ABSTRACT: Windowed high-temperature ovens including self-cleaning ovens and the like, and windowed doors for those ovens, and window assemblies for installation in such ovens, where the window assembly has at least three spaced parallel glass window panels secured in alignment with two of such panels near the oven cavity enclosing a dead-air or insulating space, and a third of such glass window panels separated from the oven cavity by two dead-air space enclosing glass panels, with the space between the third panel and the two dead-air enclosing panels being ventilated for replacement of heated air therein by cooler air, and a thin semitransparent see-through through metal reflector disposed in the ventilated air space to reflect substantial proportions of radiant oven heat and to be cooled by air wash during such ventilation.
The present invention relates to high-temperature ovens, and to window assemblies in and for such ovens and their doors, and, more particularly, to windowed self-cleaning ovens and window assemblies and windowed doors therefor.

The construction and operation of self-cleaning ovens is well known in the art. See, for example, Hurko U.S. Pat. No. 3,121,158. While the cleaning range of an oven is typically between 150° and 550° F., cleaning is by raising the oven temperature to between about 750° and 950° F.

Windowed ovens and windowed oven doors likewise have been well known in the art and permit one to observe food cooking without losing oven heat by opening the oven door.

Nevertheless, windowed self-cleaning ovens have been somewhat impractical since, during cleaning, relatively large amounts of heat escape through the window, greatly reducing the efficiency of the cleaning operation and causing uneven heat distribution in the oven itself, and also because the oven window becomes exceedingly hot, much hotter than the remainder of the oven exterior, thereby creating a safety hazard.

One solution to these problems has been to provide a movable opaque metal shield which is placed across the window during cleaning. It has been necessary to provide a safety mechanism which prevents activation of the cleaning cycle unless the movable shield is in place. This has been relatively costly and inconvenient to use and it has not been wholly effective in preventing heat loss or keeping the window temperature within safe limits.

The present invention overcomes these problems by providing an oven window which includes two spaced parallel glass panels disposed innermost with their peripheral edges surrounded by a wraparound member forming an enclosed chamber or dead-air space between the panels; at least one additional window panel spaced outwardly from the two inner panels; means for ventilating the space between the two additional panel and the inner panels; and, a reflective, semitransparent, highly conductive metal grid disposed in said ventilated space, preferably on the outer surface of the outer panel of the foresaid inner pair of panels. The dead-air space between the inner panels serves as a partial insulator. The semitransparent reflective metal grid permits a view of the oven interior but reflects back into the oven cavity a portion of the heat passing through the dead-air space. The grid also absorbs a certain amount of heat from the glass panels on which it is disposed. The grid and the outer panel of the inner pair of panels are cooled by the wash of air during ventilation of the outer air space. Cooling of the grid is facilitated by its high thermal conductivity. Accordingly, the present invention provides a relatively cool outer window surface and retains a relatively large amount of heat in the oven cavity.

Thus, it is a primary object of the invention to provide a windowed high-temperature oven such as a windowed self-cleaning oven.

A further object of the present invention is to provide a window for high-temperature ovens which will minimize heat loss through the window.

A further object of the present invention is to provide a window for high-temperature ovens which will minimize heat loss therethrough, but which will provide adequate visibility of the oven interior.

A further object of the present invention is to provide a window for self-cleaning ovens in which the temperature of the outer window panel will not exceed the manufacturers recommended safety level.

A further object of the present invention is to provide a window for a high-temperature self-cleaning oven with a windowed door in which no part of the outer window panel will exceed 230°F. when the oven is in the heat-cleaning cycle of about 750°F. to 950°F. for 2 hours in 70°F. ambient air.

A further object of the present invention is to provide a low-cost window assembly or windowed oven door for high-temperature self-cleaning ovens.

A further object of the present invention is to provide a window assembly or windowed oven door for high-temperature self-cleaning ovens which does not require inconvenient or expensive safety mechanisms such as movable shields.

Further objects and advantages of the present invention will become apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various things in which the principle of the invention may be employed.

In the annexed drawing:

FIG. 1 is a side elevational view, partly broken away and partly in section, of a household range embodying the present invention;

FIG. 2 is an enlarged fragmentary section elevational view of the door of FIG. 1;

FIG. 3 is an enlarged fragmentary perspective sectional view of the door of FIG. 1;

FIG. 4 is an enlarged fragmentary view of one corner of the door taken along the lines 4—4 of FIG. 5 showing the reflective metal grid;

FIG. 5 is an enlarged elevational view partly broken away and partly in section, taken along the line 5—5 of FIG. 6;

FIG. 6 is a perspective view of a second embodiment of the invention; and

FIG. 7 is a perspective view of a third embodiment of the present invention.

Referring now to the drawings in detail, there is shown in FIGS. 1 to 3 a household free-standing electric self-cleaning range 1 having a top cooking surface 2 with a plurality of surface heating elements 3, an oven cavity 4 directly beneath the top cooking surface 2 and formed by a boxlike oven liner 5 cooperating with a front-opening drop door 6. The oven cavity 4 is supplied with two standard heating elements, namely, a lower baking element 7 and an upper broiling element 8. Suitable thermal insulation 9 such as fiberglass or the like surrounds the oven liner 5 to retain that heat developed by the heating units 7 and 8 in the oven cavity 4 for a more efficient utilization of the heating energy as well as to retain the outer surface of the range body 10 to a relatively cool temperature which would not be injurious to the human touch.

An oven lamp 11 is arranged in the rear wall 12 of the oven liner 5 to illuminate the oven cavity 4 in a conventional manner. Further, the opposite sidewalks of the oven liner carry the usual shelf-supporting means (not shown) which support one or more removable shelves in the oven cavity in the usual manner.

The range 1 is provided along the back edge of the top cooking surface with a raised backsplash 14 which contains the various circuit control elements, switches, thermostats, clocktimers, etc., which enable the housewife to control the various heating elements of both the top cooking surface 2 and oven 4. Preferably, the heating elements and their switches are arranged to provide the normal cooking operations and the high-temperature self-cleaning operations.

As best seen in FIG. 2, the windowed oven door 6 has a frame 15 which is generally of sheet metal construction and includes a front or outer door panel 16, a middle door panel 17, and a rear or inner door panel 18. The front door panel 16 has a narrow rearwardly turned peripheral flange 19. The middle door panel 17 is of mating construction with the outer door panel 16 having a front-turned peripheral flange 20 which fits within the flange 19 of the front door panel 16.

The rear door panel 18 has a narrow front-turned peripheral flange 21 and is mounted on the rear surface of the middle door panel 17. The inner door panel 18 has a diameter roughly corresponding to the inner diameter of the oven opening and,
when the door 6 is in the closed position, the inner door panel 18 projects slightly into the oven cavity in the manner of a plug, whereas the middle door panel 17 overlays the oven opening. A vapor and heat-resistant gasket 22 is fastened to the middle door panel 17 around the periphery of the inner door panel 18 to prevent escape of heat and vapor around the door edges. A handle 23 is mounted on the outer surface of the front door panel 16 at the top portion of the oven door 6 and the door 6 is hinged at its bottom edge to the range body.

A window assembly 24 is located in the oven door 6 and is constructed according to the present invention to maintain its outermost glass panel 29 at a relatively low temperature when the oven is operating in the high-temperature cleaning range of about 750°F to 950°F. While this is the preferred temperature range for cleaning operations, the upper limit of this temperature range can be as high as about 1,050°F. Above this temperature, however, the oven is likely to suffer enamel failure and/or softening of the window glass.

The window assembly 24 includes three spaced substantially parallel transparent glass panels 28, 29, and 30. Window apertures 25, 26, and 27 are formed in the front, middle and rear door panels 16, 17, and 18 respectively, and are visually registering in the assembled door 6. The three transparent glass panels 28, 29, and 30 are secured in spaced parallel relation between the front and rear door panels 16 and 18 at those window openings 25, 26, and 27. The glass panels 28, 29, and 30 consist of a first or inner glass panel 28, a second glass panel 29 adjacent the first panel 28 and separated from the oven cavity 4 by the first panel 28, and a third or outer glass panel 30 separated from the first panel 28 by the second panel 29 so that the glass panels 28, 29, and 30 are arranged in the order of first 28 to second 29 to third 30 proceeding from the oven cavity 4 out to the front of the oven.

A first spacer member 31 is disposed between the first and second panels 28 and 29 at their peripheral edges, and a second spacer member 32 is likewise disposed between the second and third panels 29 and 30 at their peripheral edges. A wraparound or clamping member 33 encloses the peripheral edges of all three glass panels 28 to 30 and cooperates with the spacer members 31 and 32 to secure the panels 28 to 30 in spaced parallel relation. Vent apertures 34 are provided in the second spacer member 32. Additional vents 45 are also provided in the adjacent region of the wraparound member 33 so that the space between the second and third panels 29 and 30 communicates with the space between the front and middle door panels 16 and 17. Additional vent apertures 35 are provided in the upper and lower edges of the door 6 so that heated air may escape from between the second and third glass panels 29 and 30, through the oven door 6, and into the ambient atmosphere outside the oven 1.

There are no vent apertures to ventilate the space between the first and second glass panels 28 and 29, so that such space is a dead-air space tending to insulate the oven cavity 4 and retard heat loss at the window 24. Additional dead-air spaces may be formed by employing additional spaced parallel transparent panels if further dead-air insulation is required, although a single dead-air space is generally satisfactory.

A thin semitransparent metallic reflector 36 (the thickness of which is greatly exaggerated for purposes of illustration) in the form of a gridlike or foraminous reflective coating 36C is deposited on the front or outer surface of the second glass panel 29, so that the reflector 36C is located in the ventilated or air-wash space between the second and third glass panels 29 and 30. This reflector is preferably of gold or platinum or an alloy containing one or both of these since gold and platinum are highly conductive (having a thermal conductivity in excess of 40 B.t.u. ft/hr. °F./in.) at 212°F. and can form thin opaque surfaces having low surface emissivity (less than about 0.50) between 750°F and 950°F, so that it reflects a large amount of radiant heat and retains very little. Platinum and gold are also relatively chemically inactive and resist oxidation and corrosion at oven-cleaning temperatures. Thin layers of those materials retain satisfactory opacity at high temperatures. These characteristics make them highly suitable and preferred for use in the present invention. A platinum-gold alloy may be used when a "silver" color reflector is desired.

At high temperatures, the reflector 36 reflects a substantial proportion of the radiant heat emanating from the oven cavity 4, thereby reducing heat loss at the window 24. At the same time, heat that is picked up by the foraminous reflector 36C is readily conducted away in the air wash so that the space between the second and third members 29 and 30 is kept relatively cool, thereby permitting the exposed portion of the outer surface of the outer or third glass panel 30 to be maintained at a relatively cool temperature, i.e., less than about 230°F. When the oven 1 is at a heat-cleaning range temperature of about 950°F for 2 hours in 70°F ambient air, oven manufacturers specify that the side-room glass panel temperature should not exceed 265°F.

The foraminous reflector 36C has a plurality of apertures or forams 37 in regular disposition throughout, and the ratio of the reflector's total reflective surface area (i.e., the area of one side of the reflector 36C less the sum of the areas of the forams 37) to the total area of the viewing apertures 37 is preferably about 3 to 2 so that one's view through the center of the glass panel 39 is about 60 percent obstructed. This ratio could be raised or lowered, without departing from the spirit of the present invention, although either visibility or heat retention would be reduced respectively. Accordingly, in order for the reflector to both transmit and reflect substantial portions of heat and light emanating from the oven cavity, the ratio should not exceed about 3:1 or be less than about 1:2. The forams 37 should be fairly small (preferably on the order of three sixty-fourths inch square or about 0.02 square inch). As the forams size is increased (with the same ratio of reflective surface area to viewing area maintained at about 3 to 2), so is the width of the opaque portions between the forams 37, so visibility through the grid 36 becomes discontinuous and impaired. In addition, distinguishable alternating hot and cool areas form on the outer (third) panel and the hot areas tend to exceed safe and/or acceptable temperature levels. Accordingly, forams 37 size should not exceed about one-sixteenth sq. inch.

The reflector is preferably fired onto the glass in a thin coating according to standard techniques well known in the art.

One method involves oil soluble compounds of gold and/or platinum and palladium, together with rhodium, silver and certain base metals in a resin/solvent system. This compound is applied to the glass by silk screen process and then fired at a high temperature approaching the distortion point of the glass e.g., at 1,050°F. or even higher where a very hard glass substrate is employed. For a gridlike or foraminous semitransparent reflector the compound (commonly called "liquid gold") is applied in sufficient quantities so that the residue of gold left after firing is sufficiently thick to be opaque and to retain opacity at oven-cleaning temperatures but thin enough to cool readily in the air wash (e.g., on the order of 1,500 Angstroms).

The term "semitransparent reflector" as used in the specification and claims herein is understood to include, but not be limited to, a reflector of the type shown in the drawings where visible distinct forams are formed in an otherwise substantially opaque reflective metal surface. The term "semitransparent reflector" further includes reflectors of the type where the metal coating is extremely thin so that the metal itself appears to be semitransparent. This is without regard to whether the transparency is due to minute discontinuities in the coating or whether the metal itself is actually transparent due to its thinness, so long as the reflector both transmits and reflects substantial portions of heat and light emanating from the oven cavity.

Accordingly, in alternative embodiments of the present invention, the reflector is a thin coating of gold or the like, perhaps have a thickness on the order of between about 50 and 200 Angstroms. This thin coating is applied to the glass in an
even, substantially continuous film without visibly distinct foramen. It is nevertheless so thin as to be semitransparent and both transmits and reflects substantial portions of heat and light emanating from the oven cavity. One way to apply the reflector metal in this thin film is by the sputtering process. In this process, the glass plate and a supply of reflector metal are placed in a vacuum changer with a minute quantity of argon gas. When the metal is charged negatively and the glass charged positively, the argon molecules knock metal atoms off the metal which fly into the glass surface and become embedded there to form a very thin durable coating.

Thin semitransparent reflectors may be applied to the glass in other ways, including by vacuum deposition and by electroplating. Glass so treated is commercially available, sold under the trademark “Mirro-Pane.”

While gold, platinum or alloys of those metals are preferred for construction of the semitransparent foraminous reflectors according to the present invention, other metals or alloys such as nickel, chromium, copper, aluminum, silver and/or their alloys may be satisfactory in certain embodiments, although they are typically either less reflective and/or less resistant to corrosion.

Inasmuch as the two innermost glass panels reach relatively high temperature levels, those panels are preferably of heat-resistant borosilicate glass (e.g., such as is sold under the registered U.S. Trademark “Pyrex”). Such glass may be heated up to as high as 1,200°F. or higher without deformation or appreciable glowing, and it withstands rapid temperature variations satisfactorily.

Returning to a description of FIGS. 1 to 3 inclusive, the window unit 24 formed by the three glass panels 28 to 30, spacers 31 and 32, reflector 36, and wraparound member 33, is mounted at the oven door’s window apertures 25 to 27 with L-shaped brackets 38 which are fastened to the middle door panel 17. In order to guard against the escape of gases and vapors, the outer or third glass panel 30 of the window unit 24 is resiliently held against the inwardly turned flange 39 defining the window aperture 25 of the front panel 16, and the inner or first glass panel 28 of the window unit 24 is resiliently held against the outwardly turned flange 40 defining the window aperture 27 of the rear door panel 18. A heat-resistant gasket (not shown) may be employed to seal the window unit 24 between the door panels 16 and 18 to seal against escaping gases and vapors.

The oven 1 has an air circulation chamber 41 formed between the oven frame 42 and the oven liner 5. An air intake vent 43 is provided in the rear of the oven frame 42 at the lower rear of such chamber 41. A mechanical fan 44 is positioned in the oven so that the air moves in the oven and is drawn into and through the chamber 41. Vents (not shown) are provided in any suitable portion of the oven frame 42 so that warm air in the chamber 41 may escape and keep the side, front and rear walls of the oven frame 42 relatively cool for safety.

A second embodiment of the present invention is shown in FIGS. 4 to 6, wherein FIG. 6 shows a gas self-cleaning range 50 of the type having a plurality of burners 51 below and an oven 51 above. The oven cavity 53 has a side-hinged windowed door 54 covering its front opening. The range 50 is of standard self-cleaning construction in many respects, having a sheet metal outer frame 55 and an insulated inner oven liner 56 defining the oven cavity 53. The heating control panel 57 is located to the right of the windowed door 54.

The windowed oven door 54 has a frame 58 which is generally of sheet metal fabrication and comprises a front or outer door panel 59, a middle door panel 60, and a rear or inner door panel 61. The front door panel 59 has a rearwardly extending flange portion 49 at its outer peripheral edge which overlays and mates with the inner and middle door panels 61 and 60, and which are integrally formed with one another, joined at their periphery by a common connecting portion 62. The front, middle and rear panels 59, 60 and 61 have short rearwardly or frontwardly directed flange portions 63, 64 and 65, respectively, generally bordering the window opening. A glass window unit or assembly 69 is located in the oven door 54 and mounted on such flanges.

The window assembly 69 includes three rectangular transparent glass panels 70, 71 and 72 secured in spaced parallel relation between the front and rear door panels 59 and 61 at the window opening. The first glass panel 70 is adjacent the oven cavity 53. The second glass panel 71 is spaced forward of the first panel 70 and separated from the oven cavity 53 by the first panel 70. And a third glass panel 72 is spaced forward of the second panel 71, being thus separated from the first panel 70 by the second panel 71.

A first spacer member 73 of generally U-shaped cross section is disposed between the adjacent peripheral edges of the first and second glass panels 70 and 71, and a second similarly shaped spacer member 74 is likewise disposed between the adjacent peripheral edges of the second and third glass panels 71 and 72.

A wraparound or clamping member 75 encloses the peripheral edges of all three glass panels 70 to 72 and cooperates with the spacer members 73 and 74 to secure the glass panels 70 to 72 in spaced parallel relation. A plurality of ventilating apertures 77 are also provided in that portion of the clamping member 75 adjacent the second spacer member 74 so that the space between the second and third glass panels 71 and 72 is ventilated to form an air-wash space in communication with the space between the front and middle door panels 72 and 71. Additionally, both the apertures 77 and 79 are provided in the upper and lower edges of the door 54, i.e., in the rearwardly directed peripheral flange portion 49 of the outer door panel 59, so that hot air between the second and third glass panels 71 and 72 may escape therefrom through the oven door 54, and pass air from the ambient atmosphere outside the oven 50.

There are no corresponding vent apertures to ventilate the space between the first and second glass panels 70 and 71, so that such space is a dead-air space tending to insulate the oven cavity 53 and retard heat loss at the window 69.

A thin semireflective metallic reflector 80 in the form of a gridlike reflective metallic foraminous coating 80 with small foramen 89 is disposed on the front or outer surface of the second glass panel 71 so that it is located in the ventilated air-wash space between the second and third panels 71 and 72. This grid 80 has the same general physical and chemical characteristics as the grid 36 described with reference to FIGS. 1 to 3, hereinafter. The thickness of the coating 80 is greatly exaggerated for purposes of illustration and is preferably on the order of about 1,500 Angstroms in actuality. Standard fiberglass insulating material 81 fills the space between the rear and middle panels 71 and 72 outside the window area, i.e., between the clamping member 75 and the common portion 62 connecting the outer edges of the rear and middle door panels 61 and 60.

A heat-resistant gasket 82 encircles the window aperture of the rear door panel 61, secured by a suitable bracket 83, to form an airtight seal at the interface of the oven door 54 and the oven body 55 to prevent the escape of heat and moisture vapor from the oven cavity 53 during operation. A conventional door handle 84 is mounted on the front door panel 59.

The oven 50 has an air circulation chamber 85 formed between the oven frame 55 and the oven cavity 53. The air circulation chamber 85 has an air outlet (not shown) in the upper region of the oven frame 55 to permit hot air to escape so that the sidewalks of the oven frame 55 are kept relatively cool during cleaning. A fan (not shown) may be provided at an air intake vent in the base of the oven frame (also not shown) to direct cool air into the air circulation chamber 85, or air may be allowed to enter the intake vent naturally by convection.

A portion of the oven frame 55 at the lower front edge of the oven cavity 53 projects forward to extend beneath the lower peripheral edge of the oven door 54 and thereby extend the air circulation chamber 85 into that region. A plurality of
3,612,825

7

The efficacy of a window assembly according to the present invention is providing a relatively cool outer window surface is illustrated by the following:

A standard gas-fueled self-cleaning oven range sold under the trademark "Modern Maid" Tennessee Stove Corp. was specially fitted with a windowed oven door according to the present invention, replacing a solid door. The particular window assembly employed was similar to the third embodiment described herein except that the outermost window panel (herein the so-called "third" panel) was oversized (on the order of 15 inches × 22 inches) to give the appearance of an all glass oven door for decorative purposes. The first and second glass panels (the inner lite and the lite adjacent thereto) were 0.140 inch × 3 51/32 inches × 5 31/32 inches borosilicate and spaced 0.884 inch from one another. The so-called "fourth" glass panel was thirty-sixteenth inch × 5 31/32 inches × 15 31/32 inches crystal, spaced 0.523 inch outwardly from the second glass panel. These three inner panels were held at their edges in fixed relation by a metal wraparound or clamping member and a pair of metal spacer members of suitable dimensional form of the described and illustrated herein. The entire assembly was mounted in the oven door approximately one-half inch behind the large third or outer glass panel. A thin gold film was deposited on the inner surface of the fourth glass panel and the interpanel space in which the gold film was located was ventilated by a plurality of %

inch diameter circular vent apertures spaced about one-sixteenth inch along the outermost spacer member and also in the clamping member adjacent that spacer. The upper edge of the oven door was similarly vented. The oven door included a metal inner panel positioned generally above the innermost or first glass panel. A second metal panel was mounted frontward of and parallel to the inner door panel and was positioned generally above the second glass window panel, the space between the aforesaid metal door panels being filled with a standard heat-insulating material such as asbestos. A third metal panel was mounted frontward of and parallel to the second metal panel and was positioned generally above the fourth glass panel. The space between the aforesaid second and third metal door panels was open to permit circulation of air from the window space housing the gold film to the vents in the upper edge of the oven door. A similar passage was afforded in the lower region of the oven door for the intake of cool air. In addition, the space between the front (third) oversize glass panel and the fourth glass panel was ventilated at the upper and lower oven door edge so that there was an air wash on both sides of the fourth glass panel bearing the gold film. The gold film was opaque, but provided with horizontally and vertically aligned 36/64 inch square apertures regularly spaced three sixty-fourth inch apart so that the gold coating formed a semitransparent grid so that the ratio of the total reflective surface area of the reflector to the total area of the foramen in the reflector is 3:1. The gold grid was bounded by a solid 1/6 inch gold peripheral border.

The oven was operated over its standard cleaning cycle, comprising a %

hour warmup period and a subsequent 2-hour cleaning period. A standard Leeds & Northrup potentiometer was used to obtain contemporaneous measurements at regular intervals of the temperatures of (a) the air in the room containing the oven, (b) the outer or room-side surface of the third or outer glass panel taken at a point opposite the upper edge of the fourth glass panel, and (c) the oven interior taken adjacent the upper edge of the oven door. These temperature values are set forth in Table 1.

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>(a) Room temperature (°F)</th>
<th>(b) Outside glass temperature (°F)</th>
<th>(c) Oven temperature (°F)</th>
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From the above table, it can be seen that the present invention provides an oven window for a self-cleaning oven which is safe, minimizes heat loss, and is well within the specifications of the oven manufacturers.

In various embodiments of the present invention, spacing of the glass panels in three-panel units of the typology illustrated in FIGS. 1-6 herein may vary, but spacing on the order of 1 inch between adjacent glass panels is generally preferred, providing satisfactory insulating-cooling characteristics. In a relatively compact unit, a four-panel unit of the type illustrated in FIG. 7 preferably embodies approximately 1-inch spacing between the first and second panels, but the spacing between the second and fourth panels and between the fourth panel and third outermost panel is preferably on the order of one-half inch.

The foregoing discussion, description of the drawings, and the drawings themselves are considered as illustrative only of the principles of the present invention, and since numerous modifications and changes will readily occur to those skilled in the art, the invention is not limited to the exact constructions and operations described and shown, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

Having thus described our invention, we claim:

1. A windowed household self-cleaning oven having a heat-insulated structure defining an oven cavity, heating means for heating said oven cavity, controlling means for controlling said heating means to obtain various temperature combinations in the oven cavity in the cooking range of about 150°F to 550°F. and in a cleaning range in excess of about 750°F, but less than about 1,200°F, and at least three transparent panels secured in said heat-insulated structure in spaced substantially parallel relation, including a first transparent panel and a second transparent panel adjacent said first panel, and a third transparent panel separated from said first panel by said first panel, and a second transparent panel separated from said first panel by said second panel, the improvement comprising means essentially sealing the space between said first and second panels to provide a dead-air space therebetween; a thin semitransparent reflective coating on one of the surfaces of said panels, located between said second and third panels and formed of a substantially nonchonometrically reactive metal having a thermal conductivity in excess of about 40 B.t.u./(ft. hr. °F./ft.) at 212°F, and a surface emissivity less than about 0.50 throughout the temperature range between about 750°F. and 950°F.; a cool air intake communicating with the space housing said reflective coating; and a warm air outlet communicating with the space housing said reflective coating, so that when heat escapes from said oven cavity past the dead-air space between said first and second panels, substantial amounts of said escaping heat impinge upon said reflective coating, portions of which are reflected back toward said cavity and other portions of which are absorbed by said coating, said coating being cooled by the flow of air across it from said air intake to said air outlet to maintain the outermost exposed surface of the outermost transparent panel at a temperature below 265°F.

2. A windowed oven as recited in claim 1 wherein said heating means are electric.

3. A windowed oven as recited in claim 1 wherein said heating means are gas.

4. In a windowed household self-cleaning oven having a heat-insulated structure defining an oven cavity having a front opening, heating means for heating said cavity, controlling means for controlling said heating means to obtain various temperature combinations in the oven cavity in the cooking range of about 150°F to 550°F. and in a cleaning range in excess of about 750°F., but less than about 1,200°F., a door operatively mounted in said front opening, and a window mounted in said door comprised of at least three transparent glass panels in spaced substantially parallel relation, including a first transparent glass panel, a second transparent glass panel adjacent said first panel and separated from said oven cavity by said first panel, and a third transparent glass panel separated from said first panel by said second panel, the improvement comprising means essentially sealing the space in said door between said first and second panels to provide a dead-air space therebetween adjacent said oven cavity; a thin semitransparent reflective coating located between said second and third panels on one of the surfaces of said panels, said coating formed of a substantially nonchonometrically reactive metal having a thermal conductivity in excess of about 40 B.t.u./(ft. hr. °F./ft.) at 212°F., and a surface emissivity less than about 0.50 throughout the temperature range between about 750°F. and 950°F.; a cool air intake at the bottom of said door communicating with the space housing said reflective coating; and a warm air outlet at the top of said door communicating with the space housing said reflective coating, so that when heat escapes from said oven cavity past the dead-air space between said first and second panels, substantial amounts of said escaping heat impinge upon said reflective coating, portions of which are reflected back toward said cavity and other portions of which are absorbed by said coating, said coating being cooled by the flow of air across it from said air intake to said air outlet to reduce the amount of heat transmitted to the outermost transparent panel and maintain the outermost exposed surface of such panel at a temperature below 265°F.

5. A windowed oven as recited in claim 4 wherein said thin reflective coating is foraminous and the ratio of the total reflective surface area of said coating to the total area of the foraminous in said coating is between about 3:1 and 1:2.

6. A windowed oven as recited in claim 5 wherein said coating is foraminous and the foraminous has an area greater than about one-sixteenth square inch; and wherein said first panel is of borosilicate glass.

7. A windowed oven as recited in claim 6 wherein said reflector has a thickness not greater than about 1.500 Angstroms.

8. A windowed oven as recited in claim 7 wherein the principal component of said coating is gold, platinum, or an alloy of either or both of such metals.

9. A windowed oven as recited in claim 4 wherein said thin reflective coating is foraminous, and the foraminous in said foraminous coating have an average area not greater than about one-sixteenth sq. in.

10. A windowed oven as recited in claim 4 wherein said thin reflective coating is foraminous and the ratio of the total reflective surface area of said coating to the total area of the foraminous in said coating is about 3:2.

11. A windowed oven as recited in claim 7 wherein the principal component of said coating is gold, platinum, or an alloy of either or both gold and platinum.

12. A windowed oven as recited in claim 4 wherein said thin reflective coating is foraminous and the ratio of the total reflective surface area of said coating to the total area of the foraminous in said coating is about 3:2.

13. A windowed oven as recited in claim 4 wherein the principal component of said coating is gold, platinum, or an alloy of either or both gold or platinum.
14. A windowed oven as recited in claim 4 wherein said coating has a thickness not greater than about 1,500 Angstroms wherein said coating has a thickness not greater than about 1,500 Angstroms.

15. In a windowed household self-cleaning oven having a heat-insulated structure defining an oven cavity, said heat-insulated structure having an opening, heating means for heating said oven cavity, and controlling means for controlling said heating means to obtain various temperature combinations in the oven cavity in the cooking range of about 150°F to 550°F, and in a cleaning range in excess of about 750°F but less than about 1,200°F, the improvement comprising four transparent glass panels secured in said opening in said heat-insulated structure in spaced substantially parallel relation, including a first transparent glass panel, a second transparent glass panel adjacent said first panel and separated from said oven cavity by said first panel, a third transparent glass panel separated from said first panel by said second panel, and a fourth transparent glass panel located between said second and third panels, means essentially sealing the space between said first and second panels to provide a dead-air space therebetween; a thin semitransparent reflective coating located between said second and third panels on a surface of one of said second, third and second fourth transparent panels, said coating formed of a substantially nonchemically reactive metal having a thermal conductivity in excess of about 40 B.t.u./(ft.° F./hr.) at 212°F and a surface emissivity less than about 0.50 throughout the temperature range between about 750°F and 950°F; a cool air intake at the bottom of the space housing said reflective coating; and a warm air outlet at the top of the space housing said reflective coating so that when heat escapes from said oven cavity past the dead-air space between said first and second panels, substantial amounts of said escaping heat impinge upon said reflective coating, portions of which are reflected back toward said cavity and other portions of which are absorbed by said coating, said coating being cooled by the flow of air across it from said air intake to said air outlet to maintain the outermost exposed surface of the outermost transparent panel at a temperature below 265°F.

16. A windowed oven as recited in claim 15 wherein said coating is foraminous and the ratio of the total reflective surface area of said coating to the total area of the foramen in said coating is about 3:2.

17. A windowed oven as recited in claim 15 wherein said coating is foraminous and the ratio of the total reflective surface area of said coating to the total area of the foramen in said coating is between about 3:1 and 1:2.

18. A windowed oven as recited in claim 17 wherein said coating has a thickness of about 1,500 Angstroms or less.

19. A windowed oven as recited in claim 18 wherein said coating is foraminous and the foramen in said foraminous coating have an average area not greater than about one-sixteenth square inch.

20. A windowed oven as recited in claim 15 wherein the principal component of said coating is gold, platinum, or an alloy of either or both gold or platinum.

21. A windowed oven as recited in claim 15 wherein said coating is foraminous and the foramen in said foraminous coating have an average area not greater than about 0.02 square inch.

22. A windowed oven as recited in claim 15 wherein said coating has a thickness not greater than about 1,500 Angstroms.

23. In a windowed household self-cleaning oven having a heat-insulated structure defining an oven cavity, said heat-insulated structure having an opening, heating means for heating said oven cavity, and controlling means for controlling said heating means to obtain various temperature combinations in the oven cavity in the cooking range of about 150°F to 550°F and in a cleaning range in excess of about 750°F but less than about 1,200°F, the improvement comprising four transparent panels secured in said opening in said heat-insulated structure in spaced substantially parallel relation, including a first transparent panel, a second transparent panel adjacent said first panel and separated from said oven cavity by said first panel, a second transparent panel separated from said first panel by said second panel, and a fourth transparent panel located between said second and third panels, means essentially sealing the space between said first and second panels to provide a dead-air space therebetween; a thin semitransparent reflective coating located between said second and third panels on a surface of one of said second, third and second fourth transparent panels, said coating formed of a substantially nonchemically reactive metal having a thermal conductivity in excess of about 40 B.t.u./(ft.° F./hr.) at 212°F and a surface emissivity less than about 0.50 throughout the temperature range between about 750°F and 950°F; a cool air intake at the bottom of the space housing said reflective coating; and a warm air outlet at the top of the space housing said reflective coating so that when heat escapes from said oven cavity past the dead-air space between said first and second panels, substantial amounts of said escaping heat impinge upon said reflective coating, portions of which are reflected back toward said cavity and other portions of which are absorbed by said coating, said coating being cooled by the flow of air across it from said air intake to said air outlet to maintain the outermost exposed surface of the outermost transparent panel at a temperature below 265°F.