An improved cooking range includes an improved notification system that is configured to detect an operated state of the range and to periodically output a notification representative of a duration of time that the range has remained in the operated state. The notification may include the audible outputting of a sound tag representative of one or more spoken words that indicate a duration of time that the apparatus has remained in the operated state and/or an operational level of the range. The notification system can additionally be configured to detect a predetermined condition such as a flame or an excessive ambient temperature in the vicinity of the range and output an audible and/or visible warning notification. The notification system can be built into the range or can be in the form of a system that can be retrofitted to an existing range. The system enhances operational safety.
FIG. 2

FIG. 3

1. IS RANGE IN AN OPERATED STATE?
   - Y: APPLY LOGIC, IF APPLICABLE, AND OUTPUT NOTIFICATION
   - N: DOES PREDETERMINED CONDITION EXIST?
     - Y: OUTPUT ALARM NOTIFICATION
     - N: APPLY LOGIC, IF APPLICABLE, AND OUTPUT NOTIFICATION
RANGE AND NOTIFICATION SYSTEM, AND ASSOCIATED METHOD

BACKGROUND

1. Field

The disclosed and claimed concept relates generally to notification systems and, more particularly, to a notification system for use in conjunction with a cooking range, and an associated method.

2. Related Art

Numerous types of devices are employed in the cooking and preparation of food and drink. Many such devices generate heat from an energy source such as natural gas, electricity, biomass, and the like. Devices of this type can include ovens, cooktops, ranges (which typically include both an oven and a cooktop), grills, and hotplates, by way of example. A cooktop typically includes a number of burners that are employed to heat pots, pans, and the like. While such cooking devices have been generally effective for their intended purposes, they have not been without limitation.

For devices that generate heat, dangers have always existed with regard to the use of such heat. For example, kitchen towels, wooden spoons, and other combustible material can come into contact with a burner and can be ignited. Another danger exists due to the prolonged application of such heat which can cause the drying of an otherwise non-combustible food, such as if pasta is boiled in an amount of water which, if boiled for a very extended period of time, may completely evaporate and allow combustion of the dried pasta in the environment of the operating burner. Other danger exists from the prolonged application of heat, such as the possible burning of food and the resultant generation of smoke, which can cause respiratory distress and damage. Such burning can also arise merely through the application of an inappropriate high level of heat for a relatively short period of time to an article being cooked. Another danger exists with the splattering of grease, by way of example, such as when cooking bacon, whereby the grease is highly combustible when in a liquified or evaporated state and may come into contact with an operating burner and cause a fire. Other dangers associated with cooking will be apparent to one of ordinary skill in the relevant art. Such possible dangers are exacerbated due to inattention by the cook or distraction of the cook. The dangers can also be exacerbated if the cook is hearing impaired, vision impaired, or is otherwise impaired, even if only temporarily.

Since the cooking of food is an activity typically engaged in regularly by nearly everyone, it would be desirable to mitigate at least some of the dangers inherent in such activities.

SUMMARY

An improved cooking range includes an improved notification system that is configured to detect an operated state of the range and to periodically output a notification representative of a duration of time that the range has remained in the operated state. The notification may include the audible outputting of a sound tag representative of one or more spoken words that indicate a duration of time that the apparatus has remained in the operated state and/or an operational level of the range. The notification system can additionally be configured to detect a predetermined condition such as a flame or an excessive ambient temperature in the vicinity of the range and output an audible and/or visible warning notification. The notification system can be built into the range or can be in the form of a system that can be retrofitted to an existing range. The system enhances the operational safety of a range.

Accordingly, an aspect of the disclosed and claimed concept is to provide an improved method of providing an indication regarding an operated state of an apparatus such as a cooking range by detecting the existence of the operated state and periodically outputting a notification representative of the duration of time that the apparatus has remained in the operated state.

Another aspect of the disclosed and claimed concept is to provide a notification system that performs such a method.

Another aspect of the disclosed and claimed concept is to provide a cooking range or other device that includes such a notification system.

Other aspects of the disclosed and claimed concept are provided by an improved method of providing an indication regarding an apparatus that is structured to be switched between one state and an operated state. The method can be generally stated as including detecting that the apparatus has been switched to the operated state and/or detecting that the apparatus is in the operated state, and periodically outputting a notification representative of a duration of time that the apparatus has remained in the operated state.

Other aspects of the disclosed and claimed concept are provided by an improved notification system for use in conjunction with an apparatus that is structured to be switched between one state and an operated state. The notification system can be generally stated as including a processor apparatus, an input apparatus, and an output apparatus. The processor apparatus can be generally stated as including a processor and a storage. The input apparatus is structured to provide input signals to the processor apparatus, and the output apparatus is structured to receive output signals from the processor apparatus. The storage has stored therein a number of routines which, when executed on the processor, cause the notification system to perform certain operations. The operations can be generally stated as including detecting that the apparatus has been switched to the operated state and/or detecting that the apparatus is in the operated state, and periodically outputting a notification representative of a duration of time that the apparatus has remained in the operated state.

BRIEF DESCRIPTION OF THE DRAWINGS

A further understanding of the disclosed and claimed concept can be gained from the following Description when read in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective depiction of an exemplary cooking range in accordance with the disclosed and claimed concept that includes a notification system in accordance with the disclosed and claimed concept;

FIG. 2 is a schematic depiction of the notification system;

FIG. 3 is a flowchart depicting certain aspects of an improved method that can be performed on the range of FIG. 1 using the notification system of FIG. 2;

FIG. 4 is a perspective depiction of an improved range in accordance with a second embodiment of the disclosed and claimed concept;
FIG. 5 is a depiction of an existing range retrofitted with an improved notification system in accordance with a third embodiment of the disclosed and claimed concept;

FIG. 6 is a schematic depiction of a portion of the notification system of FIG. 5;

FIG. 7 is a view of an improved notification system in accordance with a fourth embodiment of the disclosed and claimed concept that can be retrofitted to an existing range;

FIG. 8 is a schematic depiction of a portion of the notification system of FIG. 7;

FIG. 9 is a schematic depiction of another portion of the notification system of FIG. 7.

Similar numerals refer to similar parts throughout the specification.

DESCRIPTION

An improved range 4 in accordance with a first embodiment of the disclosed and claimed concept is depicted generally in FIG. 1. The range 4 is a cooking range used for the cooking of food and the like, and it advantageously includes a notification system 8 in accordance with the disclosed and claimed concept, which is depicted in a schematic fashion in FIG. 2. In the exemplary first embodiments of FIGS. 1 and 2, the notification system 8 is incorporated into the range 4 and thus is not depicted in FIG. 1 as being a separate component. The notification system 8 advantageously outputs on at least a periodic basis a notification that is representative of at least a duration of time that the range 4 has remained in an operated state.

Specifically, and as is generally understood in the relevant art, the range 4 can be switched between one state, such as an OFF state or an IDLE or PILOT state, and an OPERATED state wherein the range 4 is capable of heating or cooking food, boiling water, etc. The exemplary range 4 includes a cooktop 12 having a plurality of burners 16A, 16B, 16C, and 16D, and further includes an oven 20. The burners 16A-D are operated by a corresponding set of controllers 24A-D, and the oven 20 is operated by a controller 28. The controllers 24A-D are each in the exemplary form of a rotatable knob that is mounted on a rotatable input shaft of a control element such as a natural gas valve, a rotatable input sensor, a rheostat, a variable capacitor, etc., and the like which enable the user to control the operational level of the burners 16A-D and the oven 20. In general, the controllers 24A-D enable the operational level of the burners 16A-D to be controlled among levels such as LOW, MEDIUM, and HIGH and at levels therebetween. The controller 28 typically enables a user to control an operating temperature of the interior of the oven 20 in degrees Fahrenheit or Centigrade. Depending upon the rotational position of the controllers 24A-C and 28, the corresponding burners 16A-D and/or the oven 20 operate at specific operational levels, and it is understood that the range 4 thus can simultaneously operate at multiple operational levels when one or more of the burners 16A-D are operating at different levels and/or when the oven 20 is operated at a given temperature while one or more of the burners 16A-D is also operated.

As can be seen in FIG. 2, the notification system 8 can be said to include an input apparatus 32, a processor apparatus 36, and an output apparatus 40. The input apparatus 32 provides input signals to the processor apparatus 36, and the processor apparatus 36 provides output signals to the output apparatus 40. The exemplary notification system 8 further includes a wireless transceiver apparatus 42 that is connected with the processor apparatus 36 and is in communication with any of a variety of wireless devices remote thereto, as will be set forth in greater detail below. Depending upon the particular implementation, a transmitter component of the wireless transceiver apparatus 42 can be considered to be a part of the output apparatus 40, and a receiver component of the wireless transceiver apparatus 42 can be considered to be a part of the input apparatus 32.

In the exemplary depicted embodiment, the input apparatus 32 includes a plurality of rotational position sensors 44A, 44B, 44C, and 44D which each correspond with a corresponding one of the controllers 24A-D, and the input apparatus 32 additionally includes a rotational position sensor 44E with corresponds the controller 28. The rotational position sensors 44A-E can be any of a wide variety of known devices which enable the processor apparatus 36 to determine a current rotational position of one of the controllers 24A-D and 28 or to detect a rotational movement of one of the controllers 24A-D and 28 from a first rotational position to a second rotational position, or both. The detection of such a rotational position and/or rotational movement enable the processor apparatus 36 to determine a current operational level of the burners 16A-D and/or the oven 20.

The exemplary input apparatus 32 further includes a plurality of physical contact sensors 46A, 46B, 46C, and 46D which each correspond with a corresponding one of the controllers 24A-D, and the input apparatus 32 additionally includes a physical contact sensor 46E with corresponds the controller 28. The physical contact sensors 46A, 46B, 46C, 46D, and 46E can be any of a wide variety of known devices which enable the processor apparatus 36 to detect that someone such as a cook has physically touched otherwise physically contacted one of the controllers 24A-D and/or the controller 28. By way of example, the physical contact sensors 46A-E might each include a capacitive element which detects a touch contact or other contact.

The input apparatus 32 further includes a temperature sensor 48 and a flame detector 52. The temperature sensor 48 can be any of a wide variety of temperature-sensitive devices such as a thermocouple, a thermistor, or any of a wide variety of such devices. The flame detector 52 can likewise be any of a variety of flame detection devices such as a UV flame detector, an IR flame detector, and the like without limitation. The temperature sensor 48 and the flame detector 52 are depicted in FIG. 1 as being situated at an exterior surface of the range 4 in order to detect in the vicinity of the range 4 the existence of a predetermined condition such as an ambient temperature in excess of a predetermined value or a fire, by way of example. It is noted, however, that the temperature sensor 48 and the flame detector 52 may be hidden from view in other embodiments that are not expressly depicted herein.

The processor apparatus 36 can be seen in FIG. 2 as including a processor 56 and a storage 60 that are in operative communication with one another. The processor 56 can be any of a wide variety of processors such as a microprocessor, and the like, and the storage 60 can be any type of electronic or other type of memory such as, without limitation, RAM, ROM, EPROM, FLASH, and the like that can have stored therein data and/or instructions that are executable on the processor 56. The storage 60 has one or more routines 64 stored therein which, when executed on the processor 56, cause the notification system 8 and the range 4 to perform certain operations such as detecting an operated state of the
range 4 and outputting an indication of a duration of time that the range 4 has been in the operated state. The notification can also include the operational level of the range 4 and/or other information. Other operations can include detecting a touch input on one or more of the controllers 24A-D and 2B and providing a responsive output as described below.

[0031] The storage 60 further has stored therein one or more sound tags that are indicated generally at the numeral 68 and that are representative of one or more spoken words when audibly output by the output apparatus 40. That is, the sound tags 68 are stored in the form of data and include various sound tags 68 that are representative of the spoken words that correspond with numbers such as “three”, “hundred”, “fifty”, “ninety”, and the like, and spoken words such as “front”, “rear”, “left”, “right”, “burner”, “oven”, “OFF”, “LOW”, “MEDIUM”, “degrees”, “minutes”, “warning”, “fire”, “temperature”, and the like. The routines 64 can combine the sound tags 68 in any combination to form expression such as “oven, three hundred fifty degrees, ninety minutes” which can be output in an audible fashion by the output apparatus 40 and which the user perceives as spoken words.

[0032] By way of further example, the processor 56 can detect with one of the physical contact sensors 46A-E a touch input on one of the controllers 24A-D and 2B, and the routines 64 can cause the audible outputting of a string of sound tags 68 that are representative of the operational status of the one of the controllers 24A-D and 2B that was the subject of the touch input. For instance, in response to a touch input, the output apparatus 40 may output a string of sound tags 68 that are representative of words such as “right front burner, OFF”. This will assist a visually impaired individual in operating the range 4 because it enables the individual to know the identity of a given controller 24A-D or 2B without having to turn on the controller 24A-D or 2B to ascertain its identity. Moreover, if the given controller 24A-D or 2B is in an operational state, the output apparatus 40 could indicate this with a string of sound tags 68 in response to a touch input. For example, in response to a touch input the output apparatus 40 might provide an audible output of “left rear burner, LOW, two minutes”. Such audible outputs in response to touch inputs of the controllers 24A-D and 2B helps an individual to know the operational status of the range 4 and the identities of its control elements merely by touching the controllers 24A-D and 2B.

[0033] In the exemplary embodiment depicted herein, the output apparatus 40 includes a loudspeaker 72, although other types of output elements such as visual display elements including warning lights, numerical displays, etc., and other types of audible output elements such as sirens, alarm bells, and the like can be employed depending upon the needs of the particular application. As suggested above, the sound tags 68 can be processed on the processor apparatus 36 to cause the speaker 72 to provide audible output that is representative of one or more spoken words which are representative of an operated state and/or an operational level of the range 4.

[0034] The output apparatus 40 further includes an actuator apparatus 74 that includes a number of actuators that can operate various connected devices. As employed herein, the expression “a number of” and variations thereof shall refer broadly to any non-zero quantity, including a quantity of one. By way of example, the range 4 further includes a utility shutoff 78 and a fire extinguisher 82 that are connected with the actuator apparatus 74 and can be triggered by the actuators of the actuator apparatus 74 in response to any a number of predetermined events. The range 4 may additionally be set up such that actuators of the actuator apparatus 74 can control the controllers 24A-D and 2B.

[0035] For instance, the utility shutoff 74 may include a gas shutoff valve if the range 4 operates on gas and/or can include an electrical shutoff switch if the range 4 operates on electricity. It is understood that some ranges include both gas burners and an electrically heated oven, by way of example, and thus might employ both a gas shutoff valve and an electrical shutoff switch. The utility shutoff 74 may include powered structures, such as an electrically or otherwise powered gas valve that can be closed to stop the flow of gas to the range 4 or a powered set of electrical contacts that can be separated to stop the delivery of electrical power to the range 4. Alternatively or additionally, such a utility shutoff 74 might employ a spring-energized system that employs one or more deflected springs which, when released, will stop the flow of gas and/or the delivery of electrical power to the range 4. Such springs could be released on command by an actuator of the actuator apparatus 74 in response to any a number of predetermined conditions. By way of further example, the range 4 may be set up such that the springs are retained in their deflected condition by electrical power that is provided to the range 4 but are released in response to an interruption of the supply of electrical power, such as in the form of a fail-safe type of system. The springs can potentially be configured to be released in response to any type of failure condition. These shutoffs can be provided in the vicinity of the range 4, or they alternatively could be located deeper in the infrastructure of a dwelling, such as be providing a system that switches off a circuit breaker that controls the electrical circuit that supplies the range, or by providing a gas shutoff valve mechanism in the vicinity of a gas manifold that supplies gas to various appliances in the dwelling. Other variations will be apparent.

[0036] The fire extinguisher 82 can be any of a variety of fire extinguishers that are configured to supply materials that are intended to extinguish a fire on the range 4 in the vicinity of the burners 16ABC and/or the vicinity of the oven 20. These materials can include any of a wide variety of materials such as carbon dioxide, sodium bicarbonate, halon, and the like without limitation. An actuator of the actuator apparatus 74 is connected with the fire extinguisher 82 and can trigger its operation in response to any a variety of predetermined conditions.

[0037] During operation, the notification system 8 detects an operated state of the range 4 and, in response thereto, the notification system 8 further executes one or more of the sound tags 68 on the processor apparatus 36 to provide audible output signals that are representative of one or more spoken words which can be audibly discerned by a user upon being output by the loudspeaker 72. With regard to detecting the operated state, the notification system 8 can, for instance, detect with the rotational position sensors 44A-E that one or more of the controllers 24A-D and/or 28 is in a particular rotational position and/or can detect that one or more of the controllers 24A-D and/or 28 has been moved from one rotational position to another rotational position.

[0038] By way of example, the notification system 8 may detect that the controller 24C has been moved from an OFF rotational position to a rotational position that corresponds with MEDIUM-LOW. In so doing, the notification system 8 and, more particularly, the routines 64, would employ a signal from the rotational position sensor 44C to detect the operational level at which the user has set the burner 16C, i.e., the
MEDIUM-LOW operational level. Similarly, the rotational position sensor 44E might be employed to determine that the user has rotated the controller 28 to a rotational position that corresponds with three hundred seventy-five degrees Fahrenheit, which is the intended operational level of the oven 20.

Upon detecting that such controllers 24C and 28 have been placed at such operational levels, the routines 64 may retrieve sound tags 68 for execution on the processor 36 to cause the loudspeaker 72 to output sounds representative of spoken words such as “burner set to MEDIUM-LOW” and/or “oven set to three hundred seventy-five degrees”, and the like. That is, the routines 64 may output an audible confirmation of the operational level at which the range 4 has been set. Further audible confirmations can be output if/when the user changes the operational level of the range 4.

Advantageously, the notification system 8 periodically outputs a notification that is representative of a duration of time that one or more of the burners 16A-D and/or the oven 20 has remained in its operated state. For example, after twenty minutes of operation, the notification system 8 may retrieve from the storage 60 a number of sound tags 68 which, when executed on the processor 56, cause the loudspeaker 72 to output sounds representative of words such as “burner ON, twenty minutes” or “burner at MEDIUM-LOW, twenty minutes”, it being noted that the latter notification is indicative of both an operational level of the cooktop 12 and the duration of time that the cooktop 12 has remained at that operational level. Likewise, after two hours of the oven 20 operating at three hundred seventy-five degrees, the routines 64 may retrieve from the storage 60 and execute on the processor 56 sound tags 68 for outputting on the loudspeaker 72 audible sounds that are representative of the wording “oven at three hundred seventy-five degrees, two hours” or “oven ON, one hundred twenty minutes”, etc.

Such notifications are periodically repeated, except with the duration of time being updated. That is, the next notifications occurring every ten minutes after the aforementioned notification might be, for example, “burner at MEDIUM-LOW, thirty minutes” and “burner at MEDIUM-LOW, forty minutes”, etc. The period of repetition may be greater or shorter, depending upon the needs of the application, and the period may be user-configurable. Also, the notifications may be configured to only be output after a predetermined period of time, say, thirty minutes, and then be periodically output every, say, ten minutes thereafter. These are examples of periods that may be employed in configuring the range 4 and the notification system 8 and are not intended to be limiting.

Since the range 4 can be simultaneously operated in a plurality of operated states, the notification system 8 may periodically output numerous audible notifications such as mentioned above. However, the routine 64 may employ some logic to maximize its effectiveness. For example, if one of the burners 16A-D is switched into operation at a first time and the oven 20 is switched into operation three minutes later, the periodic outputting of notifications of continued operation of the one of the burners 16A-D and the oven 20 might occur regularly albeit at three minutes apart. If the notification system 8 is configured to provide such a notification every ten minutes, it can be seen that if all of the burners 16A-D (or additional burners, depending upon the configuration of the range 4 and the oven 20 were started at different times, a large number of notifications might be output on a seemingly continuous basis.

The aforementioned logic employed by the routine 64 thus might minimize the number of notifications by providing only a single notification regarding the cooktop 12, such as whichever of the notifications would relate to the highest operational level of one of the burners 16A-D or the greatest duration of operation of one of the burners 16A-D or a combination of both, by way of example. As such, the notification system 8 might limit the notifications to a single notification related to the cooktop 12, regardless of the number of simultaneous operational levels of the cooktop 12, with the notification being limited to what is most likely to be the notification in which the user is most interested. Also, a notification regarding the oven 20 could be output at substantially the same time as the notification for the cooktop 12 in order to enable all of the notifications to be provided at substantially one time. For example, the notifications might be “cooktop MEDIUM-LOW, twenty minutes; oven three hundred seventy-five degrees, seventeen minutes”. Such a coordination of notifications advantageously recognizes the potential for the user to begin to ignore the notifications if they are provided too frequently. Moreover, it is possible that notifications provided regarding an operated state of one or more of the burners 16A-D may occur with greater frequency than a notification regarding the oven 20. For example, it may be possible that flames, overcooking, and other possible undesirable situations are less likely to occur due to extended cooking in the oven 20 compared with cooking on one of the burners 16A-D. As such, the notification system 8 may provide notifications for an operated state of one or more of the burners 16A-D after every ten minutes of operation whereas the notification of the operation of the oven 20 might be performed only every twenty minutes, by way of example.

Further logic might be employed depending upon other factors. For example, the notifications might be output relatively more frequently, say, every five minutes for one of the burners 16A-D being operated at the HIGH operational level or for the oven 20 on a BROIL setting. As a further example, the sound volume that is output by the loudspeaker 72 might be increased with each successive notification depending on factors such as whether the duration of time exceeds a predetermined amount. For instance, if one of the burners 16A-D is operated at MEDIUM for more than two hours, or if one of the burners 16A-D is operated at HIGH for more than twenty minutes, the sound volume from the loudspeaker 72 might incrementally increase with each notification and/or the notifications may themselves be output more frequently. The input apparatus 32 might also include a notification reset feature whereby such increased sound level and/or increased notification frequency may be reset, such as when the user is fully aware of the operational parameters of the range 4 and intends that the range 4 be operated in such a fashion.

In this regard, it therefore can be understood that the notification system 8 advantageously provides the aforementioned notifications in order to make the user aware that the range 4 has been operated for a certain duration of time in order to avoid a dangerous operational condition if, for instance, a user has forgotten that the range 4 is in operation or has been distracted from the fact of such operation, such as due to one or more external events. Also, the increased sound levels and increased frequency of audible outputs are helpful for persons whose hearing or vision is impaired because they increase the likelihood that such a person will eventually hear the audible outputs.
The aforementioned wireless transceiver apparatus 42 provides further versatility because it enables wireless communication with other devices. Such other devices can serve not only to provide the various notifications to a user, but at least some can also be used to control the range 4. Moreover, they enable alarm notifications to be communicated to remote locations. Example of wireless devices that are remote to the range 4 and that can be used in such a fashion would include mobile telephones, televisions, home security systems, laptop and desktop computers, and other devices.

For instance, a cellular telephone could have an application deployed thereon that will provide the audible notifications set forth above, and that can also provide visual notifications on its display and tactile notifications through its vibration system. The application further can enable the user to reduce an operating temperature or operational level of the range 4. For example, a notification might include a string of sound tags 68 as set forth above that are wirelessly communicated to the cellular telephone and are output thereon. Alternatively, the various sound tags 68 may already be stored on the cellular telephone, and the notification from the range 4 may be in the nature of a command to output certain of the stored sound tags 68 in a certain order.

The application may also give the user an option to adjust an operating temperature or operational level of the range 4. If the user interacts with the cellular telephone in such a fashion and enters a command to, say, reduce an oven temperature, the command will be wirelessly communicated from the cellular telephone to the range 4. Responsive to the received command to reduce the oven temperature, the routines 64 on the range 4 will cause an actuator of the actuator apparatus 74 to operate the controller 28 to reduce the oven temperature in accordance with the command. Depending upon the parameters detected by the temperature sensor 48 or the flame detector 52, the user may also be given an option to activate the utility shutoff 78 or the fire extinguisher 82, and/or the user may be given an opportunity to have the cellular telephone dial nine-one-one or dial the local fire department, by way of example.

Further logic may be employed with respect to cellular communications depending upon the needs of the particular application. For instance, in order to communicate with a remote cellular telephone, the wireless transceiver apparatus 42 likely will include its own cellular telephone system which will communicate with a cellular network in order to interact with the user’s remote cellular telephone. As such, the routines 64 may include a feature of automatically telephoning nine-one-one or the local fire department in any of a number of predetermined situations, such as if the flame detector 52 detects the presence of a flame. Further logic may cause other operations to be performed, such as automatically operating the fire extinguisher 82 and/or the utility shutoff 78, if the routine 64 has automatically dialed or is about to dial nine-one-one or the local fire department.

Alternatively, the routines 64 may be configured to be customized so that the system provides notifications to the user’s remote cellular telephone only in emergency situations. In such a configuration, for example, the user may configure the system such that the various strings of sound tags 68 might not be output on the user’s remote cellular telephone, and rather only emergency notifications such as “FIRE!” would be output. The user may then be given the opportunity to dial nine-one-one or the local fire department, or the user may be informed that such a call was already automatically made and further informed that, say, the fire extinguisher 82 has already been deployed.

As suggested above, notifications can also be provided with a television. That is, audible and visual notifications as described above can be output on a television set. In such a situation, the wireless transceiver apparatus 42 may wirelessly communicate with the television or may communicate with a cable feed via a remote transceiver that is in communication with the cable feed. Depending upon whether the remote control that is being used with the television also has an ability to interface wirelessly with the range 4, such a remote control potentially can be used to control the range 4 in a fashion similar to the cellular telephone and other devices mentioned herein.

Moreover, a laptop computer or desktop computer may be employed to output the notifications mentioned by providing visual outputs on the display of the computer and by providing audible outputs with the speakers of the computer. In such a situation, the wireless transceiver apparatus 42 may provide wireless communications that follow, for instance, the IEEE 802.11 protocol to enable wireless interfacing with wireless computer networks of a type that many homeowners employ in their homes. In such an implementation, the notifications that are generated by the processor apparatus 36 may be communicated via the wireless transceiver apparatus 42 to a device such as a wireless router or other such remote wireless device which communicates the signals between the range 4 and the computer. Potentially, the wireless transceiver apparatus 42 may wirelessly communicate directly with a wireless communication system on the computer.

The wireless transceiver apparatus 42 may also be configured to communicate wirelessly with a security system that is configured to receive wireless signals. For example, instead of the routines 64 being configured to automatically dial nine-one-one or the local fire department, the routines can be configured to communicate an alarm condition to a home security system, for instance, which triggers its own fire alarm. This may result in a loud horn being sounded in the house and/or an automatic telephone call to a dispatching company which may telephone the user at home or may telephone the local fire department. Depending upon the configuration of the security system, the wireless transceiver apparatus 42 may additionally be configured to be directly wired to the security system. In this regard, such a wired output could be configured to alternatively be connected with the aforementioned television, computer, or wireless router, or with another remote device.

It is to be understood that the cellular telephone, television, computers, security system, and other remote devices mentioned herein are intended to be exemplary in nature and not limiting. As such, virtually any remote electronic device that is designated by the user to interact with the range 4 can be employed to receive signals from the range 4 and/or to send control or other signals to the range 4 for purposes of providing notifications on the remote device and/or controlling the range 4 using the remote device. While examples of wireless devices have been presented herein, it is understood that other wired and wireless devices and systems that are physically remote from the range 4 can still be used to output the notifications from the range 4 and to control the range 4.

Certain of the operations mentioned above are depicted in a flowchart that is shown in FIG. 3. Processing
may begin, as at 80, where it is determined whether the range 4 is in an operated state. If yes, processing continues, as at 82, where a notification is output if the notification complies with whatever notification logic may be employed by the routine 64. For example, the logic might require that the duration of time be of a particular period, say, ten or twenty or thirty minutes, by way of example, from the time it began the operated state, and/or according to any other logic that may be employed by the routine 64, examples of which have been set forth above. Processing then continues to 84 where it is determined whether a predetermined condition is determined to exist. The examples presented herein are the existence of a flame detected by the flame detector 52 or the existence in the vicinity of the range 4 of an ambient temperature above a predetermined temperature as detected by the temperature sensor 48. If such a condition exists, an alarm notification such as the audible emergency notification “FIRE!” is output, as at 86. If, however, it is determined that the predetermined condition does not exist, processing returns to 80.

[0056] It thus can be seen that the improved range 4 with its improved notification system 8 provides periodic various notifications, including the outputting of notifications that are representative of a duration of time that the range 4 has been in an operated state. Other notifications are provided in response to touch inputs with the use of the physical contact sensors 46A-E. The wireless transceiver apparatus 42 and the actuator apparatus 74 enable the notifications to occur and for control to be provided with a remote device. The notifications can be tailored by a user in terms of the frequency of notifications, the amount of information in each notification, the sound volume of each notification, and the like. The notifications thus advantageously advise the user of the continued operation of the range 4 and help to avoid unintended prolonged operation of the range 4, which thus resists the creation of dangerous situations. The notification system 8 additionally includes components such as the temperature sensor 48 and the flame detector 52 which can enable the detection of one or more predetermined conditions such as an excessive ambient temperature or a fire, which would be an emergency condition, and can correspondingly provide an emergency notification such as “FIRE!” in the event of such an emergency condition. Other features such as the utility shutoff 78 and the fire extinguisher 82 enable a dangerous situation to be ameliorated at the range 4. Variations of the foregoing will be apparent to one of ordinary skill in the relevant art.

[0057] An improved range 104 in accordance with a second embodiment of the disclosed and claimed concept is depicted generally in FIG. 4. The range 104 includes a notification system 108 that is similar to the notification system 8. However, the range 104 includes a cooktop 112 having burners 116A-D that are electronically actuated rather than being mechanically actuated. Likewise, the range 104 includes an oven 120 that is electronically actuated.

[0058] More specifically, the range 104 includes a plurality of controllers 124A-D that each control one of the burners 116A-D, and further includes a controller 128 that controls the oven 120. Each of the controllers 124A-D and 128 includes a number of electronic buttons or other actuators rather than having physically rotatable knobs and rotational position sensors 44A-E as in the notification system 8.

[0059] More specifically, each of the controllers 124A-D and 128 includes an ON/OFF button 146, an INCREASE button 150 having an arrow depicted thereon, and a DECREASE button 154 having another arrow depicted thereon that points in an opposite direction. It is noted that in other embodiments not expressly depicted herein, the controller 128 may additionally or alternatively include a numeric keypad for direct numeric input of a target temperature.

[0060] The controllers 124A-D and 128 each include a visual display 176 which, in the depicted exemplary embodiment, visually outputs a numeric representation of the operational level of the corresponding portion of the range 104. By way of example, the visual display 176 for each of the controllers 124A-D which each control one of the burners 116A-D, the visual display 176 displays a single digit between “1” and “9”, by way of example. The visual display 176 for the controller 128 outputs a three digit number representative of a temperature of the oven 120 which can be the temperature to which the oven 120 is set, the actual temperature, or a combination of the two.

[0061] The notification system 108 is otherwise the same as the notification system 8. That is, the controllers 124A-D and 128 provide input to the range 104 to dictate its operational levels and further provide input of such operational levels to the notification system 108. In turn, the notification system 108 provides periodic notifications that are representative of a duration of time that a portion of the range 104 has been in its operated state. The notifications can be the same as those set forth above with regard to the notification system 8, or they potentially can be different based upon the needs of the configuration.

[0062] A notification system 208 in accordance with a third embodiment of the disclosed and claimed concept is depicted generally in FIG. 5 as being capable of being retrofitted onto an existing range 204. The range 204 includes a plurality of controllers 224A-D and 228 which are depicted herein as being in the exemplary form of rotatable input shafts such as might be connected with gas flow valves, rotational position sensors, rheostats, variable capacitors, and the like and which control the burners and/or oven of the range 204.

[0063] As mentioned, the notification system 208 is configured to enable it to be retrofitted to range 204, which is a conventional range. FIG. 5 depicts that the original control knobs of the range 204 have already been removed, thus exposing the controllers 224A-D and 228, to which the notification system 208 is mounted. More particularly, the notification system 208 is in the form of a plurality of burner knobs 226A-D which are each connected with one of the controllers 224A-D which control the burners of the range 204. The notification system 208 further includes an oven knob 230 that is mounted to the controller 228, which is in control of the oven of the range 204.

[0064] The burner knobs 226A-D and the oven knob 230 can each be said to include a support 210 and to further include a notification component 214 situated on the support 210. The support 210 is generally in the form of a knob-shaped piece of material, such as injection molded plastic material or other material. The notification components 214, one of which is depicted schematically in FIG. 6, are each similar to the notification system 8, except that an individual notification component 214 is incorporated into each of the burner knobs 226A-D and the oven knob 230. FIG. 6 schematically depicts the burner knob 226A by showing the schematically depicted notification component 214 situated on a schematically depicted support 210.

[0065] Each notification component 214 includes an input apparatus 232, a processor apparatus 236, and an output appa-
Each input apparatus 232 of the exemplary depicted embodiment includes a rotational position sensor 244, a temperature sensor 248, and a flame detector 252. Each processor 236 includes a processor 256 and a storage 260 upon which are stored one or more routines 264 and a plurality of sound tags 268. Each output apparatus 240 includes a loudspeaker 272 and may optionally also include a visual display 276.

In operation, the burner knobs 226A-D and the oven knob 230 each operate independently to detect that their corresponding controllers 224A-D and 228 are in positions (or have been rotated to positions) that are indicative of an operated state of a corresponding portion of the range 204. Responsive thereto, the burner knobs 226A-D and the oven knob 230 each periodically output a notification that is representative of a duration of time that the corresponding portion of the range 204 has been in the operated state. As before, the notifications can be representative of spoken words that are audibly output by the loudspeaker 272 and can have the other features mentioned above. Moreover, each of the controllers 224A-D and 228 can detect in the vicinity of the range 204 a predetermined condition such as a fire or an ambient temperature that has exceeded a predetermined level, although in alternative embodiments it may be desirable to have only one of the controllers 224A-D and 228 include said features.

The notification system 208 thus can advantageously be retrofitted to an existing range 204 to form an improved range that provides the safety and emergency notifications set forth above.

An improved notification system 308 in accordance with a fourth embodiment of the disclosed and claimed concept is depicted in FIG. 7. The notification system 308 is similar to the notification system 208 and can be retrofitted onto an existing range such as the range 204 of FIG. 5. The notification system 308 likewise includes a plurality of burner knobs 326A-D and an oven knob 330, each of which includes a support 310. However, the notification system 308 is different from the notification system 208 since the notification system 308 further includes a base unit 334 in communication with the burners knobs 326A-D and the oven knob 330. The base unit 334 advantageously includes certain components of the notification system 308, which avoids duplication of such components on each of the burner knobs 326A-D and the oven knob 330.

More specifically, the notification system 308 can be said to include an input apparatus 332 that is distributed across the burner knobs 326A-D and the oven knob 330. The notification unit 308 further includes a processor apparatus 336 and an output apparatus 340 that are situated on the base unit 334. In the depicted exemplary embodiment, the base unit 334 is in wireless communication with the burner knobs 326A-D and the oven knob 330, although other types of communication systems can be employed without departing from the present concept.

For instance, the burners knobs 326A-D and the oven knob 330 each include the aforementioned support 310 and further include an input component 318 disposed on the support 310. An exemplary schematic depiction of one of the input components 318 is shown in FIG. 8 as being disposed on the support 310 to form the exemplary burners knob 326A. It is understood that the input components 318 of the burners knobs 326A-D and the oven knob 330 together form the input apparatus 332, as is schematically depicted in FIG. 7.

As can be seen in FIG. 8, the input component 318 includes a rotational position sensor 344, a temperature sensor 348, and a flame detector 352, although it is understood that the temperature sensor 348 and the flame detector 352 potentially need not be provided on each of the input components 318. The input component 318 additionally includes a processor 354 which is in communication with the rotational position sensor 344, the temperature sensor 348, and the flame detector 352 in order to receive input signals therefrom and to generate output signals that are provided to a wireless communication system 356 of the input component 318. Each wireless communication system 356 of the burners knobs 326A-D and the oven knob 330 is in wireless communication with the base unit 334.

More particularly, and as is depicted generally in FIG. 9, the base unit 334 has the processor apparatus 336 and the output apparatus 340 disposed thereon. The processor apparatus 336 includes a processor 356 and a storage 360 having a number of routines 364 and a plurality of sound tags 368 stored therein. The processor apparatus 336 further includes a wireless communication system 362 that is in wireless communication with each of the wireless communication systems 358 and that provides to the processor 336 input signals representative of the signals that were generated and output by the processor 354.

As before, the routines 364 are executable on the processor 356 to provide output signals to the loudspeakers 372 in the form of periodic audible notifications that are representative of a duration of time that an apparatus (such as a range to which the notification system 308 has been retrofitted) has been in an operated state. An optional visual display 376 can provide on the base unit 334 and can include warning lights, numeric displays, and the like that reflect the operational level of such a range. By providing the processor apparatus 336 and the output apparatus 340 on the base unit 334, these components can be shared by the burners knobs 326A-D and the oven knob 330 rather than having to be separately provide such components on each of the burners knobs 326A-D and the oven knob 330, which can result in a cost savings. Also, by providing all of the notifications on the base unit 334, the aforementioned logic can be advantageously employed to output the various audible notifications in a fashion that is tailored to avoid a user eventually ignoring the notifications.

It thus can be seen that several embodiments of the notification system 8, 108, 208, and 308 advantageously provide periodic outputs of notifications that are representative of a duration of time that an apparatus such as a range has been in an operated state. The notifications can be in any of any variety of forms and advantageously reduce the risks that are inherent in operating the apparatus, such as when operating the apparatus for an extended period of time, by informing a user of a continued operated state of the apparatus.

Although the foregoing discussion has presented specific embodiments, persons skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the embodiments to achieve similar functionality and utility to the exemplary embodiments disclosed herein. Moreover, it should be appreciated that features from a particular embodiment may be implemented in another embodiment disclosed herein to achieve a desired functionality. Accordingly, the specific embodiments described herein should be understood as examples and not limiting the scope of the disclosure.
What is claimed is:

1. A method of providing an indication regarding an apparatus that is structured to be switched between one state and an operated state, the method comprising:
   detecting at least one of:
   - that the apparatus has been switched to the operated state,
   - that the apparatus is in the operated state; and
   periodically outputting a notification representative of a duration of time that the apparatus has remained in the operated state.

2. The method of claim 1, further comprising outputting as at least a portion of the notification an audible sound tag representative of at least a first spoken word that corresponds with the duration of time that the apparatus has remained in the operated state.

3. The method of claim 2, further comprising:
   - determining an operational level of the apparatus; and
   - outputting as at least a portion of the notification an audible sound tag representative of at least a first spoken word that corresponds with the operational level.

4. The method of claim 3, further comprising detecting the operational level by detecting at least one of:
   - a rotation of a rotatable device away from an initial rotational position; and
   - a current rotational position of the device.

5. The method of claim 1, further comprising:
   - detecting in the vicinity of the apparatus an existence of a predetermined condition; and
   - outputting another notification representative of the predetermined condition.

6. The method of claim 5, further comprising:
   - detecting as the predetermined condition a flame in the vicinity of the apparatus; and
   - outputting as the another notification at least a first spoken word that is representative of the existence of the flame.

7. The method of claim 6, further comprising performing at least one of:
   - triggering a fire extinguisher of the apparatus; and
   - operating a utility shut-off connected with the apparatus.

8. The method of claim 5, further comprising detecting as the predetermined condition a parameter that is in the vicinity of the apparatus and that is at a level that exceeds a predetermined level.

9. The method of claim 8, further comprising detecting as the predetermined condition an ambient temperature in the vicinity of the apparatus that has exceeded a predetermined temperature.

10. The method of claim 1, further comprising:
    - employing the first device in the detecting;
    - wirelessly communicating at least one of a signal from the first device and a signal to the second device; and
    - employing the second device in the outputting.

11. The method of claim 1, further comprising detecting that the apparatus is in the operated state by detecting at least one of:
    - a rotation of a device away from an initial rotational position; and
    - a current rotational position of the device.

12. The method of claim 1, further comprising prior to the detecting and the outputting:
    - detecting a touch input on a controller of the apparatus; and
    - providing an audible notification representative of an identity of the controller.

13. The method of claim 1, further comprising:
    - wirelessly receiving from a remote device a command representative of a change to the operated state; and
    - changing the operated state in accordance with the command.

14. A notification system for use in conjunction with an apparatus that is structured to be switched between one state and an operated state, the notification system comprising:
    - a processor apparatus comprising a processor and a storage;
    - an input apparatus structured to provide input signals to the processor apparatus;
    - an output apparatus structured to receive output signals from the processor apparatus;
    - the storage having stored therein a number of routines which, when executed on the processor, cause the notification system to perform operations comprising:
      - detecting at least one of:
        - that the apparatus has been switched to the operated state; and
        - that the apparatus is in the operated state; and
      - periodically outputting a notification representative of a duration of time that the apparatus has remained in the operated state.

15. The notification system of claim 14 wherein the storage further has stored therein a number of sound tags which, when output by the output apparatus, are in the form of one or more audible spoken words, and wherein the operations further comprise outputting as at least a portion of the notification an audible sound tag representative of at least a first spoken word that corresponds with the duration of time that the apparatus has remained in the operated state.

16. The notification system of claim 15 wherein the operations further comprise:
    - determining an operational level of the apparatus; and
    - outputting at least a portion of the notification an audible sound tag representative of at least a first spoken word that corresponds with the operational level.

17. The notification system of claim 16 wherein the input apparatus comprises a rotatable device, and wherein the operations further comprise detecting the operational level by detecting at least one of:
    - a rotation of the device away from an initial rotational position; and
    - a current rotational position of the device.

18. The notification system of claim 14 wherein the operations further comprise:
    - detecting in the vicinity of the apparatus an existence of a predetermined condition; and
    - outputting another notification representative of the predetermined condition.

19. The notification system of claim 18 wherein the input apparatus comprises a flame detector, and wherein the operations further comprise:
    - detecting as the predetermined condition a flame in the vicinity of the apparatus; and
    - outputting as the another notification at least a first spoken word that is representative of the existence of the flame.

20. The notification system of claim 18, further comprising detecting as the predetermined condition a parameter that is in the vicinity of the apparatus and that is at a level that exceeds a predetermined level.

21. The notification system of claim 20 wherein the input apparatus comprises a temperature sensor, and wherein the
operations further comprise detecting as the predetermined condition an ambient temperature in the vicinity of the apparatus that has exceeded a predetermined temperature.

22. The notification system of claim 14 wherein the input apparatus comprises a first device and the output apparatus comprises a second device, and wherein at least one of the input apparatus and the output apparatus further comprises a wireless communication device, and wherein the operations further comprise:

employing the first device in the detecting;
wirelessly communicating at least one of a signal from the first device and a signal to the second device; and
employing the second device in the outputting.

23. The notification system of claim 14, further comprising detecting that the apparatus is in the operated state by detecting at least one of:

a rotation of a device away from an initial rotational position; and

a current rotational position of the device.

24. The notification system of claim 14 wherein the input apparatus comprises a sensor apparatus and a support, at least a portion of the sensor apparatus being disposed on the support, the support being structured to be mounted to a portion of a controller of the apparatus, at least a portion of the sensor apparatus being structured to be employed in detecting an operational level of the apparatus.

25. The notification system of claim 24 wherein the sensor apparatus comprises a rotational sensor, wherein the support is structured to be mounted on a rotatable input shaft of the controller, and wherein the processor apparatus is structured to detect as being indicative of the operational level of the apparatus at least one of:

a current rotational position of the support, and

a change in rotational position of the support.

26. The notification system of claim 25 wherein the sensor apparatus further comprises another sensor that is structured to be employed in detecting in the vicinity of the apparatus an existence of a predetermined condition, and wherein the operations further comprise outputting another notification representative of the predetermined condition.

27. The notification system of claim 26 wherein the other sensor is at least one of:

a temperature sensor that is structured to be employed in detecting as the predetermined condition an ambient temperature in the vicinity of the apparatus that has exceeded a predetermined temperature; and

a flame detector that is structured to be employed in detecting as the predetermined condition an existence of a flame in the vicinity of the apparatus.

28. The notification system of claim 24 wherein at least a portion of the processor apparatus is disposed on the support and at least a portion of the output apparatus is disposed on the support, the output apparatus comprising an output element that is disposed on the support and that is structured to perform the periodic outputting of the notification.

29. The notification system of claim 24 wherein the output apparatus comprises an output element and another support, the output element being disposed on the another support, the input apparatus being one of a plurality of input apparatuses that are similar to one another and that are in communication with the output apparatus, the output element being structured to perform the periodic outputting of the notification.

30. The notification system of claim 24 wherein the input apparatus comprises a plurality of the sensor apparatuses and a plurality of the supports, at least a portion of each of the plurality of sensor apparatuses being disposed on a corresponding one of the plurality of supports, the plurality of supports each being structured to be retrofitted to a portion of corresponding controller of a plurality of the controllers of the apparatus, the apparatus being structured to be simultaneously operable at a plurality of operational levels, at least a portion of each of the plurality of sensor apparatuses being structured to be employed in detecting an operational level from among the plurality of operational levels of the apparatus, the output apparatus being structure to periodically output a notification representative of a duration of time that the apparatus has remained in at least one operational level.

31. The notification system of claim 30 wherein the output apparatus comprises an output element and another support, the output element being disposed on the another support, the output apparatus being in wireless communication with each of the plurality of sensor apparatuses and being structured to output as the notification representative of the duration of time an output representative of a wireless signal originated from any of the plurality of plurality of the sensor apparatuses.

32. The notification system of claim 14 wherein at least one of the input apparatus and the output apparatus comprises a wireless transceiver apparatus that is structured to communicate wirelessly with a remote device.

33. The notification system of claim 32 wherein the output apparatus comprises an actuator apparatus structured that is to actuate an additional device responsive to a command received by the wireless transceiver apparatus.

34. A cooking apparatus that comprises the notification system of claim 14 and that is structured to be switched between one state and an operated state, the cooking apparatus being structured to generate cooking heat when in the operated state.

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