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(54) Title: METHOD OF ELECTRIC RICE COOKING KETTLE FOR UNIFORMLY COOKING RICE		
(57) Abstract Disclosed is a method for uniformly cooking rice of an electric rice cooking kettle capable of cooking uniform rice regardless of a change of months. The method can cook uniform rice without adjusting a water amount during cooking of the rice, by controlling heat preserving times thereof according to a change of months. The method has an advantage in that it can uniformly cook rice, when cooking a rice with standard water amount, by automatically performing a rice cooking process according to differences in the rice's composition corresponding to a difference in the month of the year.		

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METHOD OF ELECTRIC RICE COOKING KETTLE FOR UNIFORMLY COOKING RICE

Technical Field

5 The present invention relates to a method for cooking a rice. More particularly, the present invention relates to a method for uniformly cooking a rice of an electric rice cooking kettle capable of cooking uniform rice regardless of a change of months.

Background Art

10 Recently, an electric rice cooking kettle operates according to its contents, in which a cooking process starts according to an operation of a cooking key after a status of an internal pot installed therein is sensed at first.

 In a general electric rice cooking kettle, an internal pot has a scale for indicating a water mount therein so that a user can put a suitable amount of rice therein with a measuring cup and perform a cooking process.

15 Operation of a cooking process by means of the general electric rice cooking kettle will be described with reference to FIG. 1, which is a graph for illustrating a general rice cooking process of an electric rice cooking kettle.

 At first, when an internal pot is placed in the electric rice cooking kettle, a key senses the placement of the internal pot. When a user pushes a menu key and pushes
20 a key for starting a rice cooking, a progressive program is activated. The electric rice cooking kettle then progress through a number of processes. That is, a process for cooking a rice is performed in the order of an absorbing (soaking) process, a heating process, a heat preserving process, and a steaming process. The absorbing process is completed by heating a heater included in the electric rice cooking kettle for ten
25 minutes so that a temperature of the internal pot, that is, that of a cooking rice, is increased from 25°C to 45°C, and thus soaking the cooking rice at a temperature of 45°C. The heating process includes a first heating process and a second heating process. After the absorbing process is finished, the first heating process is performed by heating the heater for four minutes so that the temperature of the cooking rice is
30 increased from 45°C to 75°C. Then, the second heating process is performed by heating the heater for two minutes so that a temperature of the cooking rice is increased from 75°C to 102°C. Then, the heat-preserving process is carried out by heating the

heater for three minutes so that the temperature of the cooking rice can be increased from 102°C to 125°C. Then, the steaming process is completed by keeping the cooking rice at 125°C for ten minutes. When the process for cooking the rice is finished, a display indicates that the rice has been cooked completely. The user can
5 confirm that the cooking process is advancing through the different processes after the internal pot is placed in the electric rice cooking kettle.

However, since a rice generally has a feature that its water component changes according to the passage of time, the water component amount of a new rice is considerably different from that of a old rice. Therefore, when a user cooks a rice, the
10 user must consider whether the rice is new or old. That is, the user must cook the new rice at a water level below standard mount and cook the old rice at a water level above thereof. This method can provide an experienced person with a good rice, but has a disadvantage that it can not performed by a person with little or no experience.

U.S. Pat. No.4,670,282 (issued to Mazic Onishi, Keno Into, and Moria
15 Isaiah on the date of June 2, 1987) discloses one example of a method for selectively controlling a state of a boiled rice. A method for cooking rice according to the above U.S. Patent comprises placing a mixture of water and rice in a pot; and heating the mixture of water and rice, while forming by convection heating within the mixture a
20 gradient which enables an upper portion of the mixture to have a temperature higher than that of a lower portion of the mixture, with a substantially ring shaped sheath electrical heater separated from the bottom of the pot and disposed in an airspace between the pot and a case which together form a continuous substantially sealed heating space, so that the upper portion of the mixture reaches an optimal cooking
25 temperature range in a shorter time than the lower portion of the mixture, by the convection heating, and forms a mixture layer kept within the optimal cooking temperature range, the rice located in the mixture layer absorbs more water than the rice located in the other regions, causing the surface of the water within the pot to gradually lower toward the bottom of the pot, and consequently the mixture layer
30 gradually lowers, and while the mixture layer gradually lower, the rice located in each region in the pot remains within the optimal cooking temperature range for substantially the same length of time, whereby the rice in the pot uniformly absorbs the water

independent of position within the pot. U.S. Patent No. 4,670,282 produces an effect without precision processing, and is constructed so as to ensure substantially uniform cooking of rice contained in the pot. However, a disadvantage remained that it does not consider changes in rice's composition that occur with passage of time, so it cannot
5 cook fully uniform rice.

Disclose of Invention

Therefore, an object of the present invention is to provide a method for uniformly cooking a rice of an electric rice cooking kettle capable of cooking uniform
10 rice without adjusting a water mount during cooking of the rice, by controlling heat preserving times thereof according to a change of months.

In order to achieve the above-mentioned object of the present invention, there is provided a method for uniformly cooking a rice of an electric rice cooking kettle, the method comprising the steps of:

15 i) storing a rice cooking duration judgement data, an absorbing process preserving time data, a steam preserving time data, a heat amount data according to a set current month, a heater operation period data for a second heat process, a heater operation period data for a heat preserving process, and a temperature preserving time data for completing a rice cooking;

20 ii) setting and storing a current month;

iii) performing a soaking process while controlling an absorbing process preserving time according to the set current month in step ii);

iv) performing a first heat process while judging a rice cooking duration;

v) performing a second heat process by heating an internal pot of the electric
25 rice cooking kettle with a heat amount based on the stored heat amount and on a heater operation period data for the second heat process in step i) corresponding to the stored current month in step ii);

vi) performing a heat preserving process by heating the internal pot with a heat amount based on the stored heat amount and on a heater operation period data for the
30 heat preserving process in step i); and

vii) performing a steam process while controlling a steam preserving time according to the set current month in step ii).

Preferably, step iii) comprises the substeps of: iii-1) setting a soak process preserving time corresponding is the set current month in step ii); iii-2) judging whether or not the set soak process preserving time in step iii-1) has passed after the soaking process has begun; iii-3) in step iii-2), when the set soak process preserving time has passed, going to step iv), and the set soak process preserving time has not passed, judging whether or not a temperature of the internal pot is equal to or greater than a soak controlling temperature; and iii-4) in step iii-3), when the internal pot temperature is less than the soak controlling temperature, heating the internal pot with a first heat amount and returning to step iii-2), and when the temperature of the internal pot is equal to or greater than the soak controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step iii-2).

More preferably, step iv) comprises the substeps of: iv-1) heating the internal pot; iv-2) judging whether or not a temperature of the heated internal pot in step iv-1) is an upper temperature for judging a rice cooking duration; iv-3) in step iv-2), when the heated internal pot temperature is the upper temperature for judging a rice cooking duration, finishing a rice cooking duration judgement, and when the heated internal pot temperature is not the upper temperature for judging a rice cooking duration, judging whether or not the heated internal pot temperature is a lower temperature for judging a rice cooking duration; and iv-4) in step iv-3), when the heated internal pot temperature is not the lower temperature for judging a rice cooking duration, returning to step iv-1), and the heated internal pot temperature is the lower temperature for judging a rice cooking duration, starting the rice cooking duration judgement.

Also, step v) comprises the substeps of: v-1) reading out the heat amount and heater operation period data for the second heat process according to the judged rice cooking amount in step iv), which corresponds to the stored current month in the step ii); v-2) determining a heat amount for the second heat process by adding the read heat amount and the heater operation period data in step v-1) and heating an internal pot of the electric rice cooking kettle by the determined heat amount; and v-3) judging whether or not a temperature of the internal pot is a temperature for starting a heat preserving process, and when the internal pot temperature is the temperature for starting the heat preserving process, going to the step vi), and when the internal pot temperature is not the temperature for starting the heat preserving process, returning

to step v-2) of heating an internal pot.

Moreover, step vi) preferably comprises the substeps of: vi-1) reading out the heat amount and the heater operation period data for the heat preserving process from the stored data in step i) according to the judged rice cooking duration in step iv),
5 which corresponds to the stored current month in step ii); vi-2) determining a heat amount for the heat preserving process by adding the heat amount and heater operation period data in the step vi-1 and heating an internal pot of the electric rice cooking kettle by the determined heat amount; and vi-3) judging whether or not a temperature of the internal pot is a temperature for completing a rice cooking, and when the
10 internal pot temperature is the temperature for completing a rice cooking, stopping a heater of the electric rice cooking kettle and returning to step vi-2), and when the internal pot temperature is not the temperature for completing a rice cooking, returning to step vii) of heating an internal pot.

Preferably, step vii) comprises the substeps of: vii-1) judging whether or not
15 a steam preserving time corresponding to the stored current month in step ii) has passed, and when the corresponding steam preserving time has passed, finishing the steaming process, and when the corresponding steam preserving time has not passed, judging whether or not an internal pot temperature of the electric rice cooking kettle is equal to or greater than a steam controlling temperature; and vii-2) in step vii-1),
20 when the internal pot temperature is less than the steam controlling temperature, heating the internal pot with a second heat amount and returning to step vii-1), and when the internal pot temperature is equal to or greater than the steam controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step vii-1).

25 Preferably, the method for uniformly cooking a rice of an electric rice cooking kettle may further have a step of vi-a) preserving an internal pot of the electric rice cooking kettle with a temperature for completing a rice cooking, between step vi) and step vii).

The above method further preferably comprises a step of vi-a) preserving an
30 internal pot of the electric rice cooking kettle with a temperature for completing a rice cooking, between step vi) and step vii). Preferably, step vi-a) comprises the substeps of: vi-a-1) reading out the temperature preserving time data for completing a rice

cooking data and an additional temperature preserving time data for completing a rice cooking, according to the judged rice cooking duration in step iv), which corresponds to the stored current month in the ii); vi-a-2) determining a temperature preserving time for completing a rice cooking by adding the read temperature preserving time data for completing a rice cooking and the read additional temperature preserving time data in step vi-a-1) and preserving the internal pot temperature for the determined temperature preserving time; and vi-a-3) judging whether or not the determined temperature preserving time in step vi-a-3) has passed, and when the determined temperature preserving time has passed, going to the step vii), and when the determined temperature preserving time has not passed, judging whether or not the internal pot temperature is equal to or greater than a temperature preserving time for completing a rice cooking; and vi-a-4) in step vi-a-3), when the internal pot temperature is less than the temperature for completing a rice cooking, heating an internal pot of the electric rice cooking kettle with a third heat amount and returning to step vi-a-3), and when the internal pot temperature is equal to or greater than the temperature preserving time for completing a rice cooking, stopping a heater of the electric rice cooking kettle and returning to step vi-a-3). The method further preferably comprises a step of viii) reheating the internal pot of the electric rice cooking kettle, after step vii). Preferably, step viii) comprises substeps of: viii-1) heating the internal pot after the steaming process is completed; viii-2) judging whether or not a reheat time corresponding to the stored current month in step ii) has passed, and when the corresponding reheat time has passed, finishing step viii-1), and when the corresponding reheat time has not passed, judging whether or not an internal pot temperature of the electric rice cooking kettle is equal to or greater than a reheat controlling temperature; and viii-3) in step viii-2), when the internal pot temperature is less than the reheat controlling temperature, heating the internal pot with a third heat amount and returning to step viii-1), and when the internal pot temperature is equal to or greater than the reheat controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step viii-1).

30 The present invention has an advantage that it can uniformly cook a rice, when cooking a rice with standard water amount, by automatically performing a rice cooking process according to differences in the rice's composition corresponding to a difference

in the month of the year.

Brief Description of the Drawings

The above objects and advantages of the present invention will become more
5 apparent by describing in detail a preferred embodiment thereof with reference to the
attached drawings, in which:

FIG. 1 is a graph for illustrating a general rice cooking process of an electric
rice cooking kettle;

FIG. 2 is a block diagram for showing a circuitry configuration of an electric
10 rice cooking kettle which can be used in the present invention;

FIG. 3 is a schematic view for showing an example of the key inputting section
in FIG. 2;

FIG. 4 is a graph for illustrating a judgement of a rice cooking duration
according to one embodiment of the present invention;

15 FIG. 5 is a table for showing a standard for the judgement of a rice cooking
duration illustrated in FIG. 4;

FIG. 6 is a table for illustrating a cooking condition according to differences in
the months, according to one embodiment of the present invention;

FIG. 7 is a table for illustrating a heater operation condition according to a rice
20 cooking duration, according to one embodiment of the present invention;

FIG. 8 is a graph for illustrating a steam preserving time for November to
February;

FIG. 9 is a graph for illustrating a steam preserving time for March to June;

FIG. 10 is a graph for illustrating steam preserving and reheat times for July;

25 FIG. 11 is a graph for illustrating steam preserving and reheat times for August;

FIG. 12 is a graph for illustrating steam preserving and reheat times for
September;

FIG. 13 is a graph for illustrating steam preserving and reheat times on
October; and

30 FIGs. 14 to 22 are a flow chart for illustrating a method of an electric rice
cooking kettle for uniformly cooking a rice according to one embodiment of the present
invention.

Best Mode for Carrying out the Invention

A description will be given below in detail, with reference to the accompanying drawings, of the mechanical structure, the circuitry configuration, and the operation
5 of a method and an apparatus for uniformly cooking a rice according to one embodiment of the present invention.

FIG. 2 shows the configuration of an electric rice cooking kettle 2 which can be used in the present invention. Electric rice cooking kettle 2 includes a key inputting section 21, an internal pot temperature sensor 22, a heater 23, a data storing section
10 24 and a control section 25. FIG. 3 shows an example of key inputting section 21 shown in FIG. 2. Key inputting section 21 inputs a command for activating a mode from a menu and a command for indicating the beginning of a cooking process, and includes a menu key 31, a key 32 for starting rice cooking, a steaming/cancellation key 33, a time/month selection key 34, and a reservation key 35. Menu key 31 includes a
15 white rice key 311, a brown rice key 312, a grain key 313, a scored rice key 314, a scored rice tea key 315, and a special dish key 316.

FIG. 4 illustrates a judgement of a rice cooking duration according to one embodiment of the present invention. The rice cooking duration is judged by a required time for heating an internal pot temperature T from 50°C to 80°C during a first heat
20 process. FIG. 5 shows a standard for the judgement of a rice cooking amount illustrated in FIG. 4. As shown in FIG. 5, zero minute to two minutes fifty nine seconds is required to cook a rice of a first amount (1-2 persons amount), three minutes to four minutes fifty nine seconds to cook a rice of a second amount (3-4 persons amount), five minutes to six minutes fifty nine seconds to cook a rice of a there amount
25 (5-6 persons amount), seven minutes to eight minutes fifty nine seconds to cook a rice of a fourth amount (7-8 persons amount), and more than nine minutes to cook a rice of a fifth amount (9-10 persons amount).

FIG. 6 illustrates a cooking condition according to differences in the month according to one embodiment of the present invention. In regard to an absorbing
30 process preserving time, the shortest absorbing process preserving time month and the longest absorbing process preserving time month are November and October, respectively. The absorbing process preserving times of November and October are 480

and 960 seconds, respectively. The absorbing process preserving time increases from November to June by a constant interval of thirty eight seconds per month. From July to October, the absorbing process preserving time gradually increases by an interval of more than thirty eight seconds.

5 In regard to a temperature preserving time for completing a rice cooking, the temperature preserving time of zero is required for completing a rice cooking from November to June. Among the months from July to October, the shortest temperature preserving time month and the longest temperature preserving time month are July and October, respectively. The temperature preserving time for completing a rice cooking
10 of July and October are ten and forty seconds, respectively. The temperature preserving time times for completing a rice cooking increases from July to October by a constant interval of ten seconds per month.

In regard to a steam preserving time, the steam preserving times of November to February, and of March to October are twelve and thirteen minutes, respectively.
15 In regard to a reheat time during a steaming process, the reheat time is zero from November to June. The shortest reheat time month and the longest reheat time month are July and October among months from July to October, respectively. The reheat times of July and October are one and four minutes, respectively. The reheat time increases from July to October by a constant interval of one minute per month.

20 In regard to a heat amount during cooking a rice, the highest heat amount month and the lowest heat amount month are November and October, respectively. The heat amounts of November and October are respectively 100 and 80% with respect to a maximum heat amount of the electric rice cooking kettle 2 of 100%. The heat amount decreases from November to June by a constant interval of one percent per month.
25 From July to October, the heat amount gradually decreases by more than one percent per month.

FIG. 7 is a table for illustrating a heater operation condition of a rice cooking amount according to one embodiment of the present invention.

In regard to a temperature preserving time for completing a rice cooking, the
30 least temperature preserving time rice cooking amount and the longest temperature preserving time rice cooking amount for completing a rice cooking are first and fifth rice cooking amounts, respectively. The temperature preserving time for completing

a rice cooking of the first and fifth rice cooking amounts are five and twenty five seconds, respectively. The temperature preserving time for completing a rice cooking increases from a first rice cooking amount to a fifth rice cooking amount by a constant interval of five minutes per month.

5 During a second heat process, the on/off operation period of the heater in the first, second, third, fourth, and fifth rice cooking amounts respectively are 16 seconds/16 seconds, 20 seconds/ 12 seconds, 24 seconds/ 8 seconds, 28 seconds/ 4 seconds, and 32 seconds/ zero second. During a heat preserving process, the on/off operation period of heater in the first, second, third, fourth, and fifth rice cooking
10 amounts are 24 seconds/ 8 seconds, 26 seconds/ 6 seconds, 28 seconds/ 4 seconds, 30 seconds/ 2 seconds, and 30 seconds/ zero seconds.

FIG. 8 illustrates a steam preserving time for November to February. The steam preserving time for November to February is twelve minutes. FIG. 9 illustrates a steam preserving time for March to June. The steam preserving time for March to June is
15 thirteen minutes.

FIG. 10 is a graph for illustrating steam preserving and reheat times for July. The steam preserving time for July is thirteen minutes. The reheat time for July is one minute. The reheat temperature for July is 120°C.

FIG. 11 is a graph for illustrating steam preserving and reheat times for August.
20 The steam preserving time for August is thirteen minutes. The reheat time on August is two minutes. The reheat temperature for August is 120°C.

FIG. 12 is a graph for illustrating steam preserving and reheat times for September. The steam preserving time for September is thirteen minutes. The reheat time for September is three minutes. The reheat temperature for September is 120°C.

25 FIG. 13 is a graph for illustrating steam preserving and reheat times for October. The steam preserving time for October is thirteen minutes. The reheat time for October is four minutes. The reheat temperature for October is 120°C.

In FIGs. 10 to 13, since a condition of a rice is suddenly changed after a rainy season, the reheating process after the steaming process is performed in order to soak
30 a water component and heat the old rice longer after the rainy season.

An operation of the method for uniformly cooking a rice of an electric rice cooking kettle according to one embodiment of the present invention will be described.

FIGs. 14 to 22 illustrates a method for uniformly cooking a rice of an electric rice cooking kettle according to one embodiment of the present invention.

Before performing a rice cooking, control section 25 controls data storing section 24 to store a rice cooking duration data, an absorbing process preserving time data, a temperature preserving time data for completing a rice cooking, a steam preserving time data, a heat amount data, an on/off operation period data of heater 23 for a second heating process, and an on/off operation period data of heater 23 for a heat preserving process therein (step S0). After a user places an internal pot including a cooking rice and water therein into electric rice cooking kettle 2, control section 25 stands by a power-on operation (step S1), and judges whether or not the power is turned-on (step S2). In step S2, when it is judged that the power has not been turned on, the routine returns to step S1. But in step S2, when it is judged that the power has been turned on, control section 25 judges whether or not a cut-off mode is selected (step S3). In step S3, when it is judged that the cut-off mode has been selected, control section 25 judges whether or not more than thirty minutes has passed after the selection of the cut-off mode (step S3001).

In step S3001, when it is judged that the more than thirty minutes has passed after the selection of the cut-off mode, control section 25 cancels a current rice cooking process (step S30011). When it is judged that the more than ten minutes has not passed, control section 25 judges whether or not the cut-off condition has continued for more than one minute (step S3002). In step S3002, when it is judged that the cut-off condition has continued for more than one minute, control section 25 judges that the present state is an abnormal, so control section 25 controls the abnormal process. When it is judged that the cut-off condition has not continued for more than one minutes, control section 25 controls heater 23 to heat an internal pot until a rice cooking is completed (step S3003) and a steaming process begins (S30031).

On the other hand, in step S3, when it is judged that the cut-off mode has not been selected, control section 25 stands by an input of a key (step S4) and judges whether or not the key is inputted (step S5). In step S5, when it is judged that the key has not been inputted, the routine returns to step S4. But in step S5, when it is judged that the key has not been inputted, a process corresponding to the inputted key is performed (step S6).

Then in step S7, the user pushes key 32 for starting a rice cooking. In step S8, control section 25 controls internal pot temperature sensor 22 to sense an internal pot temperature T, and judges whether or not the sensed internal pot temperature T is equal to or greater than 80°C (step S8).

5 In step S8, when it is judged that the sensed internal pot temperature T is equal to or greater than 80°C, the routine goes to step S30011 and the current process is canceled. But in step S8, when it is judged that the sensed internal pot temperature T is less than 80°C, control section 25 judges whether or not the sensed internal pot temperature T is equal to or greater than 45°C (step S9). In step S9, when it is judged
10 that the sensed internal pot temperature T is equal to or greater than 45°C, the routine goes to step S30021 and performs an abnormal state process. But when it is judged that the sensed internal pot temperature T in step S9 is less than 45°C, a user pushes time/month selection key 34 of key inputting section 21 to set a current month and store the set current month in storing section 23 (step S10).

15 In step S11, control section 25 judges whether or not the set current month is November. When it is judged that the set current month in step S11 is November, control section 25 set an absorbing process for 480 seconds by using the data in FIG. 6 (step S12). In step S13, control section 26 judges whether or not 480 seconds has passed after the absorbing process has started. In step S13, when it is judged that 480
20 seconds has not passed, control section 26 judges whether or not the sensed internal pot temperature T is equal to or greater than a soak controlling temperature, that is, 45°C (step S131).

In step S131, when it is judged that the sensed internal pot temperature T is less than 45°C, control section 25 controls an operation of heater 23 to heat the internal pot with
25 a heat amount of 50% (step S132), and the routine returns to step S13. But in step S131, when it is judged that the sensed internal pot temperature T is equal to or greater than 45°C, control section 25 stops heater 23 (step S133), and the routine returns to step S13.

On the other hand, when it is judged that the set current month in step S11 is
30 not November, control section 25 judges whether or not the set current month is a December (step S111). When it is judged that the current month in step S111 is December, control section 25 set an absorbing process for 518 seconds by using the

data in FIG. 6 (step S1111). In step S1112, control section 25 judges whether or not 518 seconds has passed after the absorbing process has started. In step S1112, when it is judged that 518 seconds has not passed, control section 26 judges whether or not the sensed internal pot temperature T is equal to or greater than 45°C (step S11121).
5 In step S11121, when it is judged that the sensed internal pot temperature T is less than 45°C, control section 25 controls an operation of heater 23 to heat the internal pot with a heat amount of 50% (step S11123), and the routine returns to step S1112. But in step S11121, when it is judged that the sensed internal pot temperature T is equal to or greater than 45°C, control section 25 stops heater 23 (step S11122), and the routine
10 returns to step S1112.

An absorbing process for January to October can also be performed in the same manner.

On the other hand, in step S13, when it is judged that eight minutes has passed, a second heat process starts and control section 26 controls an operation of heater 23
15 to heat the internal pot (step S14). In step S15, control section 25 judges whether or not the internal pot temperature is 80°C. In step S15, when it is judged that the internal pot temperature T is not 80°C, control section judges whether or not the internal pot temperature is 50°C (step S151). In step S151, when it is judged that the internal pot temperature T is not 50°C, the routine returns to step S14, but when it is judged that
20 the internal pot temperature T is 50°C, control section 25 begins a rice cooking duration judgement (step S152), and the routine returns to step S14.

On the other hand, in step S15, when it is judged that the internal pot temperature T is an upper temperature for judging a rice cooking duration, that is, 80°C, control section 25 finishes the rice cooking duration judgement (step S16). The
25 rice cooking duration judgement is carried out as follows. As shown in FIGs. 4 and 5, when zero minute to two minutes fifty nine seconds, three minutes to four minutes fifty nine seconds, five minutes to six minutes fifty nine seconds, seven minutes to eight minutes fifty nine seconds, and more than nine minutes are required to heat an internal pot temperature T from 50°C to 80°C during a first heat process, control section 25
30 judges that the cooking duration are the first, second, third, fourth, and fifth durations, respectively.

Then in step S17, a second heat process starts. In step S0, control section 25

reads out a heat amount data and an on/off operation period data of heater 23 for the second heat process according to the judged rice cooking duration in steps S15 to S16, corresponding to the stored set current month in step S10 from data storing section 24. In step S19, control section 25 determines a heat amount for the second heat process by adding the read heat amount data and an on/off operation period data of heater 23 in step S18. For instance, when the set current month is October and the judged rice cooking duration is a third duration, since the stored heat amount of the October is 80% and the on/off operation period of heater 23 for the third amount is 24 seconds/ 8 seconds, as shown in FIGs. 6 and 7, the heat amount for the second heat process is determined by the on/off operation period data of heater 23 of 19.2 seconds/ 8 seconds. In step S20, control section 25 controls the operation of heater 23 to heat the internal pot with the determined heat amount in step S19.

In step S21, control section 25 judges whether or not the internal pot temperature T is a temperature for starting a heat preserving process, that is, 102°C. When it is judged that the internal pot temperature T is not 102°C in step S21, the routine returns to step S20.

In step S21, when it is judged that the internal pot temperature T is 102°C, a heat preserving process starts (step S22). In step S23, control section 25 reads out a heat amount data and an on/off operation period data of heater 23 for the heat preserving process according to the judged rice cooking duration in steps S15 to S16, corresponding to the stored current month in step S10 from data storing section 24. In step S24, control section 25 determines a heat amount for the heat preserving process by adding the read heat amount data and an on/off operation period data of heater in step S23. For instance, when the set current month is July and the judged rice cooking duration is a second duration, since the heat amount of the July is 92% and the on/off operation period data of heater 23 of the second duration is 26 seconds/ 6 seconds, the heat amount for heat preserving process is determined by the on/off operation period data of heater 23 of 23.92 seconds/ 6 seconds.

In step S25, control section 25 controls the operation of heater 23 to heat the internal pot with the determined heat amount in step S24. In step S26, control section 25 judges whether or not the internal pot temperature T is 125°C. When it is judged that the internal pot temperature T is not 125°C in step S26, the routine returns to step

S25. In step S26, when it is judged that the internal pot temperature T is 125°C, control section 25 judges whether or not the stores current month in data storing section 14 in step S12 is July, August, September, or October (step S27).

In step S27, when it is judged that the stored month is not July, August, September, or the October, a steaming process begins (step S31). But when it is judged that the stored month is July, August, September, or October in step S27, control section 26 judges whether or not the stored month is July (step S28). When it is judged that the set month is July in step S28, control section 25 reads out a temperature preserving time data for completing a rice cooking for July and an additional temperature preserving time data for completing a rice cooking according to the judged rice cooking duration in steps S15 to S16, which corresponds to the stored current month in step S10 from data storing section 24 (step S29). In step S30, control section 25 determines a temperature preserving time for completing a rice cooking by adding the temperature preserving time data for completing a rice cooking and a temperature preserving time data for completing a rice cooking according to the judged rice cooking duration, and preserves the internal pot temperature for the determined temperature preserving time. For instance, when the set current month is September and the judged rice cooking amount is a first duration, since the stored temperature preserving time data for completing a rice cooking in September is thirty seconds and the additional temperature preserving time data for completing a rice cooking according to the judged first amount is five seconds, the temperature preserving time for completing a rice cooking in September is determined as thirty five seconds, as shown in FIGs. 6 and 7. In step S31, control section 25 judges whether or not the determined temperature preserving time of thirty five seconds for completing a rice cooking in step S30 has passed.

In step S31, when it is judged that the determined temperature preserving time for completing a rice cooking has not passed, control section 25 judges whether or not the internal pot temperature T is equal to or greater than a controlling temperature for completing a rice cooking, that is, 125°C (step S311). When it is judged that the internal pot temperature T is less than 125°C in step S311, control section 25 controls an operation of heater 23 to heat the internal pot with a heat amount for the heat preserving process (step S3111), and the routine returns to step S31. When it is judged

that the internal pot temperature T is equal to or greater than 125°C in step S311, control section 25 stop heater 23 (step S3112), and the routine returns to step S31.

The process for the temperature preserving time for completing a rice cooking for August to October can also be performed in the same manner.

5 On the other hand, when it is judged that thirty five seconds has passed in step S31, the steaming process begins (step S32), and control section 26 judges whether or not the stored month in step S10 is November, December, January, or February (step S33).

When it is judged that the stored month is November, December, January, or February
10 in step S33, control section 25 judges whether or not for the steam preserving time of twelve minutes has passed after the steaming process had begun (step S34).

When it is judged that twelve minutes have not passed after the steaming process began in step S34, control section 25 judges whether or not the internal pot temperature T is equal to or greater than a steam controlling temperature, that is,
15 115°C (step S35).

When it is judged that the internal pot temperature T is equal to or greater than 115°C in step S35, control section 25 stops heater 23 (step S351), and the routine returns to step S34. When it is judged that the internal pot temperature T is less than 115°C in step S35, control section 25 controls an operation of heater 23 to heat the internal pot
20 with a heat amount of 50% (step S36), and the routine returns to step S34.

Also, when it is judged that twelve minutes has passed after the steaming process had begun in step S34, the routine goes to step 40, a keeping warm process is carried out and a total process is finished (step S41).

On the other hand, when it is judged that the stored month is not November,
25 December, January, or February in step S33, control section 25 judges whether or not the stored month in step S10 is March, April, May, or June (step S331). When it is judged that the stored month is March, April, May, or June, control section 25 judges whether or not the steam preserving time of thirteen minutes have passed after the steaming process began (step S3311). When it is judged that thirteen minutes has not
30 passed after the steaming process had begun in step S3311, control section 25 judges whether or not the internal pot temperature T is equal to or greater than a steam controlling temperature, that is, 115°C (step S3312).

When it is judged that the internal pot temperature T is equal to or greater than 115°C in step S3312, control section 25 stops heater 23 (step S33121), and the routine returns to step S3311. When it is judged that the internal pot temperature T is less than 115°C in step S3312, control section 25 controls an operation of heater 23 to heat the
5 internal pot with a heat amount of 50% (step S3313), and the routine returns to step S3311.

On the other hand, when it is judged that thirteen minutes have passed after the steaming process had begun in step S3311, the routine goes to step S40 and a keeping warm process and a total process is completed (step S41). Also, When it is judged that
10 the stored month is not March, April, May, or June in step S331, control section 25 judges whether or not the stored month in step S10 is July (step S332). When it is judged that the stored month is July, control section 25 judges whether or not the steam preserving time of thirteen minutes has passed after the steaming process began (step S3321). When it is judged that thirteen minutes has not passed after the steaming
15 process had begun in step S3321, control section 25 judges whether or not the internal pot temperature T is equal to or greater than a steam controlling temperature, that is, 115°C (step S3322). When it is judged that the internal pot temperature T is equal to or greater than 115°C in step S3322, control section 25 stops heater 23 (step S33221), and the routine returns to step S3321. When it is judged that the internal pot
20 temperature T is less than 115°C in step S3322, control section 25 control an operation of heater 23 to heat the internal pot with a heat amount of 50% (step S3323), and the routine returns to step S3321.

On the other hand, when it is judged that thirteen minutes has passed after the steaming process had begun in step S3321, control section 25 controls the operation of
25 heater 23 to reheat the internal pot and judges whether or not a reheat time of one minute has passed after the reheat process had begun (step S33211). When it is judged that one minute has not passed after the reheat process had begun in step S33211, control section 25 judges whether or not the internal pot temperature T is equal to or greater than a reheat controlling temperature, that is, 120°C (step S33212). When it
30 is judged that the internal pot temperature T is equal to or greater than 120°C in step S33212, control section 25 stops 23 heater (step S332121), and the routine returns to step S33211. When it is judged that the internal pot temperature T is less than 120°C

in step S3322, control section 25 control an operation of heater 23 to heat the internal pot with a heat amount of 100% (step S33213), and the routine returns to step S33211. On the other hand, when it is judged that one minute has passed after the reheat process had begun in step S33211, the routine goes to step S40 and carry out a keeping
5 warm process, and finish a total process (step S41).

The steaming and reheating processes for August to October can also be carried out in the same manner.

Industrial Applicability

As described previously, the present invention has an advantage that it can
10 uniformly cook a rice, when cooking a rice with standard water amount, by automatically performing a rice cooking process according to differences in the rice's composition corresponding to a difference in the month of the year.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore
15 to be considered in all respects as illustrative and not respective, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed is:

1. A method of an electric rice cooking kettle for uniformly cooking a rice, said method comprising the steps of:
 - 5 i) storing a rice cooking duration judgement data, an absorbing process preserving time data, a steam preserving time data, a heat amount data according to a set current month, a heater operation period data for a second heat process, a heater operation period data for a heat preserving process, and a temperature preserving time data for completing a rice cooking;
 - 10 ii) setting and storing a current month;
 - iii) performing a soaking process while controlling an absorbing process preserving time according to the set current month in step ii);
 - iv) performing a first heat process while judging a rice cooking duration;
 - v) performing a second heat process by heating an internal pot of the electric
15 rice cooking kettle with a heat amount based on the stored heat amount and on a heater operation period data for the second heat process in step i) corresponding to the stored current month in step ii);
 - vi) performing a heat preserving process by heating the internal pot with a heat amount based on the stored heat amount and on a heater operation period data for the
20 heat preserving process in step i); and
 - vii) performing a steam process while controlling a steam preserving time according to the set current month in step ii).
2. The method of an electric rice cooking kettle for uniformly cooking a
25 rice as claimed in claim 1, wherein shortest and longest months of the soaking process preserving time are November and October, respectively.
3. The method of an electric rice cooking kettle for uniformly cooking a
rice as claimed in claim 2, wherein the soaking process preserving time of November
30 and October are four hundred eighty and nine hundreds sixty seconds, respectively.
4. The method of an electric rice cooking kettle for uniformly cooking a

rice as claimed in claim 1, wherein the soaking process preserving time increases from November to June by a constant interval per month.

5 5. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein an interval per month of the soaking process preserving times from July to October gradually increases.

6. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein step iii) comprises the substeps of:

10 iii-1) setting a soak process preserving time corresponding is the set current month in said step ii);

 iii-2) judging whether or not the set soak process preserving time in step iii-1) has passed after the soaking process has begun;

15 iii-3) in step iii-2), when the set soak process preserving time has passed, going to said step iv), and the set soak process preserving time has not passed, judging whether or not a temperature of the internal pot is equal to or greater than a soak controlling temperature; and

20 iii-4) in step iii-3), when the internal pot temperature is less than the soak controlling temperature, heating the internal pot with a first heat amount and returning to step iii-2), and when the temperature of the internal pot is equal to or greater than the soak controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step iii-2).

25 7. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein the judgement of the rice cooking duration is determined by a required time for heating the internal pot during the first heat process from a lower temperature for judging a rice cooking duration to an upper temperature for judging the rice cooking duration.

30 8. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 7, wherein lower and upper temperatures for judging the rice cooking duration during the first heat process are 50 °C and 80 °C, respectively.

9. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein said step iv) comprises the substeps of:

iv-1) heating the internal pot;

5 iv-2) judging whether or not a temperature of the heated internal pot in iv-1) is an upper temperature for judging a rice cooking duration;

iv-3) in step iv-2), when the heated internal pot temperature is the upper temperature for judging a rice cooking duration, finishing a rice cooking duration judgement, and when the heated internal pot temperature is not the upper temperature for judging a rice cooking duration, judging whether or not the heated internal pot
10 temperature is a lower temperature for judging a rice cooking duration; and

iv-4) in step iv-3), when the heated internal pot temperature is not the lower temperature for judging a rice cooking duration, returning to step iv-1), and the heated internal pot temperature is the lower temperature for judging a rice cooking duration, starting the rice cooking duration judgement.

15

10. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein step v) comprises the substeps of:

v-1) reading out the heat amount and heater operation period data for the second heat process according to the judged rice cooking amount in step iv), corresponding to
20 the stored current month in step ii);

v-2) determining a heat amount for the second heat process by adding the read heat amount and the heater operation period data in step v-1) and heating an internal pot of the electric rice cooking kettle by the determined heat amount; and

v-3) judging whether or not a temperature of the internal pot is a temperature
25 for starting a heat preserving process, and when the internal pot temperature is the temperature for starting the heat preserving process, going to step vi), and when the internal pot temperature is not the temperature for starting the heat preserving process, returning to step v-2) of heating an internal pot.

30 11. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 10, wherein the temperature for starting a heat preserving process is 102°C.

12. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein said step vi) comprises the substeps of:

vi-1) reading out the heat amount and the heater operation period data for the heat preserving process from the stored data in step i) according to the judged rice cooking duration in step iv), corresponding to the stored current month in step ii);

vi-2) determining a heat amount for the heat preserving process by adding the heat amount and heater operation period data in step vi-1 and heating an internal pot of the electric rice cooking kettle by the determined heat amount; and

vi-3) judging whether or not a temperature of the internal pot is a temperature for completing a rice cooking, and when the internal pot temperature is the temperature for completing a rice cooking, stopping a heater of the electric rice cooking kettle and returning to step vi-2), and when the internal pot temperature is not the temperature for completing a rice cooking, returning to step vii) of heating an internal pot.

13. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 12, wherein the temperature for completing a rice cooking is 125°C.

14. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein the steam preserving time for November to February, and for March to October are twelve and thirteen minutes, respectively.

15. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, wherein step vii) comprises the substeps of:

vii-1) judging whether or not a steam preserving time corresponding to the stored current month in step ii) has passed, and when the corresponding steam preserving time has passed, finishing the steaming process, and when the corresponding steam preserving time has not passed, judging whether or not an internal pot temperature of the electric rice cooking kettle is equal to or greater than a steam controlling temperature; and

vii-2) in step vii-1), when the internal pot temperature is less than the steam controlling temperature, heating the internal pot with a second heat amount and

returning to step vii-1), and when the internal pot temperature is equal to or greater than the steam controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step vii-1).

5 16. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, further comprising a step of vi-a) preserving an internal pot of the electric rice cooking kettle with a temperature for completing a rice cooking, between step vi) and step vii).

10 17. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 16, wherein November to June have a preserving time of the temperature of zero for completing a rice cooking.

15 18. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 16, wherein shortest and longest preserving times of the temperature for completing a rice cooking months are July and October, respectively.

20 19. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 18, wherein a preserving time of the temperature for completing a rice cooking for July and October are ten and forty seconds, respectively.

25 20. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 16, wherein a preserving time of the temperature for completing a rice cooking increases from July to October by a constant interval per month.

21. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 16, wherein step vi-a) comprises the substeps of:

30 vi-a-1) reading out the temperature preserving time data for completing a rice cooking data and an additional temperature preserving time data for completing a rice cooking, according to the judged rice cooking duration in step iv), corresponding to the stored current month in step ii);

vi-a-2) determining a temperature preserving time for completing a rice cooking by adding the read temperature preserving time data for completing a rice cooking and the read additional temperature preserving time data in step vi-a-1) and preserving the internal pot temperature for the determined temperature preserving time; and

5 vi-a-3) judging whether or not the determined temperature preserving time in step vi-a-3) has passed, and when the determined temperature preserving time has passed, going to step vii), and when the determined temperature preserving time has not passed, judging whether or not the internal pot temperature is equal to or greater than a temperature preserving time for completing a rice cooking; and

10 vi-a-4) in step vi-a-3), when the internal pot temperature is less than the temperature for completing a rice cooking, heating an internal pot of the electric rice cooking kettle with a third heat amount and returning to step vi-a-3), and when the internal pot temperature is equal to or greater than the temperature preserving time for completing a rice cooking, stopping a heater of the electric rice cooking kettle and
15 returning to step vi-a-3).

22. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 1, further comprising a step of viii) reheating the internal pot of the electric rice cooking kettle, after step vii).

20

23. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 22, wherein November to June are a time of zero for the step of reheating the internal pot.

25 24. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 22, wherein shortest and longest time for the step of reheating the internal pot months are July and October, respectively.

25. The method of an electric rice cooking kettle for uniformly cooking a
30 rice as claimed in claim 24, wherein times for the step of reheating the internal pot of July and October are one and four minutes, respectively.

26. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 22, wherein a time for the step of reheating the internal pot increases from July to October by a constant interval per month.

5 27. The method of an electric rice cooking kettle for uniformly cooking a rice as claimed in claim 22, wherein a temperature for the step of reheating the internal pot is 125°C.

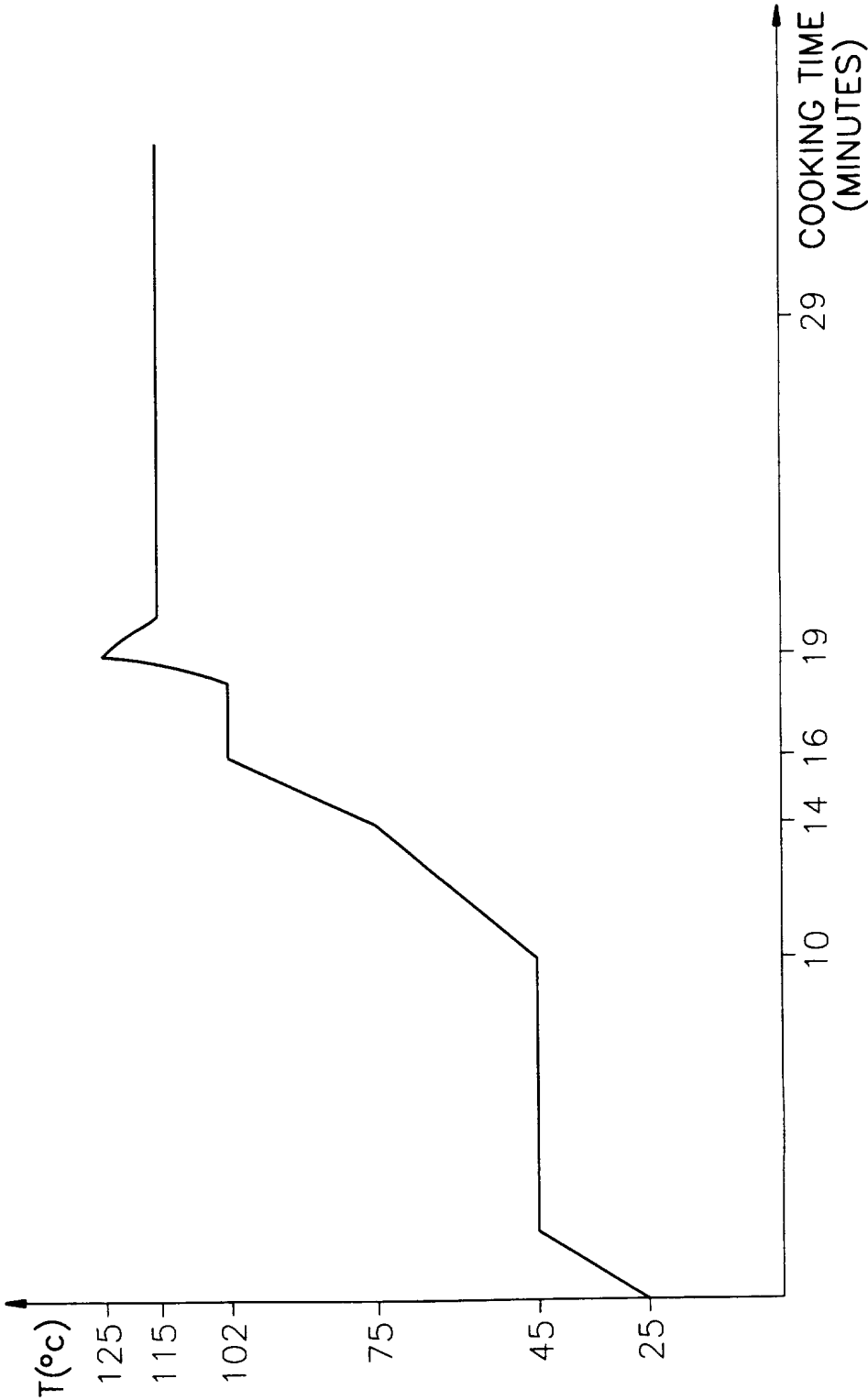
28. The method of an electric rice cooking kettle for uniformly cooking a
10 rice as claimed in claim 22, wherein step viii) comprises substeps of :

viii-1) heating the internal pot after the steaming process is completed;

viii-2) judging whether or not a reheat time corresponding to the stored current month in step ii) has passed, and when the corresponding reheat time has passed, finishing step viii-1), and when the corresponding reheat time has not passed, judging
15 whether or not an internal pot temperature of the electric rice cooking kettle is equal to or greater than a reheat controlling temperature; and

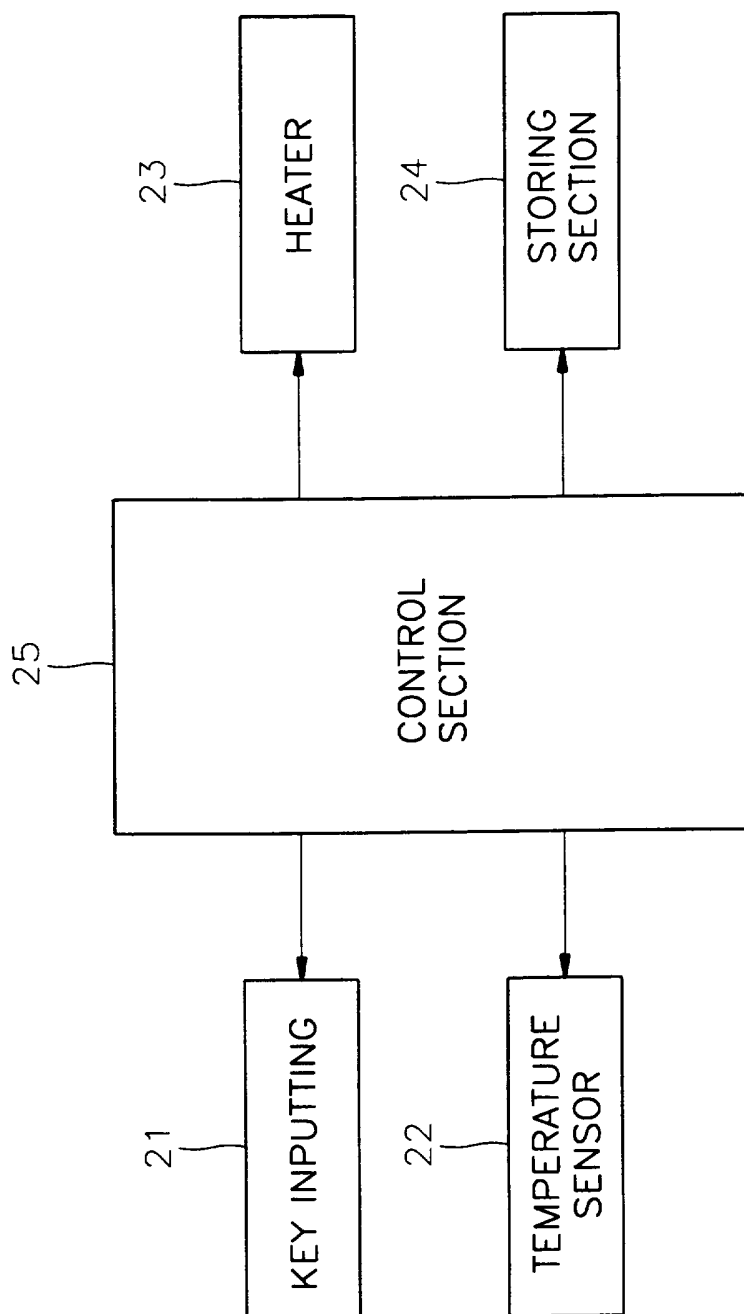
vii-3) in step viii-2), when the internal pot temperature is less than the reheat controlling temperature, heating the internal pot with a third heat amount and returning to step viii-1), and when the internal pot temperature is equal to or greater than the
20 reheat controlling temperature, stopping a heater of the electric rice cooking kettle and returning to step viii-1).

FIG. 1



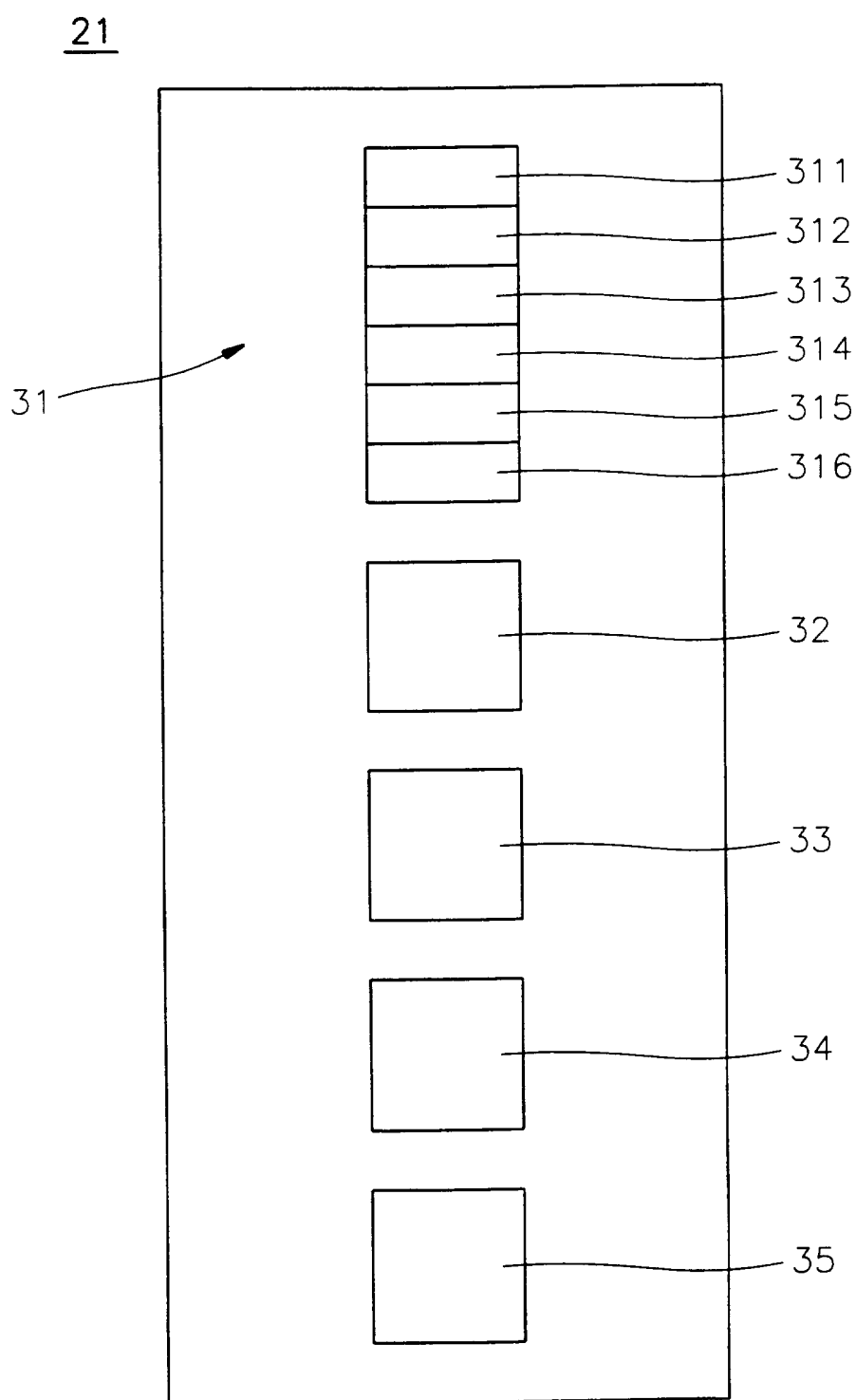
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FIG. 2



3/19

FIG. 3



4/19

FIG. 4

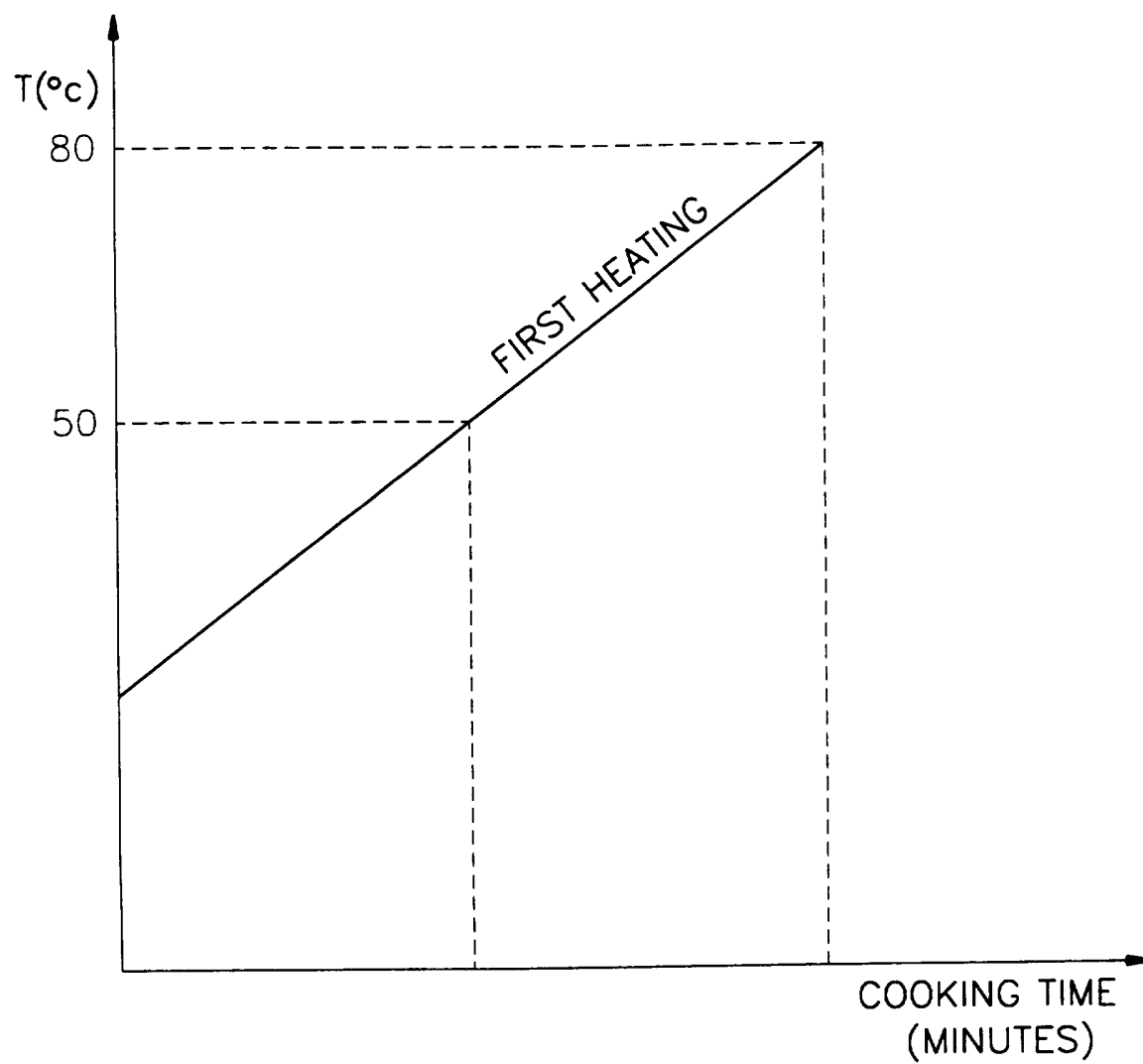


FIG. 5

RICE COOKING AMOUNT	1	2	3	4	5
REQUIRED TIME	0min-2min 59sec	3min-4min 59sec	5min-6min 59sec	7min-8min 59sec	more than 9min

FIG. 6

month	11	12	1	2	3	4	5	6	7	8	9	10
SOAKING PROCESS PRESERVING TIME(sec)	480	518	556	594	632	670	708	746	784	839	898	960
TEMPERATURE PRESERVING TIME FOR COMPLETING RICE COOKING(sec)									10	20	30	40
STEAM PRESERVING AND REHEAT TIME(min)	12	12	12	12	13	13	13	13	13 (1)	13 (2)	13 (3)	13 (4)
HEAT AMOUNT(%)	100	99	98	97	96	95	94	93	92	89	85	80

FIG. 7

RICE COOKING AMOUNT	1	2	3	4	5
TEMPERATURE PRESERVING TIME FOR COMPLETING RICE COOKING(sec)	5	10	15	20	25
HEATER ON/OFF DURING 2nd HEAT	16/16	20/12	24/8	28/4	32/0
HEATER ON/OFF DURING HEAT PRESERVING	24/8	26/6	28/4	30/2	32/0

8/19

FIG. 8

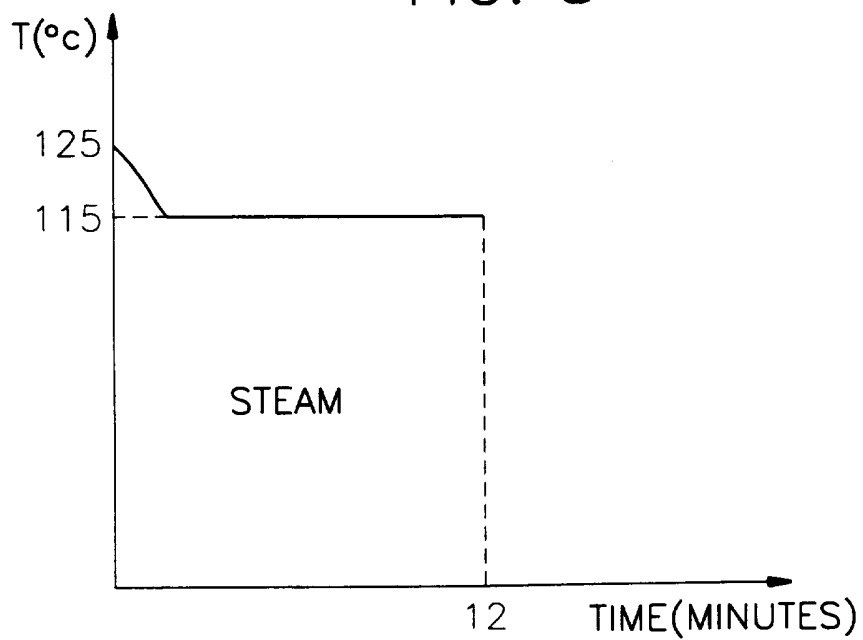
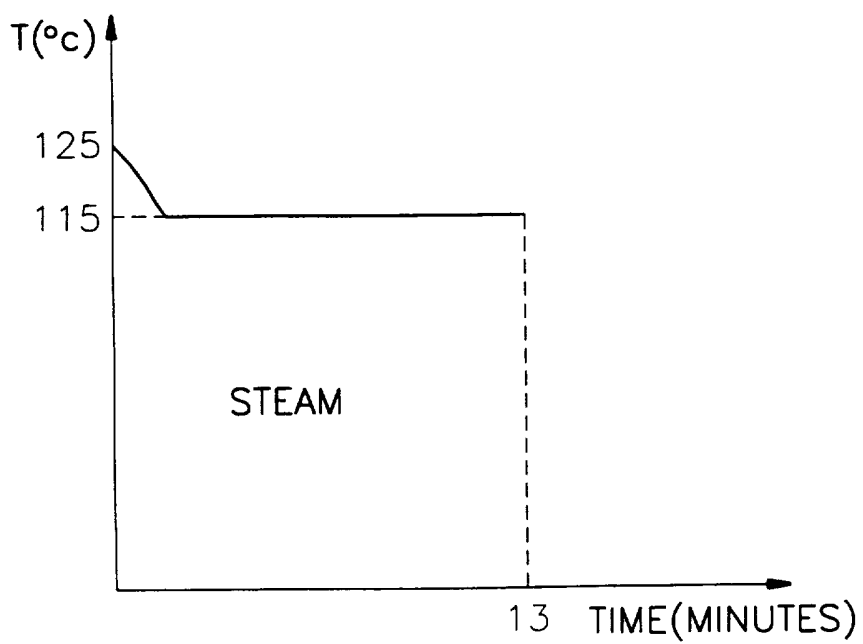


FIG. 9



9/19

FIG. 10

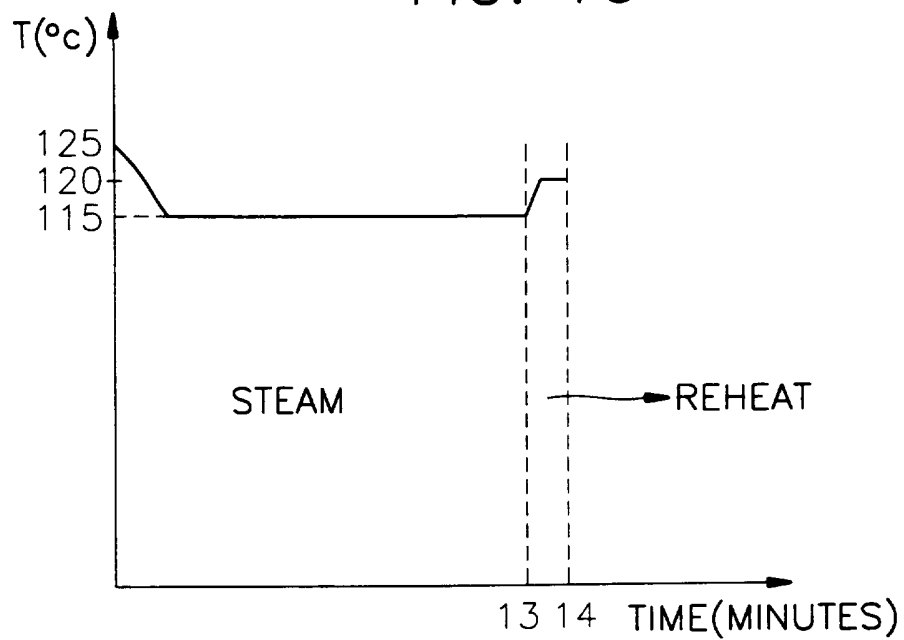
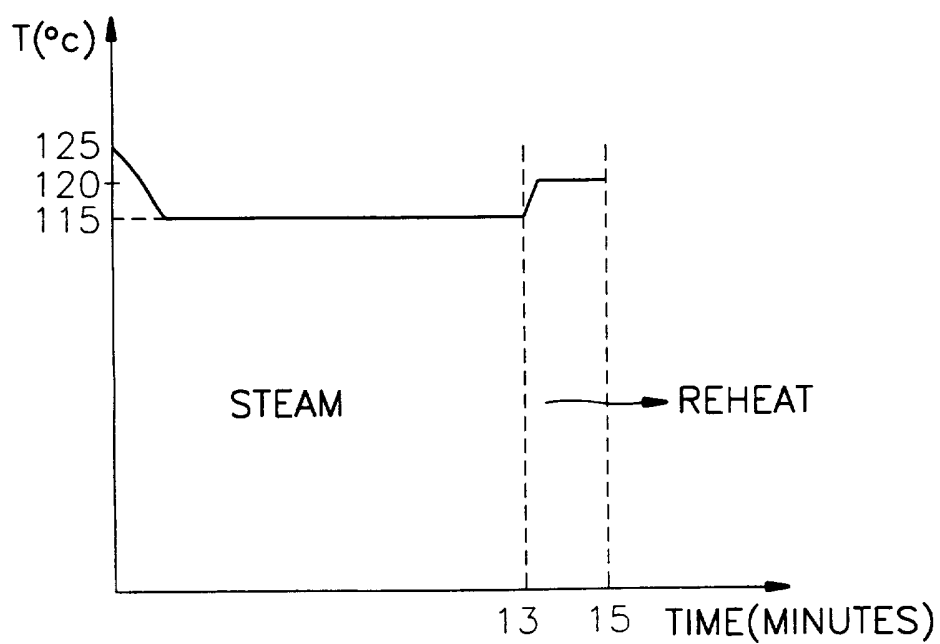


FIG. 11



10/19

FIG. 12

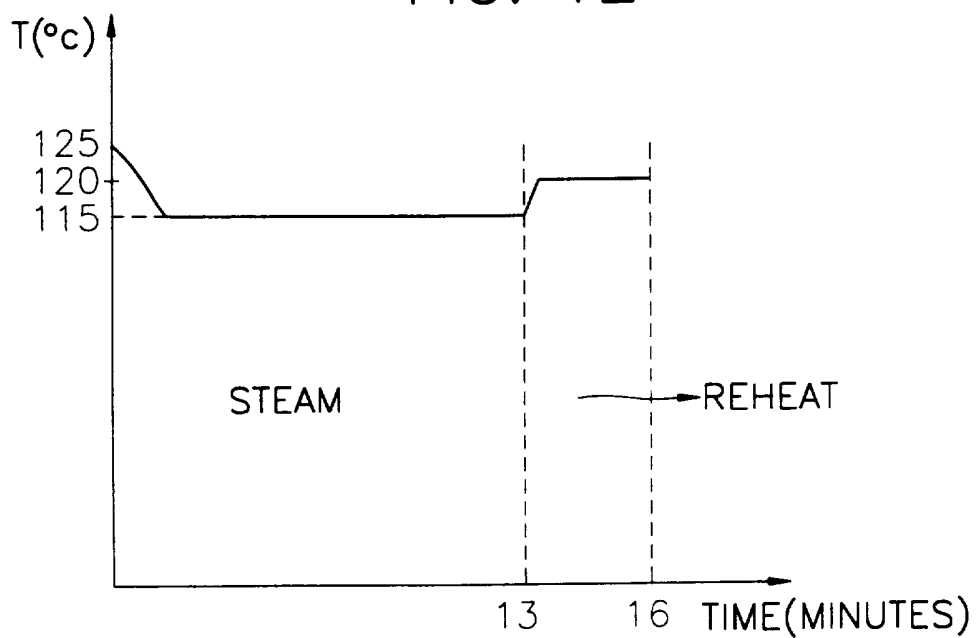
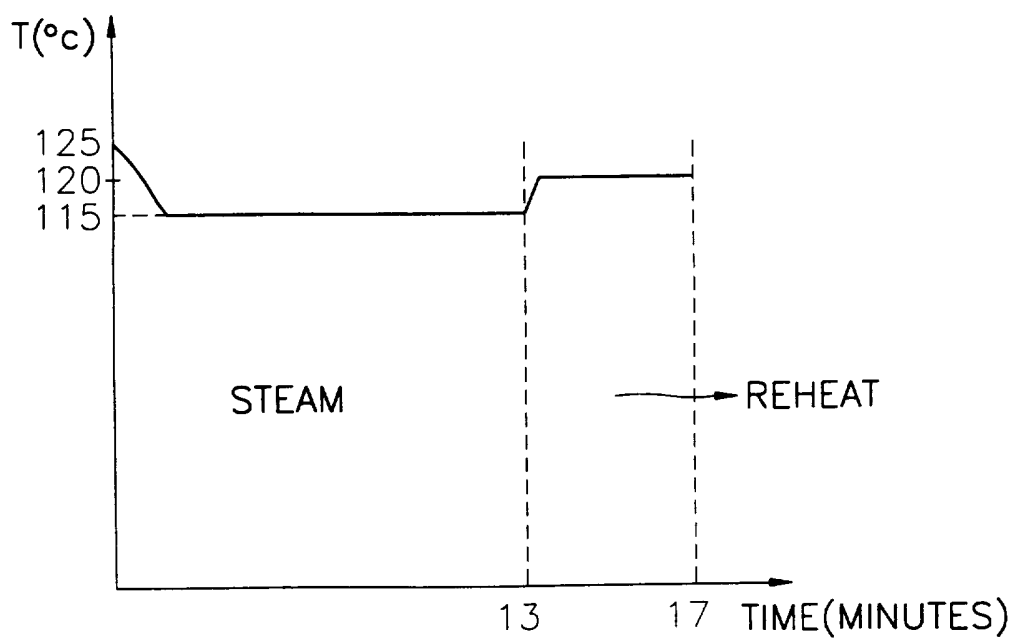


FIG. 13



11/19

FIG. 14

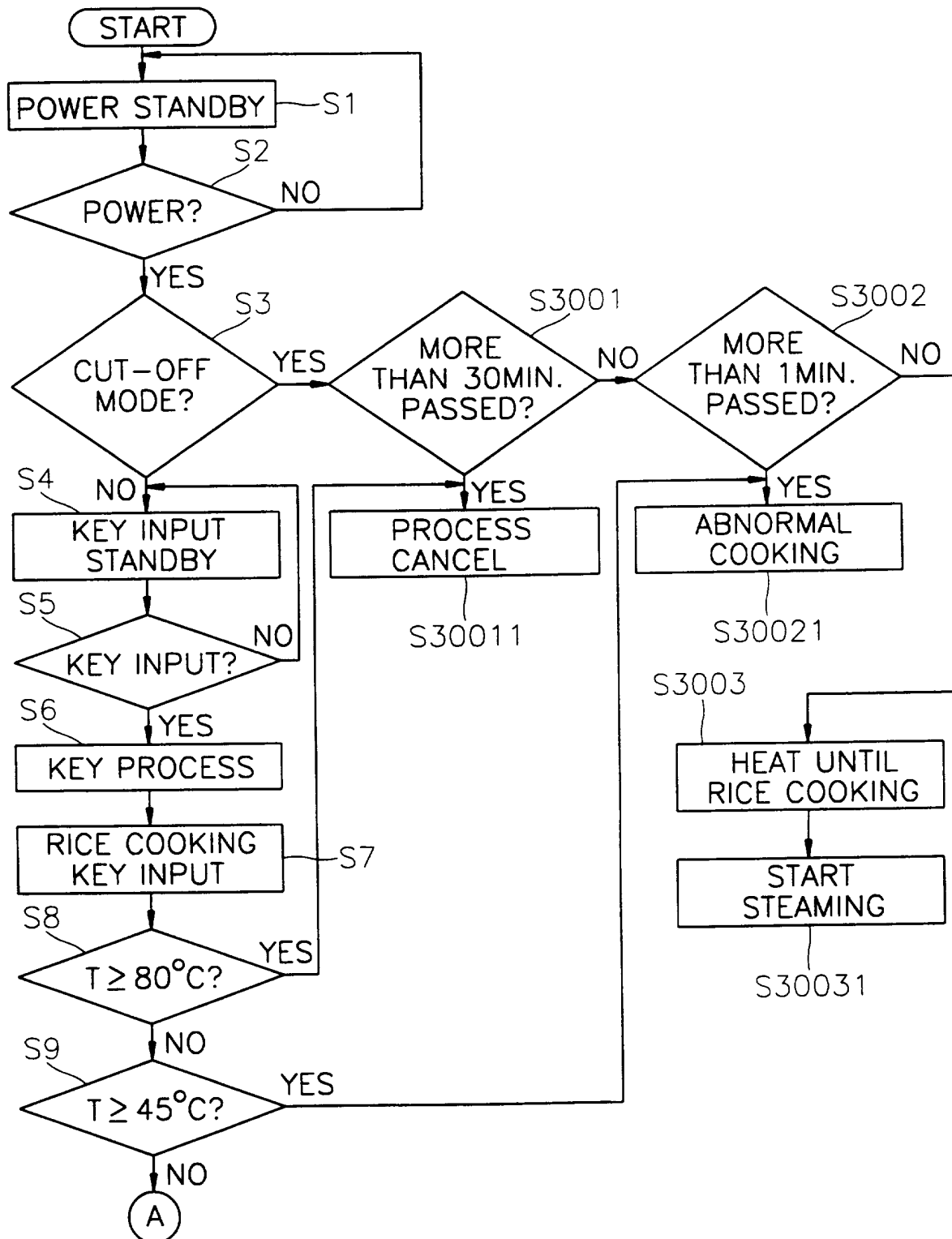


FIG. 15

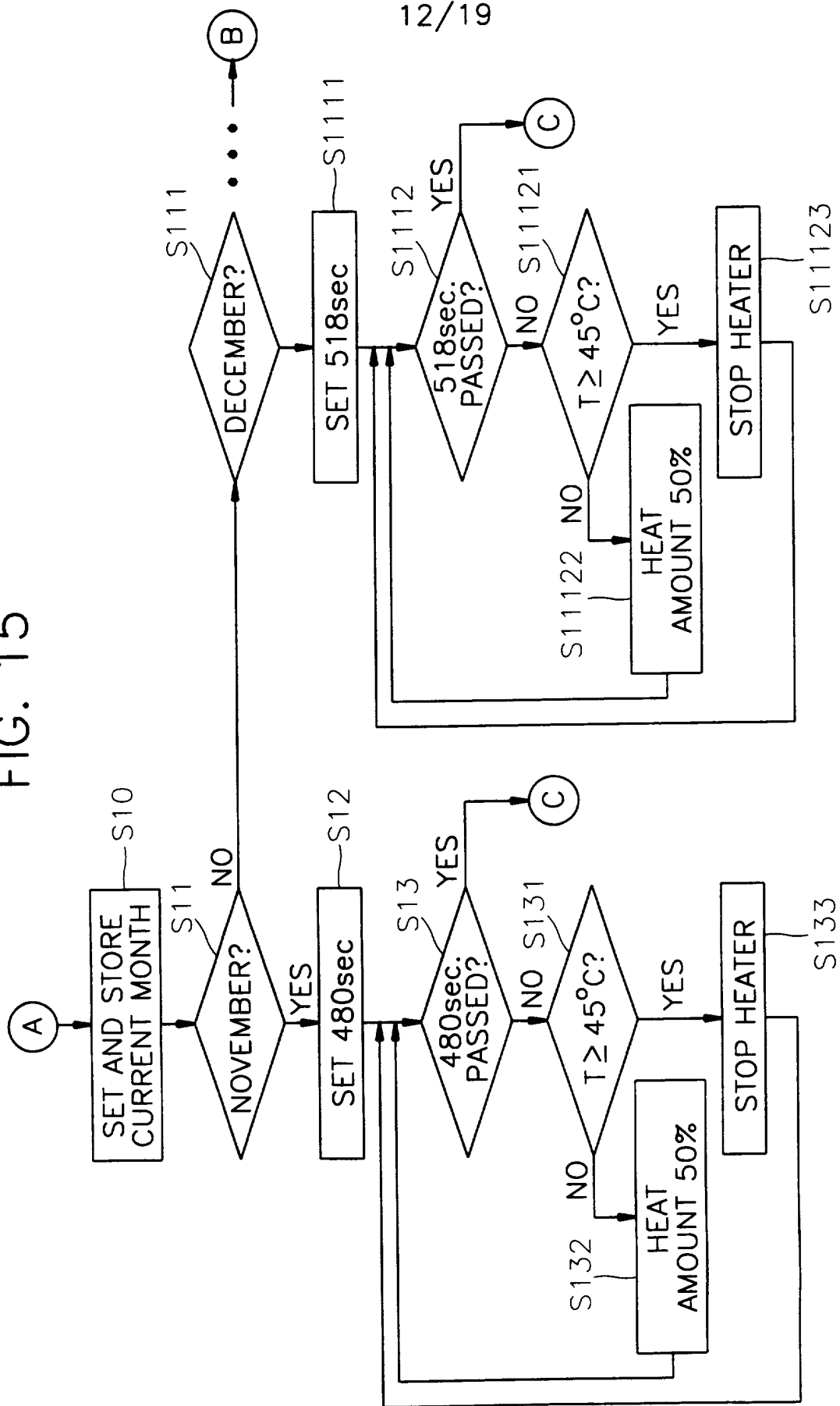
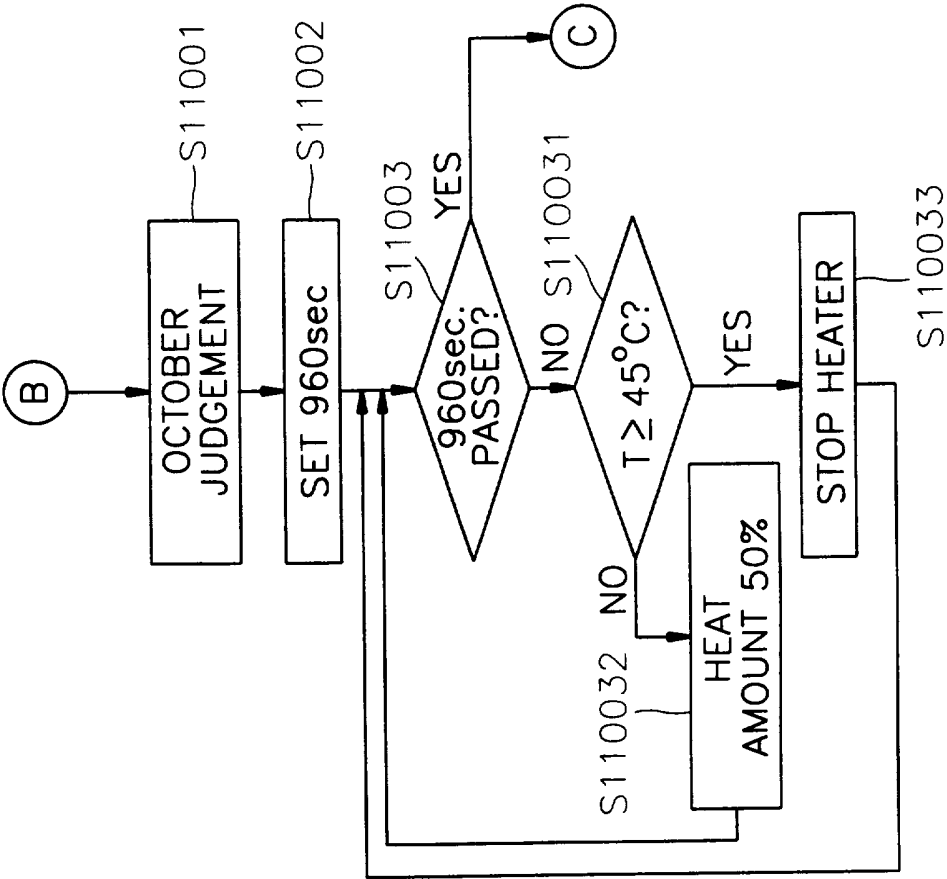
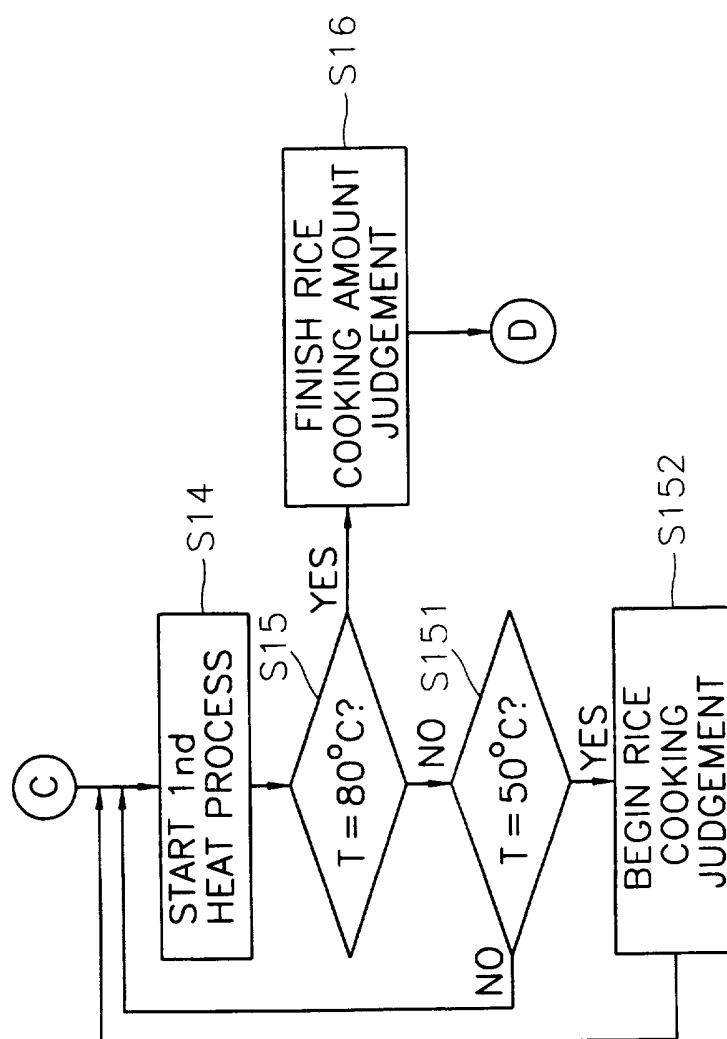


FIG. 16



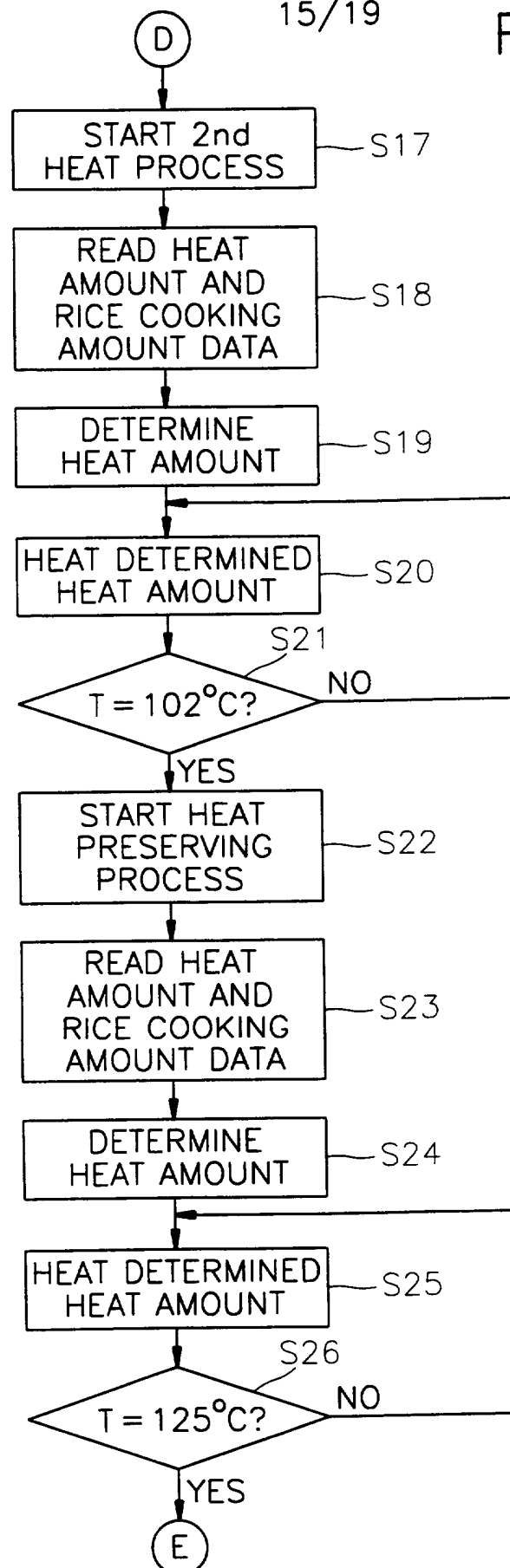
14/19

FIG. 17



15/19

FIG. 18



16/19

FIG. 19

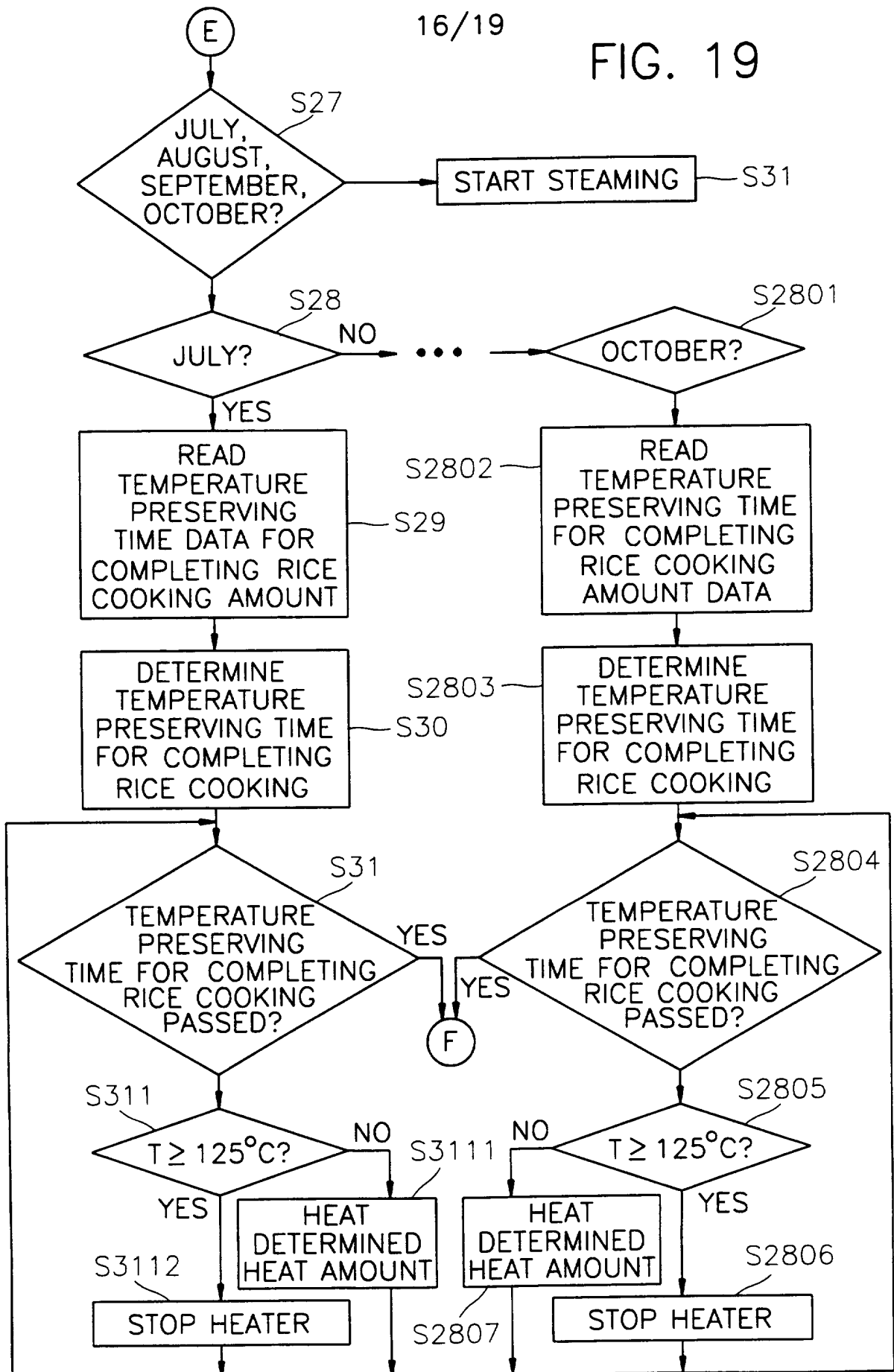


FIG. 20

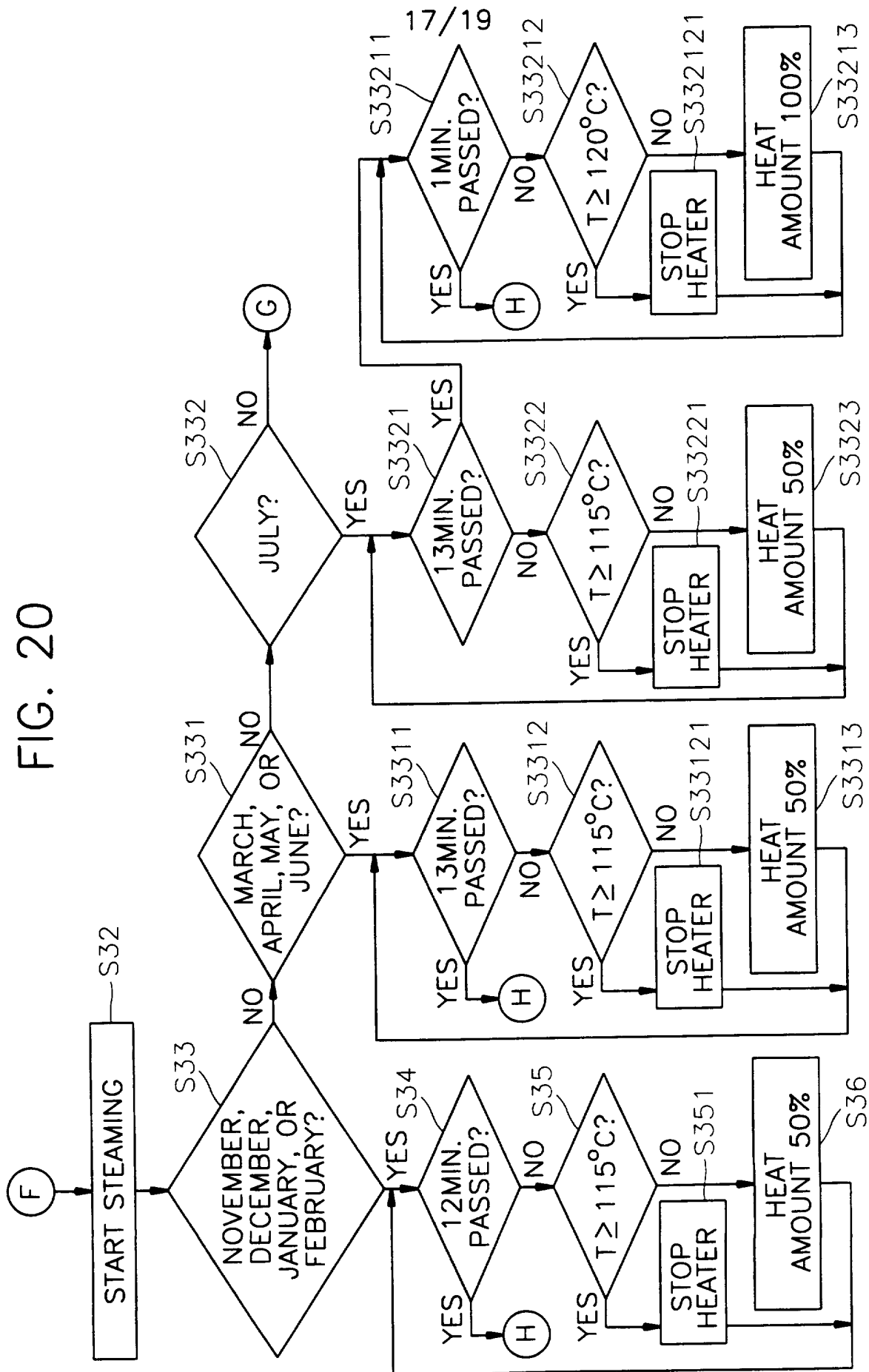
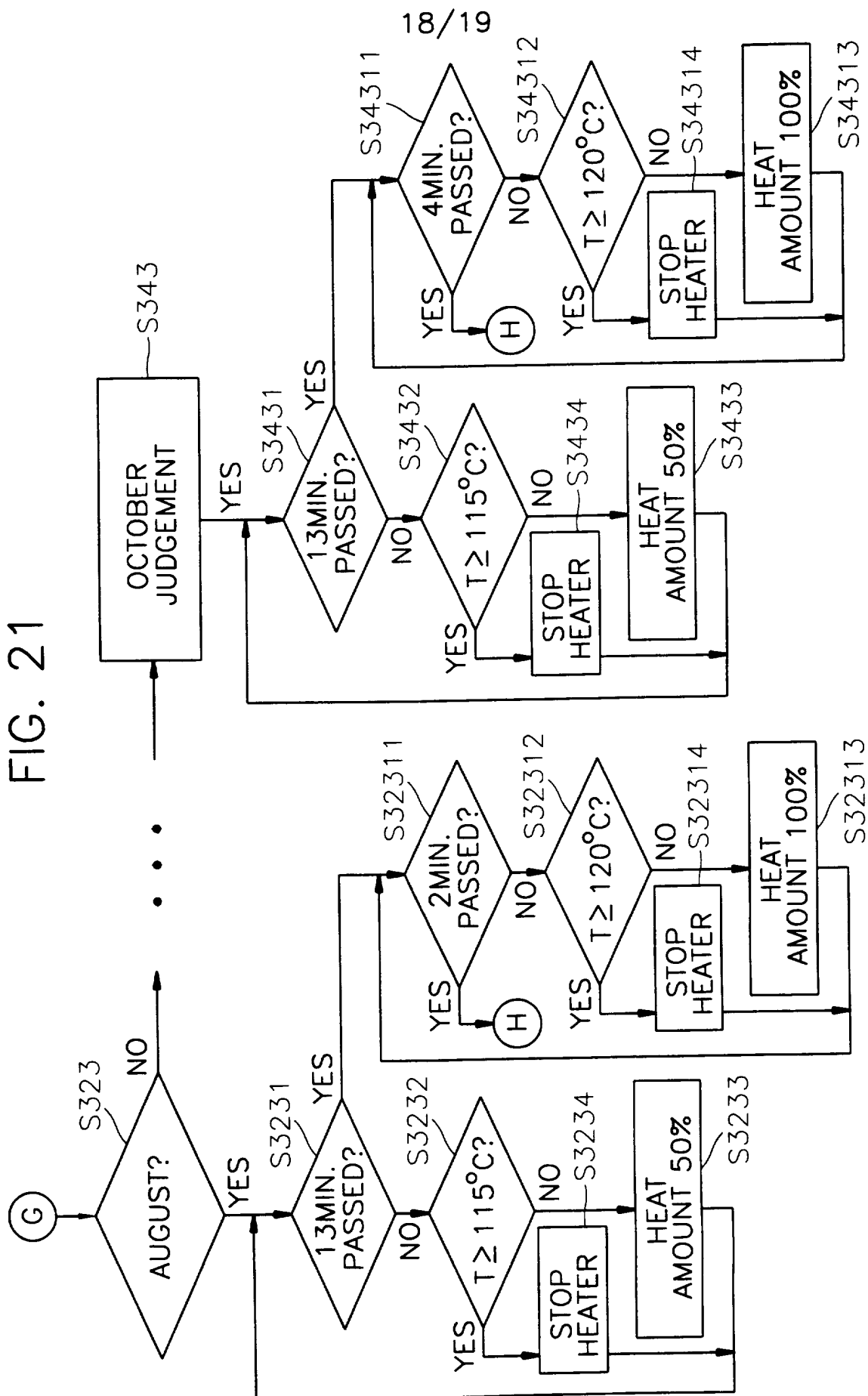
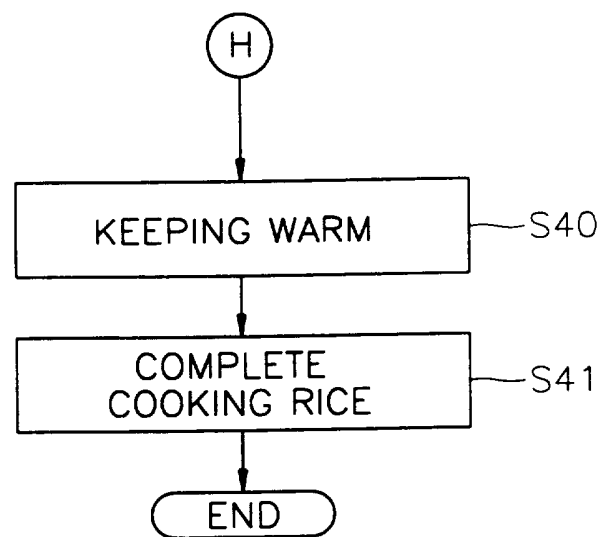


FIG. 21



19/19

FIG.22



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR 96/00181

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁶: A 47 J 27/00; A 23 L 1/182

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁶: A 47 J; A 23 L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AT

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 90/00 355 A1 (MARS, INC.) 25 January 1990 (25.01.90), abstract.	1
A	Patent Abstracts of Japan, Vol.10, No.112 (C-342), 1986, JP 60-241 865 A (TAIGAA MAHOUBIN K.K.).	1
A	Patent Abstracts of Japan, Vol.10, No.120 (C-343), 1986, JP 60-244 266 A (TAIGAA MAHOUBIN K.K.).	1
A	GB 2 114 321 A (TOKYO SHIBAURA DENKI K.K.) 17 August 1983 (17.08.83), claim 1.	1
A	US 4 670 282 A (ONISHI et al.) 02 June 1987 (02.06.87), claim 1 (cited in the application).	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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PCT/KR 96/00181

In Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche		Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
WO A1 9000355		25-01-90	AT E 80261	15-09-92
			AU A1 39727789	05-02-90
			AU E 616994	14-11-91
			DE D 689028002	15-10-92
			DE T 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
			DE A 689028002	15-10-92
GB A 2114321			GB A 3002572	02-04-80
			GB A 114321	14-10-80
			GB E 114321	14-10-80
			JP A 5814412	08-10-80
			US A 4441016	04-04-84
US A 4670282		02-06-87	GB A 1595750	19-08-81
			JP A 3440166	06-11-86
			JP E 47038254	14-10-81
			MY A 68785	11-11-80
			US A 4672179	09-10-81
			JP A 54401170	13-11-80
			JP E 47019967	01-04-82