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(54) Device for automatically governing the activation or extinguishing of a cooking hob gas burner on the basis of the presence of a saucepan on said burner

(57) A device for automatically governing the feed of gas to a burner (2) of a cooking hob (1) on the basis of the presence of a food container (4) on said burner (2), comprises an emitter (22) for generating a sensing signal arranged to explore the space above the burner (2), a receiver (23) for said signal which receive this latter when reflected by a food container (4) placed on the burner (2), and control means (33) connected to said emitter (22) and receiver (23), to enable the burner (2) to be activated when the presence of said container (4) is sensed on it, and to interrupt this activation when said container (4) is removed from the burner (2). The emitter and the receiver are positioned centrally within the burner body, and the burner is provided with a cap (16A) transparent to the above signal.

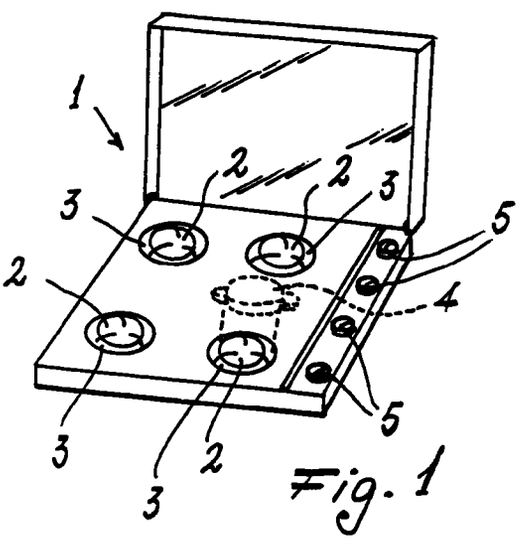

Fig. 1

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Description

This invention relates to a device for automatically governing the feed of gas to a burner of a cooking hob on the basis of the presence of a food container on said burner, comprising means for generating a sensing signal arranged to explore the space adjacent to the burner, detection means for said signal which receive this latter when reflected by a food container placed on the burner, and control means connected to said generator means and detector means and to a valve member positioned in a gas feed conduit connected to the body of said burner. A cooking hob provided with the above kind of device is disclosed in DE-A-3619762. Said cooking hob presents a food container detector radially spaced from the gas burner; the cooking plate has to be provided with a corresponding seat and the light emitter and receiver are quite easily soiled.

The cooking hobs normally comprise usual flame detection means associated with each burner and arranged to interrupt gas flow to this latter if flame is lacking after activating the burner.

As is well known, in a usual cooking hob each burner is activated by operating (often simultaneously) the corresponding knob and the spark generator element if provided. Arrangements are known in which said spark generator is activated by operating the knob. Such arrangements however enable a burner to be activated even if a food container is not positioned on it, in which case the user can also activate a burner which it is not required to operate, so that it has to be deactivated and the operation of activating the required burner repeated. In such circumstances safety problems can also arise, for example when the burner activated in error is close to a part of the user's body.

Moreover, the known arrangements enable a burner to remain active even if the food container is removed from it, this being dangerous for a careless user.

An object of the invention is to provide a device of the type mentioned at the beginning of the description, which is simple, reliable and can be easily adapted to the known cooking hobs.

Another object of the invention is to provide a device which allows a gas burner to be activated or ignited by simply placing a food container on it, and which therefore enables said burner to be activated only when a container is located on it.

A further object of the invention is to provide a device of the stated type which also acts as a further safety member for a gas cooking hob and which also results in the extinguishing of a burner (or the cessation of gas flow to it) when the saucepan is removed from it, this being achieved without reducing the efficiency and functionality of other safety elements with which the cooking hob is already provided.

These and further objects which will be apparent to the expert of the art are attained by a device in accordance with the accompanying claims.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is a schematic perspective view of a cooking hob provided with the device of the invention; and Figure 2 is a schematic exploded view of the device of the invention applied to one of the gas burners of the cooking hob of Figure 1.

With reference to said figures, a cooking hob is indicated overall by 1 and comprises, in the example, four gas burners 2 of different dimensions with which there are associated usual grids 3 for supporting food containers 4 (of which one is shown in Figure 1) of different sizes. With each burner there corresponds a knob 5 for its activation or deactivation. The four burner knobs 5 (arranged in the example in proximity to one side of the cooking hob 1) each cooperate via their own connection shaft 6 with a usual valve member 7 positioned in a conduit 8 which feeds gas to the corresponding burner.

In known manner this latter comprises, connected to the conduit 8, a substantially cup-shaped body 10 in proximity to which there are positioned a usual spark generator 12 and a usual flame detector 13; this latter is connected to and controls a usual valve member 14 positioned in the gas feed conduit 8 upstream of the member or valve 7 on which the knob acts. Connected to the burner body 10, by screws 11 in the example, there is a flame divider 16 (shown exploded in Figure 2 in its various component parts) on which a preferably glass ceramic cap 16A is located. Other materials can be used for the cap 16A, but they have to be transparent to the signals emitted by the emitter and received by the receiver, as it will be described hereafter. The upper portion 16B of the flame divider 16 comprises a central hole 16C, a lower part 16D of said flame divider being cup-shaped and comprising a central through hole 16E.

According to the invention, to each burner 2 there is connected a device for automatically governing its activation or deactivation on the basis of the presence of the food container 4 on the corresponding grid 3.

More specifically, with the body 10 of said burner 2 there is associated a discoidal element 21 supporting two members 22 and 23 which rise perpendicular thereto to be located in corresponding seats 25 and 26 formed in a cylindrical or frusto-conical portion 27 rising from the inner base of said burner body 10. The element 21 is positioned below the body 10 and is associated with it in any known manner.

The members 22 and 23 are light emitter and a light receiver respectively. The wavelength of this light is suitably chosen so that there is no possibility of interference between the light emitted by the flame and the heat emitted by the flame divider, and the light signal emitted by the emitter 22. Preferably an infrared light emitter and an infrared light receiver are used. The infrared light can be replaced by a different electromagnetic signal having a

wavelength which does not overlap with that of the flame or of the heat emitted or generated by the flame divider.

The members 22 and 23 are connected to a control unit 33 which powers them and which is also connected to the spark generator element 12. This unit is connected to the valve member 14 and can cause it to open and close in series with the command from the flame detector 13 (for safety reasons). A sensor 34 is also connected to the unit 33 to sense the movement of the knob 5, i.e. its shifting from a position in which it does not allow the burner 2 to be activated or causes it to be extinguished ("0" position) to a position in which it allows this activation (position "1" or "1/2") at different flame powers. This sensor is of known type, for example comprising a lever associated with the shaft 6, or is of optical type (as in the example) cooperating with a visual reference marker 35 associated with the shaft 6.

The device of the invention is used as follows. In the absence of a food container on the grid 3 associated with the burner 2, the signal emitted by the emitter 22 (sensing signal which explores the space above the burner or the space immediately adjacent to the cap 16A) is lost in space. In other words, the emitter 22 emits an infrared signal which, preferably collimated by the seat 25 in which it is positioned, passes through the holes 16E and 16C in the components of the flame divider 16 and reaches the cap 16A. The signal passes through this and above the burner 2. If the container 4 is absent this signal is lost in space. If the container is present it is reflected and received by the receiver 23 which generates an electrical signal fed to the unit 33 (which is preferably a microprocessor circuit). If this unit senses, via the sensor 34, that the knob 5 has been shifted from its "0" position (i.e. that the burner 2 is required to be ignited),the unit 33 activates the spark generator 12 for a determined time in any known manner and allows the valve 14 to open. The gas which hence reaches the burner body 10 can reach the flame divider 16 and ignite thereat. The burner is hence active. When the container 4 is removed from the grid 3, the signal emitted by the emitter 22 is no longer reflected and received by the receiver 23. The unit 33 therefore acts on the valve member 14 to close it. In this manner gas feed to the burner ceases and this becomes deactivated.

An embodiment has been described in which the emitter 22 emits an infrared signal. However other exploring signals can be emitted such as a radiofrequency signal etc. The receiver 23 is therefore chosen on the basis of the type of emitter used.

In addition the unit 33 is advantageously connected to a light- emitting indicator 39 positioned at each knob 5 and arranged to generate a warning signal when the corresponding burner 2 is deactivated or extinguished (when the container 4 is removed from the grid 3) and the corresponding knob remains in the position corresponding to burner activation; in this case an acoustic warning device 38 can also be activated. In this manner the user is warned of the need to return the knob to the "0" position. Only when this is detected by the sensor 34 does the unit 33 close the valve member 14 to allow subsequent operation of the burner 2. The action of the unit 33 on the valve 14 when the container 4 is removed from the burner 2 can either be immediate or can occur after a predefined time which can be as small as desired. Alternatively, said action can be such as to firstly reduce the gas flow to the burner 2 (so as to limit the flame power) and only then completely close the valve 14.

This enables a small flame to be maintained at the burner when the container 4 is removed from it only for a limited time, so as to avoid the need for a subsequent operation to activate the same burner when the container 4 is returned to it.

Claims

1. A device for automatically governing the feed of gas to a burner (2) of a cooking hob (1) on the basis of the presence of a food container (4) on said burner (2), comprising means (22) for generating a sensing signal arranged to explore the space adjacent to the burner (2), detection means (23) for said signal which receive this latter when reflected by a food container (4) placed on the burner (2), and control means (33) connected to said generator means (22) and detector means (23) and to a valve member (14) positioned in a gas feed conduit (8) connected to the body (10) of said burner (2), characterized in that the generator means (22) and receiver means (23) are positioned within the burner body (10), said burner body (10) being provided with a cap (16A) which is transparent to the above signal.

2. A device as claimed in claim 1, characterized in that the generator means (22) and receiver means (23) are associated with a support fixed to the bottom of the burner body (10) and are positioned in seats (25, 26) provided in a central portion (27) of the burner body (10) which projects upwards from a base portion (28) of said body.

3. A device as claimed in claim 1, characterized in that the valve member (14) is connected to safety means (13) arranged to interrupt gas flow to the burner if the flame generated by the burner is extinguished, said control means (33) enabling the valve member (14) to open in order to allow the burner (2) to be activated when a container (4) is located on it, and closing said valve member (14) when the container (4) is removed from the burner (2), so extinguishing the burner.

4. A device as claimed in claim 1, characterized in that the generator means (22) are an electromagnetic signal emitter.

5. A device as claimed in claim 4, characterized in that the generator means (22) are an infrared light emitter.

6. A device as claimed in claim 1, characterized in that the generator means (22) are a radiofrequency emitter.

7. A device as claimed in claim 1, characterized in that the control means are a unit (33) comprising a microprocessor circuit.

8. A device as claimed in claim 1, characterized by comprising means (34) for sensing the movement of the control knob (5) for each burner, and in particular for sensing the shifting of said knob (5) from a position in which it prevents burner activation.

9. A device as claimed in claim 1, characterized by comprising warning means (38, 39) connected to and controlled by the control means (33), said warning means generating light and/or acoustic signals when said control means (33) have halted the activation of the burner but the knob is still in the position in which it allows said activation.

10. A device as claimed in claim 1, characterized in that the action of the control means (33) on the valve member (14) when the container (4) is removed from the burner is to initially reduce the gas flow to the burner (2) and to then totally interrupt said flow.

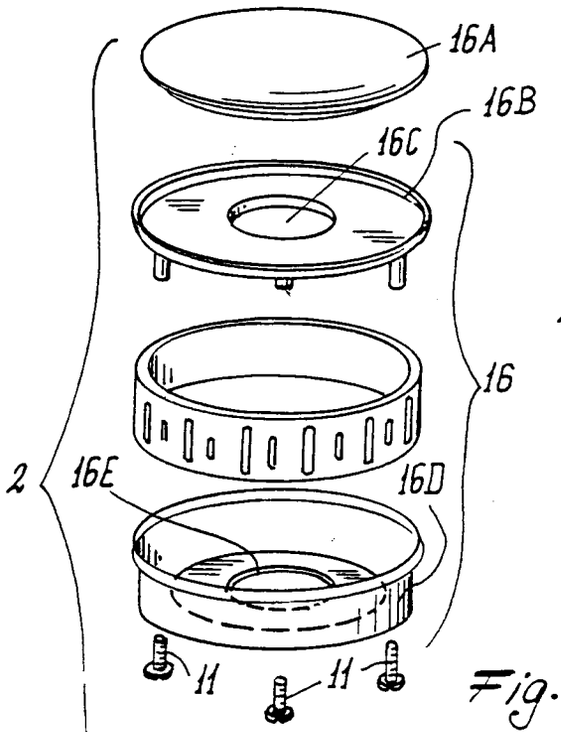
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Fig. 2

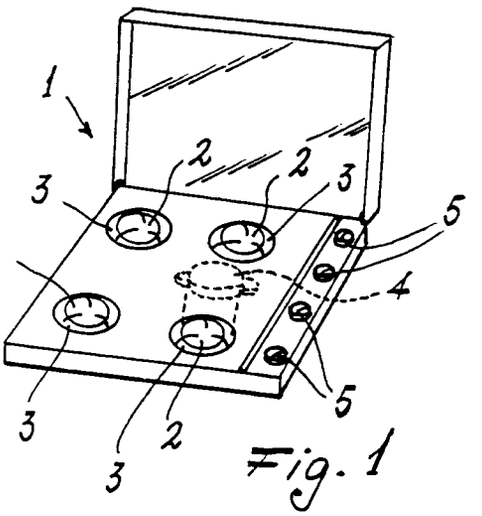
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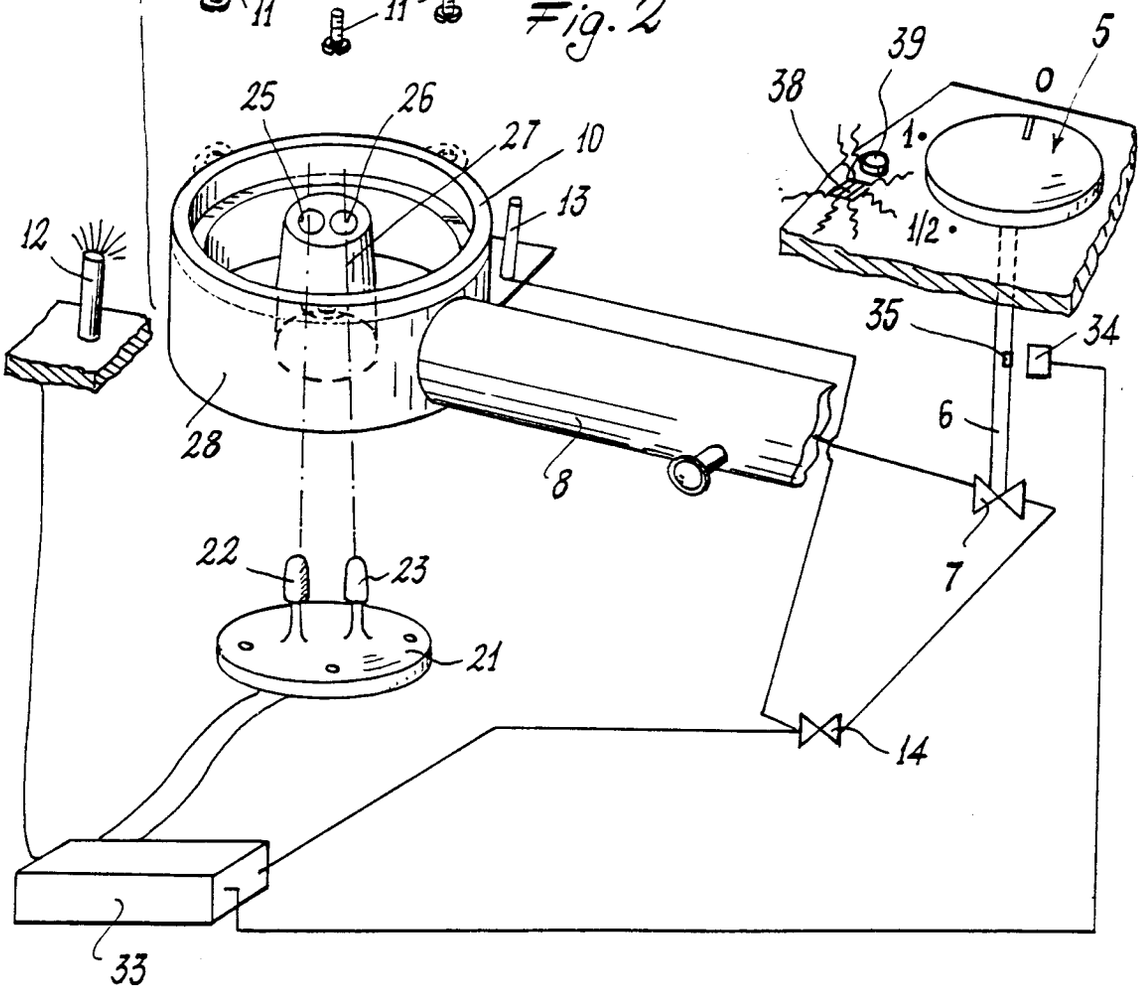
Fig. 1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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 8177

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US-A-4 681 084 (GRECH) * column 1, line 33 - column 4, line 58; figures 1-3 *	1,3,5,8, 10	F24C3/12 H05B3/68
A	FR-A-2 645 660 (GATINEAU) * page 3, line 4 - line 20 * * page 4, line 16 - page 5, line 33; figures *	1,3,5,8, 10	
A	FR-A-2 465 163 (DOUCY) * page 2, line 15 - page 3, line 4; claim 5; figures *	1,5,8	
A	FR-A-2 260 112 (MATSUSHITA ELECTRIC INDUSTRIAL COMPANY,LIMITED) * page 2, line 9 - line 15 *	1,4,8	
A	US-A-4 446 455 (NASHAWATY) * column 3, line 53 - column 4, line 41 *	1,8,9	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
D,A	DE-A-36 19 762 (LICENTIA PATENT-VERWALTUNGS-GMBH) * column 5, line 56 - column 6, line 19; figure 3 *	1,2,5,7, 8	F24C H05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 March 1996	Pineau, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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