March 18, 1969 H. G. HUFF ETAL 3,433,213

SHUTTER FOR WINDOW IN OVEN DOOR

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Fig. 2

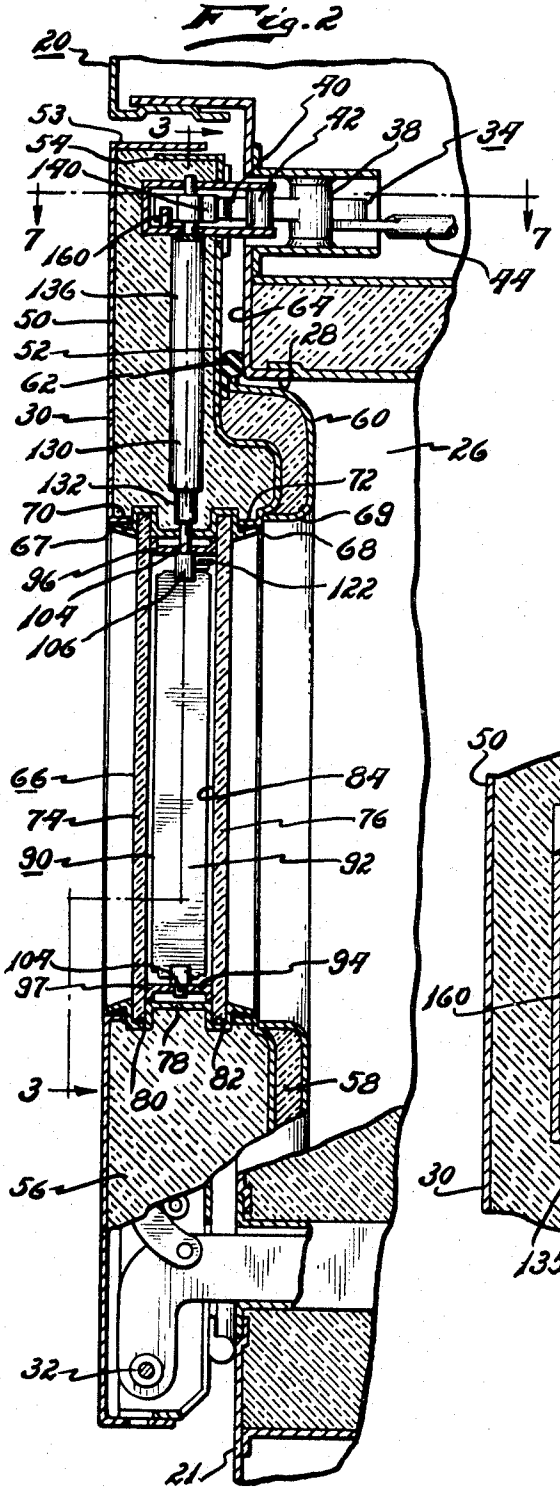


Fig. 1

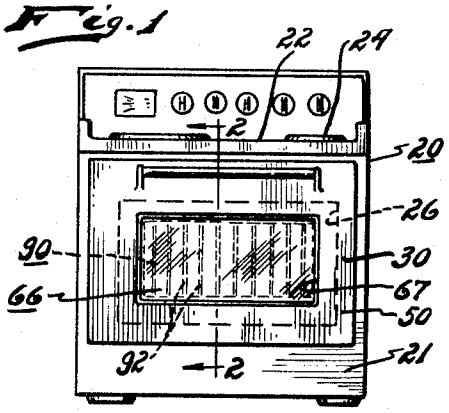
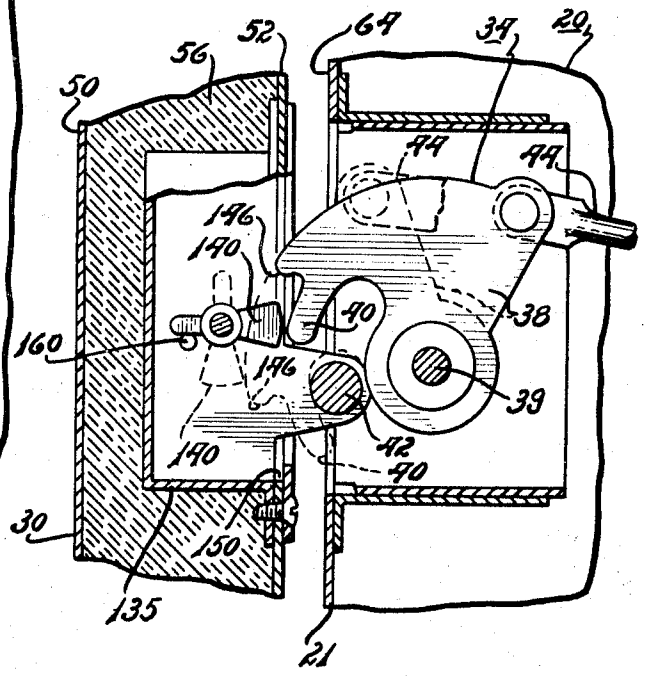


Fig. 7



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Filed Nov. 15, 1967 Sheet 2 of 3

Fig. 3

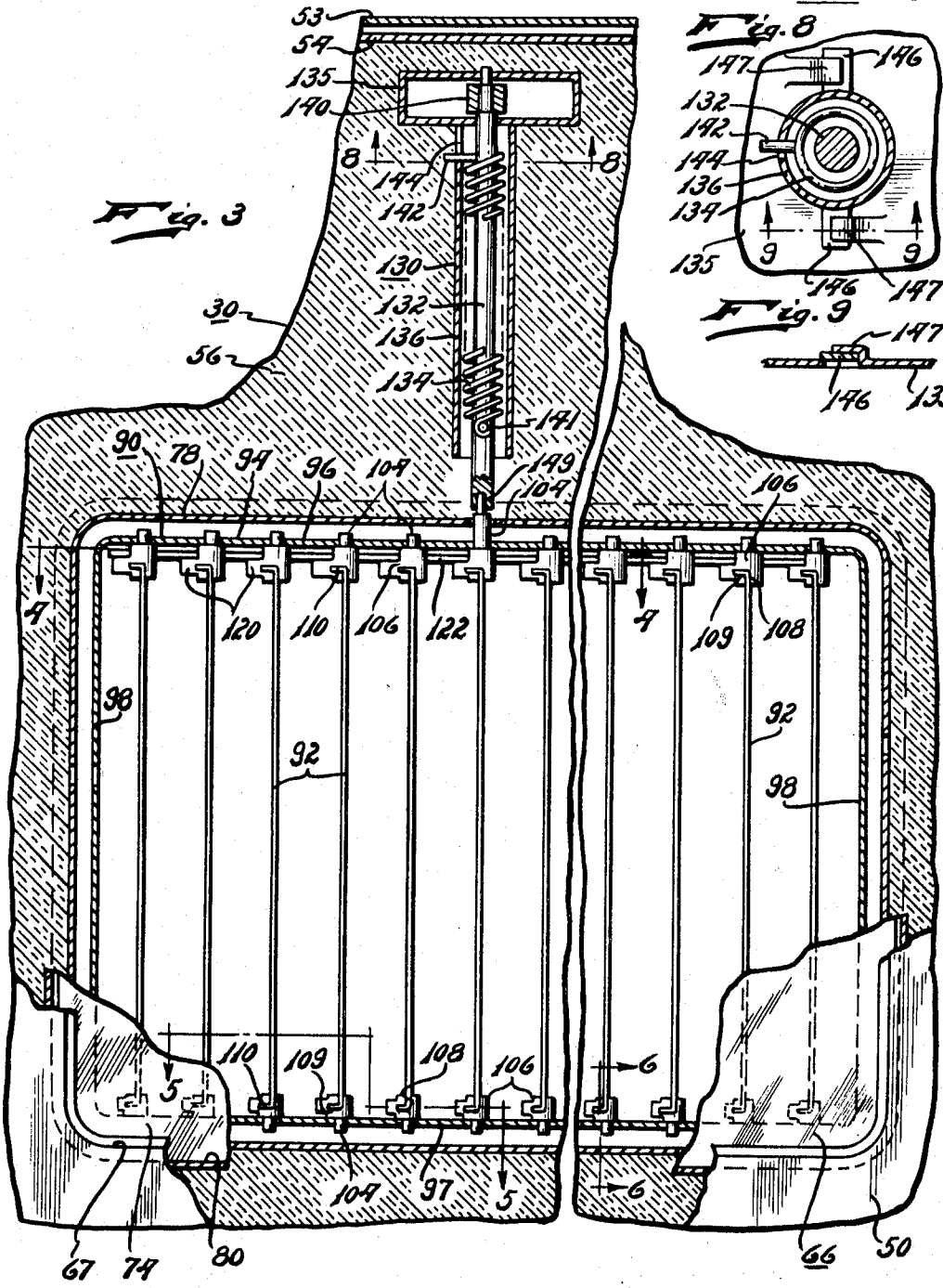

Fig. 8

Fig. 9

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Fig. 4

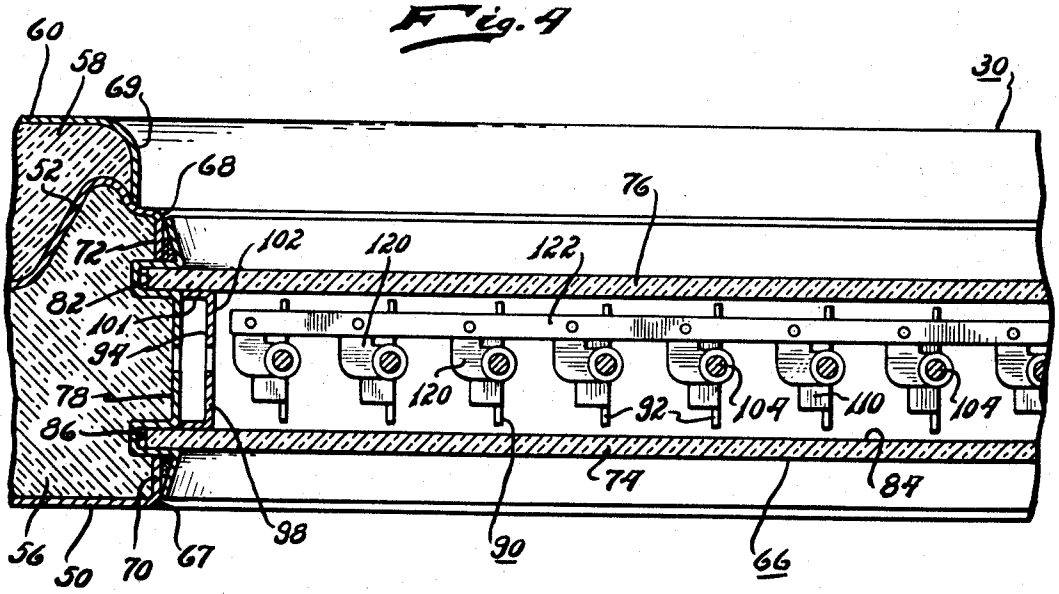


Fig. 5

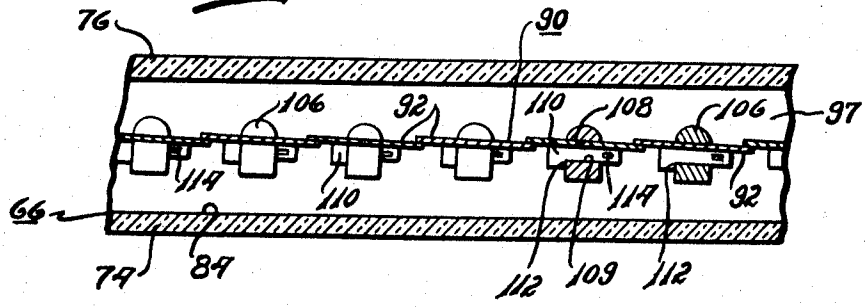
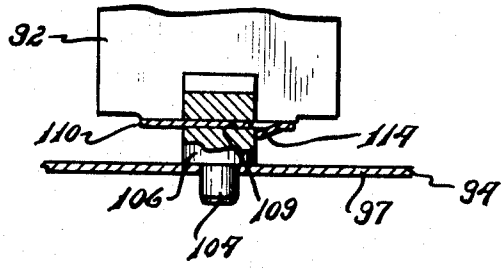


Fig. 6



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United States Patent Office

3,433,213

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3,433,213

SHUTTER FOR WINDOW IN OVEN DOOR

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Filed Nov. 15, 1967, Ser. No. 683,373

U.S. Cl. 126—197 12 Claims

Int. Cl. F24c *15/02, 15/04;* F23m *7/00*

ABSTRACT OF THE DISCLOSURE

A shutter arrangement of movable louvers positioned and operable between glass panes of a viewing window in a domestic range oven door. The louvers, normally held open, are automatically actuated into and held in closed position with the latching of the door to form a heat reflective wall barrier. Upon the door being unlatched the louvers automatically resume open position for viewing the oven chamber through the window.

The present invention relates to windowed doors and particularly such doors for use with bake ovens wherein the temperature may be elevated above normal bake use to approximately 750° F.–950° F.

In the construction of providing viewing windows in doors for bake ovens in domestic ranges it is the practice to form a window with at least two glass panes of clear transparency set in spaced apart relation to reduce the heat radiation from the oven chamber through the window. This arrangement is satisfactory for normal cooking temperature ranges extending from 150° F. to 550° F. but is unsatisfactory when the temperature within the oven chamber is raised to approximately 750° F. to 950° F. for the purpose to effect a self cleaning of the oven walls of adhering cooking stains and residue by the process of pyrolysis.

It is the object of the present invention to provide a viewing window in a range oven door with a heat reflective shutter that is operable to cover the window upon the temperature being elevated to effect a self cleaning of the oven walls.

Another object of the present invention is to provide a shutter arrangement operable by the latching arrangement of the door.

A further object of the present invention is to provide a viewing window for a range door with a shutter arrangement comprising a plurality of movable reflective shields.

A still further object of the present invention is to assemble a plurality of movable heat reflector shields or louvers within a sealed window construction to form therewith a single unitary structure which can be readily installed in a window opening of a range oven door and be coupled to a drive mechanism for adjusting the reflectors into various fixed positions.

A still further object of the present invention is to provide a drive mechanism being adapted to operably adjust a plurality of movable louvers between open and closed position with arrangement to urge and to hold the louvers in open position.

A still further object of the present invention is to provide an arrangement for a plurality of movable louvers

for a viewing window of a range oven door which automatically adjusts the louvers to open position for viewing the oven chamber when in cooking use and to closed position covering the window for the period when a self cleaning of the oven chamber is being effected.

These and other objects and advantages to be gained in the practice of the invention will be more apparent upon a reading of the following specification directed to a preferred embodiment and having reference to the accompanying drawings wherein:

FIG. 1 is a front view of a cooking range having a windowed door embodying the present invention;

FIG. 2 is an enlarged vertical sectional view of the windowed door with a fragmentary section of the range body taken substantially along line **2**—**2** of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view taken along line **3**—**3** of FIG. 2;

FIG. 4 is a fragmentary sectional view, on an enlarged scale, taken along line **4**—**4** of FIG. 3;

FIG. 5 is a fragmentary sectional view, on an enlarged scale, taken along line **5**—**5** of FIG. 3 and illustrating the louvers in closed position;

FIG. 6 is a fragmentary sectional view, on a further enlarged scale, taken along line **6**—**6** of FIG. 3;

FIG. 7 is a fragmentary enlarged sectional view taken along line **7**—**7** of FIG. 2;

FIG. 8 is an enlarged sectional view taken along line **8**—**8** of FIG. 3 and omitting the insulation;

FIG. 9 is a sectional view taken along line **9**—**9** of FIG. 8.

Referring to the drawing there is shown a free standing range **20** having a range body **21**. The range body **21** includes a top cooking surface **22** with a plurality of surface heating elements **24**, a baking oven chamber **26** having a frontal opening **28** closed by a drop door **30**. The door **30** is mounted by hinges **32** to the range body **21**.

The oven chamber **26** may be heated in any well known manner by gas or electric to provide heat energy for normal cooking operations at preselected temperatures between the range of 150° F. to 550° F. through the setting of suitable controls (not shown). At preselected periods heat energy may be supplied to raise the temperature of the walls of the oven chamber **26** to approximately 750° F. to 950° F. to effect a self cleaning of the oven walls of adhering cooking residue or food soils by utilizing the principle of pyrolysis. Further description of the oven heating arrangement or controls for cooking or self cleaning are not believed necessary as they form no particular part of the present invention except as to a door latching arrangement, indicated in general by the numeral **34**, associated with the self cleaning operation and only that portion of the latching arrangement that is associated with the present invention is illustrated and will be described.

The latching arrangement **34** comprises a latch member **38** pivotally mounted by pin **39** to the range body **21** and having a finger **40** adapted to engage about a keeper **42** fixedly attached for carry by the door **30**. The latch member **38** is pivotally operated through a link **44** extended and connected to a control mechanism (not shown) which may be either a manually operated lever or a motorized operating mechanism, such as is shown and described in U.S. patent application of William R. Guy,

Ser. No. 659,348, filed Aug. 9, 1967, and assigned to American Motors Corporation.

The door **30** comprises an outer panel **50** secured in spaced parallel relation to an inner panel **52**. The panels **50, 52** are each formed pan shape having their peripheral flanges **53, 54** respectively, turned to extend towards each other and overlap to enclose the space between the panels into which is packed suitable heat insulation material **56**. Additional thickness of insulation **58** is added to the inner side of the door which is enclosed by a pan shaped panel **60** affixed to the inner panel **52** to form a plug extension for entrance into the access opening **28** of the oven chamber. A gasket **62** is attached to the inner panel with the attachment of the panel **60** therewith. The gasket **62** engages the face **64** of the range body **21** adjacent and about the access opening **28**.

The door **30** is provided with a window opening in which is set a window assembly, indicated in general by the numeral **66**. The door panels **50, 52** are each formed with cut out openings **67, 68** that are in alignment with an opening **69** formed in the panel **60**. The marginal edges **70, 72** about openings **67, 68** respectively, are flanged to extend at right angles to the body of the panel to form a rest and securement of the window assembly **66** in the door.

The window assembly **66** comprises a plurality of transparent panels and here shown as a pair of glass panes **74, 76** set in parallel spaced apart vertical relation in a frame **78**. Each pane is received in a respective channel **80** and **82** formed in the frame **78**.

Positioned between the glass panes **74, 76**, that is, in space **84** formed therebetween, is my shutter arrangement **90** comprising a plurality of vertically extending segments or louvers **92** each being pivotally mounted in a shutter frame **94**. The frame **94** coextends about the inside perimeter of the glass frame **78** and comprises top rail **96**, bottom rail **97** joined by side rails **98**. Each rail, particularly the top and bottom rails **96, 97**, is formed U-shape in cross section with legs **101** resting against the frame **74** and the bright section **102** in spaced relation therefrom.

Each louver **92** is similarly constructed and pivotally journaled in the shutter frame **94**. The louvers are preferably formed of metal, such as stainless steel, polished metal, or of material coated that will reflect heat and be capable to withstand the high temperatures when provided in the oven chamber to effect self-cleaning of the oven walls. Secured in axial alignment to the top and bottom edge of each louver are pins **104** which extend into an adjacent top and bottom rail **96, 97** respectively to journal each louver to pivot or rotate about a vertical axis parallel with the axis of the adjacent louver.

Each pin **104** is formed with a body section **106** having an open end vertical slit **108** which turns within the body **106** to extend laterally, as at **109**. Each end of the louver is bent as at **110** in conformity with the slit **109**. In assembling, the louver **92** and its turned end **110** enters the slit from one side of the body **106** to project out the other side with the locating and securement therebetween being by a shoulder **112** and a tab **114**. The tab **114** engages the opposite side of the body **106** from shoulder **112** and is punched from the section **110** after assembly.

Each louver is provided with an arm **120**, preferably formed integrally with the upper pins **104**, which is operatively connected to a common drive bar **122** to provide an arrangement to actuate the louvers in unison. The movement is from a position transverse, that is, at right angles to the glass panes, to one that is parallel therewith. In the first, the open position, a viewing of the oven chamber is had through the glass panes between the louvers and in the second, the closed position, the panes are covered by the louvers as they form a heat reflecting wall. The louvers are arranged that when in closed position each will abut or preferably overlap the edge of the adjacent louver.

Normally the louvers are in the first or open positions when the oven is not in use, or is in use for normal cooking operation. When the temperature is to be elevated to effect a self cleaning of the oven walls the louvers are operated to the second or closed position by the latching of the door through a drive mechanism **130**.

The drive mechanism **130** includes a drive shaft **132**, a coiled spring **134**, a sleeve **136**, an open end housing **135** and an arm **140**. The spring **134** is extended co-axially about the shaft **132** and has one end affixed to a radially extending pin **141** on the shaft and the other end **142** is held in an open end slot **144** formed in the sleeve **136**. The sleeve extends over the shaft and spring to be attached to the housing **135** by wing tabs **146** interlocking beneath tabs **147** punched out from a side of the housing **135**. The wing tabs **146** are diametrically arranged and integrally formed on the sleeve **136**.

The shaft **132** has one end directly slip coupled to a louver **92** to an extension **149** of its upper axis pin **104**. The opposite end of the shaft **132** extends into the housing **135** for securement thereon of an arm **140**. The arm **140** is secured to rotate with the shaft **132** and extends to the open end of the housing **135** which is in alignment with an opening **150** formed in the inner panel **52**. The keeper **42** is attached to the housing **135** outwardly of the opening **150** and in proximity to the arm **140**.

The latch member **38** is formed with a shoulder section **146** arranged with the finger **40** so that as the finger begins engaging the keeper and before there is a full interlock the shoulder **146** will engage and rotate the arm **140** sufficiently to rotate the shaft to adjust the louvers from open, see FIG. 4, to a closed position as shown in FIG. 5. While the door remains latched the arm **140** will be held against return of the body of the latch member **138** as shown by dotted lines in FIG. 7.

As the shaft **132** is rotated to close the louvers the spring **134** is being wound to increase its tension and store energy that is subsequently utilized to return the shutters to open position. Upon the door being unlatched, that is, as the finger **40** disengages from the keeper the arm **140** will also be released from body contact with the latch member **38** to permit the energized spring **134** to reversely rotate the shaft **132** and effect a reopening of the shutters.

To limit the opening movement of the louvers to open position so that each will assume transverse right angle position to the glass panes, and to reposition the arm **140**, a stop **160** is provided in the housing against which the arm is held and abuts to arrest further return rotation of the shaft by the spring **134**. The spring will maintain sufficient yieldable pressure to maintain the shutters in open position so that their thin vertical end edges are in the line of vision providing maximum viewing between the louvers through the glass panes.

Should there be a requirement to increase or decrease the tension of the spring **134** the sleeve **136**, see FIG. 8, is detached from housing **135** by a counterclockwise rotation which frees tabs **146** from tabs **147** and thereafter by slightly dropping the sleeve to clear the tabs **147**, without disengaging spring end **142** from slot **144**, the sleeve may be rotated to either wind or unwind the spring until the desired spring tension is had after which the sleeve is reattached by interlocking the tabs.

By sandwiching the louvers between transparent glass panes and sealing them within the window structure a unitary structure is had of the combination which is readily, simply and easily installed in a window opening of a door. This assembly has a single extended operable shaft which is readily coupled to the preassembled drive mechanism **130**. The assembly is one wherein the louvers will assume an open position until the door is both closed and latched. The latching mechanism acting upon the drive mechanism will close the louvers and hold them closed until the door is unlatched.

Although a specific embodiment of this invention is shown and disclosed, it will be appreciated that certain modifications and improvements are within the spirit and scope thereof. Accordingly, such modification and improvements as are not specifically excluded by the language of the hereinafter claims are to be considered as inclusive thereunder.

We claim:

1. In a range oven door adapted to close an access opening to an oven chamber and having a window opening closed by a window,
a shutter assembly associated with said window comprising a plurality of movable louver members arranged across the area of said window to cover and uncover said window,
means operably joining to move said members in unison including yieldable means for holding said members in position to uncover said window to provide viewing areas therethrough, and
said yieldable means being extended externally of said door to be operationally engaged to position said members to cover said window against the force of said yielding means.

2. A cooking range having an oven chamber and an access opening to said chamber, a door for closing said opening, latching means for said door, said door having a window comprising a pair of transparent panels arranged in spaced apart relation for viewing therethrough said oven chamber, a shutter arrangement for said window comprising,
a plurality of movable segments between said transparent panels and being arranged to cooperatively form an intermediate planar wall between said panels in one position and assume independent transverse positions in another, and
said latching means being operable with said movable segments to actuate said segments into at least one of said positions.

3. A range oven door provided with a transparent window formed of a plurality of transparent panels in spaced apart relation, shutter means for selectively covering and uncovering said window, the combination comprising,
a frame member interposed in fixed relation between certain of said transparent panels to extend along certain marginal edge portions of said transparent panels,
a plurality of louvers reciprocally mounted to said frame member and adapted to alternately cover and uncover said window,
means operably connecting said louvers and being operable to reciprocally move said louvers in unison, and
latching means for said door being adapted to engage and operate said means to set said louvers in position to cover said window while effecting a latching of said door.

4. A range oven door of claim 3 including,
means associated with said louvers to return said louvers to position to uncover said window,
said last mentioned means being made operative by said latching means in effecting the unlatching of said door.

5. A range oven door of claim 3 including,
resilient means associated with said operable means to yieldably hold said louvers in position uncovering said window.

6. A range oven door of claim 5 including,
said latching means being operable to disengage from said operable means upon unlatching said door,
said resilient means being operable by said means in the latching of said door to store energy for subsequent use to operate said means upon its release from said latching means to reposition said louvers to uncover said window.

7. A door for closing an access opening to an oven chamber formed in a range body, latching means for selectively latching said door including a latch member on said range body being operable to engage a keeper carried by said door, a window opening in said door covered by a window assembly including transparent glass panes arranged in vertically spaced apart relation for viewing therethrough said oven chamber, a shutter assembly interposed between certain of said glass panes and extending substantially across the viewing area of said window assembly and comprising;
a frame member,
a plurality of louvers each being journaled to said frame member for reciprocal movement.
means interconnecting said louvers to pivotally actuate said louvers in unison into a first position and a second position wherein said first position positions said louvers to provide unobstructed viewing areas between said louvers for see through into said chamber through said window and in the second position said louvers cooperatively forming a planar wall between said glass panes covering the viewing area of said window, and
said means being operably engaged by said latch member to be actuated to actuate said louvers to said second position as said latch member is being operated to engage said keeper.

8. The door of claim 7 including;
said louvers having the characteristic of being a heat reflective barrier when in the second position.

9. In a range having a door for closing an access opening of an oven chamber formed in the range body, latching means for said door including a latch member on said range body being operable to alternately engage and disengage with a keeper carried on said door, a window opening in said door covered by a window assembly including transparent glass panes arranged in vertically spaced relation supported in a frame, shutter means for said window and being operable to selectively cover and uncover said window comprising,
a frame member affixed between certain of said glass panes and being extended along marginal edges thereof,
a plurality of louvers journaled to said frame member for reciprocal movement and being arranged when set in cover position to form a planar wall between and extending substantially across the viewing area of certain of said glass panes,
means movably interconnecting said louvers for movement in unison,
drive means adapted to be operably engaged and released alternately by said latch member, said drive means coupled to move and hold said louvers in cover position while in engagement with said latch member, and
means arranged with and being operable by said drive means to store energy to operably actuate said drive means in setting said louvers in uncover position upon said drive means being released by said latch member,

10. In a range of claim 9 including;
said last mentioned means being a resilient member to yieldably hold said louvers in uncover position.

11. In a range of claim 10 including,
a sleeve member detachably affixed to said door,
said sleeve member, said resilient member and said drive means being coaxially arranged and said resilient member torsionally connected between said shaft and sleeve member.

12. A combination window and shutter assembly unitized for securement in a window opening formed in a range oven door comprising;
a frame member contoured to fit a window opening,
a plurality of transparent panels affixed in spaced apart relation in said frame member,

a second frame member formed to fit within said first frame member in abutting relation therewith,

a plurality of louver members individually journaled to said second frame member for reciprocal movement,

means interconnecting said louver members for reciprocally moving said louvers in unison,

said second frame member, louvers and means being assembled between certain of said transparent panels and within said first frame member, and

one of said louvers having its axis consisting of a journaled shaft extended through and beyond an adjacent

section of said first frame member for operational engagement for moving said louver members.

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KENNETH W. SPRAGUE, *Primary Examiner.*

U.S. Cl. X.R.

126—200

Disclaimer

3,433,213.—*Herbert G. Huff*, Royal Oak, and *Donald J. Shelly*, Westland, Mich. SHUTTER FOR WINDOW IN OVEN DOOR. Patent dated Mar. 18, 1969. Disclaimer filed Nov. 18, 1971, by the assignee, *White Consolidated Industries, Inc.*

Hereby enters this disclaimer to claims 1 through 10 of said patent.

[*Official Gazette August 1, 1972.*]