# United States Patent [19]

**Gilliom**

[11] **3,859,979**

[45] **Jan. 14, 1975**


[54] **OVEN DOOR LOCK**


[75] Inventor: **John W. Gilliom,** Mansfield, Ohio

[73] Assignee: **The Tappan Company,** Mansfield, Ohio



[22] Filed: **Feb. 1, 1974**

[21] Appl. No.: **438,523**

[52] **U.S. Cl.**..... **126/197,** 219/398, 292/DIG. 69, 126/19 R

[51] **Int. Cl.** ..... **F24c 15/04**

[58] **Field of Search**..... 126/197, 19 R; 219/412, 219/413, 414, 490, 491, 493, 398; 292/110, 144, 167, DIG. 69, DIG. 66



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,406,677 | 10/1968 | Anderson | 126/197 |
| 3,458,675 | 7/1969 | Del Gaudio | 200/61.64 |
| 3,476,424 | 11/1969 | Erickson | 292/DIG. 69 |
| 3,750,643 | 8/1973 | Fowler et al. | 219/413 |
| 3,757,084 | 9/1973 | McLean et al. | 219/493 |



*Primary Examiner*—Kenneth W. Sprague
*Assistant Examiner*—Larry I. Schwartz
*Attorney, Agent, or Firm*—Donnelly, Maky, Renner & Otto



[57] **ABSTRACT**

A locking mechanism for a self-cleaning oven includes an elongated latching rod having a latch lock portion for firm engagement with a slot in the oven door, and a spring bias coupling between the latching rod and drive motor therefor maintains the door under pressure when locked to deform the door seal preventing heat leaks during self-cleaning. The latching rod is supported within the oven frame in a channel, and a rivet connected to the former is positioned for movement within a cam slot in the latter to provide for pivoting of the latching rod during movement to and from engagement with the door. When the oven selector switch is in self-clean position, the door is closed and the timer is set, the control circuit for the self-cleaning oven automatically energizes the drive motor to lock the door; and at the expiration of the cleaning time set on the timer and the dropping of the oven temperature to a predetermined safe level, the control circuit again automatically energizes the drive motor to unlock the door.


**11 Claims, 6 Drawing Figures**

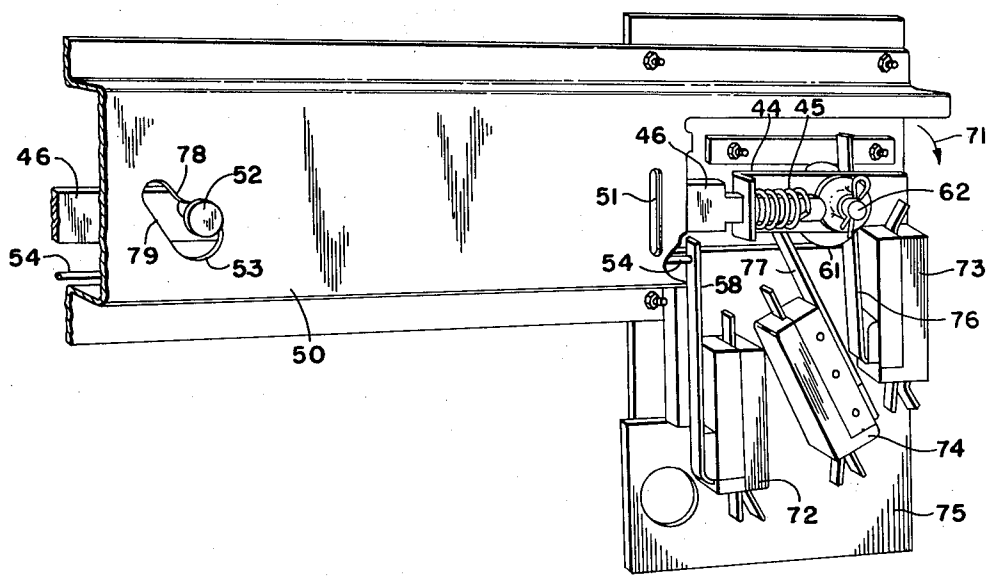
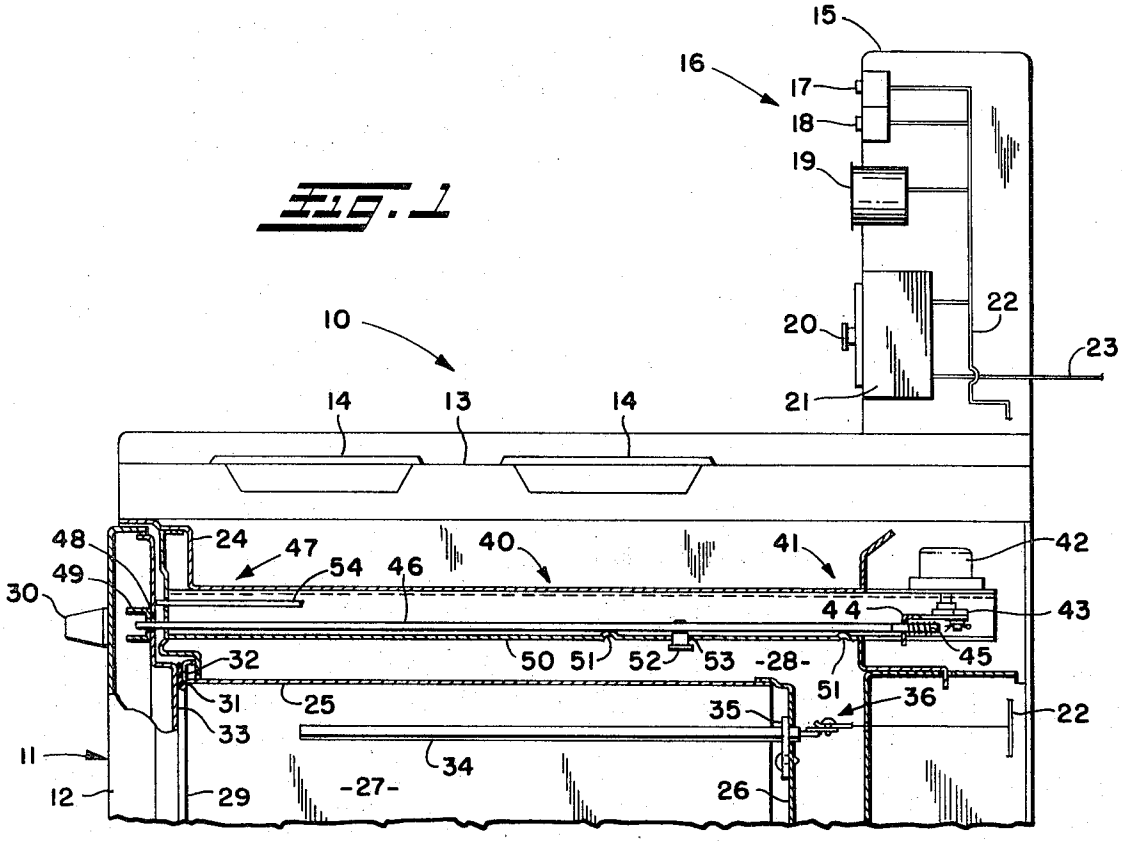


Fig. 1


15
16
17
18
19
20
21
22
23
10
14
13
14
48
24
47
54
46
40
41
42
49
30
44
43
32
50
51
52
53
-28-
45
31
25
35
36
22
33
11
34
12
29
-27-
26

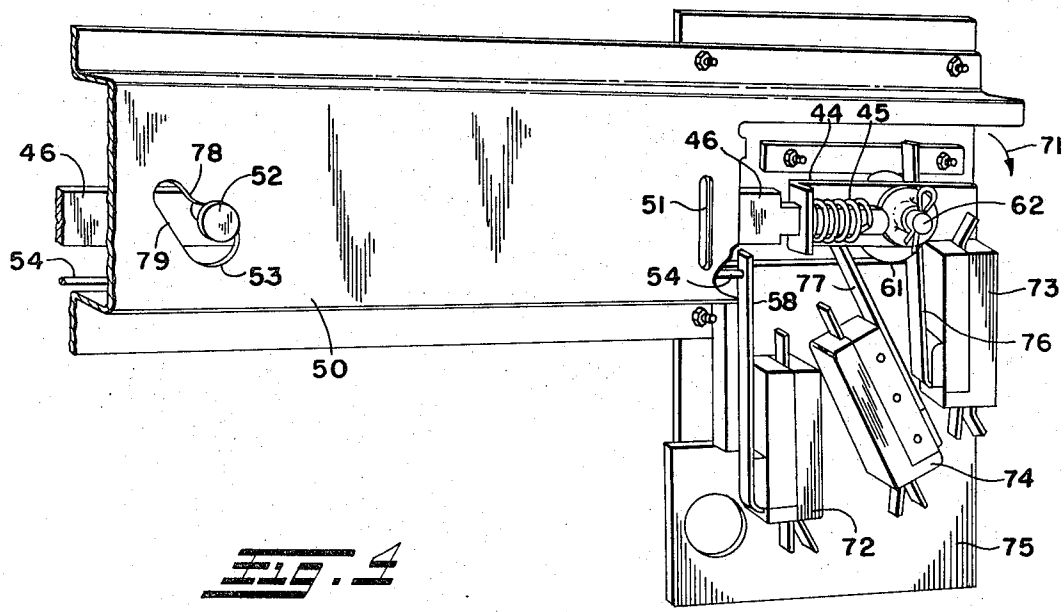

46
78
52
79
53
54
50
44
45
46
71
51
62
54
77
61
73
58
76
74
72
75

Fig. 4

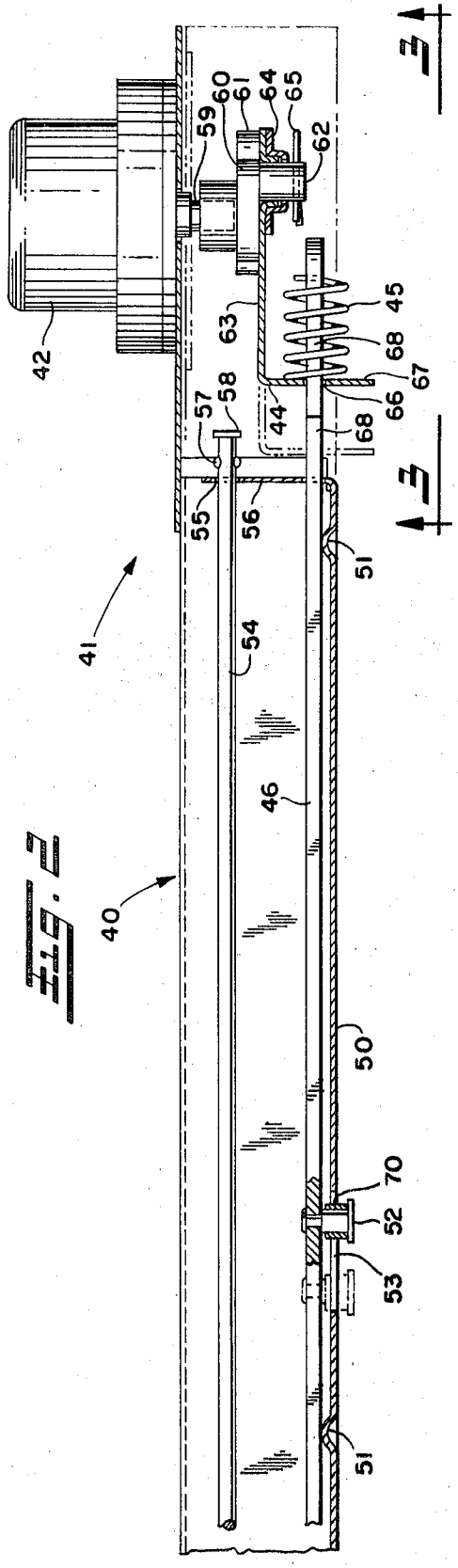



FIG. 2

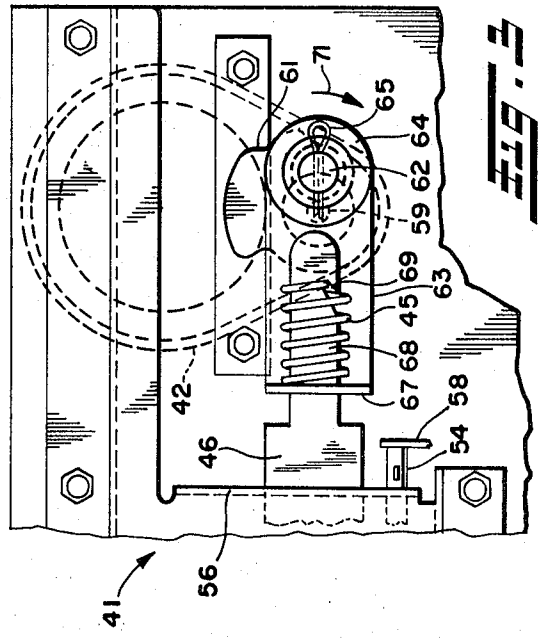



FIG. 3

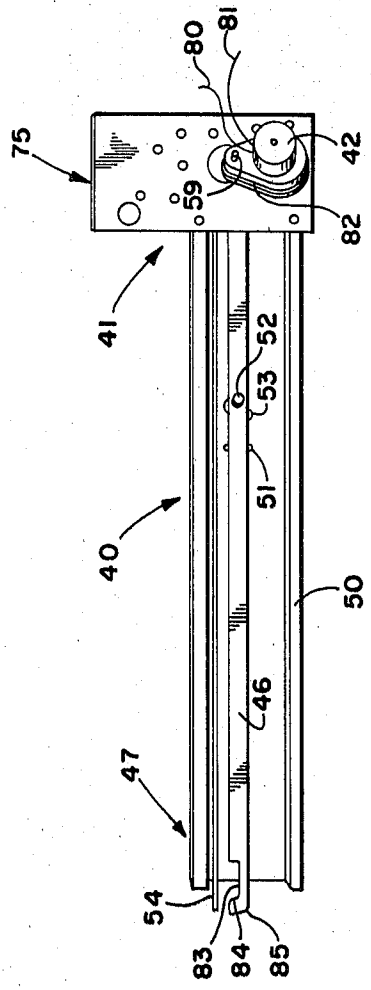



FIG. 5

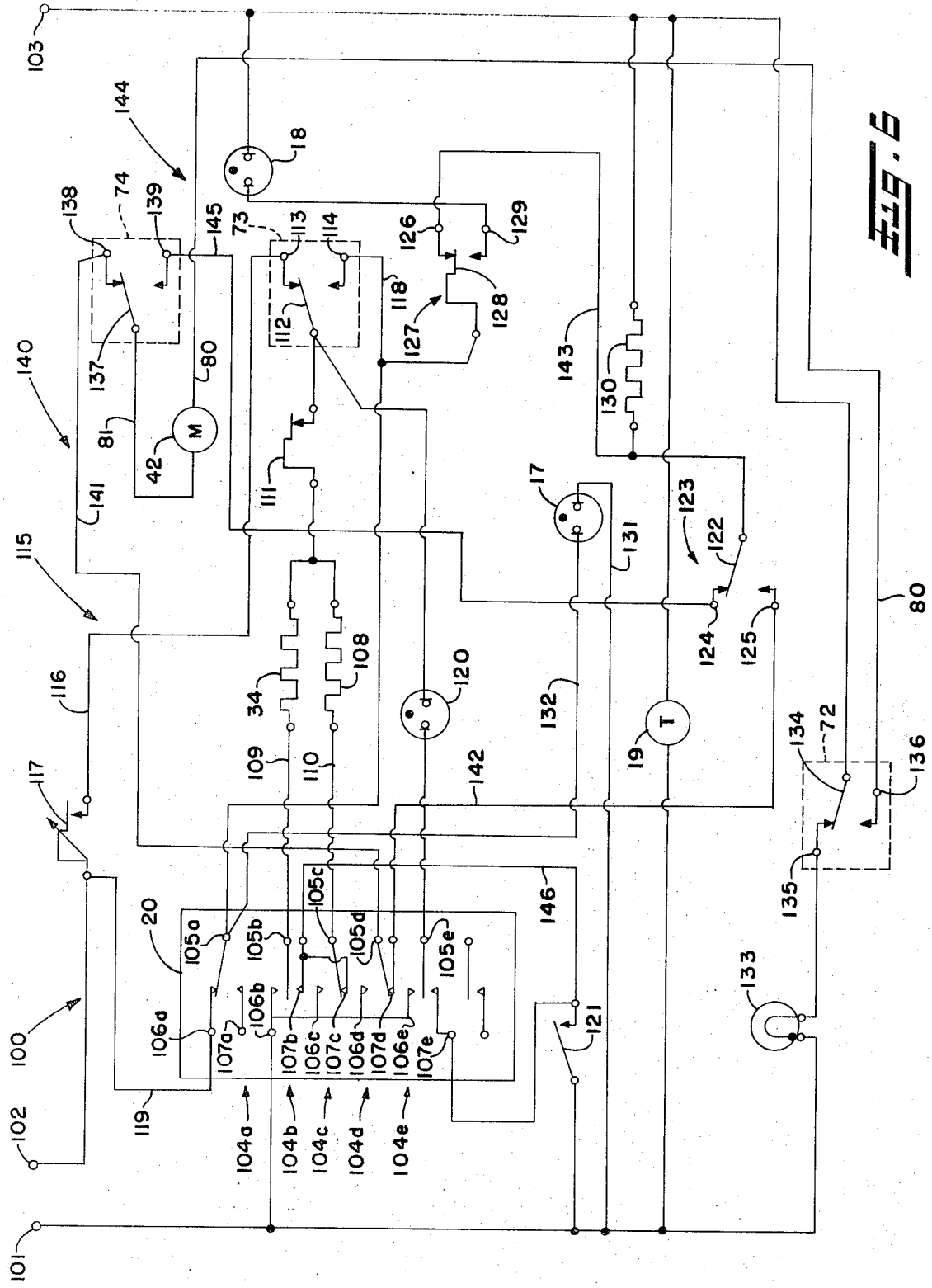

103
144
18
74
138
139
145
73
113
114
126
129
118
128
127
112
143
130
140
137
80
81
M
42
141
111
17
131
123
122
115
108
34
120
132
124
125
80
116
109
110
142
19
T
134
72
136
117
146
135
20
105a
105b
105c
105d
105e
133
106a
106b
106c
106d
106e
107a
107b
107c
107d
107e
121
100
102
119
104a
104b
104c
104d
104e
101

FIG. 6

# OVEN DOOR LOCK

## BACKGROUND OF THE INVENTION

This invention relates to a locking arrangement and automatic control for an oven door and more particularly to a spring-biased locking arrangement for maintaining pressure against the oven door seal of a self-cleaning oven when locked.

It is important from the standpoint of safety in the use of self-cleaning ovens, either of the free standing or built-in type, that the oven door be locked during the self-clean operation when oven temperature is increased, for example, to 950° F. at which pyrolysis occurs. In one prior art oven door latch illustrated in U.S. Pat. No. 3,462,585 a motor effects movement of the rod coupled to a rotatable latch member mounted on a pivot fixed relative to the oven, and such latch member is pivotally swung into and out of engagement with a protruding keeper mounted on the oven door. In such device as the latch member is rotated into engagement with the keeper to lock the door, a pressure is applied to the door seal at a level dependent on the amount of wear on the latter. In another door latching system illustrated in U.S. Pat. No. 3,757,084 a latch member pivotable about an axis fixed relative to the oven engages a keeper mounted on the oven door and is driven by a solenoid and snap-acting spring over-center arrangement. The latter device is relatively complicated and requires sufficient kinetic energy in the inertial movement of the latch member provided by the solenoid in order to move the sring pivot point beyond the center position to draw the latch member completely closed. Moreover, none of the prior art automatically locks and unlocks the oven door at the beginnnig and end of the self-clean operation.

## SUMMARY OF THE INVENTION

In the instant invention an elongated latching rod is supported above the oven cavity for movement by a motor to and from locking engagement with the oven door. A latch lock portion at one end of the latching rod is engageable with a slot in the oven door, and the latching rod is resiliently coupled to an eccentrically mounted cam driven by a motor so that when the door is locked a predetermined amount of pressure is applied to the oven door seal to prevent escape of hot air and gases during pyrolytic self-cleaning. Moreover, the latch lock portion of the latching rod is cut at an angle at its forward end so as to slide across the door liner with the spring connection operating as a universal joint to find the slot therein in the event of a slight door misalignment, and the spring also eliminates motor stalling. Fixed to the latching rod is a follower rivet, which is movable in a cam slot in a latch support channel as the motor is operated, to provide for proper positioning of the latch lock portion relative to the door slot during locking and unlocking operation.

An automatic control circuit for operating the motor to lock and to unlock the door and to energize the oven for self-cleaning is timer operated, whereby upon adjusting the oven selector switch for self-clean operation, closing the oven door and settng the timer, the door will lock automatically and the oven will self-clean. Moreover, the door will unlock automatically at the expiration of the timer and the oven temperature has dropped to a predetermined safe level. The motor and control circuit are located relatively remote from the body of the oven cavity and the axis openings thereto in order to isolate the same from high oven temperatures to preclude any heat damage thereto.



Accordingly, a primary object of the invention is to prevent opening an oven door during self-cleaning operation.

Another object of the invention is to provide a predetermined and constant pressure on an oven door seal for a self-cleaning oven when the oven door is locked.

A further object of the invention is to provide an automatic control circuit for a self-cleaning oven, which locks the door, energize the oven for self-cleaning operation and unlocks the door at the expiration of the cleaning time and the oven temperature has dropped to a predetermined safe level.

Still another object of the invention is to provide for locating the driving and control means for an oven door lock relatively remote from the oven cavity and heat thereof.

These and other objects and advantages of the present invention will become apparent as the following description proceeds. To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principles of the invention may be employed.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the annexed drawings:

FIG. **1** is an elevational view, partially broken away and partially in section, of the upper portion of a self-cleaning range;

FIG. **2** is a side view, partially in section, of the driving portion of the oven door lock;

FIG. **3** is a bottom view of part of the driving portion of the oven door lock taken on the lines **3—3** of FIG. **2**;

FIG. **4** is an isometric view of the bottom of the driving portion of the oven door lock and switches coupled therein;

FIG. **5** is a top view of the oven door lock; and

FIG. **6** is a schematic electric circuit diagram of the control circuit for the oven and door lock of the self-cleaning range.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein like reference numerals refer to like elements in the several figures, the upper portion of the self-cleaning range **10,** which includes a self-cleaning oven **11** and a door **12** for closing the same, a cook top **13** having burners **14,** and a splash guard **15** including a control panel **16** at the front thereof is illustrated in FIG. **1.** Within the splash guard are located clean and oven lock indicator lights **17, 18,** a conventional oven clock timer **19** and a conventional oven selector switch **20,** the latter being located on a control box **21** within which the oven control circuit is located, all being coupled to the range main electrical cable **22.** A pigtail **23** provides electrical power to the range from an external supply, such as from an outlet receiving, for example, 220 volt power from the utility company, to energize the various electrical components therein.

The self-cleaning oven **11** is located below the cook top **13** and within the supportive framework **24** of the

range and has upper and rear walls **25, 26** and additional side and bottom walls, not shown, forming the oven liner and defining the oven cavity **27.** A space **28** surrounds the oven liner and may be provided with insulation to insulate the oven from the other parts of the range. The access opening **29** to the oven cavity is closed by the door **12,** which is pivotable downward about a horizontal hinge, not shown, by manipulation of the handle **30** in conventional manner. A door seal **31,** which preferably surrounds a major portion of the access opening **29,** is shown at the abutting upward turned oven wall surface **32** and the door liner wall **33,** and preferably comprises a resilient gasket member to prevent heat loss from the oven cavity, especially during self-cleaning operation. Although the self-cleaning oven shown and described in the drawings is located in a free standing range, with a door pivotable on a horizontal hinge, the invention may also be included in a built-in or other type of oven or in an oven with a door pivotable about a vertical hinge.

The broil heating element **34** is supported within the oven cavity **27** by a mounting bracket **35** and is provided with an electrical connection **36** to the main electrical cable **22** for energization by the control circuit in the control box **21.** A bake heating element, not shown in FIG. **1,** is also located in the oven cavity to heat the same for baking purposes, and, in a preferred embodiment, to raise the temperature of the oven cavity to approximately 950°F. at which pyrolytic cleaning occurs. The broil and bake heating elements are preferably conventional electrical resistance heating elements rated, for example, at 3,000 and 2,400 watts, respectively.

A locking mechanism **40** located above the oven cavity **27** is operable to lock the oven door **12** in closed position whenever self-cleaning oven operation occurs. The locking mechanism includes a driving portion **41,** having a motor **42** resiliently connected by a cam member **43,** angle plate **44** and lock bias spring **45** to the rear end of the latching rod **46,** and a latch lock portion **47** engageable with the door **12** through a slot **48** located therein and reinforced by a slotted channel reinforcement **49.** The latching rod **46** is supported for movement within a latch channel **50** by support embossments **51,** and movement thereof is limited by a follower rivet **52** extendng into a cam slot **53** in such channel. A rod interlock **54** extends forward of the range supportive framework **24** for engagement with the door **12** when the latter is closed, and is coupled at its rear end to a door interlock switch, not shown in FIG. **1,** which closes contact in the control circuit.

Turning now more particularly to FIGS. **2** and **3,** the driving portion **41** in the locking mechanism **40** is shown in more detail to illustrate the features of the invention. The rod interlock **54** passes through an opening **55** in the latch channel end plate **56** and has stops **57** formed thereon to prevent withdrawal in a forward direction. The rear end of the rod interlock **54** is located in abutment with the switch plunger **58,** which is part of the door interlock switch arrangement to be described in more detail below, to operate the same when the oven door is closed to drive the rod interlock to the right or rear of the oven.

The motor **42** in the driving portion preferably has an internal reduction drive to provide relatively slow output rotational speed, for example at 1 rpm, on the drive shaft **59** with sufficient torque to operate the locking mechanism. A cam member **60** made of nylon, for example, is attached to the drive shaft and includes a cam surface **61** for operating control switches, not shown in FIGS. **2** and **3,** and an eccentric mount **62** to which the horizontal surface **63** of the angle plate **44** is connected by a cup washer **64** and cotter pin **65.**

A slot **66** in the vertical surface **67** of the angle plate **44** receives the latching rod mounting arm **68,** which has a reduced cross-section relative to the major extent of the latching rod **46,** and the slot also has a cross-section smaller than that of the major extent of the latching rod. The lock bias spring **45** has one end secured in a cut-out **69** formed in the mounting arm **68** and another end in abutment with the vertical surface **67** of the angle plate normally tending to draw the larger cross-sectional area portion of the latching rod into abutment with such vertical surface.

The support embossments **51** of the latch channel **50** provide minimum friction sliding points for the latching rod as it is moved forward and rearward by the motor, angle plate, and lock bias spring arrangement, and the follower rivet **52,** which is fixed to the latching rod, has a roller follower **70** formed, for example, of brass to guide the latching rod within the cam slot **53.** In FIGS. **2** and **3** the locking mechanism illustrated in solid lines is in locked position, whereby the latching rod has been drawn from a neutral or unlocked forward position to the right or rear of the range by a clockwise rotation of the motor drive shaft **59** as indicated by the arrow **71** in FIG. **3,** and the unlocked position of the angle plate **44** and follower rivet **52** is illustrated in phantom in FIG. **2** where the latching rod is moved to the left or forward relative to the range body by further drive shaft clockwise rotation.

Referring now to FIG. **4,** the door interlock switch **72,** clean switch **73,** and motor control switch **74** are located on a switch mounting plate **75** for actuation, respectively, by the rod interlock **54** and the cam surface **61.** Each of such switches is preferably a single pole double throw switch, which makes a first circuit connection when the respective plunger **58, 76, 77** thereof is released or makes a second circuit connection when the respective plunger is depressed relative to the switch body.

The eccentric mount **62,** angle plate **44** and latching rod **46** are illustrated in FIG. **4** in the locked position, whereby such elements are withdrawn furthest to the right or rear of the range by the clockwise direction rotation of the motor drive shaft indicated by the arrow **71.** When the latching rod is in locked position, the follower rivet **52** is located proximate the right hand portion of the cam slot **53,** and the switch plungers **76, 77** are depressed by the cam surface **61** to throw the respective switches **73, 74** to their second or locked positions. Moreover, the rod interlock **54** is in its right hand position, since the oven door is closed when it is locked, to urge the plunger **58** of the door interlock switch **72** to the right throwing the same in its second or door closed position.

The cam slot **53** is slightly over-sized to allow for wear of the door seal **31,** shown in FIG. **1,** so that the lock bias spring **45** assures that the predetermined amount of pressure, such as fourteen pounds, is always applied to the door seal when the door is locked in closed position. The convex surface **78** and sloped surface **79** of the cam slot **53** cooperate with the follower rivet **52** when the latching rod **46** is driven by the motor

to locked and unlocked positions, respectively, relative to the reinforced slot **48** in the oven door.

A top view of the locking mechanism **40** is illustrated in FIG. **5.** The motor **42** is located on the switch mounting plate **75,** and the motor leads **80, 81** are adapted for coupling to the control circuit to provide energy to the motor to drive the locking mechanism. The drive shaft **59** extends downwardly through an opening in the switch mounting plate **75** from the reduction drive portion **82** of the motor to drive the latching rod **46** within the latch channel **50.** The latch lock portion **47** of the latching rod has a cut-out **83** therein with the forward transverse end surface **84** of such cut-out being obtuse relative to the longitudinal axis of the latching rod to provide for smooth engagement with and, particularly, releasing from the reinforced slot in the oven door during latching operation. Moreover, the forward transverse end surface **85** of the latching rod **46** is cut at an obtuse angle relative to such longitudinal axis to facilitate sliding of the rod across an end wall of the door slot **48** and into the same in the event of a slight door misalignment.

In operation of the mechanical portion of the locking mechanism **40** described above with reference to FIGS. **1** through **5,** whenever the oven selector switch **20** is adjusted for self-cleaning, the oven timer **19** is set for a predetermined cleaning time, and the door **12** is closed to move the rod interlock **54** to throw the door interlock switch **72** to the door closed position, the motor **42** will be energized by the control circuit to rotate approximately 180° in the clockwise direction. Moreover, if the door and slot **48** are misaligned relative to the latching rod **46,** the transverse surface **85** will slide across the slot end wall as permitted by the universal joint action of the lock bias spring **45.** During such motor rotation the eccentric mount **62** is moved from a left or forward position relative to the range as viewed, for example, in FIG. **1,** to a right or rearward most position to lock the oven door. When the eccentric mount **62** is rotated and the latching rod **46** is drawn to the rear of the range, the follower rivet **52** is drawn along the convex surface **78** of the cam slot **53,** and the latching lock portion **47** engages the door **12** within the slot **48** thereof.

Moreover, as the eccentric mount **62** rotates clockwise, as viewed, for example in FIG. **3,** from unlocked to locked position, the door **12** is drawn tightly closed and the door seal **31** is deformed under a pressure determined by the force of the lock bias sring **45** bearing against the vertical surface **67** of the angle plate **44.** The lock bias spring **45** connection between the lataching rod **46** and motor prevents the latter from stalling in case the door and oven frame tolerances are not exact or, for example, a foreign object lodges between the same, and thus precludes destruction of the motor and/or the gears that might otherwise occur. After the cam member **60** has rotated approximately 75° from the unlocked position thereof locking is virtually complete and the further rotation to approximately 180° from the unlocked position draws the angle plate **44** against the lock bias spring **45.** The plunger **76** of the clean control switch **73** is depressed at about 50° rotation of the cam surface **61** to throw such switch from its normally unlocked position to its locked position to energize the oven for self-cleaning operation, and as such cam surface rotates to its fully locked position, the plunger **77** of the motor control switch **74** is released from its depressed position to throw the same to its door locked position de-energizing the motor and conditioning an unlock circuit for re-energization thereof upon termination of the cleaning operation.

After the cleaning operation has been completed, whereby the time set on the oven timer **19** has expired and the oven temperature has dropped to a predetermined safe level, the motor **42** is re-energized through the unlock circuit to rotate further in the clockwise direction to unlock the door. As the motor rotates to the unlocked or neutral position, the respective plungers of the switches **73, 74** are released, with that of the latter beng relaeased at the completion of the motor 360° rotation to de-energize the same and to condition the lock circuit for motor energization to lock the oven door upon initiation of a further oven cleaning operation.

The control circuit **100** for the oven portion of the self-cleaning range **10** is illustrated in FIG. **6** receiving electrical power on first and second power lines **101** and **102** and neutral power line **103.** The oven selector switch **20** in the control circuit is a conventional cam operated multiple pole switch including a number of single pole double throw switches **104*a*** through **104*e***, each including a movable switch arm **105** adjustable to connection with either of first or second fixed contacts **106, 107**; and the connections shown for the selector switch in FIG. **6** set the control circuit **100** for self-cleaning operation. The selector switch **20** also can be adjusted for pre-heat, bake, time bake or broil operation.

The broil and bake heating elements **34, 108** are connected, respectively, by the lines **109, 110** to the switches **104*b*, *c*** for selective connection to the first power line **101,** and such heating elements are also connected by the high temperature thermostat **111** to the clean control switch **73,** which includes a switch arm **112** movable between first and second fixed contacts **113, 114.** The high temperture thermostat **111** is preferably set to open circuit whenever the temperature within the oven cavity **27** exceeds a predetermined maximum level, for example, 950°F, which normally is attained only during self-cleaning operation.

The first fixed contact **113** of the clean control switch is connected via a low temperature oven operation circuit **115,** which includes a line **116** and a conventional adjustable thermostat **117** that controls oven temperature during pre-heating, baking and broiling, to the second power line **102**; and the second fixed contact **114** of the clean control switch is connected by the line **118,** switch **104*a*** when closed for self-cleaning operation, and line **119** to the second power line **102,** bypassing the adjustable thermostat **117.** An oven indicator lamp **120,** preferably located in the control panel **16,** is connectable for energization to indicate oven operation in pre-heat, bake or broil modes by connections via the switch **104*e*** to the first power line **101** and via the movable switch arm **112** and first fixed contact **113** in the clean control switch **73** to the second power line **102.**

The conventional oven timer **19** is connected between the first and neutral power lines **101, 103**; and when set or energized for a duration to control oven operation for time baking or self-clening, closes the normally open first timer switch **121** and throws the movable switch arm **122** in a second timer switch **123** from its normal connection with a first fixed contact **124** to connection with a second fixed contact **125.** The

movable switch arm **122** of the second timer switch is coupled to the first fixed contact **126** of a single pole double throw lock thermostat **127**, which also has a movable switch arm **128** and second fixed contact **129**, the former being connected to the line **118** and the latter being connected to one side of the lock indicator lamp **18**. The lock thermostat **127** is preferably set to operate or to switch at approximately 550°F., which is the normal maximum operating temperature for baking or broiling, whereby below such temperature a connection is made by the switch arm **128** to the first fixed contact **126** and above such temperature a connection is made to the second fixed contact **129**. Moreover, a conventional catalyst heating element **130** is coupled to the first fixed contact **126** of the lock thermostat **127** to heat the oven catalytic exhaust before the oven temperature has exceeded 550° during self-clean operation.

The clean indicator lamp **17** is connected by the line **131** to the first power line **101** and by the line **132**, switch **104***a* when closed as shown, and line **119** to the second power line **102** to indicate when energized that the oven is operating in self-cleaning mode; and an oven lamp **133** is energized by a connection between the movable switch arm **134** and the first fixed contact **135** of the door interlock switch **72** when the oven door is open and is de-energized when such movable switch arm is in connection with the second fixed contact **136** of the door interlock switch when the door is closed.

The neutral lead **80** of the motor **42** is connected to the second fixed contact **136** of the door interlock switch **72**, and the motor power lead **81** is connected to the movable switch arm **137** of the motor control switch **74**. Such movable switch arm is normally in connection with the first fixed contact **138** in the motor control switch, when the oven is operated in preheat, bake, time bake or broil modes, and is thrown into connection with the second fixed contact **139** by the cam surface **61** when the oven door is locked. The motor lock circuit **140** is defined by the first fixed contact **138** of the motor control switch, line **141**, switch **105***d* in the oven selector switch **20** when in position as shown, line **142**, second timer switch **123**, line **143**, lock thermostat **127**, line **118**, switch **104***a* in the oven selector switch when in position as shown, and line **119** to the second power line **102**. Moreover, the motor unlock circuit **144** is defined by the second fixed contact **139** in the motor control switch line **145**, second timer switch **123**, line **143**, lock thermostat **127**, line **118**, switch **104***a* in the selector switch when in position as shown, and line **119** to the second power line **102**.

Exemplary oven **11** and control circuit **100** operation is described below. When the oven selector switch **20** is in the off position, the movable switch arms **105** are centered between respective first and second fixed contacts **106** and **107**, and no connections are made to energize the broil or bake heating elements **34**, **108**. For pre-heating, both the broil and bake heating elements are used for efficiency, and the movable contacts **105***a*, *b*, *c* and *e* in the selector switch **20** are adjusted to connection, respectively, with the second fixed contact **107***a* and the first fixed contacts **106***b*, *c* and *e* in order to energize such heating elements as well as the oven on indicator lamp **120**. For baking the movable contacts **105***c* and *e* are adjusted in connection, respectively, with the first fixed contacts **106***c* and *e* to energize the bake heating element and the oven indicator lamp; and for timed baking the movable contacts **105***c* and *e* are adjusted to connection, respectively, with the second fixed contacts **107***c* and *e* to provide for energization of the bake heating element and oven indicator lamp only when the timer **19** is energized to close the first timer switch **121**, such energization being terminated at the expiration of the duration set on the timer. Moreover, for broiling the movable contacts **105***b* and *e* are adjusted to connection, respectively, with the first fixed contacts **106***b* and *e* to energize the broil element and the oven indicator lamp.

For self-cleaning oven operation, which uses only the bake heating element although the broil or other heating element may alternatively or additionally be used, the oven door **12** is closed throwing the switch arm **134** into connection with the second fixed contact **136** in the door interlock switch **72** to provide a connection for the motor **42** to the neutral power line **103**, and the selector switch **20** is adjusted to the self-clean position to make the connection at switches **104***a*, *c* and *d* as illustrated in FIG. **6**. Setting and energizing the timer **19** for a desired duratiaon of self-cleaning operation closes the first timer switch **121** to energize the bake heating element **108** after the motor has begun. Moreover, the energized timer **19** moves the switch arm **122** in the second timer switch **123** in connection with the second fixed contact **125**, to energize the motor lock circuit **140** to provide power to the motor **42**.

The energized motor **42** then rotates from its initial unlocked position mechanically operating the locking mechanism **40** as described above with reference to FIGS. **1** through **5**. When the motor has rotated approximately 50° from its starting unlocked position, the cam surface **61** actuates the clean control switch **73** throwing the movable switch arm **112** into engagement with the second fixed contact **114** to energize the bake heating element via the line **118**, switch **104***a* in the oven selector switch **20** and line **119**, byassing the adjustable thermostat for self-cleaning operation. At the completion of the motor lock cycle whereby the drive shaft **59** is rotated approximately 180° from its starting unlocked position, the cam surface **61** throws the movable switch arm **137** of the motor control switch **74** into connection with the second fixed contact **139** thereof to de-energize the motor and to condition the motor unlock circuit **144** for unlocking motor energization. The lock thermostat **127** switches when the oven temperature exceeds 550°F. to prevent motor **42** energization during self-cleaning and to energize the lock indicator lamp **18**.

At the expiration of the duration set on the timer **19** ending the self-cleaning oven operation, the first timer switch **121** is opened to de-energize the bake heating element **108**, and the movable switch arm **122** of the second timer switch **123** is thrown into connection with the first fixed contact **124** thereof to further condition the motor unlock circuit **144** for motor **42** re-energization when the oven temperature has dropped below that set on the lock thermostat **127** which closes the unlock circuit. Such re-energization of the motor **42** to complete its 360° operation from the original starting position, unlocks the oven door **12** and throws the movable switch arms **112**, **137** in the clean control and motor control switches **73**, **74** into connection with the respective first fixed contacts **113**, **138** thereof, resetting the low temperature oven operation circuit **115** for normal pre-heating, baking and broiling and con-

necting the motor lock circuit **140** for further energization of the motor upon the initiation of the next cleaning operation.

It should now be understood that the instant invention provides both a novel locking mechanism for the door of a self-cleaning or other oven and also provides for completely automatic locking and unlocking control functions whereby the oven door is automatically unlocked at the expiration of the self-cleaning operation and the oven temperature is dropped to a predetermined safe level.

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

**1.** An oven door lock, comprising latch means operable for locking the door in closed position; means for supporting said latch means to permit movement to and from locking engagement with the oven door; drive means for moving said latch means to and from such locking engagement; means for resiliently coupling said latch means to said drive means; and means for energizing said drive means to move said latch means to lock and to unlock the oven door.

**2.** An oven door lock as set forth in claim **1,** wherein said latch means comprises an elongated rod having one end resiliently coupled to said drive means and another end defining a latch lock portion having a cut-out therein for engagement with a slot formed in the door.

**3.** An oven door lock as set forth in claim **2,** wherein said elongated rod has a longitudinal axis defined between said one and another ends thereof, and the transverse end surface of said rod at said latch lock portion being at an obtuse angle relative to such longitudinal axis.

**4.** An oven door lock as set forth in claim **2,** wherein said elongated rod has a longitudinal axis defined between said one and another ends thereof, and the transverse end surface of said cut-out remote from said one end being at an obtuse angle relative to such longitudinal axis.

**5.** An oven door lock as set forth in claim **1,** wherein said latch means comprises an elongated rod resiliently coupled at one end to said drive means and adapted at the other end for engagement with the oven door, and said means for suporting comprises a channel mounted relative to the oven and in which said elongated rod is movable.

**6.** An oven door lock as set forth in claim **5,** wherein said channel includes a cam slot, and follower means on said elongated rod protruding into said cam slot, whereby movement of said elongated rod by said drive means is limited by said cam slot.

**7.** An oven door lock as set forth in claim **6,** wherein said drive means comprises a motor having a rotatable drive shaft, a member mounted eccentrically relative to said drive shaft for rotation thereby, and said means for resiliently coupling effecting connection between said elongated rod and said member.

**8.** An oven door lock as set forth in claim **7,** wherein said means for resiliently coupling comprises an angle member having first and second relatively perpendicular surfaces, said first surface being ridigly coupled to said eccentrically mounted member and said second surface having an opening through which a mounting arm portion of said elongated rod extends, and a spring coupled to said mounting arm portion and abutting said second perpendicular surface, whereby said spring precludes withdrawal of said mounting arm portion from said opening and normally provides a force to maintain the door under closing force when locked applying pressure to the oven door seal to prevent heat loss from the oven.

**9.** An oven door lock as set forth in claim **1,** wherein said drive means comprises a motor having a rotatable drive shaft, a member mounted eccentrically relative to said drive shaft for rotation thereby, and said means for resiliently coupling effecting connection between said elongated rod and said member.

**10.** An oven door lock as set forth in claim **9,** wherein said means for resiliently coupling comprises an angle member having first and second relatively perpendicular surfaces, said first surface being rigidly coupled to said eccentrically mounted member and said second surface having an opening through which a mounting arm portion of said elongated rod extends, and a spring coupled to said mounting arm portion and abutting said second perpendicular surface, whereby said spring precludes withdrawal of said mounting arm portion from said opening and nornmally provides a force to maintain the door under closing force when locked applying pressure to the oven door seal to prevent heat loss from the oven.

**11.** An oven door lock as set forth in claim **10,** further comprising a cam member attached to said motor drive shaft and rotatably thereby, said eccentrically mounted member being mounted on said cam member, and control switch means electrically copuled in said means for energizing for controlling the same, said control switch means being positioned to be thrown by said cam member as the latter is rotated.

* * * * *