(19) DANMARK

(10) DK/EP 3603466 T3

(12) Oversættelse af europæisk patentskrift

Patent- og Varemærkestyrelsen

(51) Int.Cl.: *A 47 J 37/07 (2006.01)* *A 47 J 37/06 (2006.01)* *F 24 C 3/12 (2006.01)*

(45) Oversættelsen bekendtgjort den: **2022-06-20**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2022-03-09**

(86) Europæisk ansøgning nr.: **19189338.7**

(86) Europæisk indleveringsdag: **2019-07-31**

(87) Den europæiske ansøgnings publiceringsdag: **2020-02-05**

(30) Prioritet: **2018-08-02 DE 102018118850**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **examedia GmbH, Stadtwaldgürtel 13, 50935 Köln Nordrhein Westfalen, Tyskland**

(72) Opfinder: **Asshauer, Klaus, Karl-Bücheler-Strasse 10, 78315 Radolfzell, Tyskland**
Hilzinger, Rolf, Bergstrasse 9, 8200 Schaffhausen, Schweiz

(74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**

(54) Benævnelse: **ANORDNING TIL REGULERING AF TEMPERATUREN I EN GRILL, NAVNLIG EN GASGRILL**

(56) Fremdragne publikationer:
US-A1- 2014 261 006
US-A1- 2018 008 095
Anonymous: "Anleitung Tripod - Stand", grillsportverein, 26. November 2017 (2017-11-26), XP055617630, Gefunden im Internet: URL:https://www.grillsportverein.de/forum/ attachments/anleitung-tripod-stand-26-11-2017-pdf.1618971 [gefunden am 2019-09-03]

Description

Technical field

The invention relates to the apparatus for controlling the temperature of a grill in a closed-loop manner, which apparatus is arranged between a heat supply unit and a heat delivery unit which is part of the grill and is used to grill the product, wherein the apparatus comprises an open-loop control element for controlling the amount of heat in a closed-loop manner, which open-loop control element can generally be operated manually.

Definitions

Under the term “open-loop control”, an apparatus or system is influenced with the aid of a manipulated variable. Closed-loop control is a process in which the actual value of a variable is measured and is matched to the target value by means of adjustment with a defined controlled variable.

During grilling, the food to be cooked is cooked and roasted on the surface substantially by means of thermal radiation. For this purpose, it is held above, beside or below a radiating heat source either with the aid of a spit or on a grilling grate. Wood fires or wood embers, gas, stones heated by gas or electrical heating loops are used as the heat source. In order to bring about the grilling process here, the heat source delivers a power. This power can be controlled in an open-loop manner by means of mechanical open-loop control elements which can be operated manually. In this case, the amount of gas is controlled in an open-loop manner in the case of a gas grill and the amount of electricity is controlled in an open-loop manner in the case of a grill operated using electricity. The open-loop control elements are knobs or sliding buttons.

Prior art

Devices for outdoor use have been used for a long time to cook foodstuffs and to carry out other tasks. For example, devices for outdoor use, for instance grills and barbecue smokers, are often used to cook meat, vegetables, fruit and other types of

foodstuffs. These grills and barbecue smokers are typically operated using manual open-loop control elements which can be operated mechanically (by hand) and are integrated in the frame of the grill or barbecue smoker. For example, a large number of such devices for outdoor use have an ignition button which, when pressed, produces a spark in the vicinity of a gas outlet on a burner (heat delivery unit). In this case, the heat supply unit used is a gas bottle, the gas from which flows to the heat delivery unit via the open-loop control element. The spark ignites the gas and the burner begins to produce heat. The amount of heat is generally controlled in an open-loop control manner using a dial or a knob which allows more or less gas to flow into the burner.

In some cases, such grilling apparatuses may also have electronic open-loop control elements. Instead of these having a manual dial or a knob for adjusting the amount of gas introduced to the burner, an electronic open-loop controller is set or adjusted by the user. The electronic open-loop controller then interacts with a magnetic coil or another electromechanical component in order to regulate the flow of gas to the burner. The user must nevertheless still be located at the grill, as is the case with manual dials and knobs, in order to change settings of the grill. In order to solve this problem, some recently produced devices for outdoor use were equipped with Bluetooth radio devices. These Bluetooth radio devices enable communication with spatially close electronic devices, including mobile phones or tablet PCs belonging to the device owner. In addition, even if connected to a mobile device, the device has very limited options. Besides the mobile device belonging to the user, the device actually has no access to information or open-loop control signals. In addition, only one device can generally be coupled to one Bluetooth-operated device in each case.

An apparatus for adjusting an open-loop control element of a gas grill is known from https://www.grillsportverein.de/forum/attachments/anleitung-tripod-stand-26-11-2017-pdf.1618971/(as of 26.11.2017). For

this purpose, the open-loop control element should be removed and the apparatus should be fitted. An integrated servomotor may undertake the open-loop control via an open-loop control unit.

The apparatus in **DE 10 2011 002 853 A1** is based on a cooking apparatus having at least one open-loop and/or closed-loop control unit and at least one cooking unit which has at least one direct support surface for laying on food to be cooked and is provided for open cooking of food to be cooked. In order to achieve a low energy consumption, it is proposed that the open-loop and/or closed-loop control unit is provided for the purpose of automatically activating at least one reduced-power heating mode following an idling heating phase.

US 2014/0261006 A1 describes a gas grill. This temperature-controllable gas grill comprises a main body having a grilling chamber, a plurality of burners in the main body for burning gas, a temperature sensor for capturing a current temperature in the grilling chamber, a gas valve and an open-loop controller. The gas valve has a slide and a stepper motor, and the stepper motor moves the slide in order to change a flow of gas supplied to the burners. The open-loop controller has a user interface and a processing unit. A user inputs a set temperature via the user interface, and the processing unit controls the stepper motor in an open-loop manner according to the current temperature and the set temperature in order to keep the current temperature in the grilling chamber in a limited range.

US 2018/008095 A1 discloses an outdoor gas cooking system having a plurality of burners. In this system, the individual manual open-loop control valves for all burners have a first setting and a further setting, for example, wherein the latter represents a specified activation position. An individual electronic main open-loop control valve is also provided and can be activated. The total amount of gas fuel for all burners in the gas cooking system is based, for example, on an operating open-loop control target value or on a target flow rate for all open-loop control valves. The total amount of fuel can be

controlled in an open-loop manner, in the case of can be controlled in a closed-loop manner to the individual open-loop control valves via sensors on the respective burners. The open-loop controller is an integrative part of the gas cooking system.

Disadvantages of the prior art

Grilling apparatuses having a cover additionally have a temperature measuring device. This is a thermometer, the measuring sensors of which determine the actual temperature inside the cover. The temperature inside the grill is visually displayed by this temperature measuring device.

This temperature can be analysed by the user. If it is too high, the amount of heat can be adjusted using open-loop control elements so that this temperature can be changed accordingly.

If the user is somewhat spatially remote from the grill, he can no longer monitor the temperature and then has no opportunity to intervene if the temperature changes in an unwanted manner. Accurate observation and then also appropriate readjustment are required, in particular in the starting phase.

This entails the risk of the product to be grilled overheating, burning or being damaged in another manner, with the result that it becomes inedible.

Previous electrically operable open-loop control elements had to be installed by the manufacturer on site since they intervene immediately in the gas circuit. For reasons of safety, the user is not allowed to accordingly become involved here. If the user changes the knob or supply of gas, the operating licence and the guarantee of the grill expire.

Object of the invention

The object of the invention is to provide an apparatus with which the amount of heat inside a grill, which is operated with gas in particular, is easily controlled in a closed-loop manner.

Achievement of the object

The achievement of the object is characterized by the features of Claim 1.

Advantages of the invention

The basic concept of the invention is to design an existing grill, which is preferably operated with gas and has a cover, with an apparatus at least for controlling the supply of the amount of heat in an open-loop manner. Provision is also made for a closed-loop control operation to be automatically carried out on the basis of the desired temperature which has been set and the actual temperature under the cover.

Therefore, at least one closed-loop control element is provided according to the invention and can be placed on the knob for controlling the amount of heat or power in the grill in an open-loop manner, wherein the closed-loop control element has a servomotor which is coupled via a closed-loop control unit. At least one sensor which measures the actual temperature inside the cover and compares it with a preset temperature value is also coupled to the closed-loop control unit or the closed-loop control element.

The invention provides for different temperature/time profiles to be stored in the closed-loop control unit. These are used to make it easy for the user to cook or grill the product to be grilled. As a result, so-called “smoke” processes are also possible without the need for constant observation and measurement. The closed-loop control unit comprises an external process unit which can be used to select different temperature/time profiles.

One development provides for a closed-loop control element to be respectively pushed onto the knob, which closed-loop control element is then controlled accordingly via the closed-loop control unit.

In order to ensure simple assembly, a flat panel is guided over the mechanical open-loop control elements and is preferably fastened to the grill - using magnets or similarly acting means. This panel comprises the label for the open-loop control elements as well as the electronic closed-loop control unit and a display. There are also plug-in contacts for sensors and the electronic open-loop control elements.

The closed-loop control unit and also the respective closed-loop control element have the advantage that they have the property of receiving further sensors. For example, it is possible to use a sensor for determining the cooking point of a piece of meat to be grilled.

Developments also provide for the use of a timer which accordingly controls the temperature in a closed-loop manner or switches off the supply of heat after a defined time. This may also be part of the panel.

The panel makes it possible to fit a single component to the grill, thus ensuring simple and safe handling.

The important advantage of the apparatus according to the invention is the fact that the supply of heat can be automatically controlled in a closed-loop manner without intervening in the mechanical or electronic elements of a grill. As a result of the electronic closed-loop control elements being simply placed onto the knobs, the existing system of the grill does not need to be changed.

This also means that any safety regulations, intended purposes or legal regulations of the commercially available grilling apparatuses are not changed. For example, in the case of grilling apparatuses which are operated with gas, the inventive apparatus does not intervene in the gas supply. It is not necessary to change the gas supply, to fit other connections or even to intervene in the flow of gas. The operating licence of the apparatus is maintained without change.

The apparatus according to the invention is suitable for all types of grilling apparatuses which have mechanical knobs for controlling the amount of heat or power on the grill in an open-loop manner irrespective of the energy (gas, electricity) used to operate the grilling apparatus.

The individual electrical closed-loop control elements can either be operated with a battery or are supplied with electricity via the closed-loop control unit. This also applies to the closed-loop control unit and the display.

The closed-loop control unit also makes it possible for information to be transmitted to a mobile radio device or tablet using conventional data transmission technologies. The user can constantly find out the state of his grilling apparatus irrespective of where the user is situated. It is also possible to also carry out closed-loop control operations using the mobile radio device or tablet.

The invention provides for the process unit to be part of the tablet PC or the smartphone and for this process to run as part of an application. This makes it possible to select or store the stored temperature/time curves which are used to control the respective closed-loop control elements. In a community, the self-created temperature/time curves can also be interchanged thereby, with the result that experience in terms of the grilling of the product to be grilled can be shared in this manner.

Further advantageous configurations are clear from the following description, the claims and the drawings.

Drawings

In the drawings:

Fig. 1 shows a view of a commercially available grill having mechanical open-loop control elements and the apparatus according to the invention;

Fig. 2 shows a further view of the grill according to Fig. 1;

Fig. 3 shows a schematic view of an electronic closed-loop control element of the invention according to the invention;

Fig. 4 shows a view of a schematic illustration of the panel having the closed-loop control elements and the closed-loop control unit as well as a display.

Description of an exemplary embodiment

The apparatus 10 can be used for a grill 1 which can generally be used outdoors.

Such a grill 1 is illustrated in Figs. 1 and 2. It consists of a housing 2 with a top side 3 and an underside 4. A grilling surface 5 on which the product to be grilled is placed is present on the top side 3. Facing the top side 3 and articulated to this one side of the top side 3 is a cover 6 which, facing the top side in the closed state, forms a cavity. This cover 6 ends with the top side 3.

Pressing an ignition button 7 produces, upon pressing, a spark in the vicinity of a gas outlet on a burner 8. The spark ignites the gas and the burner 8 begins to produce heat. This heat is used to heat the product to be grilled. The amount of heat is generally controlled in an open-loop manner by means of a dial or a knob in the form of a mechanical open-loop control element 9 which allows more or less gas to flow into the burner.

The apparatus 10 according to the invention now comprises a total of four closed-loop control elements 11 in the exemplary embodiment illustrated here and as shown in Figs. 2 and 3. These closed-loop control elements 11 are placed onto the respective knob (mechanical open-loop control element 9).

Such a closed-loop control element 11 consists of a receiving element 12 and an encoder element 13. The receiving element 12 preferably has a cylindrical design and can be configured in

such a manner that the cylindrical design is placed onto the knob (mechanical open-loop control element 9) of the grill in a rotationally fixed manner. As a result of the corresponding configuration inside the receiving element, rotationally fixed coupling is preferably possible only by attachment. For this purpose, webs inside the receiving element (12) engage around the gripping element of the knob (mechanical open-loop control element 9).

The receiving element 12 is coupled to the encoder element 13. This encoder element 13 is a servomotor which is controlled by a closed-loop control unit 14.

The closed-loop control unit 14 is an electronic circuit 15 which has the property that, on the one hand, the encoder element 13 is controlled here in an open-loop manner and, on the other hand, sensors 16 which are coupled to the closed-loop control element 11, the values provided by which are also accordingly processed there. The desired temperature can therefore be predefined via an input field. This temperature is displayed on a display 17. The closed-loop control unit 14 constantly checks whether the desired temperature has been reached by reading the data from the sensor. If the desired temperature has not been reached, the amount of heat is either maintained or increased until the desired temperature is reached. This takes place by the closed-loop control unit specifying the number of angular degrees by which the encoder element should be adjusted in the clockwise or anticlockwise direction. The knob of the grill is then accordingly adjusted in an equivalent manner by virtue of the coupling to the receiving element 12.

The encoder elements 13 may be servomotors or stepper motors 13 or identically acting means. They can be used to accordingly convert to small revolutions in a simple manner.

In order to enable simple assembly, the panel 18 is provided and is fitted to the grill by being put over the existing knobs (mechanical open-loop control elements 9). This panel 18 is

fastened by means of magnets or identically acting means. If parts of the grill are not magnetic, it is also possible to provide fastening means, for example clamping elements, clamping belts, adhesive strips or identically acting means.

The electronic closed-loop control elements 11 are already provided on the panel 18. They are then connected to the knobs by putting the respective receiving element 12 over the existing knob and connecting it to the latter in a rotationally fixed manner, wherein the panel 18 is simultaneously connected to the grill 1, preferably in a releasable manner. On account of the configuration to form a unit, very simple assembly is possible.

LIST OF REFERENCE SIGNS

Device for regulating the temperature of a grill, especially a gas grill

1	Grill
2	Housing
3	Top side
4	Underside
5	Grilling surface
6	Cover
7	Ignition button
8	Burner
9	Open-loop control element
10	Apparatus
11	Closed-loop control element
12	Receiving element
13	Encoder element
14	Closed-loop control unit
15	Electrical circuit
16	Sensors
17	Panel
18	Display

Patentkrav

1. Anordning, som er egnet til aktivt at indstille en eller flere drejeknapper tilvejebragt i grills til regulering af den afgivende effekt, idet anordningen omfatter et reguleringselement, som består af et modtagerelement og et giverelement, idet
a. der er tilvejebragt en med reguleringselementet (11) koblet reguleringsenhed (14), idet reguleringsenheden 14) eller reguleringselementet (11) omfatter i det mindste en hermed koblet sensor (16), som måler temperaturen, og hvori de af denne tilvejebragte værdier også behandles tilsvarende, og idet reguleringsenheden (14) er en elektronisk kobling,
b. reguleringsenheden (14) omfatter en ekstern procesenhed, ved hjælp af hvilken de forskellige temperatur-tidsforløb kan vælges, idet den eksterne procesenhed er en applikation, der kan køre på en tablet-PC eller smartphone,
c. modtagerelementet (12) kan sættes rotationsfast på drejeknappen (9) på grillen, og modtagerelementet (12) har en cylindrisk udformning, som kan sættes på drejeknappen (9).

2. Anordning ifølge krav 1, kendetegnet ved, at et reguleringselement (11) har midler til en masterfunktion, idet et eller flere yderligere reguleringselementer (11) har midler til en af masterfunktionen afhængig slavefunktion.

3. Anordning ifølge krav 1, kendetegnet ved, at sensoren (16) er ledningsforbundet med reguleringselementet (11).

4. Anordning ifølge krav 1, kendetegnet ved, at sensoren (16) er en platinmålemodstand.

5. Anordning ifølge et af de foregående krav, kendetegnet ved, at et eller flere reguleringselementer (11) er placeret på et panel (17), som igen har midler til fastgøring på grillen.

6. Anordning ifølge krav 5, kendetegnet ved, at panelet (17) har et display (18).

7. Anordning ifølge krav 1, kendetegnet ved, at giverelementet (13) er en servomotor eller en reguleringsmotor.

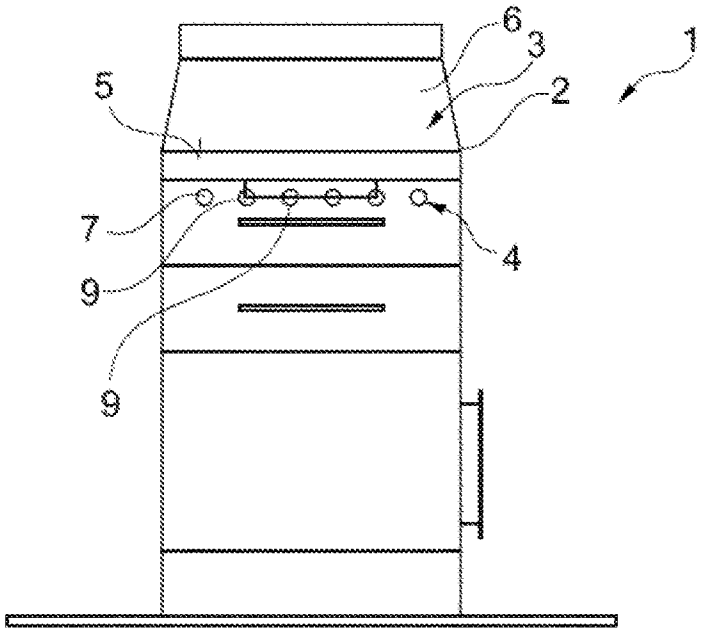

Fig. 1

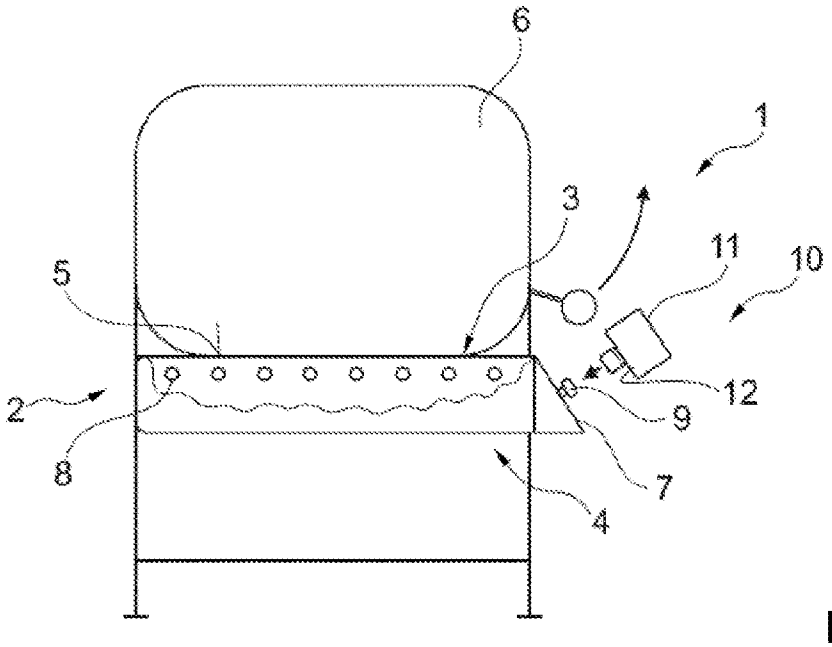

Fig. 2

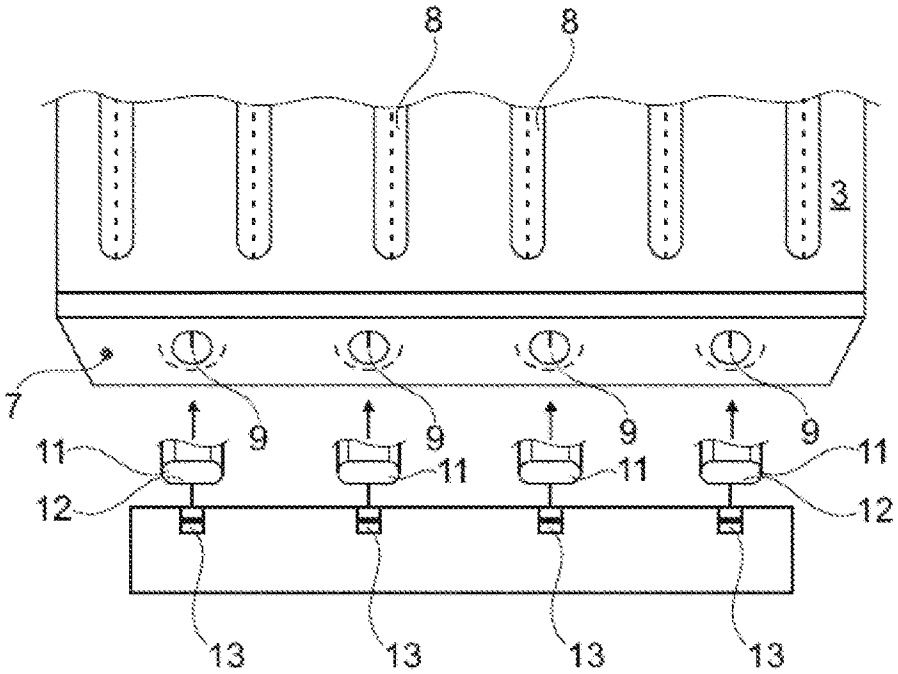

Fig. 3