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(54) Cooking apparatus with user interface

(57) Cooking apparatus, in particular oven, comprising a cooking cavity, means to set and control the operating cycle, means for both processing the signals and the commands received from said setting and control means and storing data, in which there are provided selection devices, each one of which is associated to a specific control variable that can be selected independently among a plurality of different states that can be taken up independently by the same variable, and in which each combination of such distinct states of the control variables is associated to a pre-determined set of machine instructions residing in said data storage means, adapted to act on respective operating devices of the apparatus.

The oven is provided with a display capable of visually representing in a selective manner a plurality of said control variables, along with the selected states thereof, and the selection devices are adapted to determine on said display at least a symbolical image of the animal species and/or the part of the body of said animal that is selected.

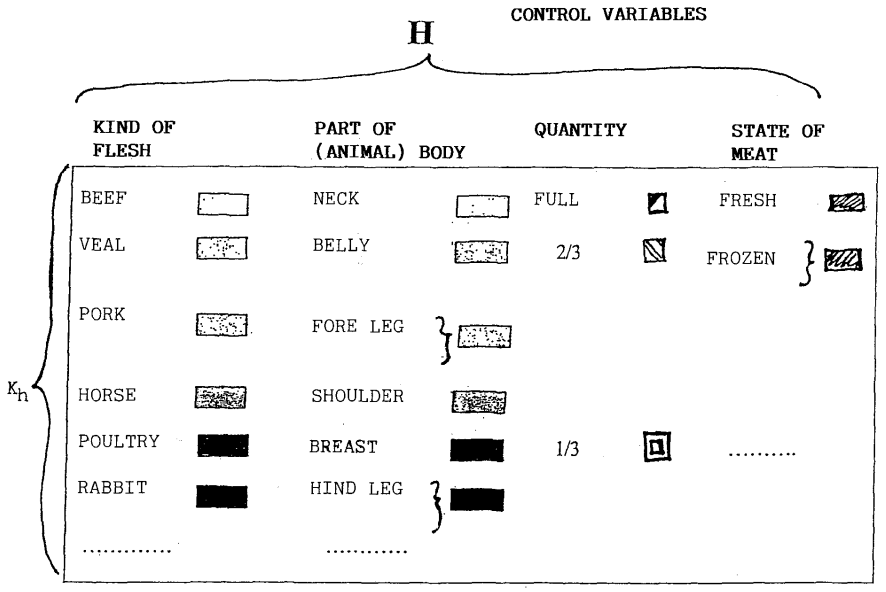

FIG. 1

EP 1 741 989 A2

Description

[0001] The present invention refers to an improved kind of cooking apparatus, in particular a food cooking oven for use in professional kitchens and mass-catering applications, which is adapted to make it most convenient for a user to set a desired cooking programme, when meat dishes have to be prepared, by selecting it among a number of pre-set cooking programmes.

[0002] While reference will be made to a food cooking oven throughout the following description, the explanations and concepts set forth herein below shall be understood as equally applying to and being equally effective in connection with cooking appliances of even different kinds.

[0003] Largely known in the art is the fact that, in traditional food cooking processes being carried out in an oven, the result eventually depends on a number of variables, such as the time, the temperature, the humidity or moisture contents, a possibly used air circulation, the radiated power in the case of microwave cooking, and the like.

[0004] All these variables are capable of being set by simply entering the value, or the level, that each one of them is supposed to take, as selected among a plurality of selectable values.

[0005] Selecting these variables, along with the value or level thereof to be set, is a rather simple operation for a user to perform, provided that he/she is an expert cook or sufficiently skilled in the art of cooking, since these variables and the related values solely and basically depend on the nature of the food and the state thereof, wherein it should be noticed that even an oven operator that is not particularly skilled in the art is able to readily identify and recognize such kind of information about the food to be handled.

[0006] So, for example, fresh vegetables are clearly and readily distinguishable from a pie or pastry prepared in a casserole, and the latter is in turn clearly and readily distinguishable from a piece of meat or fish.

[0007] Currently available ovens are provided with a facility that makes it possible for operators to avoid having to each time select the value of each single cooking variable, wherein such facility typically involves providing the oven with a plurality of automatically performable cooking programmes, each one of which is built around and organized on the basis of each single combination of input instructions entered by the oven operator; as a result, these oven are provided with a plurality of controls, by means of which the oven operator is therefore able to enter the kind of food to be cooked, along with all other correlated input information, such as for instance:

- kind of food,
- quantity,
- state of the food,

and the like.

[0008] In practice, the operator enters the above-cited input data and the oven selects and activates a previously built and identified cooking programme, which consists in carrying out a cooking cycle, in which the values of the various afore-defined variables (i.e., time, temperature, etc.) are effected so as to reach an optimum final cooking result.

[0009] Therefore, in accordance with the kind of food to be handled and the required preparation thereof, or the starting state (i.e. fresh, deep-frozen) thereof, the operator will enter the respective information and the oven will in response start and carry out a cooling programme that is defined by correspondingly selecting the proper value or level of the different variables of the afore-cited kind.

[0010] In commercial food-service and mass-catering operations, restaurants, hotels, lunch bars, and the like, use is generally made of really large quantities of meat of the most varied kind, both as far as the animal species, which the meat comes from (i.e. beef, pork, mutton, and so on), and the parts of the body, which that meat has been derived from, are concerned.

[0011] It is a largely known fact that there exist optimum cooking processes to handle each one of such kinds and varieties of meat, which most obviously differ for each one of such kinds and varieties of meat. However, owing to the really large variability of the possible combinations of animal species and parts of the body thereof, the result is that an operator with just an average level of professional skill may find him/herself rather embarrassed in deciding which levels the various cooking variables should be assigned, actually, so that he/she may quite easily make some mistake. On the other hand, currently existing cooking ovens, even the most automated ones, are not provided with means that are adapted to receive any input information relating to the different animal parts that can be cooked in the oven.

[0012] It would therefore be desirable, and it is actually a main object of the present invention to provide an apparatus for cooking meat, in particular an oven, which is provided with such input means that, when a cooking programme involving meat is being set, they are adapted to receive an information concerning not only the animal species, which the meat to be cooked comes from, but also the particular part of the body of the same animal, as well as to select a cooking cycle that allows for and takes such information data into due account.

[0013] According to the present invention, these aims, along with further ones that will become apparent from the following disclosure, are reached in a cooking apparatus incorporating the features being recited in the appended claims.

[0014] Features and advantages of the present invention will anyway be more readily understood from the description that is given below way of nonlimiting example with reference to the accompanying drawings, in which:

- Figure 1 is view of an exemplary general representation charting the control variables and the states that each one of them can take;

- Figure 2 is a view of logic-flow diagram symbolically illustrating the mode of operation of the inventive apparatus;

- Figure 3 is a view of an exemplary schematical representation of the final information that is produced as a result of the data shown in Figure 1, and entered in the inventive apparatus, being processed;

- Figure 4 is a view of an exemplary representation of some of the possible states of some of the control variables of Figure 1.

[0015] The description set forth hereinbelow, although referring to a general case, is also used to properly arrange the base of the present invention from a theoretical point of view.

[0016] An oven according to the present invention comprises a plurality of control variables that can be set in various manners, so as to take different and independently selectable states; the variables that are considered here are the in formation that a user is required to enter, and that concern both the properties of the food to be handled and some modes and parameters of operation of the oven. Mainly, although not solely, these control variables include:

1) - the category or species of the animal, which the meat to be cooked comes from;
2) - the part of the body of the animal, which the meat to be cooked belongs to;
3) - the quantity and the size of the meat to be cooked;
4) - the state of the meat to be cooked;
5) -.....
n) - (any further possible variable).

[0017] A total of "n" possible control variables H is therefore considered, which can be freely set to take respective "values", which for the sake of simplicity and consistency with the statistical jargon will be referred to and defined as "states".

[0018] Each one of these "n" variables can take a respective number of states, as set by the user. For example, the variable 1), i.e. the species of animal, can be assigned following states corresponding to the different nature of the meet:

1A) - Beef
1B) - Veal
1C) - Pork
1D) - Horse
1E) - Poultry
1F) - Rabbit
1G) - Game

[0019] In turn, the variable 2), i.e. the part of animal body, can be selected on one of the following distinct states:

2A) - Neck
2B) - Belly
2C) - Fore leg
2D) - Shoulder
2E) - Breast
2F) - Hind leg
---) - .... and so on ....
m) - (Any possible further variable)

[0020] Figure 1 provides a general, although not exhaustive overview of the control variables and the states that each one of them is capable of taking.

[0021] It will of course be appreciated that the control means used to set, i.e. enter the selected state for each variable may materially be provided in the form of any known means typically used in the art to such purposes, such as push-buttons, rotary multi-setting selector switches, linear setting selector switches, touch controls, proximity switches, and the like, being it on the other hand understood that the actual technique used to set or enter said selected states is by no means relevant to the purposes of the present invention.

[0022] Altogether, if the control variables H are in a number of "n", and each such variable can take a respective number of states K_h, the number of possible different combinations will therefore be:

$$C = (k_1) \times (k_2) \times (k_3) \times \ldots (k_n)$$

where:

- k_1 is the number of possible states of the first variable,
- k_2 is the number of possible states of the second variable,
- .....
- K_n is the number of possible states of the nth variable.

[0023] The number of said possible combinations will be designated C.

[0024] Each control used to enter each state of each variable is connected with a control, storage and processing unit (not shown), which is adapted to perform an identification of each combination of states that is set and entered by the user via the variable selecting controls.

[0025] After the states of the different variables have been so selected and entered, said control unit identifies which one among all of the C possible combinations has been selected.

[0026] This identification and recognition operation can be most easily performed with any of the largely

known data processing techniques.

[0027] The above-cited control and storage unit is also provided with a memory, in which there are stored C groups of distinct data.

[0028] Each one of said data groups includes all the machine instructions (parameters) that must be used by a - obviously pre-set - common standard operation programme in view of activating and starting a distinct cooking cycle.

[0029] Each one of said data groups is associated - e.g. in a separate register - to a respective one of said C combinations.

[0030] From a logic point of view, the operations that need to be performed in view of the above, are schematically indicated in Figure 2, where only the two blocks 1 and 6 and the last ones, "IF" and "START", are controlled, i.e. activated by the user through the selection of the states of each variable (i.e. the user tells the machine what he/she prefers), whereas the other blocks are performed by the apparatus automatically.

[0031] In practice, the above-noted operations take place as follows:

- in the first block, the user selects and enters one or more desired states referred to respective variables among the afore-cited ones, i.e. species of animal, part of the body, and so on;
- at block 3, the apparatus reads the information deriving from the preceding selection step, and initiates the processing step;
- after said processing, storage and control unit has recognized - with the help of easily performed, largely known comparison and selection techniques of the <IF> and <AND> type - the particular combination of commands selected and entered by the user, it associates to said standard cooking programme those machine instructions, which are contained in the specific data group corresponding to the selected and recognized combination of states: all it takes, at this point, is to select - eg. based on the results of experiments conducted according to common laboratory test methods - the process-related operating machine-instructions (parameters) that - as imported and carried out by said standard cooking programme of a general type, but specially adapted to be able to import said machine instructions - will generate a complete cooking cycle containing all necessary instructions and data, which is so defined as to be able to comply with the selections entered by the user in an optimum manner;
- at the next block 4, the invention is completed with following functions and related devices: each one of the afore-cited data groups - further to the already defined machine instructions - contains also a second data group - which shall be referred to as "user data" hereinbelow - in appropriate storage registers, which are associated to respective combinations of states, and which provide respective information on the operating modes of the oven.

[0032] These modes of operations relate to that kind of information 13, which is most of all of interest for the user, such as for instance the time required to complete the cooking cycle, the oven temperature, the possible energization of a microwave generator, and the like.

[0033] In general, and with particular reference to Figure 3, these data are:

- the characteristics of the cooking cycle (hot-air or fan-assisted cooking, steam cooking, mixed hot-air and steam cooking, etc.) to be performed by the oven,
- humidity under steady-state conditions,
- steady-state temperature,
- cooking time,
- microwave power output,
- ventilation level,
- and the like.

[0034] The above-cited processing unit is therefore adapted to retrieve - in a way fully similar to the one used to select the machine instructions, and after the user has duly selected the various states of the variables - said user data and transfer them via appropriate information carrier and display means to the outside for the user to be able to take notice thereof.

[0035] Through an appropriate selection - by said processing unit - of the above-cited user data for each one of the possible combinations being set, it will therefore be possible for at least some of the most interesting consequences of the just performed selection to be concurrently, i.e. almost immediately displayed for practical user information.

[0036] If the user accepts the results of the processing operation and said user data as duly displayed by the apparatus, he/she will then enter a "START" command (Figure 2) that has the effect of both holding the machine instructions as they have just been processed out and starting the cooking cycle to be performed in accordance with such machine instructions.

[0037] Should on the other hand the results of the selections entered by the user fail for any reason whatsoever to be considered as being acceptable, the possibility is given for the selections that failed to be considered as being congruous to be modified.

[0038] With reference to the block "IF", if the result is accepted by the user, the latter can confirm - via said "START" command - the selections entered by him/her by activating a proper control on the oven; otherwise, the just entered selections can be modified (via a proper control, not shown in the Figures) and the just described sequence can be iterated.

[0039] The controls used and the commands entered to modify the selections made by the user and supplied to the oven, or to confirm (START) the same selections, may be of any conventional kind largely known as such

in the art, so that they shall not be described here any further.

[0040] Those skilled in the art will also be fully able to readily appreciate that other logic-type and data processing modes and procedures may be implemented in an equally effective manner to recognize the commands being entered and select the related groups of machine instructions and user data. In other words, the example that has been described above has the sole purpose of illustrating a most simple working method that may be readily understood by those skilled in the art.

[0041] It can be most basically stated that the present invention is based on the capability - as provided by the processing, storage and control unit - for the information pertaining to each combination of states being set and entered by the user to be transformed into a corresponding - since recognized as such - group of machine instructions to be used in the cooking cycle.

[0042] As such, the present invention allows anyway for a further advantageous improvement; it must in fact be taken into due account that - not only theoretically, but also in practice - not all user data being processed out by the apparatus in front of a given combination of states selected and entered by the user will necessarily be agreed upon or accepted by the user, who for any reason whatsoever may in fact decide (block "IF") that one or more of the above-noted user data is/are not acceptable and, as a result, the oven programming must be modified correspondingly.

[0043] In such case, the user will directly enter in the oven programming those user data, which he/she has decided to use and implement in the cooking cycle to be started, and which - owing to them being also machine instructions, although not necessarily the same as the just processed-out ones - act on said standard cooking programme to trim, i.e. cutting and dressing it in accordance with the preferences entered by the user.

[0044] The desired user data may be input, i.e. entered by acting on appropriate controls 13A associated to a control panel 14, on which the user data worked out by the apparatus are displayed (see Figure 3).

[0045] So, for instance, the possibility is given for the steady-state (thermostatically controlled) temperature to be specially delimited, or a new duration time for the cooking cycle to be introduced, and these data will be incorporated in said standard programme, while all other machine parameters will remain unaltered.

[0046] The control to be operated in order to inform the apparatus to go on with the afore-illustrated procedure - after the state for each variable has of course been entered, and after the user has possibly modified any of the user data according to his/her own preferences - may most suitably be the same START control as defined above.

[0047] The basic advantage deriving from such feature lies in the fact that the user is given the possibility of verifying and either accepting the machine instructions just selected by the apparatus or modifying them by directly acting on the user data, wherein this practically occurs immediately upon the required commands being entered and before the cooking cycle is started.

[0048] The peculiarity of the invention will at this point be capable of being fully appreciated: it in fact enables the user to dialogue with the oven, by querying it on the various options, characteristics and modes of operation that it offers in front of the different situations proposed by the user and, ultimately, select the most preferred one among such options. In other words, this is effective in doing away with the hitherto unavoidable drawback of having to activate cooking programmes "blindly", i.e. based solely on conventionally defined instructions and with the possibility for the final result to be predicted in a just rough manner.

[0049] To put it most briefly, the described invention is based on the definition of three data tables, of which the first table (Figure 1) represents the different variables whose states are defined by the user, the second table (not shown) represents the aggregate of the machine parameters used by the cooking cycle selected by the processing means, and the third table (Figure 3) indicates the user data that can be either accepted or modified by the user.

[0050] A further advantageous improvement is obtained if the species and the part of the body of the animal, which the meat to be cooked is derived from, are displayed in the form of a direct and immediate representation of the image thereof. With reference to Figure 4, on the front side of the oven there is provided a visual display 10, on which - further to various indications of a generally known kind, such as some of said control variables as already defined above, a possible pre-heating step, or if the meat shall be cooked to a rare, medium or well-done condition, and so on - there are graphically represented also four indications relating to:

- the species of animal, which the meat to be cooked is derived from,
- the particular part of the body of the animal, which the meat to be cooked belongs to,
- the quantity of meat placed in the oven for cooking,
- the state of such meat (i.e. fresh or frozen).

[0051] While the first, third and fourth indications of the corresponding control variable are already known in the art, the second one, i.e. the one relating to the part of the body of the animal, is not, so that this indication - as on the other hand already specified hereinbefore - ideally completes the series of instructions needed carry out an optimum cooking process and achieve an optimum cooking result.

[0052] The improvement lies in the fact that, together with the indication provided by the word relating to the selected part of the body (shoulder, back, neck, belly, leg, and the like), it is also the stylized image 11 of the species of the selected animal that is graphically highlighted, and then, when the part 12 of the body of such

animal is subsequently selected via appropriate sequential controls, e.g. touch controls or the like, in the same image of the animal there is highlighted, e.g. chromatically or through a different brightness, the part of animal that has been selected.

[0053] In this way, even a relatively unskilled operator, provided however that he/she knows which type of meat is being handled, is able to visually verify whether the selection of the meat being displayed is actually corresponding not only to the species of animal, but also to the part of the body thereof; as a result, he/she will be fully able to supply the inventive oven with all appropriate data as required to instruct and activate the most befitting cooking cycle, without any uncertainty or possibility of an error.

Claims

1. Cooking apparatus, in particular oven, comprising:

- a cooking cavity,
- means to set and control the operating cycle,
- means for both processing the signals and the commands received from said setting and control means, and storing data,

characterized in that said setting and control means comprise:

- selection devices, each one of which:

  • is associated to a specific control variable (H),

  • which can be selected independently among a plurality of different states (k_h) that can be taken up independently by the same variable,

and **in that** each combination of such distinct states (C) of said control variables is associated to a predetermined set of instructions (machine instructions) residing in said data storage means, adapted to act on respective operating devices.

2. Cooking apparatus according to claim 1, **characterized in that** the activation of the processing procedure of the states of said control variables (H), as set via said selection devices, is triggered by an appropriate user-operable control (START) being actuated.

3. Cooking apparatus according to any of the preceding claims,
characterized in that one of said variables enables the species of the animal, which the meat comes from, to be selected and comprises at least one of the following states:

1A) - Beef
1B) - Veal
1C) - Pork
1D) - Horse
1E) - Poultry
1F) - Rabbit
1G) - Game

4. Cooking apparatus according to claim 3, **characterized in that** each combination of different states of said control variables is associated to a respective combination of user data (13), which are adapted to deliver information relating to two or more of the following operating characteristics:

- the characteristics of the cooking cycle to be performed in the oven,
- the humidity under steady-state conditions,
- the steady-state temperature,
- the cooking time,
- the microwave power output,
- the ventilation level.

5. Cooking apparatus according to claim 4, **characterized in that** it is provided with a display (10) capable of visually representing in a selective manner a plurality of said control variables (H), along with the selected states thereof, and **in that** said selection devices are adapted to determine on said display at least a symbolical image of the animal species and/or the part of the body of said animal that is selected.

6. Cooking apparatus according to claim 5, **characterized in that** it is provided with user-operable means (13A) that are adapted to selectively modify said user data (13) as processed out and presented by said processing means.

7. Cooking apparatus according to claim 6, **characterized in that** said modified user data are used by said control means to define the operating characteristics of the cooking cycle accordingly.

8. Cooking apparatus according to any of the preceding claims,
characterized in that it is provided with further means adapted to modify the settings of the states of said control variables.

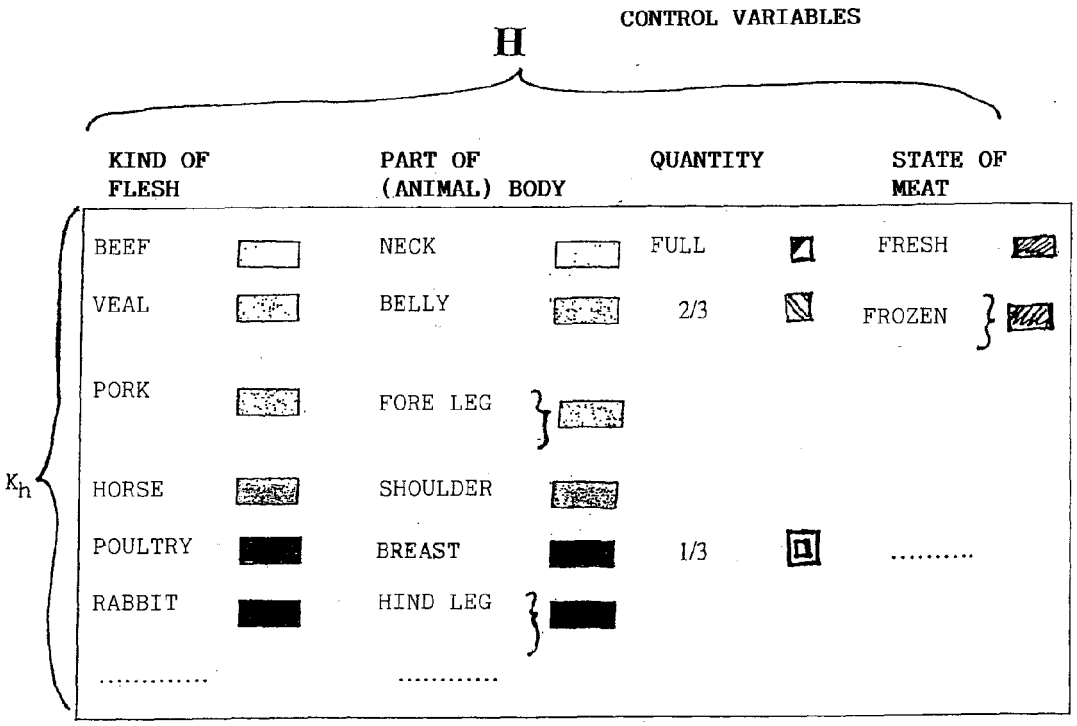
CONTROL VARIABLES
H
KIND OF FLESH
PART OF (ANIMAL) BODY
QUANTITY
STATE OF MEAT
BEEF
VEAL
PORK
HORSE
POULTRY
RABBIT
.....
NECK
BELLY
FORE LEG
SHOULDER
BREAST
HIND LEG
.....
FULL
2/3
1/3
FRESH
FROZEN
.....
K_h

FIG. 1

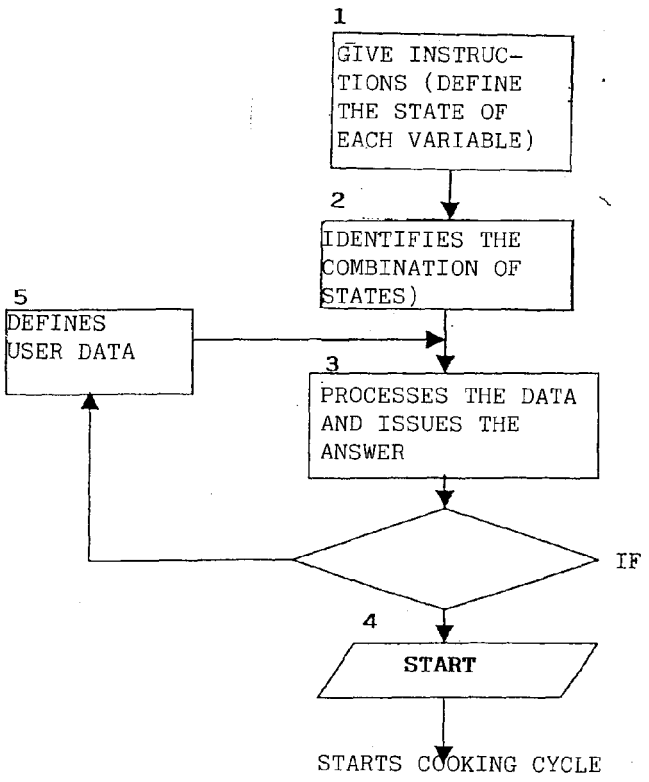
1
GIVE INSTRUC-TIONS (DEFINE THE STATE OF EACH VARIABLE)
2
IDENTIFIES THE COMBINATION OF STATES)
5
DEFINES USER DATA
3
PROCESSES THE DATA AND ISSUES THE ANSWER
IF
4
START
STARTS COOKING CYCLE

FIG. 2

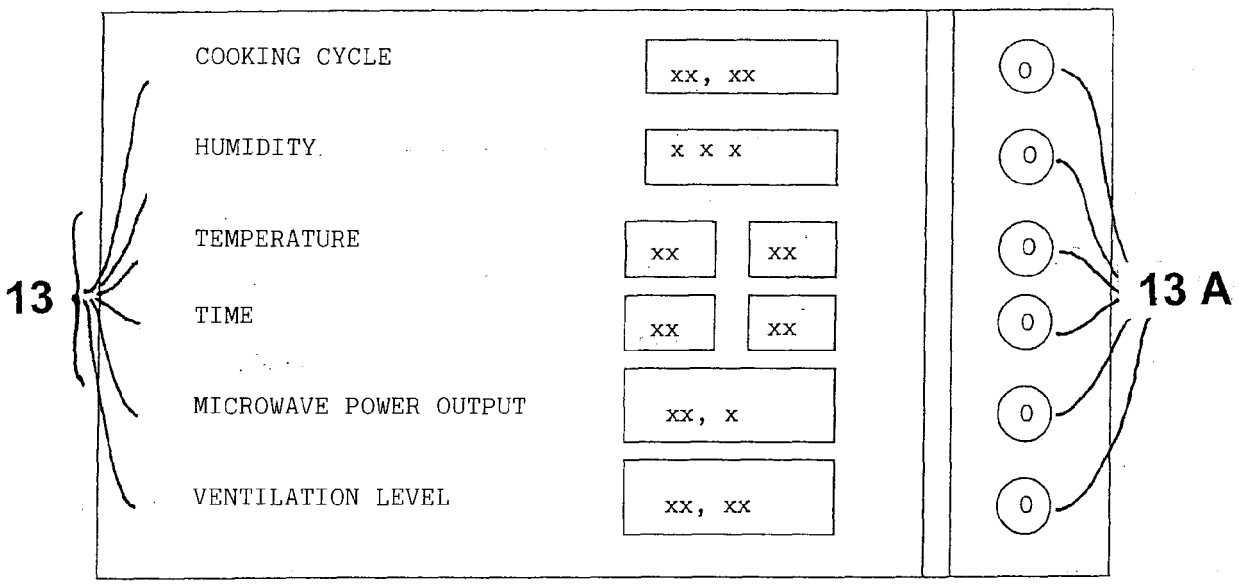
13
COOKING CYCLE
xx, xx
HUMIDITY
x x x
TEMPERATURE
xx
xx
TIME
xx
xx
MICROWAVE POWER OUTPUT
xx, x
VENTILATION LEVEL
xx, xx
13 A

FIG. 3

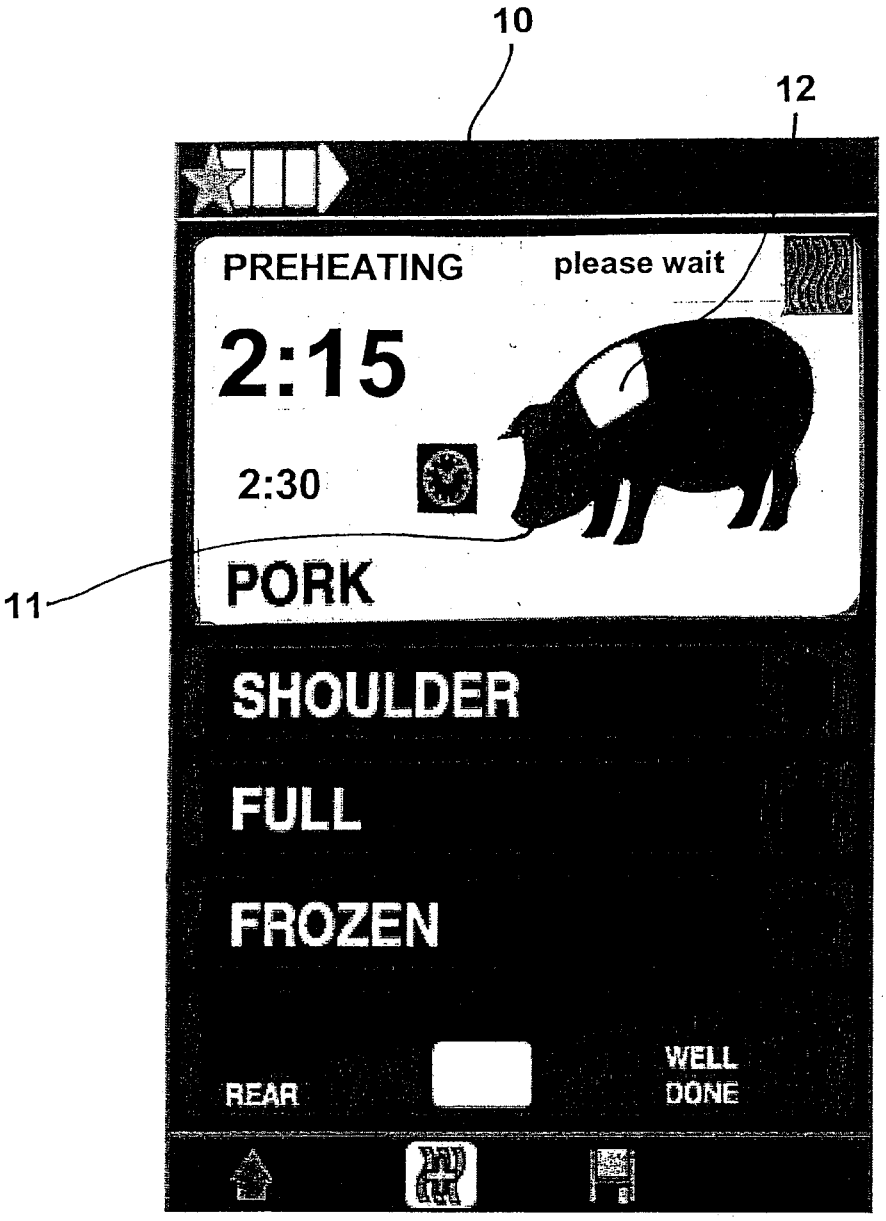
10
12
PREHEATING
please wait
2:15
2:30
11
PORK
SHOULDER
FULL
FROZEN
REAR
WELL
DONE

FIG. 4