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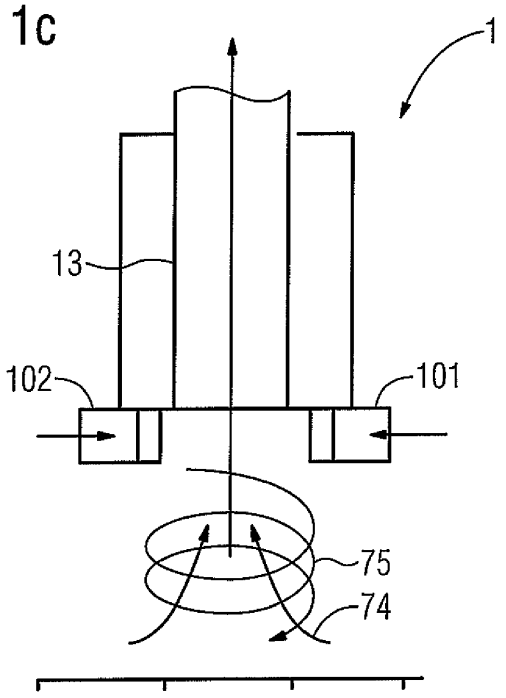
Remarks:
This application was filed on 22-02-2012 as a divisional application to the application mentioned under INID code 62.

(54) Suction hood

(57) The invention relates to a suction hood,
a) which sucks air from a first area to a second area, in particular to the outside,
b) wherein the hood comprises
b1) a first sucking means (64) which pulls the air to the suction hood by generating an at least substantially direct suction to the suction hood and
b2) a second sucking means (62) which generates a substantially circular, cyclone or helix movement in the air,

and a method for generating a air suction by means of a suction hood.

FIG 1c



EP 2 487 423 A1

Description

[0001] The invention relates to a suction hood, which sucks air from a first area to a second area.

[0002] Known or traditional suction hoods, which also can be denominated as destructor hoods, range hoods, kitchen hoods, stove hoods, exhaust hoods, cooker hoods, extraction hoods, cooking canopy or ventilation hoods, are used to remove airborne grease, combustion products, smoke, odours and/or heat and steam, which is generated usually by a cooking process on a cooktop, normally by a combination of filtration and evacuation of the air. They usually comprise three main components: A skirt or capture panel to contain the rising gases (also known as the "effluent plume"), one or more grease filters, and a fan or tangential blower for forced ventilation.

[0003] There are two major applications of extractor hoods: vented application, and recirculating application. In a vented application, the output collar of the extractor hood's blower motor is attached to a duct system, which terminates outside of the kitchen. In a recirculating application, a filter containing activated charcoal is used to remove odour and smoke particles from the air, before releasing the cleaned air back into the kitchen environment.

[0004] The fans or blowers create, when activated, an area of low pressure which takes effect spherically around the hood.

[0005] The airborne grease, combustion products, smoke, odours, heat and steam generated by the cooking of food on the cooktop rise naturally in a vertical motion due to gravity effect, and enter the effective area of the hood to be captured by the low pressure area.

[0006] The traditional hoods as described above present at least relatively low efficiency in treating the fumes from the cooktop as they suck-up equally air from the surrounding environment. FIG 1a shows such a hood 1', where the gas is sucked in from all sides along paths shown by arrows 74'.

[0007] The pressure field 71' of a traditional hood 1' over a cooktop 7' is shown in FIG 1b. The pressure field represents the effective suction volume of the hood.

[0008] In WO 89/11926 A1, a ventilating system has been proposed with nozzles and/or blowers mounted around one or more centrally located exhaust channels.

[0009] In is an object of invention, to improve the characteristics of the hood, especially the suction characteristics.

[0010] This object is solved by a suction hood according to claim 1. Advantageous embodiments can be derived especially from the dependent claims.

[0011] According to claim 1, the invention relates to a suction hood,

a) which sucks air from a first area to a second area,
b) wherein the hood comprises

b1) a first sucking means which pulls the air to the suction hood by generating an at least substantially direct suction to the suction hood and
b2) a second sucking means which pulls the air to the suction hood by generating an at least substantially circular, cyclone or helix movement.

[0012] The second sucking means preferably generates a tornado suction in the area underneath of it which allows an improved and focussed suction. The combination of a first sucking means and a second sucking means according to the invention enables an improvement of the suction characteristics of the suction hood, as the addition of the second sucking means especially allows an improvement and/or a focusing of the suction in the area underneath the second sucking means which is preferably used for cooking.

[0013] In a preferred embodiment, the second sucking means are operated or operatable in a boost mode, so that the second sucking means temporarily boosts the suction of the first sucking means. This allows to boost the suction in cases wherein, for example, a lot of fumes are generated. By activating the boost mode, the fumes normally can be exhausted or reduced more rapidly.

[0014] Preferably, the first and the second sucking means are operated or operatable in a pulse working mode and/or alternatively. This enables that, on the one hand, fumes underneath of the second sucking means can be exhausted or reduced more rapidly, when this suction means is active, whereas also fumes from the surrounding area are removed when the first sucking means is active.

[0015] In a preferred embodiment, the first and the second sucking means are operated or operatable together, so that the second sucking means continuously boosts the suction of the first sucking means. This enables an improved suction in the area underneath the second sucking means whereas also air is sucked from the surrounding area by the first suction means.

[0016] Preferably, an outer suction area surrounds an inner suction area wherein preferably

a) the first sucking means sucks the air to the suction hood mostly through the outer suction area and/or

b) the second sucking means pulls the air to the suction hood at least substantially uniformly through the outer suction area and the inner suction area.

[0017] In this case, at least substantially separate suction areas are provided for both suction means so that the suction areas can complement one another without interfering or cancelling each other too much.

[0018] In an advantageous embodiment, the air for operating the vortex is sucked in laterally, preferably through lateral openings and/or from the outer suction area. This allows an at least relatively easy feeding of the required air while not affecting the circular, cyclone or helix movement more than necessary.

[0019] Preferably, the second sucking means is added or addable by a adding means, preferably dependent on noise, efficiency and/or fumes, the adding means is preferably a switch and/or a sensor driven device. By this, the second sucking means can be added only when necessary.

[0020] In a preferred embodiment, the second sucking means is a tornado suction hood and/or the first sucking means is a standard suction hood.

[0021] Preferably, the suction hood is a vented and/or a recirculating suction hood. Both embodiments can be used in a preferred way with the suction means.

[0022] Furthermore, the invention relates to a method for generating a air suction by means of a suction hood according to one of the preceding claims.

[0023] The invention will now be described in further details with references to the schematical drawings in which

FIG 1c	outlines the concept of a tornado suction hood,
FIG 1d	shows the pressure field of a hood system according to FIG 1c,
FIG 2a to 2c	show an embodiment of the invention and in which

[0024] FIG 1c outlines the concept of a tornado suction hood 1. The arrows 75 represent the rotating column of air and the arrows 74 represent the suction draft. The combination of these two flows generates the tornado. The air is sucked in through air inlets 101, 102 and therefore pushed into the suction channel 13.

[0025] The pressure field 71 of such a hood system 1 is shown in FIG 1d. The pressure field represents the effective suction volume of the hood. The generated vortex between the cooktop 7 and the hood 1 sucks in the fume from the cooktop 7 in a swirling motion.

[0026] FIG 2a to 2c show an embodiment of the invention. FIG 2a shows a perspective view of the hood with the vortex module 62. FIG 2b shows a cross sectional view of the hood, whereas FIG 2c shows a bottom view of the hood with the vortex module 62.

[0027] The suction hood 6 comprises a first sucking means 64 which pulls the air to the suction hood by generating an at least substantially direct suction to the suction hood 6 and a second sucking means 62 which pulls the air to the suction hood 6 by generating an at least substantially circular, cyclone or helix movement.

[0028] The suction hood 6 comprises a cuboidal upper part 681 under which a lower part 682 with an at least nearly square shaped upper and lower surface, between which four longish side surfaces are arranged. At the sides of the lower part 682, air inlets 601 and 602 are shown.

[0029] The upper part 681 and the lower part 682 are arranged directly adjacent, where the common surface is left out to allow the air to flow through.

[0030] FIG 2b shows a number of suction channels 623 of the vortex module 62 arranged tangentially around the ring shaped area 622. Not shown engines blow the air tangentially from the air inlets 601 and 602 through the outer suction area 634 into the inner suction area 631 of the hood 6 and thus generate the circulating air. The circulating air, in turn, generates a suction which sucks the air into and through the inner suction area 631. The air escapes the suction area at the outlet 633. This is also called tornado aspiration.

[0031] A suctions means 64 is arranged centrally in the upper part 681 which is able to suck the air directly upwards through the inner suction area 631 and the outer suction area 634. This is also called standard aspiration.

[0032] The hood 6 can be operated with standard aspiration as well as with Tornado aspiration. This can be done in three different ways:

In a first mode, the tornado aspiration is added in a pulse working mode, so that the tornado aspiration and standard aspiration are operated alternatively. For example in the first second, tornado aspiration is used, whereas in the second second, standard aspiration is used. In the next second, tornado aspiration is used again and so on. This means that during the tornado aspiration the suction through the suction area 631 is boosted, while, during the standard aspiration, the suction are is, at least substantially spreaded over the inner suction area 631 and the outer suction area 634.

[0033] In a second mode, the tornado aspiration can be operated in a boost mode to amplify the effect of the standard

aspiration. This means that, in a normal mode, only the standard aspiration runs, whereas for boosting, the tornado aspiration is added and boosts the suction mostly in the inner suction area 631.

[0034] In a third mode, the tornado aspiration is operated together with the standard aspiration so that both modes are operated at the same time. This means that the inner suction area 631 is boosted, while the outer suction area 634 is, at least with respect to the inner suction area 631 operated with standard suction.

List of reference signs

[0035]

101, 102, 601, 602	air inlets
13	suction channel
6	suction hood
61	first sucking means
62	second sucking means
622	ring shaped area
623	suction channels
63, 631, 632, 634	suction areas
681, 682	housing

Claims

1. Suction hood,

a) which sucks air from a first area to a second area,
b) wherein the hood comprises

b1) a first sucking means (64) which pulls the air to the suction hood by generating an at least substantially direct suction to the suction hood and
b2) a second sucking means (62) which pulls the air to the suction hood by generating an at least substantially circular, cyclone or helix movement.

2. Suction hood according to one of the preceding claims, wherein the second sucking means (62) is operated or operatable in a boost mode, so that the second sucking means (62) temporarily boosts the suction of the first sucking means (64) .

3. Suction hood according to one of the preceding claims,
wherein the first (64) and the second (62) sucking means are operated or operatable in a pulse working mode and/or alternatively.

4. Suction hood according to one of the preceding claims,
wherein the first (64) and the second (62) sucking means are operated or operatable together, so that the second sucking means (62) continuously boosts the suction of the first sucking means (64).

5. Suction hood according to one of the preceding claims,
wherein an outer suction area (634) surrounds an inner suction area (631) wherein preferably

a) the first sucking means (64) sucks the air to the suction hood mostly through the outer suction area (634) and/or
b) the second sucking means (62) pulls the air to the suction hood at least substantially uniformly through the

outer suction area (634) and the inner suction area (631).

6. Suction hood according to one of the preceding claims,
wherein the air for operating the second sucking means (62), which is preferably a vortex module, is sucked in laterally, preferably

a) through lateral openings (601, 602) and/or
b) from the outer suction area (634).

7. Suction hood according to one of the preceding claims,

a) wherein the second sucking means (62) is added or addable by a adding means, preferably dependent on noise, efficiency and/or fumes,
b) wherein the adding means is preferably a switch and/or a sensor driven device.

8. Suction hood according to one of the preceding claims,

a) wherein the second sucking means (62) is a tornado suction hood and/or
b) wherein the first sucking means (64) is a standard suction hood.

9. Suction hood according to one of the preceding claims,
wherein the suction hood is

a) a vented suction hood, wherein preferably the first area is inside a room and the second area is outside the room, and/or
b) a recirculating suction hood, wherein preferably the first area is inside a room and the second area is inside the room.

10. Method for generating a air suction by means of a suction hood according to one of the preceding claims.

FIG 1a

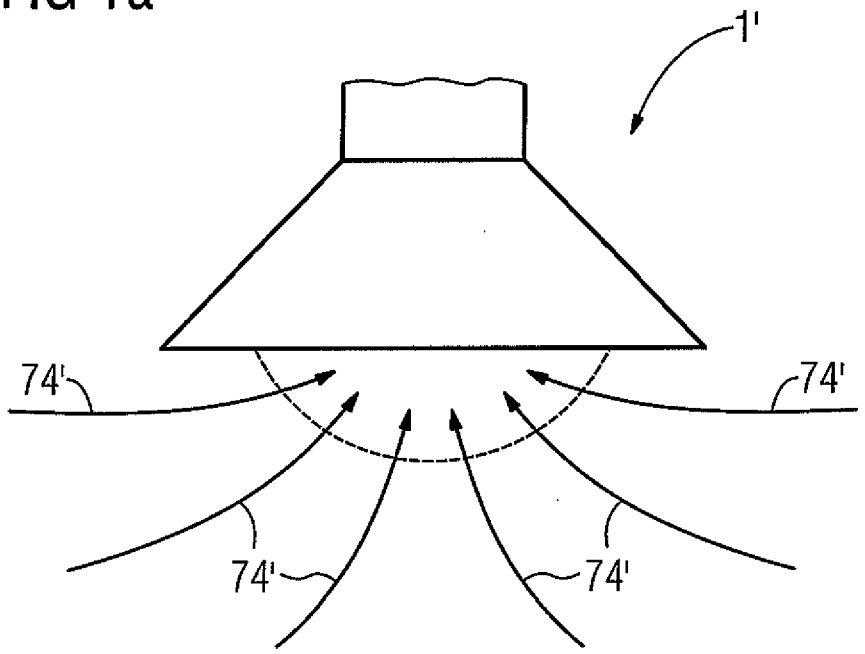


FIG 1b

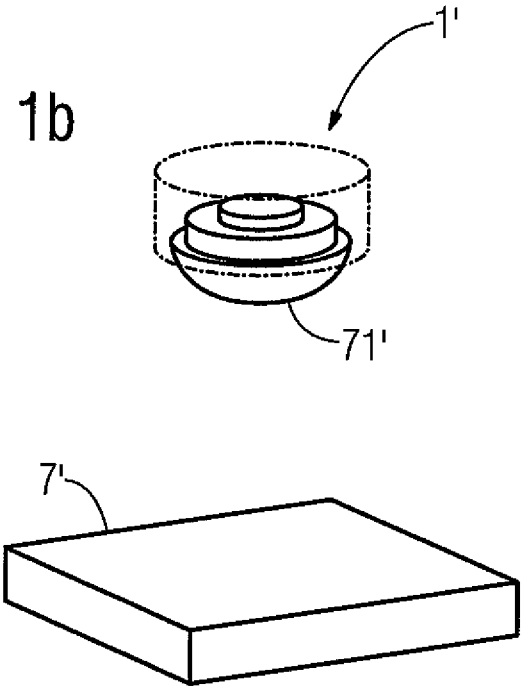


FIG 1c

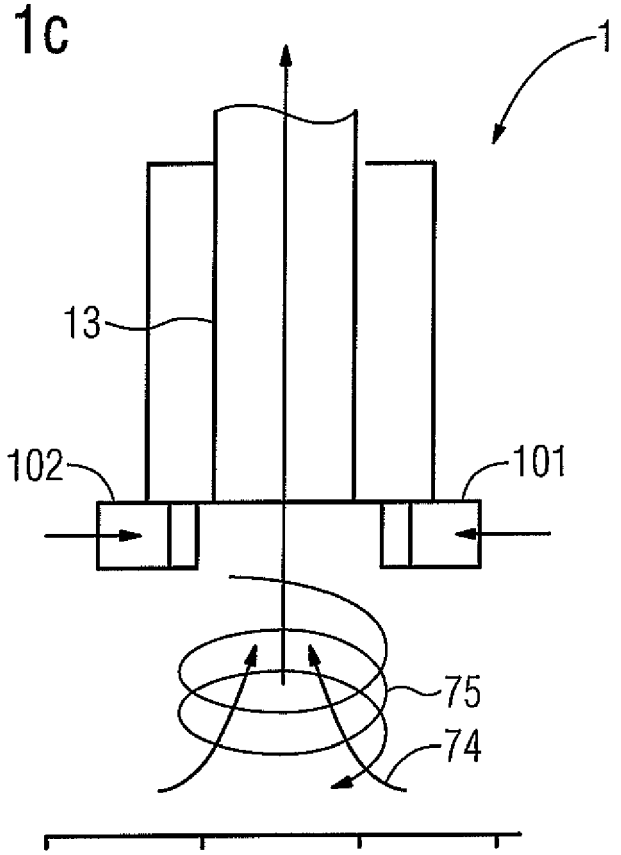


FIG 1d

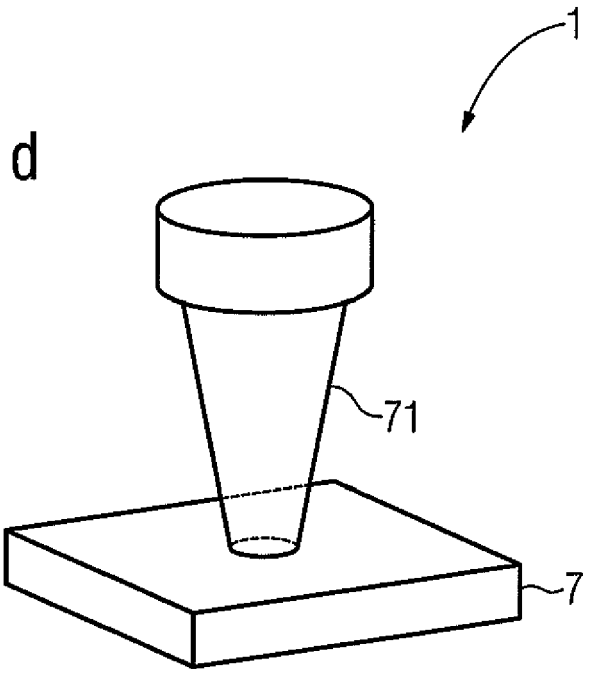


FIG 2a

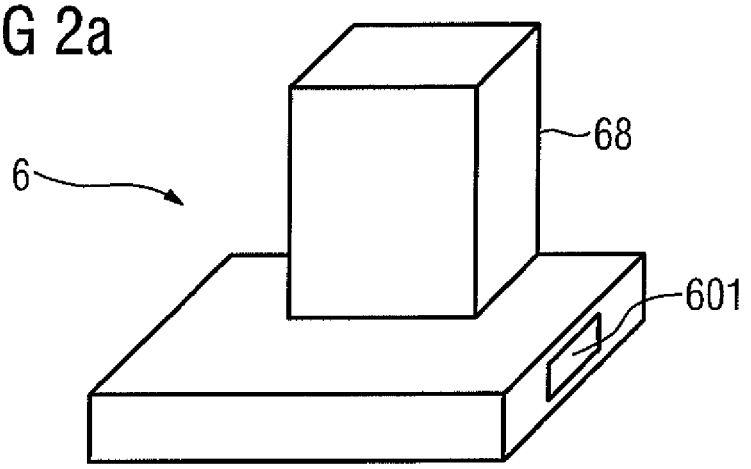

6
68
601

FIG 2b

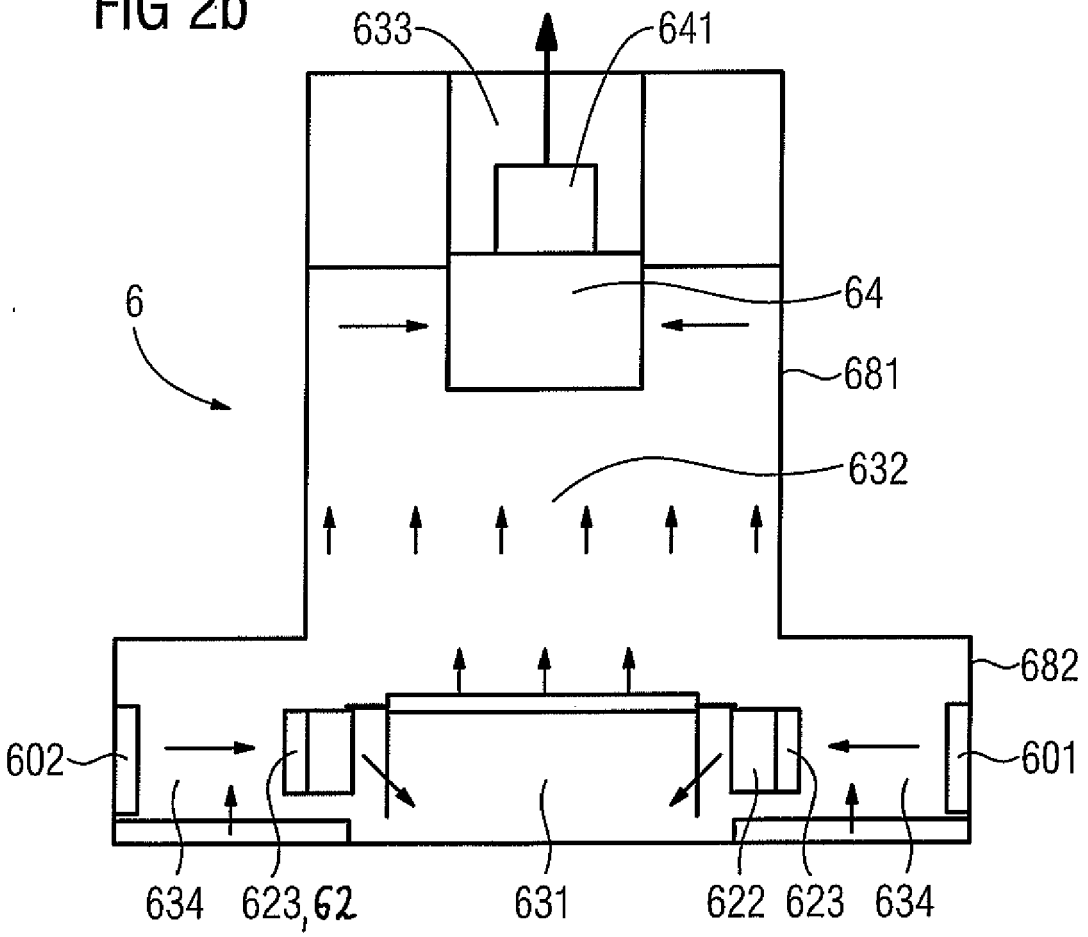
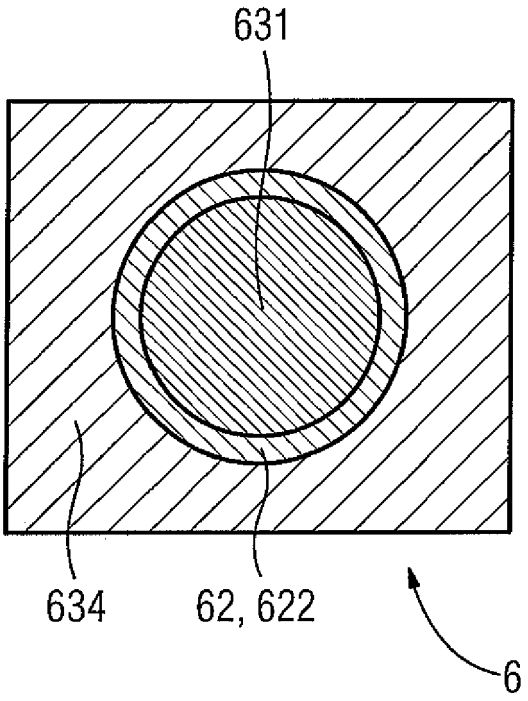

633
641
6
64
681
632
682
602
601
634
623,62
631
622
623
634

FIG 2c



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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 6548

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 89/11926 A (HANSEN & RAAGAARD APS [DK]) 14 December 1989 (1989-12-14) * pages 2,3,5-7; figures *	1,4,8-10	INV. F24C15/20
X	EP 1 887 286 A (ELECTROLUX PROFESSIONAL SPA [IT]) 13 February 2008 (2008-02-13) * paragraphs [0024] - [0043]; figures *	1,4,8-10	
X	EP 0 753 706 A (EUROP EQUIP MENAGER [FR] BRANDT COOKING [FR]) 15 January 1997 (1997-01-15) * abstract; figure *	1,4,8-10	
A	JP 2004 332967 A (HORI FUJIO) 25 November 2004 (2004-11-25) * abstract; figures *	1-10	
A	JP 2000 266385 A (DAIKIN IND LTD) 29 September 2000 (2000-09-29) * figures *	1-10	
A	JP 2005 317205 A (HORIKOSHI KUNIAKI) 10 November 2005 (2005-11-10) * abstract; figures *	1-10	TECHNICAL FIELDS SEARCHED (IPC) F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 June 2012	von Mittelstaedt, A

CATEGORY OF CITED DOCUMENTS

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A : technological background
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EPO FORM 1503 03.82 (P04C01)

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28-06-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 8911926 A	14-12-1989	AU 3839389 A	05-01-1990
		WO 8911926 A1	14-12-1989
EP 1887286 A	13-02-2008	EP 1887286 A2	13-02-2008
		EP 2088377 A2	12-08-2009
EP 0753706 A	15-01-1997	AT 197731 T	15-12-2000
		DE 69611008 D1	28-12-2000
		DE 69611008 T2	17-05-2001
		EP 0753706 A1	15-01-1997
		FR 2736567 A1	17-01-1997
JP 2004332967 A	25-11-2004	JP 4526780 B2	18-08-2010
		JP 2004332967 A	25-11-2004
JP 2000266385 A	29-09-2000	JP 3327247 B2	24-09-2002
		JP 2000266385 A	29-09-2000
JP 2005317205 A	10-11-2005	JP 4366236 B2	18-11-2009
		JP 2005317205 A	10-11-2005

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

- WO 8911926 A1 **[0008]**