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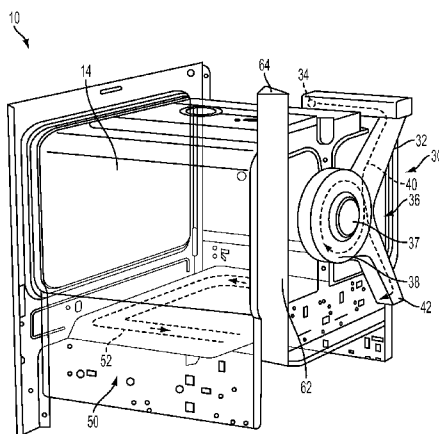


FIG. 2

(57) Abstract: An oven includes an oven enclosure having a plurality of walls defining an oven cavity. The oven enclosure includes an oven door for accessing the oven cavity. The oven includes a venting assembly attached to a wall of the oven enclosure and in fluid communication with the oven cavity. The venting assembly includes an exhaust passage attached to the wall of the oven enclosure, the exhaust passage defining a flow path through which exhaust gas flows from the oven cavity. The venting assembly includes a flow control device positioned within the exhaust passage, the flow control device selectively restricting the passage of the exhaust gas through the exhaust passage. The venting assembly includes a fluid treatment structure disposed downstream from the flow control device within the exhaust passage, the fluid treatment structure altering characteristics of the exhaust gas flowing through the exhaust passage.



HIGH EFFICIENCY RANGE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/479,518, filed April 27, 2011 entitled “High Efficiency Range,” which application is hereby incorporated by reference in its entirety.

FIELD

[0002] The present invention relates generally to ovens and, more particularly, to ovens having venting assemblies for ducting exhaust air.

BACKGROUND

[0003] Ovens generally utilize a heating assembly to heat an interior of an oven cavity. The heating assembly remains on until an interior of the oven cavity reaches a set temperature. Once the oven cavity reaches the set temperature, the heating assembly will turn off. The heating assembly will remain off until a certain minimum temperature is reached within the oven cavity, whereupon the heating assembly will cycle back on to heat the oven cavity to the set temperature. During this on/off cycling of the heating assembly, exhaust air from the interior of the oven is continuously vented regardless of whether the heating assembly is on or off.

BRIEF SUMMARY

[0004] The following presents a simplified summary of the invention in order to provide a basic understanding of some example aspects. This summary is not an extensive overview. Moreover, this summary is not intended to identify critical elements nor delineate the scope of the invention. The sole purpose of the summary is to present some concepts in simplified form as a prelude to the more detailed description that is presented later.

[0005] In accordance with one aspect, an oven is provided including an oven having an oven enclosure including a plurality of walls defining an oven cavity. The oven enclosure includes an oven door for accessing the oven cavity. A venting assembly is attached to a wall of the oven enclosure and in fluid communication with the oven cavity. The venting assembly includes an exhaust passage attached to the wall of the oven enclosure, the exhaust passage defining a flow path through which exhaust gas flows from the oven cavity. The venting assembly includes a flow control device positioned within the exhaust passage, the

flow control device selectively restricting the passage of the exhaust gas through the exhaust passage. The venting assembly also includes a fluid treatment structure disposed downstream from the flow control device within the exhaust passage, the fluid treatment structure being configured to alter characteristics of the exhaust gas flowing through the exhaust passage.

[0006] In accordance with another aspect, an oven is provided including an oven, including an oven enclosure including a plurality of walls defining an oven cavity, the oven enclosure including an oven door for accessing the oven cavity. A venting assembly is attached to the oven enclosure and in fluid communication with the oven cavity. The venting assembly includes an exhaust passage defining a flow path through which exhaust gas flows from the oven cavity. The venting assembly includes a fan positioned within the exhaust passage, the fan configured to selectively draw the exhaust air from the oven cavity and into the exhaust passage. The venting assembly further includes a heat exchanger disposed downstream from the fan and in fluid communication with the exhaust passage, the exhaust air flowing through the heat exchanger, the heat exchanger being positioned in proximity to an air inlet of the oven enclosure such that the heat exchanger is configured to heat fresh air passing through the air inlet.

[0007] In accordance with another aspect, a method of heating an oven is provided including an oven, including an oven enclosure including a plurality of walls defining an oven cavity. A venting assembly is attached to the oven enclosure and in fluid communication with the oven cavity. The venting assembly includes an exhaust passage defining a closed loop flow path through which exhaust gas flows from the oven cavity and into the exhaust passage. A flow control device is positioned within the exhaust passage, the flow control device selectively restricting the passage of the exhaust gas through the exhaust passage. A catalyst is disposed within the exhaust passage downstream from the flow control device, the catalyst being configured to alter characteristics of the exhaust gas flowing through the exhaust passage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The foregoing and other aspects of the present invention will become apparent to those skilled in the art to which the present invention relates upon reading the following description with reference to the accompanying drawings, in which:

[0009] FIG. 1 is a perspective view of an oven;

[0010] FIG. 2 is a rear perspective view of the oven including a venting assembly for controlling a flow of exhaust gas;

[0011] FIG. 3 is a partially exploded rear perspective view of the oven including the venting assembly;

[0012] FIG. 4 is a schematic view of the oven including the venting assembly; and

[0013] FIG. 5 is a side view showing a second example oven including a second example venting assembly for controlling a flow of exhaust gas.

DETAILED DESCRIPTION

[0014] Example embodiments that incorporate one or more aspects of the present invention are described and illustrated in the drawings. These illustrated examples are not intended to be a limitation on the present invention. For example, one or more aspects of the present invention can be utilized in other embodiments and even other types of devices. Moreover, certain terminology is used herein for convenience only and is not to be taken as a limitation on the present invention. Still further, in the drawings, the same reference numerals are employed for designating the same elements.

[0015] Referring to the example of FIG. 1, an example oven 10 is shown. The oven 10 includes an oven cavity 18 for heating and/or cooking food items. The oven cavity 18 is heated by a heating assembly 20. As will be described in detail below, the oven 10 includes a venting assembly for selectively allowing exhaust gas to exit from the oven cavity 18. By controlling the exit of exhaust gas from the oven cavity 18, oven efficiency can be increased.

[0016] It is to be appreciated that the oven 10 in FIG. 1 is somewhat generically/schematically shown, as the oven 10 can include any number of constructions. For example, the oven 10 includes a gas oven, an electric oven, freestanding ovens, built-in ovens, double oven freestanding ranges, etc. Further, the oven 10 is not limited to the size and shape that is shown, as the oven 10 could be larger or smaller in size, and/or could include more or less than the four burners positioned at an upper surface of the oven 10.

[0017] The oven 10 includes an oven enclosure 12. The oven enclosure 12 defines a body of the oven 10 and limits the ingress/egress of air from the oven 10. The oven enclosure 12 includes a plurality of walls 14 (e.g., side walls, bottom walls, top walls, etc.). The oven enclosure 12 further includes an oven door 16. The oven door 16 can be provided at a front portion of the oven 10, and allows for selective access to an interior of the oven 10. It is to be appreciated that the oven 10, including the oven enclosure 12, the plurality of walls 14 and oven door 16 are somewhat generically/schematically shown, as the oven 10 can include a number of different constructions. For example, the oven enclosure 12 can be larger or smaller than as shown. Further, the oven door 16 is not limited to a single door, and

in other examples, includes a plurality of doors. As such, the oven 10 shown in FIG. 1 comprises merely one possible example of an oven.

[0018] The oven enclosure 12, including the plurality of walls 14, defines an oven cavity 18. The oven cavity 18 includes a substantially open space within the oven 10, into which food items can be placed for heating and/or cooking. The oven cavity 18 is substantially surrounded by the plurality of walls 14, such that warm air within the oven cavity 18 is limited from escaping. It is to be appreciated, however, that the oven cavity 18 can be larger or smaller in size than as shown, and/or include various cooking structures placed therein (e.g., racks, shelves, etc.). Further, the oven 10 is not limited to the single oven cavity shown in FIG. 1, and in further examples, could include a plurality of oven cavities, such as in a vertically or horizontally stacked orientation.

[0019] As with the oven 10 and oven cavity 18, the heating assembly 20 is also generically/schematically depicted for illustrative purposes. In particular, the heating assembly 20 includes any number of structures that provide heat to the oven cavity 18. For example, the heating assembly 20 can include one or more gas heating assemblies. In another example, the heating assembly 20 could include one or more electric heaters, such as electric resistance heaters. Of course, it is to be understood that the heating assembly 20 can include other heating structures, and is not limited to those described herein, and could include steam heating, convection heating, or the like. In addition, while the heating assembly 20 is shown to be positioned near a bottom portion of the oven cavity 18, it is to be understood that the heating assembly 20 could be positioned at any suitable location, and could comprise a plurality of heating assemblies 20. For example, the heating assembly 20 could be positioned either or both near a bottom portion or and a top portion of the oven cavity 18. In an example in which the heating assembly 20 includes electric heaters, the electric heaters may be positioned within the oven cavity 18 at either or both the bottom portion or top portion.

[0020] The operation of the heating assembly 20 can now be briefly described. Initially, a user sets a temperature for the oven cavity 18, such as by using a user interface, controller, etc. Once the temperature is set, the heating assembly 20 will turn on, and remains on until the pre-set temperature is reached in the oven cavity 18. Once the pre-set temperature within the oven cavity 18 is reached, the heating assembly 20 turns off. The heating assembly 20 then cycles on and off as heat is needed to maintain the desired cooking temperature.

[0021] Referring now to FIG. 2, a rear perspective view of the oven 10 is shown. It is to be understood that the oven 10 is generically depicted in a partially disassembled state for illustrative purposes. For example, neither the heating assembly nor the cook top is shown. However, the oven 10 will be in a fully assembled state (as shown in FIG. 1) during operation.

[0022] The oven 10 includes a venting assembly 30. The venting assembly 30 is attached to a rear wall 22 of the oven enclosure 12 and is in fluid communication with the oven cavity 18. In particular, exhaust gas exits the oven cavity 18 and passes through the venting assembly 30. As will be described in more detail below, the venting assembly 30 can improve the efficiency of the oven 10 by controlling the exhaust gas exiting the oven cavity 18.

[0023] The venting assembly 30 includes an exhaust passage 32. The exhaust passage 32 is a substantially hollow conduit defining an exhaust gas flow path 40 (shown generically as arrow 40) through which the exhaust gas can pass. The exhaust passage 32 includes any number of different structures through which exhaust gas can pass, including, but not limited to, tubes, hoses, ducts, pipes, etc.

[0024] The exhaust passage 32 includes an exhaust inlet 34. The exhaust inlet 34 defines an opening through which the exhaust gas exits the oven cavity 18 and enters the exhaust passage 32. In one example, the exhaust inlet 34 includes an opening, aperture, or the like formed in one of the walls 14 of the oven enclosure 12. In the shown example of FIG. 2, the exhaust inlet 34 is positioned at an upper wall of the oven enclosure 12 above the oven cavity 18. In such an example, as hot air (e.g., exhaust gas) in the oven cavity 18 rises, the exhaust gas can pass through the exhaust inlet 34 and enter the exhaust passage 32. While the exhaust inlet 34 is shown to be positioned at the upper wall in proximity to the rear wall 22, it is to be understood that the exhaust inlet 34 could be positioned at any number of locations within the oven 10. For example, the exhaust inlet 34 could be positioned along the rear wall 22, such as at an upper portion of the rear wall 22. Similarly, the exhaust inlet 34 could be positioned at side walls (e.g., lateral with respect to the rear wall 22). Further, the exhaust inlet 34 can define an opening of nearly any size, and could further include flow restricting structures to selectively allow/restrict the passage of exhaust gas through the exhaust inlet 34. For example, the exhaust inlet 34 could include valves, or the like, that selectively open/close to allow for exhaust gas to enter the exhaust passage 32.

[0025] Downstream from the exhaust inlet 34, the exhaust passage 32 further includes a flow control device 36. The flow control device 36 is positioned within the exhaust passage

32. While FIG. 2 depicts the flow control device 36 as comprising a fan 37, it is to be appreciated that the flow control device 36 can include any number of structures that selectively restrict the passage of the exhaust gas through the exhaust passage 32. For example, the flow control device 36 is not limited to the fan 37 and could include valves, pumps, etc.

[0026] The fan 37 is disposed within the flow path of the exhaust passage 32. The fan 37 is selectively actuated (i.e., turned on/off) to draw air into the exhaust passage 32. In particular, when the fan 37 is turned on, the fan 37 can spin, rotate, or the like. As the fan 37 spins, exhaust gas from the oven cavity 18 is drawn through the exhaust inlet 34, and through the exhaust passage 32. When turned on, the fan 37 can be operated at a sufficiently high speed as to draw the exhaust gas into the exhaust passage 32 and propel the exhaust gas along the exhaust passage 32 in a direction downstream from the fan 37. Conversely, when the fan 37 is turned off, exhaust gas is limited from passing through the exhaust passage 32. The fan 37 is housed in a generally circular passage 38 that is sized to accommodate the fan 37 and fan blades. Of course, the fan 37 is not specifically limited to the construction shown in FIG. 2, and in further examples, could be larger or smaller in size, and or could be positioned at a variety of locations within the oven 10. For instance, while the fan 37 is shown to be positioned substantially at a center of the rear wall 22 (e.g., vertical and horizontal midpoint), the fan 37 could be positioned at nearly any location along the rear wall 22, or could be located along the top wall, side walls, etc.

[0027] The exhaust passage 32 further includes an exhaust outlet 42. The exhaust outlet 42 is positioned downstream from the flow control device 36 (e.g., fan 37). The exhaust outlet 42 defines an opening through which the exhaust gas exits the exhaust passage 32. In one example, the exhaust outlet 42 includes an opening, aperture, or the like, formed at an end of the exhaust passage 32. While the exhaust outlet 42 is shown to be positioned at a bottom corner portion of the rear wall 22, it is to be understood that the exhaust outlet 42 could be positioned at nearly any location.

[0028] Referring now to FIG. 3, a partially exploded view of the oven 10 including the venting assembly 30 is shown. It is to be appreciated that the oven 10 and venting assembly 30 are depicted in the exploded state for illustrative purposes, and to more clearly depict aspects of the oven 10. However, in operation, the oven 10 can be in a fully assembled state as shown in FIG. 1.

[0029] The venting assembly 30 further includes a fluid treatment structure 50. The fluid treatment structure 50 is disposed downstream from the flow control device 36. In one

example, the fluid treatment structure 50 is in fluid communication with the exhaust passage 32, such that the fluid treatment structure 50 receives exhaust gas from the exhaust passage 32. The fluid treatment structure 50 is attached to the exhaust outlet 42. For example, the fluid treatment structure 50 can comprise a separate structure from the exhaust passage 32, such that the fluid treatment structure 50 is separately attached to the exhaust outlet 42. In another example, the fluid treatment structure 50 is integral with the exhaust passage 32, such that the fluid treatment structure 50 and exhaust passage 32 are a single structure. It is to be appreciated that the fluid treatment structure 50 is somewhat generically shown in FIG. 3, as the fluid treatment structure 50 can include any number of sizes, shapes, and constructions. Further, while the fluid treatment structure 50 is shown in the exploded state, in operation, the fluid treatment structure 50 is to positioned underneath the oven enclosure 12 (as shown in FIG. 2). As will be described in detail below, the fluid treatment structure 50 can alter characteristics of the exhaust gas flowing through the exhaust passage 32. These characteristics include, but are not limited to, the temperature of the exhaust gas, the quality and/or air composition of the exhaust gas, a smell of the exhaust gas, etc.

[0030] The fluid treatment structure 50 includes a heat exchanger 52. It is to be understood that the fluid treatment structure 50 can include any number of structures, such that the heat exchanger 52 comprises only one possible structure. The heat exchanger 52 is positioned underneath the oven enclosure 12 and oven cavity 18. In particular, the heat exchanger 52 is positioned between an air inlet 66 (shown in FIG. 4) and the heating assembly 20. As such, ambient air (e.g., fresh air) can enter the oven enclosure 12 through the air inlet 66, and can encounter the heat exchanger 52 before passing to the heating assembly 20.

[0031] The heat exchanger 52 includes a heat exchanger passage 54. The heat exchanger passage 54 is a substantially hollow conduit through which the exhaust gas can flow. The heat exchanger passage 54 includes a number of different structures through which exhaust gas can pass, including, but not limited to, tubes, hoses, ducts, pipes, etc. Further, the heat exchanger passage 54 may include any number of bends, curves, or the like, to assist in heat exchange. For example, the heat exchanger passage 54 in FIG. 3 includes a bend 55, but in further examples, could include a plurality of bends.

[0032] The heat exchanger passage 54 can further include a heat exchanger inlet 56. The heat exchanger inlet 56 defines an opening through which the exhaust gas exits the exhaust passage 32 and enters the heat exchanger passage 54. In one example, the heat exchanger inlet 56 can include an opening, aperture, or the like. The heat exchanger inlet 56

is attached to the exhaust outlet 42, such that exhaust gas can flow through the exhaust outlet 42 and into the heat exchanger inlet 56. The heat exchanger inlet 56 and exhaust outlet 42 can be attached in any number of ways, including mechanical fasteners (threading attachment, nuts and bolts, etc.), welding, adhesives, etc.

[0033] The heat exchanger 52 can further include one or more fins 58. The fins 58 each define a substantially planar surface that extends outwardly (e.g., radially) from an outer surface of the heat exchanger 52. While the fins 58 are shown to extend in a substantially parallel orientation, it is to be appreciated that the fins 58 can include any number of constructions and can extend in a number of different directions. The fins 58 can extend along a direction that is substantially transverse to the direction of the exhaust gas flow path 40, though other directions are envisioned. The fins 58 include a number of different materials, including aluminum, steel, metals, etc. The fins 58 can be attached to the heat exchanger passage 54 in any number of ways, such as by welding, or the like.

[0034] The fins 58 assist in increasing the rate of heat transfer between the exhaust gas and incoming air that enters the oven 10. In particular, the exhaust gas that flows through the heat exchanger passage 54 is at an elevated temperature. The exhaust gas flowing through the heat exchanger passage 54 can heat the heat exchanger passage 54 and fins 58, thus transferring heat from the exhaust gas and to the fins 58. As will be explained in more detail below, the incoming air can flow in proximity to and/or in contact with the fins 58 and the heat exchanger passage 54, such that the incoming air is heated. Therefore, it is to be understood that the heat exchanger 52, as part of the fluid treatment structure 50, will alter the characteristics of the exhaust gas flowing through the heat exchanger by cooling off (e.g., reducing the temperature of) the exhaust gas.

[0035] The heat exchanger 52 further includes a heat exchanger outlet 60. The heat exchanger outlet 60 is positioned at a downstream end of the heat exchanger passage 54. The heat exchanger outlet 60 defines an opening through which the exhaust gas exits the heat exchanger 52. In one example, the heat exchanger outlet 60 can include an opening, aperture, or the like, formed at an end of the heat exchanger passage 54.

[0036] The venting assembly 30 further includes an exhaust outlet 62 (shown in FIGS. 2 and 3). The exhaust outlet 62 is in fluid communication with the heat exchanger outlet 60, such that the exhaust outlet 62 receives exhaust gas from the heat exchanger passage 54. In particular, the exhaust outlet 62 can be attached to the heat exchanger outlet 60 in any number of ways, including, but not limited to mechanical fasteners (threading connection, nuts and bolts, etc.), welding, etc. In further examples, the exhaust outlet 62 can

be integrally formed with the heat exchanger outlet 60, such that the heat exchanger outlet and exhaust outlet 62 comprise a single piece structure.

[0037] The exhaust outlet 62 can extend in a substantially vertical direction along the rear wall 22. The exhaust outlet 62 defines a passageway through which the exhaust gas can exit the venting assembly 30 and oven 10. For example, the exhaust gas can flow through the exhaust outlet 62 from a lower position to an upper position. The exhaust gas can exit the exhaust outlet 62 through an exhaust opening 64 located at the upper position of the exhaust outlet 62. It is to be understood that the exhaust outlet 62 shown in FIGS. 2 and 3 comprises merely one possible example, as the exhaust outlet 62 can include a number of different sizes, shapes, and structures. For example, the exhaust outlet 62 is not limited to the generally vertical shape, and in further examples, could extend horizontally and/or could include one or more curves, bends, undulations, or the like. Similarly, the exhaust outlet 62 is not limited to extending along the rear wall 22 (e.g., attached to the rear wall 22), and could instead extend along side walls of the oven enclosure 12.

[0038] Referring now to FIG. 4, the operation of the venting assembly 30 in the oven 10 is described. It is to be appreciated that FIG. 4 generically/schematically depicts the oven 10 for illustrative purposes and for ease of explanation. Initially, a user sets a temperature for the oven cavity 18, such as by using a user interface, controller, etc. Once the temperature is set, the heating assembly 20 will turn on, and remains on until the pre-set temperature is reached in the oven cavity 18. The heating assembly 20 receives fresh air from a location exterior of the oven 10 through the air inlet 66. In particular, a fresh air flow 68 passes through the air inlet 66, whereupon the fresh air flow 68 can be heated, combusted, or the like, to heat the oven cavity 18. Once the pre-set temperature within the oven cavity 18 is reached, the heating assembly will turn off. The heating assembly 20 cycles on and off as heat is needed to maintain the temperature within the oven cavity 18.

[0039] The venting assembly 30 selectively vents exhaust gas from the oven cavity 18 to improve efficiency. In particular, when the heating assembly 20 is turned on, the venting assembly 30 operates to vent exhaust gas from the oven cavity 18. The fan 37 can turn on, thus drawing exhaust gas from the oven cavity 18 and through the exhaust inlet 34. The exhaust gas flows through the exhaust passage 32, past the fan, and towards the exhaust outlet 42. The exhaust gas then exits the exhaust passage 32 through the exhaust outlet 42, whereupon the exhaust gas will enter the heat exchanger 52. The exhaust gas enters the heat exchanger 52 through the heat exchanger inlet 56, flows through the heat exchanger passage 54, and exits the heat exchanger 52 through the heat exchanger outlet 60.

[0040] As the exhaust gas flows through the heat exchanger passage 54, heat from the exhaust gas is conducted to the heat exchanger fins 58, thus heating up the heat exchanger fins 58. This heat transfer increases efficiency of the oven 10 in a number of ways. First, the exhaust gas is cooled due to the heat transfer to the heat exchanger fins 58. As such, the exhaust gas exits the exhaust outlet 62 at a relatively lower temperature than the exhaust gas flowing from the oven cavity 18 through the exhaust inlet 34. Accordingly, the kitchen temperature remains cooler since the exhaust gas exiting the exhaust outlet 62 into the kitchen is at a lower temperature.

[0041] The heat exchanger 52 is not limited to the aforementioned efficiency increase. In addition, the heat exchanger 52 is positioned adjacent the air inlet 66. By being positioned between the air inlet 66 and the heating assembly 20, the heat exchanger 52 will contact the fresh air flow 68. In particular, incoming fresh air first flows through the air inlet 66, and then through the heat exchanger fins 58 prior to reaching the heating assembly 20. The incoming air can therefore be heated by the heat exchanger fins 58 and heat exchanger passage 54. As such, the incoming fresh air, after flowing through the heat exchanger 52, is relatively warmer. The temperature difference between the heated incoming fresh air and a target heating temperature is therefore decreased, since the incoming fresh air has been heated. This difference between the heated incoming fresh air and the room temperature can be equal to the newly gained efficiency of the oven 10.

[0042] Referring now to FIG. 5, a second example oven 110 is shown. In this example, the second oven 110 can include an electric oven. In particular, the heating assembly 20 includes an electric heating assembly, such as an electric resistance heater. It is to be appreciated that at least some of the structure of the second oven 110 can be similar and/or identical to the structure described above with respect to the oven 10 shown in FIG. 1. For example, the second oven 110 includes the oven enclosure 12, walls 14, oven door 16, oven cavity 18, and heating assembly 20. As such, these structures can be generally identical to the example shown in FIG. 1.

[0043] As with the oven 10 shown in FIG. 1, the second oven 110 can include a venting assembly 130. The venting assembly 130 is attached to the rear wall 22 of the oven enclosure 12. The venting assembly 130 is in fluid communication with the oven cavity 18. In particular, exhaust gas exits the oven cavity 18 and passes through the venting assembly 30. As will be described in more detail below, the venting assembly 30 can improve the efficiency of the second oven 110 by controlling the exhaust gas exiting the oven cavity 18.

[0044] The venting assembly 130 includes an exhaust passage 132. The exhaust passage 132 is a substantially hollow conduit defining an exhaust gas flow path through which the exhaust gas passes. The exhaust passage 132 includes any number of different structures through which the exhaust gas can pass, including, but not limited to, tubes, hoses, ducts, pipes, etc.

[0045] The exhaust passage 132 includes an exhaust inlet 134. The exhaust inlet 134 defines an opening through which the exhaust gas exits the oven cavity 18 and enters the exhaust passage 132. In one example, the exhaust inlet 134 includes an opening, aperture, or the like formed in one of the walls 14 of the oven enclosure 12. In the shown example of FIG. 5, the exhaust inlet 134 is positioned at an upper wall of the oven enclosure 12 above the oven cavity 18. In such an example, as hot air (e.g., exhaust gas) in the oven cavity 18 rises, the exhaust gas passes through the exhaust inlet 134 and enters the exhaust passage 132. While the exhaust inlet 134 is shown to be positioned at the upper wall in proximity to the rear wall, it is to be understood that the exhaust inlet 134 could similarly be positioned at any number of locations within the second oven 110. For example, the exhaust inlet 134 could be positioned at the rear wall, at side walls, etc. Further, the exhaust inlet 134 defines an opening of nearly any size.

[0046] Downstream from the exhaust inlet 134, the exhaust passage 132 further includes a flow control device 136. The flow control device 136 is positioned within the exhaust passage 132. The flow control device 136 is somewhat generically depicted in FIG. 5, as the flow control device 136 includes a number of structures that selectively restrict/allow the passage of exhaust gas through the exhaust passage 132. For example, the flow control device 136 can include valves, pumps, etc. In a further example, the flow control device 136 could include a fan. The fan can be selectively actuated (i.e., turned on/off) to draw air into the exhaust passage 132. In one example, the fan could be similar and/or identical to the fan 37 described with respect to FIGS. 1 to 4. Of course, it is to be appreciated that any number of fans or flow moving devices are envisioned.

[0047] The venting assembly 130 further includes a fluid treatment structure 150. The fluid treatment structure 150 is disposed downstream from the flow control device 136. The fluid treatment structure 150 is in fluid communication with the exhaust passage 132, such that the fluid treatment structure 150 receives exhaust gas from the exhaust passage 132. It is to be appreciated that the fluid treatment structure 150 is somewhat generically shown in FIG. 5, as the fluid treatment structure 150 can include a number of different structures and

constructions. For example, while the fluid treatment structure 150 could include the heat exchanger described above with respect to FIGS. 1 to 4, it is not limited to such a structure.

[0048] The fluid treatment structure 150 can include a catalyst 152. The catalyst 152 can be disposed within the exhaust passage 132, such that the catalyst 152 is in fluid communication with the oven cavity 18. The catalyst 152 can include any number of materials that may reduce or eliminate odors that are present in the exhaust gas. In one example, the catalyst 152 can be heated so as to operate more effectively. The exhaust gas will flow through the catalyst 152, such that certain materials, odors, etc. are filtered by the catalyst 152. After passing through the catalyst 152, the exhaust gas can then flow through an exhaust outlet 142. The exhaust outlet 142 is shown to be positioned in the rear wall of the oven enclosure 12, but in further examples, could be positioned in side walls, the top wall, etc.

[0049] The operation of the venting assembly 130 in the second oven 110 can now be described. Initially, the second oven 110 will be heated in a similar manner that the oven 10 is heated. That is, the user pre-sets a temperature and the heating assembly 20 turns on (and remains on) until the pre-set temperature is reached in the oven cavity 18. The heating assembly 20 will cycle on and off as heat is needed to maintain the temperature within the oven cavity 18.

[0050] During the baking process, food items can produce exhaust gases. These exhaust gases can include moisture from baking, smoke from grilling and/or soot from a self-clean cycle. The second oven 110 functions as a closed loop system, such that when no fresh air is required, the oven cavity 18 is effectively a sealed system in which the only heat losses are through the walls 14 and/or oven door 16. However, the second oven 110 may also require the exhaust gas, including the by-products of the baking process and the self-clean cycle, to be exhausted from the oven cavity 18.

[0051] Based on the presence of these gases, the venting assembly 130 can be turned on. In particular, the flow control device 136 can be opened to allow for the exhaust gas to exit the oven cavity 18 and enter the exhaust passage 132. The exhaust gas, including one or more of the aforementioned gases (e.g., CO, O₂, H₂O) passes through the exhaust passage 132 and through the catalyst 152. By passing through the catalyst 152, the exhaust gas can reduce and/or eliminate the odors from the exhaust gas. As such, the exhaust gas can exit the catalyst 152 and pass through the exhaust outlet 142, thereupon reentering the oven cavity 18. Accordingly, heat loss to the kitchen is reduced, since the exhaust gas remains either within the oven cavity 18 or within the venting assembly 130. The second oven 110 therefore

realizes an increase in energy efficiency at least for these reasons. It is to be appreciated that the catalyst 152, as part of the fluid treatment structure 150 will therefore alter the characteristics of the exhaust gas flowing through the exhaust passage 132. In particular, the catalyst 152 will remove odors from the exhaust gas and/or remove undesirable materials, such as by-products of the baking process or self-cleaning cycle.

[0052] Once any exhaust gases and/or byproducts of the combustion or self-clean cycle are isolated in the exhaust passage 132, the catalyst 152 reduces or eliminates smoke and/or odors in the exhaust passage 132. It is to be appreciated that the catalyst 152 can include any number of different structures or materials that reduce smoke and odors. For example, the catalyst 152 can include an active catalytic filter or plasma technology. However, it is to be appreciated that any number of different structures/materials can be provided within the exhaust passage 132 to reduce smoke and odors, and are not so limited to the active catalytic filter, or plasma technology described herein. In further examples, the catalyst 152 may be optional, and could be replaced with other smoke and odor reducing materials.

[0053] The invention has been described with reference to the example embodiments described above. Modifications and alterations will occur to others upon a reading and understanding of this specification. Examples embodiments incorporating one or more aspects of the invention are intended to include all such modifications and alterations insofar as they come within the scope of the appended claims.

Claims

What is claimed is:

1. An oven, including:
 - an oven enclosure including a plurality of walls defining an oven cavity, the oven enclosure including an oven door for accessing the oven cavity; and
 - a venting assembly in fluid communication with the oven cavity, the venting assembly including:
 - an exhaust passage defining a flow path through which exhaust gas flows from the oven cavity;
 - a flow control device operatively coupled to the exhaust passage, the flow control device configured to selectively restrict the passage of the exhaust gas through the exhaust passage; and
 - a fluid treatment structure disposed downstream from the flow control device, the fluid treatment structure configured to alter characteristics of the exhaust gas flowing through the exhaust passage.
2. The oven of claim 1, wherein the venting assembly is attached to at least one of the walls of the oven enclosure.
3. The oven of claim 2, wherein the fluid treatment structure includes a heat exchanger and the flow control device includes a fan.
4. The oven of claim 3, wherein the characteristics of the exhaust gas include a temperature of the exhaust gas.
5. The oven of claim 2, wherein the fluid treatment structure includes a catalyst and the flow control device includes a valve.
6. The oven of claim 5, wherein the characteristics of the exhaust gas include odors from the exhaust gas.

7. An oven, including:
 - an oven enclosure including a plurality of walls defining an oven cavity, the oven enclosure including an oven door for accessing the oven cavity;
 - an exhaust passage in fluid communication with the oven cavity; and
 - a heat exchanger in fluid communication with the exhaust passage, wherein the exhaust gas flows through the heat exchanger, the heat exchanger being positioned in proximity to an air inlet of the oven enclosure such that the heat exchanger is configured to heat fresh air passing through the air inlet.
8. The oven of claim 7, further including a heating assembly.
9. The oven of claim 8, wherein the heat exchanger is positioned between the air inlet on one side and the heating assembly on an opposing second side, such that the fresh air passing through the air inlet is configured to be heated by the heat exchanger prior to reaching the heating assembly.
10. The oven of claim 9, wherein the exhaust gas flowing through the heat exchanger is configured to be cooled by the fresh air passing by the heat exchanger.
11. The oven of claim 10, wherein the exhaust gas entering the heat exchanger through a heat exchanger inlet is at a higher temperature than the exhaust gas exiting the heat exchanger through a heat exchanger outlet.
12. The oven of claim 9, wherein the heat exchanger includes a plurality of fins extending in a direction that is transverse to a direction of along which the exhaust gas flows through the heat exchanger.
13. The oven of claim 7, wherein the exhaust passage includes an exhaust inlet disposed at an upper wall of the oven enclosure, the exhaust inlet defining an opening through which the exhaust gas exits the oven cavity and enters the exhaust passage.
14. The oven of claim 7, wherein the heat exchanger includes a heat exchanger passage through which the exhaust gas is configured to flow.

15. The oven of claim 14, wherein the heat exchanger passage includes at least one bend.
16. An oven, including:
 - an oven enclosure including a plurality of walls defining an oven cavity; and
 - a venting assembly attached to the oven enclosure and in fluid communication with the oven cavity, the venting assembly including:
 - an exhaust passage defining a closed loop flow path through which exhaust gas flows from the oven cavity and into the exhaust passage;
 - a flow control device positioned within the exhaust passage, the flow control device selectively restricting the passage of the exhaust gas through the exhaust passage; and
 - a catalyst disposed within the exhaust passage downstream from the flow control device, the catalyst being configured to alter characteristics of the exhaust gas flowing through the exhaust passage.
17. The oven of claim 16, wherein the characteristics of the exhaust gas that the catalyst is configured to alter include reducing a presence of smoke and odors from the exhaust gas.
18. The oven of claim 16, wherein the exhaust passage includes an exhaust outlet disposed at a rear wall of the oven enclosure, wherein the catalyst is positioned between the flow control device and the exhaust outlet.
19. The oven of claim 16, wherein the exhaust passage includes an exhaust inlet disposed at an upper wall of the oven enclosure, wherein the flow control device is positioned between the exhaust inlet and the catalyst.

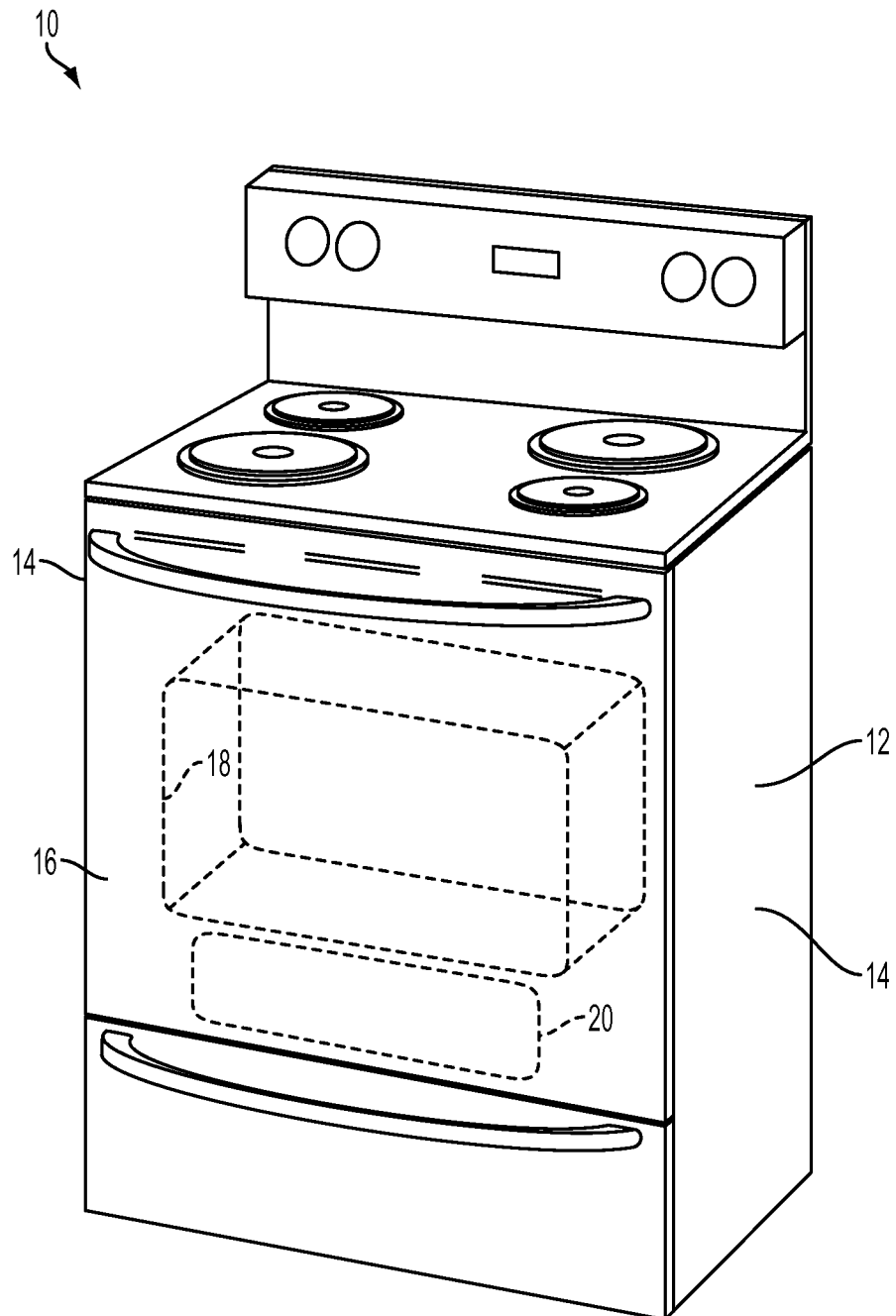


FIG. 1

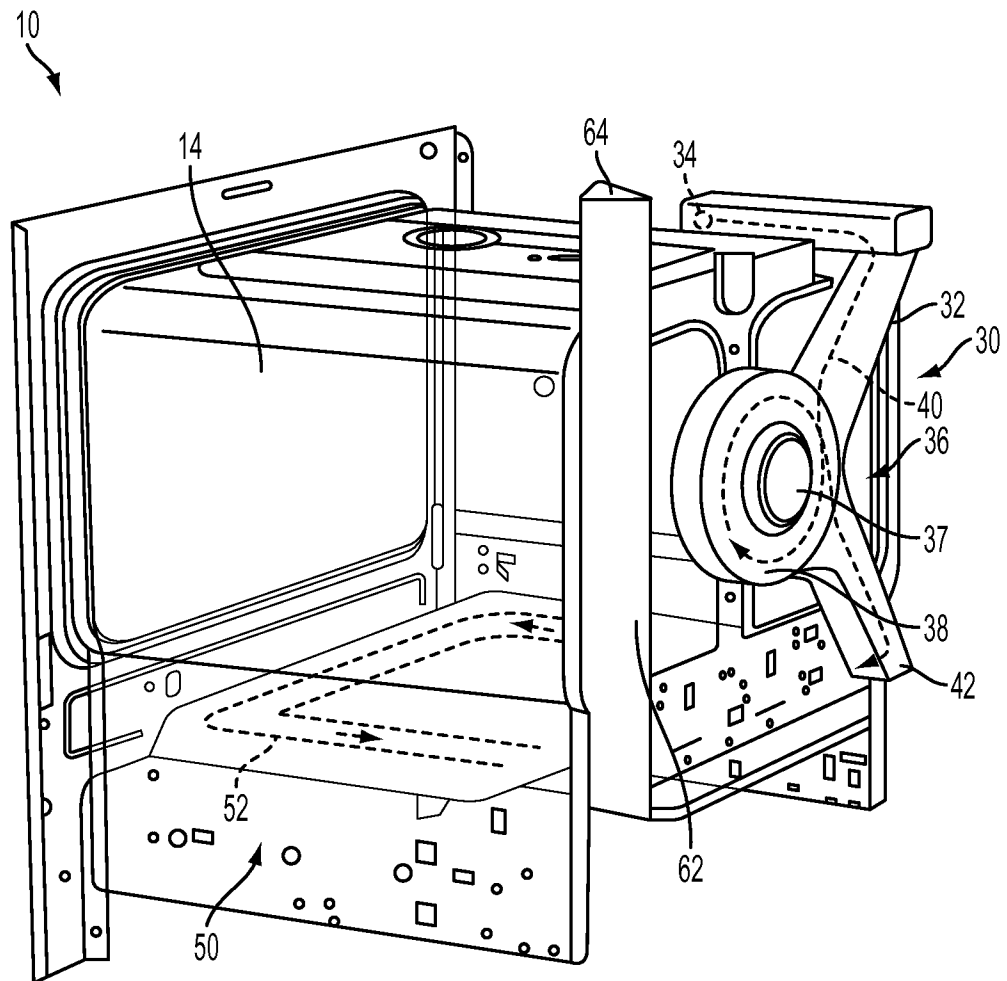


FIG. 2

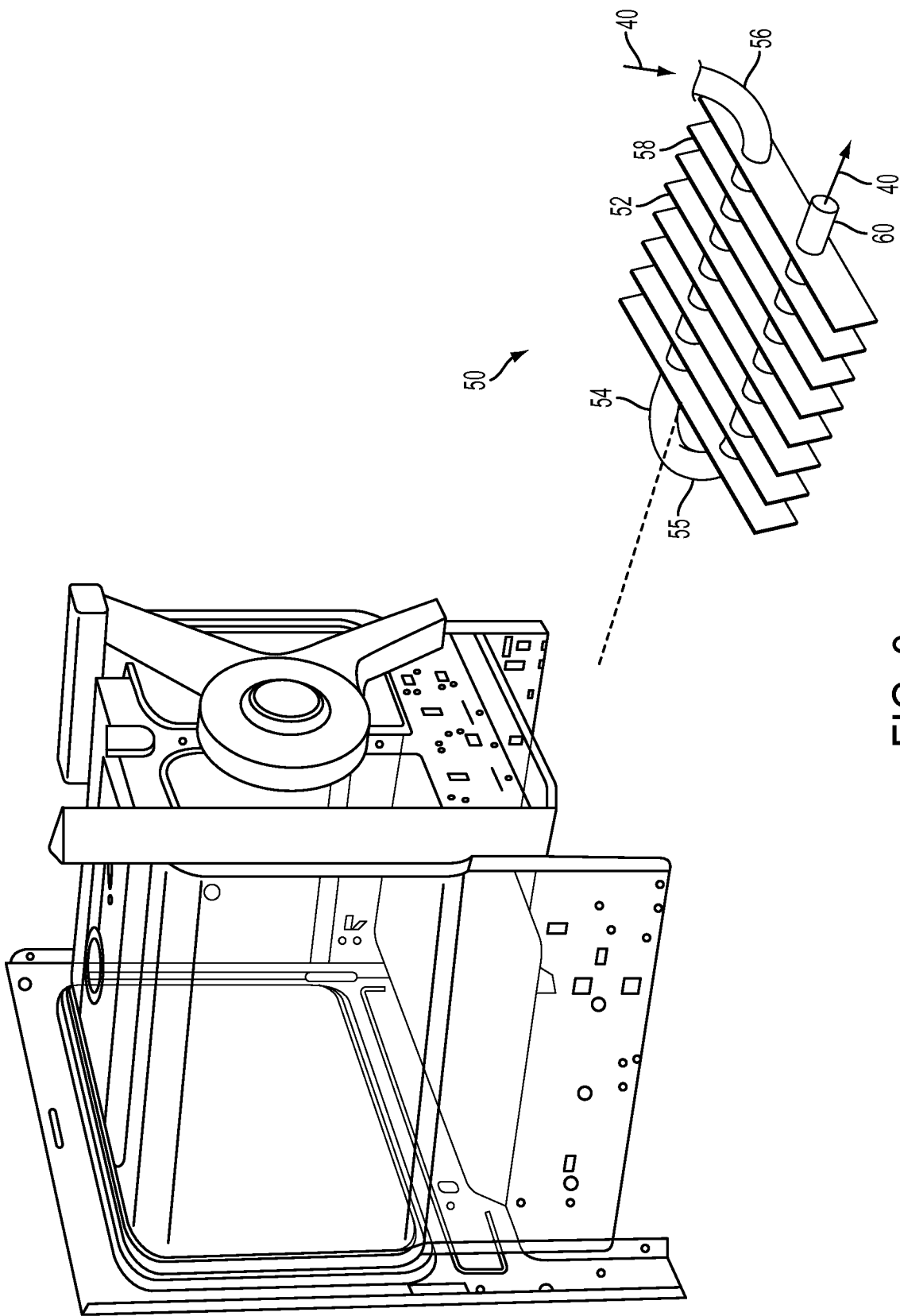


FIG. 3

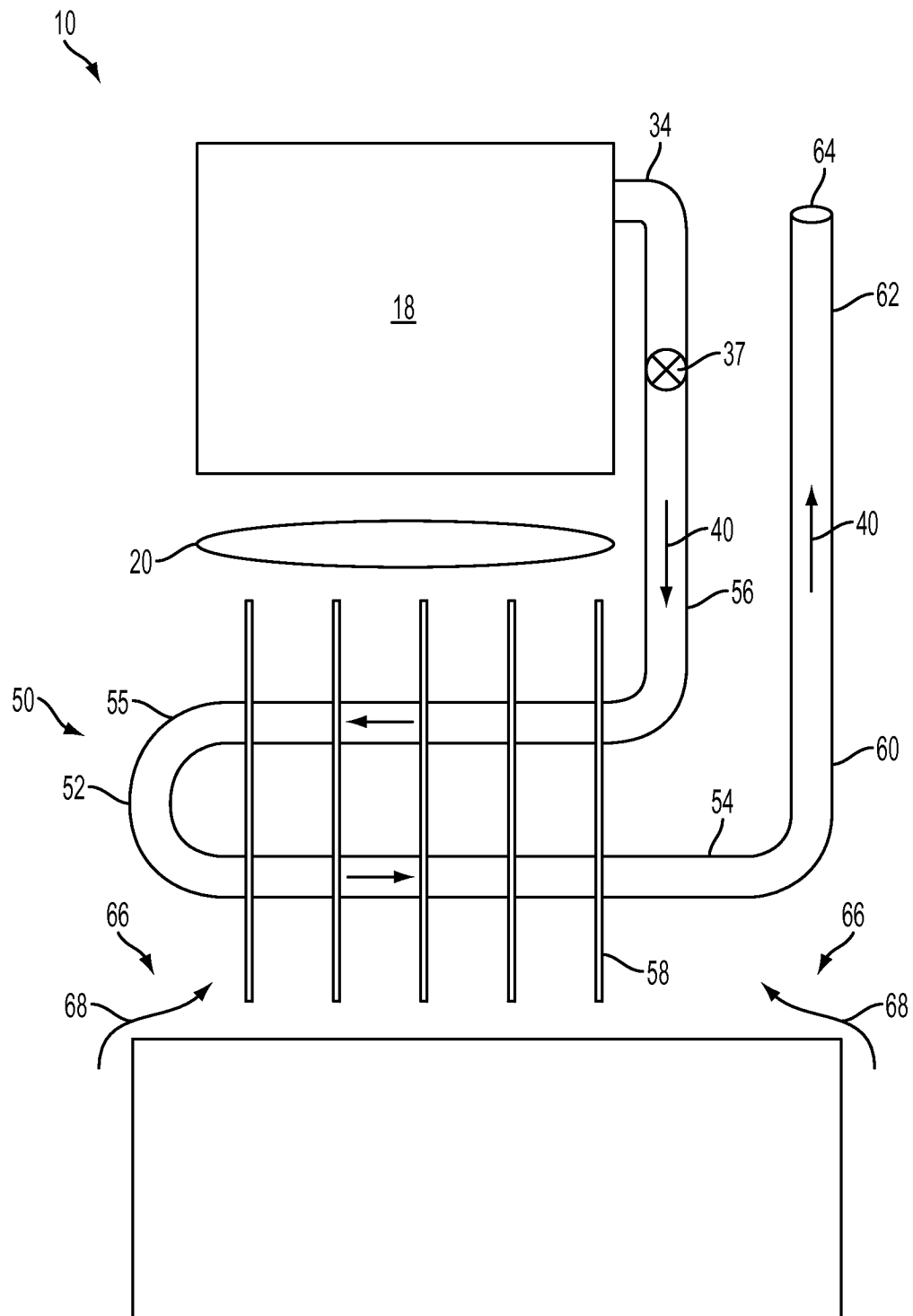


FIG. 4

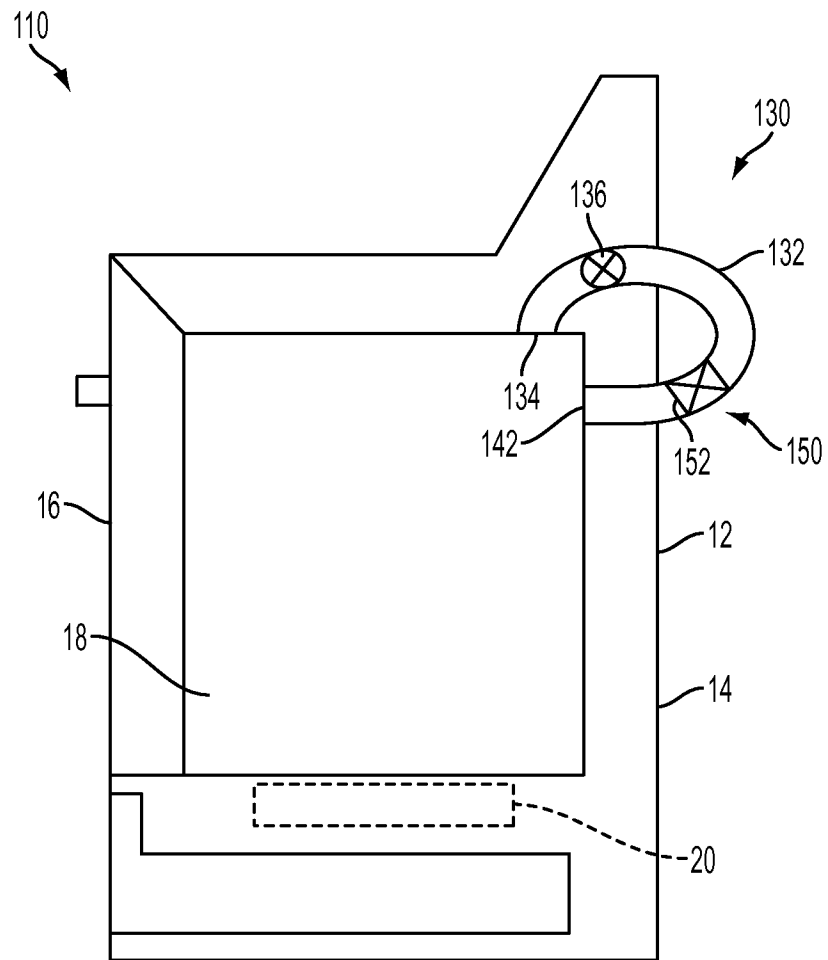


FIG. 5