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- **BAEK, Seung-Jo**
Gyeonggi-Do (KR)
- **SOHN, Sang-Bum**
Seocho-Gu
Seoul (KR)
- **LEE, Je-Jun**
Seoul (KR)

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(71) Applicant: **LG ELECTRONICS INC.**
Seoul (KR)

(74) Representative: **Gille Hrabal Struck Neidlein Prop
Roos**
Patentanwälte
Brucknerstrasse 20
40593 Düsseldorf (DE)

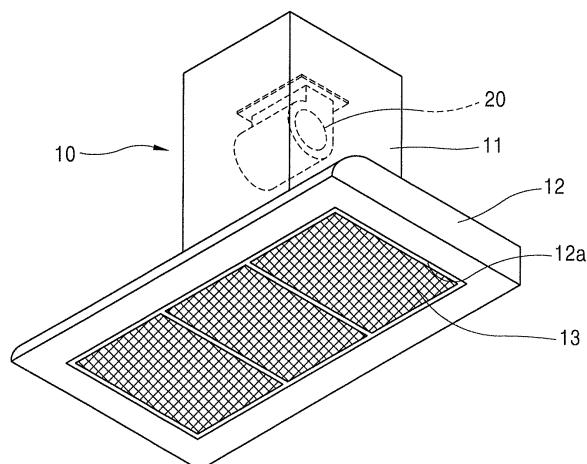
(72) Inventors:
• **SONG, Sung-Bae**
Manan-Gu, Anyang
Gyeonggi-Do (KR)

(54) **Extractor hood**

(57) The present invention discloses an exhaust hood, comprising: a duct portion; a canopy portion installed at the bottom of the duct portion, and provided at the lower surface with a suction port; and a suction port opening regulating means installed within the canopy portion for regulating the opening of the suction port according to the position of food. Temperature sensor por-

tions each can sense heat of a plurality of burners, for example, a first burner portion or second burner portion, installed at a range below the hood, and regulate, i.e., vary the position of the suction port by moving the regulating member, to quickly discharge a larger quantity of foul air to the outside of the room, thereby keeping the room climate pleasant.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an exhaust hood, and more particularly to, an exhaust hood which is installed above a range so as to discharge foul air, such as heat, vapor, food odor, etc., produced when cooking, to the outside of a room.

2. Description of the Background Art

[0002] Generally, a hood as an air exhaustion apparatus is installed above a cooking stove, that is, a range, so as to exhaust foul air, such as heat, vapor, food odor, etc., produced when cooking food, to the outside of a room, thereby keeping the room comfortable.

[0003] Fig. 1 is a bottom perspective view illustrating a prior art exhaust hood, and Fig. 2 is a side view illustrating an installation structure of the prior art exhaust hood.

[0004] As illustrated in Figs. 1 and 2, the prior art exhaust hood 10 comprises a duct portion 11 that houses an air blower 20 therein and is secured to an indoor wall 30 and a canopy portion 12 that is installed at the bottom of the duct portion 11 at a predetermined spacing from a range 50.

[0005] The canopy portion 12 is formed in such a shape that is relatively wider than the duct portion 11, and has a suction port 12a formed at a lower part thereof, and the suction port 12a has a filter 13 installed thereto.

[0006] In the prior art exhaust hood thus constructed, the air blower 20 is operated to suck foul air produced when cooking through the suction port 12a of the canopy portion 12, and discharge the sucked foul air to the outside of a room through the duct portion 11.

[0007] Meanwhile, the width of the canopy portion 12 may be relatively larger than that of a cooking area, that is, an area where food is placed, in order to quickly discharge foul air produced when cooking to the outside of the room. However, in case the width of the canopy portion 12 is larger, a kitchen space becomes narrower. Thus, in general, the width of the canopy portion should be very restricted in consideration of a kitchen space.

[0008] As stated above, if the width of the canopy portion of the prior art exhaust hood is restricted, the size of the suction port formed at a lower part of the canopy portion is also restricted. This makes it hard to quickly and effectively discharge foul air produced when cooking cannot to the outside of the room, thereby contaminating the room air.

SUMMARY OF THE INVENTION

[0009] Therefore, an object of the present invention is to provide an exhaust hood which can quickly discharge

foul air produced when cooking to the outside of a room and prepare a pleasant indoor environment by properly regulating the opening degree of a suction port located right above food being cooked without having to make the size of a canopy portion large.

[0010] To achieve the above object, there is provided an exhaust hood according to the present invention, comprising: a duct portion; a canopy portion installed at the bottom of the duct portion, and provided at the lower surface with a suction port; a suction port opening regulating means installed within the canopy portion and for regulating the opening of the suction port according to the position of food; and a plurality of temperature sensor portions installed at lower parts of the canopy portion so as to sense heat of food and drive the suction port opening regulating means according to the result of sensing.

[0011] The suction port opening regulating means for the exhaust hood comprises: a regulating member horizontally and slidably installed within the canopy portion; a driving portion secured to the canopy portion so as to drive the regulating member; and power transmission units for converting the rotary motion of the driving portion into the vertical motion of the regulating member.

[0012] One example of the power transmission unit may comprise: a pinion secured to a rotary shaft of the driving portion; and a rack formed on the top surface of the regulating member so as to engage with the pinion.

[0013] The driving portion is supported by a bracket, and the bracket is secured to the inside of the canopy portion by bolts.

[0014] Rail grooves are formed on the inner surfaces of both sides of the canopy portion, and rail protuberances are formed on the outer surfaces of both sides of the regulating member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

[0016] In the drawings:

Fig. 1 is a bottom perspective view illustrating a prior art exhaust hood;

Fig. 2 is a side view illustrating an installation structure of the prior art exhaust hood;

Fig. 3 is a longitudinal sectional view illustrating an exhaust hood according to a first embodiment of the present invention;

Fig. 4 is a perspective view of essential parts of the exhaust hood according to the first embodiment of the present invention;

Figs. 5A to 5C show the exhaust hood according to the first embodiment of the present invention, wherein Fig. 5A is a longitudinal sectional view of front and

rear parts of a suction port when opened, Fig. 5B is a longitudinal sectional view of the front part of the suction port when opened, and Fig. 5C is a longitudinal sectional view of the rear part of the suction port when opened;

Fig. 6 is a longitudinal sectional view illustrating an exhaust hood according to a second embodiment of the present invention;

Fig. 7 is a perspective view of essential parts of the exhaust hood according to the second embodiment of the present invention;

Figs. 8A to 8C show the exhaust hood according to the second embodiment of the present invention, wherein Fig. 8A is a longitudinal sectional view of front and rear parts of a suction port when opened, Fig. 8B is a longitudinal sectional view of the front part of the suction port when opened, and Fig. 8C is a longitudinal sectional view of the rear part of the suction port when opened;

Fig. 9 is a longitudinal sectional view illustrating an exhaust hood according to a third embodiment of the present invention;

Fig. 10 is a bottom perspective view showing an open state of a front part of a suction port in the exhaust hood according to the third embodiment of the present invention; and

Fig. 11 is a bottom perspective view showing an open state of a rear part of the suction port in the exhaust hood according to the third embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Hereinafter, an exhaust hood of the present invention will be described with reference to the accompanying drawings.

[0018] Fig. 3 is a longitudinal sectional view illustrating an exhaust hood according to a first embodiment of the present invention. Fig. 4 is a perspective view of essential parts of the exhaust hood according to the first embodiment of the present invention. Figs. 5A to 5C show the exhaust hood according to the first embodiment of the present invention, wherein Fig. 5A is a longitudinal sectional view of front and rear parts of a suction port when opened, Fig. 5B is a longitudinal sectional view of the front part of the suction port when opened, and Fig. 5C is a longitudinal sectional view of the rear part of the suction port when opened.

[0019] As illustrated therein, the exhaust hood 100 according to the first embodiment of the present invention comprises: a duct portion 110; a canopy portion 120 installed at the bottom of the duct portion 110 and provided at the lower surface with a suction port 121; a suction port opening regulating means 130 installed within the canopy portion 120 and for regulating the opening of the suction port 121 according to the position of food; and a plurality of temperature sensor portions 141 and 142 in-

stalled at lower parts of the canopy portion 120 so as to sense heat of food and drive the suction port opening regulating means 130 according to the result of sensing.

[0020] The duct portion 110 is secured to a kitchen inner wall 30 by general engaging means, for example, bolts (not shown). The top part of the duct portion 110 is connected to an exhaust duct (not shown) connecting to the outside of the room, the bottom part of the duct portion 110 is connected to the canopy portion 120, and the duct portion 110 has an air blower 111 installed therein.

[0021] The canopy portion 120 is constructed of a structure having a relatively larger width than the duct portion so that it can quickly suck and discharge foul air produced when cooking. Preferably, the spacing between the canopy portion 120 and the range 500 is maintained a proper distance, for example, generally 600 to 650 mm, so as not to make cooking inconvenient.

[0022] The range 500 known as a cooking stove is provided with a plurality of burner portions, for example, a first burner portion 501 and a second burner portion 502. Depending on a user's selection, either the first burner 501 or the second burner 502 can be used, or both of the first burner portion 501 and second burner portion 502 can be used.

[0023] AT this time, in order to sense heat produced from food when cooking, the first sensor portion 141 and second sensor portion 142 are installed respectively at the front side and rear side of the canopy portion 120.

[0024] Hence, the first temperature sensor portion 141 and second sensor portion 142 sense heat of food cooked in the first burner portion 501 or second burner portion 502, and drive the suction port opening regulating means 130 according to the result of sensing.

[0025] The suction port opening regulating means 130 regulates the opening degree of the suction port 121 formed at the lower part of the canopy portion 120 according to the result of sensing of the first temperature sensor 141 and second temperature sensor 142 as set forth above, to quickly discharge foul air produced when cooking to the outside of the room, thereby maintaining a pleasant room air.

[0026] Hereinafter, the construction of the suction port opening regulating means for the exhaust hood according to the first embodiment will be described.

[0027] The suction port opening regulating means for the exhaust hood according to the first embodiment comprises: a regulating member 131 horizontally and slidably installed within the canopy portion 120; a driving portion 132 secured to the canopy portion 120 so as to drive the regulating member 131; and power transmission units 133 and 134 for converting the rotary motion of the driving portion 132 into the vertical motion of the regulating member 131.

[0028] As the driving portion 132, a general driving motor is used. The power transmission unit 133 and 134 comprises a pinion 133 secured to a rotary shaft 132a of the driving portion, i.e., driving motor 132 and a rack 134 formed on the top surface of the regulating member 131

so as to engage with the pinion 133.

[0029] Referring to Fig. 4, the rack 134 is longitudinally formed on the top surface of the regulating member 134 in a vertical direction of the canopy portion 120, and the pinion 131 is engaged with the rack 134, being fitted to the rotary shaft 132a of the driving motor 132.

[0030] The driving motor 132 is supported by a bracket 135, and the bracket 135 is secured to the inside of the canopy portion 120 by bolts (not shown).

[0031] Rail grooves 137 are longitudinally formed on the inner surfaces of both sides of the canopy portion 120 in the vertical direction thereof so that the regulating member 131 can slide in the vertical direction of the canopy portion 120. Rail protuberances 138 are longitudinally formed on the outer surfaces of both sides of the regulating member 131 in the vertical direction thereof so as to correspond to the rail grooves 138.

[0032] The foul air produced when cooking contains fine food particles. In case such food particles are introduced into the canopy portion 120 or duct 110, the inside of the canopy portion 120 or duct 110 may be contaminated and the food particles may be rotten to give off odors. To avoid this problem, it is preferable that at least either the duct portion 111 or the canopy portion 120 has a filter 139 installed therein.

[0033] Additionally, the foul air produced when cooking is discharged out of the room through the canopy portion 120 and the duct 110. Preferably, a sound insulation material 131a is installed within the regulating member 131 in order to block noise produced when operating the air blower 111.

[0034] Hereinafter, the operation of the exhaust hood thus constructed according to the first embodiment of the present invention will be described.

[0035] Referring to Fig. 5A, in case of cooking food using both first burner portion 501 and second burner portion 502, both first sensor portion 141 and second sensor portion 141 sense heat of the food. At this time, when the driving motor 132 is driven, the regulating member 131 is slidably moved along the rail grooves 137 by the pinion 133 secured to the rotary shaft 132a of the driving motor 132 and the rack 134 engaging with the pinion 133. When the regulating member 131 is slid to be located in the middle of the suction port 121, both sides of the suction port 121, that is, both of the front and rear parts of the suction port 121 are opened, and through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 111.

[0036] Referring to Fig. 5B, in case of cooking food using only the first burner portion 501, only the first sensor portion 141 senses heat of the food. At this time, when the driving motor 132 is driven, the regulating member 131 is slidably moved along the rail grooves 137 by the pinion 133 secured to the rotary shaft 132a of the driving motor 132 and the rack 134 engaging with the pinion 133. When the regulating member 131 is slid to be located in the rear side of the suction port 121, the front part of the

suction port 121 are opened, and through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 111.

[0037] Referring to Fig. 5C, in case of cooking food using only the second burner portion 502, only the second sensor portion 142 senses heat of the food mounted on the second burner portion 502. At this time, when the driving motor 132 is driven, the regulating member 131 is slidably moved along the rail grooves 137 by the pinion 133 secured to the rotary shaft 132a of the driving motor 132 and the rack 134 engaging with the pinion 133. When the regulating member 131 is slid to be located in the front side of the suction port 121, the rear part of the suction port 121 are opened, and through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 111.

[0038] As described above, the respective temperature sensor portions 141 and 142 sense heat of foods mounted respectively on multiple burner portions installed at the range 500, that is, on the first burner portion 501 or second burner portion 502, and regulates, i.e., varies the opening of the suction port 121 by moving the regulating member 131, to quickly discharge a larger quantity of foul air to the outside of the room, thereby keeping the room pleasant.

[0039] Fig. 6 is a longitudinal sectional view illustrating an exhaust hood according to a second embodiment of the present invention. Fig. 7 is a perspective view of essential parts of the exhaust hood according to the second embodiment of the present invention. Figs. 8A to 8C show the exhaust hood according to the second embodiment of the present invention, wherein Fig. 8A is a longitudinal sectional view of front and rear parts of a suction port when opened, Fig. 8B is a longitudinal sectional view of the front part of the suction port when opened, and Fig. 8C is a longitudinal sectional view of the rear part of the suction port when opened;

[0040] As illustrate in Figs. 6 and 7, the exhaust hood 200 according to the second embodiment of the present invention comprises: a duct portion 210; a canopy portion 220 installed at the bottom of the duct portion 210 and provided at the lower surface with a suction port 221; a suction port opening regulating means 230 installed within the canopy portion 220 and for regulating the opening of the suction port 221 according to the position of food; and a plurality of temperature sensor portions 240 installed at lower parts of the canopy portion 220 so as to sense a temperature of a position of the canopy portion 220 and drive the suction port opening regulating means 230 according to the result of sensing.

[0041] The suction port opening regulating means 230 of the exhaust hood according to the second embodiment of the present invention comprises a bracket 231 secured to the inside of the canopy portion 220, a first driving motor 232 supported by the bracket 231, a second driving motor 233 installed adjacent to the first driving motor 232,

a first regulating member 234 rotatably coupled to a rotary shaft 232a of the first driving motor 232 so as to selectively open some parts of the suction port 221, and a second regulating member 235 rotatably coupled to a rotary shaft 233a of the second driving motor 233 so as to selectively open other parts of the suction port 221.

[0042] The first driving motor 232 and second driving motor 233 are secured leaning against each other. A first securing hole 234a is formed at one side of the first regulating member 234 so as to insert the rotary shaft 232a of the first driving motor 232 therein, and a second securing hole 235a is formed at one side of the second regulating member 235 so as to insert the rotary shaft 233a of the second regulating member 235 therein.

[0043] The first regulating member 234 and second regulating member 235 shut the suction port 221, being spread out horizontally relative to the rotary shaft 23a and rotary shaft 235a, respectively. When cooking, the first regulating member 234 rotates at a predetermined angle relative to the rotary shaft 234a by the operation of the first driving motor 232 to thus open some parts of the suction port 221, and also the second regulating member 235 rotates at a predetermined angle relative to the rotary shaft 235a to thus open some parts of the suction port 221.

[0044] Hereinafter, the operation of the exhaust hood thus constructed according to the second embodiment of the present invention will be described.

[0045] Referring to Fig. 8A, in case of cooking food using both first burner portion 501 and second burner portion 502, both first sensor portion 241 and second sensor portion 242 sense heat of the food. At this time, when both first driving motor 232 and second driving motor 233 are driven, the regulating member 234 secured to the rotary shaft 232a of the first driving motor 232 rotates at a predetermined angle relative to the rotary shaft 234a and at the same time, the second regulating member 235 secured to the rotary shaft 235a of the second driving motor 235 rotates at a predetermined angle relative to the rotary shaft 235a, to thus open the front and rear parts of the suction port 221. Through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 211.

[0046] Referring to Fig. 8B, in case of cooking food using only the first burner portion 501, only the first sensor portion 241 senses heat of the food mounted on the first burner portion 501. At this time, when the first driving motor 232 is driven, the first regulating member 234 secured to the rotary shaft 232a of the first driving motor 232 rotates at a predetermined angle relative to the rotary shaft 234a, to thus open the rear part of the suction port 221. Through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 211.

[0047] Referring to Figs. 7 and 8B, in case of cooking food using only the second burner portion 502, only the second sensor portion 242 senses heat of the food

mounted on the second burner portion 502. At this time, when the second driving motor 233 is driven, the second regulating member 235 secured to the rotary shaft 233a of the second driving motor 233 rotates at a predetermined angle relative to the rotary shaft 235a, to thus open the front part of the suction port 221. Through this open space, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 211.

[0048] Fig. 9 is a longitudinal sectional view illustrating an exhaust hood according to a third embodiment of the present invention. Fig. 10 is a bottom perspective view showing an open state of a front part of a suction port in the exhaust hood according to the third embodiment of the present invention. Fig. 11 is a bottom perspective view showing an open state of a rear part of the suction port in the exhaust hood according to the third embodiment of the present invention.

[0049] As illustrated in Figs. 9 to 11, the exhaust hood 300 according to the third embodiment of the present invention comprises: a duct portion 310; a canopy portion 320 installed at the bottom of the duct portion 310 and provided at the lower surface with a suction port 321; a suction port opening regulating means 330 installed within the canopy portion 320 and for regulating the opening of the suction port 321 according to the position of food; and a plurality of temperature sensor portions 340 installed at lower parts of the canopy portion 320 so as to sense a temperature of a position of the canopy portion 320 or a temperature of heat of food and drive the suction port opening regulating means 330 according to the result of sensing.

[0050] The suction port opening regulating means 330 of the exhaust hood according to the third embodiment of the present invention comprises a bracket 331 secured to the inside of the canopy portion 320, a driving motor 332 supported by the bracket 331, and a regulating member 333 supported by the bracket 331 and for regulating the opening of the suction port 321 while rotating at a predetermined angle by the driving motor 332.

[0051] Auxiliary suction ports 321 are formed at both sides of the bottom surface of the canopy portion 320, and a suction hole 333a is formed at the regulating member 333.

[0052] Hereinafter, the operation of the exhaust hood thus constructed according to the third embodiment of the present invention will be described.

[0053] Referring to Figs. 9 and 10, in case of cooking food using only the first burner portion 501, only the first sensor portion 341 senses heat of the food mounted on the first burner portion 501. At this time, when the driving motor 332 is driven, the regulating member 333 secured to the rotary shaft 332a of the driving motor 332 rotates at a predetermined angle relative to the rotary shaft 332a. Whereupon the suction hole 333a is positioned at the front side of the canopy portion 120, and through this suction hole 333a, foul air produced when cooking is quickly discharged out of the room by a suction force of

the air blower 311.

[0054] Referring to Figs. 9 and 11, in case of cooking food using only the second burner portion 502, only the second sensor portion 342 senses heat of the food mounted on the first burner portion 502. At this time, when the driving motor 332 is driven, the regulating member 333 secured to the rotary shaft 332a of the driving motor 332 rotates at a predetermined angle relative to the rotary shaft 332a. Whereupon the suction hole 333a is positioned at the rear side of the canopy portion 120, and through this suction hole 333a, foul air produced when cooking is quickly discharged out of the room by a suction force of the air blower 321.

[0055] As seen above, according to the exhaust hood present invention, the temperature sensor portions each can sense heat of hood being cooked on a plurality of burners, for example, a first burner portion or second burner portion, installed at the range, and regulate, i.e., vary the position of the suction port by moving the regulating member, to quickly discharge a larger quantity of foul air to the outside of the room, thereby keeping the room pleasant.

Claims

1. An exhaust hood, comprising:

a duct portion;
a canopy portion installed at the bottom of the duct portion, and provided at the lower surface with a suction port; and
a suction port opening regulating means installed within the canopy portion and for regulating the opening of the suction port according to the position of food.

2. The exhaust hood of claim 1, further comprising a plurality of temperature sensor portions installed at lower parts of the canopy portion so as to sense heat of food and drive the suction port opening regulating means according to the result of sensing.

3. The exhaust hood of claim 1, wherein the suction port opening regulating means comprises:

a regulating member horizontally and slidably installed within the canopy portion;
a driving portion secured to the canopy portion so as to drive the regulating member; and
power transmission units for converting the rotary motion of the driving portion into the vertical motion of the regulating member.

4. The exhaust hood of claim 3, wherein the power transmission unit comprise:

a pinion secured to a rotary shaft of the driving

portion; and

a rack formed on the top surface of the regulating member so as to engage with the pinion.

5. The exhaust hood of claim 3, wherein the driving portion is a driving motor.

6. The exhaust hood of claim 3, wherein the driving portion is supported by a bracket, and the bracket is secured to the inside of the canopy portion by bolts.

7. The exhaust hood of claim 3, wherein rail grooves are formed on the inner surfaces of both sides of the canopy portion, and rail protuberances are formed on the outer surfaces of both sides of the regulating member.

8. The exhaust hood of claim 3, wherein a sound insulation material is installed within the regulating member.

9. The exhaust hood of claim 2, wherein the suction port opening regulating means comprises; a bracket secured to the inside of the canopy portion; a first driving motor supported by the bracket; a second driving motor installed adjacent to the first driving motor;

a first regulating member rotatably coupled to a rotary shaft of the first driving motor so as to selectively open some parts of the suction port; and
a second regulating member rotatably coupled to a rotary shaft of the second driving motor so as to selectively open other parts of the suction port.

10. The exhaust hood of claim 9, wherein the first driving motor and second driving motor are secured leaning against each other, and a first securing hole is formed at one side of the first regulating member so as to insert the rotary shaft of the first driving motor thereinto and a second securing hole is formed at one side of the second regulating member so as to insert the rotary shaft of the second regulating member thereinto.

11. The exhaust hood of claim 9, wherein the first regulating member and second regulating member shut the suction port, being spread out horizontally.

12. The exhaust hood of claim 1, wherein the suction port opening regulating means comprises:

a bracket secured to the inside of the canopy portion;
a driving motor supported by the bracket; and
a regulating member supported by the bracket and for regulating the opening of the suction port while rotating at a predetermined angle by the driving motor.

13. The exhaust hood of claim 12, wherein auxiliary suction ports are formed at both sides of the bottom surface of the canopy portion
14. The exhaust hood of claim 11, wherein a suction hole is formed at the regulating member. 5
15. The exhaust hood of claim 1, wherein at least either the duct portion or the canopy portion has a filter installed therein. 10
16. An exhaust hood, comprising:
- a duct portion;
 - a canopy portion installed at the bottom of the duct portion and provided at the lower surface with a suction port; 15
 - a suction port opening regulating means installed within the canopy portion and for regulating the opening of the suction port according to the position of food; and 20
 - a plurality of temperature sensor portions installed at lower parts of the canopy portion so as to sense a temperature of a position of the canopy portion and drive the suction port opening regulating means according to the result of sensing. 25
17. The exhaust hood of claim 16, wherein the suction port opening regulating means comprises: 30
- a regulating member horizontally and slidably installed within the canopy portion;
 - a driving portion secured to the canopy portion so as to drive the regulating member; and 35
 - power transmission units for converting the rotary motion of the driving portion into the vertical motion of the regulating member. 40

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FIG. 1

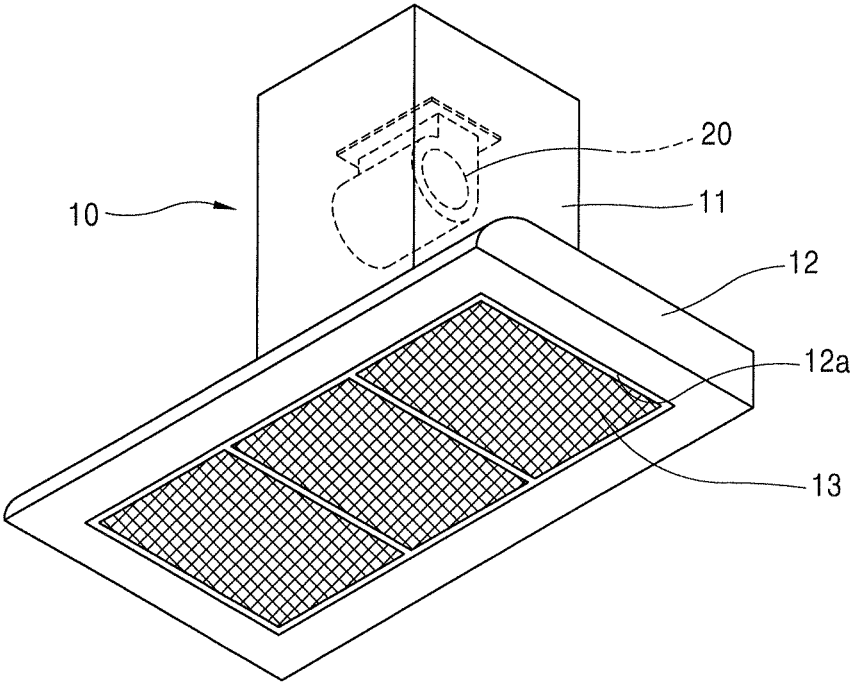


FIG. 2

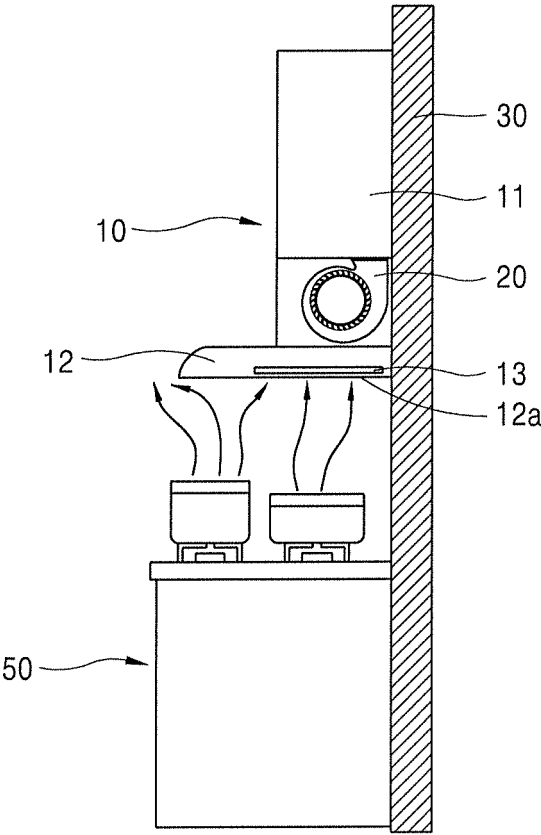


FIG. 3

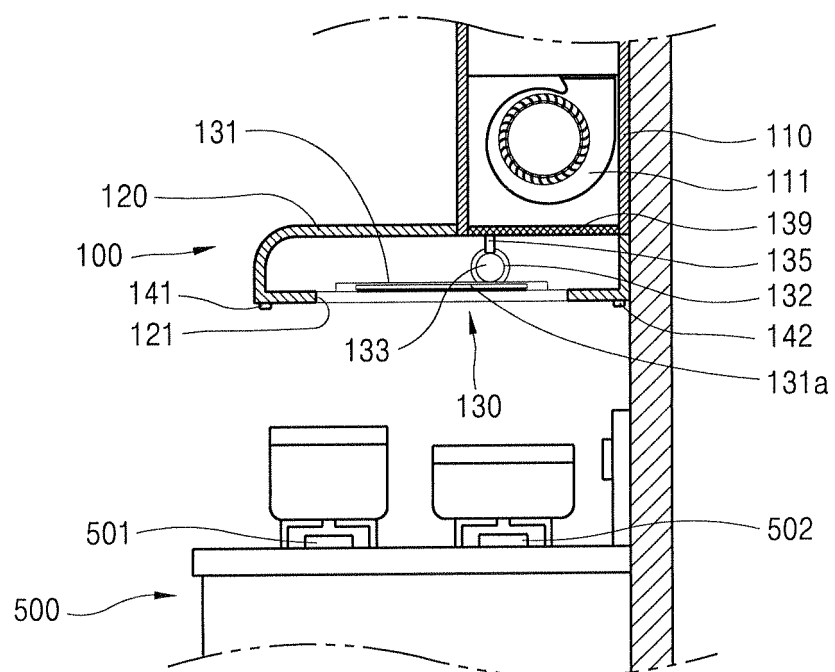


FIG. 4

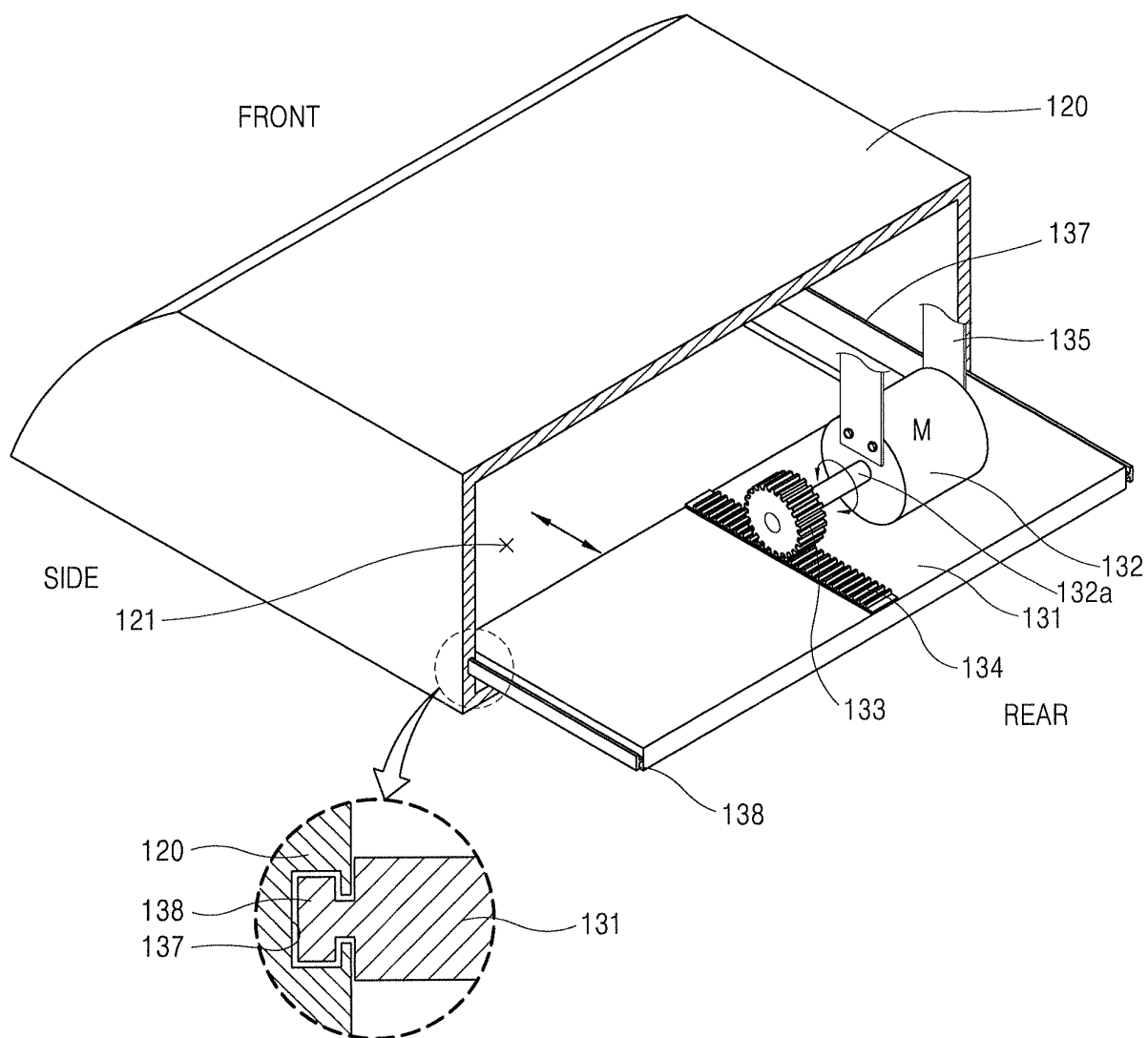


FIG. 5A

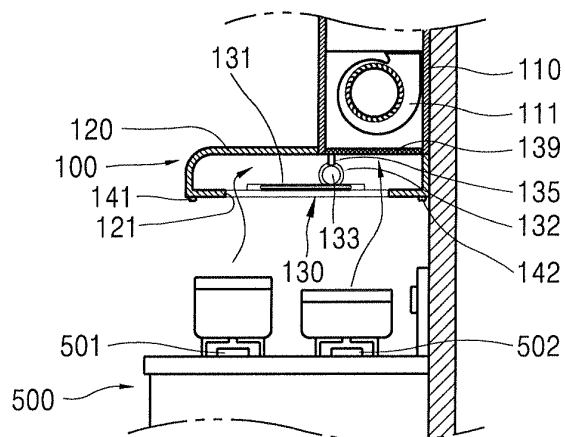


FIG. 5B

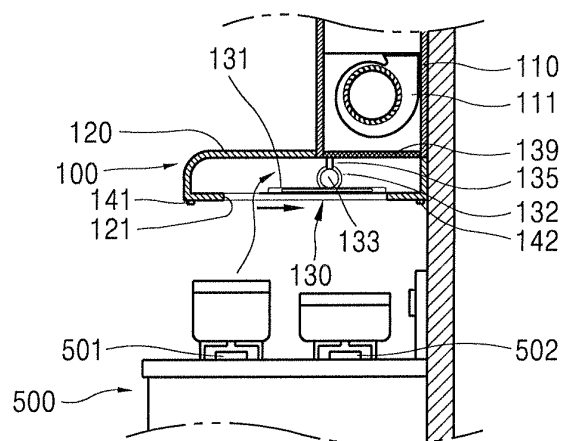


FIG. 5C

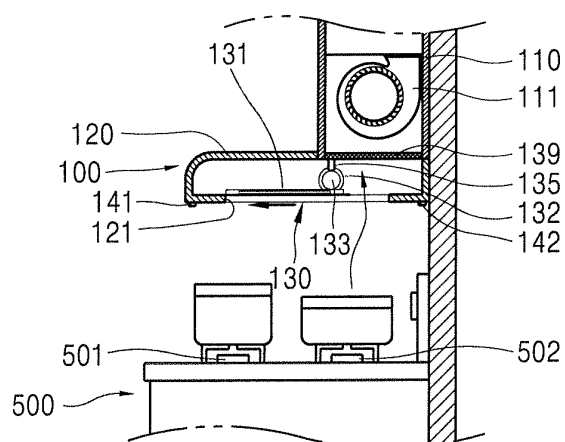


FIG. 6

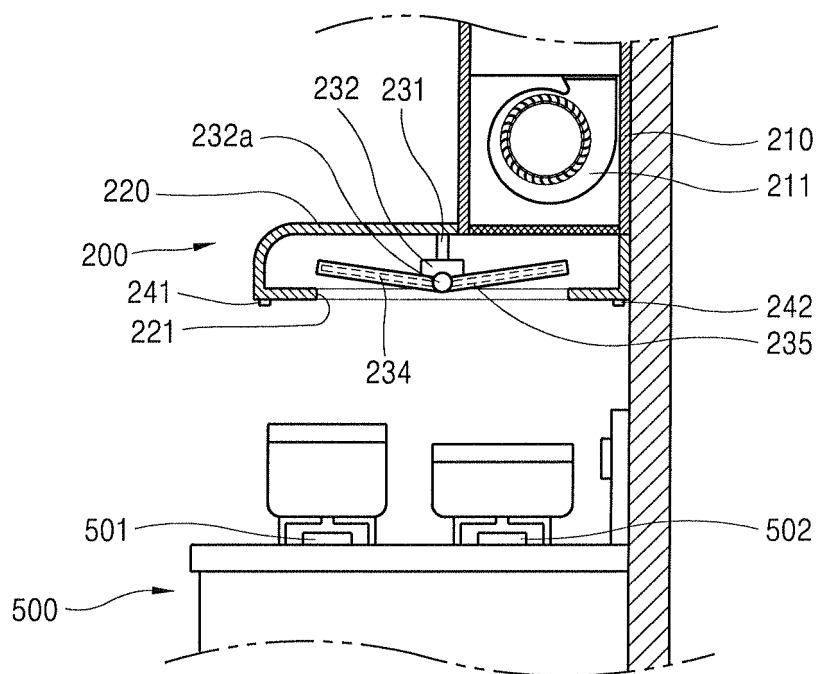


FIG. 7

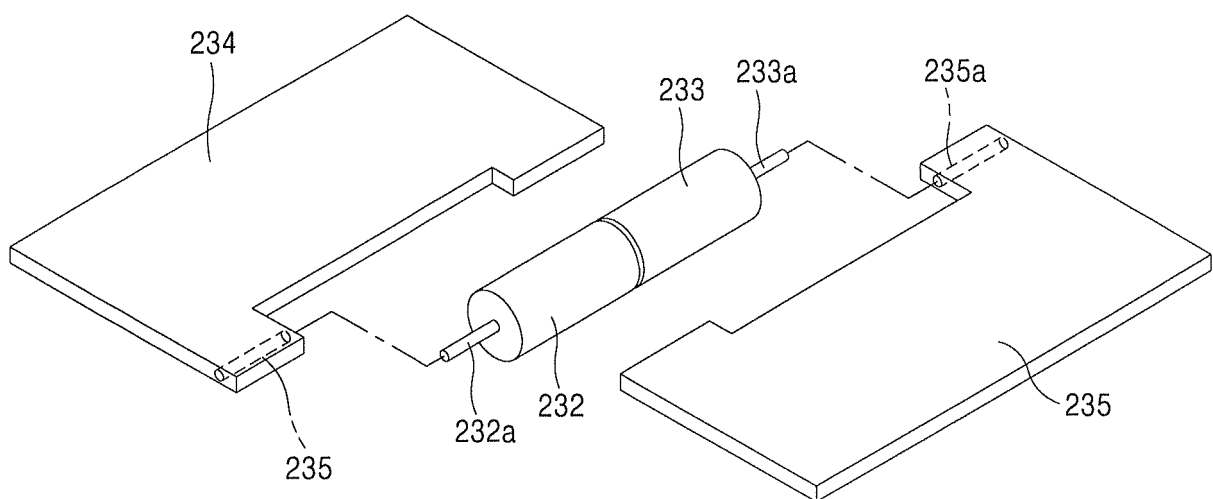


FIG. 8A

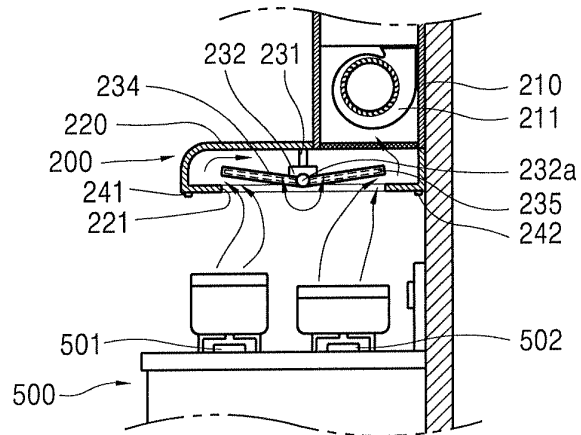


FIG. 8B

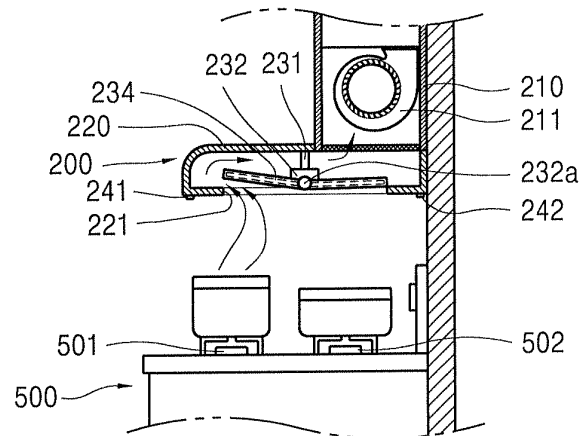


FIG. 8C

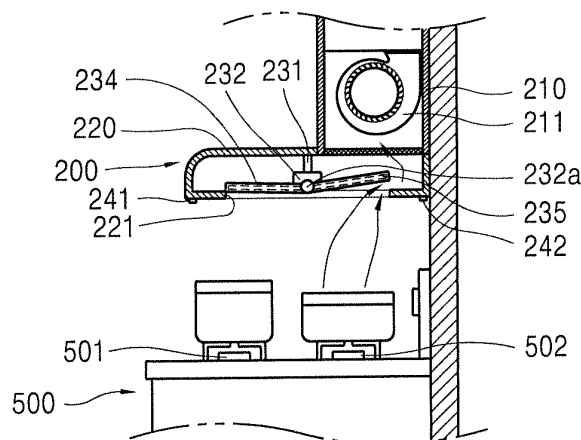


FIG. 9

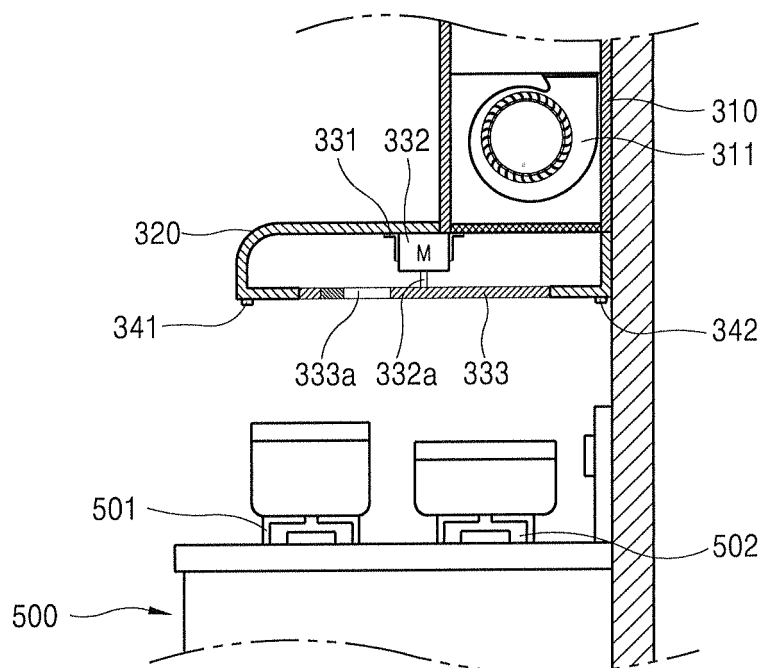


FIG. 10

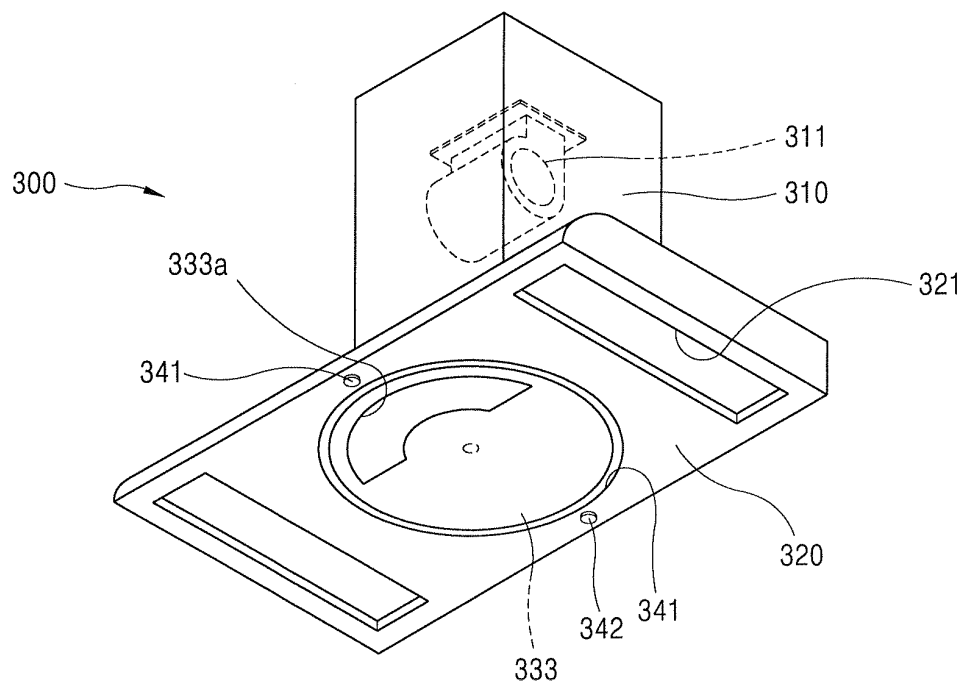
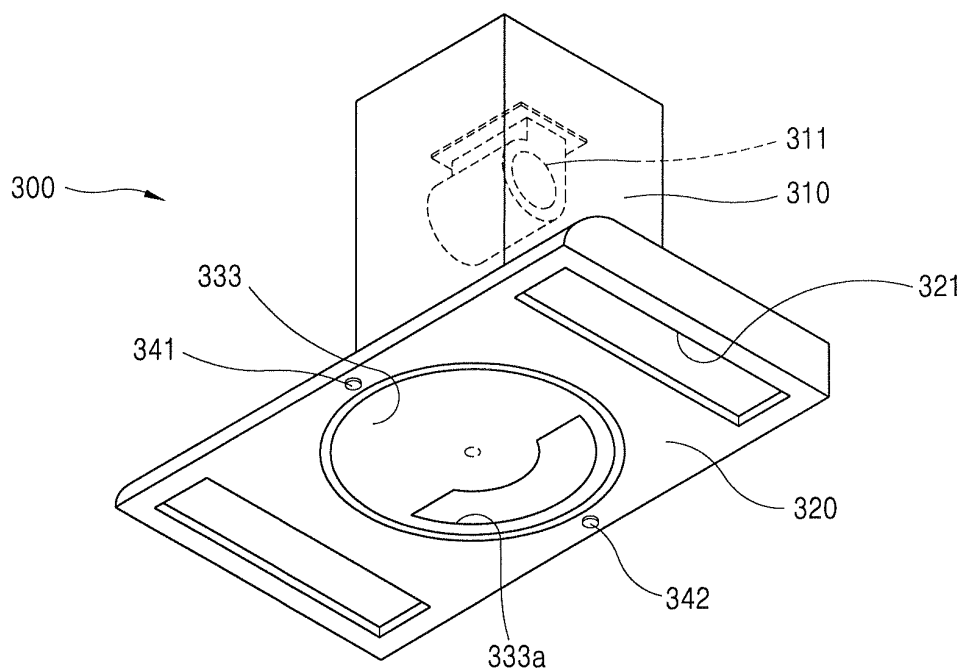


FIG. 11





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 10 7003

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2004/035411 A1 (LIVCHAK ANDREY ET AL) 26 February 2004 (2004-02-26) * abstract * * paragraphs [0002], [0004] - [0007], [0082] - [0087], [0113] - [0115], [0125], [0136]; figures 4,5a,5b,40,46,47 *	1-7,16, 17	F24C15/20
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Place of search Munich		Date of completion of the search 16 December 2005	Examiner von Mittelstaedt, A
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