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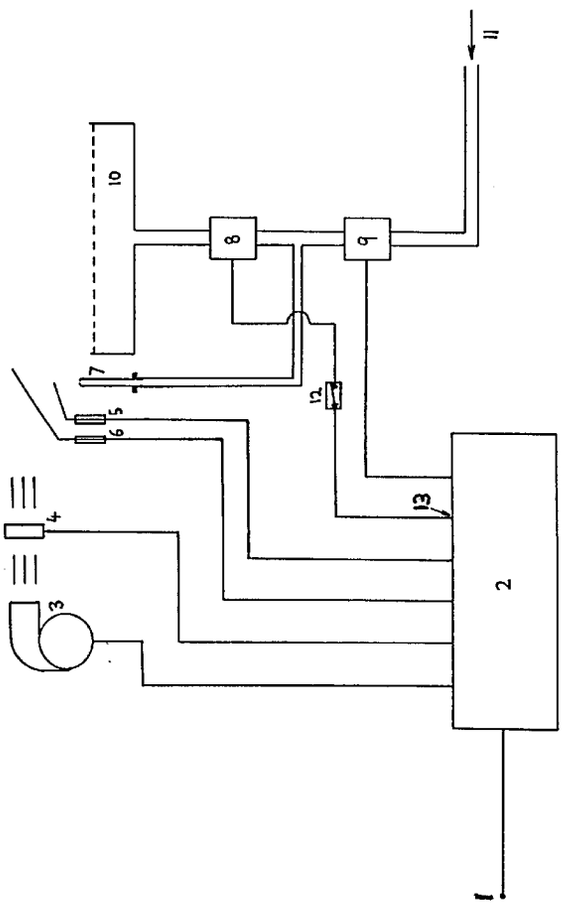
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(54) Heating appliances.

(57) A gas fired heating appliance comprises a main gas burner 10 and a pilot gas burner 7, a main gas valve 8 for controlling the supply of gas to the main gas burner 10, a pilot gas valve 9 for controlling the supply of gas to the pilot gas burner 7, and a full sequence control 2 operable in response to an external signal 1 for causing the pilot gas burner 7 to be lit, and when lit for causing an output signal 13 to be generated for application to the main gas valve 8, the appliance including an internal thermostat 12 for connecting the output signal 13 to the main gas valve 8 whereby the pilot gas valve 9 operates to supply gas to the pilot gas burner 7 only in response to the external signal 1, and the main gas valve 8 operates to supply gas to the main gas burner 10 only in response to the external signal 1 and the operation of said internal thermostat 12.



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This invention relates to heating appliances, and more especially to gas fired heating appliances such as hot water boilers for gas central heating systems. It is especially concerned with control systems for use in such heating appliances.

Traditionally gas heating appliances have employed either "Permanent Pilot" or "Full Sequence Control" ignition systems to initiate the combustion process in response to the call for heat.

The Permanent Pilot system already widely used on gas boilers has the advantage of being cost effective and rapid in its response to a demand for heat. Unfortunately, the system possesses a significant disadvantage in that the pilot consumes costly gas continuously.

The Full Sequence Control system, on the other hand, does not waste pilot gas when there is no heat demand, but invariably takes longer to initiate a light up when a call is made. Also the system is much more complicated and costly to produce.

It is an object of the present invention to provide a gas heating appliance which combines some of the features of a Full Sequence Control system and a Permanent Pilot system to afford a number of benefits.

According to the present invention there is provided a gas fired heating appliance comprising a main burner and a pilot burner, a main gas valve for controlling the supply of gas to said main gas burner, a pilot gas valve for controlling the supply of gas to said pilot gas burner, and a control system operable in response to an external signal for causing said pilot gas burner to be lit, and when lit for causing an output signal to be generated for application to said main gas valve, said appliance including an internal thermostat for connecting said output signal to said main gas valve whereby said pilot gas valve operates to supply gas to said pilot gas burner only in response to said external signal, and said main gas valve operates to supply gas to said main burner only in response to said external signal and the operation of said internal thermostat.

In a preferred arrangement according to the invention, said control system incorporates a full sequence control.

Advantageously, said main gas valve is supplied with gas from said pilot gas valve.

A heating appliance in accordance with the preferred form of the invention offers all of the advantages of a full sequence control system AND a reduction in full sequence ignition attempts which cuts down noise, system wear, and electrical interference generation by, for example, the ignition spark generator. Such a control system may be described by the general term "Semi-Permanent Pilot".

An exemplary embodiment of the invention will now be described, reference being made to the accompanying single figure drawing which is a block schematic diagram of a control system for use in a heating appliance in accordance with the present invention.

The control system shown in the drawing employs a full sequence control 2 which supervises the safe light-up of a pilot burner 7 and subsequently a main burner 10. Usually, thought not essentially, the full sequence control is operated in conjunction with the components shown, such as a fan 3 to provide the air supply for combustion, an air pressure switch 4 to signal to the control 2 that the fan 3 is operating adequately, and an igniting electrode or filament 5 for the lighting the pilot burner 7 and which may or may not be combined in function with a flame sensor 6 for sensing the presence of a flame on the pilot burner 7.

The operating logic of such an arrangement is well known and need not be described in detail here, but essentially when a call for heat 1 is applied to the system, the pilot burner 7 will be fed with fuel gas from the supply 11 by the opening of gas valve 9. When the source of ignition energy 5 has ignited the pilot flame at burner 7, the flame will be detected by the flame sensor 6 to halt the ignition process and, via the full sequence control 2, provide an output at point 13 thereof.

In conventional heating appliances, the output at point 13 would normally be applied directly to the main gas valve 8 which feeds gas to the main gas burner 10, which is subsequently caused to be lit by the pilot burner 7. The main burner 10 remains lit until the call for heat 1 is removed. The call for heat 1 applied to the full sequence control 2 may typically be derived from a time switch, an external e.g. room thermostat, or an internal appliance thermostat. In this way, whenever there is a call for heat 1 applied to the full sequence control 2, whether this be derived externally or internally, a full light-up routine is used to light the main burner 10.

There is now proposed a modification of the system which has thus far been described in that the internal appliance thermostat, shown at 12 in the drawing, is connected between the output 13 of the full sequence control 2 and the main gas valve 8, and only external demands for heat, e.g. from a time switch or room thermostat, are applied to the input 1 of the control 2.

Thus, when an external call for heat 1 is applied, the pilot burner 7 is caused to be lit, and when the flame thereof has been sensed by the flame sensor 6, an output is afforded at point 13 of the control 2. If the appliance thermostat 12 is closed, i.e. calling for heat after this point, the signal from point 13 will be applied to the main gas valve 8 to feed gas to the main burner 10 to enable full operation of the appliance. If the appliance thermostat 12 is open at this point, i.e. the appliance temperature is above its minimum limit, no signal will be applied to the main gas valve 8, and

the light-up routine which would normally have been expected is obviated.

It may be seen from this that the typical frequent ON/OFF operation of the appliance thermostat 12 now merely controls the main gas burner 10, leaving the pilot burner 7 on for the generally longer periods where the external call for heat 1 remains.

The semi-permanent pilot system here described produces less electrical and audible noise, is faster in response to internal thermostat heat demands and produces less wear on the controls than a conventional full sequence system where each internal demand instigates a full light-up routine. Also, the use of fuel gas is reduced from that consumed by the permanent pilot system.

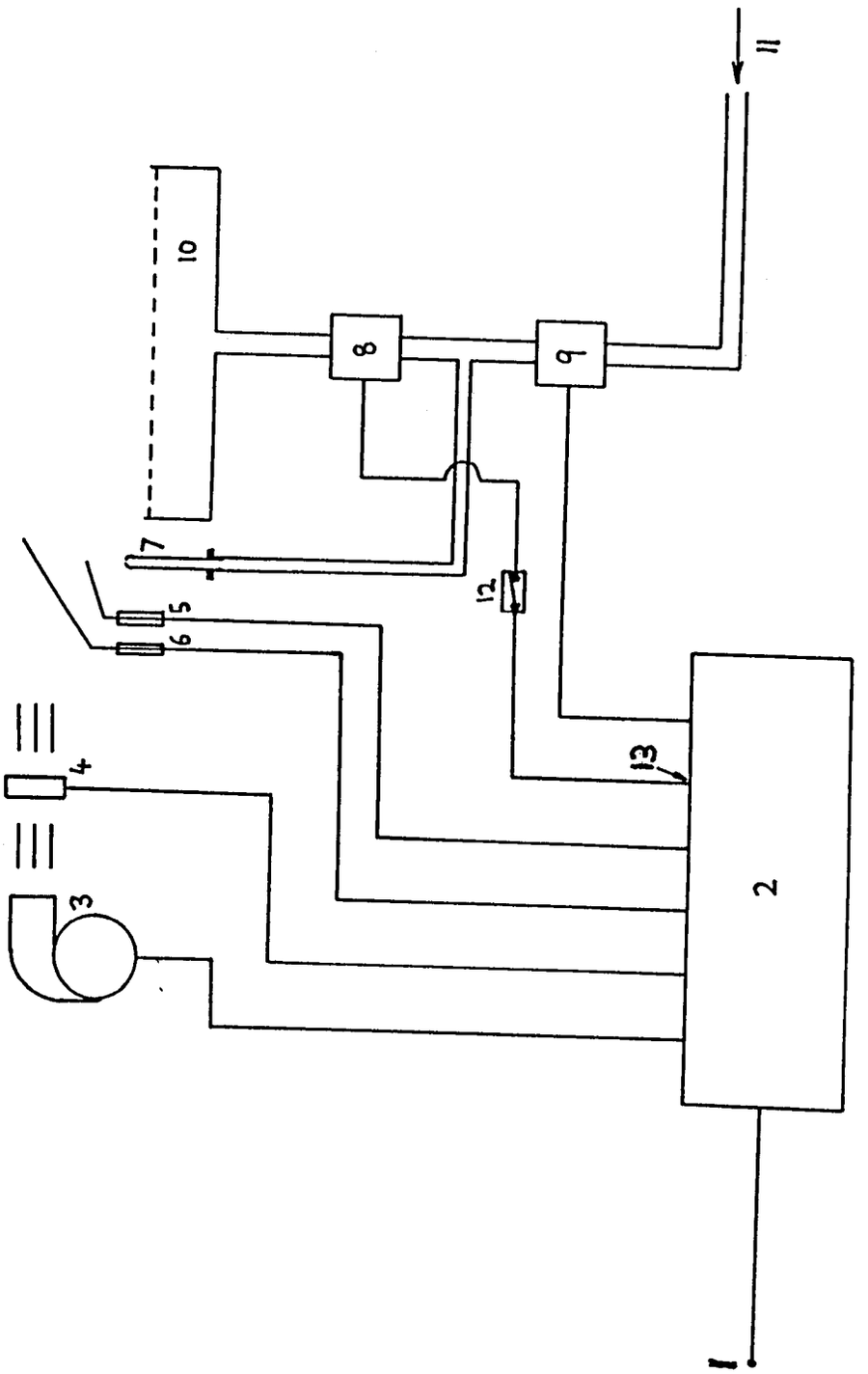
Although the heating appliance control system which has been described is particularly applicable to heating appliances incorporating full system control, it should be appreciated that all aspects of a conventional full sequence control are not essential for implementing the invention. For example, in the control system shown in the drawing the fan 3 and air pressure switch 4 may be dispensed with.

Claims

1. A gas fired heating appliance comprising a main gas burner and a pilot gas burner, a main gas valve for controlling the supply of gas to said main gas burner, a pilot gas valve for controlling the supply of gas to said pilot gas burner, and a control system operable in response to an external signal for causing said pilot gas burner to be lit, and when lit for causing an output signal to be generated for application to said main gas valve, said appliance including an internal thermostat for connecting said output signal to said main gas valve whereby said pilot gas valve operates to supply gas to said pilot gas burner only in response to said external signal, and said main gas valve operates to supply gas to said main burner only in response to said external signal and the operation of said internal thermostat.

2. A heating appliance as claimed in claim 1, in which said control system incorporates a full sequence control.

3. A heating appliance as claimed in claim 1 or claim 2, in which said main gas valve is supplied with gas from said pilot gas valve.


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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 4162

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.5)
X	PATENT ABSTRACTS OF JAPAN vol. 7, no. 169 (M-231)26 July 1983 & JP-A-58 075 620 (MATSUSHITA DENKI SANGYO) 7 May 1983 * abstract * * figure *	1-3	F23N5/20 F23N5/02
A	PATENT ABSTRACTS OF JAPAN vol. 7, no. 133 (M-221)10 June 1983 & JP-A-58 049 827 (INAYAMA MINORU) 24 March 1983 * abstract * * figure *	1-3	
A	PATENT ABSTRACTS OF JAPAN vol. 14, no. 121 (M-946)7 March 1990 & JP-A-13 18 809 (MATSUSHITA ELECTRIC IND) * abstract * * figure *	1,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F23N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03 SEPTEMBER 1993	KOOIJMAN F.G.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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