SYSTEM FOR CONTROLLING GAS SUPPLY TO A GAS HEATER

In one aspect, the present invention is directed to a system for controlling the gas supply to a gas heater (such as a gas stove, a heating stove, and so on), the system comprising: an electric valve, for blocking and unblocking a gas supplying pipe to said gas heater; a control unit, for controlling the operation of said electric valve; a timer, for determining a delay in activation of said electric valve to block said gas supply; and a remote-control unit, for providing, in a mobile manner, a user interface for setting said timer; and a processing unit, for concentrating information from said timer, and activating the operation of blocking gas supply passage whenever the time of said timer runs out.
Fig. 5
SYSTEM FOR CONTROLLING GAS SUPPLY TO A GAS HEATER

FIELD OF THE INVENTION

[0001] The present invention relates to the field of domestic safety systems. More particularly, the invention relates to a system for controlling gas supply to a gas heater.

BACKGROUND OF THE INVENTION

[0002] Gas heaters, such as gas stoves and heating stoves, are presently very common.

[0003] The first gas stoves were developed in the 1820s, but only in the 1880s did this technology become a commercial success. The first gas stoves were rather unwieldy, but soon the oven was integrated into the base and the size reduced to better fit in with standard kitchen furniture of the day. In the 1910s, producers started to enamel their gas stoves for easier cleaning. A high-end gas stove called the AGA cooker was invented in 1922 by Swedish Nobel Prize winner Gustaf Dalén.

[0004] Gas heaters use Butane or Propane as their energy source. These gases are popular in use as “clean” and easy to use substances. On the other hand, if not properly used, these gases can be dangerous.

[0005] One of the obstacles for a user of a gas heater is remembering to turn it off. For example, leaving a gas stove in operation beyond the required period may result in overcooking or burning food; undesirable, but not dangerous. However, leaving a gas heater unsupervised may result in accumulation of gas in the room, which may poison people present in the room.

[0006] As such, one of the problems of using gas heaters is proper timing in turning off the heater. These days, as gas heaters are operated manually, a user has no choice other than relying on his sense of timing. Additionally or alternatively, he often checks his watch, in order not to miss the proper time to turn off the heater. Nevertheless, he may forget to do so because of distraction, such as a telephone call, and so on.

[0007] It is an object of the present invention to provide a solution to the above-mentioned and other problems of the prior art.

[0008] Other objects and advantages of the invention will become apparent as the description proceeds.

SUMMARY OF THE INVENTION

[0009] The following embodiments and aspects thereof are described and illustrated in conjunction with systems, tools, and methods, and so forth, which are meant to be merely illustrative, not limiting in scope.

[0010] In one aspect, the present invention is directed to a system for controlling gas supply to a gas heater (such as a gas stove; a heating stove; and so on), the system comprising:

[0011] an electric valve (42), for blocking and unblocking a gas supplying pipe (14) to the gas heater;

[0012] a control unit (40), for controlling the operation of the electric valve;

[0013] a timer, for determining a delay in activation of the electric valve to block the gas supply; and

[0014] a remote-control unit (20), for providing, in a mobile manner, user interface for setting the timer; and

[0015] a processing unit, for concentrating information from the timer, and activating the operation of blocking gas supply passage whenever the time of the timer runs out.

[0016] The system may further comprise a button (22) through which a user can arbitrarily set the blocking and unblocking operation. According to one embodiment of the invention, the timer is an electronic button. According to another embodiment of the invention, the timer is mechanical.

[0017] According to one embodiment of the invention, the processing unit activates the operation of blocking gas supply passage by sending an instruction thereof via RF signals, IR signals, and so on.

[0018] Preferably, the user interface comprises means for displaying the remaining time of the timer, such as a display (in the event an electronic timer is employed), or a pointer installed on a rotor (in the event a mechanical timer is employed).

[0019] The system may further comprise sound indication for operations performed by the system.

[0020] According to one embodiment of the invention, the gas supplying pipe supplies gas to the gas heater as an entirety.

[0021] According to another embodiment of the invention, the gas supplying pipe supplies gas to at least one flame unit of the gas heater.

[0022] One of the major advantages of the present invention is the fact that the system (for controlling gas supply to a gas heater) of the present invention can be installed in any existing gas heater, rather than requiring embedding in a special design at the gas heater manufacturer side. The reasons for allowing installation of the system in an existing gas heater are: (a) since the user interface resides on a remote control unit, no modification to the existing gas is required; and (b) the blocking/unblocking mechanism does not interfere with the open/close mechanism already existing in the gas heater, but rather controls the pipe that provides gas to the heater. As a result, the system for controlling gas supply to a gas heater of the present invention can be added to any existing gas heater, and therefore the user thereof need not buy a new gas heater in order to enjoy the advantages of the present invention.

[0023] In addition to the exemplary aspects and embodiments described above, further aspects and embodiments will become apparent by reference to the figures and by study of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings, in which:

[0025] FIG. 1 schematically illustrates a kitchen in which is installed a gas stove, according to one embodiment of the invention.

[0026] FIG. 2 schematically illustrates a system for blocking the gas supply to a gas stove, according to one embodiment of the invention.

[0027] FIG. 3 schematically illustrates a remote-control unit 20 that employs an electronic timer, according to one embodiment of the invention.
FIG. 4 schematically illustrates a remote-control unit 20b that employs a mechanical timer, according to another embodiment of the invention.

FIG. 5 is a block diagram schematically illustrating the components of a system for blocking the gas supply to a gas heater, according to one embodiment of the invention.

It is to be understood, however, that the drawings are designed solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims. It should be further understood that the drawings are not necessarily drawn to scale and that, unless otherwise indicated, are merely intended to conceptually illustrate the structures and procedures described herein. Reference numerals may be repeated among the figures in order to indicate corresponding or analogous elements.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In some instances, well-known methods, procedures, components and circuits have not been described in detail, for the sake of brevity.

FIG. 1 schematically illustrates a kitchen in which is installed a gas stove, according to one embodiment of the invention.

The gas stove, marked herein by reference numeral 10, may be turned off by a remote-control unit 20. Thus, a turned on flame unit 16 can be turned off in two ways: manually, as in the prior art, and by the remote-control unit.

The remote-control unit may employ a timer, as will be described hereinafter. Thus, a user may set the time to turn off a part of or all of the flame units.

FIG. 2 schematically illustrates a system for blocking gas supply to a gas stove, according to one embodiment of the invention.

The figure illustrates the major physical components of the system: control unit 40, which controls the gas supply to gas stove 10 (e.g., comprises a mechanism for turning off its flame units); and a remote control 20 thereof.

In this figure, the box of control unit 40 is open, in order to show the internal components thereof.

One way to turn off a heater is by blocking its gas supply, as illustrated in FIG. 2. For this purpose, control unit 40 employs an electric valve 42 that intermediates between gas supplying pipe 14 and pipe 12 that is connected to the gas consumer thereof, i.e., gas stove 10.

The control unit employs an electric valve 42, which controls gas passage through the control unit, i.e., blocks and unblocks gas passage therethrough. Thus, when the electric valve is closed, no gas is supplied to the gas stove. When electric valve 42 is open, gas is supplied to the gas stove.

FIG. 3 schematically illustrates a remote-control unit 20a that employs an electronic timer, according to one embodiment of the invention.

The user interface of the remote-control unit employs an electronic timer, which determines the time remaining until activating the operation of blocking the gas supply to the flame unit(s) of the gas stove. The time remaining is displayed on display 30. Thus, display 30 provides visual indication about the time remaining until the gas supply is blocked. An additional display 32 may be used, for displaying actual time. Each of displays 30 and 32 may also be used for relaying other information, such as system status.

As mentioned, the timer illustrated in this Fig. is electronic, i.e., the mechanism of the countdown timer is electronic.

Buttons 24a and 24b are used for setting the electronic timer. When the timer value reaches zero, the remote-control unit sends control unit 40 a shutdown instruction (i.e., a signal to block the gas supply). Upon receiving the shutdown signal from the remote-control unit, the electric valve blocks the gas supply to the gas stove.

Button 22 is used for arbitrarily blocking the gas supply to the stove, regardless of the timer. The system may be designed such that button 22 or another will turn on the heater.

FIG. 4 schematically illustrates a remote-control unit 20b that employs a mechanical timer, according to another embodiment of the invention.

The difference between the embodiment of FIG. 3 and that of FIG. 4 is that while the timer of FIG. 3 is electronic, in the embodiment of FIG. 4 it is mechanical, i.e., the mechanism that counts down is mechanical.

Knob 24 is used for setting the delay time of the mechanical timer. Knob 24 is also a rotor, which points on scale 34, thereby providing a visual indication of the time remaining in the timer.

FIG. 5 is a block diagram schematically illustrating the components of a system for blocking gas supply to a gas heater, according to one embodiment of the invention.

The system comprises the following logical modules:

- a control unit, which physically controls the gas supply passage (i.e., closes/opens the gas passage therethrough);
- a timer;
- a remote-control unit, which provides on a mobile device a user interface for setting the timer; and
- a processing unit, which is the component that concentrates information from the timer, and activates the operation of blocking the gas supply passage whenever the set time of the timer runs out.

The remote-control unit provides a user interface for setting the time on a mobile device. The fact that the user interface is installed on a mobile system provides user convenience along with safety, as the remote-control unit can be placed out of reach of children.

Whenever the processing unit (in this case residing on the remote-control unit), indicates that the set time has run out, or that the user has activated a shutdown operation (e.g., by pressing the shutdown button), the processing unit activates transmission of a shutdown signal to the control unit. The transmission is carried out by a transmitter employing an antenna.

Preferably, the signal is wireless, such as an RF (Radio Frequency) signal, infrared (IR), and so on.

The user interface comprises a display (not illustrated in this figure) and input button(s) and/or knob(s) (not illustrated as well in this figure). The remaining time in the timer is displayed by the display.

The control unit is the part of the system that executes orders from the processing unit. The signal transmitted by the remote-control unit is received by a receiver of
the remote-control unit through an antenna. The receiver employs a circuitry that activates an electric valve that blocks the gas supply.

The operation of both the control unit and the remote unit, requires an electrical power supply. As the control unit is a stationary device, which can receive power from the domestic electric supply system, it may use a rechargeable battery. The remote-control unit is a mobile device, and as such, uses an independent power source, such as a battery. The battery may also be rechargeable, and in this case, the remote control system may be connected to the domestic power supply in order to be loaded.

For safety reasons, it is preferable that the remote-control unit only blocks the gas supply. Designing a remote-control unit also capable of activating the gas supply to a heater may be too dangerous without adult supervision. As such, gas heaters are usually designed to present obstacles to the user thereof. Thus, if a remote-control unit according to embodiments of the present invention is also designed to activate the gas supply, activation should present an obstacle to the user in order to prevent accidental activation of gas supply. For example, the activation may be invoked by pressing two specific buttons of the remote-control unit at the same time, or two or more buttons in a predefined order, and so on.

According to one embodiment of the invention, the system controls the gas supply to the entire stove. According to another embodiment of the invention, the system controls the gas supply to each flame unit of the gas stove separately. This requires an appropriate user interface, such as a separate timer and setting means to each flame unit.

One of the major advantages of the present invention is the fact that the system (for controlling the gas supply to a gas heater) of the present invention can be installed in any existing gas heater, rather than embedded in a special design at the gas heater manufacturer side. The reasons allowing installation of the system in an existing gas heater are: (a) since the user interface resides on a remote control unit, no modification to the existing gas heater is required; and (b) the blocking/unblocking mechanism does not interfere with the open/close mechanism already existing in the gas heater, but rather controls the pipe that provide gas to the heater. As a result, the system for controlling gas supply to a gas heater of the present invention can be added to any existing gas heater, and therefore the user thereof need not buy a new gas heater to enjoy the advantages of the present invention.

In the figures and/or description herein, the following reference numerals have been mentioned:

- numeral 10 denotes a gas stove, as an example of a gas heater;
- numeral 12 denotes a gas pipe connecting control unit 40 with gas stove 10;
- numeral 14 denotes a gas supplying pipe;
- numeral 16 denotes a flame unit of gas stove 10;
- numeral 20 denotes a remote-control unit;
- numeral 20a denotes a remote-control unit that employs an electronic timer;
- numeral 20b denotes a remote-control unit that employs a mechanical timer;
- numeral 22 denotes a button for manual and arbitrary blocking of the gas supply;
- numeral 24 denotes a knob for setting a mechanical timer (the knob is also a rotor);
- numeral 24a denotes a button for increasing the value of the timer;
- numeral 24b denotes a button for decreasing the value of the timer;
- numeral 26 denotes an indicator indicating low battery;
- numeral 28 denotes aperture(s) in the casing of a remote-control unit, through which sound can be heard;
- numeral 30 denotes a display for displaying the remaining time in the timer;
- numeral 32 denotes a display for displaying the actual time;
- numeral 40 denotes a control unit;
- numeral 42 denotes an electric valve;
- numeral 44 denotes a battery; and
- numeral 46 denotes a receiver of RF or IR signals.

While certain features of the invention have been illustrated and described herein, the invention can be embodied in other forms, ways, modifications, substitutions, changes, equivalents, and so forth. The foregoing description of the embodiments of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many modifications and variations are possible in light of this disclosure. It is intended that the scope of the invention be limited not by this detailed description, but rather by the claims appended hereto.

What is claimed is:

1. A system for controlling gas supply to a gas heater, the system comprising:
   - an electric valve, for blocking and unblocking a gas supply pipe to said gas heater;
   - a control unit, for controlling the operation of said electric valve;
   - a timer, for determining a delay in activation of said electric valve to block said gas supply;
   - a remote-control unit, for providing, in a mobile manner, user interface for setting said timer;
   - a processing unit, for sending instructions to said control unit to block said gas supply upon indicating that the time remaining on said timer has run out;
   - thereby enabling installing said system in an existing gas heater.

2. A system according to claim 1, further comprising a button through which a user can arbitrarily set blocking and unblocking operation.

3. A system according to claim 1, wherein said timer is an electronic timer.

4. A system according to claim 1, wherein said timer is a mechanical timer.

5. A system according to claim 1, wherein said processing unit activates the operation of blocking the gas supply passage by sending an instruction thereof via RF signals.

6. A system according to claim 1, wherein said processing unit activates the operation of blocking the gas supply passage by sending an instruction thereof via IR signals.

7. A system according to claim 1, wherein said user interface comprises means for displaying the remaining time of said timer.

8. A system according to claim 7, wherein said means for displaying the remaining time of said timer comprise a display.

9. A system according to claim 7, wherein said means for displaying the remaining time of said timer comprise a pointer installed on a rotor.
10. A system according to claim 1, further comprising audible indication for operations performed by said system.

11. A system according to claim 1, wherein said gas heater is a gas stove.

12. A system according to claim 1, wherein said gas heater is a heating stove.

13. A system according to claim 1, wherein said gas supplying pipe supplies gas to said gas heater as an entirety.

14. A system according to claim 1, wherein said gas supplying pipe supplies gas to at least one flame unit of said gas heater.

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