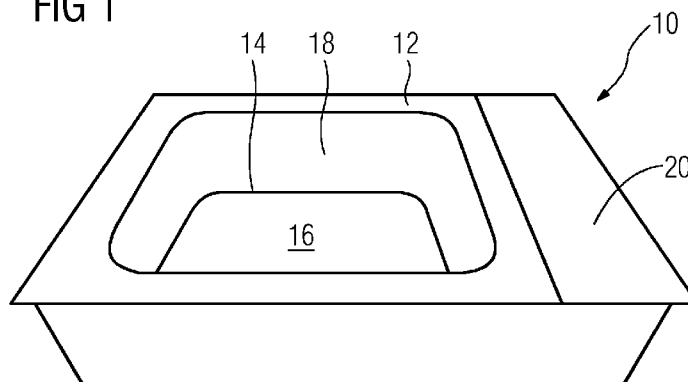




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- Declarations under Rule 4.17:**  
— *of inventorship (Rule 4.17(iv))*
- Published:**  
— *with international search report (Art. 21(3))*

(54) **Title:** COOKING APPLIANCE FOR RECEIVING AT LEAST ONE COOKING VESSEL

FIG 1



(57) **Abstract:** The present invention relates to a cooking appliance (10) comprising at least one cooking surface (12, 14). The cooking surface includes a horizontal top side (12) and at least one basin (14) extending downwards from said top side (12). The basin (14) is provided for receiving at least one cooking vessel (22, 24, 26), so that the cooking vessel (22, 24, 26) is at least partially enclosed by the basin (16). The basin (14) includes a horizontal bottom (16) and a side wall (18) enclosing said bottom (16). The top side (12) of the cooking surface encloses an upper edge of the side wall (18) of the basin (14). At least one heating element is arranged below and/or inside the bottom (16) of the basin (14). At least one temperature sensor is arranged inside and/or below the basin (14), so that the temperature sensor is in a direct or indirect thermal contact with a corresponding cooking vessel (22, 24, 26).



**Description**Cooking appliance for receiving at least one cooking vessel

5 The present invention relates to a cooking appliance provided for receiving at least one cooking vessel.

The basic parameter for controlling the cooking process is the temperature of food stuff and/or cookware. There are several  
10 methods for detecting the temperature. On a cooking hob with a glass ceramic panel a temperature sensor is arranged below the glass ceramic panel, on which a cooking vessel, for example a pot or pan, is placed. The temperature detected by said temperature sensor is used to control the cooking process for the food  
15 stuff in the cooking vessel. Another method is the detection of the temperature at the wall of the cooking vessel. In this case, a temperature sensor, e.g. a pyrometer, is remotely arranged outside the cooking vessel. Moreover, the temperature sensor may be integrated inside the bottom of the cooking vessel, wherein  
20 information about the temperature is wirelessly transferred to the cooking hob. A further kind of temperature sensor is directly in contact with food stuff or water inside the cooking vessel and wirelessly connected to the cooking hob. The knowledge of these temperatures may be used for programs or algorithms sup-  
25 porting the cooking process. Exact information about the temperature of the food stuff would be advantageous.

Further, there is a trend to use professional or semi-professional cooking appliances as well as professional cooking  
30 methods in domestic cuisines. For example, sous vide cooking methods increase in domestic cooking appliances.

At present, gastronorm containers are available for induction cooking. Said gastronorm containers are provided as cooking ves-  
35 sels and also for transporting cooked food stuff. The gastronorm

containers have standardized sizes. For example, the gastronorm containers are used by the catering industry.

It is an object of the present invention to provide a cooking  
5 appliance, which allows an improved temperature controlled cooking process, wherein the energy is efficiently used.

The object is achieved by the cooking appliance according to claim 1.

10

According to the present invention the cooking appliance comprises at least one cooking surface, wherein

- the cooking surface includes a horizontal top side and at least one basin extending downwards from said top side,
- 15 - the basin is provided for receiving at least one cooking vessel, so that the cooking vessel is at least partially enclosed by the basin,
- the basin includes a horizontal bottom and a side wall enclosing said bottom,
- 20 - the top side of the cooking surface encloses an upper edge of the side wall of the basin,
- at least one heating element is arranged below and/or inside the bottom of the basin, and
- at least one temperature sensor is arranged inside and/or  
25 below the basin, so that
- the temperature sensor is in a direct or indirect thermal contact with a corresponding cooking vessel.

The inventive cooking appliance allows that the cooking vessel  
30 is counter-sunk on the cooking surface. The area of contact between the cooking surface and the cooking vessel is relative large. This improves the heat transfer from the cooking surface to the cooking vessel on the one hand and increases the accuracy of the temperature detection by the temperature sensor on the  
35 other hand.

In particular, the at least one heating element is an electric heating element, for example an induction heating element and/or a radiant heating element.

5

Preferably, the basin is provided for receiving at least one standardized cooking vessel.

10

Further, the basin may be provided for receiving at least one combination of standardized cooking vessels, wherein the size of each standardized cooking vessel is an integer multiple of a base unit area.

15

Moreover, the size of one heating element or of some adjacent heat elements may correspond with the base unit area for the standardized cooking vessels, wherein each standardized cooking vessel is separately heated by one or more heating elements. It is possible to heat one big cooking vessel or more cooking vessels by different temperatures and/or powers.

20

In particular, the bottom of the basin is flat. The flat bottom improves the thermal contact between the cooking surface and the cooking vessel.

25

Preferably, the cooking surface is made of glass ceramics. The glass ceramic cooking surface is well appropriate for the induction heating element or radiant heating element.

30

For example, the temperature sensor corresponds with one or more adjacent heating elements.

Further, at least one temperature sensor may correspond with one cooking vessel.

Preferably, the depth of the basin is between 1 mm and 25 mm. A small depth of the basin forms a frame for the cooking vessel. A large depth of the basin allows that the complete cooking vessel or at least a relative big lower portion of said cooking vessel  
5 is received by the basin.

Further, the cooking appliance may comprise at least one scale arranged in the basin, wherein said scale is provided for weighting the cooking vessel. The scale in the basin allows  
10 weight adjusted cooking.

Moreover, the cooking appliance may comprise or correspond with a user interface. Preferably, said user interface is arranged at the same level as the top side of the cooking surface.  
15

In particular, those portions of the basin provided for being in contact with one or more cooking vessels are thermally insulated from the environment. This contributes to efficient use of energy.  
20

Further, a cooking hob may be arranged on the horizontal top side of the cooking surface. Preferably, said cooking hob is arranged besides the at least one basin. In particular, the cooking hob comprises standard cooking areas.  
25

For example, the cooking appliance is installable in a work top, wherein preferably the top side of the cooking surface is arranged or arrangeable at the same level as said work top.

30 Alternatively, the cooking appliance may be a freestanding cooking device.

Novel and inventive features of the present invention are set forth in the appended claims.

35

The present invention will be described in further detail with reference to the drawing, in which

FIG 1 illustrates a schematic perspective view of a cooking appliance according to a preferred embodiment of the present invention,

FIG 2 illustrates a schematic perspective view of the cooking appliance according to the preferred embodiment of the present invention with one cooking vessel,

FIG 3 illustrates a schematic top view of the cooking appliance according to the preferred embodiment of the present invention with said one two cooking vessel,

FIG 4 illustrates a schematic top view of the cooking appliance according to the preferred embodiment of the present invention with two cooking vessels, and

FIG 5 illustrates a schematic top view of the cooking appliance according to the preferred embodiment of the present invention with four cooking vessels.

FIG 1 illustrates a schematic perspective view of a cooking appliance 10 according to a preferred embodiment of the present invention. The cooking appliance 10 is a cooking hob or a part of a cooking hob. Further, the cooking appliance 10 may be a freestanding autonomous appliance or an integrated part of a built-in kitchen.

The cooking appliance 10 comprises a cooking surface and a user interface 20. The cooking surface and the user interface 20 are arranged side-by-side. For example, the material of the cooking surface may be glass ceramic, aluminium, stainless steel or enamel. The cooking surface includes a top side 12 and a basin

14. The top side 12 of the cooking surface extends horizontally. In this example, the top side 12 of the cooking surface is arranged at the same level as the user interface 20. Preferably, the top side 12 of the cooking surface and the user interface 20 are arranged at the same level as a worktop. The basin 14 of the cooking surface extends downwards from the level of the top side 12. In this example, the basin 14 is arranged in the central portion of the cooking surface. The basin 14 includes a bottom 16 and a side wall 18. The top side 12 of the cooking surface encloses an upper edge of the side wall 18 of the basin 14. The bottom 16 of the basin 14 extends horizontally. Preferably, the bottom 16 of the basin 14 is flat. The side wall 18 of the basin 14 encloses the bottom 16 of said basin 14. The side wall 18 of the basin 14 extends vertically or is marginally inclined. In the latter case, the diameter in horizontal direction of the basin 14 decreases top down. The basin 14 is arranged below the top side 12 of the cooking surface.

The basin 14 forms a cooking zone and is provided for receiving a cooking vessel 22. Preferably, the size of the basin 14 is adapted to the size of a defined cooking vessel 22. The cooking appliance 10 comprises at least one heating element. For example, said heating element may be an induction heating element or a radiant heating element. Preferably, the at least one heating element is arranged below and/or inside the bottom 16 of the basin 14. Optionally, one or more additional heating elements may be arranged outside the sidewall 18 of the basin 14.

Further, the cooking appliance 10 comprises at least one temperature sensor. Preferably, said at least one temperature sensor is arranged below and/or besides the cooking vessel 22, when the cooking vessel 22 is received by the basin 14. The heating element and the temperature sensor are not shown in the drawings. In particular, the temperature sensor is a part of the heating element. Preferably, the temperature sensor is arranged in a

central portion of the heating element. According to a first example, the temperature sensor is arranged below the cooking surface, e.g. glass ceramic panel, and in the centre of the heating element. In this example, there is no contact between the temperature sensor and the cooking vessel. According to a second example, the temperature sensor is arranged in the centre of the heating element, wherein a hole is formed in the cooking surface, e.g. glass ceramic panel, in which the temperature sensor is placed. In this example, there is a direct contact between the temperature sensor and the bottom of the cooking vessel. In the second example the distance between the temperature sensor and the bottom of the cooking vessel is smaller than as in the first example.

The basin 14 has a depth between 1 mm and about 20 mm. With a small depth the basin 14 forms a kind of frame for the cooking vessel 22. With a large depth of the basin 14, the complete cooking vessel 22 or at least a relative big lower portion of said cooking vessel 22 is received by the basin 14.

FIG 2 illustrates a schematic perspective view of the cooking appliance 10 according to the preferred embodiment of the present invention with the cooking vessel 22. In FIG 2 the cooking vessel 22 is received by the basin 14. The bigger lower portion of the cooking vessel 22 is sunk-in the basin 14.

In this example, the cooking vessel 22 is a gastronorm container having a standardized size. The gastronorm containers are provided as cooking vessels. Further, the gastronorm containers are provided for transporting cooked food stuff.

The size of the basin 14 is marginally bigger than the size of the counter-sunk portion of the cooking vessel 22. Thus, there is a perfect fit between the cooking vessel 22 and the basin 14. Optionally, an additional frame or holder may be provided in or-

der to fix the position of the cooking vessel 22 in relation to the basin 14. Furthermore, the geometric structure of the at least one heating element may be adapted to the base area of the cooking vessel 22.

5

In this example, the base areas of the basin 14 and the cooking vessel 22 are rectangular with rounded corners. According to other examples, the base areas of the basin 14 and/or the cooking vessel 22 may be circular, oval, square or rectangular. In a similar way, the at least one heating element may be circular, oval, square or rectangular.

Further, the cooking appliance 10 may comprise at least one illumination device. Said illumination device may provide a direct and/or indirect illumination of the top side 12 and/or the basin 14. The illumination device may be an integrated part of the cooking appliance 10, the basin 14 and/or the cooking zone.

Additionally, the cooking appliance 10 may comprise a scale integrated in the basin 14, so that the food stuff in the cooking vessel 22 in the basin 14 can be weighted. For example, the scale allows weight adjusted cooking.

Moreover, the cooking appliance 10 may comprise a basket lifting system. Said basket lifting system is provided for putting a basket with food stuff into the cooking vessel 22 and/or for removing the basket with food stuff from the cooking vessel 22. For example, the basket lifting system is controlled by a pre-set timer. In a similar way, the cooking appliance 10 may comprise a lifting system provided for lifting the food stuff and/or the cooking vessel 22 into and/or out of the basin 14.

For example, there is a direct contact between the basin 14 and the cooking vessel 22. Preferably, those portions of the basin 14 enclosing the cooking vessel 22 with direct contact are ther-

mally insulated. In general, the basin 14 may be thermally insulated in order to obtain an efficient energy usage.

Furthermore, the cooking appliance 10 may comprise a cover sheet  
5 for closing the basin 14. For example, said cover sheet and the top side 12 of the cooking surface form a continuous area at the same level in the closed state of the basin 14.

Preferably, the cooking appliance 10 is provided for performing  
10 all kinds of cooking processes, which are possible on a cooking hob. For example, the cooking appliance 10 allows a low temperature cooking at about 85 °C for preparing milk, pudding, sausages, rice and they like. Further, the cooking appliance 10 may allow medium temperature cooking at between 90 °C and 95 °C for  
15 preparing dumplings, fish, poaching, bouillon, eggs and they like. Moreover, the cooking appliance 10 may allow high temperature cooking at about 98 °C for boiling vegetables, potatoes, eggs and they like. Additionally, the cooking appliance 10 may allow strong temperature cooking at about 98 °C for fierce boiling  
20 ing pasta and they like.

Furthermore, the cooking appliance 10 may allow steam cooking, keeping warm functions, reheating of food stuff, sous vide cooking, deep frying, frying, fondues functions, smoking functions  
25 and popcorn programs. Preferably, sous vide cooking may be performed in the complete temperature range between 40 °C and 80 °C. Warming functions and cooling functions with a warming plate or cooling plate, respectively, may also be performed by the cooking appliance 10. A time control may also be provided by the  
30 cooking appliance 10. For example, the user may request boiling water for a certain time point.

The gastronorm containers are available on the market in different versions in view of the size, material and coating. The gastronorm containers have standardized sizes. In this example, the  
35

basin 14 of the cooking appliance 10 is provided for one gas-  
tronorm container 2/3 GN, two gastronorm containers 1/3 GN or  
four gastronorm containers 1/6 GN. The gastronorm container 2/3  
GN has a length of 354 mm and a width of 325 mm. The gastronorm  
5 container 1/3 GN has a length of 176 mm and a width of 325 mm.  
The gastronorm container 1/6 GN has a length of 176 mm and a  
width of 162 mm. In FIG 2 the cooking vessel 22 is the gas-  
tronorm container 2/3 GN. The gastronorm containers allow flexi-  
bility in cooking.

10

FIG 3 illustrates a schematic top view of the cooking appliance  
10 according to the preferred embodiment of the present inven-  
tion with one cooking vessel 22. The cooking vessel 22 is the  
gastronorm container 2/3 GN and has the length of 354 mm and the  
15 width of 325 mm. In this example, the basin 14 is exactly  
adapted for receiving the one gastronorm container 2/3 GN.

15

FIG 4 illustrates a schematic top view of the cooking appliance  
10 according to the preferred embodiment of the present inven-  
20 tion with two cooking vessels 24. The both cooking vessels 24  
are the gastronorm containers 1/3 GN having the length of 176 mm  
and the width of 325 mm.

20

Several heating elements may be arranged side-by-side below  
25 and/or inside the bottom 16 of the basin 14. In particular, the  
sizes of said heating elements are adapted to the size of the  
cooking vessels 24, wherein one or more heating elements corre-  
spond with one cooking vessel 24. Preferably, the heating ele-  
ments are activated separately, so that also only one of the two  
30 cooking vessels 24 is heated.

25

30

FIG 5 illustrates a schematic top view of the cooking appliance  
10 according to the preferred embodiment of the present inven-  
tion with four cooking vessels 26. The four cooking vessels 26

are the gastronorm containers 1/6 GN having the length of 176 mm and the width of 162 mm.

Also in this embodiment, several heating elements may be arranged side-by-side below and/or inside the bottom 16 of the basin 14. The sizes of said heating elements may be adapted to the size of the cooking vessels 26, wherein one or more heating elements correspond with one cooking vessel 26. The heating elements may be activated separately, so that also only one, two or three of the four cooking vessels 26 are heated.

According to a preferred embodiment of the present invention, the sizes and positions of the heating elements below and/or inside the bottom 16 of the basin 14 are adapted in such a way that all possible standardized cooking vessels 22, 24 and 26 may be heated separately. For example, the sizes and positions of the heating elements are adapted to the smallest possible standardized cooking vessel 26, wherein the sizes of the bigger standardized cooking vessels 22 and 24 are an integer multiple of the size of said smallest possible standardized cooking vessel 26. More general, the size of the heating elements corresponds with a base unit area, wherein the size of each possible standardized cooking vessel 22, 24 and 26 is an integer multiple of the size of said base unit area.

25

As shown in FIG 3 to FIG 5, the basin 14 may receive different combinations of cooking vessels 22, 24 and 26. Further, the cooking vessels 22, 24 and 26 may be covered by different lids, wherein said lids are adapted to different cooking functions, e.g. standard cooking or steam cooking with a gasket.

30

Additionally, the cooking appliance 10 may comprise further accessories for special cooking processes, e.g. sous vide cooking, pasta cooking, steam cooking, pressure cooking or deep frying. Said accessories may be special baskets, racks and/or contain-

35

ers. For example, a pasta basket, a deep frying basket or a  
sous-vide rack may be provided. Further accessories may be an  
induction driven hotplate for warming up and/or a cooling plate  
for cooling down cooked food stuff before putting inside the  
5 fridge.

At last, the cooking appliance 10 may comprise one or more cover  
elements or lids in order to obtain a special design.

10 In particular, the cooking appliance is provided for assisted  
cooking. The cooking appliance allows all cooking methods, e.g.  
boiling, frying, deep frying, steaming and poaching. The acces-  
sories of the cooking appliance facilitate the assisted cooking  
as well as the standard cooking.

15

Although illustrative embodiments of the present invention have  
been described herein with reference to the accompanying draw-  
ings, it is to be understood that the present invention is not  
limited to those precise embodiments, and that various other  
20 changes and modifications may be affected therein by one skilled  
in the art without departing from the scope or spirit of the in-  
vention. All such changes and modifications are intended to be  
included within the scope of the invention as defined by the ap-  
pended claims.

25

**List of reference numerals**

- 10 cooking appliance
- 12 top side of the cooking surface
- 14 basin
- 16 bottom
- 18 side wall
- 20 user interface
- 22 cooking vessel, gastronorm container 2/3 GN
- 24 cooking vessel, gastronorm container 1/3 GN
- 26 cooking vessel, gastronorm container 1/6 GN

**Claims**

1. A cooking appliance (10) comprising at least one cooking surface (12, 14), wherein
- the cooking surface includes a horizontal top side (12) and at least one basin (14) extending downwards from said top side (12),
  - the basin (14) is provided for receiving at least one cooking vessel (22, 24, 26), so that the cooking vessel (22, 24, 26) is at least partially enclosed by the basin (16),
  - the basin (14) includes a horizontal bottom (16) and a side wall (18) enclosing said bottom (16),
  - the top side (12) of the cooking surface encloses an upper edge of the side wall (18) of the basin (14),
  - at least one heating element is arranged below and/or inside the bottom (16) of the basin (14), and
  - at least one temperature sensor is arranged inside and/or below the basin (14), so that
  - the temperature sensor is in a direct or indirect thermal contact with a corresponding cooking vessel (22, 24, 26).
2. The cooking appliance (10) according to claim 1, characterized in that
- the at least one heating element is an electric heating element, for example an induction heating element and/or a radiant heating element.
3. The cooking appliance (10) according to claim 1 or 2, characterized in that
- the basin (14) is provided for receiving at least one standardized cooking vessel (22, 24, 26).

4. The cooking appliance (10) according to any one of the preceding claims,  
characterized in that  
the basin (14) is provided for receiving at least one combination of standardized cooking vessels (22, 24, 26), wherein  
5 the size of each standardized cooking vessel (22, 24, 26) is an integer multiple of a base unit area.
5. The cooking appliance (10) according to claim 4,  
10 characterized in that  
the size of one heating element or of some adjacent heat elements corresponds with the base unit area for the standardized cooking vessels (22, 24, 26), wherein each standardized cooking vessel (22, 24, 26) is separately heated by one or  
15 more heating elements.
6. The cooking appliance (10) according to any one of the preceding claims,  
characterized in that  
20 the bottom (16) of the basin (14) is flat.
7. The cooking appliance (10) according to any one of the preceding claims,  
characterized in that  
25 the cooking surface (12, 14) is made of glass ceramics.
8. The cooking appliance (10) according to any one of the preceding claims,  
characterized in that  
30 the temperature sensor corresponds with one or more adjacent heating elements and/or at least one temperature sensor corresponds with one cooking vessel (22, 24, 26).
9. The cooking appliance (10) according to any one of the preceding claims,  
35

characterized in that  
the depth of the basin (14) is between 1 mm and 25 mm.

10. The cooking appliance (10) according to any one of the pre-  
ceding claims,  
characterized in that  
the cooking appliance (10) comprises at least one scale ar-  
ranged in the basin (14), wherein said scale is provided for  
weighting the cooking vessel (22, 24, 26).

11. The cooking appliance (10) according to any one of the pre-  
ceding claims,  
characterized in that  
the cooking appliance (10) comprises or corresponds with a  
user interface (20), wherein preferably said user interface  
(20) is arranged at the same level as the top side (12) of  
the cooking surface.

12. The cooking appliance (10) according to any one of the pre-  
ceding claims,  
characterized in that  
those portions of the basin (14) provided for being in con-  
tact with one or more cooking vessels (22, 24, 26) are ther-  
mally insulated from the environment.

13. The cooking appliance (10) according to any one of the pre-  
ceding claims,  
characterized in that  
a cooking hob is arranged on the horizontal top side (12) of  
the cooking surface, wherein preferably said cooking hob is  
arranged besides the at least one basin (14).

14. The cooking appliance (10) according to any one of the pre-  
ceding claims,  
characterized in that

the cooking appliance (10) is installable in a work top,  
wherein preferably the top side (12) of the cooking surface  
is arranged or arrangeable at the same level as said work  
top.

5

15. The cooking appliance (10) according to any one of the  
claims 1 to 13,  
characterized in that  
the cooking appliance (10) is a freestanding cooking device.

10

FIG 1

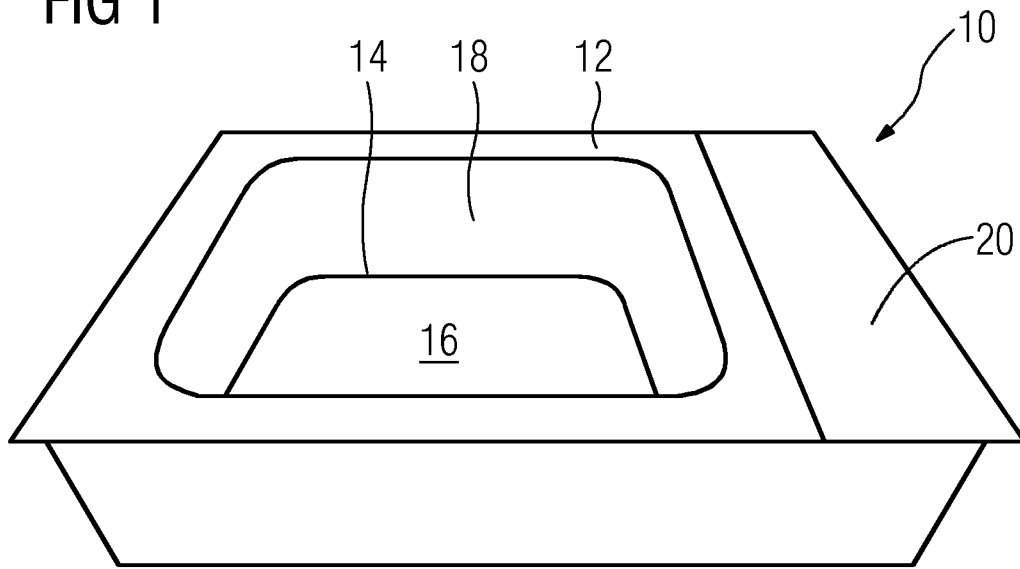


FIG 2

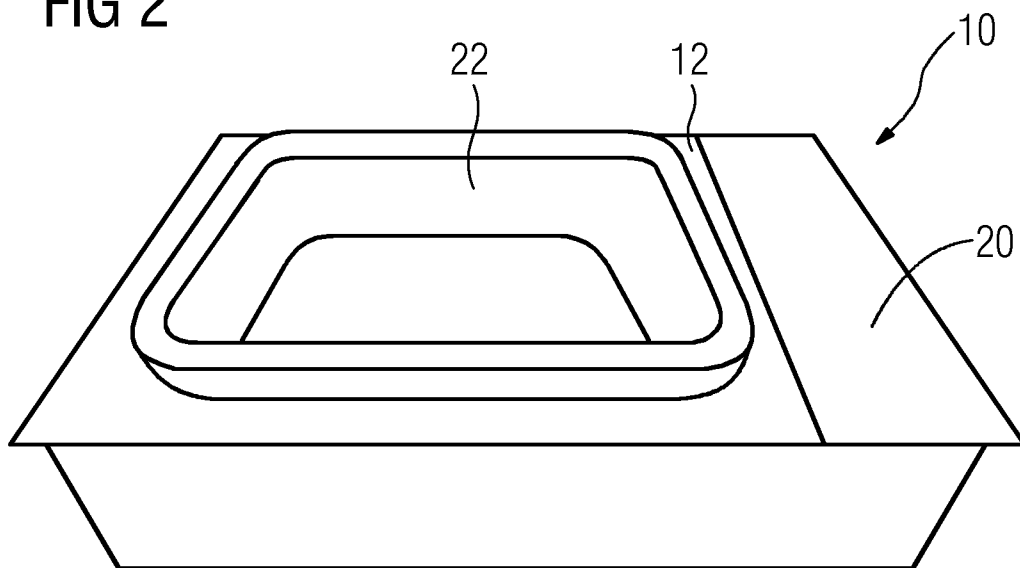


FIG 3

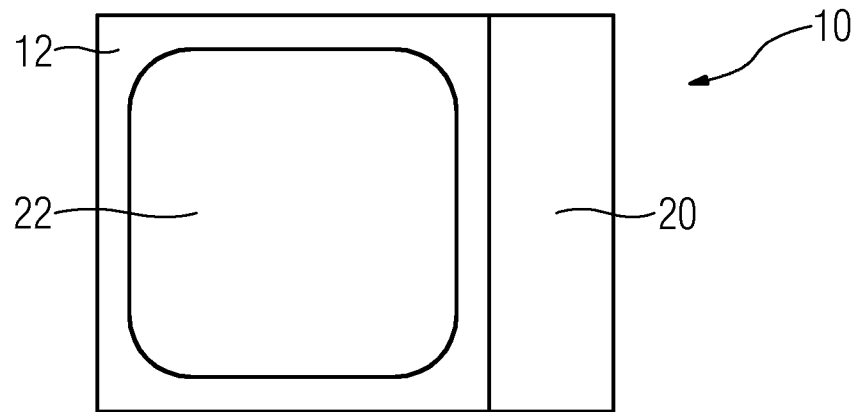


FIG 4

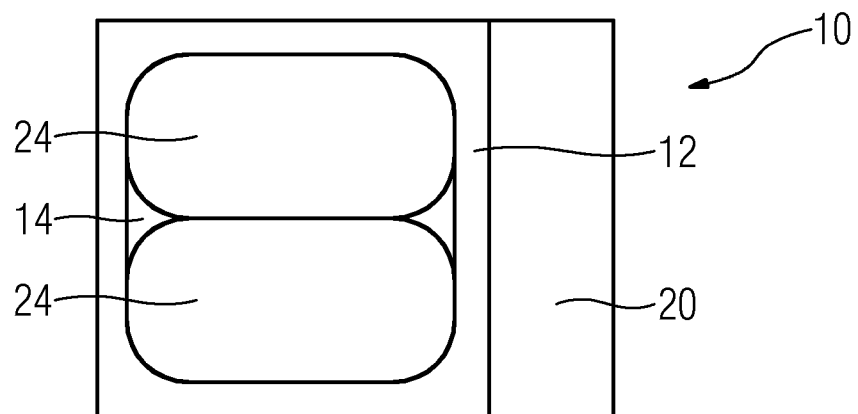
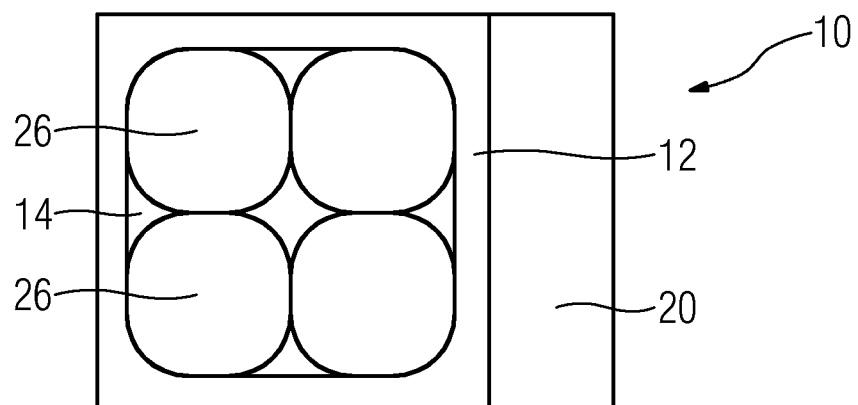


FIG 5



## INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2016/059113

A. CLASSIFICATION OF SUBJECT MATTER  
INV. F24C15/08 A47J39/00 F24C15/18  
ADD.

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)  
F24B F24C 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 practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------|-----------------------|
| X         | US 4 569 277 A (STIGLICH NICHOLAS M [US])<br>11 February 1986 (1986-02-11)         | 1-9,<br>11-15         |
| Y         | the whole document                                                                 | 10                    |
| X         | US 5 097 759 A (VILGRAIN STANISLAS [US] ET<br>AL) 24 March 1992 (1992-03-24)       | 1                     |
| A         | the whole document                                                                 | 2-15                  |
| X         | DE 44 06 108 A1 (BRODTHAGE DIETER [DE])<br>31 August 1995 (1995-08-31)             | 1                     |
| X         | the whole document                                                                 |                       |
| A         | US 3 525 299 A (GOUWENS HARRY A ET AL)<br>25 August 1970 (1970-08-25)              | 4                     |
| A         | the whole document                                                                 |                       |
|           | -----<br>-/-                                                                       |                       |



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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)

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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International application No  
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