

(19) **DANMARK**

(10) **DK/EP 3905930 T3**



(12)

Oversættelse af europæisk patentskrift

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **A 47 J 36/32 (2006.01)** **A 47 J 37/06 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2023-04-24**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2023-01-25**
- (86) Europæisk ansøgning nr.: **19832160.6**
- (86) Europæisk indleveringsdag: **2019-12-30**
- (87) Den europæiske ansøgnings publiceringsdag: **2021-11-10**
- (86) International ansøgning nr.: **EP2019087177**
- (87) Internationalt publikationsnr.: **WO2020141166**
- (30) Prioritet: **2019-01-01 FR 1900002**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
- (73) Patenthaver: **SEB S.A., 112 Chemin du Moulin Carron , Campus SEB, 69130 Ecully, Frankrig**
- (72) Opfinder: **Volatier, Sébastien, 17 rue des Molidors, 21000 Dijon, Frankrig**
- (74) Fuldmægtig i Danmark: **Plougmann Vingtoft A/S, Strandvejen 70, 2900 Hellerup, Danmark**
- (54) Benævnelse: **FREM GANGSMÅDE TIL UDFØRELSE AF EN FUNKTION TIL MARKERING AF ET NÆRINGSMIDDEL PÅ ET ELEKTRISK KOGEAPPARAT**
- (56) Fremdragne publikationer:
WO-A1-2013/107964
WO-A1-2013/107965
WO-A1-2015/179904
US-A1- 2015 312 964
US-B1- 6 425 319

Description

The present invention relates to methods for implementing a function for marking a food from an electric food cooking appliance, comprising a lower cooking plate and an upper cooking plate for heating upon their contact, a determined food during a cooking phase, as well as an electric cooking appliance implementing these methods.

Among these electric cooking appliances, twin grills are especially known which comprise upper and lower cooking plates between which one or more food items to be cooked are positioned.

The food is positioned horizontally on the lower cooking plate and the upper plate rests on the food. Food may be meat, fish, vegetables or other.

These electric cooking appliances operate in two phases: a first so-called preheating phase without the food and during which the cooking plates are raised to temperature, and a cooking phase during which the food is disposed between the plates and is cooked.

Such a cooking appliance is known from documents WO2013107964 and WO2013107965 in the name of the applicant.

These documents describe an electric cooking appliance for obtaining an optimised organoleptic result by automatic cooking that is truly favourable to the food and the taste of the user.

This electric cooking appliance is based on an estimate of the surface (Z) occupied by a determined food (A) on the plates and/or on the thickness (Y) of the food between the plates, which therefore corresponds to a distance between the two cooking plates, for determining a cooking duration of a selected type of determined food (A) for which a value of internal cooking temperature (X) of the determined food (A) is reached, a value of internal cooking temperature of the determined food (A) corresponding to a cooking state at the core of the determined food (A), for example rare, medium or well-cooked.

Several values of internal cooking temperature may be contemplated, these values of internal cooking temperature being stored in a memory of the electric cooking appliance.

This electric cooking appliance also provides a marking function.

This marking function aims at accentuating the surface marking of the food when this marking function is selected.

The implementation of this marking function consists in increasing the temperature of the cooking plates during the pre-heating phase compared to the temperatures of the cooking plates when the marking function is not activated.

5 In this way, a more pronounced marking is applied to the food when the food is introduced between the two cooking plates.

Several setpoint temperatures to be applied during the preheating phase and the cooking phase are also stored in memory, one or other of these setpoint temperatures being applied according especially to the type of food selected by the user.

Such a marking is:

10 - fast at the beginning of cooking for a better retention of water inside the food, and thus a better juiciness,

- sufficiently clean, while being able to prevent harmful charring, to provide taste and crispness without generating carcinogenic compounds.

15 However, it was found that this increase in temperature during the preheating phase generated more cooking at the core during the cooking phase for the same cooking durations as those determined without the selection of a marking function, and this for the different values of internal cooking temperature available in the memory of the electric cooking appliance and each corresponding to different cooking states at the core of the food.

20 Furthermore, this increase in temperature can also lead to heterogeneous marking of the food.

Indeed, during cooking the temperature of the lower cooking plate is less than the temperature of the upper cooking plate due to the flow of juices onto the lower cooking plate.

25 The purpose of the present invention is to solve all or part of the drawbacks mentioned above.

Also, one of the purposes of the present invention is to adjust the cooking of the food when selecting the marking function so as to avoid overcooking and to homogenize the marking of the food.

30 Also, the invention relates to a method for implementing a function for marking a food from an electric food cooking appliance, such as a meat grill, comprising a lower cooking plate and an upper cooking plate for heating upon their contact, a determined

food during a cooking phase, characterised in that this method comprises the following steps:

- 5 - disposing a memory wherein are recorded and classified according to an increasing order of values of different internal cooking temperatures of the determined food, said values of different internal cooking temperatures each corresponding to a cooking state at the core of the determined food, and wherein are also stored, preheating setpoint temperatures to be applied during a preheating phase, and at least one cooking setpoint temperature to be applied during a cooking phase,
- 10 - activating a function for marking the determined food to produce a marking of the surface of the determined food thus desired by the user,
- selecting a preheating setpoint temperature to be applied during a preheating phase and at least one cooking setpoint temperature to be applied during a cooking phase among those stored in the memory according to the determined food and of the activation of the function for marking the determined food,
- 15 - after a preheating phase, contacting the determined food with the lower cooking plate and the upper cooking plate to start the cooking phase with the aim of reaching at least one of the values of internal cooking temperature of the determined food thus desired by a user, then
- determining a first cooking duration of the determined food during the cooking phase according to the first in the increasing order of said values of internal cooking temperature of the determined food from among the different values of internal cooking temperature of the determined food recorded and classified in the memory, but also according to the activation of the function for marking the determined food,
- 20 - from said first determined cooking duration, indicating to the user, by the electric cooking appliance, reaching a first value of internal cooking temperature corresponding to a first cooking state at the core of the determined food, then:
- 25 - if the user does not remove the food, applying by the electric cooking appliance, a second determined cooking duration of the determined food according to the second in the increasing order of said values of internal cooking temperature of the determined food recorded and classified in the memory, but also according to the activation of the
- 30 function for marking the determined food,
- from this second determined cooking duration, again indicating to the user, by the electric cooking appliance, reaching the second value of internal cooking temperature of

the determined food corresponding to a second cooking state at the core of the determined food,

- and so on, if the user does not remove the determined food until reaching the last in the increasing order of said values of internal cooking temperature of the determined food recorded and classified in the memory corresponding to a last cooking state at the core of the determined food.

The invention also relates to a method for implementing a function for marking a food from an electric food cooking appliance, such as a meat grill, comprising a lower cooking plate and an upper cooking plate to heat upon their contact, a determined food during a cooking phase, characterised in that it comprises the following steps:

- disposing a memory wherein are recorded values, of different internal cooking temperatures of the determined food, said values of different internal cooking temperatures each corresponding to a cooking state at the core of the determined food, and wherein are also stored, preheating setpoint temperatures to be applied during a preheating phase and at least one cooking setpoint temperature to be applied during a cooking phase,

- activating a function for marking the determined food to produce a marking of the surface of the determined food thus desired by the user,

- selecting a preheating setpoint temperature to be applied during a preheating phase and at least one cooking setpoint temperature to be applied during a cooking phase among those stored in the memory according to the determined food and of the activation of the function for marking the determined food,

- selecting a cooking state at the core of the determined food corresponding to one of said values of internal cooking temperature,

- after a preheating phase, contacting the determined food with the lower cooking plate and the upper cooking plate to start the cooking phase, with the aim of reaching a value of internal cooking temperature of the determined food corresponding to a cooking state at the core of the determined food previously selected by a user, then

- determining a cooking duration of the determined food during the cooking phase according to the value of the internal cooking temperature corresponding to the cooking state at the core of the determined food selected by the user, but also according to the activation of the function for marking the determined food,

- from the determined cooking duration, indicating by the electric cooking appliance, reaching the value of internal cooking temperature corresponding to the cooking state at the core of the determined food selected by the user.

Such methods make it possible to adapt the cooking durations corresponding to each cooking state at the core by taking account of the user's selection of the function for marking the determined food.

Thus, overcooking of the food is avoided while at the same time accentuating the marking of the determined food.

Furthermore, this marking will be made more homogeneous on both faces of the food in contact with the cooking plates, regardless of the cooking state at the core, during which the user removes the food from between the cooking plates.

According to one implementation of either of these methods, the determination of the cooking duration(s) of the determined food when the function for marking the determined food is activated, uses a predetermined cooking rule established from experimental data, or uses a calculation table, said cooking rule or said calculation table being prerecorded in the factory, before the first operational use of the electric cooking appliance.

According to one implementation of either of these methods, the cooking rule is obtained by a method of calculating by quadratic or linear correlation.

According to one implementation of either of these methods, in addition to at least one of the values of internal cooking temperature among those memorised and to the activation of the function for marking the food determined by the user, the determination of the cooking duration(s) of the food is also done according to the thickness of the determined food, and/or the surface occupied by the determined food on the cooking plates.

According to one implementation of either of these methods, each value of internal cooking temperature of the determined food memorised is a constant prerecorded in the factory, before the first operational use of the electric cooking appliance.

According to one implementation of either of these methods, the determination of the cooking duration(s) of the determined food during the cooking phase is a function of said surface occupied by the determined food on the upper cooking plate, which is obtained by measuring temperatures of the upper cooking plate.

According to one implementation of either of these methods, to estimate the surface occupied by the determined food, an element for measuring the temperature of the upper cooking plate disposed at a distance from a contact zone of the determined food is used, and consecutively to the contacting of the food with the upper cooking plate, the following are measured:

- the temperature of the upper cooking plate, and a duration during which a drop in temperature is observed, is compared with at least one reference threshold, or
- a predetermined duration for stabilising the measured temperature.

According to one implementation of either of these methods, when the marking function is activated, then one single setpoint temperature of the lower cooking plate and the upper cooking plate is applied during the cooking phase, while when the marking function is not activated, then at least two setpoint temperatures of the lower cooking plate and of the upper cooking plate are applied during the cooking phase.

According to one implementation of either of these methods, when the marking function is not activated, then a shift from a first setpoint temperature to a second setpoint temperature of the lower cooking plate and of the upper cooking plate is performed when the derivative of a measured temperature of the upper cooking plate changes sign.

According to one implementation of either of these methods, the first setpoint temperature of the lower cooking plate and of the upper cooking plate when the marking function is not activated, is greater than a setpoint temperature applied during a preheating phase of the electric cooking appliance, and the second setpoint temperature of the lower cooking plate and of the upper cooking plate is less than the setpoint temperature applied during the preheating phase.

According to one implementation of either of these methods, the single setpoint temperature of the lower cooking plate and of the upper cooking plate when the marking function is activated, is greater than the setpoint temperature applied during a preheating phase of the electric cooking appliance.

According to one implementation of either of these methods, the different preheating and different cooking setpoint temperatures differ according to the type of determined food.

According to one implementation of either of these methods, when the marking function is activated, then the temperature regulation of the lower cooking plate and of

the upper cooking plate during the cooking phase is achieved from the information returned by an element for measuring the temperature of the lower cooking plate.

Moreover, the invention also relates to an electric cooking appliance for implementing a method as previously described, the electric cooking appliance comprising a lower cooking plate and an upper cooking plate to heat upon their contact, a determined food during a cooking phase, characterised in that it comprises, to achieve a marking of the surface of the determined food thus desired by the user, and to reach a cooking state at the core of the determined food desired by a user:

- a memory for storing, according to an increasing order of values of different internal cooking temperatures of the determined food, said values of different internal cooking temperatures, each corresponding to a cooking state at the core of the determined food, and to store preheating setpoint temperatures to be applied during a preheating phase and at least one cooking setpoint temperature to be applied during a cooking phase,

- means for determining the thickness of the food thus disposed in contact with the cooking plates and/or means for estimating the surface occupied by this determined food on the cooking plates,

- means for activating a function for marking the determined food;

- processing means arranged to select a preheating setpoint temperature to be applied during a preheating phase and at least one cooking setpoint temperature to be applied during a cooking phase among those stored in the memory according to the determined food and the activation of the function for marking the determined food, and to determine at least one cooking duration of the determined food thus disposed, according to:

- * at least one of the values of internal cooking temperature among those memorised,

- * the thickness of the determined food, and/or a surface occupied by the determined food, and

- * the activation of the function for marking the determined food by the user from the activation means of this function,

- means for indicating to the user, by the electric cooking appliance, of reaching the corresponding cooking state at the core.

The fact that the determination of the at least one cooking duration is dependent on the activation of the function for marking the determined food allows the cooking of the determined food to be adjusted when selecting the marking function regardless of the cooking state at the core desired by the user.

5 This also makes it possible to further homogenise the marking of the determined food on these two faces.

Therefore, there will be different cooking durations for the same cooking state at the core and the same characteristics of the determined food depending on whether the function for marking the determined food has been activated or not.

10 According to one aspect of the invention, the cooking appliance comprises a lower electric switch capable of enabling or interrupting the power supply of the lower electric heating element and an upper electric switch capable of enabling or interrupting the power supply of the upper electric heating element.

15 According to one aspect of the invention, at least one cooking program is defined with:

- a setpoint temperature of the preheating phase, and at least one setpoint temperature and at least one cooking duration of the at least one cooking phase applied to the lower electric heating element, and

- a setpoint temperature of the preheating phase, and at least one setpoint temperature and at least one cooking duration of the cooking phase applied to the upper electric heating element,

the processing means being arranged to independently control the lower electric switch and the upper electric switch during the preheating phase and/or the cooking phase.

25 According to one aspect of the invention, for one same cooking program, the setpoint temperature of the preheating phase and the at least one setpoint temperature of the cooking phase applied to the lower electric heating element, are respectively different from the setpoint temperature of the preheating phase and the at least one setpoint temperature of the cooking phase applied to the upper electric heating element.

30 This arrangement allows better control of the marking independently on the upper face and on the lower face of the determined food.

Further characteristics and advantages of the invention will appear clearly from the description given below, in the case of a common use of the three aforementioned

parameters (X, Y, Z) for cooking a type of determined food depending on whether the activation S of a marking function is applied or not, and this by way of indicating and not in any way limiting purposes, with reference to the attached drawings.

5 Fig. 1 illustrates a view in an open position of the electric cooking appliance according to the invention.

Fig. 2 shows a view in an open position of the electric cooking appliance according to the invention from which the cooking plates have been removed.

Fig. 3 is a front face in a closed position of the electric cooking appliance according to the invention.

10 Fig. 4 is an enlarged view on a user interface of the electric cooking appliance according to the invention.

Fig. 5 is a graph representative of the parameters of the electric cooking appliance and the variables measured for a user selected beef menu when the marking function has not been activated.

15 Fig. 6 is a graph representative of the parameters of the electric cooking appliance and the variables measured for a user selected beef menu when the marking function has been activated.

20 An electric cooking appliance 1 usually comprises a power supply (not illustrated) for connecting the electric cooking appliance 1 to a power grid for the purpose of supplying power to the appliance.

As particularly illustrated in Figs. 1 and 2, the electric cooking appliance 1 furthermore comprises a lower part 10 and an upper part 20.

The lower part 10 is connected to the upper part 20 by a hinge type joint 2.

25 As particularly illustrated in Fig. 1, the lower part 10 comprises a lower cooking plate 11 capable of receiving the food and coming into contact with the lower face of the food, and the upper part 20 comprises an upper cooking plate 21 capable of being moved relative to the lower cooking plate 11, especially through the joint 2, so as to come into contact with the upper face of the food disposed on the lower cooking plate 11.

30 The joint allows the upper part 20 to be moved relative to the lower part 10 to define:

- a contact position of the lower cooking plate 11 and the upper cooking plate 21, in which especially a preheating phase of the electric cooking appliance 1 is performed,

- an open position allowing the food to be disposed on the lower cooking plate 11;
and

- a closed position in which the food is sandwiched between the lower cooking plate 11 and the upper cooking plate 21.

5 The closed position defines a spacing of the plate during a cooking phase.

This spacing of the lower 11, upper 21 cooking plates corresponds to the maximum thickness of the food disposed between the lower 11, upper 21 cooking plates in the closed position.

10 This thickness Y is variable and can be measured by a device for measuring the thickness (not illustrated) returning a value of thickness Y of the food.

The device for measuring the thickness of the food may for example comprise a potentiometer and a rocker arm connected to, or comprised in, the joint 2 connecting the lower part 10 to the upper part 20 of the electric cooking appliance 1.

15 Other types of devices for measuring the thickness of the food may also be used, for example a Hall effect sensor.

Moreover, processing means of the electric cooking appliance 1 may use a direct measurement of the thickness Y returned by this device to apply a cooking program or assign this measurement to different ranges of predefined values stored in the database and for which the operation of the electric cooking appliance 1 is substantially the same when two measured values of thickness Y are in the same range of values.

20 For example, such processing means comprise a processor or a controller or a microcontroller.

As particularly illustrated in Fig. 2, the lower part 10 also comprises a lower electric heating element 12 capable of heating the lower cooking plate 11, and an element for measuring the temperature 13 of the lower cooking plate 11.

25 In this same fig. 2, and similarly, the upper part 20 also comprises an upper electric heating element 22 capable of heating the upper cooking plate 21, and an element for measuring the temperature 23 of the upper cooking plate 21.

30 The electric heating elements 12, 22 are for example resistive heating elements, and the elements for measuring the temperature 13, 23 are temperature sensors, for example of the negative temperature coefficient sensor type.

Moreover, the electric cooking appliance 1 comprises a lower first electric switch (not illustrated) capable of enabling or interrupting the power supply of the lower electric

heating element 12 and an upper second electric switch (not illustrated) capable of enabling or interrupting the power supply of the upper electric heating element 22.

An electric cooking appliance 1 comprising two electric switches allows independent control of the heating of the lower cooking plate 11 and the heating of the upper cooking plate 21.

Typically, such electric switches are for example electric power relays.

Moreover, the elements for measuring the temperature 13, 23 are used to perform the temperature regulation of the cooking plates 11, 21, especially during a preheating phase PP of the cooking appliance 1.

The element for measuring the temperature 13 of the lower cooking plate 11 is also used to regulate the temperature of the lower 11, upper 21 cooking plates during a cooking phase PC of the food, and the element for measuring the temperature 23 of the upper cooking plate 21 is used to estimate the surface Z occupied by the food on the upper cooking plate 21.

It is also contemplable to regulate the temperature of the lower cooking plate 11 and the upper cooking plate 21 to different setpoint temperatures in order to better control the homogeneity of the marking of a determined food A.

The surface occupied by the food on the upper cooking plate 21 is estimated by the processing means from the duration of the drop in temperature determined by the temperature measurements performed by the element for measuring the temperature 23 of the upper cooking plate 21 after the preheating phase, especially at the beginning of the cooking phase PC when the food is contacted with the upper cooking plate 21.

As illustrated in Fig. 2, in order to determine the average duration of the drop in temperature caused by one or more food items distributed over the surface of the upper cooking plate 21 then the element for measuring the temperature 23 of the upper cooking plate 21 is offset to perform a measurement on an edge of the upper cooking plate 21.

Thus, the surface occupied by the food estimated from the duration of the drop in temperature that can be determined due to the proximity of a single food to the element for measuring the temperature 23 of the upper cooking plate is limited. Indeed, such a duration of drop in temperature would not be representative of the duration of the drop in temperature caused by all the food disposed in contact with the upper cooking plate 21.

The element for measuring the temperature 13 of the lower cooking plate is disposed centred with respect to the lower cooking plate 11.

Nevertheless, other arrangements of these elements for measuring temperature 13, 23 could be contemplated.

5 The electric cooking appliance 1 also comprises a memory (not illustrated) wherein different values of internal cooking temperature X of one or more determined food items A are stored, each corresponding to a cooking state at the core of a determined food A.

Each memorised value of internal cooking temperature X of a determined food is a constant prerecorded in the factory, before the first operational use of the electric
10 cooking appliance 1.

In the memory, there are also stored preheating setpoint temperatures Ta, TaS to be applied during a preheating phase PP and at least one cooking setpoint temperature Ta+, Tb, TbS to be applied during a cooking phase PC.

Finally, the electric cooking appliance 1 comprises a user interface 30 arranged to
15 allow the user to select certain parameters enabling the electric cooking appliance 1 to define a cooking program.

To this end, as illustrated in Fig. 3 but particularly in Fig. 4, the user interface 30 comprises means for selecting 31 a type of determined food A from among a plurality of types of determined food A, and a button for actuating 32 a function S for marking the
20 lower and upper surfaces of the determined food disposed in contact with the lower cooking plate 11 and the upper cooking plate 21.

Pressing this button 32 for actuating a marking function S thus allows an additional setting for a cooking program to be defined.

The user interface 30 also comprises a button 33 for actuating a frozen food
25 function which can be actuated by the user when the food is inserted between the lower 11, upper 21 cooking plates while in a frozen state.

Pressing this button 33 for actuating a frozen food function thus allows an additional setting to be defined for a cooking program.

To select the type of food to be cooked, the selection means 31 of the model of
30 electric cooking appliance 1 set forth in Figs. 3 and 4 comprises a screen 34, especially of the TFT type, capable of displaying icons 35 providing types of determined food A to the user.

The user, using arrow buttons 36, has the possibility of navigating in a carousel to enable him to scroll through the various icons 35 each representing a type of determined food A.

5 The user interface 30 also comprises an on/off button 37 of the electric cooking appliance 1, a button 38 for validating a selection of a type of determined food A, and a button for switching to manual mode 39 which allows the user to manually vary a setpoint temperature for the cooking phase PC displayed on the screen 34, said setpoint temperature being adjustable using the arrow buttons 36.

Thus, a cooking program is defined as an input by a combination:

10 - of predetermined constant values, especially the different values of internal cooking temperatures (X) of the food, each corresponding to a cooking state at the core of a determined food (A),

- of values of variables measured or estimated by the electric cooking appliance 1, especially the thickness (Y) of the determined food (A) measured by the device for measuring the thickness and/or the surface (Z) occupied by the determined food (A)
15 estimated from the measurement of the time during which a drop in temperature produced upon contact of the food with the upper cooking plate 21 is observed, said drop in temperature being monitored by the element for measuring the temperature 23 of the upper cooking plate 21,

20 - of different input parameters declared by the user, especially a determined food A to be cooked or a type of food A to be cooked or even a menu A from a predefined list, of the activation or non-activation of a function for marking S the food, and optionally of the activation or non-activation of a function signalling the frozen state of the food.

From these constant values, these variable values, and these input parameters, the
25 processing means of the electric cooking appliance 1 define a cooking program, especially by selecting a preheating setpoint temperature T_a , T_{aS} to be applied during the preheating phase PP and at least one cooking setpoint temperature T_{a+} , T_b , T_{bS} to be applied during the cooking phase PC from those stored in the memory according to the determined food A and the activation of the marking function S of the determined food
30 A, and by determining at least one cooking duration T.

The execution of the cooking program will therefore consist in applying preheating setpoint temperatures during the preheating phase until the user introduces a determined food A between the lower 11, upper 21 cooking plates or until a safety

function of the electric cooking appliance 1, for example exceeding a threshold time, deactivates the lower 12, upper 22 electric heating elements of the electric cooking appliance 1 and in applying cooking setpoint temperatures during the cooking phase of the determined food A for cooking durations T determined by the processing means

5 In the case where the marking function S has not been selected by the user then this determination of the cooking durations can be obtained by a method for calculating by quadratic correlation with the following second degree function:

(1):

$$T_A(X,Y,Z)=A1(A)+A2(A)*X+A3(A)*Y+A4(A)*Z+A5(A)*X^2+A6(A)*Y^2+A7(A)*Z^2+A8(A)*X*Y$$

10 $+A9(A)*X*Z+A10(A)*Y*Z.$

The coefficients A1(A), A2(A), A3(A), A4(A), A5(A), A6(A), A7(A), A8(A), A9(A) and A10(A) are predefined for each menu (A), for predefined temperature conditions. They are also stored in the memory of the electric cooking appliance 1. These are constant coefficients.

15

Alternatively, the determination of the cooking duration T of the food can be obtained by a method for calculating by linear correlation with the following first degree function:

$$(2): T_A(X,Y,Z)=B1(A)+B2(A)*X+B3(A)*Y+B4(A)*Z$$

20 The coefficients B1(A), B2(A), B3(A), and B4(A) are predefined for each menu (A), for predefined temperature conditions. They are also stored in the memory of the electric cooking appliance 1. These are constants.

In case the marking function S has been activated by the user, then this determination of the cooking durations can be obtained by a method for calculating by quadratic correlation with the following second degree function:

25

$$(1): T_{A,S}(X,Y,Z)=A1(A,S)+A2(A,S)*X+A3(A,S)*Y+A4(A,S)*Z+A5(A,S)*X^2+A6(A,S)*Y^2+A7(A,S)*Z^2+A8(A,S)*X*Y+A9(A,S)*X*Z+A10(A,S)*Y*Z.$$

The coefficients A1(A, S), A2(A, S), A3(A, S), A4(A, S), A5(A, S), A6(A, S), A7(A, S), A8(A, S), A9(A, S) and A10(A, S) are predefined for each menu (A), for predefined temperature conditions. They are stored in the memory of the electric cooking appliance 1. These are constant coefficients.

30

Alternatively, the determination of the cooking duration T of the food can be obtained by a method for calculating by linear correlation with the following first degree function:

$$(2): T_{A,s}(X,Y,Z)=B1(A,S)+B2(A,S)*X+B3(A,S)*Y+B4(A,S)*Z$$

5 The coefficients B1(A, S), B2(A, S), B3(A, S), and B4(A, S) are predefined for each menu (A), for predefined temperature conditions. They are stored in the memory of the electric cooking appliance 1. These are constants.

The quadratic correlation method is preferred to the other one because it covers more experimental points and therefore provides a better result.

10 All these coefficient are experimentally determined.

These cooking programs are determined and can be executed by the processing means of the electric cooking appliance 1.

It is understood that due to the different parameters and values used, the electric cooking appliance 1 is able to execute a wide variety of cooking programs.

15 Finally, the user interface (30) comprises an information means (40) of the cooking state at the core of the food as the cooking phase (PC) and/or the remaining time until a transition to a subsequent cooking state progress.

This information means 40 comprises a colour repository disposed around the screen 34. Each colour in this repository is associated with a value of internal cooking temperature of the determined food A and thus with a cooking state at the core of the determined food A.

20 During the cooking phase of the determined food A, an arrow (not illustrated) is displayed on the edge of the screen 34 and moves as the cooking program progresses so that this arrow points to the cooking state at the core in which the determined food A is during the cooking phase PC.

The operation of the electric cooking appliance 1 is detailed below with reference to Figs. 5 to 6 for a user selection of beef as determined food A for cooking two beef steaks of 2 cm thickness and with a surface of 60 cm²each.

30 In the case where the user has not activated the marking function S, then after selecting the beef menu via the selection means 31, the processing means apply a setpoint temperature Ta of the lower cooking plate 11 and the upper cooking plate 21 during the preheating phase PP.

During this preheating phase PP, the electric cooking appliance 1 is in its contact position.

In the example provided, the setpoint temperature T_a during the preheating phase PP is 200°C.

5 It is noticed that during this preheating phase PP, both electric switches for heating the lower cooking plate 11 and for heating the upper cooking plate 21 are first in their closed state and then the electric switch for heating the upper cooking plate 21 shifts to its open state followed by the electric switch for heating the lower cooking plate 11.

 These shifts in the state of the electric switches are made to anticipate the
10 temperature rise towards the setpoint temperature T_a of the upper cooking plate 21 and the lower cooking plate 11 due to thermal inertia.

 As illustrated in the graph of Fig. 5, it is also noticed that the temperature T_{sup} of the upper cooking plate 21 is greater than the temperature T_{inf} of the lower cooking plate 11 throughout the temperature rise period. Nevertheless, at the end of the preheating
15 phase the temperature T_{inf} of the lower cooking plate 11 is substantially identical to the temperature T_{sup} of the upper cooking plate 21.

 At the end of the preheating phase PP, the electric cooking appliance 1 emits a sound and/or visual signal to signal the user that the temperature T_{inf} , T_{sup} of the plates is appropriate to initiate the cooking phase PC.

20 The user then brings the electric cooking appliance 1 to its open position, puts the two pieces of beef in it and then brings the electric cooking appliance 1 to its closed position.

 In this closed position, the two pieces of beef are in contact with the upper cooking plate 21 and the lower cooking plate 11.

25 The cooking phase PC starts at this point.

 As illustrated in the graph of Fig. 5, the temperature T_{sup} of the upper cooking plate 21 and the temperature T_{inf} of the lower cooking plate 11 initially fall and then stabilise and rise again.

 A duration during which there is a drop in temperature T_{sup} produced upon contact
30 of the food with the upper cooking plate is determined by the processing means from the temperatures measured by the element measuring the temperature 23 of the upper cooking plate 21.

This then allows the processing means to deduce a value for the surface Z occupied by the two beef steaks on the upper cooking plate 21 by comparing this duration with at least one reference threshold or with a predetermined duration for the stabilisation of the measured temperature T_{sup} .

5 For example, the value of the occupied surface Z is here substantially equal to $2 \times 60 \text{ cm}^2 = 120 \text{ cm}^2$.

When the two beef steaks are put into the electric cooking appliance, at the beginning of the cooking phase PC, the device for measuring the thickness determines the value of the thickness Y of the two steaks. In this example set forth, this value is 20 mm.

10 Thus, from these two variables Y, Z, a value of final temperature T_f equal to a predetermined value of internal cooking temperature X of the beef for example equal to 50°C in the example set forth, and taking account of the fact that the user has not selected the marking function S, then the processing means of the electric cooking appliance 1 define and then execute a cooking program for cooking the two beef steaks.

15 As illustrated in the graph of Fig. 5, this cooking program applies a first setpoint temperature T_{a+} of the upper cooking plate 21 and the lower cooking plate 11 and a second setpoint temperature T_b of the upper cooking plate 21 and the lower cooking plate 11.

20 The first setpoint temperature T_{a+} of the upper cooking plate 21 and the lower cooking plate 11 is greater than the setpoint temperature T_a applied during the preheating phase PP, and the second setpoint temperature T_b of the upper cooking plate 21 and the lower cooking plate 11 is less than the setpoint temperature T_a applied during the preheating phase PP.

25 Typically, this first setpoint temperature T_{a+} is 10°C greater than the setpoint temperature T_a applied during the preheating phase PP.

Upon application of this first setpoint temperature T_{a+} , both electric switches are in their closed state.

30 This increase in setpoint temperature compensates for the drop in temperature T_{inf} , T_{sup} measured on the lower 11, upper 21 cooking plates caused by the introduction of the beef steaks.

This first setpoint temperature T_{a+} is applied during the cooking phase PC until the derivative of the measured temperature T_{sup} of the upper cooking plate changes sign, in other words when the measured temperature T_{sup} starts to rise.

From this moment on, the second setpoint temperature T_b is applied during the cooking phase PC, and the electric switch for heating the upper cooking plate 21 shifts to its open state followed by the electric switch for heating the lower cooking plate 11.

Typically, this second setpoint temperature T_b is 20°C less than the setpoint
5 temperature T_a applied during the preheating phase PP.

The regulation of the temperature of the lower cooking plate 11 and the temperature of the upper cooking plate 21 to the setpoint temperatures T_a , T_b during the cooking phase is done independently on the basis of the temperature information returned by the elements for measuring the temperature 13, 23.

10 During the regulation during the cooking phase PC, it is noticed that the temperature T_{inf} of the lower cooking plate 11 remains less than the temperature T_{sup} of the upper cooking plate 21.

This difference is due to the flow of juices over the lower cooking plate 11, which thus cools it.

15 It is also noticed that during the cooking phase PC the electric switch for the heating of the lower cooking plate 11 is mostly in its closed state so as to compensate for the temperature difference with the upper cooking plate 21.

The electric switch for heating the upper cooking plate 21, in turn, has a higher cycling rate so that the temperature T_{sup} of the upper cooking plate 21 changes around
20 the second setpoint temperature T_b .

When defining the cooking program, the processing means have also determined a first cooking duration T_1 for the beef steaks so that a value of the internal cooking temperature X of the beef is, for example, equal to a final temperature $T_f=50^\circ\text{C}$, which corresponds, for example, to a "rare" cooking state at the core.

25 In the example provided, this cooking duration starts at the beginning of the cooking phase PC and is equal to 255 seconds, that is 4 min 15 seconds, for a measured steak thickness Y equal to 2 cm and an occupied surface of 120 cm² without activation of the marking function S.

At the end of this duration T_1 , the user receives an indication of the cooking state
30 at the core of the food on the information means 40.

The user can also receive information on the time remaining until this final temperature T_f is reached.

The information means 40 can also indicate the time remaining until a transition to a subsequent cooking state.

In the case where the user has activated the marking function S, then after selecting the beef menu via the selection means 31, the processing means apply a setpoint
5 temperature T_a of the lower cooking plate 11 and the upper cooking plate 21 during the preheating phase PP.

During this preheating phase PP, the electric cooking appliance 1 is in its contact position.

In the example provided, the setpoint temperature T_{aS} during the preheating
10 phase PP is 250°C , which is 50°C higher than when the marking function S has not been activated.

It is noticed that during this preheating phase PP, both electric switches for heating the lower cooking plate 11 and for heating the upper cooking plate 21 are first in their closed state and then the electric switch for heating the upper cooking plate 21 shifts to
15 its open state followed by the electric switch for heating the lower cooking plate 11.

The electric switch for heating the lower cooking plate 11 then shifts back to its closed state when the temperature slope T_{inf} of the lower cooking plate 11 starts to decrease.

These shifts in the state of the electric switches are made to anticipate the rise and
20 drop in temperature towards the setpoint temperature T_a of the upper cooking plate 21 and the lower cooking plate 11 due to the thermal inertia of the cooking plates 11, 21.

As illustrated in the graph of Fig. 6, it is also noticed that the temperature T_{sup} of the upper cooking plate 21 is greater than the temperature T_{inf} of the lower cooking plate 11 through most of the temperature rise period. Nevertheless, shortly before the end of
25 the preheating phase, the temperature T_{inf} of the lower cooking plate 11 is slightly greater than the temperature T_{sup} of the upper cooking plate 21 and these two temperatures T_{inf} , T_{sup} are identical at the end of the preheating phase PC.

At the end of the preheating phase PP, the electric cooking appliance 1 emits a sound and/or visual signal to signal the user that the temperature T_{inf} , T_{sup} of the plates
30 is appropriate to initiate the cooking phase PC.

The user then brings the electric cooking appliance 1 to its open position, put the two pieces of beef in it and then brings the electric cooking appliance 1 to its closed position.

In this closed position, the two pieces of beef are in contact with the upper cooking plate 21 and the lower cooking plate 11.

The cooking phase PC starts at this point.

As illustrated in the graph of Fig. 6, the temperature T_{sup} of the upper cooking plate 21 and the temperature T_{inf} of the lower cooking plate 11 initially fall and then stabilise and rise again.

A duration during which there is a drop in temperature T_{sup} produced when the food comes into contact with the upper cooking plate is determined by the processing means from the information supplied by the element for measuring temperature 23 of the upper cooking plate 21.

This then allows the processing means to deduce therefrom a value for the surface Z occupied by the two beef steaks on the upper cooking plate 21 by comparing this duration with at least one reference threshold or with a predetermined duration for stabilisation of the temperature T_{sup} measured.

For example, the value of the occupied surface Z is here substantially equal to $2 \times 60 \text{ cm}^2 = 120 \text{ cm}^2$

When the two beef steaks are put into the electric cooking appliance, at the beginning of the cooking phase PC, the device for measuring the thickness determines the value of the thickness Y of the two steaks. In this example set forth, this value is 20 mm.

Thus, from these two variables on the thickness Y and on the occupied surface Z , and from the constant on the predetermined value of the internal cooking temperature X of the beef equal, for example, to a final temperature $T_f = 50^\circ\text{C}$ in the example set forth, and taking into account the fact that the user has selected the marking function S , then the processing means of the electric cooking appliance 1 define and execute a cooking program for cooking the two beef steaks.

As illustrated in the graph of Fig. 6, this cooking program applies a single setpoint temperature T_{bS} of the upper cooking plate 21 and the lower cooking plate 11.

The setpoint temperature T_{bS} is greater than the setpoint temperature T_{aS} applied during the preheating phase PP.

Typically, this first setpoint temperature T_{bS} is 10°C greater than the setpoint temperature T_{aS} applied during the preheating phase PP.

Upon application of this setpoint temperature T_{bS} , both electric switches are in their closed state.

This increase in setpoint temperature compensates for the drop in temperature T_{inf} , T_{sup} measured on the cooking plates 11, 21 caused by the introduction of the beef steaks.

5 In the example set forth, this setpoint temperature T_bS is applied throughout the cooking phase PC.

Typically, this first setpoint temperature T_bS is 10°C greater than the setpoint temperature T_aS applied during the preheating phase PP.

10 It is also noticed that for this particular cooking program defined for the beef menu, with a particular thickness Y and occupied surface Z , then the electric switches are in their closed state until reaching the first cooking duration T_1 corresponding to reaching the first cooking state at the core of the food.

This particularly applies to the beef menu, which has the highest setpoint temperature T_bS .

15 It is noticed that only the temperature T_{sup} of the upper cooking plate reaches this target temperature T_bS . Thus, only the upper electric switch shifts from a closed state to an open state for the beef menu.

Of course, with a smaller thickness and/or surface Z there is less inertia and the temperature T_{inf} of the lower cooking plate 11 and the temperature T_{sup} of the upper cooking plate 21 will be able to reach this target temperature T_bS .

20 Similarly, for other determined foods A , if the setpoint temperature T_bS has a value less than that for the beef menu then the temperature T_{inf} of the lower cooking plate 11 and the temperature T_{sup} of the upper cooking plate 21 will also be able to reach that set temperature T_bS .

25 In such cases, the electric switches will perform a cycling operation allowing the temperature T_{inf} of the lower cooking plate 11 and the temperature T_{sup} of the upper cooking plate 21 to fluctuate around the setpoint temperature T_bS .

30 The regulation of the temperature of the lower cooking plate 11 and the temperature of the upper cooking plate 21 to the setpoint temperatures T_bS during the cooking phase is done independently on the basis of the temperature information returned by the elements for measuring the temperature 13, 23.

During the regulation during the cooking phase PC, it is noticed that the temperature T_{inf} of the lower cooking plate 11 remains less than the temperature T_{sup} of the upper cooking plate 21.

This difference is due to the flow of juices over the lower plate 11, which thus cools it.

When defining the cooking program, the processing means have also determined a first cooking duration T1S for the beef steaks so that a value of the internal cooking temperature X of the beef is, for example, equal to a final temperature $T_f=50^{\circ}\text{C}$, which corresponds, for example, to a "rare" cooking state at the core.

In the example provided, this cooking duration T1s starts at the beginning of the cooking phase PC and is equal to 210 seconds, that is 3 min 30 seconds, for a measured steak thickness Y equal to 2 cm and an occupied surface Z of 120 cm^2 with the activation of the marking function S.

It is therefore noticed that the cooking duration T1S when the marking function S is activated is reduced compared to the cooking duration T1 when the marking function S is not activated, all other parameters being equal.

At the end of this duration T1S, the user receives an indication of the cooking state at the core of the determined food on the information means 40.

Whether or not the marking function S is activated, if the user does not remove the determined food, then the cooking phase PC continues until another cooking duration determined by the processing means is reached and which corresponds to the reaching of another higher value of internal cooking temperature X corresponding to another cooking state at the core of the determined food, for example "medium" cooking, and so on until a cooking duration is reached which corresponds to reaching a final value of internal cooking temperature X corresponding to a final cooking state at the core of the determined food, for example "well done" cooking.

According to an alternative not represented, the value of internal cooking temperature X corresponding to a cooking state at the core of the determined food can be selected beforehand by the user via the user interface 30.

In this alternative, the cooking phase ends as soon as the determined duration corresponding to reaching the value of internal cooking temperature X selected by the user is reached.

Of course, in the embodiment and its alternative set out above, the user has to remove the food after the determined cooking duration of reaching the value of internal cooking temperature X desired by the user, otherwise the thermal inertia of the cooking plates 11, 21 would continue to cook the food.

For other determined foods A, or with a selection of other types of food, the behaviour of the electric cooking appliance 1 is identical to that described above for the beef menu, except that the setpoint temperatures T_a , T_{a+} or T_b have different values than those used for the beef menu. Cycling of the electric switches is also more frequent
5 because these setpoint temperatures T_a , T_{a+} or T_b are reached more easily than the setpoint temperatures T_a , T_{a+} or T_b applied for the beef menu.

Although the invention has been described with only a few examples of the application of cooking programs for beef, it is clear that the invention is by no means limited thereto, but rather encompasses all the technical equivalents of the means
10 described, insofar as they are comprised within the scope of the claims.

Thus, other predetermined constant values than the different values of internal cooking temperature X of the food, each corresponding to a cooking state at the core of a determined food, could be used.

Indeed, the cooking state at the core is especially used for meat.

15 However, for other types of food A, especially vegetables, it is possible to determine in the laboratory different values of variations in the mass loss of the food, each corresponding to a cooking state of the vegetable-type food.

Patentkrav

- 1.** Fremgangsmåde til udførelse af en funktion til markering (S) af et næringsmiddel på et elektrisk kogeapparat (1) til et næringsmiddel, såsom en kødgrill, omfattende en nedre kogeplade (11) og en øvre kogeplade (21) til ved
- 5 deres kontakt at opvarme et bestemt næringsmiddel (A) i løbet af en kogefase (PC), **kendetegnet ved, at** denne fremgangsmåde omfatter følgende trin:
- at anbringe en hukommelse, i hvilken værdierne for forskellige indre kogetemperaturer (X) for det bestemte næringsmiddel (A) er registreret og klassificeret i stigende rækkefølge, idet værdierne for forskellige indre
 - 10 kogetemperaturer (X) hver især svarer til en kogetilstand i kernen af det bestemte næringsmiddel (A), og i hvilken der også er lagret tilsigtede forvarmningstemperaturer (Ta, TaS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet kogetemperatur (Ta+, Tb, TbS), der skal anvendes i løbet af en kogefase (PC),
 - 15 - at aktivere en funktion til markering (S) af det bestemte næringsmiddel (A) for at udføre en således af brugeren ønsket markering af overfladen på det bestemte næringsmiddel (A),
 - at vælge en tilsigtet forvarmningstemperatur (Ta, TaS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet
 - 20 kogetemperatur (Ta+, Tb, TbS), der skal anvendes i løbet af en kogefase (PC), blandt de i hukommelsen lagrede som funktion af det bestemte næringsmiddel (A) og af aktiveringen af markeringsfunktionen (S) for det bestemte næringsmiddel (A),
 - efter en forvarmningsfase (PP) at bringe det bestemte næringsmiddel (A)
 - 25 i kontakt med den nedre kogeplade (11) og den øvre kogeplade (21) for at sætte kogefasen (PC) i gang med henblik på at opnå mindst en af værdierne for en således af en bruger ønsket indre kogetemperatur (X) for det bestemte næringsmiddel (A), derpå
 - at bestemme en første kogetid (T1) for det bestemte næringsmiddel (A) i
 - 30 løbet af kogefasen (PC) som funktion af den første i stigende rækkefølge af værdierne for det bestemte næringsmiddels (A) indre kogetemperatur (X) blandt de forskellige i hukommelsen registrerede og klassificerede værdier for det bestemte næringsmiddels (A) indre kogetemperatur (X), men også

som funktion af aktiveringen af markeringsfunktionen (S) for det bestemte næringsmiddel (A),

- ved slutningen af den første bestemte kogetid (T1) på det elektriske kogeapparat (1) at angive for brugeren, at en første værdi for indre kogetemperatur (X) svarende til en første kogetilstand i kernen af det bestemte næringsmiddel (A) er nået, derpå:
- hvis brugeren ikke udtager næringsmidlet, at anvende ved det elektriske kogeapparat (1) en anden bestemt kogetid for det bestemte næringsmiddel (A) som funktion af den anden i stigende rækkefølge af de i hukommelsen registrerede og klassificerede værdier for det bestemte næringsmiddels (A) indre kogetemperatur (X), men også som funktion af aktiveringen af markeringsfunktionen (S) for det bestemte næringsmiddel (A),
- ved slutningen af denne anden bestemte kogetid på det elektriske kogeapparat (1) atter at angive for brugeren, at den anden værdi for det bestemte næringsmiddels (A) indre kogetemperatur (X) svarende til en anden kogetilstand i kernen af det bestemte næringsmiddel (A) er nået,
- og så videre, hvis brugeren ikke udtager næringsmidlet, indtil den sidste i stigende rækkefølge af de i hukommelsen registrerede og klassificerede værdier for det bestemte næringsmiddels (A) indre kogetemperatur (X) svarende til en sidste kogetilstand i kernen af det bestemte næringsmiddel (A) er nået.

- 2. Fremgangsmåde til udførelse af en funktion til markering (S) af et næringsmiddel på et elektrisk kogeapparat (1) til et næringsmiddel, såsom en kødgrill, omfattende en nedre kogeplade (11) og en øvre kogeplade (21) til ved deres kontakt at opvarme et bestemt næringsmiddel (A) i løbet af en kogefase (PC), kendetegnet ved, at den omfatter følgende trin:**
- at anbringe en hukommelse, i hvilken værdierne for forskellige værdier for det bestemte næringsmiddels (A) indre kogetemperatur (X) er registreret, idet værdierne for forskellige indre kogetemperaturer (X) hver især svarer til en kogetilstand i kernen af det bestemte næringsmiddel (A), og i hvilken der også er lagret tilsigtede forvarmningstemperaturer (Ta, TaS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet kogetemperatur (Ta+, Tb, TbS), der skal anvendes i løbet af en kogefase (PC),

- at aktivere en funktion til markering (S) af det bestemte næringsmiddel (A) for at udføre en markering af overfladen på det således af brugeren ønskede bestemte næringsmiddel (A),
- at vælge en tilsigtet forvarmningstemperatur (T_a , T_aS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet kogetemperatur (T_{a+} , T_b , T_bS), der skal anvendes i løbet af en kogefase (PC), blandt de i hukommelsen lagrede som funktion af det bestemte næringsmiddel (A) og af aktiveringen af markeringsfunktionen (S) for det bestemte næringsmiddel,
- at vælge en kogetilstand i kernen af det bestemte næringsmiddel (A) svarende til den ene af værdierne for indre kogetemperatur,
- efter en forvarmningsfase at bringe det bestemte næringsmiddel (A) i kontakt med den nedre kogeplade og den øvre kogeplade for at sætte kogefasen i gang med henblik på at opnå en værdi for det bestemte næringsmiddels (A) indre kogetemperatur svarende til en i forvejen af en bruger valgt kogetilstand i kernen af det bestemte næringsmiddel (A), derpå
- at bestemme en kogetid for det bestemte næringsmiddel (A) i løbet af kogefasen som funktion af værdien for indre kogetemperatur svarende til den af brugeren valgte kogetilstand i kernen af det bestemte næringsmiddel (A), men også som funktion af aktiveringen af markeringsfunktionen (S) for det bestemte næringsmiddel (A),
- ved slutningen af den bestemte kogetid at angive på det elektriske kogeapparat (1), at værdien for indre kogetemperatur svarende til den af brugeren valgte kogetilstand i kernen af det bestemte næringsmiddel (A) er nået.

- 3.** Fremgangsmåde ifølge et af kravene 1 eller 2, ved hvilken man ved bestemmelsen af det bestemte næringsmiddels (A) kogetid eller kogetider (T_1 , ...), når markeringsfunktionen (S) for det bestemte næringsmiddel (A) er aktiveret, anvender en forudbestemt ud fra eksperimentelle data oprettet kogeregulering eller gerne anvender en beregningstabel, idet kogereguleringen eller beregningstabellen er registreret i forvejen på fabrikken før den første ibrugtagning af det elektriske kogeapparat (1).

4. Fremgangsmåde ifølge krav 3, ved hvilken kogereglen opnås ved en fremgangsmåde til beregning ved kvadratisk eller lineær korrelation.

5. Fremgangsmåde ifølge krav 1 til 4, ved hvilken bestemmelsen af
5 næringsmidlets kogetid eller kogetider ($T_1, \dots$) foruden den mindst ene af værdierne for indre kogetemperatur (X) blandt de i hukommelsen indlæste og brugerens aktivering af markeringsfunktionen (S) for det bestemte næringsmiddel (A), også udføres som funktion af det bestemte næringsmiddels (A) tykkelse (Y) og/eller af den af det bestemte næringsmiddel (A) optagne overflade (Z) på
10 kogepladerne.

6. Fremgangsmåde ifølge et af kravene 1 til 5, ved hvilken hver i hukommelsen indlæst værdi for det bestemte næringsmiddels (A) indre kogetemperatur (X) er en i forvejen på fabrikken før den første ibrugtagning af det elektrisk kogeapparat
15 (1) registreret konstant.

7. Fremgangsmåde ifølge et af kravene 1 til 6, ved hvilken bestemmelsen af kogetiden eller kogetiderne ($T_1, T_2, \dots$) i løbet af kogefasen (PC) er en funktion af den af det bestemte næringsmiddel (A) optagne overflade (Z), som opnås ved
20 målinger af den øvre kogeplades (21) temperaturer (T_{sup}).

8. Fremgangsmåde ifølge krav 7, ved hvilken man til at bedømme den af det bestemte næringsmiddel (A) optagne overflade (Z) anvender et element til måling af den øvre kogeplades (21) temperatur (23), der er anbragt i afstand fra et
25 kontaktområde for det bestemte næringsmiddel (A), og efter at have bragt næringsmidlet i kontakt med den øvre kogeplade (21) måler:

- den øvre kogeplades (21) temperatur (T_{sup}), og man sammenligner et tidsrum, i løbet af hvilket der konstateres et temperaturfald, med mindst en referencetærskel, eller
30 - et forudbestemt tidsrum til stabilisering af den målte temperature (T_{sup}).

9. Fremgangsmåde ifølge et af kravene 1 til 8, ved hvilken en eneste tilsigtet kogetemperatur (T_bS) for den nedre kogeplade (11) og for den øvre kogeplade (21) anvendes i løbet af kogefasen (PC), når markeringsfunktionen (S) for
35 næringsmidlet er aktiveret, medens mindst to tilsigtede temperaturer (T_a, T_b)

for den nedre kogeplade (11) og for den øvre kogeplade (21) anvendes i løbet af kogefasen (PC), når markeringsfunktionen (S) ikke er aktiveret.

- 10.** Fremgangsmåde ifølge krav 9, ved hvilken, når markeringsfunktionen (S) ikke er aktiveret, så foretages en overgang fra en første tilsigtet temperatur (T_{a+}) til en anden tilsigtet temperatur (T_b) for den nedre kogeplade (11) og for den øvre kogeplade (21), når den afledede af en målt temperatur (T_{sup}) på den øvre kogeplade (21) skifter fortegn.
- 10 **11.** Fremgangsmåde ifølge krav 10, ved hvilken den første tilsigtede temperatur (T_{a+}) for den nedre kogeplade (11) og for den øvre kogeplade (21) er højere end en i løbet af en forvarmningsfase (PP) for det elektrisk kogeapparat (1) anvendt tilsigtet temperatur (T_a), når markeringsfunktionen (S) ikke er aktiveret, og den anden tilsigtede temperatur (T_b) for den nedre kogeplade (11) og for den øvre kogeplade (21) er lavere end den i løbet af forvarmningsfasen (PP) anvendte tilsigtede temperatur (T_a).
- 15 **12.** Fremgangsmåde ifølge et af kravene 9 til 10, ved hvilken den nedre kogeplades (11) og den øvre kogeplades (21) eneste tilsigtede temperatur (T_bS) er højere end den i løbet af en forvarmningsfase (PP) for det elektriske kogeapparat (1) anvendte tilsigtede temperatur (T_aS), når markeringsfunktionen (S) er aktiveret.
- 20 **13.** Fremgangsmåde ifølge et af kravene 1 til 12, ved hvilken de forskellige tilsigtede forvarmnings- (T_a , T_aS) og kogetemperaturer (T_{a+} , T_b , T_bS) afviger i overensstemmelse med den bestemte næringsmiddeltype (A).
- 25 **14.** Fremgangsmåde ifølge et af kravene 1 til 13, ved hvilken reguleringen af den nedre kogeplades (11) og den øvre kogeplades (21) temperatur i løbet af kogefasen (PC) gennemføres ud fra den af et element til måling af den nedre kogeplades (11) temperatur (13) returnerede information, når markeringsfunktionen (S) er aktiveret.
- 30 **15.** Elektrisk kogeapparat (1) til udførelse af fremgangsmåden ifølge et af kravene 1 til 14, hvor det elektriske kogeapparat (1) omfatter en nedre kogeplade (11) og
- 35

en øvre kogeplade (21) til ved deres kontakt at opvarme et bestemt næringsmiddel (A) i løbet af en kogefase (PC), **kendetegnet ved, at** det til at udføre en således af brugeren ønsket markering af det bestemte næringsmiddels overflade og til at nå en af en bruger ønsket kogetilstand i kernen af det bestemte

5 næringsmiddel (A) omfatter:

- en hukommelse til i stigende rækkefølge at lagre værdierne for forskellige indre kogetemperaturer (X) for det bestemte næringsmiddel (A), idet værdierne de forskellige indre kogetemperaturer (X) hver især svarer til en kogetilstand i kernen af det bestemte næringsmiddel (A), og til at lagre

10 tilsigtede forvarmningstemperaturer (Ta, TaS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet kogetemperatur (Ta+, Tb, TbS), der skal anvendes i løbet af en kogefase (PC),
- midler til bestemmelse af det således i kontakt med kogepladerne anbragte næringsmiddels tykkelse (Y) og/eller midler til bedømmelse af

15 den af dette bestemte næringsmiddel (A) optagne overflade (Z) på kogepladerne (11, 21),
- midler til aktivering af en funktion til markering (S) af det bestemte næringsmiddel (A);
- behandlingsmidler indrettede til at vælge en tilsigtet

20 forvarmningstemperatur (Ta, TaS), der skal anvendes i løbet af en forvarmningsfase (PP), og mindst en tilsigtet kogetemperatur (Ta+, Tb, TbS), der skal anvendes i løbet af en kogefase (PC) blandt de i hukommelsen lagrede som funktion af det bestemte næringsmiddel (A) og af aktiveringen af markeringsfunktionen (S) for det bestemte
- næringsmiddel, og til at bestemme mindst en kogetid (T1, ...) for det

25 således anbragte bestemte næringsmiddel (A) som funktion:

 - * af den mindst ene af værdierne for indre kogetemperatur (X) blandt de i hukommelsen indlæste,
 - * af næringsmidlets tykkelse (Y) og/eller af den overflade (Z), som

30 næringsmidlet optager, og
 - * af aktiveringen af markeringsfunktionen (S) for næringsmidlet af brugeren ud fra midlerne til aktivering af denne funktion,
- midler til på det elektriske kogeapparat (1) at vise brugeren, at den tilsvarende kogetilstand i kernen er nået.

16. Kogeapparat ifølge krav 15 omfattende en nedre elektrisk afbryder, der er egnet til at tillade eller afbryde det nedre elektriske varmeelements (12) strømforsyning, og en øvre elektrisk afbryder, der er egnet til at tillade eller afbryde det øvre elektriske varmeelements (22) strømforsyning.

5

17. Kogeapparat ifølge krav 16, i hvilket mindst et kogeprogram er defineret med:

- en tilsigtet temperatur i forvarmningsfasen (PP) og mindst en tilsigtet temperatur og mindst en kogetid i mindst en kogefase (PC), der anvendes i
- 10 det nedre elektriske varmeelement (12), og
- en tilsigtet temperatur i forvarmningsfasen (PP) og mindst en tilsigtet temperatur og mindst en kogetid i en kogefase (PC), der anvendes i det
- øvre elektriske varmeelement (22),

idet behandlingsmidlerne er indrettede til indbyrdes uafhængigt at styre den

15 nedre elektriske afbryder og den øvre elektriske afbryder under forvarmningsfasen (PP) og/eller under kogefasen (PC).

18. Kogeapparat (1) ifølge krav 17, i hvilket den tilsigtede temperatur i forvarmningsfasen (PP) og den mindst ene tilsigtede temperatur i kogefasen, der

20 anvendes i det nedre elektriske varmeelement (12), for et og samme kogeprogram hver især afviger fra den tilsigtede temperatur i forvarmningsfasen (PP) og fra mindst en tilsigtet temperatur i kogefasen (PC), der anvendes i det øvre elektriske varmeelement (22).

25

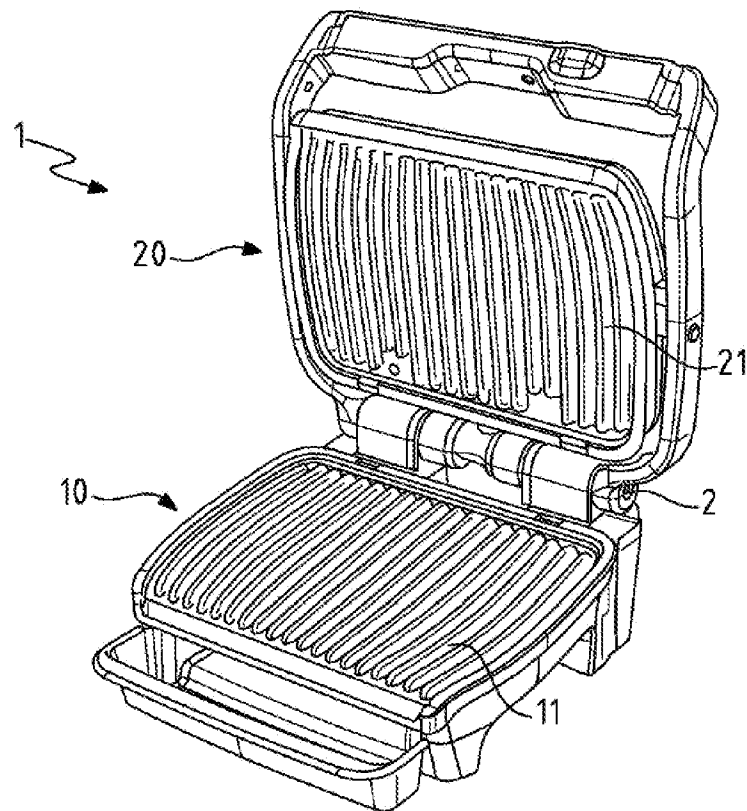


FIG.1

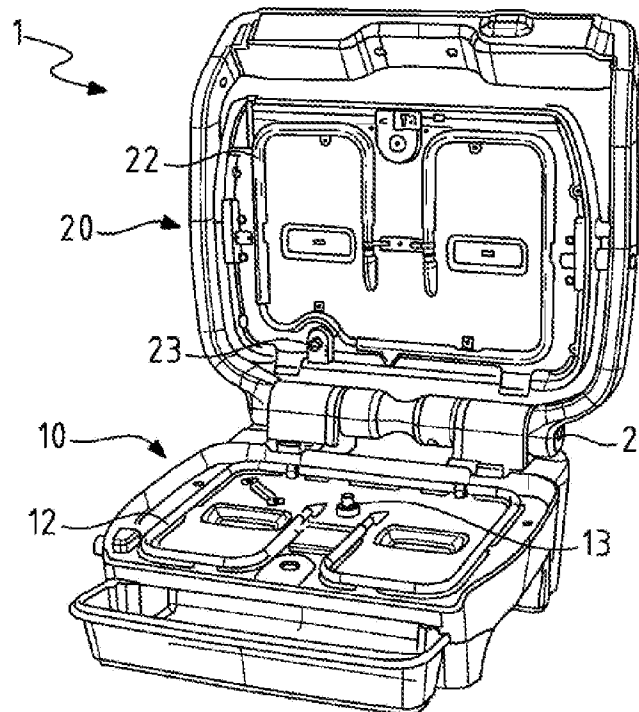


FIG.2

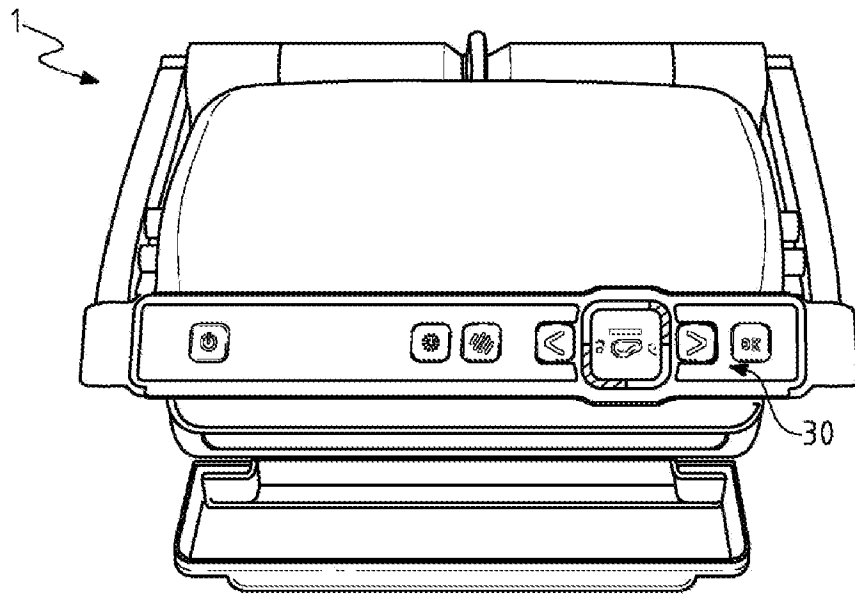


FIG.3

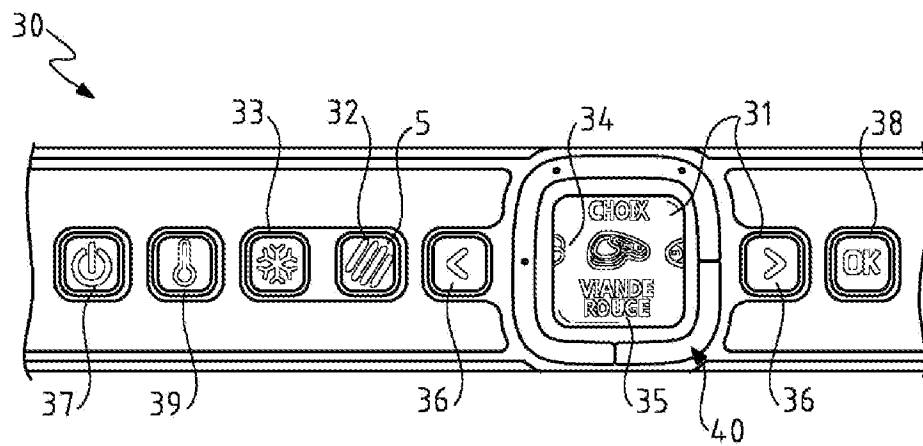


FIG.4

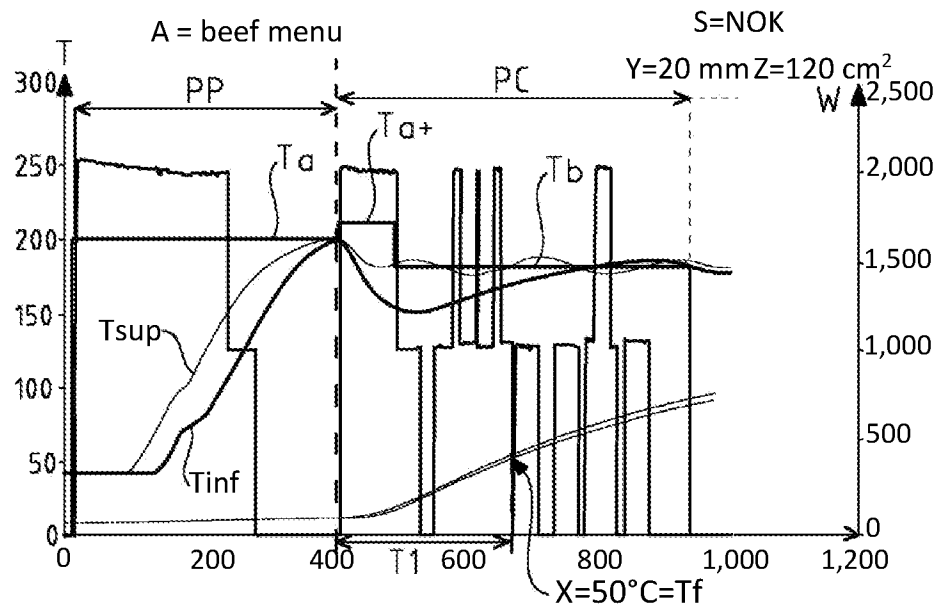


FIG.5

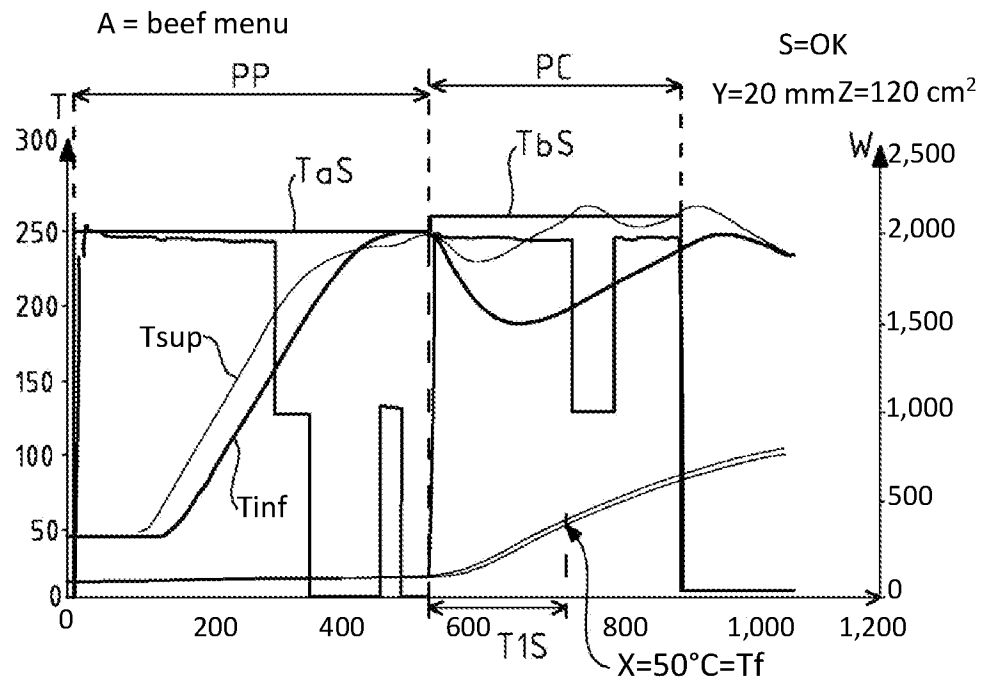


FIG.6