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(54) **A HEATING APPLIANCE**

(57) A heating appliance (1) comprises: a heating element (2); a sensor (4) configured to detect wind impinging on the heating element (2); and a wind shield (5) at least partially surrounding the heating element (2). The wind shield (5) comprises a wall (6). A driving element is configured to move the wall (6) between a stowed position

and a deployed position. A controller is configured to activate the driving element to move the wall (6) from its stowed position to its deployed position if the controller determines the sensor (4) has detected wind impinging on the heating element (2).

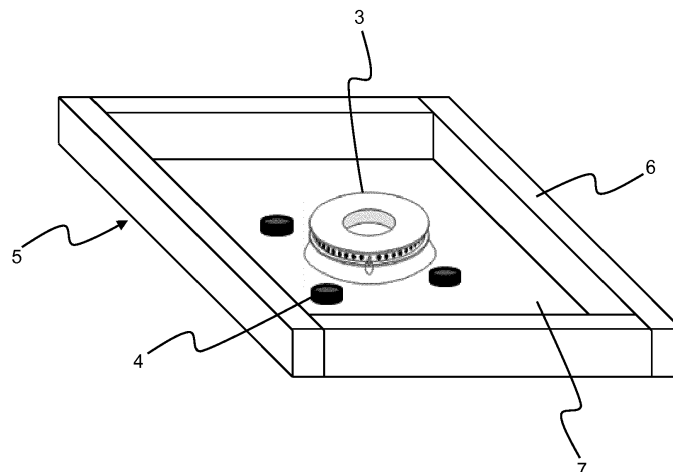


Figure 3

Description

Technical Field

[0001] The present disclosure relates to a heating appliance.

Background

[0002] Heating appliances are used in many applications for heating items. As a particular example, a cooking hob (or a stovetop) is an appliance that may be used to cook or heat food, liquids, etc. A cooking hob typically includes one or more heating elements that generate localised heat when activated. A pan or other vessel containing food, a liquid, etc. can be placed on an activated heating element in order to cook the food in the pan. The heating element of a cooking hob may be, for example, a gas burner, a radiant heating coil, a halogen lamp, an electrical resistive element or a magnetic induction element.

Summary

[0003] According to an aspect disclosed herein, there is provided a heating appliance comprising: a heating element; a sensor configured to detect wind impinging on the heating element; a wind shield at least partially surrounding the heating element, the wind shield comprising a wall; a driving element configured to move the wall between a stowed position and a deployed position; and a controller configured to activate the driving element to move the wall from its stowed position to its deployed position if the controller determines the sensor has detected wind impinging on the heating element.

[0004] This allows for the controller to automatically obstruct the flow of wind impinging on a heating element of a heating appliance such as a cooking hob. Impeding the flow of wind in this manner prevents the wind from significantly reducing the effectiveness of the heating element, for example by cooling the heating element and/or by excessive cooling of any cooking vessel (depending on for example the height of the wall(s) once raised).

[0005] In an example, the heating element is a gas burner. In the particular case that the heating element is a gas burner, moving the wall to its deployed position reduces the likelihood that an ignited gas burner will be extinguished by the wind.

[0006] In an example, the heating appliance comprises a plurality of sensors, the wind shield comprises a plurality of separately movable walls, the sensors being arranged to be capable of determining the direction of wind impinging on the heating element, the controller being configured to activate the driving element to move one or more walls according to the direction of wind impinging on the heating element.

[0007] In an example, each sensor being associated with one or more of the walls, the controller being con-

figured to activate the driving element to move the one or more walls associated with a particular sensor from their stowed positions to their deployed positions if the controller determines that the particular sensor has detected wind impinging on the heating element.

[0008] In an example, driving element is an electric motor.

[0009] In an example, the or each sensor is located on an uppermost surface of the heating appliance.

[0010] In an example, the or each sensor is located adjacent the heating element.

[0011] In an example, the or each sensor is a temperature sensor.

[0012] In an example, the or each temperature sensor is configured to obtain a measure of the temperature of the heating element.

[0013] In an example, the controller is configured to move the wall from its stowed position to its deployed position if the controller determines that the temperature sensor has detected a decrease in temperature that is greater than a predetermined threshold value.

[0014] In an example, the wind shield fully surrounds the heating element.

[0015] In an example, the heating appliance is a cooking hob.

Brief Description of the Drawings

[0016] To assist understanding of the present disclosure and to show how embodiments may be put into effect, reference is made by way of example to the accompanying drawings in which:

Figure 1 shows schematically a plan view of an example of a cooking hob having four heating elements and including a wind shield for each heating element;

Figure 2 shows schematically a close-up perspective view of one heating element of the cooking hob shown in Figure 1, with walls of the wind shield in a stowed position; and

Figure 3 shows schematically a close-up perspective view of one heating element of the cooking hob shown in Figure 1, with walls of the wind shield in a deployed position.

Detailed Description

[0017] Heating appliances are used in many applications for heating items. As a particular example, a cooking hob (or a stovetop) is an appliance that may be used to cook or heat food, liquids, etc. A cooking hob typically includes one or more heating elements that generate localised heat when activated. A pan or other vessel containing food, a liquid, etc. can be placed on an activated heating element in order to cook the food in the pan. The heating element of a cooking hob may be, for example,

a gas burner, a radiant heating coil, a halogen lamp, an electrical resistive element or a magnetic induction element.

[0018] The environment in which a cooking hob is located can reduce the effectiveness of its heating elements. For example, if the environment is windy then the flow of the wind over the heating element may reduce the temperature of the heating element, thus reducing the temperature of the pan. This is frustrating for a user and is particularly a problem when the heating element is a gas burner because wind can extinguish an ignited gas burner.

[0019] Referring now to Figures 1 to 3, there is shown schematically an example of a heating appliance 1, in this case a cooking appliance, specifically a cooking hob. In another example, the heating appliance 1 is a device for use outdoors, such as a barbecue or a grill. The heating appliance 1 includes a heating element 2. In this example, the heating element 2 is a gas burner. In another example, the heating element may be, for example, a radiant heating coil, a halogen lamp, an electrical resistive element or a magnetic induction element. In this example, a plurality of heating elements 2 are provided. Specifically, as is shown particularly in Figure 4, four heating elements 2 are provided in this example. The heating appliance 1 shown in Figure 1 includes two pan supports 3, which are metal grates that provide a surface above the heating element 2 on which a pan can be rested so that the pan can be heated by the heating element 2. For clarity, the pan supports 3 have been removed from the heating appliance 1 in Figures 2 and 3.

[0020] The heating appliance 1 also provides for a connection (not shown) to a source of fuel to be used by the heating elements 2 to provide heat. In this example, since the heating elements 2 are gas burners, the fuel supplied to the heating appliance 1 is natural gas or a specific hydrocarbon gas or mixture, such as butane and/or propane. In another example where the heating elements 2 are radiant heating coils, halogen lamps, electrical resistive elements or magnetic induction elements, the fuel may be electricity. In this example, the heating appliance 1 also provides for a connection (not shown) to a source of electricity, which is used to ignite the gas and to supply electricity to the other components that are described below. The source of electricity may be a mains connection or may be battery. Indeed, the heating appliance may include a battery.

[0021] Referring now particularly to Figures 2 and 3, which show a close-up view of one of the heating elements 2 shown in Figure 1, one or more sensors 4 are provided in the region around a heating element 2. The sensors 4 are configured to detect whether wind is impinging on the heating element 2. In this example, a plurality of sensors 4 is provided in respect of each heating element 2. The sensors 4 in this example are each located on an uppermost surface 7 of the heating appliance 1 such that when wind is impinging on the heating element 2, wind is also contacting at least one of the sensors

4. The sensors 4 in this example are spaced equidistantly around the heating element 2. The sensors 4 may be configured to also detect one or more of: (i) the speed of the wind impinging on the heating element 2 and (ii) the direction of the wind impinging on the heating element 2. In this specific example, four sensors 4 are provided around each heating element 2. The sensors 4 are adjacent the heating element 2. This arrangement can be used to more precisely detect the direction of wind acting on the heating element 2. In another example, three sensors 4 are provided around one heating element 2. Three sensors 4 is the minimum number of sensors 4 that are required to detect the direction of wind contacting the heating element 2 to a reasonable degree of accuracy. More sensors 4 may be provided per heating element 2 for more precisely determining the direction of the wind. Alternatively, fewer sensors 4 may be provided per heating element 2 in order to reduce costs.

[0022] In this specific example, each of the sensors 4 is a temperature sensor. In another example, each of the sensors 4 is another type of sensor that can be configured to detect whether wind is impinging on the heating element 2, such as an anemometer. A temperature sensor can be easily and effectively used to detect the presence of wind because the temperature detected by a temperature sensor will vary depending on whether or not wind is acting on the temperature sensor. If wind is flowing over a temperature sensor then the wind will cool the surface of the temperature sensor and the measured temperature will therefore be lower than when wind is not flowing over the temperature sensor. Accordingly, in this example, if wind is flowing over the uppermost surface 7 of the heating appliance 1 and thus contacting the heating element 2, the wind will cool the temperature sensor and the resulting measured temperature will be lower than when wind is not contacting with the heating element 2. In addition, if wind is acting on the heating element 2 whilst it is activated, the wind may reduce heat transfer from the heating element 2 to the region around it and thus to a temperature sensor, thereby also reducing the measured temperature. In an example, each sensor 4 is in thermal contact with the heating element 2. In another example, each sensor 4 is in direct physical contact with the heating element 2. Each temperature sensor may be, for example, a negative temperature coefficient thermistor or a positive temperature coefficient thermistor.

[0023] In an example, a measure of the speed of the wind can be obtained based on a temperature detected by a temperature sensor because a higher wind speed correlates to a lower measured temperature. In another example in which a plurality of sensors 4 are provided and arranged around the heating element 2, a measure of the direction of wind impinging on the heating element 2 can be obtained based on the temperatures detected by the temperature sensors because the temperature sensor(s) that wind is flowing over will detect a lower temperature than other temperature sensors.

[0024] A wind shield 5 at least partially surrounds the heating element 2. In this example, the heating element 2 is fully surrounded by the wind shield 5. The wind shield 5 in this example includes a plurality of walls 6 that are each independently movable between a stowed position (shown in Figure 2) and a deployed position (shown in Figure 3). In this specific example, each wind shield 5 includes four walls 6. In another example, the wind shield 5 may include only one wall 6. The walls 6 each comprise a shape that can impede the flow of wind. In this example, each wall 6 has a cuboid shape. When a wall 6 is in its deployed position, the wall 6 protrudes away from heating appliance 1 so that it is raised above the uppermost surface 7. In this position, the wall 6 impedes the flow of wind toward the heating element 2. One or more walls 6 may include an indent that receives the pan support 3 when the wall 6 is in its deployed position. When a wall 6 is in its stowed position, the wall 6 is housed within the body of the heating appliance 1 such that an uppermost face of the wall 6 is substantially flush with the uppermost surface 7 of the heating appliance 1.

[0025] One or more walls 6 may be associated with one or more sensors 4, or vice versa. To this end, the heating appliance 1 may include a data storage storing information on the associations between the walls 6 and the sensors 4. A wall 6 may be associated with an adjacent sensor 4. Associating a wall 6 with a sensor 4 allows for that specific wall 6 to be moved between its stowed position and its deployed position based on whether a particular sensor 4 detects wind contacting with the heating element 2.

[0026] In this example, the heating appliance 1 includes an electrical motor. The electrical motor acts as a driving element and is constructed and arranged to drive the walls 6 between their stowed position (see Figure 2) and their deployed position (see Figure 3). In another example, the heating appliance 1 may include a different driving element that can drive the walls 6 between their deployed position and their stowed position, such as one or more hydraulic actuators or one or more pneumatic actuators. In this example, the electrical motor can drive each wall 6 individually and independently between its stowed position and its deployed position, for example by use of appropriate gearing and linkages (not shown). This allows for some walls 6 to be driven to their deployed position and some walls 6 to be retained in their stowed position. An advantage of this is that at least one wall 6 can be left in its stowed position whilst others are in their deployed position, which may make it easier for a user to place a pan on to, or remove a pan from, the heating element 2, whilst the deployed walls 6 still impede the flow of wind impinging on the heating element 2.

[0027] The heating appliance 1 includes a controller, which may be a processor or the like. The controller is connected to each sensor 4, the electrical motor and the data storage.

[0028] The controller is configured to move one or more walls 6 from their stowed position to their deployed

position when the controller determines that a sensor 4 has detected that wind is impinging on the heating element 2. In an example, the controller may be configured to move a wall 6 that is associated with a particular sensor 4 from its stowed position to its deployed position when its associated sensor 4 detects that wind is impinging on the heating element 2.

[0029] In this example, the controller is configured to move one or more walls 6 from their stowed position to their deployed position when the controller determines that a sensor 4, which is a temperature sensor in this example, has detected a change in temperature that is greater than a predetermined threshold value.

[0030] An example of use of the heating appliance 1 shown in Figures 1 to 3 will now be described with reference to a single gas burner shown in the close-up perspective view of Figures 2 and 3.

[0031] Initially, the heating element 2 of the heating appliance 1 is deactivated and the walls 6 of the wind shield 5 are in their stowed position. A user, wanting to use the cooking hob to cook or heat food, etc., activates the heating element 2 so that the heating element 2 outputs heat. Since the heating element 2 in this example is a gas burner, a user turns a dial to begin gas flow to the heating element 2 and then ignites the gas flow using, for example, a match. The heating element 2 is now activated and is outputting heat. A user can now cook food in a pan by placing the pan onto the pan support 3 so that it sits over to the heating element 2.

[0032] When there is no wind impinging on the heating element 2, the temperature sensors each detect the same temperature (or substantially similar temperatures) because they are each heated equally by the heating element 2 and not cooled by wind. Consequently, based on the measurements made by the sensors 4, the controller determines that there has not been a change in the temperature detected by a sensor 4 that is greater than a predetermined threshold value. The controller therefore determines that there is no wind contacting the heating element 2 and thus that the walls 6 of the wind shield 5 should remain in their stowed positions.

[0033] However, in this example, wind begins to contact the heating element 2. If the strength of the wind is sufficient then, since the heating element 2 in this example is a gas burner, the wind may extinguish the ignited gas burner.

[0034] The wind flows over the uppermost surface 7 of the heating appliance 1, over the sensors 4 and into contact with the heating element 2. In an example, depending on the arrangement of the sensors 4 around the heating element 2, and the direction of the wind, it is possible that the wind may not flow over a sensor 4 if it is hidden behind the heating element 2 because the heating element 2 may impede the flow of the wind.

[0035] The wind flowing over the sensors 4 reduces the temperature of the surface of at least some of the sensors 4 due to wind chill caused by conduction. This change in temperature is detected by the sensors 4 be-

cause the sensors 4 in this example are temperature sensors. The temperature of some of the sensors 4 may be further reduced if the wind is of sufficient strength to blow the flame of the ignited heating element away from these sensors 4.

[0036] In this example, the controller determines that at least one of the sensors 4 has detected a reduction in temperature that is more than a predetermined threshold value. Consequently, the controller determines that wind is impinging on the heating element 2. In response, the controller activates the electrical motor to drive all of the walls 6 of the wind shield 5 from their stowed position (as shown in Figure 2) to their deployed position (as shown in Figure 3). The electrical motor maintains the walls 6 in their deployed position until the user has deactivated the heating element 2.

[0037] The walls 6 obstruct the flow of the wind so that the wind does not impinge on the heating element 2. An advantage of this is that by eliminating or reducing the flow rate of wind impinging on the heating element 2, the wind can be prevented from lowering the effectiveness of the heating element 2. Indeed, in this example, the wind shield 5 prevents the wind from extinguishing the ignited gas burner.

[0038] In an example in which each wall 6 is associated with a particular sensor 4 (or vice versa), if the controller determines that a particular sensor 4 has detected wind impinging on the heating element 2, the controller activates the electrical motor to drive the wall (or walls) 6 associated with that sensor 4 from its (their) stowed position(s) to its (their) deployed position(s). Alternatively or additionally, by for example comparing the outputs of the sensors 4 (the locations of which are known but which are not associated with a particular wall 6), the direction of the wind can be determined and the controller activates the electrical motor to drive the wall (or walls) 6 associated with that wind direction from its (their) stowed position(s) to its (their deployed) position(s). An advantage of these examples is that by not raising all of the walls 6 of the wind shield 5, a user may be more easily able to place pans on to and remove pans from the heating element 2.

[0039] The above arrangement therefore automatically impedes the flow of wind impinging on a heating element of a cooking hob. This prevents the wind from significantly reducing the effectiveness of the heating element. Indeed, when the heating element is a gas burner, the arrangement automatically prevents an ignited gas burner from being extinguished by the wind.

[0040] It will be understood that the processor (controller) or processing system or circuitry referred to herein may in practice be provided by a single chip or integrated circuit or plural chips or integrated circuits, optionally provided as a chipset, an application-specific integrated circuit (ASIC), field-programmable gate array (FPGA), digital signal processor (DSP), graphics processing units (GPUs), etc. The chip or chips may comprise circuitry (as well as possibly firmware) for embodying at least one

or more of a data processor or processors, a digital signal processor or processors, baseband circuitry and radio frequency circuitry, which are configurable so as to operate in accordance with the exemplary embodiments.

In this regard, the exemplary embodiments may be implemented at least in part by computer software stored in (non-transitory) memory and executable by the processor, or by hardware, or by a combination of tangibly stored software and hardware (and tangibly stored firmware).

[0041] Reference is made herein to data storage for storing data. This may be provided by a single device or by plural devices. Suitable devices include for example a hard disk and non-volatile semiconductor memory.

[0042] Although at least some aspects of the embodiments described herein with reference to the drawings comprise computer processes performed in processing systems or processors, the invention also extends to computer programs, particularly computer programs on or in a carrier, adapted for putting the invention into practice. The program may be in the form of non-transitory source code, object code, a code intermediate source and object code such as in partially compiled form, or in any other non-transitory form suitable for use in the implementation of processes according to the invention. The carrier may be any entity or device capable of carrying the program. For example, the carrier may comprise a storage medium, such as a solid-state drive

(SSD) or other semiconductor-based RAM; a ROM, for example a CD ROM or a semiconductor ROM; a magnetic recording medium, for example a floppy disk or hard disk; optical memory devices in general; etc.

[0044] The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with one or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

Claims

1. A heating appliance comprising:

- a heating element;
- a sensor configured to detect wind impinging on the heating element;
- a wind shield at least partially surrounding the heating element, the wind shield comprising a wall;
- a driving element configured to move the wall

- between a stowed position and a deployed position; and
a controller configured to activate the driving element to move the wall from its stowed position to its deployed position if the controller determines the sensor has detected wind impinging on the heating element.
2. A heating appliance according to claim 1, wherein the heating element is a gas burner.
3. A heating appliance according to claim 1 or claim 2, comprising a plurality of sensors, the wind shield comprising a plurality of separately movable walls, the sensors being arranged to be capable of determining the direction of wind impinging on the heating element, the controller being configured to activate the driving element to move one or more walls according to the direction of wind impinging on the heating element.
4. A heating appliance according to claim 3, each sensor being associated with one or more of the walls, the controller being configured to activate the driving element to move the one or more walls associated with a particular sensor from their stowed position to their deployed position if the controller determines that the particular sensor has detected wind impinging on the heating element.
5. A heating appliance according to any of claims 1 to 4, wherein the driving element is an electric motor.
6. A heating appliance according to any of claims 1 to 5, wherein the or each sensor is located on an uppermost surface of the heating appliance.
7. A heating appliance according to any of claims 1 to 6, wherein the or each sensor is located adjacent the heating element.
8. A heating appliance according to any of claims 1 to 7, wherein the or each sensor is a temperature sensor.
9. A heating appliance according to claim 8, wherein the or each temperature sensor is configured to obtain a measure of the temperature of the heating element.
10. A heating appliance according to claim 8 or claim 9, wherein the controller is configured to move the wall from its stowed position to its deployed position if the controller determines that the temperature sensor has detected a decrease in temperature that is greater than a predetermined threshold value.
11. A heating appliance according to any of claims 1 to 10, wherein the wind shield fully surrounds the heating element.
12. A heating appliance according to any of claims 1 to 11, wherein the heating appliance is a cooking hob.

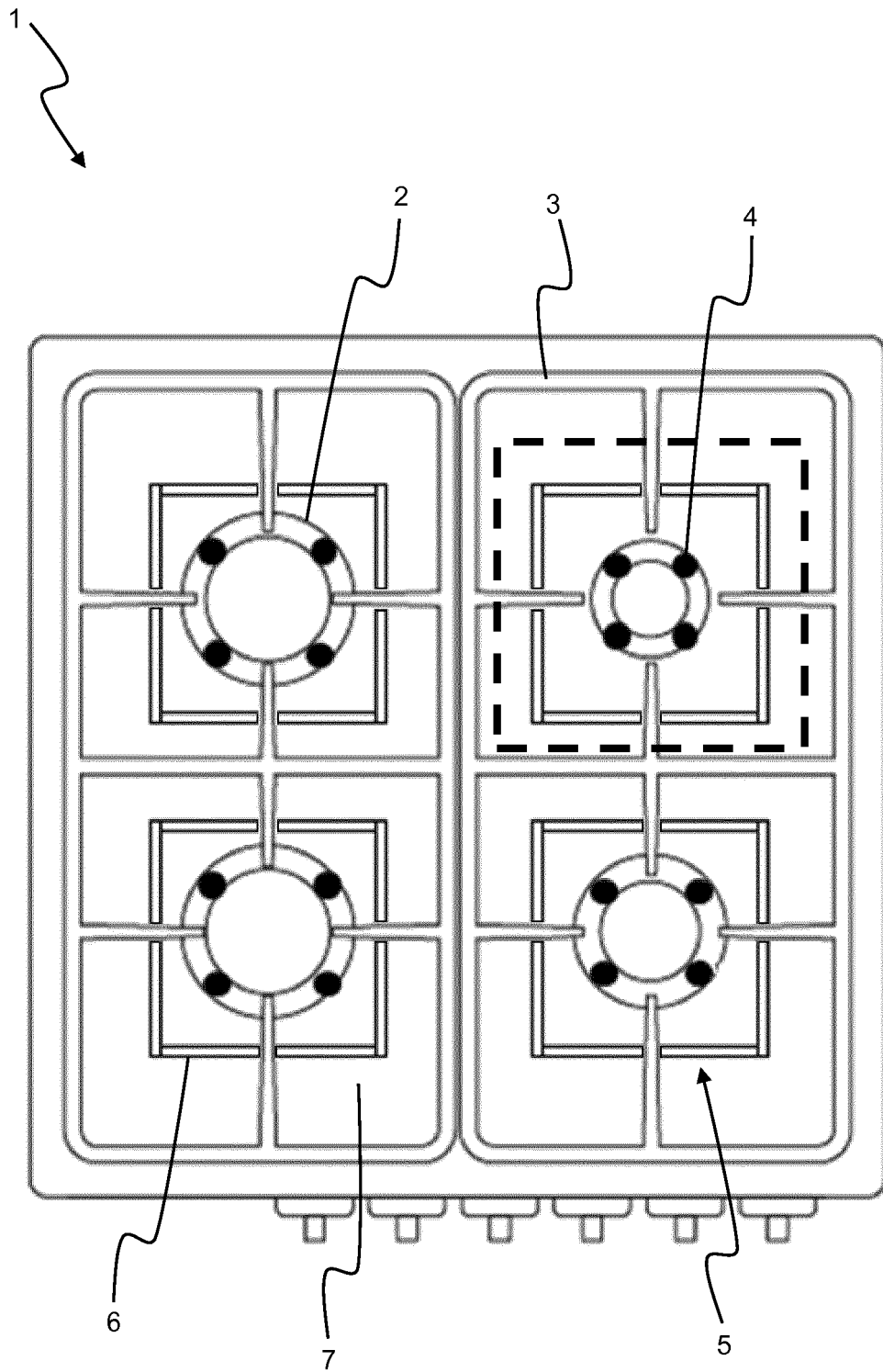


Figure 1

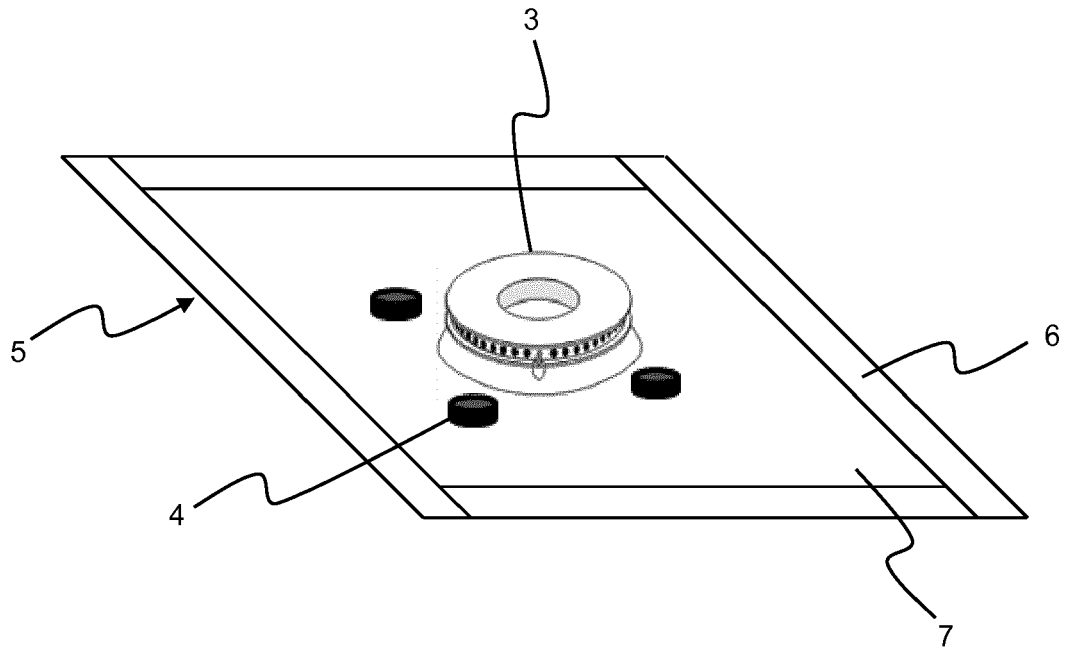


Figure 2

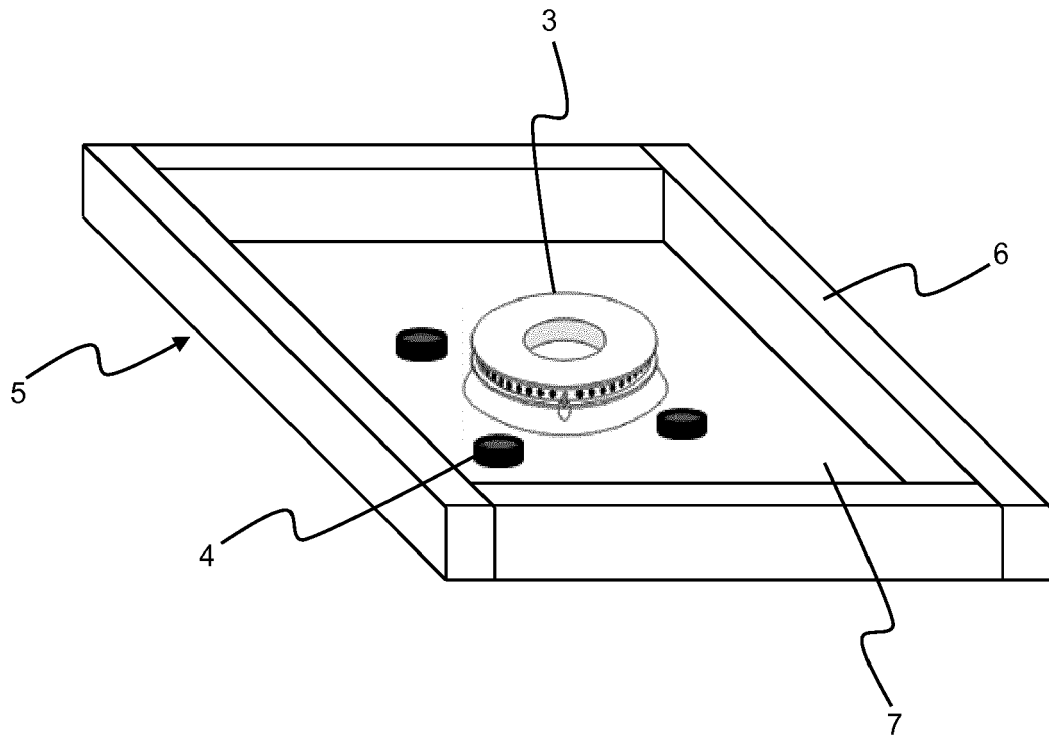


Figure 3



EUROPEAN SEARCH REPORT

Application Number
EP 17 20 3022

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2011/030996 A1 (KIM JONG MAN [KR]) 17 March 2011 (2011-03-17) * figures 1-8,17-18 *	1-12	INV. H05B6/12 F24C3/12 F24C15/28
A	KR 200 399 921 Y1 (NOT AVAILABLE) 1 November 2005 (2005-11-01) * figure 5 *	1-12	
A	US 5 979 428 A (GREENE JR GEORGE J [US]) 9 November 1999 (1999-11-09) * figures 14-15 *	1-12	
A	DE 20 2016 001283 U1 (KUTLU FATIH [FR]) 18 March 2016 (2016-03-18) * claim 1 *	1-12	
A	EP 1 906 097 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 2 April 2008 (2008-04-02) * figures 1-2 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			H05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 May 2018	Examiner Pierron, Christophe
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 3022

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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15-05-2018

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011030996 A1	17-03-2011	KR 100937741 B1 WO 2011030996 A1	20-01-2010 17-03-2011
-----	-----	-----	-----
KR 200399921 Y1	01-11-2005	NONE	
-----	-----	-----	-----
US 5979428 A	09-11-1999	NONE	
-----	-----	-----	-----
DE 202016001283 U1	18-03-2016	NONE	
-----	-----	-----	-----
EP 1906097 A2	02-04-2008	CN 101147653 A EP 1906097 A2 KR 20080025603 A US 2008067167 A1	26-03-2008 02-04-2008 21-03-2008 20-03-2008
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