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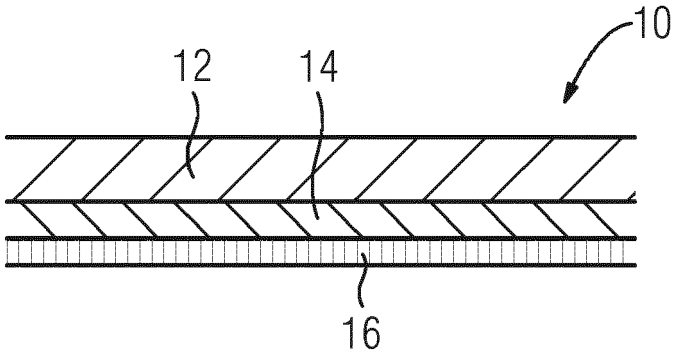
(54) PANEL FOR A COOKING HOB

(57) The present invention relates to a panel (10) for a cooking hob. The panel (10) includes at least one glass layer (12, 18). Further, the panel (10) includes at least one reactive layer (14; 20). The reactive layer (14; 20) is made of at least one reactive material, which is responsive to electric, electromagnetic and/or thermic parameters.

FIG 1



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Description

[0001] The present invention relates to a panel for a cooking hob. Further, the present invention relates to a cooking hob.

[0002] A panel for a cooking hob usually includes a static pattern for indicating the positions and sizes of the cooking zones. However, the static pattern must be adapted to the arrangement of the heating elements. A flexible arrangement of the heating elements is not possible with the same static pattern.

[0003] Further, the cooking hob may include a display for indicating numerically or graphically the temperatures on the single cooking zones. However, the display provides only an indirect indication and requires a relative complex circuit.

[0004] It is an object of the present invention to provide a panel for a cooking hob, which allows a direct indication of the cooking zones and/or temperatures by low complexity.

[0005] The object is achieved by the panel for a cooking hob according to claim 1.

[0006] According to the present invention a panel for a cooking hob is provided, wherein:

- the panel includes at least one glass layer, and
- the panel includes at least one reactive layer, wherein
- the reactive layer is made of at least one reactive material, which is responsive to electric, electromagnetic and/or thermic parameters.

[0007] The core of the present invention is the reactive layer depending on electric, electromagnetic and/or thermic parameters. The reactive layer is able to indicate states characterised by said electric, electromagnetic and/or thermic parameters.

[0008] Preferably, the panel includes at least one coated layer and/or at least one printed layer.

[0009] For example, the reactive layer is made of at least one reactive material, which is responsive to an electric field generated by an electric heating element, so that the presence of the electric field is indicated by the reactive layer.

[0010] According to another example, the reactive layer is made of at least one reactive material, which is responsive to an electromagnetic field generated by an induction coil, so that the presence of the electromagnetic field is indicated by the reactive layer.

[0011] Preferably, the reactive layer is arranged beneath the glass layer.

[0012] Optionally, the reactive layer is arranged between the glass layer and a further glass layer.

[0013] Furthermore, the coated layer may be attached at the lower side of the panel.

[0014] According to a further example, the reactive layer is made of at least one thermochromic or thermoluminescent material, which is responsive to a current temperature, so that the colour of said thermochromic or thermoluminescent material depends on the temperature level.

[0015] For example, the colour of the thermochromic or thermoluminescent material becomes green at a low temperature level.

[0016] Further, the colour of the thermochromic or thermoluminescent material may become yellow at a medium temperature level.

[0017] Moreover, the colour of the thermochromic or thermoluminescent material may become red at a high temperature level.

[0018] For example, the reactive layer made of thermochromic or thermoluminescent material is arranged beneath the glass layer.

[0019] Further, the printed layer may be arranged beneath the reactive layer made of thermochromic or thermoluminescent material.

[0020] Alternatively, the reactive layer made of thermochromic or thermoluminescent material is arranged above the printed layer, wherein said printed layer in turn is attached above the glass layer.

[0021] Moreover, the present invention relates to a cooking hob with at least one panel, wherein the cooking hob comprises at least one panel according to any one the preceding claims.

[0022] Novel and inventive features of the present invention are set forth in the appended claims.

[0023] The present invention will be described in further detail with reference to the drawings, in which

FIG 1 illustrates a schematic sectional side view of a panel for a cooking hob according to a first embodiment of the present invention,

FIG 2 illustrates a schematic sectional side view of the panel for the cooking hob according to a second embodiment of the present invention,

FIG 3 illustrates a schematic sectional side view of the panel for the cooking hob according to a third embodiment of the present invention, and

FIG 4 illustrates a schematic sectional side view of the panel for the cooking hob according to a fourth embodiment of the present invention.

[0024] FIG 1 illustrates a schematic sectional side view of a panel 10 for a cooking hob according to a first embodiment of the present invention.

[0025] The panel 10 of the first embodiment includes a glass layer 12, an electric or electromagnetic reactive layer 14 and a coated layer 16. The electric or electromagnetic reactive layer 14 is arranged beneath the glass layer 12. In turn, the coated layer 16 is arranged beneath the electric or electromagnetic reactive layer 14.

[0026] The electric reactive layer 14 is responsive to an electric field generated by an electric heating element

arranged beneath the panel 10. By this way, the cooking zone is indicated by the electric reactive layer 14, when the corresponding electric heating element is activated.

[0027] The electromagnetic reactive layer 14 is responsive to an electromagnetic field. For example, said electromagnetic field is generated by an induction coil arranged beneath the panel 10. The magnetic field lines extend perpendicular to the plane of the electromagnetic reactive layer 14.

[0028] FIG 2 illustrates a schematic sectional side view of the panel 10 for the cooking hob according to a second embodiment of the present invention.

[0029] The panel 10 of the second embodiment includes the glass layer 12, the electric or electromagnetic reactive layer 14, a further glass layer 18 and the coated layer 16. In this embodiment, the electric or electromagnetic reactive layer 14 is arranged between the two glass layers 12 and 18.

[0030] The electric or electromagnetic reactive layer 14 indicates the cooking zone, when the corresponding heating element is activated.

[0031] FIG 3 illustrates a schematic sectional side view of the panel 10 for the cooking hob according to a third embodiment of the present invention.

[0032] The panel 10 of the third embodiment includes the glass layer 12, a thermochromic or thermoluminescent layer 20 and a printed layer 22. The thermochromic or thermoluminescent layer 20 is arranged beneath the glass layer 12. In turn, the printed layer 22 is arranged beneath the thermochromic or thermoluminescent layer 20.

[0033] The thermochromic or thermoluminescent layer 20 changes its colour in dependence of the temperature level. The thermochromic layer 20 changes between different colours or from a coloured to transparent in dependence of the temperature level.

[0034] The colour of the thermochromic or thermoluminescent layer 20 indicates the current temperature of the corresponding cooking zone. For example, a green thermochromic or thermoluminescent layer 20 indicates a low temperature level, while a yellow thermochromic or thermoluminescent layer 20 indicates a medium temperature level. Preferably, a red thermochromic or thermoluminescent layer 20 indicates a high temperature level.

[0035] FIG 4 illustrates a schematic sectional side view of the panel 10 for the cooking hob according to a fourth embodiment of the present invention.

[0036] The panel 10 of the fourth embodiment includes the glass layer 12, the thermochromic layer 20 and the printed layer 22. The printed layer 22 is arranged above the glass layer 12. In turn, the thermochromic or thermoluminescent layer 20 is arranged above the printed layer 22.

[0037] The present invention allows a direct indication of the activated cooking zones and the current temperatures by low complexity.

[0038] Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0039]

10	panel
12	glass layer
14	electric or electromagnetic reactive layer
16	coated layer
18	further glass layer
20	thermochromic or thermoluminescent layer
22	printed layer

Claims

1. A panel (10) for a cooking hob, wherein:

- the panel (10) includes at least one glass layer (12, 18), and
- the panel (10) includes at least one reactive layer (14; 20), wherein
- the reactive layer (14; 20) is made of at least one reactive material, which is responsive to electric, electromagnetic and/or thermic parameters.

2. The panel according to claim 1,
characterised in that
the panel (10) includes at least one coated layer (16) and/or at least one printed layer (22).

3. The panel according to claim 1 or 2,
characterised in that
the reactive layer (14) is made of at least one reactive material, which is responsive to an electric field generated by an electric heating element, so that the presence of the electric field is indicated by the reactive layer (14).

4. The panel according to claim 1 or 2,
characterised in that
the reactive layer (14) is made of at least one reactive material, which is responsive to an electromagnetic field generated by an induction coil, so that the presence of the electromagnetic field is indicated by the reactive layer (14) .

5. The panel according to claim 3 or 4,

characterised in that
the reactive layer (14) is arranged beneath the glass layer (12) .

6. The panel according to any one of the claims 3 to 5, **characterised in that**
the reactive layer (14) is arranged between the glass layer (12) and a further glass layer (18).

7. The panel according to any one of the claims 3 to 6, **characterised in that**
the coated layer (16) is attached at the lower side of the panel (10).

8. The panel according to claim 1 or 2, **characterised in that**
the reactive layer (20) is made of at least one thermochromic or thermoluminescent material, which is responsive to a current temperature, so that the colour of said thermochromic or thermoluminescent material depends on the temperature level.

9. The panel according to claim 8, **characterised in that**
the colour of the thermochromic or thermoluminescent material becomes green at a low temperature level.

10. The panel according to claim 8 or 9, **characterised in that**
the colour of the thermochromic or thermoluminescent material becomes yellow at a medium temperature level.

11. The panel according to any one of the claims 8 to 10, **characterised in that**
the colour of the thermochromic or thermoluminescent material becomes red at a high temperature level.

12. The panel according to any one of the claims 8 to 11, **characterised in that**
the reactive layer (20) made of thermochromic or thermoluminescent material is arranged beneath the glass layer (12).

13. The panel according to claim 12, **characterised in that**
the printed layer (22) is arranged beneath the reactive layer (20) made of thermochromic or thermoluminescent material.

14. The panel according to any one of the claims 8 to 11, **characterised in that**
the reactive layer (20) made of thermochromic or thermoluminescent material is arranged above the printed layer (22), wherein said printed layer (22) in turn is attached above the glass layer (12).

15. A cooking hob with at least one panel (10), **characterised in that**
the cooking hob comprises at least one panel (10) according to any one the preceding claims.

FIG 1

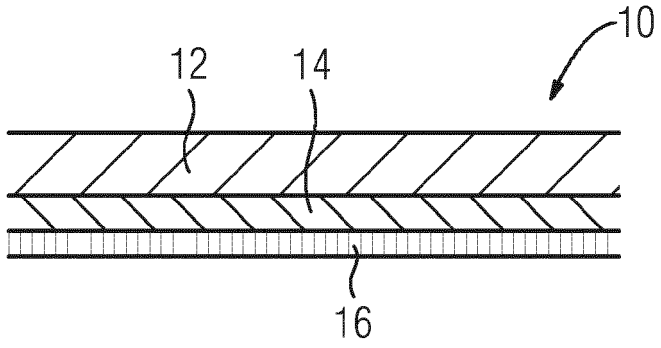


FIG 2

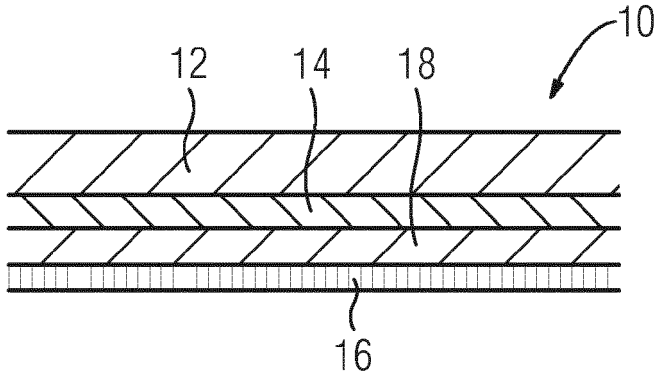


FIG 3

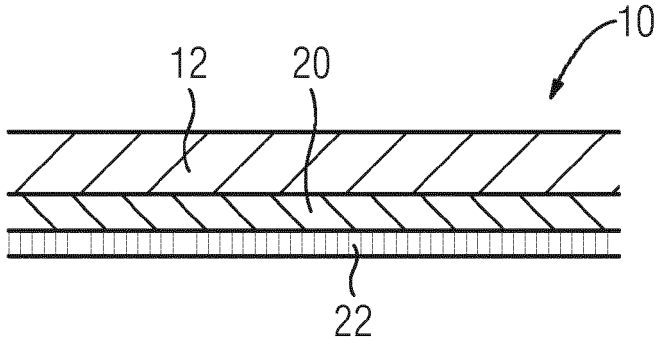
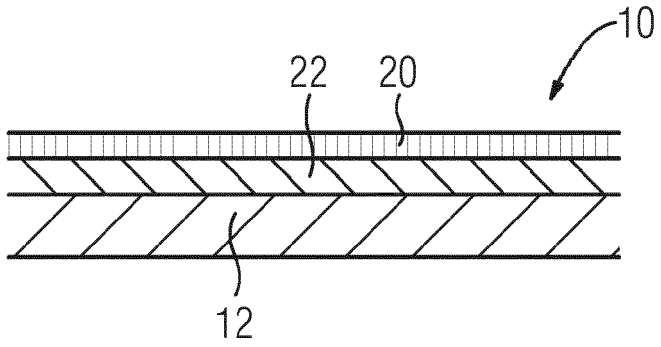


FIG 4



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EUROPEAN SEARCH REPORT

Application Number
EP 18 16 8383

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 150 636 A (BOGDANSKI FRANZ [DE] ET AL) 21 November 2000 (2000-11-21) * abstract * * column 5, lines 5-16 *	1-3,5-7, 15	INV. H05B3/68 H05B6/12 F24C15/10
A	EP 2 653 785 A1 (WHIRLPOOL CO [US]) 23 October 2013 (2013-10-23) * abstract * * columns 48,52 *	1,15	
A	WO 2008/012013 A1 (ELECTROLUX HOME PROD CORP [BE]; RUMMEL STEFAN [DE]) 31 January 2008 (2008-01-31) * abstract; claims 1,5,6,9,10,11,12,20 *	1,15	
X	EP 2 642 821 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 25 September 2013 (2013-09-25) * abstract; claim 1; figures 1-3 *	1,2,4-7, 15	
X	WO 2011/086504 A2 (BSH BOSCH SIEMENS HAUSGERAETE [DE]; BUNUEL MAGDALENA MIGUEL ANGEL [ES]) 21 July 2011 (2011-07-21) * abstract; claim 1; figures 1-2 *	1,2,8-15	TECHNICAL FIELDS SEARCHED (IPC) H05B F24C
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X	US 2003/006227 A1 (LERNER WILLIAM S [US]) 9 January 2003 (2003-01-09) * abstract; claim 1; figures 1-26 *	1,2,8	
X	WO 2010/069791 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]; BUNUEL MAGDALENA MIGUEL ANGEL [ES]) 24 June 2010 (2010-06-24) * abstract; claim 1; figures 1-2c *	1,2,4	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 February 2019	Garcia, Jesus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 18 16 8383

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 18 16 8383

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 3(completely); 1, 2, 5-7, 15(partially)

panel including a reactive layer made of a reactive material responsive to an electric field generated by an electric heating element so that the presence of the electric field is indicated by the reactive layer and cooking hob with said panel.

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2. claims: 4(completely); 1, 2, 5-7, 15(partially)

panel including a reactive layer made of a reactive material responsive to an electromagnetic field generated by an induction coil element so that the presence of the electromagnetic field is indicated by the reactive layer and cooking hob with said panel.

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3. claims: 8-14(completely); 1, 2, 15(partially)

panel including a reactive layer made of a thermochromic or thermoluminescent material responsive to a current temperature so that the colour of said material depends on the temperature level and cooking hob with said panel.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 16 8383

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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01-02-2019

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82