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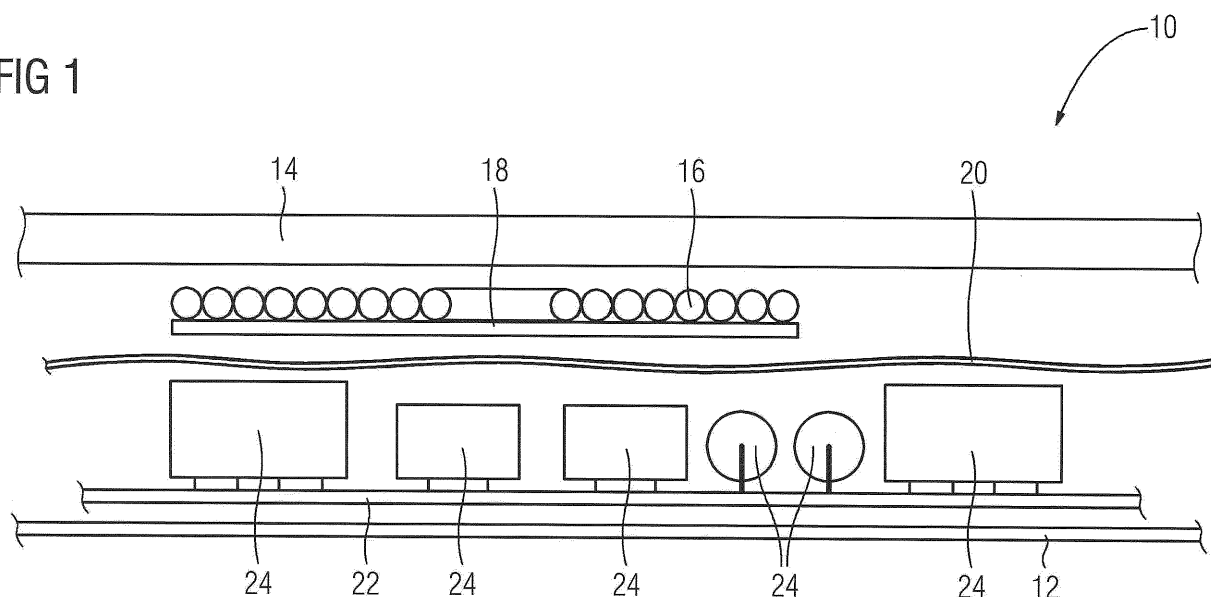
(54) **COOKING HOB WITH ONE OR MORE HEATING POWER TRANSFERRING ELEMENTS**

(57) The present invention relates to a household cooking hob (10) comprising one or more heating power transferring elements (16), wherein:

- the cooking hob (10) comprises at least one electric and/or electronic element (24),
- at least a part of the at least one electric and/or electronic element (24) is arranged beneath the one or more heating power transferring elements (16),

- the cooking hob (10) comprises at least one creepage distance reducing element (20), and
- at least a part of the creepage distance reducing element (20) is arranged between the one or more heating power transferring elements (16) on the one hand and the at least one electric and/or electronic element (24) on the other hand.

FIG 1



Description

[0001] The present invention relates to a household cooking hob with one or more heating power transferring elements.

[0002] In the field of household cooking hobs there is a strong demand on installation of such hobs in workbenches having a small height. Accordingly, there is a strong demand to provide cooking hobs with a small height. Thereby, however, the distance between the mechanical, electric and/or electronic elements becomes very small. Said small distance requires a sufficient electric and thermal insulation.

[0003] It is an object of the present invention to provide a cooking hob with one or more heating power transferring elements, wherein components arranged very close to each other are sufficiently insulated.

[0004] These and other problems are solved by the cooking hob according to claim 1.

[0005] Preferred embodiments may be taken from the dependent claims, and, beyond that, from the following description, in particular comprising various embodiments as covered and described in the annexed claims.

[0006] According to the present invention, a household cooking hob comprising one or more heating power transferring elements, wherein the cooking hob comprises at least one electric and/or electronic element, at least a part of the at least one electric and/or electronic element is arranged beneath the one or more heating power transferring elements, the cooking hob comprises at least one creepage distance reducing element, and at least a part of the creepage distance reducing element is arranged between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand.

[0007] Such household cooking hob according of the present invention may be advantageously provided with a reduced height compared to household cooking hobs of the prior art. Preferably, the household cooking hob of the present invention is a build-in appliance. Particularly, in such embodiment the reduced height is of particular advantage, as the height of a worktop plate may also advantageously reduced. Moreover, the space below the cooking hob of the present invention is advantageously increased, which allows placement of drawers or the like in an easier way. Thereby, the advantage particularly may result from the creepage distance reducing element arranged between heating power transferring elements and the at least one electric and/or electronic element. In particular, the creepage distance-reducing element may advantageously act as an electric insulator and/or thermal insulator. Preferably, the creepage distance reducing element has a small thickness and allows for realizing a small height, particularly a small distance between the heating power transferring elements and the at least one electric and/or electronic element. Thus, the cooking hob advantageously may be realised with a small construction height.

[0008] It is known in the art that such household cooking hobs usually are provided for conducting at least one cooking process comprising heating and/or cooling step, respectively. Such cooking process preferably at least comprises a heating step, e.g. frying, boiling, simmering or pouching of a foodstuff or a cooking liquid, respectively. For supporting the foodstuff or cookware item, it is particularly known to provide a cooking support, for example in the form of a cooking surface. Such cooking surface usually provides a support for the cookware items, for example, provided in the form of a plate element, particularly a glass or glass ceramic plate.

[0009] Preferably, the cooking hob comprises, preferably consists of, a cooking support and a lower casing. Thereby it is preferred that an open top side of the lower casing is covered by at least a part of the cooking support. The cooking support may be provided particularly as at least one panel, wherein preferably the panel is a glass ceramic panel. Preferably, at least one or more heating power transferring elements are arranged beneath the panel.

[0010] The lower casing may be manufactured from different material comprising plastics or metal, e.g. aluminium.

[0011] In particular, such casing may include a bottom wall and at least one sidewall. It is preferred that said casing is made of metal, e.g. aluminium or steel, and/or plastics, wherein preferably the casing made of metal is grounded.

[0012] Advantageously said lower casing may comprise at least one heating power energy unit, particularly arranged in a respective heating power energy unit housing, the heating power transferring elements, heating power transferring element carrier or heating power transferring element support. In other words, the lower casing and the cooking support may form a closed unit comprising all essential parts of the cooking hob. Thereby the lower casing may comprise fastening means for fastening and/or arranging the cooking hob on top of or in a cutout of a work plate.

[0013] Thereby, preferably, a power-transferring element may be arranged below a cooking support. Preferably, the one or more heating power transferring elements are arranged in an upper portion of the lower casing of the cooking hob. A power transferring element may be arranged and supported by one or more heating power transferring element carrier or heating power transferring element support, preferably the power transferring element attached and/or arranged on said carrier or support. A housing comprising an energy power unit may be arranged below one or more heating power transferring element carrier or heating power transferring element supports. Thereby, preferably a heating power transferring element carrier or heating power transferring element support with the supported heating power-transferring element may advantageously be arranged on top of and/or attached to such housing of an energy power unit.

[0014] For conducting the cooking process, particular-

ly a heating step, a cooking appliance, particularly the lower casing, comprises at least one heating power-transferring element. Said heating power-transferring element is provided for transferring heating power to the foodstuff or cooking liquid, preferably contained in a cookware item.

[0015] Preferably, the at least one heating power transferring element is an electric heating element, in particular an induction heating element, particularly induction coil, and/or radiant heating element. The heating power provided by a heating power-transferring element may be preferably provided electrically. Preferably, the heating power may be provided by a heat-generating magnetic field, more particularly an induction field. Accordingly, the cooking hob of the present invention preferably is an induction hob.

[0016] Preferably, a heating power-transferring element in the form of an induction coil comprises a planar conductive winding wire, particularly a copper wire. Preferably, an induction coil comprises at least one magnetic field supporting element, e.g. a ferrite element. Preferably, said at least one magnetic field supporting element, particularly at least one ferrite element, is arranged below the plane of the conductive winding wire. Said at least one magnetic field supporting element, particularly ferrite element, is advantageous in establishing and/or supporting the high frequent alternating magnetic field of the induction coil. Said magnetic field supporting element, particularly if arranged below the conductive winding wire, may be glued to or supported by ferrite support elements, e.g. snap fit connectors or the like.

[0017] Preferably, an induction coil comprises a shielding element, e.g. a mica sheet. The shielding element preferably is adapted to the form of the planar conductive winding wire or the form of at least two planar conductive winding wires of at least two adjacently arranged coils. The shielding element preferably is provided above the at least one magnetic field supporting element, particularly at least one ferrite element. The shielding element preferably in its main function is a support for the planar conductive wire windings of the coil. However, additionally the shielding element, particularly mica sheet, may also shield temperature radiated from the above, e.g. resulting from a heated up pot bottom.

[0018] In the cooking hob of the present invention the at least one heating power transferring element is preferably arranged and/or mounted on a heating power transferring element carrier or heating power transferring element support, particularly comprised in the lower casing. It is particularly preferred that a carrier made of aluminum sheet metal supports the heating power-transferring element. Particularly, the cooking hob of the present invention may comprise power transferring element carrier or heating power transferring element support to support one heating power transferring element, however, it is also considered herein that one power transferring element carrier or heating power transferring element support is provided to support more than one heating power

transferring element.

[0019] In a preferred embodiment of the present invention, two heating power-transferring elements are arranged on and supported by one common heating power transferring element carrier. Particularly at least two induction coils are arranged on and supported by one common induction coil carrier plate.

[0020] The heating power transferring element carrier or heating power transferring element support may be advantageously supported by or on a housing of the heating energy power unit.

[0021] Particularly, at least one of, preferably all of, the heating power transferring elements of an cooking hob of the invention, more particularly an induction coil of an induction hob, may be arranged below a cooking support, particularly a cooking surface in form of a plate element, and particularly within the lower casing, in order to provide the heat for a heating step to a heating zone of the cooking support and to the bottom side of a cookware item and foodstuff, respectively, when placed on said heating zone.

[0022] A cooking support of a cooking hob of the invention, particularly of an induction hob of the invention, preferably comprises at least one heating zone. Such heating zone as referred to herein, preferably refers to a portion of the cooking support, particularly cooking surface, which is associated with one heating power transferring element, e.g. a radiant heating element or an induction coil, which is arranged at, preferably below, the cooking support, e.g. the glass ceramic plate. Particularly, in an embodiment according to which the cooking hob of the present invention is an induction hob, it is preferred that such heating zone refers to a portion of the cooking support, which is associated with at least one induction coil. Thereby, the heating power transferring elements associated with a heating zone are preferably configured such that the same heating power of the associated heating power transferring elements is transferred to the heating zone. Preferably, the heating zone thus refers to a portion of the cooking support to which the same heating power of the associated at least one heating power transferring element is transferred.

[0023] In addition, the cooking hob of the present invention, may particularly be configured such that in one operation mode one or more than one heating zones form one cooking zone and/or are combined to one cooking zone, respectively. A cooking zone may be particularly be provided as at least a portion of the cooking surface. Particularly, such cooking zone is associated with at least one heating zone. Additionally, or alternatively, a cooking zone may be associated with more than one heating zone. Particularly, a cooking zone may be associated with an even number, particularly two, four, six, eight or ten, more particularly two, heating zones. Alternatively, a cooking zone may be associated with an uneven number, particularly three, five, seven or nine, more particularly three, heating zones.

[0024] Preferably, the cooking hob of the present in-

vention is configured such that a cooking zone comprises one or more than one heating zones, which can be driven with the same or different power, frequency or heating level.

[0025] In the present invention, it is preferred that in at least one operation mode of the cooking hob according to the present invention is configured such that a cooking zone comprises at least two, preferably two, heating zones, driven by the same power, frequency or heating level. Particularly, such cooking zone comprises or is associated with at least two, preferably two, heating power-transferring elements.

[0026] Additionally, or alternatively, the cooking hob of the present invention may be configured such that the number of heating zones associated with one cooking zone may vary and/or may be adjustable dependent on the needs of the cook and/or the size, form or kind of cookware placed on the cooking surface. Particularly, a cooking hob according to the present invention, preferably an electric hob, such as an induction hob, may comprise at least one heating power energy unit. A heating power energy unit as used herein, preferably provides energy to at least one of, preferable a number of, the heating power transferring elements such that the heating power transferring element is capable of transferring heating power for heating up the foodstuff or cooking liquid. A heating power energy unit of an induction hob, for example, may provide energy in the form of a high frequency alternating current to a heating power-transferring element in the form of an induction coil, which transfers heating power in the form of a magnetic field to a suitable cookware item. For such purpose, a heating power energy unit may comprise at least one associated power circuit mounted and/or arranged on at least one printed circuit board. Preferably, a heating power energy unit is supported and arranged in a housing, preferably a plastic housing, preferably arrangable in and adapted to the lower casing. This allows easy manufacturing and modularization.

[0027] Particularly, the housing may comprise supporting elements for supporting the heating power transferring element carrier or heating power transferring element support. Particularly, such supporting elements may comprise elastic means, e.g. springs or silicon elements, for elastically supporting the heating power transferring element carrier or heating power transferring element support, and particularly advantageous in pressing a heating power-transferring element onto the bottom surface of the cooking support plate, which particularly is a glass ceramic plate.

[0028] Particularly, the heating power energy unit, and particularly the associated power circuit, may be configured to be connected to at least one, preferably two phases of a mains supply. A cooking hob according to the present invention thereby comprises at least one, preferably two or three heating power energy units, connected to one or two, preferably one phases of the mains supply each.

[0029] Preferably, a heating power energy unit may comprise at least - one associated power circuit, particularly in the form of an at least one heating power generator, for generating heating power and supplying heating power-transferring elements with heating power, particularly for providing heating power to the at least one heating zone. Thereby the power circuit particularly may be provided in the form of a half-bridge configuration or a quasiresonant configuration.

[0030] It will be immediately understood that the heating power energy unit may thus comprise one heating power generator for providing heating power to more than one heating zone, each associated with at least one heating power transferring element.

[0031] Furthermore, the heating power energy unit may comprise one heating power generator comprising a single or pair of high frequency switching elements.

[0032] In particular, the high frequency switching element is provided in the form of a semiconductor-switching element, particularly an IGBT element.

[0033] In case the heating power energy unit may comprise one heating power generator comprising a single high frequency switching element, the single switching element preferably forms part of associated power circuit, provided in the form of a or a part of a Quasi Resonant circuit.

[0034] In case that the heating power energy unit may comprise one heating generator comprises a pair of high frequency switching elements, said pair of high frequency switching elements preferably forms part of an associated power circuit, provided in the form of a or a part of a half-bridge circuit.

[0035] A person skilled in the art will immediately understand that the heat, generated by and/or radiated from particularly the heating power transferring elements, the heating power energy unit and/or the cookware item, particularly the bottom thereof, may have also disadvantageous effects, particularly regarding safety and proper functioning. Particularly, the heating power energy unit, more particularly power circuits comprising switching elements, may generate a significant amount of heat being disadvantage for the safety and proper functioning of the cooking hob. For this reason, the cooking hob comprises at least one cooling means. Particularly, said cooling means is adapted for cooling down the electric and/or electronic elements. Particularly, the heating power energy unit may comprise such cooling means. Such cooling means may comprise at least one of a fan, a cooling channel, a cooling body, preferably from a metal, particularly aluminium, cooling air-guiding means, cooling air deflection means and the like. Particularly, the cooking hob of the present invention may comprise such cooling means for cooling at least one heating power generator or a part thereof, particularly to at least one single or pair of high frequency switching elements. More particularly, such cooling means may comprise a cooling body, preferably arranged in the air path of a cooling fan, and thermally connected to at least one heating power generator

or a part thereof, particularly to at least one single or pair of high frequency switching elements. Thereby it is preferred that the cooling means comprises at least one fan for generating an air stream through the cooling channel. Preferably, the cooling channel and/or cooling body extends horizontally through the cooking hob. For example, the cooling channel and/or cooling body extends over a substantial part of the horizontal width of the cooking hob.

[0036] The cooking hob according to the present invention preferably further comprises a control unit. Such control unit is preferably operatively connected with the heating power energy unit to control at least one operational parameter of the cooking hob, particularly an operational parameter of the heating power energy unit. Furthermore, the control unit comprises a user interface at least for receiving a command input of a user. This advantageously allows the user to control at least one operational parameter of the cooking hob, particularly an operational parameter of the heating power energy unit. Moreover, the control unit, and particularly a user interface if present, may be operatively connected to other appliances or interfaces, e.g. a suction hood, a voice control device, a server, a remote interface, a cloud-computing source or the like.

[0037] Accordingly, the household cooking hob according to the present invention comprises at least one electric and/or electronic element. Particularly, said at least one electric and/or electronic element comprises a heating power energy unit and/or control unit or parts thereof.

[0038] Particularly, the at least one electric and/or electronic element of the household cooking hob of the present invention may be part of an at least one heating energy power unit, preferably mounted and/or arranged on a power board and/or a power generating circuit mounted on a printed circuit board (PCB).

[0039] Such at least one electric and/or electronic element may be, for example, selected from the group comprising a heating power generator, filter coils, EMC filters, rectifier, switching elements, like IGBTs, relays, or the like.

[0040] In connection therewith a person skilled in the art will immediately acknowledge that a certain security creepage distance between electric and/or electronic elements on the one hand and the heating power transferring element carrier or heating power transferring element support with mounted heating power transferring elements on the other hand, particularly a certain security creepage distance between heating power energy units particularly comprising at least one associated power circuit mounted and/or arranged on at least one printed circuit board, on the one hand and an aluminum coil carrier with copper winding induction coil on the other hand is crucial for the security and proper functioning of the cooking hob. Thereby said certain security creepage distance at least partially determines the minimum height of cooking hobs, particularly induction hobs, in the prior art. The present inventors have surprisingly found that said creep-

age distance between electric and/or electronic elements on the one hand and the heating power transferring element carrier or heating power transferring element support with mounted heating power transferring elements on the other hand, particularly a creepage distance between heating power energy units particularly comprising at least one associated power circuit mounted and/or arranged on at least one printed circuit board, on the one hand and an aluminum coil carrier with copper winding induction coil on the other hand can be advantageously reduced by the inventive arrangement of at least a part of a creepage distance reducing element between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand. This also advantageously allows for providing a cooking hob, particularly an induction hob, having a reduced creepage distance and reduced overall height.

[0041] Thereby, the creepage distance reducing element is provided and arranged such that short cuts and arcing between current-carrying parts, particularly the at least one electric and/or electronic elements, more particularly the or parts of the heating power energy unit, on the one hand and the heating power transferring element carrier or heating power transferring element support, particularly aluminum coil carrier, on the other hand are advantageously avoided. In other words, the provided creepage distance-reducing element advantageously compensates for the reduced creepage distance.

[0042] The present inventors have surprisingly found that the height of a household cooking hob can be advantageously reduced, if the cooking hob comprises at least one creepage distance reducing element, wherein at least a part of said creepage distance reducing element is arranged between one or more heating power transferring elements of the cooking hob on the one hand and at least one electric and/or electronic element, particularly at least one electric and/or electronic element of the power energy unit, on the other hand.

[0043] It is particularly preferred to select the material of said creepage distance reducing material from materials capable of compensating the reduced airway and/or creepage distance. Furthermore it is preferred that the at least one creepage distance reducing element is made of at least one electric insulating material. Particularly, said creepage distance reducing element has a resistance of about at least 10 Ω , preferably 50 Ω , more preferably 75 Ω , and most preferably 100 Ω . Resistance as used herein preferably refers to the resistance between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand. The higher the electrical insulating resistance, the more the distance between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand can be advantageously decreased.

[0044] Preferably, the material of said creepage dis-

tance reducing element additionally or alternatively is an EMC and/or heat insulating material.

[0045] The present inventors have also surprisingly found that the creepage distance-reducing element according to the present invention may advantageously improve EMV shielding. Preferably, the creepage distance-reducing element is thus manufactured from a material having non- or low inductive properties. Such material advantageously reduces the probability of self-induction and own magnetic disturbances and field, respectively.

[0046] The present inventors have furthermore found that the creepage distance reducing element according to the present invention may advantageously improve heat shielding, particularly between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand. Preferably, the creepage distance-reducing element is thus manufactured from a material having heat-insulating properties.

[0047] In particular, the at least one creepage distance reducing element is made of at least one heat insulating material, wherein preferably said creepage distance reducing element has a thermal conductivity of at least 0.01 W/(m*K), preferably at least 0.25 W/(m*K), more preferably at least 0.3 W/(m*K). The term "thermal conductivity" as used herein preferably refers to the thermal conductivity between the one or more heating power transferring elements on the one hand and the at least one electric and/or electronic element on the other hand.

[0048] In a further preferred embodiment the at least one creepage distance reducing element has a dielectric strength of more than 10 kV/mm, preferably more than 18 kV/mm.

[0049] In a further preferred embodiment the at least one creepage distance reducing element has a heat resistance of about at least 100°C, preferably at least 200°C, more preferably at least 300°C, most preferably at least 400°C.

[0050] Particularly, the material of said creepage distance reducing element may advantageously selected from mineral, preferably crystalline material, metal or plastic, wherein a mineral, particularly a crystalline mineral, is preferred. In a particularly preferred embodiment, the at least one creepage distance reducing element is comprising and/or consisting of mica.

[0051] The present inventors have furthermore found that providing the creepage distance-reducing element in a planar shape is advantageous. Particularly, the height of the cooking hob can be advantageously reduced, however, in addition a planar shape may have further advantageous properties regarding cooling and/or cooling air path improvement. Particularly the circulation of cooling air may be advantageously improved and may particularly prevent cooling air escaping from the area above the at least one electric and/or electronic element towards the heating power transferring elements.

[0052] Preferably the at least one creepage distance

reducing element has a planar shape. Particularly, the at least one creepage distance reducing element is provided as a layer, particularly a mica layer. Preferably, the creepage distance-reducing element having a planar shape and/or provided as a layer extends over a horizontal plane.

[0053] Preferably the thickness of said planar shaped creepage distance reducing element and/or said creepage distance reducing element provided as a layer is at least 0.29 mm, more preferably at least 0.25mm, still more preferably at least 0.20mm, still more preferably at least 0.10mm, still more preferably at least 0.05mm, most preferably at least 0.01 mm.

[0054] The higher the thickness of the creepage distance-reducing element, the better will be the advantageous shielding and insulating properties.

[0055] Additionally or alternatively, the thickness of said planar shaped creepage distance reducing element and/or said creepage distance reducing element provided as a layer preferably is at most 0.5 mm, more preferably at most 4.0 mm, still more preferably at most 3.0 mm, still more preferably at most 2.0 mm, more preferably at most 1.0 mm, most preferably at most 0.5 mm. The lower the thickness, the more the height of the hob can be advantageously reduced and the less material for the creepage distance-reducing element has advantageously to be used.

[0056] Preferably, the thickness of said planar shaped creepage distance reducing element and/or said creepage distance reducing element provided as a layer is between at least 0.29 mm and at most 5.0 mm, between at least 0.29mm and at most 4.0 mm, between at least 0.29mm and at most 3.0 mm, between at least 0.29mm and at most 2.0 mm, between at least 0.29mm and at most 1.0 mm, between at least 0.29mm and at most 0.5 mm, more preferably between at least 0.25mm and at most 5.0 mm, between at least 0.25mm and at most 4.0 mm, between at least 0.25mm and at most 3.0 mm, between at least 0.25mm and at most 2.0 mm, between at least 0.25mm and at most 1.0 mm, between at least 0.25 mm and at most 0.5 mm, still more preferably between at least 0.20mm and at most 5.0 mm, between at least 0.20mm and at most 4.0 mm, between at least 0.20mm and at most 3.0 mm, between at least 0.20mm and at most 2.0 mm, between at least 0.20mm and at most 1.0 mm, between at least 0.2 mm and at most 0.5 mm, still more preferably between at least 0.10mm and at most 5.0 mm, between at least 0.10mm and at most 4.0 mm, between at least 0.10mm and at most 3.0 mm, between at least 0.10mm and at most 2.0 mm, between at least 0.10mm and at most 1.0 mm, between at least 0.1 mm and at most 0.5 mm, still more preferably between at least 0.05mm and at most 5.0 mm, between at least 0.05mm and at most 4.0 mm, between at least 0.05mm and at most 3.0 mm, between at least 0.05mm and at most 2.0 mm, between at least 0.05mm and at most 1.0 mm, between at least 0.05 mm and at most 0.5 mm, and between at least 0.01 mm and at most 5.0 mm, between

at least 0.01 mm at most 4.0 mm, between at least 0.01 mm and at most 3.0 mm, between at least 0.01 mm and at most 2.0 mm, between at least 0.01 and at most 1.0 mm, between at least 0.01 mm and at most 0.5 mm,.

[0057] The present inventors have found that it is of particular advantage regarding improved EMV insulation, if the creepage distance-reducing element is arranged above electric and/or electronic elements having relatively high EMV emission. Such electric and/or electronic elements having relatively high EMV emission are preferably selected from the group comprising filter coils, chokes, copper-wrapped parts, capacitors and power electronics. It is thus preferred that the creepage distance reducing element is arranged such that it substantially covers the lower casing, and particularly that it substantially covers at least one heating power energy unit. The creepage distance-reducing element may, however, be provided as a single piece part, or alternatively as a multi-piece part.

[0058] It is thereby particularly preferred, if the cooking hob of the present invention comprises at least one creepage distance reducing element per heating zone, particularly more creepage distance reducing elements than heating zones. Preferably, the cooking hob comprises a creepage distance reducing elements advantageously arranged below one heating zone. It is also particularly preferred, if the cooking hob of the present invention comprises at least one creepage distance reducing element per heating power transferring element.

[0059] Moreover, it is further preferred that at least one creepage distance reducing element is arranged such that a cooling means and/or the heating power energy unit may comprise one heating power generator comprising a single or pair of high frequency switching elements is substantially covered by said at least one creepage distance reducing element.

[0060] Preferably, the one or more heating power transferring elements are supported by one or more heating power transferring element carrier or heating power transferring element, wherein preferably at least a part of the creepage distance reducing element is arranged between said one or more heating power transferring element carrier or heating power transferring element on the at least one electric and/or electronic element on the other hand.

[0061] In particular, at least one creepage distance reducing element is arranged between the heating power-transferring element and/or its heating power transferring element carrier or heating power-transferring element on the one hand and the cooling channel on the other hand.

[0062] According to a special embodiment of the present invention, the at least one creepage distance reducing element is a multilayer film including one or more creepage distance reducing element, preferably at least one mica layer, and at least one conductive layer, preferably at least one aluminium layer. Particularly by this way, the conductive layer with a small thickness may be provided.

[0063] For example, the at least one conductive layer is grounded.

[0064] Further, at least one conductive layer may be connected to the printed circuit board.

5 **[0065]** Moreover, at least one conductive layer is connected to a predefined electric potential. Preferably, the conductive layer is connected to the ground, either directly or via an electric or electronic circuit. The conductive layer connected to the ground can absorb electromagnetic disturbances from induction coils.

10 **[0066]** For example, the conductive layer provides an electric creepage distance-reducing element between the heating power transferring element on the one hand and the electric and/or electronic elements on the other hand.

15 **[0067]** Novel and inventive features of the present invention are set forth in the appended claims.

[0068] The present invention will be described in further detail with reference to the drawing, in which

FIG 1 illustrates a schematic partial sectional side view of a cooking hob according to a preferred embodiment of the present invention.

25 **[0069]** FIG 1 illustrates a schematic partial sectional side view of a cooking hob 10 according to a preferred embodiment of the present invention.

30 **[0070]** The cooking hob 10 comprises a casing 12 and a panel 14. The casing 12 includes a bottom wall, four sidewalls and an open top side. Preferably, the casing 12 is made of metal, e.g. steel. Alternatively, the casing 12 may be made of plastics. The panel 14 covers the top side of the casing 12. For example, the panel 14 is a glass ceramic panel. At least one heating element 16 is arranged beneath the panel 14. A carrier 18 supports the heating element 16. Said carrier 18 is arranged beneath the heating element 16. Preferably, the heating element 16 is an electric heating element. At least one printed circuit board 22 is arranged above the bottom wall of the casing 12. A plurality of electric and/or electronic elements 24 is attached on the printed circuit board 22. The printed circuit board 22 and the electric and/or electronic elements 24 form the circuit of the cooking hob 10.

35 **[0071]** In this example, the cooking hob 10 is an induction-cooking hob, wherein the heating element 16 is an induction coil and the carrier 18 is a coil carrier.

40 **[0072]** Preferably, a mica layer 20 is arranged between the carrier 18 and the electric and/or electronic elements 24. The mica layer 20 extends substantially in a horizontal plane. The mica layer 20 may either cover the whole cross-section of the casing 12 or only a part of the casing 12. Further, two or more mica layers 20 may be arranged between the carrier 18 and the electric and/or electronic elements 24, wherein each of said mica layers 20 covers a part of said electric and/or electronic elements 24. The mica layer 20 provides an electric and/or thermal insulation between the carrier 18 and the electric and/or electronic elements 24. Preferably, the mica layer 20 is glued

to the bottom side of the carrier 18.

[0073] The mica layer 20 is a dielectric layer. Mica is a group of sheet silicate minerals having a substantially perfect basal cleavage. Said substantially perfect basal cleavage is obtained by hexagonal or pseudo-hexagonal sheet-like arrangement of the atoms. The mica layer 20 provides the electric and/or thermal insulation with a small layer thickness. The thin mica layer 20 allows a small height of the cooking hob 10.

[0074] A typical thickness of the mica layer is between 0.1 mm and 0.5 mm, in particular 0.3 mm. The dielectric strength of the mica layer is bigger than 18 kV/mm. Further, the mica layer has a heat resistance of about 400°C. For example, the thermal conductivity of the mica layer is about 0.3 W/(m·K).

[0075] Further, the mica layer 20 may be arranged between the heating element 16 and/or its carrier 18 on the one hand and a cooling means of the cooking hob 10 on the other hand. Preferably, said cooling means or cooling channel extends horizontally through the cooking hob 10. An air stream driven by at least one fan passes the cooling channel and/or cooling means and cools down the electric and/or electronic elements 24.

[0076] Moreover, the mica layer 20 may be a multilayer film including one or more mica layers and at least one conductive layer. For example, the conductive layer is connected to the grounded casing 12. The conductive layer connected to the ground can absorb electromagnetic disturbances from induction coils. Further, the conductive layer may be connected to another appropriate potential of the circuit of the cooking hob 10.

[0077] For example, the conductive layer provides an electric creepage distance-reducing element between the heating element 16 and the electric and/or electronic elements 24. In particular, high frequency currents pass the induction coil 16, which may disturb the electric and/or electronic elements 24 and electric and/or electronic circuits.

[0078] The inventive cooking hob 10 with the mica layer 20 allows a small distance between the heating element 16 and the electric and/or electronic elements 24, so that the cooking hob 10 may be realised with the small construction height. Further, the mica layer 20 provides the electric and/or thermal insulation between the carrier 18 and the electric and/or electronic elements 24. Moreover, the mica layer 20 with the integrated conductive layer allows the electric creepage distance-reducing element between the heating element 16 and the electric and/or electronic elements 24.

[0079] The embodiments in the figures may relate to preferred embodiments, while all elements and features described in connection with embodiments may be used, as far as appropriate, in combination with any other embodiment and feature as discussed herein, in particular related to any other embodiment discussed further above.

[0080] The features of the present invention disclosed in the specification, the claims, examples and/or the fig-

ures may both separately and in any combination thereof be material for realizing the invention in various forms thereof.

5 List of reference numerals

[0081]

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|----|----------------------------------|
| 10 | cooking hob |
| 12 | casing |
| 14 | panel |
| 16 | heating element |
| 18 | carrier of the heating element |
| 20 | mica layer |
| 22 | printed circuit board |
| 24 | electric and electronic elements |

Claims

1. A household cooking hob (10) comprising one or more heating power-transferring elements (16), wherein:
 - the cooking hob (10) comprises at least one electric and/or electronic element (24),
 - at least a part of the at least one electric and/or electronic element (24) is arranged beneath the one or more heating power transferring elements (16),
 - the cooking hob (10) comprises at least one creepage distance reducing element (20), and
 - at least a part of the creepage distance reducing element (20) is arranged between the one or more heating power transferring elements (16) on the one hand and the at least one electric and/or electronic element (24) on the other hand.
2. The cooking hob according to claim 1, wherein the at least one creepage distance reducing element (20) is made of at least one electric insulating material, preferably having a resistance of about at least 10 Ω, preferably 50 Ω, more preferably 75 Ω, and most preferably 100 Ω.
3. The cooking hob according to any one of the preceding claims, wherein the at least one creepage distance reducing element (20) has a planar shape, having preferably a thickness between 0.01 mm and 0.5 mm.
4. The cooking hob according to any one of the preceding claims,

characterised in that

the at least one creepage distance reducing element (20) has a dielectric strength more than 10 kV/mm, preferably more than 18 kV/mm.

5. The cooking hob according to any one of the preceding claims,
characterised in that
the at least one creepage distance reducing element has a heat resistance of about at least 100°C, preferably at least 200°C, more preferably at least 300°C, most preferably at least 400°C. 5

6. The cooking hob according to any one of the preceding claims, 10
characterised in that
the at least one creepage distance reducing element is a mica layer (20), wherein preferably at least a part of the mica layer (20) extends over a horizontal plane. 15

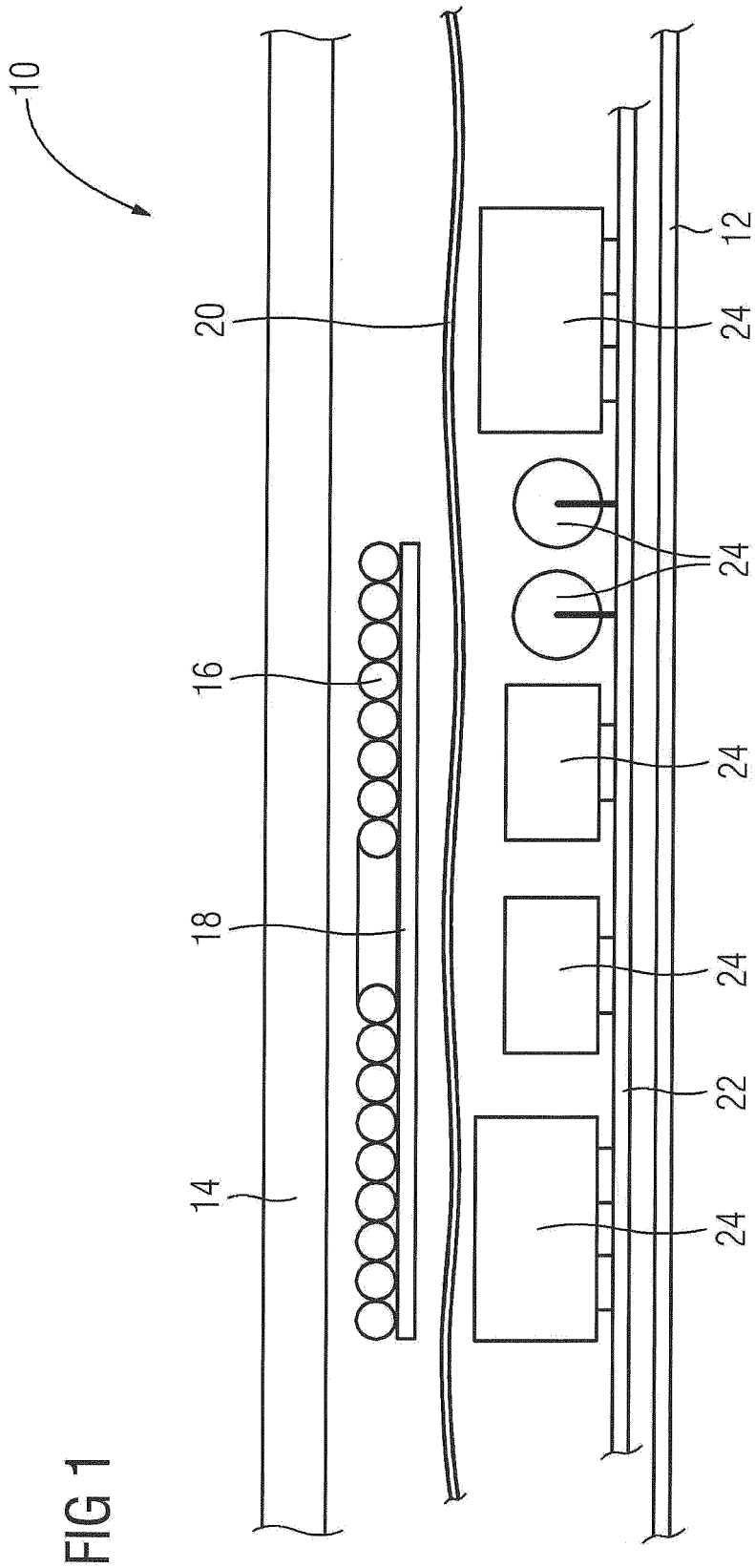
7. The cooking hob according to any one of the preceding claims,
characterised in that
the one or more heating power transferring elements (16) are supported by one or more heating power transferring element carrier or heating power transferring element support (18), wherein preferably at least a part of the creepage distance reducing element (20) is arranged between said one or more heating power transferring element carrier or heating power transferring element support (18) on the at least one electric and/or electronic element (24) on the other hand. 20
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8. The cooking hob according to any one of the preceding claims,
characterised in that
at least one creepage distance reducing element (20) is a multilayer film including one conductive layer, wherein preferably the at least one conductive layer is grounded. 35

9. The cooking hob according to one of the preceding claims, **characterised in that** 40
at least one conductive layer is connected to the printed circuit board (22), wherein preferably at least one conductive layer is connected to a predefined electric potential. 45

10. The cooking hob according to one of the preceding claims, **characterised in that**
the conductive layer provides an electric shielding between the heating power transferring element (16) on the one hand and the electric and/or electronic elements (24) on the other hand. 50

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EUROPEAN SEARCH REPORT

Application Number
EP 17 18 5267

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