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(54) **OPTIMIZED EXTRACTION SYSTEM FOR A HOB**

(57) An optimized extraction system for a hob, suitable for generating a targeted extraction in correspondence of the first portion and/or second portion of the hob based on the position of the active burners, from time to time.

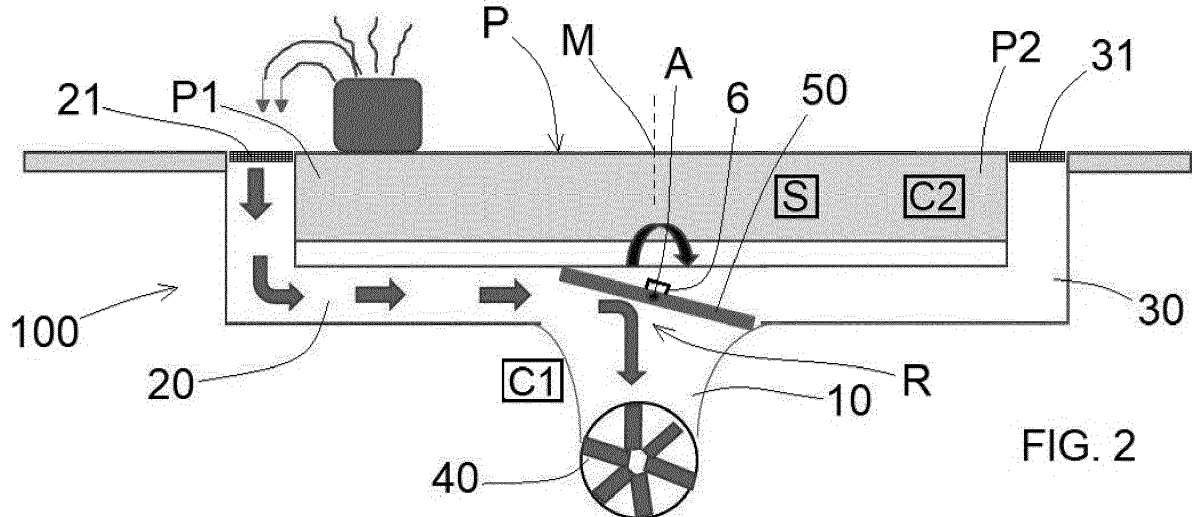


FIG. 2

Description

[0001] The present patent application for industrial invention relates to an optimized extraction system for a hob.

[0002] As it is known, hobs are usually combined with air extraction devices suitable for capturing the fumes and the bad odors that are produced by the cooking vessels.

[0003] According to a conventional technology, the hob is surmounted by an extractor hood that contains a device used for the forced extraction of the air and provided with an electric motor to actuate a fan that can operate at different revolution speeds. When said device is activated, the fumes and the bad odors produced during cooking are extracted inside the extractor hood, passing through a filtering unit before they are conveyed outside by means of an ordinary exhaust pipe.

[0004] More recently, air extraction devices with a new design have been introduced on the market. Said air extraction devices are housed under the hob in such a way that, when they are activated, the fumes and the bad odors generated when cooking are extracted downwards through one or more grilles mounted on the hob, reaching the filtering unit associated with said extraction device before they are discharged outside.

[0005] Both types of air extraction devices for hobs are largely popular and highly reliable. However, they are impaired by some drawbacks due to the fact that the extraction flow cannot be optimized based on the number and the position of the burners or of the electrical plates that are used in each hob.

[0006] In fact, if only one burner is used in the hob, it appears evident that it is not necessary to run the extraction device in full operation, or otherwise said, to indistinctly perform the extraction action on the entire surface of the hob, including the areas with burners that are not momentarily used.

[0007] Such a situation is unfavorable, not only for the waste of electrical energy, but also and mostly for the fact that, not being exactly directed on the active burner, the efficiency level of the extraction action is quite low.

[0008] Such a problem has been addressed by several manufacturers of extraction devices based on technical solutions that are complicated and unable to solve the problem.

[0009] According to the prior art, the hob communicates with the extraction device by means of interconnecting electronic systems that inform the extraction device about the number of burners that are used from time to time, in such a way that said extraction device can consequently set the rotational speed of the fan (which can be usually selected among three or four speeds).

[0010] For example, if only one burner or two burners of the hob are used, the fan of the air extraction device is rotated at the first speed; if three burners are used, then the fan is rotated at the second speed; in case of four active burners, the fan is rotated at the maximum

level, i.e. the third or the fourth speed.

[0011] However, such a modern technology has proved to be totally unsatisfactory in spite of being capable of automatically changing the rotational speed of the fan of the extraction device. In fact, such a technology is not capable of providing a targeted extraction for each active burner.

[0012] If only one burner of the hob is active and the extraction device is consequently set at the first operating speed by the electronic control unit, this will reduce the waste of electrical energy, but the extraction force will not be concentrated on the only one active burner. Otherwise said, in spite of being more advanced, such a technology is not capable of achieving an optimal efficiency level.

[0013] CN109990333 discloses a range hood with adjustable air input. The range hood comprises a driving assembly that controls an adjusting assembly according to the current fume generating position.

[0014] DE102018107904 discloses a method for operating one closure element of one inlet opening of an air extraction device for a hob, wherein a hob signal is read, which represents one position of a cooking vessel and/or a number of cooking vessels set on the hob.

[0015] CN107525112 discloses a range hood with dual air ducts and a control system.

[0016] CA2872239 discloses a control of an exhaust hood system having multiple hood sections with an exhaust output fed to a common downstream.

[0017] The purpose of the present invention is to solve the drawbacks of the prior art by disclosing an extraction system for a hob that is optimized according to the position and the number of active burners.

[0018] Another purpose is to disclose an extraction system for a hob that is capable of guaranteeing the highest operating efficiency, that is to say of guaranteeing a targeted extraction action only for the burners that are active in a given moment.

[0019] These purposes are achieved according to the invention with the characteristics of the independent claim 1.

[0020] Advantageous embodiments of the invention appear from the dependent claims.

[0021] For the sake of clarity, the description of the invention continues with reference to the appended drawings, which have a merely illustrative, not limiting value, wherein:

Figs. 1, 2 and 3 are three partially sectioned diagrammatic views that illustrate different operating conditions of an extraction system according to the invention.

[0022] Figs. 1, 2 and 3 illustrate an extraction system (100) according to the invention.

[0023] The extraction system (100) is an extraction system that operates under a hob (P). The extraction device (100) is suitable for forcedly extracting the fumes

downwards through grilles (21, 31) disposed in the proximity of the hob (P) near the burners.

[0024] The hob (P) comprises a first lateral portion (P1) and a second lateral portion (P2). Each lateral portion (P1, P2) can be considered as half of the hob relative to a central line (M) of the hob.

[0025] The extraction system (100) comprises a main duct (10) basically disposed with vertical axis under the hob (P).

[0026] A fan (40) is disposed in the main duct (10). The fan (40) is actuated by an electric motor. An electronic control unit (C1) controls the actuation of the electric motor of the fan (40).

[0027] The main duct (10) is joined with a first extraction branch (20) and a second extraction branch (30) that lead to grilles (21, 31) respectively disposed in the proximity of the first lateral portion (P1) and of the second lateral portion (P2) of the hob.

[0028] The extraction branches (20, 30) are symmetrical and opposite. Each extraction branch (20, 30) has a substantially L-shaped profile and comprises a horizontal portion that extends under the hob (P) in parallel direction relative to the hob, and a vertical portion that ends in correspondence of the grille (21, 31) disposed near the hob (P).

[0029] The first extraction branch (20) serves the first lateral portion (P1) of the hob and the second extraction branch (30) serves the second lateral portion (P2) of the hob.

[0030] A deflector (50) is movably mounted in a connection point (R) between the main duct (10) and the two extraction branches (20, 30). The deflector (50) can be moved in three positions:

- a first position (Fig. 1) wherein the communication between the main duct (10) and the two extraction branches (20, 30) is enabled;
- a second position (Fig. 2) wherein the communication between the main duct (10) and the first extraction branch (20) is enabled,
- a third position (Fig. 3) wherein the communication between the main duct (10) and the second extraction branch (30) is enabled.

[0031] The deflector (50) is actuated by an actuator (6) controlled by the electronic control unit (C1). Advantageously, the actuator (6) may be of pneumatic type and may comprise an electrovalve controlled by the electronic control unit (C1). Obviously, the actuator (6) may also be of electric, magnetic, or electro-magnetic type.

[0032] The air extraction system (100) comprises detection means (S) suitable for selectively detecting the activation of the burners disposed in the first portion (P1) and in the second portion (P2) of the hob. The detection means (S) are provided in the hob (P) and may consist in temperature sensors, such as thermocouples. The de-

tection means (S) are operatively connected to the electronic control unit (C1).

[0033] The extraction system may also comprise a second electronic control unit (C2) connected to the detection means (S) and interfaced with the electronic control unit (C1). In particular, the second electronic control unit (C2) may be an electronic control unit that controls the turning-on of the burners of the hob. In such a case, the detection means (S) are integrated in the second electronic control unit.

[0034] The second electronic control unit (C2) may be operatively connected to the first electronic control unit in wireless mode.

[0035] The deflector (50) is a plate hinged in a horizontal axis (A) in the center of the connection point (R) between the main duct (10) and the extraction branches (20, 30). The length of the deflector (50) is higher than the internal diameter of the extraction branches (20, 30) and the width of the deflector (50) is substantially equal to the internal diameter of the extraction branches (20, 30). The deflector (50) is hinged to the horizontal axis (A) along a central line of the deflector, in such a way to rotate around said horizontal axis (A).

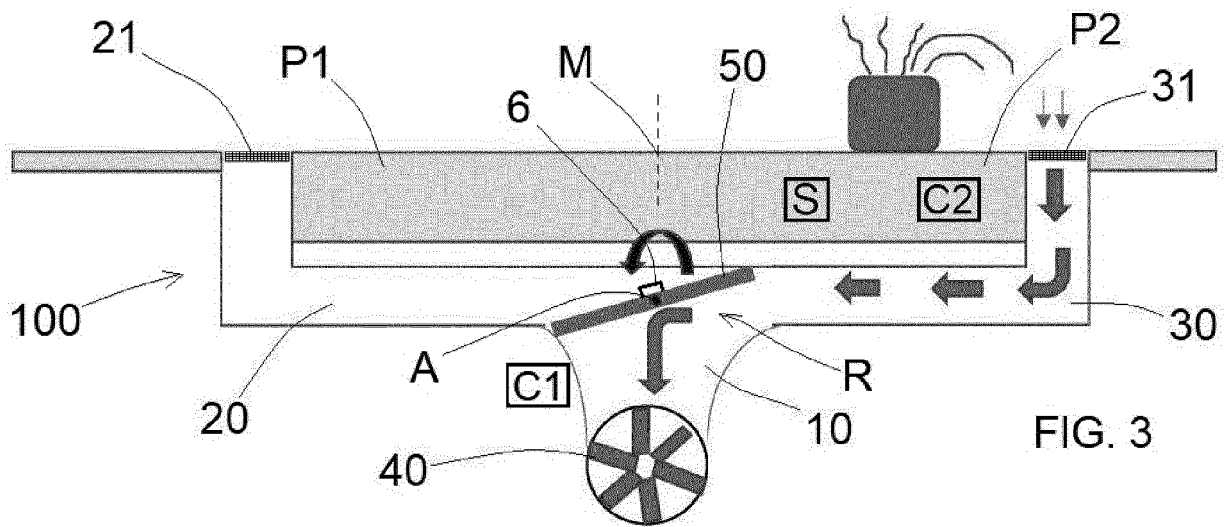
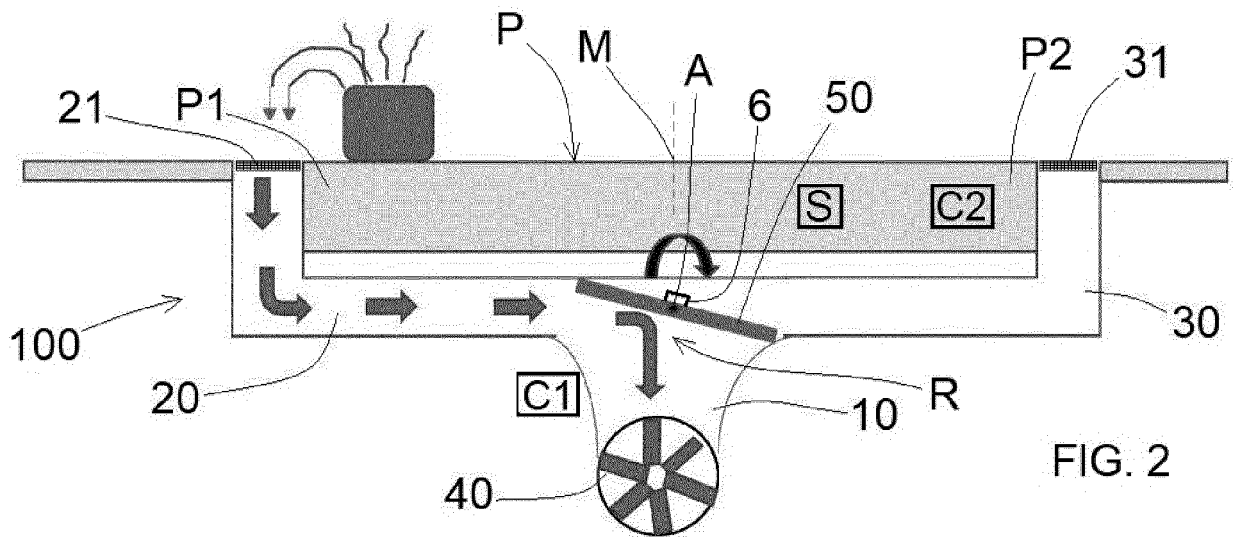
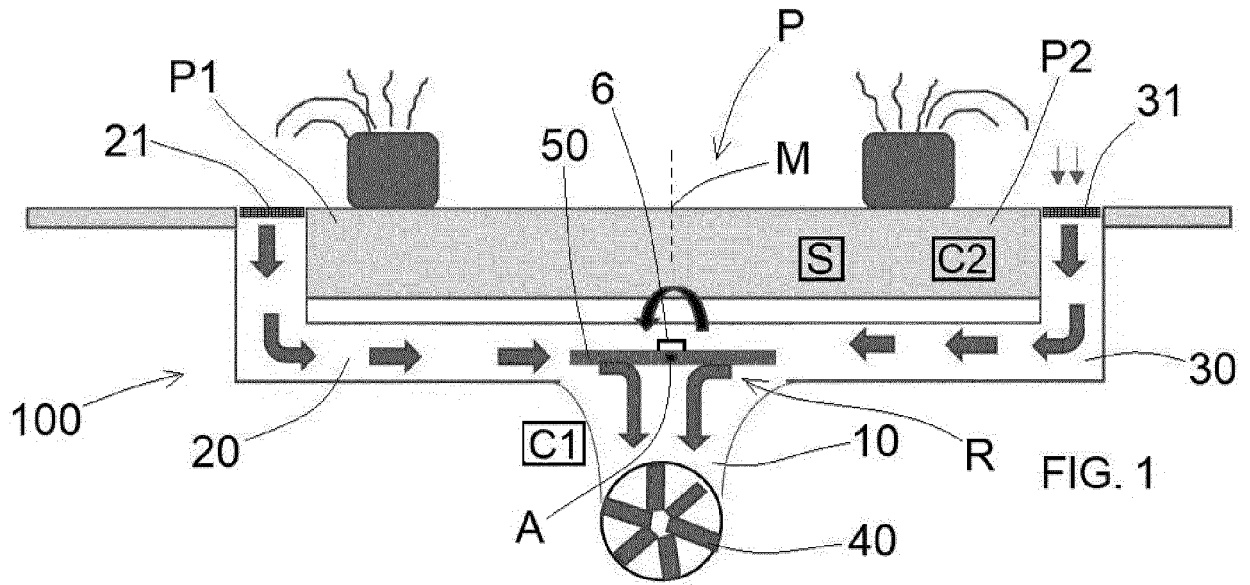
[0036] With reference to Fig. 1, when the deflector (50) is in the first position, the deflector is disposed in horizontal direction along the axis of the horizontal portions of the extraction branches (20, 30). In such a way, the main duct (10) communicates with the two extraction branches (20, 30). Therefore, the extraction of the fan (40) is performed in correspondence of the two extraction branches (20, 30) when the detection means (S) inform the electronic control unit (C1) that the burners of the first portion (P1) and of the second portion (P2) of the hob are active.

[0037] With reference to Fig. 2, when the deflector (50) is in the second position, the deflector is inclined by approximately 20° - 30° relative to a horizontal plane, obstructing the air extraction in the second extraction branch (30) and enabling the air extraction only in the first extraction branch (20). The deflector (50) is moved to the second position when the detection means (S) inform the electronic control unit (C1) that the burners of the second portion (P2) of the hob (P) are not active and only the burners of the first portion (P1) of the hob (P), which is served by the first extraction branch (20), are active.

[0038] With reference to Fig. 3, when the deflector (50) is in the third position, the deflector is inclined in an opposite direction relative to the one of Fig. 2. In such a position, the deflector (50) obstructs the air extraction in the first extraction branch (20) and enables the air extraction only in the second extraction branch (30). The deflector (50) is moved to the third position when the detection means (S) inform the electronic control unit (C1) that only the burners of the second portion (P2) of the hob (P) are active.

Claims

1. Extraction system (100) for a hob (P) with burners disposed in a first lateral portion (P1) and in a second lateral portion (P2) of the hob, wherein said extraction system (100) comprises:
 - a main duct (10) provided with an extraction fan (40) actuated by an electric motor,
 - a first extraction branch (20) and a second extraction branch (30) connected to said main duct (10), wherein the first extraction branch (20) serves the first portion (P1) of the hob (P) and the second extraction branch (30) serves the second portion (P2) of the hob (P),
 - a mobile deflector (50) disposed in a connection point (R) between the main duct (10) and the extraction branches (20, 30), in such a way to be:
 - in a first position, wherein the communication between the main duct (10) and the two extraction branches (20, 30) is enabled;
 - a second position, wherein the communication between the main duct (10) and the first extraction branch (20) is enabled;
 - a third position, wherein the communication between the main duct (10) and the second extraction duct (30) is enabled,
 - an actuator (6) suitable for moving said deflector,
 - an electronic control unit (C1) operatively connected to the actuator (6) of the deflector to control a movement of the deflector (50), and
 - detection means (S) operatively connected to the electronic control unit (C1) and suitable for detecting a state of the burners respectively in correspondence of the first portion (P1) and of the second portion (P2) of the hob (P), wherein said extraction branches (20, 30) are mounted under the hob (P) and lead to a first grille (21) and a second grille (31) respectively disposed near the first portion and (P1) and near the second portion (P2) of the hob, the main duct (10) is mounted under said extraction branches (20, 30), the detection means (S) are disposed in said hob (P).
2. The extraction system (100) of claim 1 or 2, wherein said extraction system (100) also comprises a second electronic control unit (C2) disposed in the hob (P) and operatively connected to the detection means (S) and to said electronic control unit (C1).
3. The extraction system (100) of claim 2, wherein said detection means (S) are integrated in said second electronic control unit (C2).
4. The extraction system (100) of claim 1 or 2, wherein said detection means (S) comprise temperature sensors.
5. The extraction system (100) of any one of claims 2 to 4, wherein said second electronic control unit (C2) is operatively connected to said electronic control unit (C1) by means of wireless technology.
6. The extraction system (100) of any one of the preceding claims, wherein said electronic control unit (C1) is operatively connected to the electric motor of said fan (40).
7. The extraction system (100) of any one of the preceding claims, wherein said actuator (6) is a pneumatic actuator comprising an electrovalve actuated by said electronic control unit (C1).
8. The extraction system (100) of any one of the preceding claims, wherein said deflector (50) comprises a plate hinged in a horizontal axis (A) in the centre of the connection point (R) between the main duct (10) and the extraction branches (20, 21).
9. The extraction system (100) of claim 8, wherein the length of said plate of the deflector (50) is higher than the internal diameter of the extraction branches (20, 30) and the width of said plate of the deflector (50) is substantially equal to the internal diameter of the extraction branches (20, 30).
10. The extraction system (100) of claim 9, wherein said plate of the deflector (50) is hinged to the horizontal axis (A) along a central line of the deflector.





EUROPEAN SEARCH REPORT

 Application Number
 EP 20 20 1113

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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	DE 10 2018 107904 A1 (MIELE & CIE [DE]) 10 October 2019 (2019-10-10) * abstract * * figures 1,2 * * paragraphs [0034], [0035], [0037] *	1-10	INV. F24C15/20
A	EP 0 915 299 A2 (BECK BERND [DE]; BECK MICHAEL [DE]; BECK VOLKER [DE]) 12 May 1999 (1999-05-12) * paragraphs [0017], [0018]; figure 1 *	1-10	
A	DE 20 2007 006405 U1 (MAIER MAX [DE]) 18 September 2008 (2008-09-18) * figure 1 *	1-10	
A	CN 109 990 333 A (VATTI CO LTD) 9 July 2019 (2019-07-09) * paragraphs [0003], [0005], [0006], [0013], [0019], [0035], [0038]; figure 1 *	1-10	
A	CN 107 525 112 A (HANGZHOU ROBAM APPLIANCES CO LTD) 29 December 2017 (2017-12-29) * paragraph [0020]; claims 1, 4, 5 *	1-10	TECHNICAL FIELDS SEARCHED (IPC) F24C F24F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 February 2021	Examiner Jalal, Rashwan
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ON EUROPEAN PATENT APPLICATION NO.**

EP 20 20 1113

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102018107904 A1	10-10-2019	NONE	
EP 0915299 A2	12-05-1999	AT 257236 T	15-01-2004
		DE 19744661 A1	15-04-1999
		EP 0915299 A2	12-05-1999
		ES 2209026 T3	16-06-2004
DE 202007006405 U1	18-09-2008	NONE	
CN 109990333 A	09-07-2019	NONE	
CN 107525112 A	29-12-2017	NONE	

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 109990333 [0013]
- DE 102018107904 [0014]
- CN 107525112 [0015]
- CA 2872239 [0016]