the appliance for household use), are activated.

When the device has more than one valve, or likewise, more than one burner, and as a result has various thermocouples (4), the circuit is equipped with a selector (5), so that by means of a trigger (6), a single valve may be selected for use with the corresponding supply.

One the pushbutton (3) is pressed, the burner is lit by means of a spark lighter (7), and the supply of an auxiliary current is provided to the magnetic group of the valve.

The supply source (8) can be used with a storage cell, and can also be connected to the circuit by an isolation transformer (9).

Both the isolation transformer and the thermocouples (4) together with the spark lighter (7), are controlled by means of timers (10), and in both cases operate on transistors (11).

Claims

1. A gas appliance having an instant lighting device (1) with a spark lighter (7), comprising at least one burner, with at least one corresponding magnetic group of safety valves and thermocouples (4) to be heated by the flames of the burner(s) in order to allow gas to be fed to the burner(s) when heated, an electric supply source (8) with storage cell for supplying auxiliary electric current to the instant lighting device (1) and the magnetic group of safety valve(s), an isolation transformer for supplying electric current to the electric supply source (8), characterized by a printed electric circuit (2) with outlets and a timer (10) for feeding and timing the spark lighter (7) and the auxiliary current to the magnetic group of safety valve(s) and to the thermocouples (4), the said auxiliary current to be replaced by the electrical current generated by them once heated by the flame, by a trigger (6) and a selector (5) for controlling the instant lighting device (1) in order to enable where necessary the supply of gas only to one safety valve at the time so as to prevent the possibility of activating more safety valves at the same time and by the fact that the safety valve shuts off when the corresponding thermocouple cools at a temperature which corresponds to a one third energy reduction of the generated electric current.

2. A gas appliance according to claim 1, character-

ized in that the timer (10) allows the supply of electric current such that the duration of the auxiliary current is greater than that of the functioning of the spark lighter (7).

3. A gas appliance according to claim 1, characterized in that the lighting device (1) comprises a pushbutton (3) for enabling the supply of electric current to the device (3) and in that upon pressing the pushbutton (3) for supplying electrical energy to the lighting system the existence of a flame is detected through ionization, the spark lighter stops functioning and, at the same time, the timer (10), which gives auxiliary electricity to the thermocouple continues functioning during approximately 6 seconds more.
4. A gas appliance according to claim 3, characterized in that once the thermocouple (4) is heated, if the pushbutton (3) is pressed, the printed electrical circuit (2) is not in use and does not consume energy.

Patentansprüche

1. Gasgerät mit Sofortzündvorrichtung (1) durch Funkenzünder (7), bestehend aus mindestens einem Brenner mit mindestens einem Magnetaggregat von Sicherheitsventilen und Thermoelementen (4), die von den Flammen des (der) Brenner/s erwärmt werden, um die Gaseinspeisung in den (die) Brenner zu gestatten, wenn diese erwärmt sind; einer Stromversorgungsquelle (8) mit Sammlerzelle für eine evtl. Hilfsstromversorgung an die Sofortzündvorrichtung (1) und Magnetaggregat von Sicherheitsventilen; einem Trenntransformator für die Stromversorgung an die Stromversorgungsquelle (8), **dadurch gekennzeichnet**, daß eine gedruckte Elektroschaltung (2) mit Ausgängen und einem Zeitmesser (10) vorgesehen sind, um den Funkenzünder (7) zu speisen und um die Hilfsstromversorgung zu dem Magnetaggregat des (der) Sicherheitsventils/le und zu den Thermoelementen (4) abzusichern und zeitlich einzustellen, indem der besagte Hilfsstrom vom Hauptstrom zu ersetzen ist, der von denselben erzeugt wird, sobald diese von der Flamme erwärmt worden sind, was über einen Auslöseimpuls (6) und Wähler (5) zur Kontrolle der Sofortzündvorrichtung (1) erfolgt, um, falls erforderlich, nur die Gasversorgung zu je einem Sicherheitsventil zu ermöglichen und um die Möglichkeit auszuschließen, mehrere Sicherheitsventile gleichzeitig in Betrieb zu setzen und daß das Sicherheitsventil aussetzt, wenn das entsprechende Thermoelement auf eine Temperatur sinkend

abkühlt, die der Energiereduzierung von einem Drittel des erzeugten Stroms entspricht.

2. Gasgerät nach Anspruch 1, dadurch gekennzeichnet, daß die Dauer der Hilfsstromversorgung durch Einschreiten des Zeitmessers (10) länger ist, welche die Stromversorgung gestattet, als die Funktionsdauer des Funkenzünders (7). 5
3. Gasgerät nach Anspruch 1, dadurch gekennzeichnet, daß die Zündvorrichtung (1) einen Druckknopf (3) für die Stromversorgung zur Vorrichtung (3) umfaßt und daß nach Betätigung des Systems das Vorhandensein einer Flamme durch Ionisation entdeckt wird, indem der Funkenzünder aufhört zu funktionieren und sich gleichzeitig der Zeitmesser (10) in Betrieb setzt, der das Thermoelement mit Hilfsstrom versorgt, indem dieser kontinuierlich während ca 6 weiterer Sekunden funktioniert. 10 15 20
4. Gasgerät nach Anspruch 3, dadurch gekennzeichnet, daß nach Erwärmung des Thermoelements (4), wenn der Druckknopf (3) betätigt worden ist, die gedruckte Elektroschaltung (2) nicht benutzt wird und somit auch keine Energie verbraucht. 25

Revendications 30

1. Un appareil au gaz à dispositif d'allumage instantané (1), avec allumeur à étincelle (7), comprenant au moins un brûleur et au moins un groupe magnétique de soupapes de sécurité et de thermocouples (4) qui seront chauffés par les flammes du ou des brûleurs, afin de permettre le passage du gaz aux brûleurs une fois que ceux-ci seront chauds; une source d'alimentation électrique (8) avec une batterie pour fournir un courant électrique auxiliaire au dispositif d'allumage instantané (1) et au groupe magnétique de soupapes de sécurité; un transformateur d'isolement pour alimenter la source d'alimentation électrique (8), caractérisé par un circuit électrique imprimé (2) avec des sorties et un temporisateur (10) pour l'alimentation et la programmation de l'allumeur à étincelles (7) et le courant auxiliaire au groupe magnétique de soupapes de sécurité et aux thermocouples (4), ce courant auxiliaire étant remplacé par le courant électrique produit par ces derniers une fois portés à température par la flamme, à l'aide d'un déclencheur (6) et d'un sélecteur (5) contrôlant le dispositif d'allumage instantané (1) afin de permettre, le cas échéant, l'alimentation en gaz d'une seule soupape de sécurité à la fois, pour empêcher l'activation simultanée de plus de soupapes de sécu- 35 40 45 50 55

rité, et également caractérisé par le fait que la soupape de sécurité se ferme lorsque la température du thermocouple correspondant diminue jusqu'au tiers de l'énergie du courant électrique produit.

2. Un appareil au gaz selon revendication 1, caractérisé par le fait qu'il permet l'alimentation en courant électrique par l'intervention du temporisateur (10), de sorte que la durée du courant auxiliaire soit supérieure à celle du fonctionnement de l'allumeur à étincelles (7).
3. Un appareil au gaz selon revendication 1, caractérisé par le fait que le dispositif d'allumage (1) comprend un bouton-poussoir (3) permettant l'alimentation électrique du dispositif (3) et par le fait qu'en appuyant sur le bouton-poussoir (3) pour fournir de l'électricité au système d'allumage, l'existence d'une flamme est détectée par ionisation, l'allumeur à étincelles cesse de fonctionner et le temporisateur (10) qui fournit l'énergie électrique auxiliaire au thermocouple continue à fonctionner pendant environ six secondes supplémentaires.
4. Un appareil au gaz selon revendication 3, caractérisé par le fait qu'une fois que le thermocouple (4) a été porté à température, l'activation du bouton-poussoir (3) met hors-tension le circuit électrique imprimé (2), qui ainsi ne consomme pas d'énergie.

