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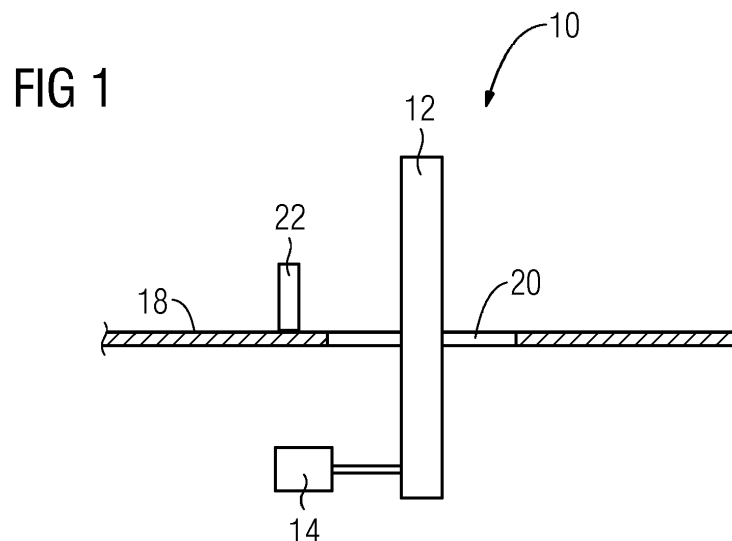
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(54) **CONTROL ELEMENT FOR A GAS COOKING HOB**

(57) The present invention relates to a control element (10) for a gas cooking hob, in particular a rotary control element (10) for a gas cooking hob. The control element (10) comprises a moveable shaft (12) and a permanent magnet (14) rigidly connected to said shaft (12). The control element (10) comprises a stationary printed circuit board (18). The printed circuit board (18) includes a cut-out (20) penetrated by the moveable shaft (12). The control element (10) comprises a magnetic sensor (22)

arranged on the printed circuit board (18) and beside the cut-out (20). The magnetic sensor (22) is responsive to the permanent magnet (14), so that the magnetic sensor (22) generates at least one control signal depending on the position and/or orientation of the shaft (12). The control element (10) comprises a control lighting including at least one light emitting diode (LED). The control lighting is controlled via the magnetic sensor (22).



Description

[0001] The present invention relates to a control element for a gas cooking hob. In particular, the present invention relates to a rotatable control element for a gas cooking hob. Further, the present invention relates to a control device for a gas cooking hob. Moreover, the present invention relates to a gas cooking hob.

[0002] In gas cooking hobs control signals are often indicated by a control lighting including light emitting diodes (LED). The control lighting is directly or indirectly controlled by a control element arranged on the gas cooking hob. Usually, the control element includes a moveable shaft with sliding contacts. However, if the sliding contacts are contaminated by cooking liquids, the function of the control element is impaired.

[0003] It is an object of the present invention to provide a control element for a gas cooking hob, wherein a contamination of the control element does not impair the function of said control element.

[0004] The object is achieved by the control element for a gas cooking hob according to claim 1.

[0005] According to the present invention a control element for a gas cooking hob, in particular a rotary control element for a gas cooking hob is provided, wherein:

- the control element comprises a moveable shaft,
- the control element comprises a permanent magnet rigidly connected to the shaft,
- the control element comprises a stationary printed circuit board,
- the printed circuit board includes a cut-out penetrated by the moveable shaft,
- the control element comprises a magnetic sensor arranged on the printed circuit board and beside the cut-out,
- the magnetic sensor is responsive to the permanent magnet, so that the magnetic sensor generates at least one control signal depending on the position and/or orientation of the shaft,
- the control element comprises a control lighting including at least one light emitting diode (LED), and
- the control lighting is controlled via the magnetic sensor.

[0006] The core of the present invention is the contactless detection of the position and/or orientation of the shaft by the the magnetic sensor, wherein the control lighting is controlled via said magnetic sensor. A contamination of the shaft and the permanent magnet does not impair the function of the control element.

[0007] Preferably, the moveable shaft is rotatable around its longitudinal axis. The moveable shaft is rotatable by the user.

[0008] Alternatively or additionally, the moveable shaft is slidable along its longitudinal axis.

[0009] For example, the magnetic sensor is a hall sensor.

[0010] Further, a gas flow to a corresponding gas burner may be controlled by a torsion angle of the shaft.

[0011] In this case, the gas flow may be controlled by a mechanic valve via the shaft. For example, the gas flow is controlled by the mechanical valve in the same time of the control lighting by the magnetic sensor.

[0012] Further, one direction of rotation of the shaft may correspond with an activation of the corresponding gas burner, while a contrary direction of rotation of the shaft corresponds with a deactivation of the corresponding gas burner.

[0013] Preferably, the control lighting is activated by rotating the shaft in the direction corresponding with the activation of the corresponding gas burner.

[0014] In a similar way, the control lighting is deactivated by rotating the shaft in the direction corresponding with the deactivation of the corresponding gas burner.

[0015] In particular, at least one light emitting diode of the control lighting is deactivated after a predetermined time, when the corresponding gas burner has been deactivated by rotating the shaft.

[0016] For example, the control lighting includes at least one light emitting diode for indicating a temperature icon.

[0017] Moreover, the at least one light emitting diode of the control lighting is arranged beneath a top panel of the gas cooking hob.

[0018] Furthermore, the present invention relates to a control device for a gas cooking hob, wherein the control device comprises at least one control element mentioned above.

[0019] At last, the present invention relates to a gas cooking hob, wherein the gas cooking hob comprises at least one control element and/or at least one control device mentioned above.

[0020] Novel and inventive features of the present invention are set forth in the appended claims.

[0021] 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 control element for a gas cooking hob according to a preferred embodiment of the present invention, and

FIG 2 illustrates a schematic top view of the control element for the gas cooking hob according to the preferred embodiment of the present invention.

[0022] FIG 1 illustrates a schematic sectional side view of a control element 10 for a gas cooking hob according to a preferred embodiment of the present invention.

[0023] The control element 10 comprises a shaft 12, a permanent magnet 14, a printed circuit board 18 and a magnetic sensor 22. Preferably, the magnetic sensor is a hall sensor 22. The shaft 12 is rotatable by the user in order to activate, deactivate and/or adjust a correspond-

ing gas burner. In this example, the shaft 12 is arranged vertically. In general, the shaft 12 may have an arbitrary orientation. The shaft 12 is rotatably attached at the control element 10 of the gas cooking hob. The shaft 12 is rotatable around its longitudinal axis. Alternatively or additionally, the shaft 12 is slidable relative to the control element 10 of the gas cooking hob. For example, the shaft 12 is slidable along its longitudinal axis. The permanent magnet 24 is rigidly attached at the shaft 12. The permanent magnet 24 is spaced from the longitudinal axis of the shaft 12. The printed circuit board 18 includes a cut-out 20 penetrated by the shaft 12. The magnetic sensor 22 is attached upon the printed circuit board 18 and besides said cut-out 20.

[0024] A rotation of the shaft 12 changes the distance between the permanent magnet 14 and the magnetic sensor 22. Moreover, the rotation of the shaft 12 changes the orientation of the permanent magnet 14 relative to the magnetic sensor 22. The signal generated by the magnetic sensor 22 depends on the torsion angle of the shaft 12. The control element 10 allows a contactless detection of the torsion angle of the shaft 12. If the shaft 12 and/or its environment would be contaminated by cooking liquids, then the torsion angle of the shaft 12 is still detectable.

[0025] The control element 10 is provided for activating and deactivating the corresponding gas burner. Further, the control element 10 is provided for adjusting the gas flow to said corresponding gas burner. Moreover, the control element 10 may be provided for activating an electric ignition of the corresponding gas burner. Additionally, the control element 10 is provided for activating and deactivating a control lighting of the gas cooking hob.

[0026] There are no active components below the printed circuit board 18. The permanent magnet 14 is a passive component. The magnetic sensor 22 is an active component, but arranged on the top side of the printed circuit board 18. A contamination of the shaft 12 and the permanent magnet 14 does not impair the function of the control element 10.

[0027] Further, the shaft 12 penetrates a top panel 28 of a control device or of the gas cooking hob, wherein a rotary knob 26 is attached at the upper end of the shaft 12. The rotary knob 26 and the top panel 28 are not shown in FIG 1.

[0028] FIG 2 illustrates a schematic top view of the control element 10 for the gas cooking hob according to the preferred embodiment of the present invention.

[0029] The rotary knob 26 forms the top part of the control element 10 and is attached at the upper end of the shaft 12. The rotary knob 26 is directly arranged above the top panel 28 of the control device or of the gas cooking hob. The shaft 12 penetrates said top panel 28. The control lighting is arranged beside the rotary knob 26. The control lighting belongs to the corresponding gas burner of said rotary knob 26. The control lighting includes a plurality of light emitting diodes (LED) arranged beneath the top panel 28.

[0030] The control lighting includes a temperature icon 30, a position icon 32, a bar symbol 34, an activation icon 36 and an ignition icon 38. The position icon 32 indicates the position of the corresponding gas burner on the gas cooking hob. The bar symbol 34 indicates the deactivation of the corresponding gas burner. The activation icon 36 indicates an activated state of the corresponding gas burner. The ignition icon 38 indicates the activation of the electric ignition.

[0031] When the shaft 12 is rotated into an on-direction, preferably clockwise, then the temperature icon 30, the position icon 32, the bar symbol 34, the activation icon 36 and the ignition icon 38 are activated. When the shaft 12 is rotated into an off-direction, preferably counter-clockwise, then the position icon 32, the activation icon 36 and the ignition icon 38 are deactivated. The bar symbol 34 is deactivated after a predetermined time, e. g. one minute. The temperature icon 30 is deactivated, when no heat occurs upon the corresponding gas burner any longer.

[0032] The gas flow to the corresponding gas burner is adjusted by the torsion angle of the shaft 12 either mechanically via a valve or electronically via the magnetic sensor 22.

[0033] Although an illustrative embodiment of the present invention has been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to that precise embodiment, 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

[0034]

10	control element
12	shaft
14	permanent magnet
18	printed circuit board
20	cut-out
22	magnetic sensor, hall sensor
26	rotary knob
28	top panel
30	temperature icon
32	position icon
34	bar symbol
36	activation icon
38	ignition icon

Claims

1. A control element (10) for a gas cooking hob, in particular a rotary control element (10) for a gas cooking

hob, wherein:

- the control element (10) comprises a moveable shaft (12),
 - the control element (10) comprises a permanent magnet (14) rigidly connected to the shaft (12),
 - the control element (10) comprises a stationary printed circuit board (18),
 - the printed circuit board (18) includes a cut-out (20) penetrated by the moveable shaft (12),
 - the control element (10) comprises a magnetic sensor (22) arranged on the printed circuit board (18) and beside the cut-out (20),
 - the magnetic sensor (22) is responsive to the permanent magnet (14), so that the magnetic sensor (22) generates at least one control signal depending on the position and/or orientation of the shaft (12),
 - the control element (10) comprises a control lighting including at least one light emitting diode (LED), and
 - the control lighting is controlled via the magnetic sensor (22).
2. The control element according to claim 1,
characterised in that
the moveable shaft (12) is rotatable around its longitudinal axis.
 3. The control element according to claim 1 or 2,
characterised in that
the moveable shaft (12) is slidable along its longitudinal axis.
 4. The control element according to any one of the preceding claims,
characterised in that
the magnetic sensor is a hall sensor (22).
 5. The control element according to any one of the preceding claims,
characterised in that
a gas flow to a corresponding gas burner is controlled by a torsion angle of the shaft (12).
 6. The control element according to claim 5,
characterised in that
the gas flow is controlled by a mechanic valve via the shaft (12).
 7. The control element according to claim 6,
characterised in that
the gas flow is controlled by the mechanical valve in the same time of the control lighting by the magnet sensor (22).
 8. The control element according to any one of the preceding claims,
characterised in that
one direction of rotation of the shaft (12) corresponds with an activation of the corresponding gas burner, while a contrary direction of rotation of the shaft (12) corresponds with a deactivation of the corresponding gas burner.
 9. The control element according to claim 8,
characterised in that
the control lighting is activated by rotating the shaft (12) in the direction corresponding with the activation of the corresponding gas burner.
 10. The control element according to claim 8 or 9,
characterised in that
the control lighting is deactivated by rotating the shaft (12) in the direction corresponding with the deactivation of the corresponding gas burner.
 11. The control element according to claim 10,
characterised in that
at least one light emitting diode (34) of the control lighting is deactivated after a predetermined time, when the corresponding gas burner has been deactivated by rotating the shaft (12).
 12. The control element according to any one of the claims 5 to 11,
characterised in that
the control lighting includes at least one light emitting diode (30) for indicating a temperature icon (30).
 13. The control element according to any one of the preceding claims,
characterised in that
the at least one light emitting diode of the control lighting is arranged beneath a top panel (28) of the gas cooking hob.
 14. A control device for a gas cooking hob,
characterised in that
the control device comprises at least one control element according to any one of the preceding claims.
 15. A gas cooking hob,
characterised in that
the gas cooking hob comprises at least one control element according to any one of the claims 1 to 13 and/or at least one control device according to claim 14.

FIG 1

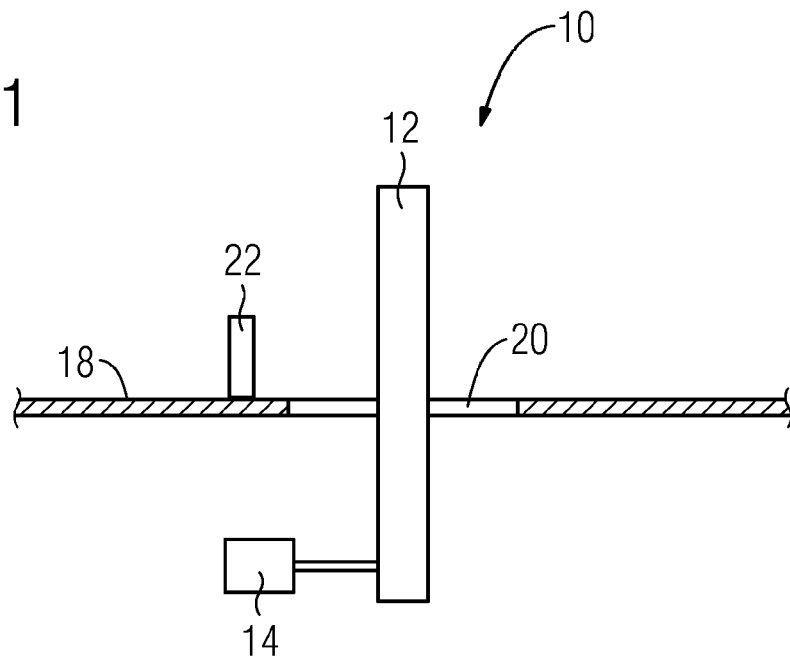
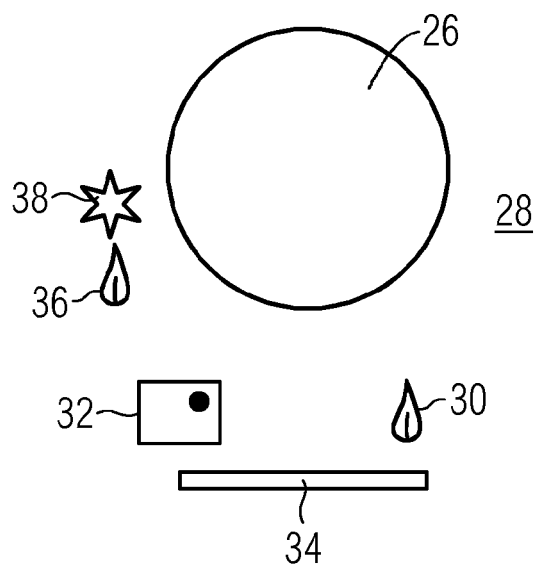


FIG 2





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 EP 17 16 8503

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