



(12) **DEMANDE DE BREVET CANADIEN**
CANADIAN PATENT APPLICATION

(13) **A1**

(86) **Date de dépôt PCT/PCT Filing Date:** 2022/05/11

(87) **Date publication PCT/PCT Publication Date:** 2022/11/17

(85) **Entrée phase nationale/National Entry:** 2023/10/27

(86) **N° demande PCT/PCT Application No.:** IB 2022/054382

(87) **N° publication PCT/PCT Publication No.:** 2022/238923

(30) **Priorité/Priority:** 2021/05/12 (IT102021000012227)

(51) **Cl.Int./Int.Cl.** **A47J 27/04** (2006.01)

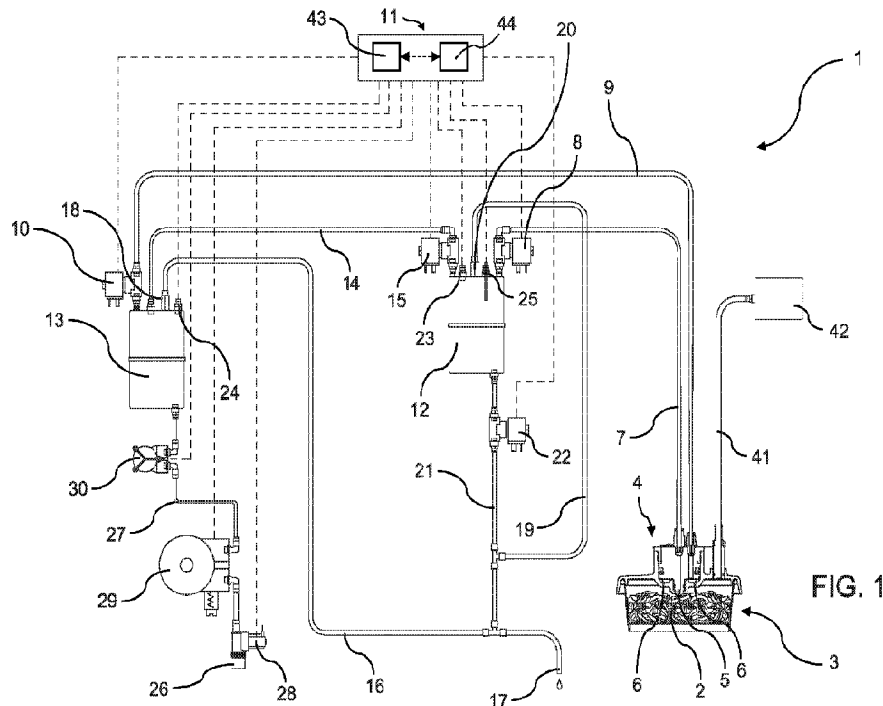
(71) **Demandeur/Applicant:**
PASTIFICIO RANA S.P.A., IT

(72) **Inventeur/Inventor:**
RANA, GIAN LUCA, IT

(74) **Agent:** PERRY + CURRIER

(54) **Titre : MACHINE ET PROCEDE DE CUISSON D'ALIMENTS**

(54) **Title: MACHINE AND METHOD FOR COOKING FOOD**



(57) **Abbrégé/Abstract:**

A machine for cooking food has a dispenser (4) configured to be arranged over a container (3) containing food (2) and to close the container (3) and comprising at least one first opening (5) to dispense steam into the container (3) and at least one second opening (6) to dispense hot water into the container (3); a first duct (7) and a first solenoid valve (8), to supply steam to the first opening (5); a second duct (9) and a second solenoid valve (10) to supply hot water to the second opening (6); and a control unit (11) configured to control the opening and the closing of the first and the second solenoid valves (8, 10) so as to modulate the time of the steam supply and the volume of water depending on a selected cooking program.



Date Submitted: 2023/10/27

CA App. No.: 3217065

Abstract:

A machine for cooking food has a dispenser (4) configured to be arranged over a container (3) containing food (2) and to close the container (3) and comprising at least one first opening (5) to dispense steam into the container (3) and at least one second opening (6) to dispense hot water into the container (3); a first duct (7) and a first solenoid valve (8), to supply steam to the first opening (5); a second duct (9) and a second solenoid valve (10) to supply hot water to the second opening (6); and a control unit (11) configured to control the opening and the closing of the first and the second solenoid valves (8, 10) so as to modulate the time of the steam supply and the volume of water depending on a selected cooking program.

"MACHINE AND METHOD FOR COOKING FOOD"

Cross-Reference to Related Applications

This patent application is related to Italian Patent
5 Application No. 102021000012227 filed on May 12, 2021, the
entire disclosure of which is incorporated herein by
reference.

Technical Field of the Invention

The present invention relates to a machine and to a
10 method for cooking food.

In particular, the present invention relates to a
machine and to a method for cooking food by means of the
supply of hot water and steam.

State of the Art

15 Within the scope of the quick catering industry, it is
known to use machines for cooking fresh food and/or for
heating precooked food by means of the use of steam.

Patent applications No. WO 2019/207509, No. WO
2020/212909 and No. WO 2020/212207 of the applicant teach
20 how to cook fresh food contained in a container by means of
the supply of hot water and steam into the container
containing the food.

The cooking of fresh food by means of water and steam
requires dosing the steam and the hot water so as to cook
25 the food quickly. At the same time, it is necessary to reach
high qualitative levels with regard to the cooking of the
food and prevent the presence of water on the bottom of the

container so as to meet the customer's expectations both in terms of taste and in terms of product presentation.

The object of the present invention is to provide a machine for cooking food which manages to conciliate the
5 above-described requirements in a simple and cost-effective manner.

Subject and Summary of the Invention

According to the present invention, a machine for cooking food is provided, the machine comprising:

- 10 - a dispenser configured to be arranged over a container containing food and to close the container and comprising at least one first opening for dispensing steam into the container and at least one second opening for dispensing hot water into the container;
- 15 - a first duct and a first solenoid valve, for supplying steam to the first opening;
- a second duct and a second solenoid valve for supplying hot water to the second opening; and
- a control unit configured to control the opening and
20 the closing of the first and the second solenoid valves so as to modulate the time of the steam supply and the volume of water depending on a selected cooking program.

Thanks to the present invention, it is possible to automatically and quickly prepare a plurality of different
25 recipes associated with respective cooking programs, dispensing in an independent manner steam and hot water inside the container.

The control of the time of the steam supply and of the volume of water to be dispensed into the container allows implementing each cooking program in a simple and effective manner.

5 In particular, the first solenoid valve and the second solenoid valve are on-off type.

In this manner, it is possible to control the supply of steam and hot water to the first and the second openings in a simple and reliable manner.

10 In particular, the control unit is configured to close in sequence the second solenoid valve and, after a given time interval, the first solenoid valve, so as to interrupt the hot water supply in advance with respect to the end of the steam supply.

15 In particular, the control unit is configured to control the first solenoid valve so as to supply steam to the first opening at intervals.

In particular, the control unit is configured to control the second solenoid valve so as to supply hot water to the
20 second opening at intervals.

In this manner, it is possible to control the cooking of the food in the container and prepare a wide range of different recipes.

In particular, the control unit comprises a user
25 interface configured to select a cooking program from a plurality of cooking programs related to respective recipes; the control unit being configured to control the first and

the second solenoid valves depending on the selected cooking program so as to prepare the desired recipe.

In particular, the control unit is configured to emit an authorization signal for opening the container and for removing the container from the machine.

In this manner, it is possible to communicate to a user of the machine that the cooking program has come to an end.

In particular, the user interface is configured to set cooking programs depending on respective recipes.

In this manner, it is possible to store a plurality of different recipes in the control unit.

In particular, the user interface is configured to select the time of the steam supply, and/or the steam supply intervals, and/or the volume of hot water to be dispensed, and/or the hot water supply intervals, and/or the delay of the water supply with respect to the steam supply, and/or the delay of the opening of the container with respect to the closing of the first solenoid valve.

In this manner, it is possible to determine the operational parameters of a cooking program.

A further object of the present invention is to provide a method for cooking food which allows mitigating the drawbacks of the prior art.

In accordance with the present invention, a method for cooking food is provided, the method comprising:

- dispensing steam into a container containing food through at least one first opening of a dispenser arranged

over the container;

- dispensing hot water into the container through at least one second opening of the dispenser;

- supplying steam to the first opening through a first duct and a first solenoid valve;

- supplying hot water to the second opening through a second duct and a second solenoid valve; and

- controlling the opening and the closing of the first and the second solenoid valves so as to modulate the time of the steam supply and the volume of hot water depending on a selected cooking program.

Thanks to the present method, it is possible to supply steam and hot water into the container simultaneously and/or according to any sequence so as to prepare a wide range of different recipes, each of which is associated with a given cooking program.

Brief Description of the Drawings

The invention is described in the following with reference to the accompanying drawings, which illustrate a non-limiting example embodiment thereof, wherein:

- Figure 1 is a schematic view, with parts removed for clarity, of a machine for cooking food;

- Figure 2 is a detailed view of a detail of the machine of Figure 1; and

- Figures 3 and 4 are graphs that show respective opening and closing states of the steam supply solenoid valve and of the hot water supply solenoid valve of the machine

for cooking food of Figure 1.

**Detailed Description of Preferred Embodiments of the
Invention**

With reference to Figure 1, reference numeral 1
5 indicates, as a whole, a machine for cooking food 2 in a
container 3 containing said food 2.

The machine 1 can be used in public catering places
(for example coffee bars, restaurants, diners etc.) or at
home.

10 In accordance with a non-limiting embodiment of the
present invention, the food 2 contained in the container 3
can be a dose of raw pasta or a sauce for said dose of pasta.

The machine 1 comprises a dispenser 4 configured to be
arranged over the container 3 and to close the container 3
15 and comprising at least one opening 5 for dispensing steam
into the container 3 and at least one opening 6 for
dispensing hot water into the container 3; a duct 7 and a
solenoid valve 8, for supplying steam to the opening 5; a
duct 9 and a solenoid valve 10 for supplying hot water to
20 the opening 6; and a control unit 11 configured to control
the opening and the closing of the solenoid valves 8 and 10
so as to modulate the time of the steam supply and the volume
of water depending on a selected cooking program.

In accordance with a non-limiting embodiment of the
25 present invention, the solenoid valves 8 and 10 are on-off
type.

In the non-limiting case of the present invention

described and illustrated herein, the machine 1 comprises a boiler 12, which is configured to provide steam and is connected to the duct 7; a boiler 13, which is configured to provide hot water and is connected to the duct 9; and a duct 5 14 and a solenoid valve 15 of on-off type for supplying hot water from the boiler 13 to the boiler 12.

In accordance with an embodiment, each boiler 12, 13 comprises electric resistors, not shown in the accompanying figures, for adjusting the quantity of heat provided and, 10 consequently, the steam temperature and the hot water temperature, respectively.

In particular, the boiler 12 is configured to heat the steam at a temperature ranging between approximately 105 °C and approximately 135 °C, and the boiler 13 is configured to 15 heat the hot water at a temperature ranging between approximately 90 °C and approximately 105 °C.

In particular, the machine 1 comprises a duct 16 for supplying hot water from the boiler 13 to a discharge 17, and a safety valve 18, which is coupled to the boiler 13, is 20 in fluidic communication with the duct 16 and is configured to allow the passage of hot water in the duct 16 in case the pressure inside the boiler 13 exceeds a given threshold.

In particular, the machine 1 comprises a duct 19 for supplying steam from the boiler 12 to the discharge 17, and 25 a safety valve 20, which is coupled to the boiler 12, is in fluidic communication with the duct 19 and is configured to allow the passage of steam in the duct 19 in case the pressure

inside the boiler 12 exceeds a given threshold.

Furthermore, the machine 1 comprises a duct 21 for supplying discharge water from the boiler 12 to the discharge 17, and a solenoid valve 22 of on-off type configured to control the supply of discharge water to the discharge 17 along the duct 21.

In particular, the machine 1 comprises a temperature sensor 23, which is configured to emit a first temperature signal related to the temperature of the steam in the boiler 12; and a temperature sensor 24, which is configured to emit a second temperature signal related to the temperature of the hot water in the boiler 13.

Furthermore, the machine 1 comprises a level probe 25, which is associated with the boiler 12 and is configured to emit a level signal related to the level of water in the boiler 12.

In the case described and illustrated herein, the machine 1 comprises a connection 26 to a water supply network, which ensures an almost unlimited supply of water at ambient temperature; a duct 27 for supplying water at ambient temperature from the connection 26 to the boiler 13; a solenoid valve 28 of on-off type for controlling the supply of water at ambient temperature along the duct 27; a pump 29, which is configured to provide a head sufficient for allowing the flow of the water inside the machine 1; and a flow-rate meter 30, preferably a flowmeter, which is configured to emit a flow-rate signal related to the flow-

rate of the water running in the duct 27.

In accordance with a further embodiment, not shown in the accompanying figures, the machine 1 comprises, in alternative to the connection 26, a tank, which is configured
5 to contain water at ambient temperature and is fluidically connected to the duct 27.

With reference to Figure 2, the container 3 comprises a base wall 31, preferably having a circular shape; a side wall 32, preferably slightly flared, provided with an upper
10 edge 33; and an opening 34, preferably having a circular shape, opposite the base wall 31.

The dispenser 4 comprises a central body 35 provided with a steam supply channel 36, which is in fluidic communication with the duct 7 and with the openings 5, and
15 with a hot water supply channel 37, which is in fluidic communication with the duct 9 and with the openings 6; and a lid 38, which is arranged around the central body 35 and is configured to close the opening 34 of the container 3 so as to form a substantially closed cooking compartment for
20 the cooking of the food 2.

In particular, the central body 35 comprises a central protrusion 39, which is provided with the openings 5; and an annular wall 40, which extends around the central protrusion 39 and is provided with the openings 6.

25 With reference to Figure 1, the machine 1 comprises a duct 41, which is configured to evacuate steam from the container 3 and is connected to a steam discharge 42. In

particular, the duct 41 extends through the lid 38 so as to put the inside of the cooking compartment in fluidic communication with the steam discharge 42.

The control unit 11 comprises a user interface 43
5 configured to allow the selection of a cooking program from a plurality of cooking programs related to respective recipes. The control unit 11 is configured to control the solenoid valves 8 and 10 depending on a selected cooking program.

10 Furthermore, the control unit 11 is configured to receive the signals emitted by the temperature sensors 23 and 24, by the level probe 25 and by the flow-rate meter 30 and to control the solenoid valves 8, 10 and 15 depending on the signals received from the temperature sensors 23 and 24,
15 from the level probe 25 and from the flow-rate meter 30.

In accordance with an embodiment, the user interface 43 comprises a touch-screen panel, not shown in the accompanying figures, by means of which an operator can view and manually select a desired recipe.

20 Furthermore, the control unit 11 comprises a storage 44, in which a plurality of recipes is stored. Each recipe is associated with a plurality of cooking parameters which define a given cooking program.

The user interface 43 is configured to allow an operator
25 to set said cooking programs and to store said cooking programs in the storage 44.

More specifically, the plurality of cooking parameters

comprises the time of the steam supply, and/or the steam supply intervals, and/or the volume of hot water to be dispensed, and/or the hot water supply intervals, and/or the delay of the hot water supply with respect to the steam supply, and/or the delay of the opening of the container 3 with respect to the closing of the solenoid valve 8, and/or the flow-rate of hot water to be dispensed inside the container 3.

With reference to Figure 3, a graph is shown of an opening and closing state 45 of the solenoid valve 8 and of an opening and closing state 46 of the solenoid valve 10 in a particular operational configuration of the machine 1. More specifically, the graph of Figure 3 is a cartesian plane wherein the abscissa axis represents the time and the ordinate axis represents the opening/closing states 45 and 46 of the solenoid valves 8 and 10, each of which can assume the value 0 (closed solenoid valves 8 and 10) or the value 1 (open solenoid valves 8 and 10). When the solenoid valves 8 and 10 are open, steam and hot water are dispensed inside the container 3. Vice versa, when the solenoid valves 8 and 10 are closed the supply of steam and hot water inside the container 3 is interrupted.

In the non-limiting case of the present invention described and illustrated herein, the control unit 11 is configured to control the state 45 of the solenoid valve 8 so as to supply in a continuous manner steam to the openings 5 and to control the state 46 of the solenoid valve 10 so as

to supply hot water to the openings 6 at intervals.

The control unit 11 is configured to determine the delay of the hot water supply with respect to the steam supply. In such circumstance, the control unit 11 is configured to control the opening of the solenoid valve 8 at a time instant 47 and to control the opening of the solenoid valve 10 at a subsequent time instant 48 with respect to the time instant 47.

Furthermore, the control unit 11 is configured to close in sequence the solenoid valve 10 and, after a given time interval, the solenoid valve 8. In other words, the control unit 11 is configured to control the closing of the solenoid valve 10 at a time instant 49 and to control the closing of the solenoid valve 8 at a time instant 50, which is subsequent with respect to the time instant 49.

The control unit 11 is configured to emit an authorization signal for opening the container 3 and for removing the container 3 from the machine 1 once the cooking program has come to an end. In particular, the control unit 11 is configured to emit said authorization signal at a given time instant 51, subsequent to the closing time instant 50 of the solenoid valve 8 and to the opening time instant 49 of the solenoid valve 10.

In accordance with an embodiment, the user interface 43 is configured to display the authorization signal emitted by the control unit 11 and/or to emit a sound notice related to the authorization signal.

With reference to Figure 4, a graph is shown of an opening and closing state 52 of the solenoid valve 8 and of an opening and closing state 53 of the solenoid valve 10 in a further operational configuration of the machine 1. In the non-limiting case of the present invention described and illustrated herein, the control unit 11 is configured to control the state 52 of the solenoid valve 8 so as to supply steam to the openings 5 at intervals and to control the state 53 of the solenoid valve 10 so as to supply hot water to the openings 6 at intervals.

In use and with reference to Figure 1, an operator arranges the container 3 containing food 2 under the dispenser 4 so that the lid 38 closes the opening 34 of the container 3 and selects by means of the user interface 43 the desired recipe from the plurality of recipes stored in the storage 44.

The control unit 11 associates the selected recipe with a cooking program and respective cooking parameters and controls the solenoid valves 8, 10, 15, 22 and 28 and the pump 29 depending on said cooking parameters and on the signals emitted by the temperature sensors 23 and 24, by the level probe 25 and by the flow-rate meter 30.

With reference to Figure 3, the control unit 11 controls the opening of the solenoid valve 8 at the time instant 47 allowing the supply of steam inside the container 3. After a given time interval, the control unit 11 controls the opening of the solenoid valve 10 at the time instant 48

allowing the supply of hot water inside the container 3. The control unit 11 keeps the solenoid valve 8 open up to the time instant 50 allowing the continuous supply of steam to the openings 5 and intermittently opens/closes the solenoid valve 10 so as to supply hot water to the openings 6 at intervals.

When the selected cooking program is coming close to an end, the control unit 11 closes the solenoid valve 10 at the time instant 49 and, after a given time interval, the solenoid valve 8 at the time instant 50.

Once the cooking program has come to an end, the control unit 11 emits at the time instant 51 the authorization signal for opening the container 3 and for removing the container 3 from the machine 1. Said authorization signal is displayed by the user interface 43.

With reference to Figure 4, the control unit 11 intermittently opens/closes the solenoid valves 8 and 10 so as to supply at intervals steam and hot water respectively to the openings 5 and to the openings 6.

During each cooking process, the control unit 11 controls the solenoid valves 8 and 10 independently of each other. In this manner, it is possible to supply steam and hot water into the container 3 simultaneously and/or according to any sequence.

It is evident that variations can be made to the present invention without departing from the scope of protection of the appended claims.

C L A I M S

1. A machine for cooking food, the machine (1) comprising:

- a dispenser (4) configured to be arranged over a
5 container (3) containing food (2) and to close the container
(3) and comprising at least one first opening (5) to dispense
steam into the container (3) and at least one second opening
(6) to dispense hot water into the container (3);

- a first duct (7) and a first solenoid valve (8), to
10 supply steam to the first opening (5);

- a second duct (9) and a second solenoid valve (10) to
supply hot water to the second opening (6); and

- a control unit (11) configured to control the opening
and the closing of the first and the second solenoid valves
15 (8, 10) so as to modulate the time of the steam supply and
the volume of water depending on a selected cooking program.

2. The machine as claimed in Claim 1, wherein the
first solenoid valve (8) and the second solenoid valve (10)
are on-off type.

20 3. The machine as claimed in Claim 1 or 2, wherein the
control unit (11) is configured to close in sequence the
second solenoid valve (10) and, after a given time interval,
the first solenoid valve (8).

4. The machine as claimed in any one of the foregoing
25 Claims, wherein the control unit (11) is configured to
control the first solenoid valve (8) so as to supply steam
to the first opening (5) at intervals.

5. The machine as claimed in any one of the foregoing Claims, wherein the control unit (11) is configured to control the second solenoid valve (10) so as to supply hot water to the second opening (6) at intervals.

5 6. The machine as claimed in any one of the foregoing Claims, wherein the control unit (11) is configured to emit an authorization signal to open the container (3) and to remove the container (3) from the machine (1).

7. The machine as claimed in any one of the foregoing
10 Claims, wherein the control unit (11) comprises a user interface (43) configured to select a cooking program from a plurality of cooking programs related to respective recipes; the control unit (11) being configured to control the first and the second solenoid valves (8, 10) depending
15 on the selected cooking program.

8. The machine as claimed in Claim 7, wherein the user interface (43) is configured to set cooking programs depending on respective recipes.

9. The machine as claimed in Claim 7 or 8, wherein the
20 user interface (43) is configured to select the time of the steam supply, and/or the steam supply intervals, and/or the volume of hot water to be supplied, and/or the hot water supply intervals, and/or the delay of the hot water supply with respect to the steam supply, and/or the delay of the
25 container opening (3) with respect to the closing of the first solenoid valve (8).

10. A method for cooking food, the method comprising:

- dispensing steam into a container (3) containing food (2) through at least one first opening (5) of a dispenser (4) arranged over the container (3);

- dispensing hot water into the container (3) through
5 at least one second opening (6) of the dispenser (4);

- supplying steam to the first opening (5) through a first duct (7) and a first solenoid valve (8);

- supplying hot water to the second opening (6) through a second duct (9) and a second solenoid valve (10); and

10 - controlling the opening and the closing of the first and the second solenoid valves (8, 10) so as to modulate the time of steam supply and the volume of hot water depending on a selected cooking program.

11. The method as claimed in Claim 10, and comprising
15 closing in sequence the second solenoid valve (10) and, after a given time interval, the first solenoid valve (8).

12. The method as claimed in Claim 10 or 11, and comprising controlling the first solenoid valve (8) so as to supply steam to the first opening (5) at intervals.

20 13. The method as claimed in any one of Claims 10 to 12, and comprising controlling the second solenoid valve (10) so as to supply hot water to the second opening (6) at intervals.

14. The method as claimed in any one of Claims 10 to
25 13, and comprising selecting a cooking program from a plurality of cooking programs related to respective recipes; and controlling the first and the second solenoid valves (8,

10) depending on the selected cooking program.

15. The method as claimed in any one of Claims 10 to 14, and comprising emitting an authorization signal to open the container (3) and to remove the container (3) from the
5 machine (1).

16. The method as claimed in any one of Claims 10 to 15, and comprising setting cooking programs depending on respective recipes.

17. The method as claimed in any one of Claims 10 to
10 16, and comprising selecting the time of the steam supply, and/or the steam supply intervals, and/or the volume of hot water to be supplied, and/or the hot water supply intervals, and/or the delay of the hot water supply with respect to the steam supply, and/or the delay of the opening of the
15 container (3) with respect to the closing of the first solenoid valve (8).

