Title: DEVICE FOR STEAM-COOKING FOOD

Abstract: Device for steam-cooking food, characterized in that it comprises a receptacle (1) provided with a lid (3) having in the centre a part (7, 8) able to support in a freely rotatable manner a vertical tubular element (12) which extends inside the said receptacle (1), said tubular element (12) being provided, at its end projecting inside the said receptacle (1), with a horizontal, sub-horizontal or subvertical arm (14; 14) which is closed at its front end and provided near the end with a radial hole (15) having an orientation substantially tangential to the walls of the receptacle (1), the other end of said tubular element (12) communicating with a duct (16) supplying pressurized steam, so that the steam emitted from said radial hole (15) causes the rotation of said horizontal arm (14; 14) about a vertical axis.
TITLE: DEVICE FOR STEAM-COOKING FOOD

DESCRIPTION

The present invention relates to a device for steam-cooking food, of the type comprising a receptacle provided with a lid having in the centre a part able to support in a freely rotatable manner a vertical tubular element which extends inside the said receptacle, said tubular element being provided, at its end projecting inside the said receptacle, with a horizontal, subhorizontal or subvertical arm which is closed at its front end and provided near the end with a radial hole having an orientation substantially tangential to the walls of the receptacle, the other end of said tubular element communicating with a duct supplying pressurized steam, so that the steam emitted from said radial hole causes the rotation of said horizontal arm about a vertical axis.

As a result of this characteristic feature it is possible to obtain a rotational movement of the horizontal arm which may be used to knead a foodstuff contained in the receptacle and/or to ensure uniform distribution of the steam and therefore the heat inside the food being cooked, all of which without having to use a motor and therefore in an extremely cost-effective manner.

Further objects and advantages of the device according to the invention will become clear from the following description of some embodiments thereof, provided by way of a non-limiting example and illustrated in the accompanying drawings in which:

Figure 1 is an axial, longitudinal, cross-sectional view of a device for steam-cooking food, according to a first embodiment of the present invention;

Figure 2 is a partial, axial, longitudinal, cross-sectional view of the device according to Figure 1, rotated through 90° with respect to Figure 1, with the end of the horizontal arm of the tubular stirring element cross-sectioned along its radial hole;

Figure 3 is an axial, longitudinal, cross-sectional view of a device for steam-cooking food, according to a second embodiment of the present invention; and

Figure 4 is a partial, axial, longitudinal, cross-sectional view of the device
according to Figure 3, rotated through 90° with respect to Figure 3, with the end of the horizontal arm of the tubular stirring element cross-sectioned along its radial hole.

With reference to the drawings, and with particular reference to Figures 1 and 2 thereof, 1 denotes a receptacle containing the food 2 to be cooked. The receptacle 1 is closed by a lid 3 having, formed in its peripheral edge, a seat 103 for receiving an annular seal 4 so as to ensure a good hydraulic seal between lid and edge of the receptacle 1.

The lid 3 is provided with a hole in the centre, said hole being provided peripherally with a tubular flange or extension 5. The lid 3 also has a breather hole 6.

A tubular bush 7 is engaged inside the hole 5 and is provided at its top end with a flanged edge 107 projecting radially outwards and at its bottom end with an end wall 207 having a hole 307 in the centre.

A tubular element 8 is engaged inside the bush 7 and is provided on its inner shell, in the vicinity of its top end, with an annular protrusion 9. An annular seat 10 is provided at the bottom end of this protrusion 9. The bottom end of the tubular element 8, finally, has an annular seal 11.

A second tubular element 12 with a smaller diameter is coaxially inserted inside the tubular element 8 and is provided at one end with a head 112 which rests in a freely rotating manner on the annular seat 10, while the opposite end of the tubular element 12 extends through the seal 11 and the hole 307 in the bush 7, towards the outside. This end is threaded and receives, screwed thereon, the end of the tubular shank 13 which extends downwards into the vicinity of the bottom of the receptacle 1, said shank 13 having, extending from it, a radial tubular arm 14 which extends into the vicinity of the walls of the receptacle 1. The end of the tubular arm 14 is closed by a stopper 114 and this arm 14 has, in the vicinity of this end, a hole 15, the axis of which is oriented in a direction substantially parallel to the tangent with respect to the walls of the receptacle 1.

Finally, a connection piece 16 connected to a steam supply (not shown) is screwed onto the top end of the tubular element 8.

The operating principle of the device described is easy to understand.
The food 2 to be processed, with a liquid or paste-like consistency, is introduced into the receptacle 1, to a level such that the arm 14, once inserted inside the receptacle 1, is completely immersed inside the said food.

At this point the lid 3 is fitted on top of the receptacle 1 and the steam is supplied through the connection piece 16.

The steam which passes through the tubular duct 12, the tubular shank 13 and the arm 14 flows out from the hole 15.

The outflowing steam has a dual effect: on the one hand, the steam injected within the food 2 with its heat causes cooking of the said food 2 and, on the other hand, as a result of the reactive force, the arm 14 is forced to rotate (in this case towards the right-hand side), therefore continuously mixing the food 2 and ensuring also homogeneous and uniform distribution of the heat inside the said food.

Figures 3 and 4 show a second embodiment of the invention. In those figures, parts similar to those described with reference to Figures 1 and 2 are indicated by the same numbers and therefore a description thereof will not be repeated.

The differences between the embodiment of Figures 1 and 2 and the embodiment of Figures 3 and 4 consists in the fact that the arm 14', instead of being immersed inside the food 2, as was the case for the arm 14, is suspended at a height higher than the level of the food 2 contained inside the receptacle 1 and that a stirring element 17 is suspended from the bottom side of this arm 14', said stirring element in the embodiment shown being in the form of a metal wire which extends downwards until it is substantially immersed inside the food 2.

The operating principle of this device is practically the same as that described in connection with the embodiment of Figure 1.

It can be noted that the hole 15, both in the embodiment of Figures 1 and 2 and in that of Figures 3 and 4, is advantageously inclined downwards with respect to the horizontal. This is performed in order to prevent food from being sprayed upwards.

Obviously, by adjusting the inclination of this hole 15, it is possible to increase or reduce the horizontal component of the steam flow and consequently adjust the
speed of rotation of the arms 14 or 14'.

It can also be noted that, despite the fact that the devices have been shown in the two embodiments as both having a single arm 14, 14', it is obvious that several arms 14, 14' may be associated with the tubular element 12 so as to increase both the propulsive force of the assembly and the intensity with which the product 2 is mixed.

The present invention is therefore not limited to the embodiments shown and described, but comprises all those modifications and variants which fall within the wider scope of the inventive idea, substantially in accordance with that claimed below.
CLAIMS

1) Device for steam-cooking food, characterized in that it comprises a receptacle (1) provided with a lid (3), a part (7, 8) able to support in a freely rotatable manner a vertical tubular element (12) which extends inside the said receptacle (1), said tubular element (12) being provided, at its end projecting inside the said receptacle (1), with a horizontal, subhorizontal or subvertical arm (14; 14') which is closed at its front end and provided near the end with a radial hole (15) having an orientation substantially tangential to the walls of the receptacle (1), the other end of said tubular element (12) communicating with a duct (16) supplying pressurized steam, so that the steam emitted from said radial hole (15) causes the rotation of said horizontal arm (14; 14') about a vertical axis.

2) Device according to Claim 1, characterized in that the lid (3) is provided in the centre with a hole (5) which has, engaged inside it, a tubular bush (7) provided at its top end with a flanged edge (107) projecting radially outwards and provided at its bottom end with an end wall (207) having a hole (307) in the centre.

3) Device according to the preceding Claims 1 and 2, characterized in that said bush (7) has, engaged inside it, a tubular element (8) provided on its inner shell, in the vicinity of its top end, with an annular protrusion (9) having at its bottom end an annular seat (10), an annular seal (11) being arranged at the bottom end of the tubular element (8).

4) Device according to any one of the preceding claims, characterized in that the tubular element (8) has, inserted inside it, a second coaxial tubular element (12), of smaller diameter, provided at one end with a head (112) supported in a freely rotatable manner by the annular seat (10) and in which the opposite end of the tubular element (12) extend outwards through the seal (11) and the hole (307) of the bush (7), towards the outside.

5) Device according to any one of the preceding Claims 1 to 4, characterized in that the bottom end of the tubular element (8) has, connected thereto, the end of a vertical tubular shank (13) from which there extends a radial tubular arm (14) which extends into the vicinity of the walls of the receptacle (1), the
end of the tubular arm (14) being closed, and this arm (14) being provided in the vicinity of this end with a hole (15), the axis of which is oriented in a direction substantially tangential to the walls of the receptacle (1).

6) Device according to the preceding claims, characterized in that the top end of the tubular element (8) is connected to a steam supply.

7) Device according to any one of the preceding claims, in which, by adjusting the inclination of the hole (15) in the arm (14; 14'), it is possible to increase or reduce the horizontal component of the steam flow and consequently adjust the speed of rotation of the arms (14; 14').

8) Device according to any one of Claims 1 to 7, in which the arm (14) is inserted inside the receptacle (1) to a depth such that it is completely immersed within the said food (2).

9) Device according to any one of Claims 1 to 7, in which the arm (14') is inserted inside the receptacle (1) to a depth such that it is situated completely above the level of the food (2), the bottom side of this arm (14') having, suspended therefrom, a stirring element (17) which extends downwards so as to be substantially immersed inside the food (2).

10) Device according to Claim 9, in which said stirring element (17) consists of a metal wire element.

11) Device according to any one of the preceding claims, in which said rotating arms (14; 14') supported by the tubular element (12) are fastened to said element (12) by means of quick-engagement means, or the like, so that they may be easily interchanged with each other.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A47J27/04 A47J31/44

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)

A47J

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

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

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication</th>
<th>Relevant to claim No</th>
</tr>
</thead>
<tbody>
<tr>
<td>P, A</td>
<td>WO 2006/072485 A (BSH BOSCH SIEMENS HAUGGERAETE [DE]; HEBERLE HILDEGARD [DE]; MATHES ANT) 13 July 2006 (2006-07-13) page 4, line 13 - page 5, line 18; figures 1-3</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>DE 201 07 565 U1 (MAPA GMBH GUMMI PLASTIKWERKE [DE]) 23 August 2001 (2001-08-23) page 7, paragraph 2 - page 9, paragraph 4; figure 1</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>EP 0 968 676 A1 (WING SHING PRODUCTS BVI CO LTD [VG]) 5 January 2000 (2000-01-05) paragraphs [0014] - [0016]; figure 1</td>
<td>1</td>
</tr>
</tbody>
</table>

[See patent family annex]

Date of the actual completion of the international search: 13 October 2006

Date of mailing of the international search report: 31/10/2006

Name and mailing address of the ISA:

European Patent Office, P B 5818 Patentlaan 2
NL-2280 HV RIVIERA
Tel (+31-70) 340-3040 Tx 31 651 epo nl.
Fax (+31-70) 340-3016

Authorized officer:

RATTENBERGER, B
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WO 01/97668 A (RANCILO MACCHINE CAFFE [IT]; OLDANI RENZO [IT]; BOTTELI ELIANO [IT]) 27 December 2001 (2001-12-27) abstract; figures 1,2</td>
<td>1</td>
</tr>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>DE 20107565 U1</td>
<td>23-08-2001</td>
<td>FR 2824249 A3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69807670</td>
</tr>
<tr>
<td>WO 0197668 A</td>
<td>27-12-2001</td>
<td>AT 325570 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU 8576401 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CN 1437455 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1294263 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT T020000616 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2004107843 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2005115419 A1</td>
</tr>
</tbody>
</table>