

[54] **VENT FOR A SELF-CLEANING OVEN**
 [72] Inventors: **James E. Davis; Harold L. Frick**, both of Marion, Ohio
 [73] Assignee: **Whirlpool Corporation**
 [22] Filed: **Dec. 15, 1970**
 [21] Appl. No.: **98,290**
 [52] U.S. Cl. **126/21 R, 126/273 A**
 [51] Int. Cl. **F24c 15/32**
 [58] Field of Search.....**126/21 R, 21 A, 19, 39 C, 273 R, 126/273 A**

3,499,430 3/1970 Kemp.....126/21 R
 3,548,152 12/1970 Klepzig.....126/21 R X

FOREIGN PATENTS OR APPLICATIONS

1,032,763 6/1966 Great Britain126/21 R

Primary Examiner—Charles J. Myhre
Attorney—James S. Nettleton, Thomas E. Turcotte, Burton H. Baker, Gene A. Heth, Franklin C. Harter, Anthony Niewyk, Robert L. Judd and Hofgren, Wegner, Allen, Stellman & McCord

[56] References Cited

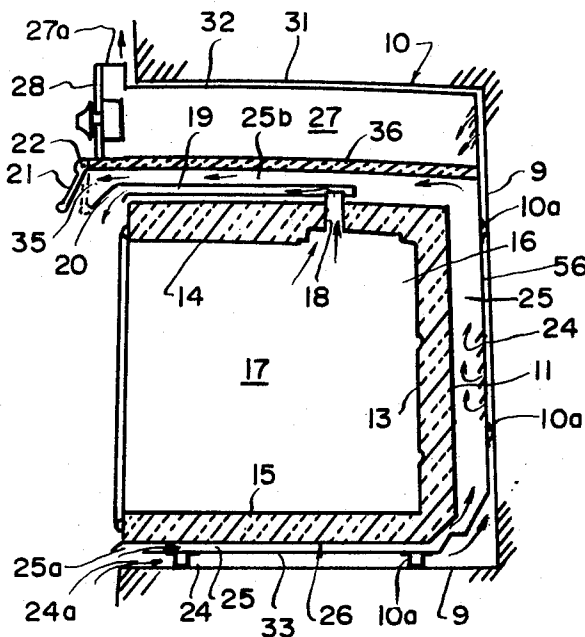
UNITED STATES PATENTS

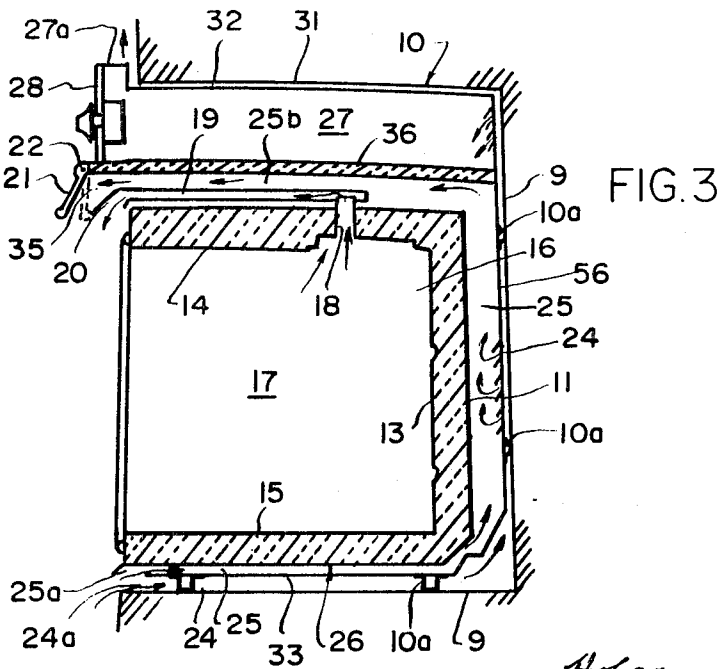
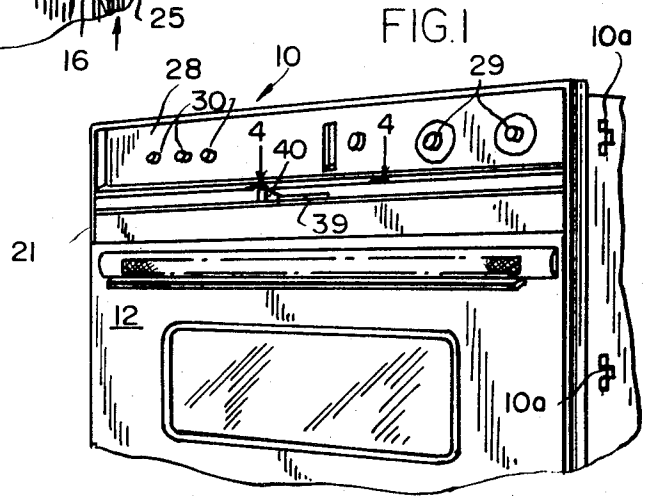
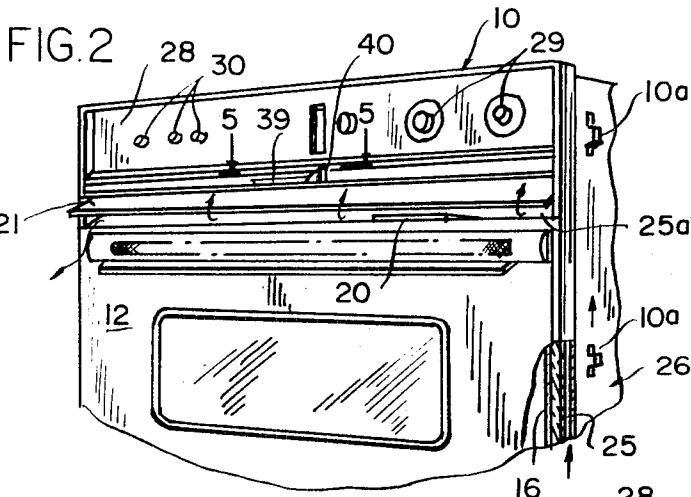
2,839,044 6/1958 Phares.....126/273 A X
 3,150,655 9/1964 Saponara126/21 R
 3,310,046 3/1967 Scott et al.....126/21 A
 3,480,000 11/1969 Torrey et al.....126/21 A X

[57] ABSTRACT

A vent structure for venting an air space around the cavity of a self-cleaning oven in which food is cooked with the vent structure including a movable damper movable between a relatively closed first position for restricting air flow through the air space during the cooking and an open second position to facilitate flow of cooling air through the space during the high temperature self-cleaning burn off of the food soil deposits.

10 Claims, 7 Drawing Figures





INVENTORS.
 JAMES E. DAVIS
 HAROLD L. FRICK

BY *Hofgren, Wegner, Allen,*
Stellman & McCord.
 ATTORNEYS.

FIG.4

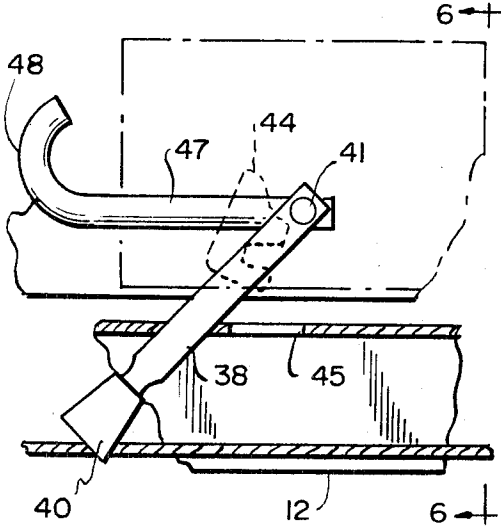


FIG.5

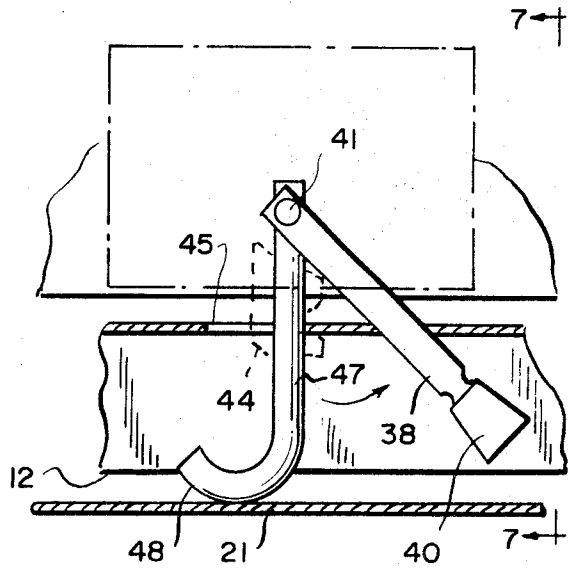


FIG.6

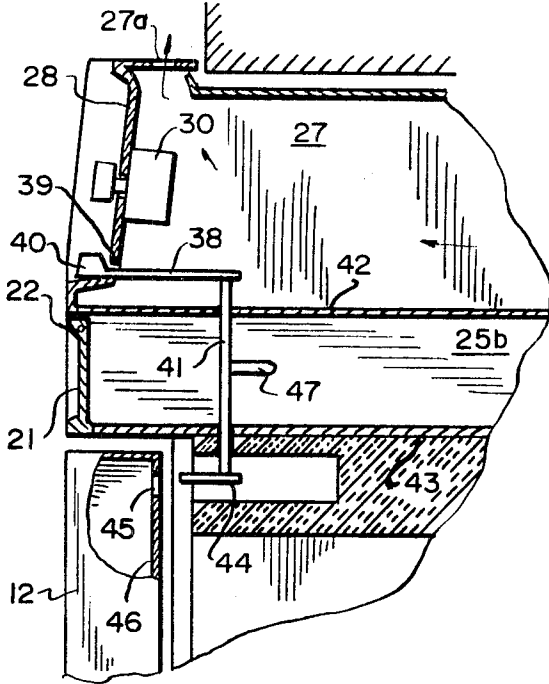
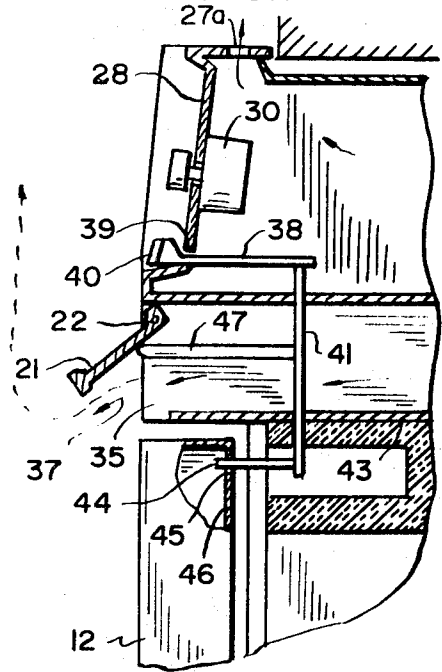


FIG.7



VENT FOR A SELF-CLEANING OVEN

FIELD OF THE INVENTION

One of the features of this invention is to provide in a self-cleaning food cooking oven in which food deposits on the walls of the oven are burned therefrom means for controlling venting of the outer shell of the oven including a movable damper and means for opening the damper for maximum cooling air flow during the self-cleaning cycles and for restrictively closing the damper during ordinary cooking cycles.

Another feature of the invention is to provide means for venting an air space around the oven for cooling the oven and for concurrently latching the oven door prior to initiation of a self-cleaning cycle in the oven.

Still another feature of the invention is to provide an air flow means for flowing air in contact with the exterior of the walls defining the cooking space for cooling the same and for directing the resulting heated air through an air exit.

A specific feature is to provide in the structure means for arranging the open damper between the existing heated air during the self-cleaning cycles and the oven control knobs for protecting them against excessive heat.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view of a built-in self-cleaning oven embodying the invention, in this view the movable damper is in closed position.

FIG. 2 is a view similar to FIG. 1 but with the damper or vent cover in open position, and with a portion of the oven and door removed to illustrate details.

FIG. 3 is a semi-schematic view illustrating the cooling air and heated gas air flow paths in the illustrated embodiment of the invention.

FIG. 4 is a fragmentary enlarged sectional plan view taken substantially along line 4-4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4 but taken along line 5-5 of FIG. 2.

FIG. 6 is a vertical sectional view taken substantially along line 6-6 of FIG. 4.

FIG. 7 is a view similar to FIG. 6 but taken along line 7-7 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As is illustrated in FIGS. 1 and 2 of the drawings, the preferred embodiment of the invention comprises a built-in oven 10 having an insulated self-cleaning food cooking oven structure 11 that is normally closed by a door 12.

As is illustrated in FIG. 3, the oven structure 11 comprises a liner having walls 13, 14 and 15 as well as side walls 16 forming an oven cavity defining a cooking oven 17. As is shown by the sectional view through the rear, top and bottom walls 13, 14 and 15 of FIG. 3 all walls are preferably insulated against heat losses.

As is customary in self-cleaning food cooking ovens the walls that define the cooking oven 17 are periodically heated by means that are not shown here because they form no part of the present invention in order to burn off food soil deposits accumulated during the cooking. In such ovens, during the heat cleaning operation the temperature is raised to a maximum somewhere between about 750°F. and about 950°F. for removing the food soil and grease spatter that accumulates on the walls of the oven liner during normal cooking.

As is illustrated most clearly in FIG. 3, the oven walls 13-16 are spaced from a housing 26 for the built-in oven 10 to define an air space having cooling air passageways 25 extending substantially around the oven structure 11. These passageways 25 are for flowing air in contact with the exterior of the walls 13-16 of oven structure 11 for cooling these walls especially during the self-cleaning cycles.

The duct system formed by the passageways 25 is provided with movable damper means shown in the illustrated embodiment as a hinged exit cover 21 that is mounted for arcuate movement at its top about a pair of horizontally aligned end hinge pins 22 as illustrated most clearly in FIGS. 6 and 7.

This damper means duct exit cover 21 is movable between a first position shown in solid line in FIGS. 1 and 6, and shown in broken line in FIG. 3, for restricting air flow through the passageways 25 during the cooking, and a second position shown in FIGS. 2, 3, 5 and 7 for opening the duct system to vent the passageways 25 for greatly increased cooling air flow around the bottom, back, sides and top of oven structure 11 during the high temperature burning of the food deposits in the self-cleaning cycles.

As is shown in FIG. 3, the built-in oven 10 is normally mounted in a suitable recess or cavity formed in a wall structure indicated at 9, which typically may be a wood cabinet structure. The built-in oven 10 may advantageously be provided with a plurality of foot-like projections 10a to space built-in oven 10 from the wall structure indicated at 9, thereby forming an air duct 24 extending around the bottom, back, sides and top of built-in oven 10. An air inlet 25a for air passageways 25 is formed between the lower front edge of built-in oven 10 and the supporting wall or cabinet structure indicated at 9a, as shown in FIG. 3. Duct 24, as shown, is separated from the exterior surfaces of the oven structure 11 by the inner air passageways 25. The inlet for duct 24 is indicated at 24a in FIG. 3. The air in the duct 24 after being directed upwardly along the back 56 of the built-in oven 10 exhausts into and flows through a top space 27 whose front is defined by a top panel 28 carrying the various oven controls 29 and 30 and exits from a relatively long horizontally extending series of openings 27a formed along the top edge of panel 28.

This air flow means therefore not only serves to insulate the oven structure 11 from the top 31 of the built-in oven 10 but also the air in flowing around the controls 29 and 30 to the exterior by way of the normal leakage paths cools these controls.

The cooling air passageways 25 are separated from the duct 24 by a surrounding wall 33 forming part of housing 26 so that the air in the passageways 25 flows in direct contact with the outer surfaces of the insulated oven structure 11 and then flows through a horizontal passage 25b that overlies the duct section 19 and exits at an air outlet indicated at 35 when the duct cover 21 is in open position as shown in FIGS. 2, 3, 5 and 7. The top of this cooling air passage 25b is defined by an insulated wall 36 that also defines the bottom of the top space 27. From the foregoing it will be appreciated that the present invention provides air passage means for insulating and protecting the wall structure 9 supporting the built-in oven 10 from the high temperatures generated in cooking oven 17 during a heat cleaning operation in oven 17.

The cooking oven 17 is vented by means of a duct 18 shown in FIG. 3, that is directed upwardly through the top wall 14 and that has a forward duct section 19 provided with an exit 20, shown in FIGS. 2 and 3, at the front of the oven for venting the gases and vapors generated in the cooking oven to the exterior of the oven.

The present invention provides means for a controlled venting of the cooling air passageways 25 defined by the outer shell or housing 26 of the oven 17 actuated concurrently with operation of a latch means to latch the oven door 12 and hold it closed during the high temperature cleaning cycle of the oven 17. To this end, the operating means for the illustrated embodiment of the invention includes a lever operating system for operating the damper means 21 to open position at the same time the latch means for the oven is moved to door engaging position to hold the oven door closed upon initiation of the self-cleaning cycle for the oven.

The lever operating system for the illustrated embodiment of the invention is illustrated in detail in the sectional views of FIGS. 4-7. As illustrated, the controls include a movable lever 38 which may advantageously project forwardly through a slot 39 at the bottom of the top panel 28 and have an exterior handle 40 for moving the lever 38 in a horizontal arc.

The rear end of this lever 38 is within the forward portion of the air space 27 and is attached to a vertical axle 41 that extends through the top and bottom walls 42 and 43 defining the heated air duct section 25b.

The bottom of this axle 41 beneath the bottom wall 43 carries a door latch 44 with a hook end arranged to engage catch means provided on said door comprising an edge portion of an opening 45 formed in door 12 to hold the door 12 closed during the self-cleaning cycles in the manner illustrated most clearly in FIGS. 5 and 7. This type of latch is shown in U.S. Pat. No. 3,476,424. The catch means or opening 45 in the illustrated embodiment is provided in a rear panel 46 forming a part of the oven door 12. Such safety arrangements as the latch 44 and catch means 45 are customarily provided in self-cleaning ovens in order that the door will not be accidentally opened during the self-cleaning cycles when the interior of the oven is subjected to intense heat in order to burn off the food deposits rapidly and efficiently.

The axle 41 which as described is arcuately movable about its central vertical axis also carries a rod 47 having an outer end curved to provide a cam surface 48. This rod is angularly arranged with respect to the lever 38 so that when the lever handle 40 is moved to the extreme left of its motion confining slot 39 as illustrated in FIGS. 1, 4 and 6 the rod 47 is out of engagement with the damper or duct exit cover 21 so that urging springs (not shown) hold it closed as illustrated. This is the normal position during the customary use of the cooking oven space 17 for a cooking operation.

Then, on initiation of a self-cleaning cycle the lever 38 is pushed to the extreme right in its slot 39 as illustrated in FIG. 2 with the result that the rod 47 engages the damper 21 and moves it to open position as shown in FIGS. 2, 5 and 7 and at the same time moves the latch 44 into engagement with the door 12 to prevent its being accidentally opened.

As described previously, the controls 29 and 30 that are located at the front of the top space 27 are protected from the exiting heated air and hot gases and vapors during the self-cleaning oven cycles by a combination of the overlying cooling air passage 25b, the insulated wall 36, and the cooling air in the air space or chamber 27.

The control knobs of controls 29 and 30 are further protected from the heated air and hot gases and vapors during self-cleaning that are indicated by the arrows 37 by the directing of the heated air and hot gases outward away from the oven by the open cover 21 as illustrated in FIGS. 2, 3 and 7. As mentioned previously, the hinge pins 22 for the cover are located at the top thereof so that when the cover is open during the self-cleaning cycles it also is arranged to direct the exiting heated air and gases outward away from the controls. The result is that during all periods of operation of the oven including the self-cleaning cycles the controls are maintained relatively cool.

As can be seen from the above description the invention here provides increased cooling air flow around the oven during self-cleaning cycles of the oven ensuring protection against heat damage to the operating controls of the oven during the heat cleaning cycle, and protection against high temperatures for the wall structure enclosing the built-in oven. In addition, the invention provides an automatically operated latch that prevents opening of the oven door during the self-cleaning cycles.

Having described our invention as related to the embodiment shown in the accompanying drawings, it is our intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A self-cleaning food cooking oven, comprising: wall means defining a housing for said cooking oven; an oven liner having walls forming an oven cavity disposed in said housing defining a cooking oven that is heated during self-cleaning cycles to temperatures capable of burning food deposits from the walls of said oven with resultant development of elevated temperatures in said oven, said oven having an access opening and being spaced from said housing to define an air space hav-

ing cooling air passageways extending substantially around said oven providing air flow means for flowing air in contact with the exterior of said oven for cooling the same and for directing the resulting heated air through an air outlet to the exterior of the oven; means forming an air inlet for said air space; means forming an air outlet for said air space; a movable door for normally closing the access opening to said oven; a movable latch means on the oven for latching said door and holding it closed during a self-cleaning cycle in said oven; and means for venting said air space and for concurrently operating said latch means to latch said door and hold it closed prior to initiation of a self-cleaning cycle in said oven thereby to maximize cooling air flow around said oven and prevent the opening of said door during the self-cleaning cycle.

2. The oven of claim 1 wherein there are provided an upper chamber means above said oven containing operating controls for the oven and said air flow means includes a section exhausting into said controls containing chamber.

3. The oven of claim 1 wherein said venting means includes a movable damper means over said outlet movable between a first position for restricting air flow through said outlet during said cooking and a second position for opening said damper to vent heated air from said passageways during said cleaning thereby to facilitate cooling of portions of said oven; and operating means for moving said damper means to a selected said position.

4. The oven of claim 3 wherein there are provided operating controls for said oven located adjacent said outlet and means are provided for mounting the movable damper means so as to arrange it between the outlet and controls when the damper is in said second position in order to protect the controls from said heated air.

5. The oven of claim 3 wherein there are provided means operably connecting the latch means and said operating means for moving the latch to door engaging position when the damper is moved to said second position.

6. The oven of claim 3 wherein said operating means comprises a fulcrum member pivoted about an axis for moving said latch, said fulcrum member carrying a damper opening lever for movement about the same axis and engaging the damper for movement between said first and second positions.

7. The oven of claim 6 wherein said damper opening lever provides a cam surface which is out of engagement with said damper when said damper is in said first position and in engagement with said damper when said damper is in said second position.

8. The oven of claim 3 wherein catch means are provided on said door engaged by said latch means for retaining the door closed when the operating means has been moved to move the damper means to said second position, thereby preventing the opening of said door during said self-cleaning cycles.

9. The oven of claim 3 wherein there are provided operating controls for said oven located adjacent said outlet and means are provided for mounting the movable damper means so as to arrange it between the outlet and controls when the damper is in said second position in order to protect the controls from said heated air, and an upper chamber means above said oven containing operating controls for the oven and said air flow means includes a section exhausting into said controls containing chamber.

10. A self-cleaning food cooking oven, comprising: wall means defining a housing for said cooking oven; an oven cavity liner disposed in said housing defining a cooking space that is heated during self-cleaning cycles to temperatures capable of burning food deposits from the walls of said liner with resultant development of elevated temperatures in said cooking oven, said liner being spaced from said housing to define an air space having cooling air passageways extending substantially around said liner providing air flow means for flowing air in contact with the exterior of said liner for cooling the same and for directing the resulting heated air through an outlet to the exterior of the oven; air inlet means for said air space; means forming an air outlet for said space; a movable

damper means over said outlet movable between a first position for restricting air flow through said outlet during said cooking and a second position for opening said damper to vent heated air from said passageways during said cleaning thereby to facilitate cooling of portions of said oven; and operating 5 means for moving said damper means to a selected said position.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65

70

75