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(54) **OVEN APPLIANCE WITH INTERIOR CLEANLINESS SENSOR**

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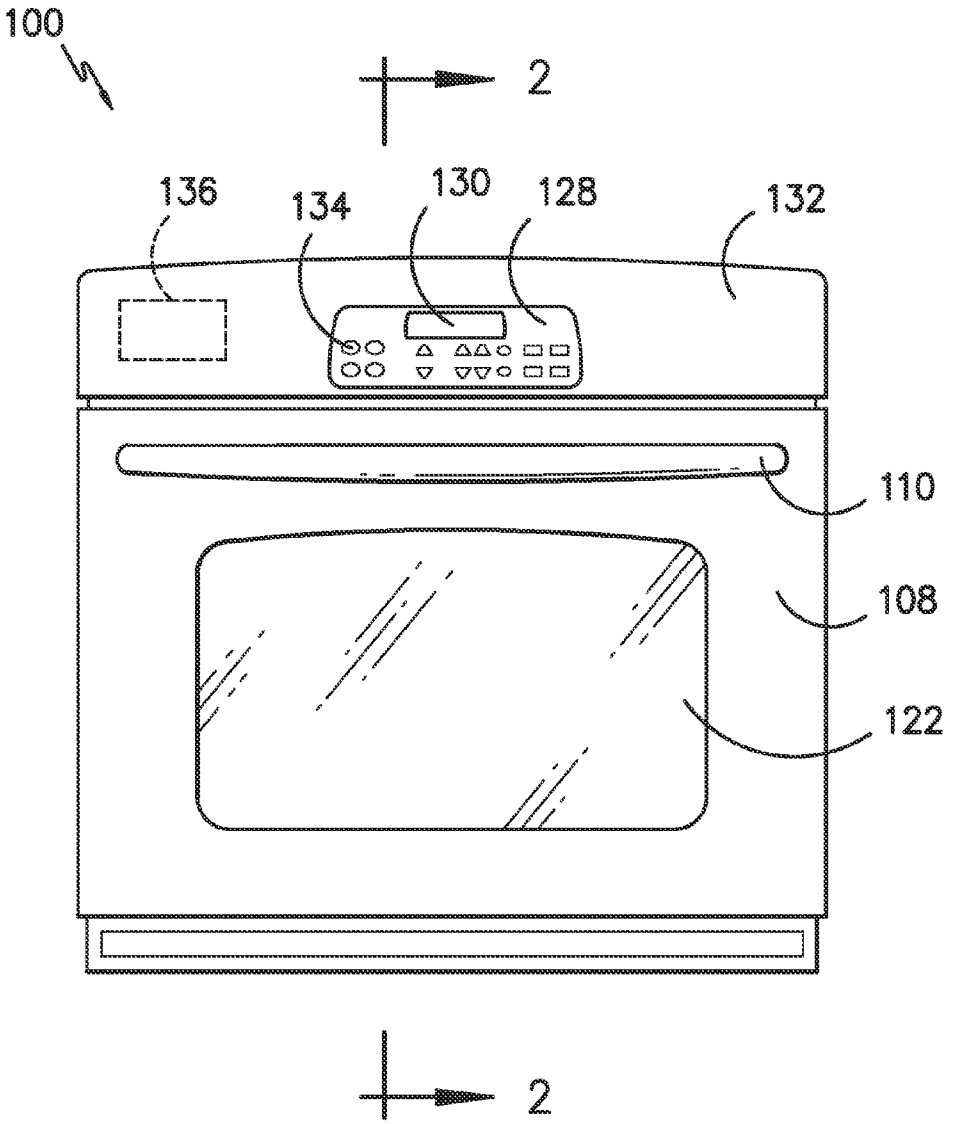
(57) **ABSTRACT**

An oven appliance with a sensor for sensing gases in the cooking chamber is provided. One or more features and methods are provided for detecting the gas levels in the cooking chamber to determine if the cooking chamber is clean or unclean. Features for initiating and terminating an oven cleaning cycle are also provided.



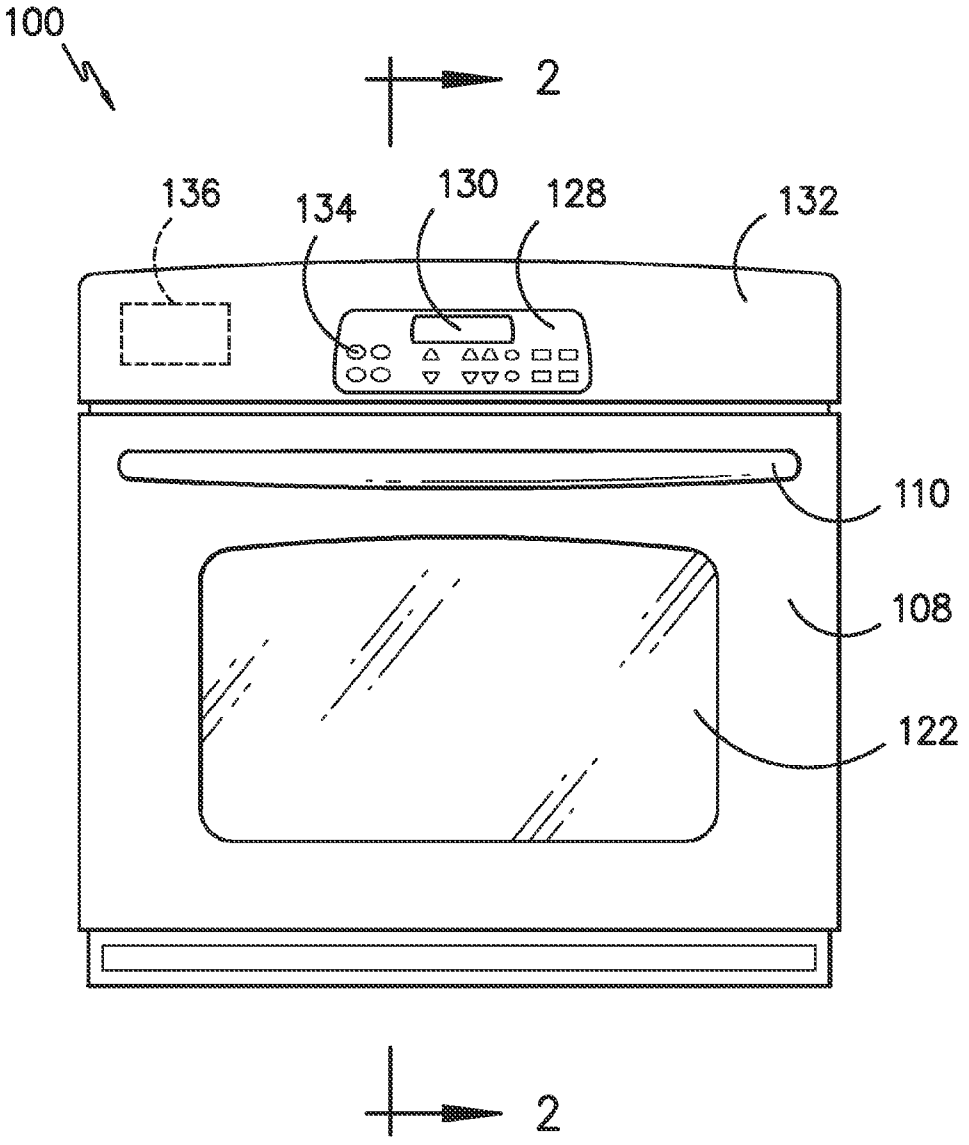


FIG. -1-

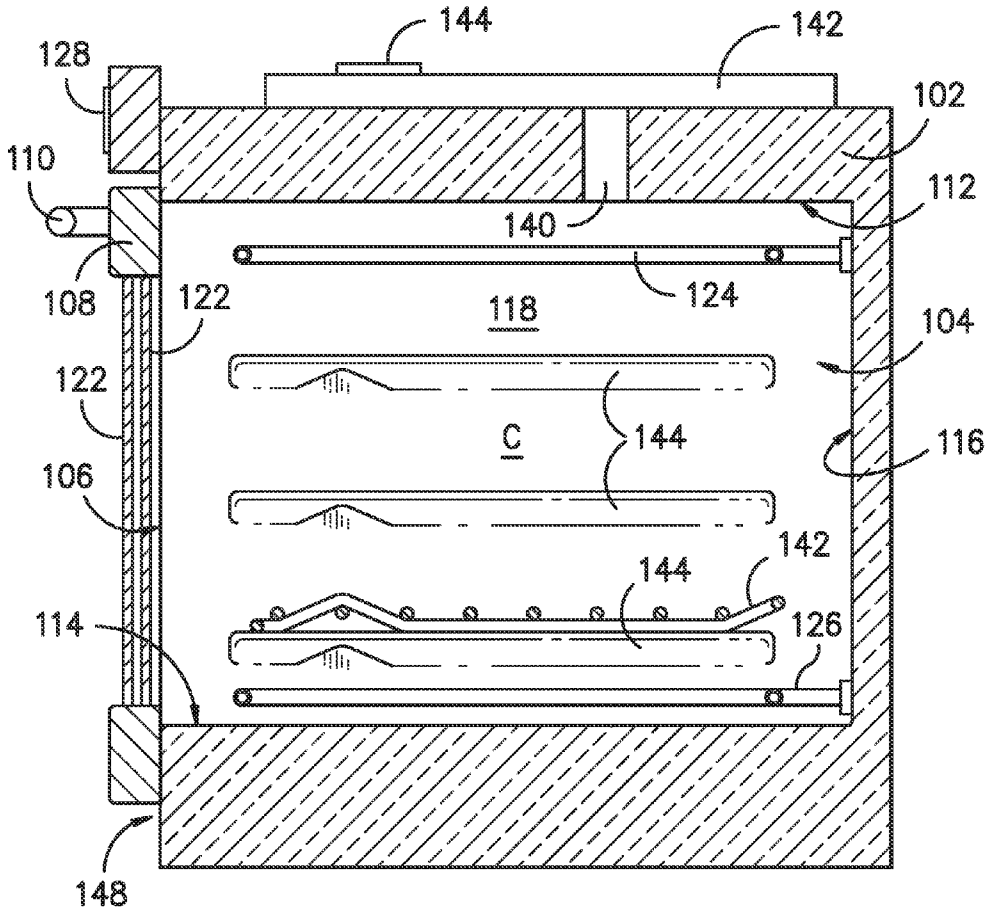

144
142
128
102
110
112
140
108
122
124
118
104
122
C
144
116
106
142
144
114
126
148

FIG. -2-

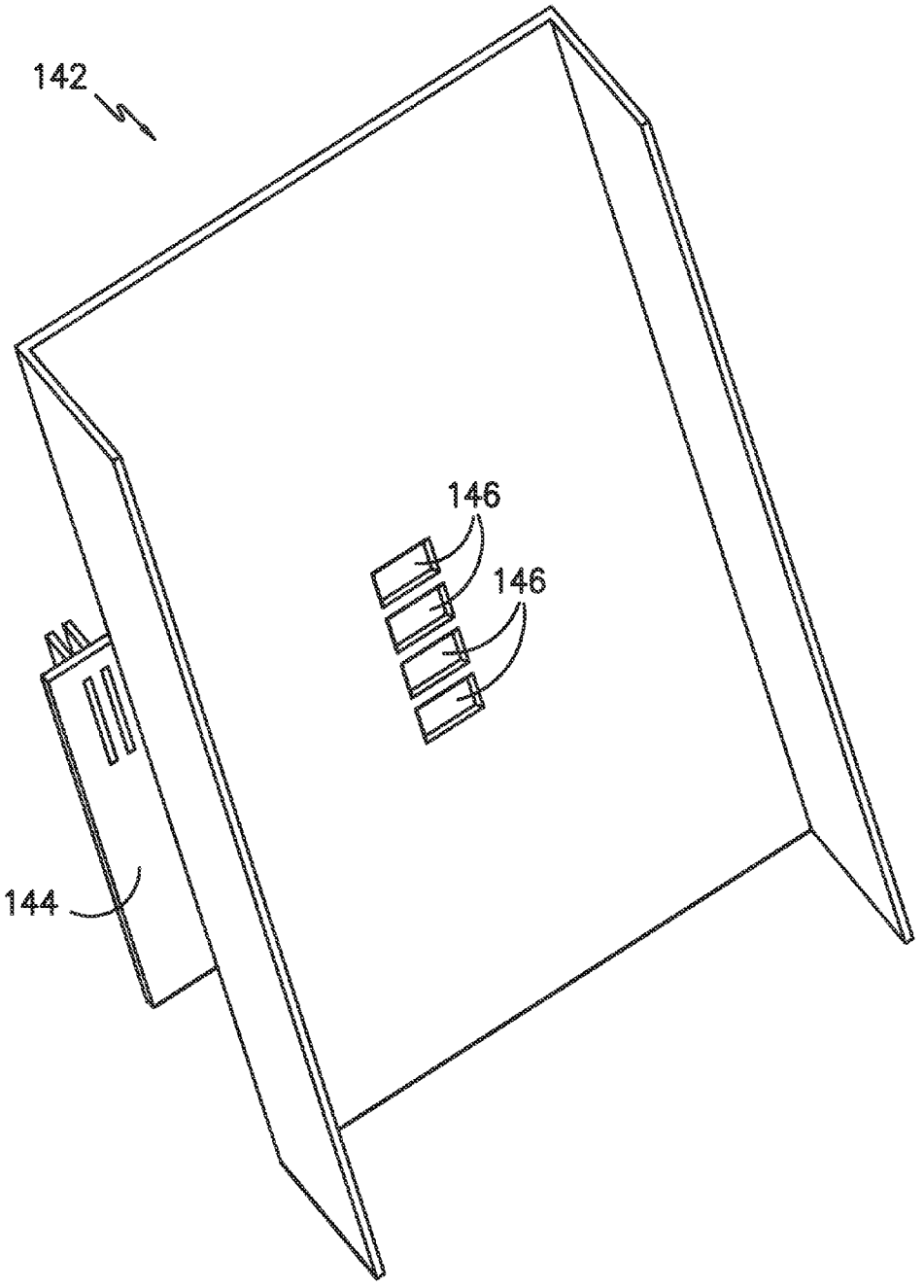


FIG. -3-

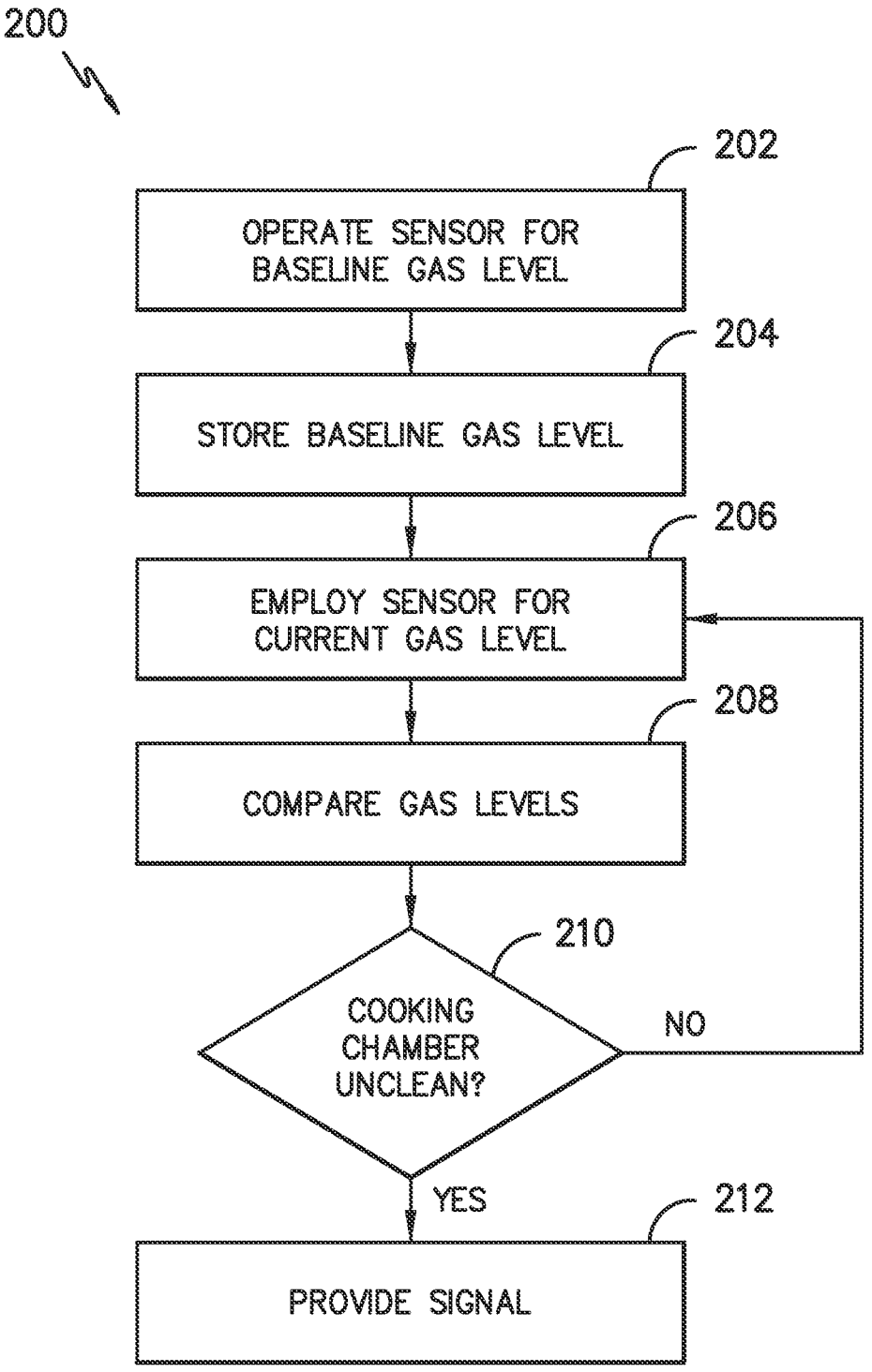

200
202
OPERATE SENSOR FOR BASELINE GAS LEVEL
204
STORE BASELINE GAS LEVEL
206
EMPLOY SENSOR FOR CURRENT GAS LEVEL
208
COMPARE GAS LEVELS
210
COOKING CHAMBER UNCLEAN?
NO
YES
212
PROVIDE SIGNAL

FIG. -4-

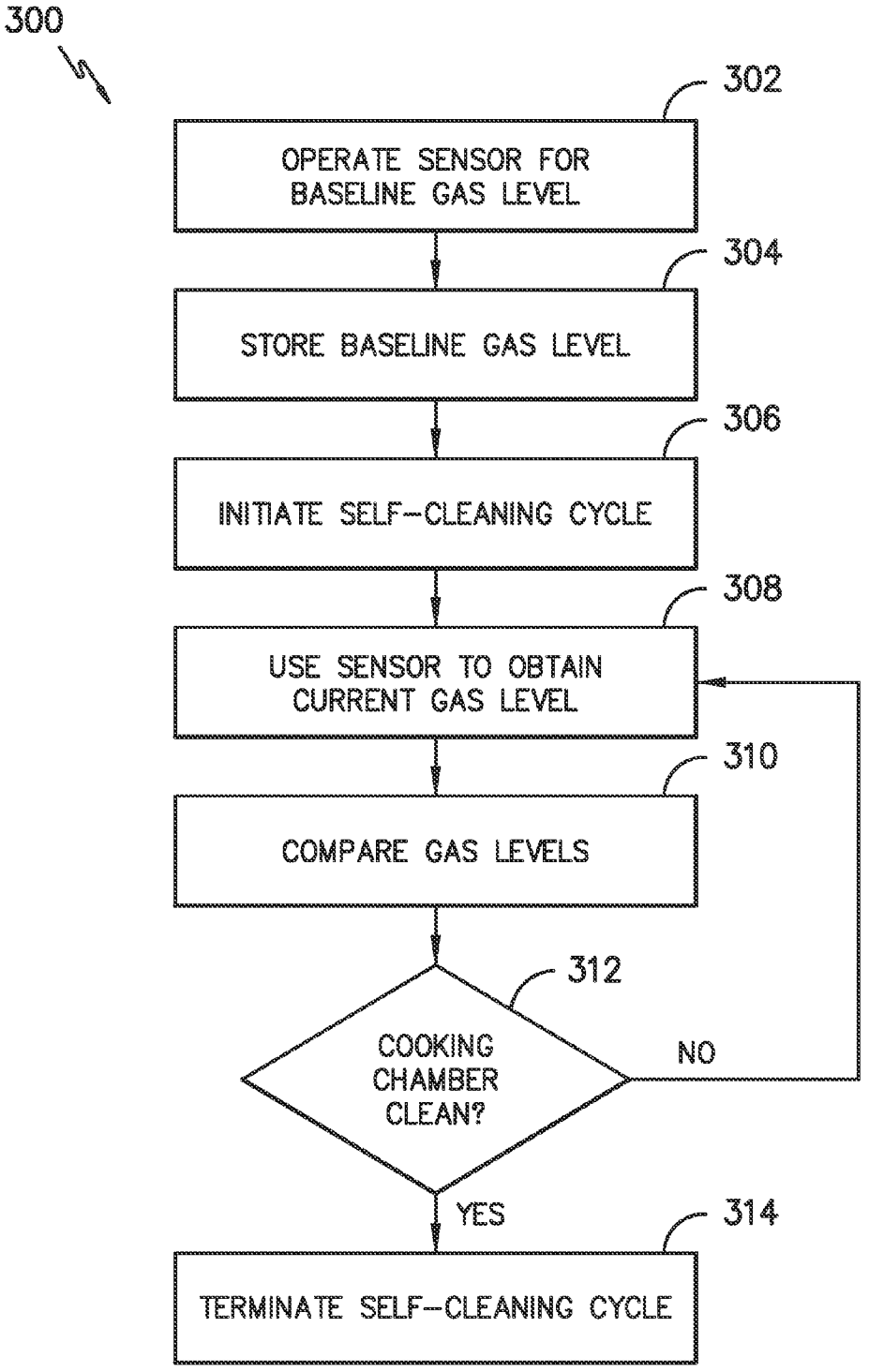

300
302
OPERATE SENSOR FOR BASELINE GAS LEVEL
304
STORE BASELINE GAS LEVEL
306
INITIATE SELF-CLEANING CYCLE
308
USE SENSOR TO OBTAIN CURRENT GAS LEVEL
310
COMPARE GAS LEVELS
312
COOKING CHAMBER CLEAN?
NO
YES
314
TERMINATE SELF-CLEANING CYCLE

FIG. -5-

OVEN APPLIANCE WITH INTERIOR CLEANLINESS SENSOR

FIELD OF THE INVENTION

[0001] The subject matter of the present disclosure relates generally to an oven appliance with features for detecting the cleanliness of the interior of the oven and methods for operating an oven appliance to detect the cleanliness of the oven interior.

BACKGROUND OF THE INVENTION

[0002] Oven appliances generally include a cabinet that defines a cooking chamber for baking or broiling food items therein. Food items placed in the cooking chamber may fall or spill over onto the floor of the cooking chamber. During baking or broiling operations, food items on the floor of the cooking chamber may char or burn from the heat generated in the cooking chamber by one or more heating elements. Also, gases and fumes generated during cooking may cause residue to build up on the surfaces of the cooking chamber. As a result, the cooking chamber may become unclean.

[0003] With conventional oven configurations, a user of the oven appliance must rely on the visual appearance or the smell of the cooking chamber to determine when the cooking chamber should be cleaned. However, to avoid potential health issues and odors associated with an unclean oven, it may be desirable to clean the cooking chamber before it looks or smells unclean to the user.

[0004] Oven appliances also generally include a self-cleaning feature for cleaning the cooking chamber. A self-cleaning cycle of an oven appliance typically lasts a predetermined period of time, although the cooking chamber may be clean before the predetermined period has expired. If the self-cleaning cycle continues after the cooking chamber is clean, the oven appliance is unavailable for cooking operations for longer than is necessary and uses more energy than is necessary to clean the cooking chamber. Further, if the self-cleaning cycle occurs during peak energy usage hours, the self-cleaning cycle interrupts the availability of the oven appliance for cooking operations and may lead to increased operational costs.

[0005] Accordingly, an oven appliance with features for detecting the cleanliness of the cooking chamber would be useful. In particular, an oven appliance with features for indicating to a user of the oven appliance that the cooking chamber is unclean would be advantageous. Further, an oven appliance with features for terminating a self-cleaning cycle when the cooking chamber is clean would also be useful. Additionally, an oven appliance with features for initiating a self-clean cycle during non-peak energy usage hours would be beneficial.

BRIEF DESCRIPTION OF THE INVENTION

[0006] The present invention provides an oven appliance with a sensor for sensing gases in the cooking chamber. One or more features and methods are provided for detecting the gas levels in the cooking chamber to determine if the cooking chamber is clean or unclean. Features for initiating and terminating an oven cleaning cycle are also provided. Additional aspects and advantages of the invention will be set forth in part in the following description, may be apparent from the description, or may be learned through practice of the invention.

[0007] In a first exemplary embodiment, a method for operating a sensor of an oven appliance having a cooking chamber configured for receipt of food items for cooking includes the steps of employing the sensor to detect a current gas level within the cooking chamber; comparing the current gas level to a baseline gas level; determining, from the step of comparing, whether the cooking chamber is unclean and, if so, then providing a signal to a user of the oven appliance to indicate the cooking chamber is unclean.

[0008] In a second exemplary embodiment, a method for operating a sensor of an oven appliance having a cooking chamber configured for receipt of food items for cooking includes the steps of initiating a self-cleaning cycle of the oven appliance; using the sensor to detect a current gas level within the cooking chamber; comparing the current gas level to a baseline gas level; establishing, from the step of comparing, whether the cooking chamber is clean and, if so, then terminating the self-cleaning cycle.

[0009] In a third exemplary embodiment, an oven appliance includes a cabinet defining a cooking chamber configured for receipt of food items for cooking; a heating element configured to heat the cooking chamber; at least one sensor; and a controller in operative communication with the at least one sensor. The controller is configured for employing the at least one sensor to detect a current gas level within the cooking chamber; comparing the current gas level to a baseline gas level; determining, from the step of comparing, whether the cooking chamber is unclean and, if so, then providing a signal to indicate the cooking chamber requires cleaning to a user of the oven appliance.

[0010] These and other features, aspects, and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

[0012] FIG. **1** provides a front view of an exemplary embodiment of an oven appliance of the present subject matter.

[0013] FIG. **2** is a cross-sectional view of the oven appliance of FIG. **1** taken along the **2-2** line of FIG. **1**.

[0014] FIG. **3** is a perspective view of a portion of the bottom of a duct of an exemplary embodiment of an oven appliance.

[0015] FIG. **4** illustrates a method of operating a sensor of an oven appliance in accordance with one exemplary embodiment of the present subject matter.

[0016] FIG. **5** illustrates a method of operating a sensor of an oven appliance in accordance with another exemplary embodiment of the present subject matter.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the inven-

tion. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0018] Referring to FIGS. **1** and **2**, for this exemplary embodiment, oven appliance **100** includes an insulated cabinet **102** with an interior cooking chamber **104** defined by a top wall **112**, a bottom wall **114**, a back wall **116**, and opposing side walls **118**, **120**. Cooking chamber **104** is configured for the receipt of one or more food items to be cooked. Oven appliance **100** includes a door **108** pivotally mounted, e.g., with one or more hinges (not shown), to cabinet **102** at the opening **106** of cabinet **102** to permit selective access to cooking chamber **104** through opening **106**. A handle **110** is mounted to door **108** and assists a user with opening and closing door **108**. For example, a user can pull on handle **110** to open or close door **108** and access cooking chamber **104**.

[0019] Oven appliance **100** can include a seal (not shown) between door **108** and cabinet **102** that assists with maintaining heat and cooking fumes within cooking chamber **104** when door **108** is closed as shown in FIGS. **1** and **2**. Multiple parallel glass panes **122** provide for viewing the contents of cooking chamber **104** when door **108** is closed and assist with insulating cooking chamber **104**. A baking rack **142** is positioned in cooking chamber **104** for the receipt of food items or utensils containing food items. Baking rack **142** is slidably received onto embossed ribs or sliding rails **144** such that rack **142** may be conveniently moved into and out of cooking chamber **104** when door **108** is open.

[0020] A heating element at the top, bottom, or both of cooking chamber **104** provides heat to cooking chamber **104** for cooking or other operations of oven appliance **100**. Such heating element(s) can be gas, electric, microwave, or a combination thereof. For example, in the embodiment shown in FIG. **2**, oven appliance **100** includes a top heating element **124** and a bottom heating element **126**.

[0021] Oven appliance **100** includes a user interface **128** having a display **130** positioned on an interface panel **132** and having a variety of controls **134**. Interface **128** allows the user to select various options for the operation of oven **100** including, e.g., temperature, time, and/or various cooking and cleaning cycles. Operation of oven appliance **100** can be regulated by a controller **136** that is operatively coupled, i.e., in communication with, user interface **128**, heating elements **124**, **126**, and other components of oven **100** as will be further described.

[0022] For example, in response to user manipulation of the user interface **128**, controller **136** can operate the heating element(s). Controller **136** can receive measurements from a temperature sensor (not shown) placed in cooking chamber **104** and, e.g., provide a temperature indication to the user with display **130**. Controller **136** can also be provided with other features as will be further described herein.

[0023] Controller **136** may include a memory and one or more processing devices such as microprocessors, CPUs, or the like, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with operation of oven appliance **100**. The memory may represent random access memory such as DRAM or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor.

[0024] Controller **136** may be positioned in a variety of locations throughout oven appliance **100**. In the illustrated embodiment, controller **136** is located next to user interface **128** within interface panel **132**. In other embodiments, controller **136** may be located under or next to the user interface **128** otherwise within interface panel **132** or at any other appropriate location with respect to oven appliance **100**. In the embodiment illustrated in FIG. **1**, input/output ("I/O") signals are routed between controller **136** and various operational components of oven appliance **100** such as heating elements **124**, **126**, controls **134**, display **130**, sensors, alarms, and/or other components as may be provided. In one embodiment, user interface **128** may represent a general purpose I/O ("GPIO") device or functional block.

[0025] Although shown with touch type controls **134**, it should be understood that controls **134** and the configuration of oven appliance **100** shown in FIG. **1** is provided by way of example only. More specifically, user interface **128** may include various input components, such as one or more of a variety of electrical, mechanical, or electro-mechanical input devices including rotary dials, push buttons, and touch pads. The user interface **128** may include other display components, such as a digital or analog display device designed to provide operational feedback to a user. User interface **128** may be in communication with controller **136** via one or more signal lines or shared communication busses.

[0026] Further, while oven **100** is shown as a wall oven, the present invention could also be used with other cooking appliances such as, e.g., a stand-alone oven, an oven with a stovetop, or other configurations of such ovens.

[0027] Referring now to FIG. **2**, oven appliance **100** includes a vent **140** in top wall **112** of cooking chamber **104**. Vent **140** is in fluid communication with the exterior of cooking chamber **104** through duct **142**. Vent **140** and duct **142** thereby form an exhaust for fumes and gases generated in cooking chamber **104**, i.e., an exhaust for fumes and gases given off by food items and residues in cooking chamber **104**.

[0028] As shown in FIG. **2**, a printed circuit board ("PCB") **144** used in certain functions of oven appliance **100** may be mounted to duct **142**. Generally, a PCB such as PCB **144** is electrically powered and generates heat during operation. Thus, mounting PCB **144** to duct **142** separates PCB **144** from the heat generated in cooking chamber **104** to help prevent damage to PCB **144**. PCB **144** and vent **140** may have other configurations and locations as well.

[0029] In the illustrated exemplary embodiment of FIG. **3**, PCB **144** is a double-sided PCB and includes sensors **146** protruding into duct **142**. Sensors **146** measure the level, i.e., the concentration, of an off-gas or several off-gases exhausting from cooking chamber **104** through duct **142**. Such gases may include gases typically given off by cooking foods, such as, e.g., organic solvent vapors, inorganic vapors, organic-nonpolar vapors, organic polar vapors, amines, and sulfur-containing compounds. As a further example, these vapors may include alcohols, inorganic acids, organic acids, aldehydes, heterocyclic compounds, pyrazines, and thiazoles. In other embodiments, sensors **146** may measure additional or different gases.

[0030] In certain embodiments, sensors **146** may be a metal oxide semiconductor ("MOS") sensor array, which measures gas levels through changes in resistance when a voltage is applied to the sensor array. Thus, the voltage readouts from sensors **146** from various cycles of oven appliance **100** or baseline measurements may be compared using, e.g., controller **136**, an op-amp comparator, or the like, to indicate changes in gas levels within cooking chamber **104**. As an example, the voltage readouts from sensors **146** during a cooking cycle may be compared to a baseline voltage readout to determine, based on the difference in the current gas level and the baseline gas level, whether the food item is sufficiently cooked. In alternative embodiments, sensors **146** may be any sensor appropriate for measuring gases generated in cooking chamber **104**, such as a near infrared ("NIR") gas detector, radio frequency ("RF") sensor, optical sensor, multimodal sensor platform, or the like. Further, it should be understood that in various embodiments, one or more sensors **146** may be used to measure the level of gases given off by food items or residues in cooking chamber **104**. Additionally, sensors **146** may be positioned in other locations with respect to cooking chamber **104**, such as within cooking chamber **104** or in another location outside cooking chamber **104**.

[0031] The gas level measured by sensors **146** can indicate whether cooking chamber is clean or unclean. For example, sensors **146** may measure the level or concentration of the gases given off from cooking chamber **104** when the cooking chamber is in a known clean state, and this gas level value may be stored by controller **136** as a baseline gas level. During a preheat cycle of oven appliance **100**, heating elements **124**, **126** are operated to heat cooking chamber **104** to a set temperature, and as the cooking chamber is heated, any gases generated in cooking chamber **104** from, e.g., foods that have fallen to the bottom of the cooking chamber, may exhaust through duct **142**. To determine the cleanliness of cooking chamber **104**, sensors **146** may measure the level or concentration of gases given off during the preheat cycle, and controller **136** may compare the current gas level to the baseline gas level. If the current gas level exceeds the baseline gas level by a predetermined amount, controller **136** may determine cooking chamber **104** is unclean. For example, controller **136** may find the difference between the current gas level and the baseline gas level, and if the difference is at least a threshold value, then controller **136** may determine cooking chamber **104** is unclean. If cooking chamber **104** is determined to be unclean, controller **136** may provide a signal to a user of oven appliance **100** that cooking chamber **104** requires cleaning. As an example, the signal may indicate a self-cleaning cycle of oven appliance **100** should be initiated.

[0032] Additionally, if the user selects to initiate a self-cleaning cycle, the self-cleaning cycle may be delayed until an off-peak period of energy usage to optimize availability of oven appliance **100** and minimize energy costs. For example, the user may select to delay the self-cleaning cycle by a predetermined period of time or to delay the self-cleaning cycle until a specific time. Alternatively, if the user selects to initiate a self-cleaning cycle, controller **136** may determine whether the user has selected to initiate a self-cleaning cycle during a peak energy usage time. If so, controller **136** may delay the self-cleaning cycle until an off-peak time, without input from the user as to when to initiate the self-cleaning cycle. In other embodiments, if cooking chamber **104** is determined to be unclean, controller **136** may initiate a self-cleaning cycle without input from the user. In such embodiments, controller **136** may delay the self-cleaning cycle until a time of off-peak energy usage.

[0033] The gas level may be monitored during other cycles of oven appliance **100** as well. For example, during a self-cleaning cycle of oven appliance **100**, sensors **146** may measure the level or concentration of gases given off from, e.g., food particles and residue built up in the cooking chamber, and controller **136** may compare the current gas level to the baseline gas level. If the current gas level has been reduced to at least the baseline gas level, controller **136** may terminate the self-cleaning cycle. After the self-cleaning cycle is terminated, controller **136** may operate sensors **146** to measure the level or concentration of gases given off from cooking chamber **104** because, after the self-cleaning cycle, the cooking chamber is in a known clean state. Controller **136** may then store the measured gas level value as the baseline gas level.

[0034] FIG. **4** illustrates an exemplary method for operating oven appliance **100**. As shown, method **200** includes step **202** of operating sensors **146** to obtain a baseline gas level when cooking chamber **104** is in a known clean state, such as, e.g., during a preheat cycle or other heating cycle before oven appliance **100** is first used for cooking operations after the oven appliance has been assembled. As a further example, sensors **146** may be operated to obtain a baseline gas level during a preheat cycle or other heating cycle before oven appliance **100** is first used for cooking operations after a self-cleaning cycle has been completed. At step **204**, the baseline gas level is stored, e.g., by controller **136**. Thus, a baseline gas level may be obtained and stored once, e.g., before oven appliance **100** is first used for cooking operations after assembly; periodically, e.g., after oven appliance **100** has completed a certain number of self-cleaning cycles; or after each self-cleaning cycle, before oven appliance **100** is used for a cooking cycle. Steps **202** and **204** also may be performed at other times when cooking chamber **104** is in a known clean state.

[0035] The method also includes step **206** of employing sensors **146** to obtain a current gas level. At step **208**, the current gas level is compared to the baseline gas level. The method also includes step **210** of determining whether the cooking chamber is unclean based on the comparison of the current gas level to the baseline gas level. For example, if the current gas level exceeds the baseline gas level by at least a predetermined amount, the cooking chamber may be determined to be unclean. The predetermined amount may be a percentage of the baseline gas level, e.g., about 25% of the baseline gas level, such that when the difference between the current gas level and the baseline gas level is at least the predetermined amount, the cooking chamber may be determined to be unclean. As a further example, for certain sensors **146** described above, changes in gas level are detected as changes in resistance when a voltage is applied to the sensor or sensors. Thus, if the change in resistance from the baseline gas level to the current gas level is at least a threshold value, i.e., the difference between the current and the baseline gas levels is at least a threshold value, cooking chamber **104** may be determined to be unclean. Other values of the predetermined amount or any other appropriate measure to properly detect that cooking chamber **104** requires cleaning may be used as well.

[0036] Steps **206**, **208**, and **210** may be performed during, e.g., a preheat cycle of oven appliance **100** when gases or vapors from cooking food items are not also exhausting

through duct **142**. In this way, sensors **146** can detect the gases given off from cooking chamber **104**, rather than the gases or vapors given off by cooking foods, to determine whether the cooking chamber is unclean. Alternatively, steps **206**, **208**, and **210** may be performed during another heating cycle of oven appliance **100** where the gases given off from cooking chamber **104**, rather than another source, may be obtained and compared to a baseline.

[0037] If it is determined at step **210** that cooking chamber **104** is clean, method **200** may return to step **206** and repeat steps **206**, **208**, and **210** throughout, e.g., the preheat or other heating cycle of oven appliance **100** as described. If, at step **210**, cooking chamber **104** is found to be unclean, method **200** proceeds to step **212**, where a signal is provided to a user of oven appliance **100** to indicate cooking chamber **104** is unclean. The signal may be, e.g., any audible and/or visual signal that indicates to the user that cooking chamber **104** requires cleaning. By way of example, the signal may be a notification displayed on user interface **128** of the appliance, an LED light, a buzzer, and/or any other appropriate visual and/or audible signal. In certain embodiments, the signal may indicate to the user that a self-cleaning cycle of oven appliance **100** should be initiated.

[0038] FIG. **5** illustrates another exemplary method for operating oven appliance **100**. As shown, method **300** includes step **302** of operating sensors **146** when the cooking chamber is in a known clean state to obtain a baseline gas level. Cooking chamber **104** may be in a known clean state, e.g., before oven appliance **100** is first used for cooking operations after the oven appliance has been assembled. At step **304**, the baseline gas level is stored, e.g., by controller **136**. The method also includes step **306** of initiating a self-cleaning cycle of oven appliance **100**. At step **308**, sensors **146** are used to obtain a current gas level, and at step **310**, the current gas level is compared to the baseline gas level. The method also includes step **312** of establishing whether cooking chamber **104** of oven appliance **100** is clean based on the comparison of the current gas level to the baseline gas level. For example, if the current gas level is less than or equal to the baseline gas level, the cooking chamber may be established to be clean.

[0039] If it is established at step **312** that cooking chamber **104** is unclean, method **300** may return to step **308** and repeat steps **308**, **310**, and **312**. If, at step **312**, cooking chamber **104** is found to be clean, method **300** proceeds to step **314**, where the self-cleaning cycle is terminated. Because after the self-cleaning cycle cooking chamber **104** is in a known clean state, steps **302** and **304** may be repeated after step **314**, before oven appliance **100** is used for a cooking cycle, to obtain and store a baseline gas level. Alternatively, the baseline gas level may be established once and used as the baseline gas level throughout the life of oven appliance **100**; that is, steps **302** and **304** are performed once, and method **300** begins at step **306**. In other embodiments, steps **302** and **304** may be performed periodically, e.g., after oven appliance **100** has completed a certain number of self-cleaning cycles without repeating steps **302** and **304**, a new baseline is obtained and stored.

[0040] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

What is claimed is:

1. A method for operating a sensor of an oven appliance, the oven appliance having a cooking chamber configured for receipt of food items for cooking, the method comprising the steps of:
- employing the sensor to detect a current gas level within the cooking chamber;
- comparing the current gas level to a baseline gas level;
- determining, from the step of comparing, whether the cooking chamber is unclean and, if so, then
  - providing a signal to a user of the oven appliance to indicate the cooking chamber is unclean.

2. The method of claim **1**, further comprising the steps of:
- repeating the steps of employing, comparing, and determining if the cooking chamber is found to be clean by the step of determining.

3. The method of claim **1**, wherein the step of employing is performed during a preheat cycle of the oven appliance.

4. The method of claim **1**, further comprising the steps of:
- operating the sensor to detect a gas level of the cooking chamber in a clean state; and
- storing the gas level of the cooking chamber in a clean state as the baseline gas level.

5. The method of claim **1**, wherein the step of determining comprises determining whether the difference between the current gas level and the baseline gas level is at least a predetermined amount.

6. The method of claim **5**, further comprising the step of selecting the predetermined amount.

7. The method of claim **1**, wherein the step of providing comprises indicating a self-cleaning cycle of the oven appliance should be initiated.

8. A method for operating a sensor of an oven appliance, the oven appliance having a cooking chamber configured for receipt of food items for cooking, the method comprising the steps of:
- initiating a self-cleaning cycle of the oven appliance;
- using the sensor to detect a current gas level within the cooking chamber;
- comparing the current gas level to a baseline gas level;
- establishing, from the step of comparing, whether the cooking chamber is clean and, if so, then
  - terminating the self-cleaning cycle.

9. The method of claim **8**, further comprising the steps of:
- repeating the steps of employing, comparing, and determining if the cooking chamber is not found to be clean by the step of establishing.

10. The method of claim **8**, further comprising the steps of:
- operating the sensor to detect a gas level of the cooking chamber in a clean state; and
- storing the gas level of the cooking chamber in a clean state as the baseline gas level.

11. The method of claim **10**, wherein the steps of using and storing are performed after the step of terminating.

12. An oven appliance, comprising:
- a cabinet, the cabinet defining a cooking chamber configured for receipt of food items for cooking;
- a heating element configured to heat the cooking chamber;

at least one sensor; and

a controller in operative communication with the at least one sensor, the controller configured for

employing the at least one sensor to detect a current gas level within the cooking chamber;

comparing the current gas level to a baseline gas level;

determining, from the step of comparing, whether the cooking chamber is unclean and, if so, then

providing a signal to indicate the cooking chamber requires cleaning to a user of the oven appliance.

13. The oven appliance of claim **12**, wherein the controller is further configured for

initiating a self-cleaning cycle of the oven appliance;

using the at least one sensor to detect the current gas level within the cooking chamber;

establishing whether the cooking chamber is clean and, if so, then

terminating the self-cleaning cycle.

14. The oven appliance of claim **13**, wherein the controller determines whether the cooking chamber is clean by comparing the current gas level to the baseline gas level.

15. The oven appliance of claim **12**, wherein the controller determines whether the cooking chamber is unclean by determining whether the current gas level exceeds the baseline gas level by a predetermined amount.

16. The oven appliance of claim **12**, further comprising:

a vent for exhausting gases and fumes generated during cooking from the cooking chamber; and

a duct connected to the vent,

wherein the at least one sensor is positioned in the duct.

17. The oven appliance of claim **12**, wherein the controller is further configured for

operating the at least one sensor to detect a gas level of the cooking chamber in a clean state; and

storing the gas level of the cooking chamber in a clean state as the baseline gas level.

18. The oven appliance of claim **12**, wherein the controller is further configured for performing the step of employing during a preheat cycle of the oven appliance.

19. The oven appliance of claim **12**, wherein the step of providing comprises indicating a self-cleaning cycle of the oven appliance should be initiated.

* * * * *