

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 September 2001 (27.09.2001)

PCT

(10) International Publication Number  
**WO 01/70087 A2**

(51) International Patent Classification<sup>7</sup>: **A47J 37/06**,  
27/62

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(21) International Application Number: PCT/CA01/00353

(22) International Filing Date: 19 March 2001 (19.03.2001)

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(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/190,552 20 March 2000 (20.03.2000) US  
09/568,419 10 May 2000 (10.05.2000) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,  
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,  
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,  
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(63) Related by continuation (CON) or continuation-in-part  
(CIP) to earlier application:  
US 09/568,419 (CIP)  
Filed on 10 May 2000 (10.05.2000)

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,  
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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Published:

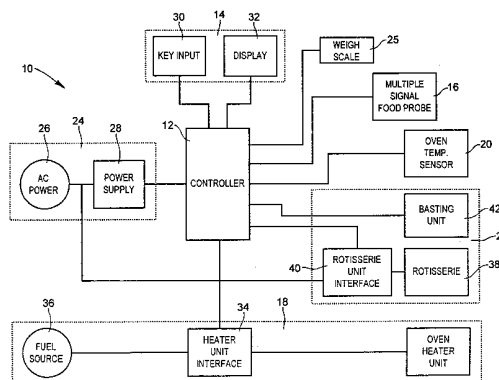
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— *without international search report and to be republished  
upon receipt of that report*

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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR AUTOMATIC COOKING



(57) Abstract: An automatic cooker for cooking food includes a heating unit, a controller, a power supply, at least one food probe and a control panel. The heating unit has a cavity therein for heating the food and a cavity temperature controller. The controller is electrically connected to the cavity temperature controller of the heating unit and the controller includes control data for comparing at least a plurality of foods and a plurality of doneness to internal food temperature. The power supply is electrically connected to the controller. The at least one food probe is electrically connected to the controller. Each probe is adapted to be inserted in the food when the food is in the cavity during cooking and is adapted to provide data to the controller with regard to the internal temperature of the food. The control panel is electrically connected to the controller and it includes a method of inputting food type and doneness from which the controller determines the required internal food temperature for a selected food and doneness. A method of automatically cooking uses the steps of providing control data, selecting a food from the plurality of foods, selecting a doneness from the plurality of doneness settings, determining the done internal food temperature from the control data, and indicating when the internal food temperature reaches the done internal food temperature. The control data includes comparisons of at least a plurality of foods and a plurality of doneness settings to internal food temperature.

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## METHOD AND APPARATUS FOR AUTOMATIC COOKING

### FIELD OF THE INVENTION

This invention relates to cookers and in particular to automatic cookers for use in association with ovens and rotisseries.

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### BACKGROUND OF THE INVENTION

Cooking and cookers are exceedingly old. Society has progressed very far from the days of cooking over an open fire. A chef now has a wide variety of choices with regard to cookers. These choices range from microwave, conventional oven to wood burning ovens. Typical conventional ovens use gas, infrared or electricity as heat sources. Each of these cookers has different attributes in terms of cost, capability, manual or automatic control, safety and decor. With the exception of microwave ovens, most of these cookers have at least a very simplistic method of displaying the functions. For a conventional oven, the user can typically select mode (e.g. bake or broil) and temperature. Some conventional ovens allow the user to preselect the start time and the end time. Conventional ovens do not allow the user to select the type of food and the doneness and then have the oven determine when the food is cooked.

Studies have shown that there are potential health advantages to cooking with heat rather than microwaves. In certain instances the likelihood of killing harmful bacteria is increased when cooking with heat rather than microwaves. Further, for some users cooking in a conventional oven rather than in a microwave is much more flexible with regard to cooking options like searing, crispness and basting. Further with microwaves it is often difficult to effectively cook to a specific doneness, since cooking continues even after the food is taken out of the microwave oven. In addition, food cooked in a microwave often results in inconsistent doneness. This is particularly true when the thickness of the food is variable and/or the water content is variable.

Rotisseries are included in many conventional ovens however

typically the methods of control are very limited. As discussed above with regard to conventional ovens rotisseries are not automatically controlled in regard to doneness nor are they adapted to indicate when a doneness level is reached.

Accordingly it would be advantageous to provide a conventional oven that allows the user to input the type of food and the doneness and have the oven determine when the food is done. Further it would be advantageous if this automatic conventional oven also allowed the user to determine crispness and searing. In addition it would be advantageous if this automatic conventional oven included a rotisserie option and a basting option. Still further, it would be advantageous to provide a rotisserie that indicates when food has reached a predetermined doneness.

### SUMMARY OF THE INVENTION

The present invention relates to an oven, including a heating source which can be supplied by either electricity, gas or the like; a controller; a single or multiple probe(s) to measure the temperature of the food; a temperature probe for sensing the internal temperature of the oven; a method of entering selections, for example pushbuttons, keypad or touch screen located over a display screen; a display capable of showing the selections available for the particular foods as well as status of the oven; an interface to control the heat generated by the heater; and a power supply for the controller and the various elements. The controller uses embedded cooking schemes to determine the appropriate temperature of the oven and set it accordingly so as to automatically cook the food pursuant to the selections of the user.

In one aspect of the present invention an automatic cooker for cooking food includes a heating unit, a controller, a power supply, at least one food probe and a control panel. The heating unit has a cavity therein for heating the food and a cavity temperature controller. The controller is electrically connected to the cavity temperature controller of the heating unit and the controller includes control data for comparing at least a plurality of foods and a plurality of doneness to internal food temperature. The power supply is

electrically connected to the controller. The food probe is electrically connected to the controller. Each probe is adapted to be inserted in the food when the food is in the cavity during cooking and is adapted to provide data to the controller with regard to the internal temperature of the food. The control panel is

5. electrically connected to the controller and it includes a method of inputting food type and doneness from which the controller determines the required internal food temperature for a selected food and doneness.

In another aspect of the invention a method of automatic cooking includes the steps of providing control data, selecting a food from the plurality of

10 foods, selecting a doneness from the plurality of doneness settings, determining the done internal food temperature from the control data, and indicating when the food internal temperature reaches the done internal food temperature. The control data includes comparing at least a plurality of foods and a plurality of doneness settings to internal food temperature.

15 In a further aspect of the invention a rotisserie device for use in association with a heating unit and food includes a shaft to skewer the food, a motor connected to the shaft to rotate the shaft and a thermo-electric power source electrically connected to the motor. The thermo-electric power source converts heat energy into electrical energy to drive the motor. The rotisserie

20 device may also include at least one food probe for determining the internal temperature of the food; a control device electrically connected to the thermo-electric power source; and an indicator electrically connected to the thermo-electric power source and the control device. The control device includes control data for comparing at least a plurality of foods and a plurality of doneness

25 settings to internal food temperature. The indicator indicates when the internal temperature of the food reaches a preselected temperature.

Further features of the invention will be described or will become apparent in the course of the following detailed description.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

30 The invention will now be described by way of example only, with

reference to the accompanying drawings, in which:

Fig. 1 is a block diagram of the automatic cooker of the present invention;

Fig. 2 is a perspective view of an automatic cooker oven  
constructed in accordance with the present invention;

Fig. 3 is a sample touch screen used in the oven of fig. 2;

Fig. 4 is a sample touch screen of the present invention showing a first selection screen;

Fig. 5 is a sample touch screen of the present invention showing a second selection screen;

Fig. 6 is a sample push button control panel of the present invention showing a doneness selection screen;

Fig. 7 is a sample push button control panel of the present invention showing a start time selection screen;

Fig. 8A and 8B is a chart of sample cooking schemes that form part of the preprogramed database for use in the controller of the present invention;

Fig. 9 is schematic diagram of the rotisserie of the present invention;

Fig. 10 is a block diagram of the rotisserie of the present invention;

Fig. 11 is a sectional view of the rotisserie of the present invention shown in a barbeque;

Fig. 12 is a perspective view of table top automatic cooker oven of the present invention showing the auto cooking mode;

Fig. 13 is a front view of a control panel of the table top automatic cooker oven of fig. 12 showing the auto cooking mode;

Fig. 14 is a perspective view of table top automatic cooker oven of the present invention showing the time temperature cooking mode;

Fig. 15 is a front view of a control panel of the table top automatic cooker oven of fig. 14 showing the time temperature cooking mode;

Fig. 16 is a perspective view of a vertical automatic cooker rotisserie of the present invention;

Fig. 17 is a front view of a control panel of the vertical automatic cooker rotisserie of fig. 16 showing the auto cooking mode;

Fig. 18 is perspective view of a rotisserie unit of the present invention shown in an oven; and

5 Fig. 19 is a blown apart perspective view of an alternate embodiment of a table top automatic cooker oven of the present invention showing an additional top bracket.

### DETAILED DESCRIPTION OF THE INVENTION

Referring to figure 1, a block diagram of the thermo-electric automatic cooker of the present invention is shown generally at 10. Automatic  
10 cooker 10 includes a controller 12, control panel 14, a food probe 16, an oven or other heating unit 18, a temperature sensor 20, advanced cooking accessories 22 and a power source 24. The automatic cooker 10 may also include a weigh scale 25.

15 The power source 24 includes an A/C power input 26 which is an ordinary A/C power input. The A/C power input 26 is connected to the power supply 28. The power supply 28 may be built in a number of different ways. For example the power supply 28 may be a transformer which can reduce the voltage after which it is rectified and regulated to the appropriate level as  
20 required by the control circuits. Alternatively the power supply 28 may be rectified and followed by a controller to be pulse width or frequency adjusted together with a small higher frequency isolation transformer with feedback to establish the required voltage levels required by the control circuits. It will be appreciated by those skilled in the art that there are a number of other ways of  
25 meeting power requirements of automatic cooker 10.

The control panel 14 includes input pads or keys 30 and a display 32. The key inputs 30 allow the user to make selections or control other functions. The key inputs 30 may be single function pushbuttons, multipurpose pushbuttons grouped as in a matrix, a touch type as in a touch-screen or a  
30 combination. Key inputs 30 allow the user to make the selections or input

information as to what is to be cooked, doneness, other cooking options and ultimately start the cooking process or set the start time.

Where key inputs 30 are pushbuttons the pushbuttons could include but are not limited to 1) Select, 2) Enter, Go back/Reset, 3) Start, 4) Pause/Stop, 5) Clock. Alternatively where key inputs 30 are through a touch-screen, the touch-screen could show the selection possibilities and touching the screen at the corresponding area would make the selection. The user can select from a number of preselected information. For example the user can select the type of food (e.g. beef, veal, pork, ham, chicken etc.) and the doneness (e.g. very rare, rare, medium rare, medium, medium well or well done, etc.). In addition, preferably the user can make a crispness selection (e.g. slightly brown, browned, crisp or extra crisp etc.), a basting selection (e.g. none, light, moderate or heavy etc.) and cut (e.g. roast, chop, ribs etc.)

The display 32 is used to show the user selections and the status of the automatic cooker 10. The display 32 may have different formats as determined by the manufacturer. For example the display 32 may include a plurality of simple indicators which have beside each indicator the function that it represents. Alternatively the display 32 may include an alphanumeric type display made with single or multiple lines to display the selections or functions desired. As a further alternative the display 32 may consist of a graphics type of display with both alpha and numeric characters as well as graphic symbols to indicate the functions. As discussed above the display 32 may also have a touch sensitive panel attached to it for key input 30 selections.

Referring to figure 2 an example of the automatic cooker of the present invention is shown in an oven 33. The oven includes a rotisserie 35, a control panel 37 a basting container 39 and a bell or other sound generator 41. Temperature probes 43 are operably connected to the control panel 37. Sample control panels are shown in figures 3 - 7. In figures 4 and 5 two samples of a touch screen control panel are shown. An example of a first selection screen is shown at 45 (figure 4) and a sample second screen after Beef has been selected is shown at 47 (figure 5). In figures 6 and 7 two samples of a pushbutton control

panel are shown. An example of a doneness selection screen wherein Beef and Rump Roast have already been selected is shown at 49 (figure 6) and a similar screen wherein cooking has started is shown at 51 (figure 7).

5 The food probe 16 may include one or a plurality of probes. The food probe 16 measures the internal temperature of the food being cooked. Preferably a plurality of probes are used such that the data can be used to provide a more complete picture of the states of cooking. The data obtained by food probe(s) 16 and where present the weigh scale 25 is used in connection with the cooking scheme embedded in the controller 12 to establish the state of  
10 cooking of the food. Food probe(s) are inserted into the center of the food and will feedback the information to the controller. Food probes 16 and where present weigh scale 25 provide data to the controller 12 which are then compared with the preselected cooking scheme to determine the next steps or to determine whether the cooking is done.

15 The multi-probe 16 embodiment provides the controller with additional data to help determine when the food is done. For example the information from the probes can be arranged such that cooking will continue as long as at least one of the probes has a reading that is below a minimum temperature for killing bacteria for that particular food. Once each of the probe  
20 shows a reading that is over the minimum threshold the average or median temperature or a combination thereof can be determined to determine when the food is cooked.

There are a number of methods of obtaining the food temperature in an electrically readable format. For example food probe 16 may be semi-  
25 conductor device, thermal-couple elements or temperature dependent resistors. Preferably food probe 16 is embedded in prongs on which the food is placed. The food is placed in such a way that the tip of probe 16 is in the center or thickest portions of the food. In a multiple food probe 16 arrangement the controller 12 includes a method of taking the plurality of monitored temperatures  
30 and calculating the internal temperature of the food. Each different type of probe has special interfacing requirements to allow the controller to read the data. Also

the inputs may not be linear with temperature and special circuitry and/or software embedded in the controller is used to obtain the correct data.

The temperature sensor 20 provides feedback to the controller 12 with regard to the operating temperature in the heating unit 18. The heating unit temperature is used by the controller in connection with the selected cooking scheme to generate the proper cooking environment in the oven as required by the selected food and type. The resultant output from the controller 12 is used by the heater unit interface 34 to control the amount of heat generated in the oven cavity of the heating unit 18. The temperature sensor 20 may be made in the same manner as the food sensing probes 16 described above.

The heating unit 18 is adapted to heat the oven cavity in the automatic cooker 10 wherein heat is used for the cooking of the food. There are a number of different fuel sources 36 that may be used, for example electric, gas or the like. Where electricity is used there are a number of ways to generate heat, these include resistive wire, infrared heating elements, ceramic heating elements or the like. Alternatively, in case of gas a burner unit with open flame is the normal heating source. Further, ultraviolet heating can be used for heating the food and the power source therefor may be gas, electric or the like.

The heater unit interface 34 controls the amount of heat generated by the heater unit 18 and is continually adjusted by the automatic oven controller 12. The heater unit interface 34 is the control element for the oven heater be it electric or gas. It is controlled by the automatic oven controller 12 which supplies sufficient energy for the oven heater.

In case of an electric fuel source 36, the heater unit interface 34 can consist of a relay or semiconductor device. With a relay it will be time controlled whereas with a semiconductor the device may be using pulse width control, frequency control or proportional control.

In case of a gas fuel source 36, the heater unit interface 34 will have a valve arrangement to control the flow of gas supply to the heater. The valve can be either time controlled on/off or a continuous mode of flow control.

Preferably automatic cooker 10 includes a rotisserie 38 and a

roisserie interface 40. The rotisserie 38 may cause the food to be continuously rotated at various speeds as required to cook the preselected food. Alternatively the rotisserie interface 40 may cause the rotisserie 38 to be selectively rotated, as may be required for a steak wherein the steak is kept in one position then  
5 rotated to a specific angle in relation to the heating source to accomplish better searing of the steak. The speed of rotation may be varied by the rotisserie interface 40 depending on the input information. The rotisserie 38 typically includes a retractable juice pan which is spaced below the food for collecting the juices during the cooking process.

10 In addition, preferably automatic cooker 10 includes a basting unit 42. Basting unit 42 allows a user to include a basting liquid in the cooking process which the automatic cooker 10 will dispense. The basting unit may include a perforated pipe that is spaced above the rotisserie or other food tray with a solenoid valve in flow communication therewith. Basting liquid is provided  
15 to the perforated pipe at predetermined intervals and allowed to fall onto the food.

The controller 12 is the central unit which controls the automatic cooker 10. The controller receives data from the key input 30, food probe 16 and temperature sensor 20. The controller outputs data to the display 32, the  
20 heater unit interface 34, rotisserie interface 40 and basting unit 42. The controller 12 receives data from the key input 30 and uses this data with data in its embedded database to set up a particular cooking scheme for the selected food. With data from the oven temperature sensor 20, the controller 12 controls and maintains the correct oven temperature as required for the selected food via  
25 the heater unit interface 34. The controller 12 receives data from the food probe(s) 16 which is used to establish the completeness of cooking. As well the controller 12 uses this data to determine changes in oven temperature to obtain the selected finished result as determined by the preselected cooking scheme.

30 In use the user will input their selection through key input 30. From this information the controller 12 determines a cooking scheme which includes the oven temperature and where applicable the food temperature when it

reaches the preselected doneness. In addition the scheme may include searing data, cooking data, basting data, crispness data and no heat cycle. A chart of a sample of such schemes is shown in figure 8 (A & B) . Accordingly the cooking process may be completely automated. As can be seen from figure 8 (A & B) the cooking scheme may include such information as searing, doneness, basting, crisping and no heat cycle. The searing information may include the temperature, the time, if rotation of the rotisserie occurs, the number of rotations or parts thereof and the speed of the rotation. The cooking information may include the temperature for the heating unit, the rotation speed of the rotisserie and the duration which will vary and may continue until the crispening starts, the doneness is reached or the preset time is reached. The basting cycle will take place during the cooking cycle and the basting information may include the interval between basting and the number of rotations of the rotisserie per basting. *The crispening information includes the temperature of the oven during crispening.* The crispening cycle would be initiated after the cooking cycle and prior to the food reaching the doneness temperature. The no heat cycle occurs after the crispening cycle wherein the rotation of the rotisserie is typically held at normal for a predetermined period of time. It will be appreciated by those skilled in the art that a comprehensive list of cooking schemes will be provided to the controller so that a wide range of cooking scheme is available to the user for a particular piece of food, with user selected searing, doneness and crispness levels.

The following selections are given as an example only of possible selections and it will be appreciated by those skilled in the art that there are a wide variety of other selections that could also be included. The selections included may be determined by the manufacturer of the automatic cooker.

The example selections herefollowing, follow a specific order wherein the first selection that is made will limit the subsequent selections that are available. These selections would be made on a control panel such as those shown in figures 4 and 5.

1) Type of Food - Beef;

- 5
- 2) Cut of the food type - Rib eye;
  - 3) Doneness - Medium rare;
  - 4) Crispness - Browned;
  - 5) Basting - Moderate; and
  - 6) Start - In one hour.

### **Type of Food**

The following choices may be available but are not limited by this list:

- 10
- 1) Beef
  - 2) Veal
  - 3) Pork
  - 4) Ham
  - 5) Chicken
  - 6) Turkey
  - 7) Poultry
  - 15 8) Bison
  - 9) Game animal
  - 10) Fish
  - 11) Potato
  - 12) Vegetables
  - 20 13) Other recipes

### **Cut of food selection**

Each of the above listed food selections has its own sub-selections. Only one selection is shown herebelow as an example. Where beef is selected, the following cuts of foods may be available but are not limited by this list:

- 25
- 1) Rib Eye
  - 2) Rib
  - 3) Tenderloin
  - 4) Brisket
  - 5) Chuck roast

- 6) Eye round
- 7) Round tip
- 8) Tri tip
- 9) Rump roast
- 5 10) Breaded Beef
- 11) Spare ribs
- 12) Beef steak
- 13) Beef burger

**Doneness selection**

- 10 The following selections may be available but are not limited by this list:
  - 1) Very rare
  - 2) Rare
  - 3) Medium Rare
  - 4) Medium
  - 15 5) Medium well
  - 6) Well done

**Crispness selection**

- The following selections may be available but is not limited by this list:
  - 1) Slightly brown
  - 20 2) Brownd
  - 3) Crisp
  - 4) Extra crisp

**Basting selection**

- The following selections may be available but is not limited by this list:
  - 25 1) Non
  - 2) Light
  - 3) Moderate

4) Heavy

### **Start of cooking**

This is selected once all cooking parameters have been made. It will start the cooking process. Alternatively the user may choose to postpone the start time.

## **5 ROTISSERIE**

Referring to figure 9 a schematic diagram of a rotisserie is shown generally at 50. Rotisserie 50 includes a rotatable shaft 52, food probes 54, a drive 56 and a control device 58.

10 Drive 56 includes a motor 60 to drive the shaft and thermo-electric power module 62. In an embodiment where the drive is situated in a heating unit, drive 56 is capable of operating in a 350-400 °C temperature environment. The thermo-electric power system 62 is used to produce power to drive motor 60. That is thermo-electric power system 62 converts heat energy into electric energy to drive motor 60. In one embodiment motor 60 is a 2V DC, 10W motor and thermo-electric module produces 2.5-3.5VDC at 8Watts, which can be  
15 regulated to 2VDC if desired. This will allow the rotisserie to be operated at low speeds of 2- 6 rpm against low friction. A regulator 92 may be included to regulate the power to the motor and the speed of rotation. Alternative a battery may be used either alone or in conjunction with the regulator 92.

20 The rotisserie 50 shown herein is powered by a thermo-electric power system 62. Alternatively it could be powered by a DC battery. A further alternative is that rotisserie 50 could be powered by an AC power source as discussed above with regard to automatic cooker 10.

25 The food probes 54 are in the form of forks and include a fixed fork 64 and a sliding fork 66. Sliding fork 66 includes a sliding fork fastener 68. Preferably sliding fork fastener 68 is a quick release type fastener wherein turning the lever one half turn tightens the fastener. As discussed above the food probe can have a number of embodiments.

Shaft 52 has a pointed end 72 for spearing the meat. The other end 74 is removable from motor 60. Pointed end 72 is releasably supported by support 76. Spaced below the shaft 52 is a juice pan 78. Juice pan 78 is provided with a lid 80 that has a plurality of holes therein. The lid is arranged such that the peripheral edges slope downwardly towards the center such that when juice lands thereon it flows through the holes as it flows towards the center of the lid.

A temperature sensor 82 is used to monitor the temperature of the cooking space. A loud bell or a speaker 84 is used to alert the user that the meat is done. The noise may repeat or continue until the user disconnects it.

A control device 58 is shown in a simplified form. Control device 58 includes a meat selector dial 86 and a doneness dial 90. The control device 58 is electrically connected to thermo-electric power module 62 which in turn is electrically connected to probe 54 and may be connected to the temperature sensor 82. The control device may be electro-mechanical such that the meat and the doneness are set mechanically without the need for power. Alternatively the control device may be an electronic device that would require power to operate.

Accordingly, the user can set the meat and the doneness and the bell will ring when the meat is done. The rotisserie 50 will determine when the meat is done based on probe temperature. Accordingly the control device 58 receives data from food probe 54 in the middle of the meat and in some circumstances the temperature probe 82 which provides the temperature gradient from the oven temperature. Based on this data and the data input from the meat selector dial 86 and the doneness dial 90 the control panel 58 will determine when the cooking is done.

The device shown in figure 9 is a rotisserie unit that could be used in any already installed oven. Alternatively the rotisserie 50 could be used as an integral rotisserie 38 described above. Further rotisserie 50 could be incorporated into a barbeque. The location of rotisserie 50 will determine the type of components used. For example in a barbeque application it would be

possible to locate the motor outside the barbeque lid thereby reducing the temperatures that the motor would be required to withstand. Further it will be appreciated that it would be possible to locate some of the electronics proximate to the motor but have the majority of the electronics in a remote control device that would send the information by infra red or other remote mechanism.

Referring to figure 10 a block diagram of a rotisserie of the present invention is shown at 91. As discussed above the rotisserie includes an audible sound or bell 84, a motor 60 and a thermo-electric control system 62. The doneness control 92 may include a meat selector 86 and doneness selector 90 of the control device 58 shown in figure 9. Preferably rotisserie 91 includes multiple internal temperature sensor probes 94.

The thermo-electric control system 62 includes a generator 96 for transforming the heat energy into electric energy. Generator 96 may be a semiconductor or the like. One side of generator 96 is heated by the barbeque heat source while the other is cooled by ambient air with the use of a heat sink 97 (not shown in figure 9 but shown in figures 10 and 11). Generator 96 delivers power to motor 60. Preferably generator 96 provides power to motor 60 via a regulator 98 and an electronic speed controller 100. Regulator 98 receives power from generator 96 and delivers a constant voltage to electronic speed controller 100. A number of different regulators may be used herein. For example a potentiometer may be used or a simple electronic circuit using semiconductors and/or in integrated circuits and resistors or capacitors may be used.

Electronic speed controller 100 is used to vary the speed of the rotisserie 91 as desired and may be varied depending on the meat being cooked. A number of different speed controllers may be used herein. For example speed controller 100 may be a simple electronic circuit using semiconductors and/or integrated circuits and resistors or capacitors.

Motor 60 drives rotisserie 91 and may be connected via an adjustable gear box 102. Adjustable gear box 102 may have a mechanical speed controller 104 connected thereto. The mechanical speed controller 104 in

conjunction with adjustable gear box 102 allows the user to vary the speed among fixed increments using different gear ratios to control the revolutions per minute. It will be appreciated by those skilled in the art that the manufacturer has a number of choices when constructing the rotisserie of the present invention. For example an electronic speed controller 100 could be used or alternatively a mechanical speed controller 104 could be used.

Preferably multiple internal temperature sensor probes 94 are used to determine the internal temperature of the food being cooked. However it will be appreciated that a single sensor could also be used. As discussed above the sensor probes can be mechanical type sensors, expansion type sensors, electronic type sensors or the like.

The output of the sensor probes 94 is connected to a thermometer 106 which indicates the internal temperature of the food being cooked. A number of different types of thermometers may be used herein. Thermometer 106 may be mechanical type thermometer, expansion type thermometer, electronic type thermometer or the like. In the case of an electronic type thermometer a simple electronic circuit using semiconductors and/or integrated circuits and resistors or capacitors may be used.

The output of the sensor probes 94 is also connected to the doneness control 92. The doneness control 92 is connected to the audible sound device 84 such that when the temperature of the preselected doneness is reached an audible sound will be generated. A number of different doneness control 92 and audible sound device 84 may used herein. For example doneness control 92 may be a mechanical type, an expansion type, an electronic types or the like. Similarly the audible sound device 84 may be a mechanically operated bell or and electronic circuit with a speaker, a piezo sounder, a buzzer or the like.

Referring to figures 11 the rotisserie of the present invention is shown used in a barbeque 110. The rotisserie includes a thermo-electric power generator 96 and a heat sink 97 as described above. The thermo-electric generator 96 is connected by an electric cable 112 to the motor 60. Motor 60

rotates rotisserie rod 114. Thermo-electric generator 96 is also connected to the audible sound device 84, a rotisserie speed controller 116 and a doneness control 92. As described above rotisserie speed controller 116 may be electronic or mechanical or a combination thereof. Barbeque 110 may be placed on stand 118.

Referring to figure 11 a removable fork 120 is releasably attached to rotisserie rod 114 at one side of the barbeque. At the other side a fork 122 including multiple internal temperature probe is attached to rotisserie rod 114. Forks 120 and 122 rotate as rotisserie rod 114 rotates.

## ALTERNATES

The method of automatically cooking food of the present invention can be implemented in different cooking devices. Some non-limiting examples are shown in figures 12 - 18. For example a table top oven is shown generally at 130 in figures 12 and 14. The table top oven 130 includes a control panel 132, a basting container 134 and a bell or sound device 136. Temperature probes 138 (not used in figure 14) are operably connected to the control panel 132. A sample control panel 132 is shown in figure 13 showing the automatic cooking mode. Referring to figures 14 and 15 time and temperature mode cooking is shown that would be used for example in association with fish.

Referring to figure 16 rotisserie 140 has a shaft that is oriented vertically. Rotisserie 140 can be a stand alone unit that includes a rotating unit 142, a control panel 144, a basting container 146 and a bell or other audible device 148. Temperature probes 150 are operably attached to the control panel 144. A sample control panel 144 is shown in figure 17.

The rotisserie 160 of the present invention could also be a unit that can be set inside an oven 162, as shown in figure 18. As discussed above rotisserie 160 includes a motor 164, a thermo-electric power generator 166 and a control device 168. The motor 164 is connected by an electric cable 170 to a heat sink 172. The rotisserie 160 includes a plurality of temperature probes 174 operably connected to the control device 168 and a bell or audible device 176.

Referring to figure 19 an alternate embodiment of the table top or under a shelf embodiment is shown generally at 180. The table top oven 180 includes a control panel 182, a basting tray 184 and a rotisserie 186.

Temperature probes (not shown) are operably connectable to the oven 180. A top bracket 188 may be attached to the oven 180. Basting tray 184 may serve as a weigh scale or alternatively rotisserie may include a weigh scale. The top bracket 188 insulates the top of the oven 180 and therefore allows the user to place the oven 180 close to cabinets or underneath cabinets.

## GENERAL

The automatic cooker 10 of the present invention is a device that allows the user to cook food by inputting the type of food and where applicable the cut, the doneness and other parameters and the automatic cooker then cooks the food and indicates when the food is cooked. Accordingly the automatic cooker provides a fully selectable operation of cooking depending solely on what the finished product should be. Further, the automatic cooker provides an easy means of selection depending on the type of food, the cut of the food, the doneness, the crispness and the like. In addition the automatic cooker provides a unit that allows the food to be basted. The automatic cooker provides an increased consistency of the cooking as compared to conventional cooking methods. Accordingly the user need not guess the required time for cooking nor does the user need to guess the weight of the food.

As described above the automatic cooker 10 includes a controller 12 to automatically control the application of the heat source and to maintain the temperature in the oven cavity depending on the preselected scheme of cooking to obtain the desired results.

As discussed above there are a wide variety of display options with regard to the information displayed and the way that information is displayed. The display may show the selections available for each type of food as well as the selections made. In addition the display may also show actual time of the day.

There are a number of advantages that can be realized by the automatic cooker. For example the embedded database which is used to determine the particular cooking scheme can be based on information from various government agencies such as the FDA (Food and Drug Administration),  
5 USDA (US Department of Agriculture) and FSIS (Food Safety and Inspection Service). By using these parameters the automatic cooker will reduce the likelihood of not killing certain bacteria by not cooking the food to the appropriate temperature or at the appropriate temperature controlled heating cavity.

Rotisserie cooking is generally fast and healthier and the automatic  
10 cooker provides for this type of cooking. The rotisserie is provided with a pan for collecting the juices during the cooking process. Further, the rotisserie may continue to rotate after the heating or cooking has stopped for say 20 minutes. This generally allows for the even distribution of the juices in the food.

It will be appreciated that the above description related to the  
15 invention by way of example only. Many variations on the invention will be obvious to those skilled in the art and such obvious variations are within the scope of the invention as described herein whether or not expressly described.

WHAT IS CLAIMED AS THE INVENTION IS:

1. An automatic cooker for cooking food comprising:

a heating unit having a cavity therein for heating food and a cavity temperature controller;

5 a controller electrically connected to the cavity temperature controller of the heating unit, the controller having control data for comparing at least a plurality of foods and a plurality of doneness to internal food temperature;

a power supply electrically connected to the controller;

10 at least one food probe electrically connected to the controller, the probe being adapted to be inserted in the food when the food is in the cavity and adapted to provide data to the controller with regard to the internal temperature of the food; and

15 a control panel electrically connected to the controller having input means for inputting food and doneness wherein the controller determines a done internal food temperature for a selected food and doneness.

2. An automatic cooker as claimed in claim 1 further including a cavity temperature sensor electrically connected to the controller, the cavity temperature sensor providing cavity temperature data to the controller and wherein the control data further compares temperature of the cavity to internal food temperature.

3. An automatic cooker as claimed in any preceding claim further including an indicator operably connected to the controller for indicating when the internal food temperature reaches the done internal food temperature.

25 4. An automatic cooker as claimed in any preceding claim wherein the control panel further includes an output means to display the internal food temperature.

5. An automatic cooker as claimed in any preceding claim further including a

plurality of food probes and wherein the plurality of food probes are used to determine an internal food temperature.

6. An automatic cooker as claimed in any preceding claim wherein the heating unit is a gas oven.

5 7. An automatic cooker as claimed in any preceding claim wherein the heating unit is an electric oven.

8. An automatic cooker as claimed in any preceding claim further including a rotisserie electrically connected to the controller.

10 9. An automatic cooker as claimed in any preceding claim further including a basting unit electrically connected to the controller.

10. An automatic cooker as claimed in any preceding claim wherein the food probe is a semi-conductor device.

11. An automatic cooker as claimed in any preceding claim wherein the food probe is a thermal-couple.

15 12. An automatic cooker as claimed in any preceding claim wherein the food probe is a temperature dependent resistor.

13. An automatic cooker as claimed in any preceding claim wherein the control panel includes a touch screen.

20 14. An automatic cooker as claimed in any of claims 1 to 12 wherein the control panel includes a plurality of pushbuttons.

15. An automatic cooker as claimed in any preceding claim further including a

top bracket.

16. An automatic cooker as claimed in any preceding claim further including a means for measuring a weight of the food.

17. A method of automatic cooking for use in association with a heating unit and food comprising the steps of:

providing control data for comparing at least a plurality of foods and a plurality of doneness settings to internal food temperature;

selecting a food from the plurality of foods;

selecting a doneness from the plurality of doneness settings;

determining a done internal food temperature from the control data;

and

indicating when the internal food temperature reaches the done internal food temperature.

18. A method of automatic cooking as claimed 17 further including the steps of determining a heating temperature for the heating unit and setting the heating unit to the heating temperature.

19. A method of automatic cooking as claimed in any of claims 17 and 18 further including the step of setting the heating unit temperature to zero when the internal food temperature reaches the done internal temperature.

20. A method of automatic cooking as claimed in any of claims 17 to 19 wherein the control data further compares a plurality of crispness settings and further including the steps of selecting a crispness from the plurality of crispness settings, determining a crispness temperature for the heating unit, determining a crispness internal food temperature to initiate a crispness cycle and setting the heating unit to the crispness temperature after the internal food temperature has reached the crispness internal food temperature.

21. A method of automatic cooking as claimed in any of claims 17 to 20 further including the step of rotating the food.

5 22. A method of automatic cooking as claimed in any of claims 17 to 21 wherein the control data further compares a plurality of rotating speed and further including the steps of determining the rotating speed and setting the rotating speed.

23. A method of automatic cooking as claimed in any of claims 17 to 22 further including the step of basting the food.

10 24. A method of automatic cooking as claimed in any of claims 17 to 23 further including the step of providing a weight of the food and the weight is used in determining the done internal food temperature.

25. A method of automatic cooking as claimed in claim 24 wherein the weight is determined by the heating unit.

15 26. A rotisserie device for use in association with a heating unit and food comprising:  
a shaft to skewer the food;  
a motor connected to the shaft to rotate the shaft; and  
a thermo-electric power source electrically connected to the motor  
20 wherein the thermo-electric power source converts heat energy into electrical energy to drive the motor.

25 27. A rotisserie device as claimed in claim 26 further including at least one food probe for determining the internal temperature of the food; a control device electrically connected to the thermo-electric power source; and an indicator electrically connected to the thermo-electric power source and the control device; wherein the control device includes control data for comparing at least a

plurality of foods and a plurality of doneness settings to internal food temperature; and wherein the indicator indicates when the internal temperature of the food reaches a preselected temperature.

5 28. A rotisserie device as claimed in any of claims 26 and 27 further including a plurality of food probes.

29. A rotisserie device as claimed in any of claims 26 to 28 further including a speed controller connected to the motor to control the speed of rotation of the shaft.

10 30. A rotisserie device as claimed in any of claims 27 to 29 further including a thermometer connected to the at least one food probe for displaying the internal temperature of the food.

31. A rotisserie device as claimed in any of claims 26 to 30 wherein the rotisserie device is adaptable to be installed in a barbeque.

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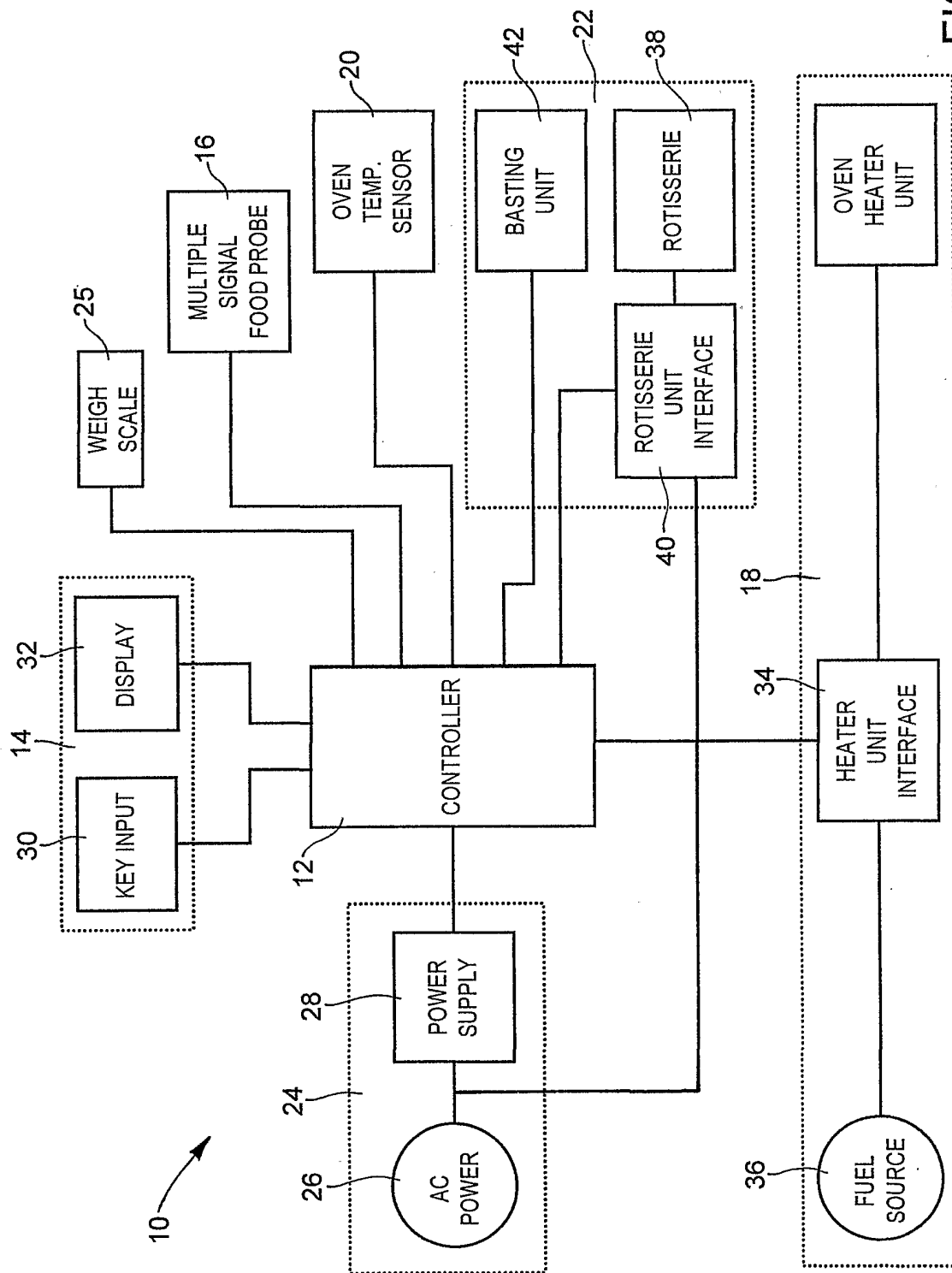


FIG. 1

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37

|            |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                              |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <p><u>SELECTIONS</u></p> <p>BEEF</p> <p>RUMP ROAST</p> <p>MEDIUM WELL</p> <p>CRISP</p>                                                                                                                                                                                                                                                                             | <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">NON</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">LIGHT</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">MODERATE</div> <div style="border: 1px solid black; padding: 5px;">HEAVY</div> |
| 68 F       |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                              |
|            |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                              |
| 03 : 37 PM | SELECT BASTING                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                              |
|            | <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 2px;">GO BACK / RESET</div> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 2px; margin-left: 10px;">START</div> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 2px; margin-left: 10px;">PAUSE / STOP</div> |                                                                                                                                                                                                                                                                                                                              |

FIG. 3

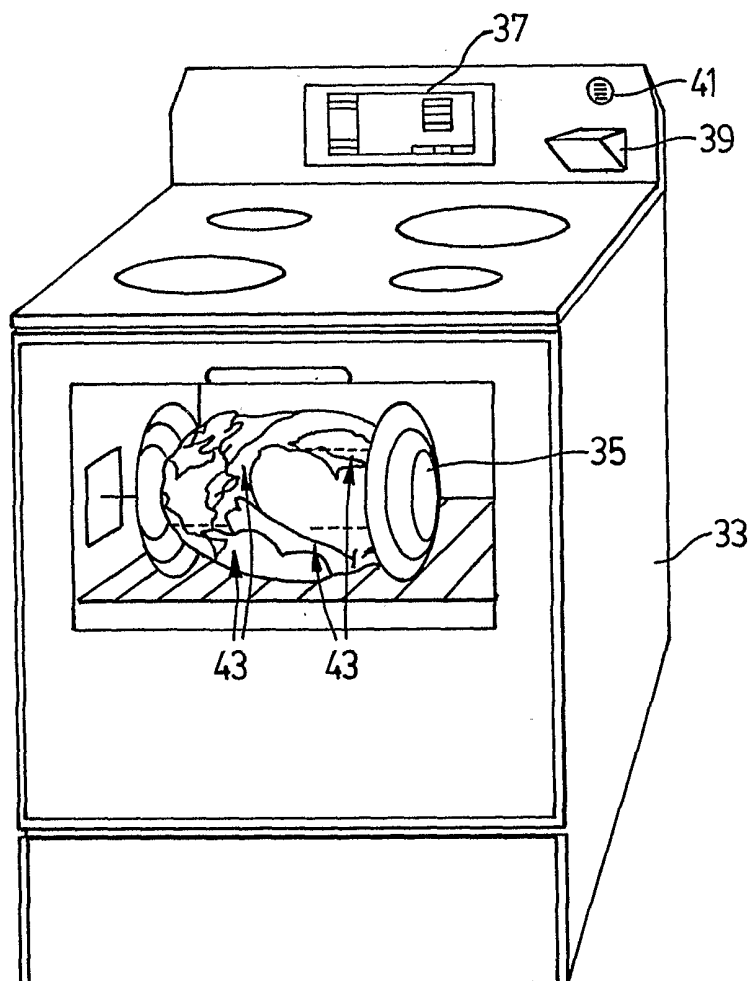


FIG. 2

45

|            |                                                                                                                     |                                                                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|            | <u>SELECTIONS</u>                                                                                                   |                                                                                                                                             |
| 68 F       | <div>BEEF</div> <div>VEAL</div> <div>LAMB</div> <div>PORK</div> <div>HAM</div> <div>CHICKEN</div> <div>TURKEY</div> | <div>POULTRY</div> <div>BISON</div> <div>GAME ANIMAL</div> <div>FISH</div> <div>POTATO</div> <div>VEGETABLES</div> <div>OTHER RECIPES</div> |
|            |                                                                                                                     |                                                                                                                                             |
| 03 : 37 PM | <div>GO BACK / RESET</div> <div>START</div>                                                                         | <div>PAUSE / STOP</div>                                                                                                                     |
|            | SELECT FOOD                                                                                                         |                                                                                                                                             |

FIG. 4

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|            |                                                                                                                                             |                                                                                                                                                           |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <u>SELECTIONS</u><br>BEEF                                                                                                                   |                                                                                                                                                           |
| 68 F       | <div>RIB EYE</div> <div>RIB</div> <div>TENDERLOIN</div> <div>BRISKET</div> <div>CHUCK ROAST</div> <div>EYE ROUND</div> <div>ROUND TIP</div> | <div>ROUND TIP</div> <div>TRI TIP</div> <div>RUMP ROAST</div> <div>BREADED BEEF</div> <div>SPARE RIBS</div> <div>BEEF STEAK</div> <div>BEEF BURGERS</div> |
|            |                                                                                                                                             |                                                                                                                                                           |
| 03 : 37 PM | <div>GO BACK / RESET</div> <div>START</div>                                                                                                 | <div>PAUSE / STOP</div>                                                                                                                                   |
|            | SELECT CUT                                                                                                                                  |                                                                                                                                                           |

FIG. 5

68 F

03 : 37 PM

SELECTIONS

BEEF

RUMP ROAST

SELECT DONENESS

VERY RARE

RARE

MEDIUM RARE

MEDIUM

MEDIUM WELL

WELL DONE

GO BACK / RESET

START

PAUSE / STOP

49

FIG. 6

68 F

03 : 37 PM

SELECTIONS

BEEF

RUMP ROAST

COOKING START TIME : 03 : 37 PM

SELECT START TIME

GO BACK / RESET

START

PAUSE / STOP

51

FIG. 7

| FOOD            | SEARING |       |     | COOKING |           |        | DONENESS            |           |         |         |         |           |           |     |
|-----------------|---------|-------|-----|---------|-----------|--------|---------------------|-----------|---------|---------|---------|-----------|-----------|-----|
|                 | TEMP    | TIME  | ROT | SPEED   | TEMP.     | ROT.   | TIME                | VERY RARE | RARE    | M. RARE | MED.    | MED. WELL | WELL DONE | NON |
| BEEF            |         |       |     |         |           |        |                     | 120-129   | 130-142 |         | 143-153 | 154-164   | 165-172   |     |
| RIB EYE         | 550     | 5 MIN | 1   | SLOW    | 337       | NORMAL | TO CRISPENING CYCLE | 124       | 134     | 144     | 154     | 159       | 164       | NON |
| EYE ROUND       | 550     | 5 MIN | 1   | SLOW    | 325       | NORMAL | TO CRISPENING CYCLE | 124       | 134     | 144     | 154     | 159       | 164       | NON |
| SPARE RIBS      |         |       |     |         | 325       | NORMAL | TO CRISPENING CYCLE | 124       | 134     | 144     | 154     | 159       | 164       | NON |
| BEEF BURGER     |         | 5 MIN | 1   | SLOW    | 450       | SLOW   | TO DONENESS         |           |         |         | 154     | 159       | 164       | NON |
| LAMB            | 550     | 5 MIN | 1   | SLOW    | 325       | NORMAL | TO CRISPENING CYCLE |           |         | 139     | 154     | 159       | 164       | NON |
| BREADED LAMB    |         |       |     |         | 325       | NORMAL | TO CRISPENING CYCLE |           |         | 139     | 154     | 159       | 164       | NON |
| CHICKEN         |         |       |     |         |           |        |                     |           |         |         |         |           |           | NON |
| CHICKEN WHOLE   |         |       |     |         | 375       | NORMAL | TO CRISPENING CYCLE |           |         |         |         |           | 174       | NON |
| CHICKEN STUFFED |         |       |     |         | 325       | NORMAL | TO CRISPENING CYCLE |           |         |         |         |           | 174       | NON |
| CORNISH HEN     |         |       |     |         | 375       | NORMAL | TO CRISPENING CYCLE |           |         |         |         |           | 174       | NON |
| BISON (BUFFALO) | 550     | 5 MIN | 1   | SLOW    | 325       | NORMAL | TO CRISPENING CYCLE |           |         |         | 139     | 154       | 164       | NON |
| GAME ANIMALS    | 550     | 5 MIN | 1   | SLOW    | 325       | NORMAL | TO CRISPENING CYCLE |           |         |         | 154     | 169       | 174       | NON |
| FISH            |         |       |     |         | PRESET TE | NORMAL | TO PRESENT TIME     |           |         |         |         |           |           | NON |
| VEGETABLES      |         |       |     |         | PRESET TE | NORMAL | TO PRESENT TIME     |           |         |         |         |           |           | NON |

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FIG. 8A

| BASTING (DURING COOKING CYCLE) |              |              |            | CRISPENING TEMPERATURES |         |         |               | NO HEAT ROTISSERIE CYCLE |          |                     |
|--------------------------------|--------------|--------------|------------|-------------------------|---------|---------|---------------|--------------------------|----------|---------------------|
| HEAVY                          | MODERATE     | LIGHT        | TIME       | SLIGHTLY BROWNED        | BROWNED | CRISPED | EXTRA CRISPED | TEMP.                    | ROTATION | TIME                |
|                                |              |              |            |                         |         |         |               |                          |          |                     |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 337                     | 412     | 437     | 487           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 450                     | 450     | 450     | 450           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
|                                |              |              |            |                         |         |         |               |                          |          |                     |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
|                                |              |              |            |                         |         |         |               |                          |          |                     |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION |                         |         |         |               | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 375                     | 450     | 475     | 525           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 375                     | 450     | 475     | 525           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
|                                |              |              |            |                         |         |         |               |                          |          |                     |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION | 325                     | 400     | 425     | 475           | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |
| EVERY 5 MIN                    | EVERY 10 MIN | EVERY 15 MIN | 1 ROTATION |                         |         |         |               | 0                        | NORMAL   | 20 MIN OR DOOR OPEN |

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FIG. 8B

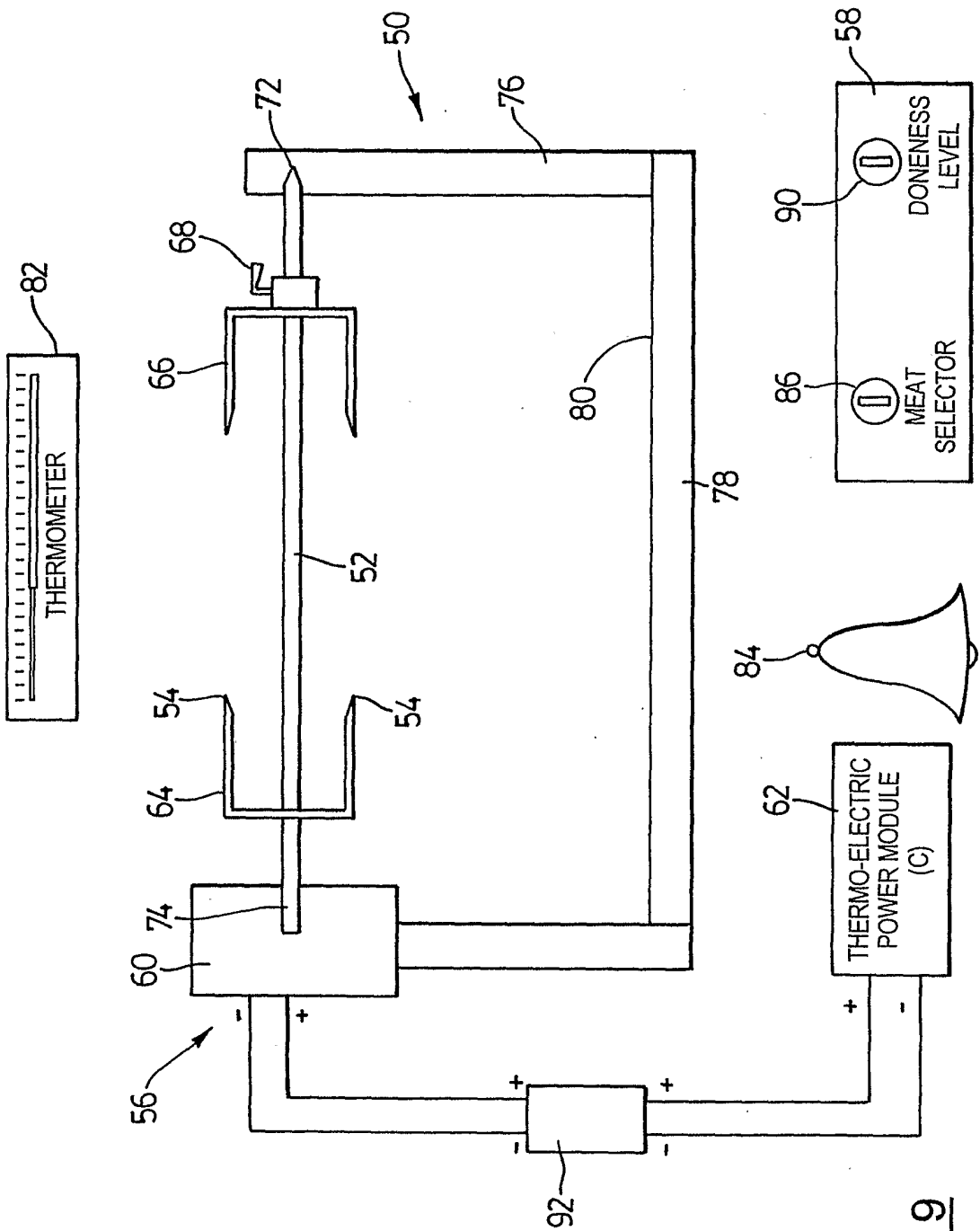
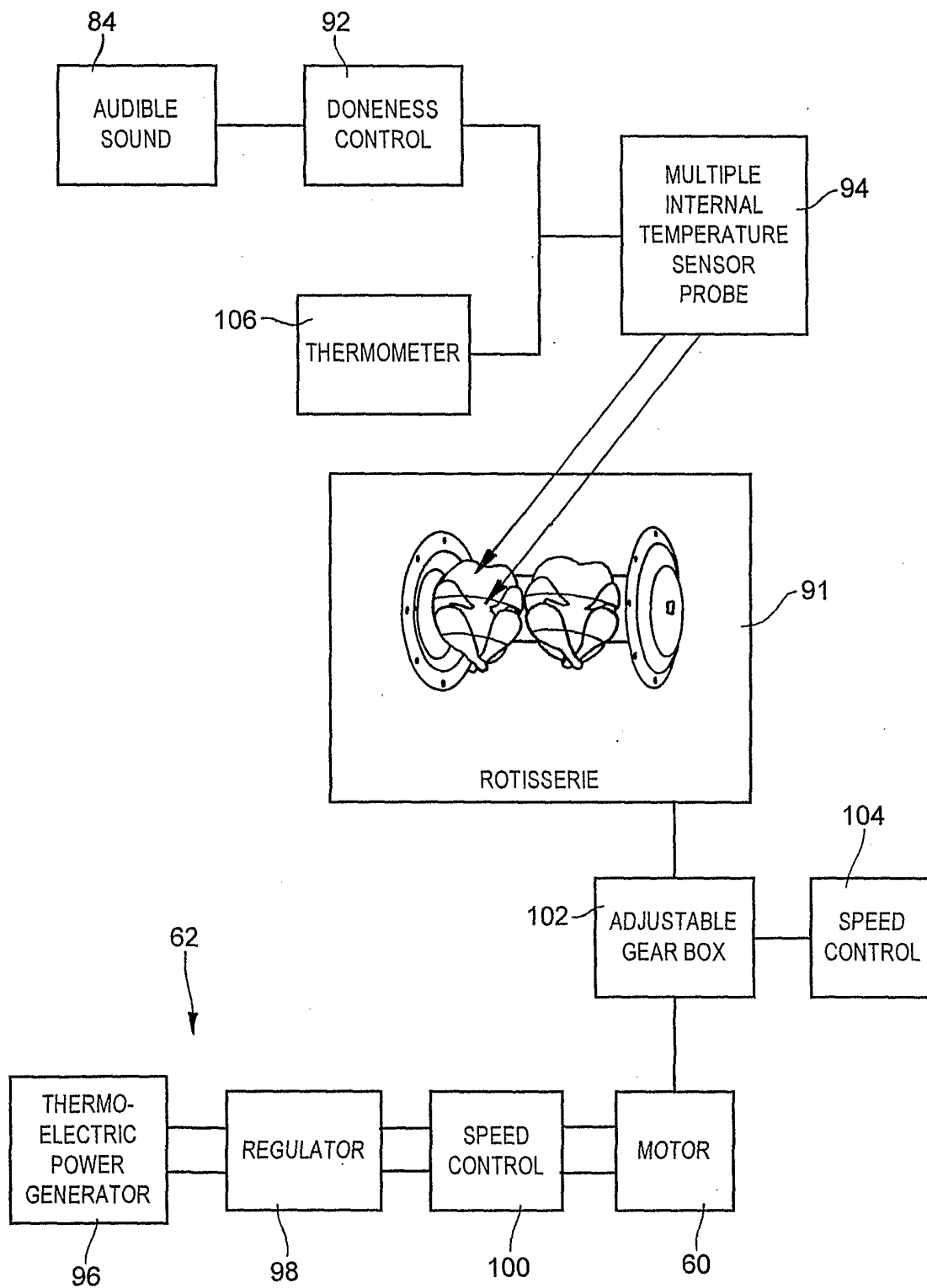


FIG. 9

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FIG. 10

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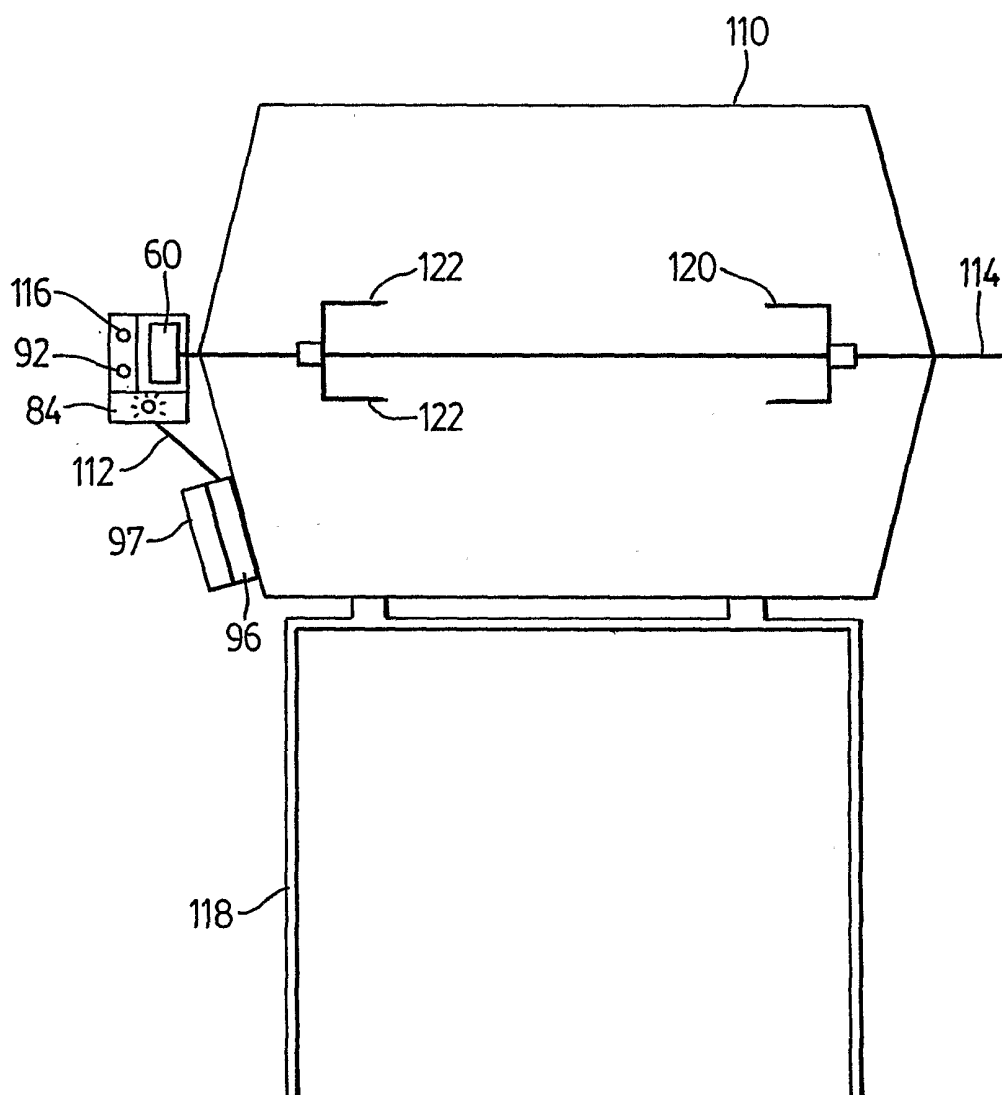
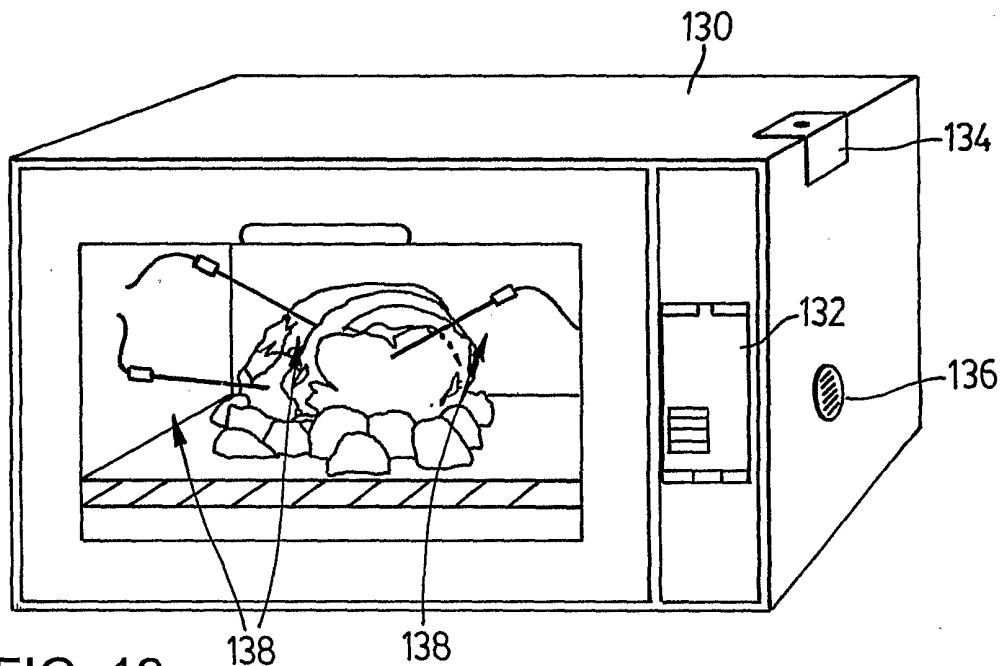
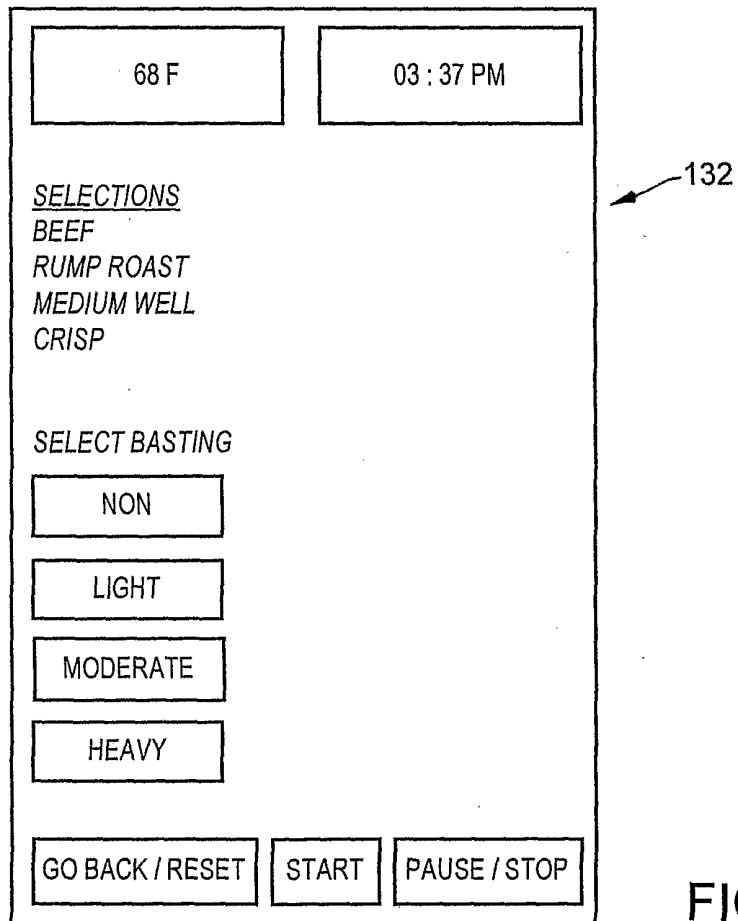


FIG. 11.

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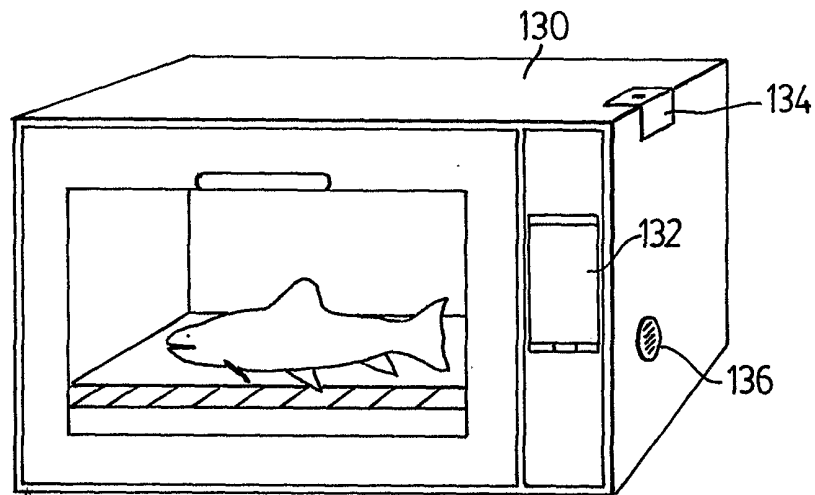


**FIG. 12**

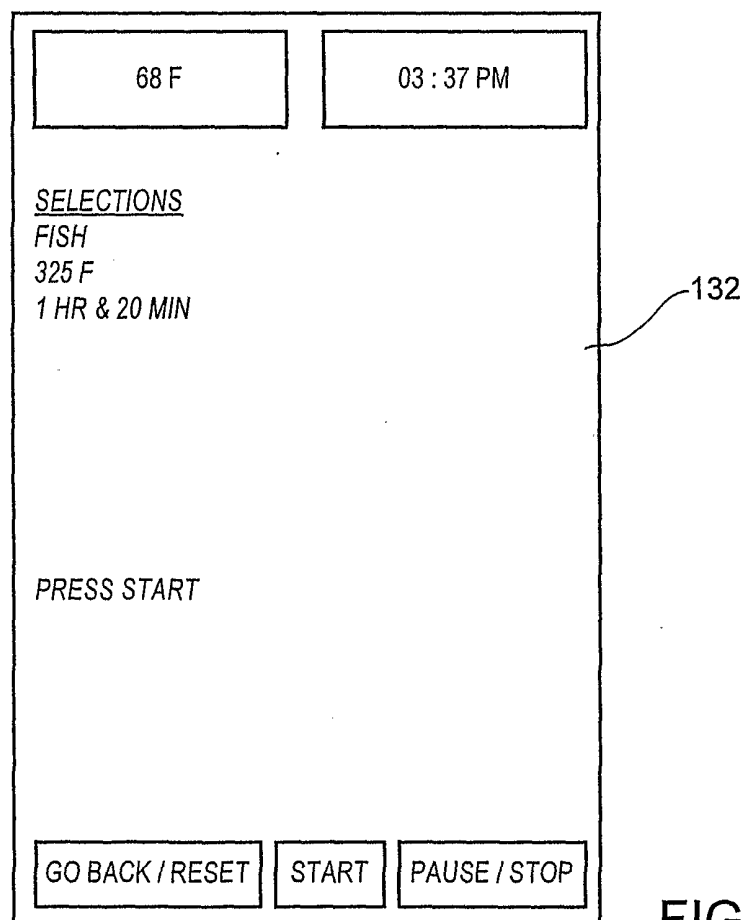


**FIG. 13**

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**FIG. 14**



**FIG. 15**

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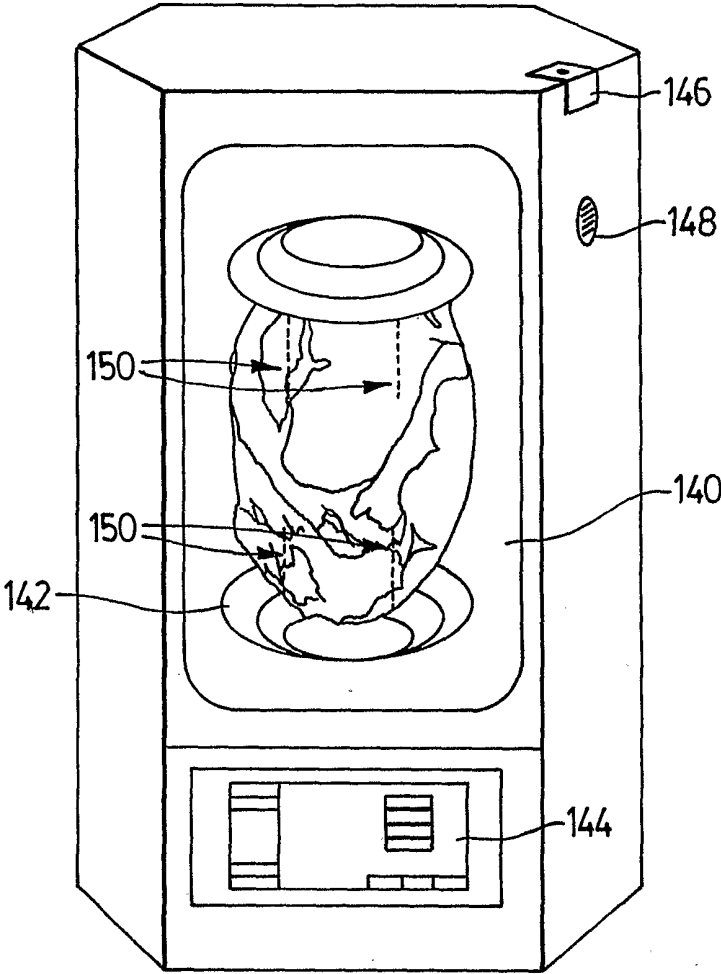


FIG. 16

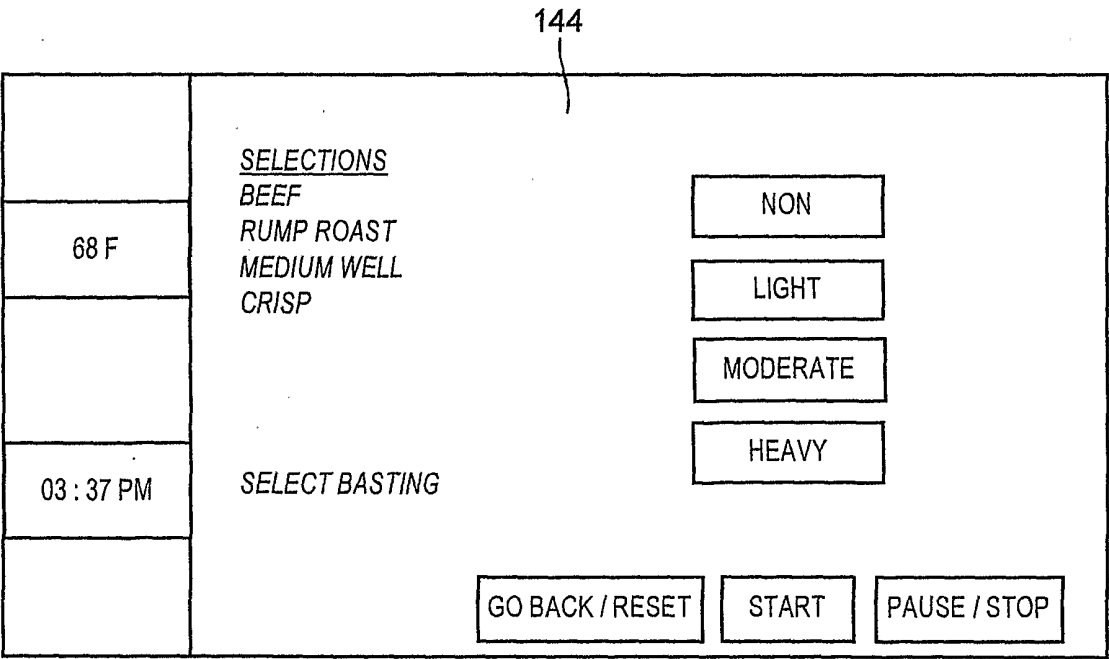


FIG. 17

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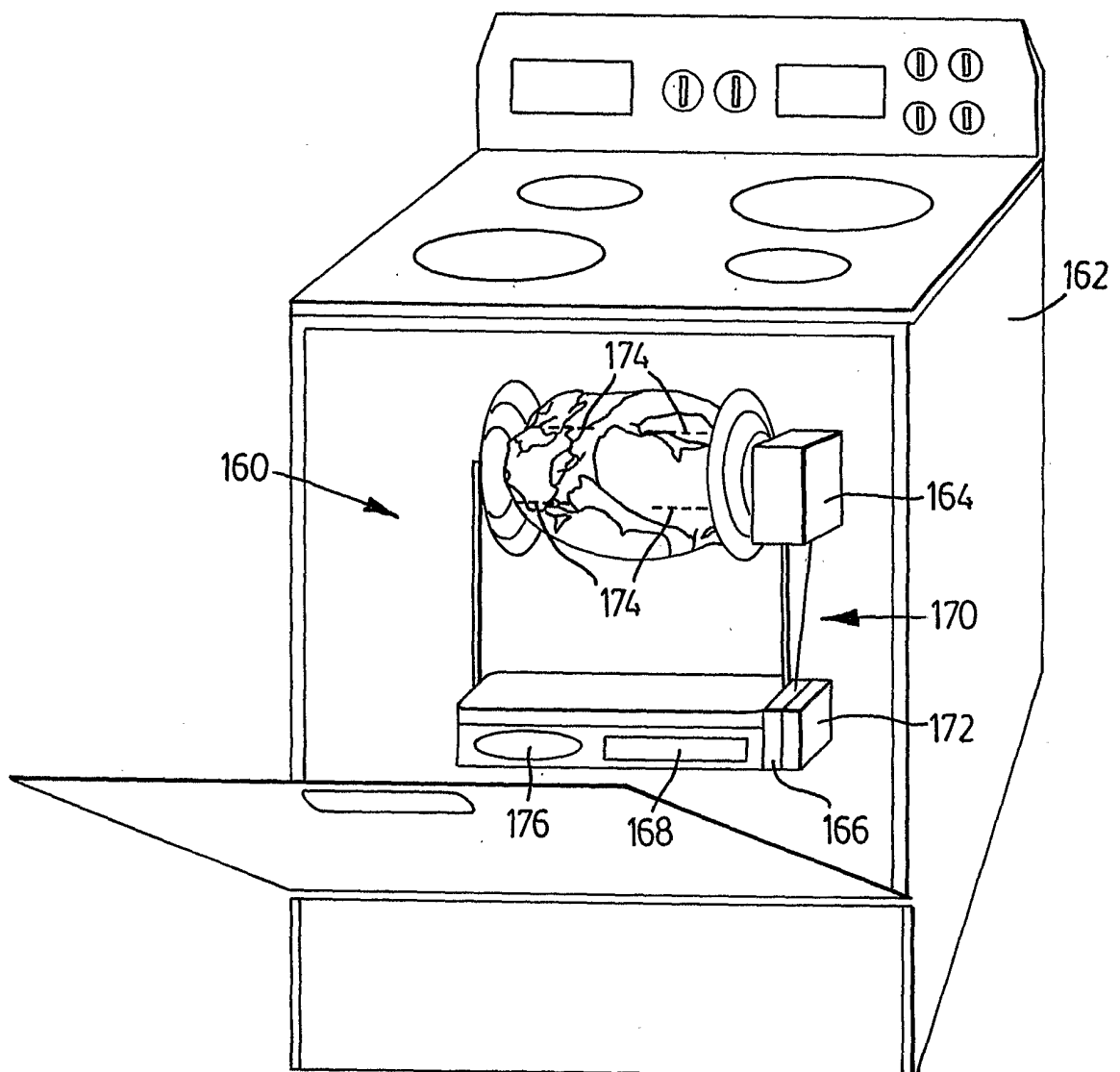


FIG. 18

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