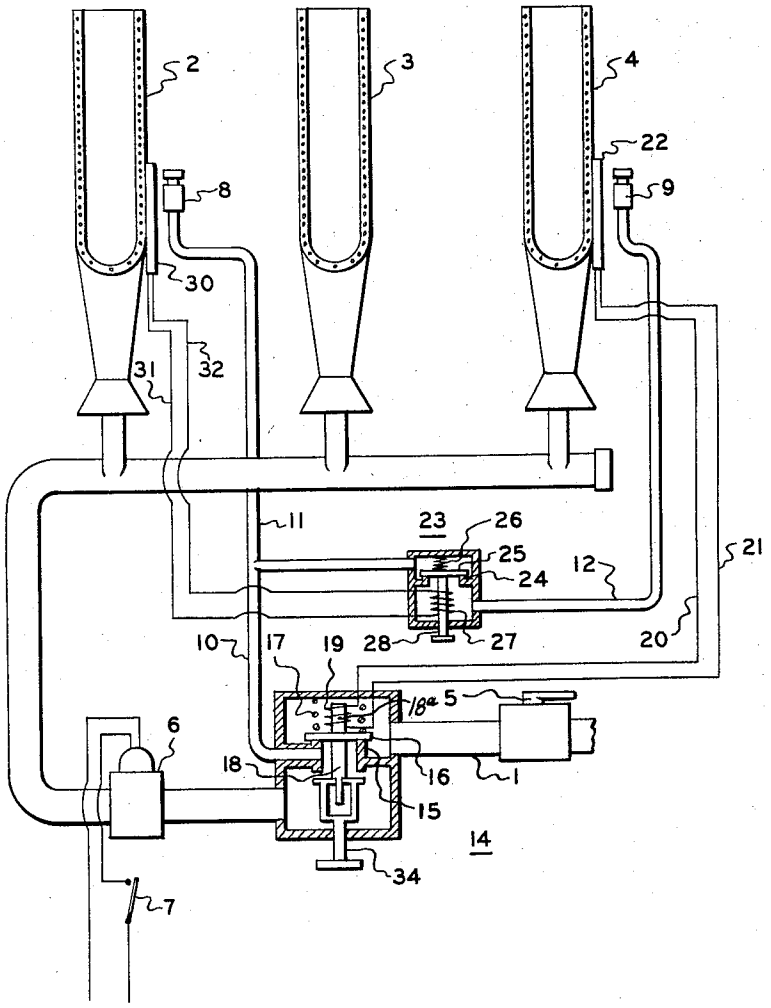
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MULTIPLE PILOT CONTROL FOR BURNER SYSTEMS

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MULTIPLE PILOT CONTROL FOR BURNER SYSTEMS

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1 Claim. (Cl. 158—131)

The present invention relates to a multiple pilot control for burner systems. It is particularly concerned with a multiple pilot control system adapted to provide complete pilot shutoff when more than one safety pilot is employed.

Certain types of heating appliances such as gas fired boilers and furnaces are equipped with a plurality of burners all of which receive their fuel supply from a common source. To assure quick and safe ignition of the fuel supplied to each of the burners, it is desirable that each of the burners or at least a number of burners be provided with their own separate pilot lights. Also for safety reasons it is desirable that means be provided for shutting off the fuel supply to the burners as well as to the pilots in the event of pilot failure.

The usual safety pilot control system comprises a main supply valve spring biased to a closed position for controlling the flow of fuel to the burners and to the pilots and means responsive to the heat of the pilot flames for maintaining the valve in an open position. The heat responsive control means commonly employed or proposed for this purpose have included bimetal thermal controls and thermocouple or thermoelectric members placed in heating relationship with reference to the pilot flame and mechanically or electrically connected to the main control valve in such a manner that any pilot failure will automatically shut off the supply of gas to the burners and to the pilot or pilots.

For various reasons it has not been either practical nor economical to attempt to actuate a single control valve by means of more than one thermocontrol element. While it has been proposed to provide a plurality of main gas line supply valves each of which is operably controlled by a separate safety pilot, this practice is not economical and furthermore is not practical because of the excessive pressure drop experienced when a number of shutoff valves are employed.

An object of the present invention is to provide a multiple safety pilot control system adapted to operate a single main fuel control valve upon extinguishment of any one or more of the pilot flames.

A further object of the invention is to provide a multiple safety pilot control for a burner system so designed that a single main fuel supply valve is controlled by each of the safety pilots.

The above objects and additional objects which will become apparent from the following description of the invention are attained by providing a safety pilot control system for a plurality of fuel burners comprising a plurality of safety pilots and in which the main fuel supply valve is controlled by one of the safety pilots while the fuel supply to that pilot is controlled by a second safety pilot in such a manner that should any one of the pilot flames become extinguished, the main fuel supply valve is closed.

For a better understanding of the invention reference may be had to the accompanying drawing in which the single figure is a schematic view of a multiple burner

system embodying the multiple safety pilot control of the present invention.

Referring to the drawing reference numeral **1** indicates a supply line for supplying fuel to a plurality of burners **2**, **3** and **4**. Included in the supply line is a manually operated shutoff valve **5** and an automatic solenoid operated valve **6**, the latter controlling the admission of fuel to the burners **2**, **3** and **4** and being operated by a room thermostat or other control means **7**.

For the purpose of igniting the gaseous fuel fed to the burners when the solenoid valve **6** is opened in response to a call for heat by the thermostat **7** there is provided a plurality of pilots **8** and **9** located adjacent certain of the burners. In order that quick and easy ignition of the gaseous fuel be obtained, it is desirable that the pilots be provided for each of the burners or at least every other burner, and in the modification shown two pilots are provided for the three burners, these pilots being positioned adjacent the end burners. The pilots are continuously burning pilots so that the supply pipe **10** for the pilots is connected to the main supply line **1** ahead of the solenoid operated valve **6**. The pilot **8** is connected to the supply pipe **10** by supply line **11** while the pilot **9** is connected to the supply pipe **10** by supply line **12**. It is to be understood however, that both supply line **11** and supply line **12** could be connected directly to the main supply line **1** rather than indirectly through the common line **10**.

Arranged in the main gas supply line **1** ahead of both the solenoid operated valve **6** and the pilot supply line **10** is a safety valve **14** including a valve seat **15** towards which the valve disc **16** is continuously urged by means of the spring **17**.

The purpose of the safety valve **14** is to shut off the supply of gaseous fuel to the burners and to the pilots **8** and **9** in the event either or both of the pilot flames become extinguished. For this reason the valve disc **16** is normally urged to a valve closing position by the spring **17**. A valve stem plunger **18** is provided for manually opening the valve against the biasing action of the spring **17**. The portion **18***a* of plunger **18** is composed of a magnetic material and comprises part of a thermomagnetic system for maintaining the valve in an open position. This system comprises a winding **19** surrounding the portion **18***a* electrically connected by leads **20** and **21** to a thermocouple **22** arranged in heating relationship with the pilot **9**. When the thermocouple **22** is heated by the pilot flame issuing from pilot **9**, a weak electric current is generated in the circuit which is sufficient to maintain the valve **14** in an open position.

In accordance with the present invention the gas supply to the first pilot burner **9** which through thermocouple **22** controls the operation of valve **14**, is in turn controlled by means of a valve **23** in the supply line **12**. The valve **23** comprises a valve seat **24** and a disc **25** spring biased towards the valve seat by means of a spring **26**. Valve **23** is maintained in an open position by a thermocouple circuit including a winding **27** surrounding the armature and plunger **28**, which winding is electrically connected to a thermocouple **30** by leads **31** and **32**. The thermocouple **30** is placed in heating relationship with the second pilot **8** and together with that pilot forms a safety pilot controlling the operation of the valve **23**.

The advantages of this multiple safety pilot control system will become apparent from the consideration of the operation of the apparatus.

After first setting the control thermostat or switch **7** so that solenoid valve **6** is closed thus shutting off the supply of gas to the burners, the manual control valve **5** is opened so that the gaseous fuel is supplied to the safety valve **14**. The manual reset plunger **18** of the

valve 14 is then depressed by pressure on reset button 34 to open the valve 14 feeding gas to the pilot 8. The pilot 8 is then lit with a match or otherwise and pressure maintained on the plunger 18 until the thermocouple 30 becomes warm enough to generate sufficient voltage to normally maintain its cooperating armature 27 in a valve open position. Ordinarily approximately thirty seconds is sufficient for this purpose. Thereafter, with the reset plunger 18 still in the manually depressed position, the plunger 27 of valve 23 is depressed and will be held in the depressed position by the voltage generated by the heated thermocouple 30. The gas issuing from the pilot 9 is then ignited and after about thirty seconds sufficient voltage will be generated in the thermocouple 22 to maintain the plunger 18 in a valve opening position against the biasing action of spring 17. The system is then in condition for normal operation and the control switch or thermostat 7 can be set for normal burner operation.

In the event that either pilot flame is extinguished, the gas supplied to the main burners and both pilot burners will be shut off. This action results from the fact that the safety valves controlling the supply of fuel to each of the pilots is in turn controlled by the pilot flame of the other pilot.

Thus if the pilot flame of pilot 9 should become extinguished the thermocouple 22 will immediately cool to a temperature where the voltage generated by this thermocouple is insufficient to maintain the valve 14 open against the biasing action of spring 17. In this case the main fuel supply shutoff valve 14 will automatically close and cut off the supply of gas to both the burners and the pilots. On the other hand if the pilot flame 8 should become extinguished the cooling of the thermocouple 30 will effect closure of the safety valve 23 which in turn will cut off the supply of gas to the pilot 9. With the supply of gas to the pilot 9 cut off, the thermocouple 22 will cool down with the result that the main gas supply valve 14 will close and stop the flow of gas to the burners and both pilots.

It is apparent from the foregoing that there has been provided a multiple safety pilot control comprising a single main fuel supply line safety valve and a plurality of safety pilots so arranged that if either of the pilot flames is extinguished the gas supply to the main burners and to the pilot burners is cut off. In addition the control system is so constructed and arranged as to permit easy lighting of both the pilots. Only a single plunger needs to be manually depressed and held in the depressed position during the period of time necessary for the generation of sufficient voltage in the thermocouples to maintain the manual resets in valve opening positions.

What I claim as new and desire to secure by Letters Patent of the United States is:

A multiple pilot control for a system including a plurality of burners comprising a first pilot adjacent one of said burners, a second pilot adjacent another of said burners, a main shutoff valve for shutting off the fuel supply to all of said burners and said pilots, a branched pilot supply line controlled by said main shutoff valve for supplying fuel to both of said pilots, said supply line including a first branch line leading to said second pilot and a second branch line leading to said first pilot, said second branch line including a second shutoff valve for shutting off only the supply of fuel to said first pilot, means responsive to the heat of said first pilot for maintaining said main valve in an open position, and means responsive to the heat of said second pilot for maintaining said second valve in an open position.

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