

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 060 604
A1

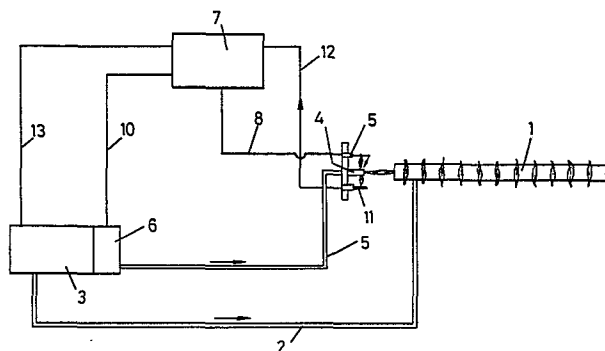
(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **82200333.1**(51) Int. Cl.³: **F 23 Q 9/14**(22) Date of filing: **12.03.82**(30) Priority: **17.03.81 NL 8101301**(71) Applicant: **Furigas Electronics N.V., Postbus 231 de Ruyterkade 51, Willemstad Curaçao Netherlands Antilles (NL)**(43) Date of publication of application: **22.09.82**
Bulletin 82/38(72) Inventor: **Willemsen, Johannes Albertus Hendrikus, Ossewei 3, NL-9482 RZ Tienaarlo (NL)**(84) Designated Contracting States: **AT BE CH DE FR GB IT LI NL SE**(74) Representative: **den Boer, Jan Johannes, Ir., Octrooibureau Polak & Charlouis Laan Copes van Cattenburch 80, NL-2585 GD The Hague (NL)**

(54) **System for automatic ignition through an intermittently operating pilot flame burner of the main burner of a gas fired appliance, using a thermo-element as a signal emitter.**

(57) The invention provides a system for the automatic ignition of a gas fired appliance, having an intermittently operative pilot flame burner (4), comprising a thermo-element (11), which serves through an electronic unit (7) as means for producing a control signal for opening the main gas valve (3). Thereby the system has a small reaction time while a thermo-element is a simple, cheap and little or not failure sensitive part, which already is used in large numbers in other gas appliances.



EP 0 060 604 A1

A system for automatic ignition through an intermittently operating pilot flame burner of the main burner of a gas fired appliance, using a thermo-element as a signal emitter.

5 The invention relates to an automatic ignition system for automatic ignition of the gas burner of a gas fired appliance through the intermediary of an intermittently operative pilot flame burner, having a pilot flame gas valve, an ignition signal for the appliance actuating an ignition device and simultaneously open the pilot flame valve such
10 that the ignition device ignits the pilot flame gas.

By causing intermittent burning of the pilot flame, namely only in the moment in which the main burner has to be ignited and therefore not constantly, as was usual, an energy and cost savings is permitted, which
15 is important in connection with the fact that fuels are becoming scarcer and energy prices increase.

— A similar system is known from the U.S. patent 4,086.048. According to that patent, a circuit using diodes is used between a flame detection
20 means at the pilot flame burner and the main gas valve, such that the main gas valve only opens if the pilot flame burns.

The invention aims at providing a similar automatic ignition system, having an intermittently operative pilot flame burner, which is simpler and more
25 reliable.

This is achieved according to the invention in that adjacent to the pilot flame burner a thermo-element or thermo-couple is provided, which is heated by the ignited pilot flame and issues a voltage, which after a
30 predetermined small value has been reached is transduced through an electronic unit into a control signal for opening the main gas valve of the main burner.

Thereby already when the thermo-couple voltage has a very small value, e.g.
35 5 mV, through electronic circuits a value is reached, which is sufficient

as control signal for the main valve. The reaction time of this system therefore is small.

5 Furthermore a thermo-element is a simple and little or not failure sensitive element, while it is used in large numbers in all kinds of gas fired appliances. Moreover, by the invention, gas fired appliances having a permanently burning pilot flame and a thermo-element may easily be re-arranged into intermittent operation, since therefore only an ignition device and an electronic unit have to be provided.

10

It is to be noted that e.g. from the French patent 2169451, according to which, however, no automatic ignition takes place, applying an ionisation electrode and a thermo-element adjacent to the pilot flame burner of a gas fired appliance is known, the purpose being to shorten the time interval after which the appliance is again safeguarded against the

15

outflow of unignited gas after an operative period of the burner. Such an ionisation electrode ensures a quick reaction as well for opening as for closing the gas valves, but the disadvantage is that ionisation measurement is very failure sensitive.

20

It is to be noted further that using a thyristor in the electronic unit of a gas fired appliance is known from the U.S. patent 4,188,180.

25

A further system is known, in which the burner pilot flame heats a small tube, containing a quantity of mercury. Said mercury expands and actuates a pressure switch through the liquid pressure generated thereby, said switch opening the main gas valve. A disadvantage of said known system is the long reaction time.

30

The invention will hereunder be explained with reference to the drawing in which an embodiment as example of the system according to the invention is shown schematically. The figure shows the diagram of the system.

35

0060604

In fig. 1 only a main burner 1 of the gas fired appliance has been shown. Gas may be supplied thereto through a main gas conduit 2 in which a
5 main gas valve 3 has been provided. The ignition device comprises a pilot flame burner 4 the flame of which is directed towards outflow apertures of the main gas burner 1.

Combustion gas for the pilot flame burner 4 may be supplied thereto through a pilot flame gas conduit 5 in which a pilot flame gas valve
10 6 is provided, which together with the main gas valve 3 may be contained in a housing.

An electronic control device 7 includes as an example a spark generator, not further shown, connected through an electric conduit 8 to a pin 9
15 provided adjacent to the pilot flame burner 4.

The gas fired appliance is e.g. a central heating boiler, a gas heater, a hot water storage apparatus or a gas boiler.

With the central heating boiler, gas heater or hot water storage apparatus, a thermostat signal provides the ignition signal for the burner.
20

With a gas boiler the ignition signal is issued each time the hot water tap thereof is opened. The ignition signal actuates the ignition device, such as e.g. a spark generator, whereby high voltage sparks are generated between the ignition pin 9 and the mass of the burner 4.

25 Simultaneously, under the influence of the ignition signal of the electronic unit 7, through a conduit 10 a control signal is issued to the pilot flame gas valve 6, whereby this valve is opened. The gas flowing from the burner apertures of the pilot flame burner 4 is now ignited by the sparks emitted by the pin 9.

30 According to the invention adjacent to the burner 4, a thermo-element or thermo couple 11 has been provided, which is arranged such that it is exposed to the flames of the pilot burner and is heated thereby. The potential generated thereby is guided as a signal through an electric
35 conduit 12 towards the electronic unit 7. The signal is, after a

0060604

predetermined value has been reached, e.g. 5 mV, transmitted through a conduit 13 to the main gas valve 3, which is opened thereby.

Gas now flows through the conduit 2 towards the main burner 1, which after issuing from the burner apertures thereof, is ignited by the pilot flame of the burner 4.

5

If the gas fired appliance issues a terminating signal for the burner, the electronic unit 7 causes the closure of the main gas valve 3, as well as of the pilot flame gas valve 6, so that no gas is used during the time that the main burner 1 is not required to be burning.

10

The electronic unit 7, which is controlled by a programmed integrated circuit or chip, comprises electronic elements which are generally known per se so that no description thereof will be given here.

15

Said electronic unit 7 likewise contains all necessary safety devices as dictated by the International Inspection standards, among others e.g. a maximum thermostat locking device.

20

--- ++ ---

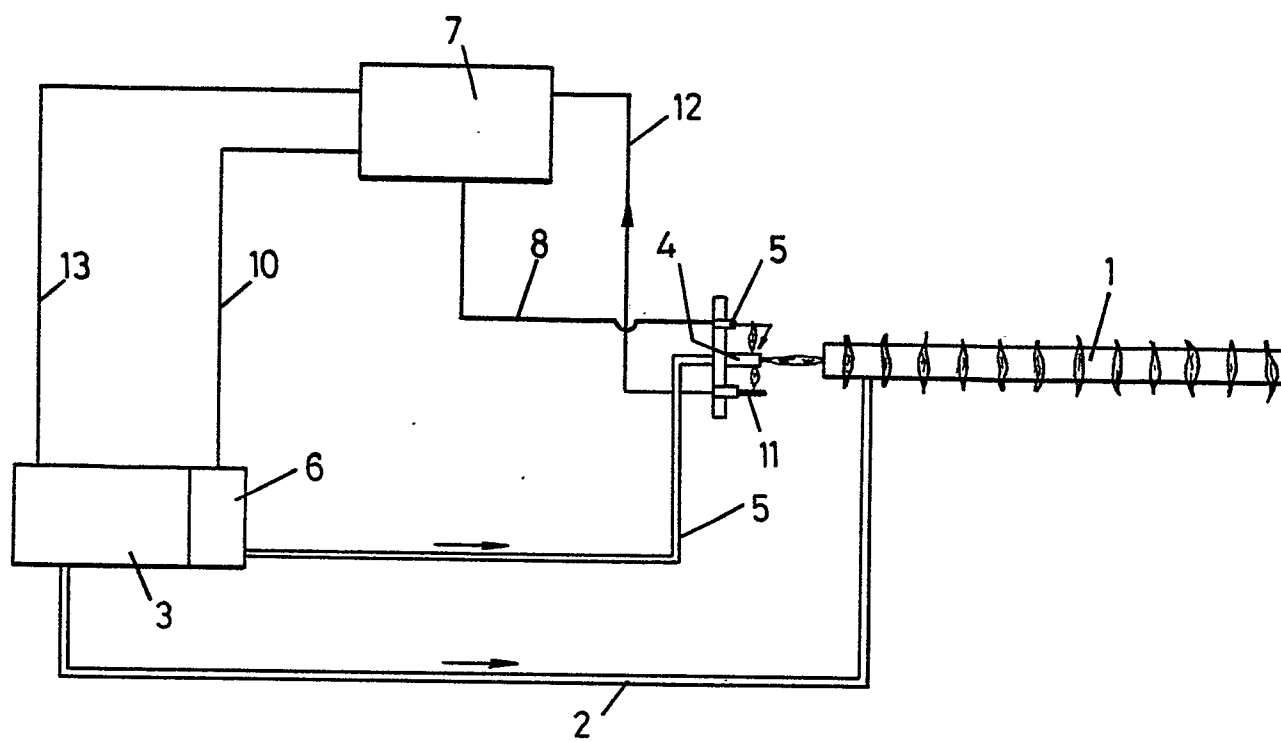
C L A I M

An automatic ignition system for automatic ignition of the main burner of a gas fired appliance through the intermediary of an intermittently operative pilot flame burner, having a pilot flame gas valve, an ignition signal for the appliance actuating an ignition device and simultaneously opening the pilot flame gas valve such that the ignition device ignits the pilot flame gas, characterised in that adjacent to the pilot flame burner (4) a thermo-element (11) has been provided, which is heated by the ignited pilot flame and emits a voltage, which, after a predetermined small value has been reached, is transduced by an electronic unit (7) into a control signal for opening the main gas valve (3) of the main burner (1).

15

--- ++ ---

1/1





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. 3)
X	US-A-2 678 092 (W.A.RAY) *Column 3, lines 54-67; column 4, lines 1-13; figure 1*	1	F 23 Q 9/14
D,X	US-A-4 188 180 (HAMELINCK) *Column 2, lines 32-50; column 3, lines 35-68; column 4, lines 1-23; figures 1,2*	1	
A	DE-A-2 317 857 (LICENTIA) *Page 2, paragraph 5; page 4, claim 1; figure *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			F 23 Q
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-06-1982	Examiner VANHEUSDEN J.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	