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(54) **Biomass burner with removable basket grate**

(57) Biomass burner comprising a combustion chamber (1) with a burner grate (5) with primary air supply through the grate (5) and a pre-chamber (2) separated by an intermediate partition wall (3) provided with a window (6) through which the burner grate (5) is removable

towards the pre-chamber (2). The pre-chamber (2) has a rear gate (7) through which the burner grate (5) is accessible and can be removed for cleaning.

Air ports (14) direct secondary air into the combustion chamber (1).

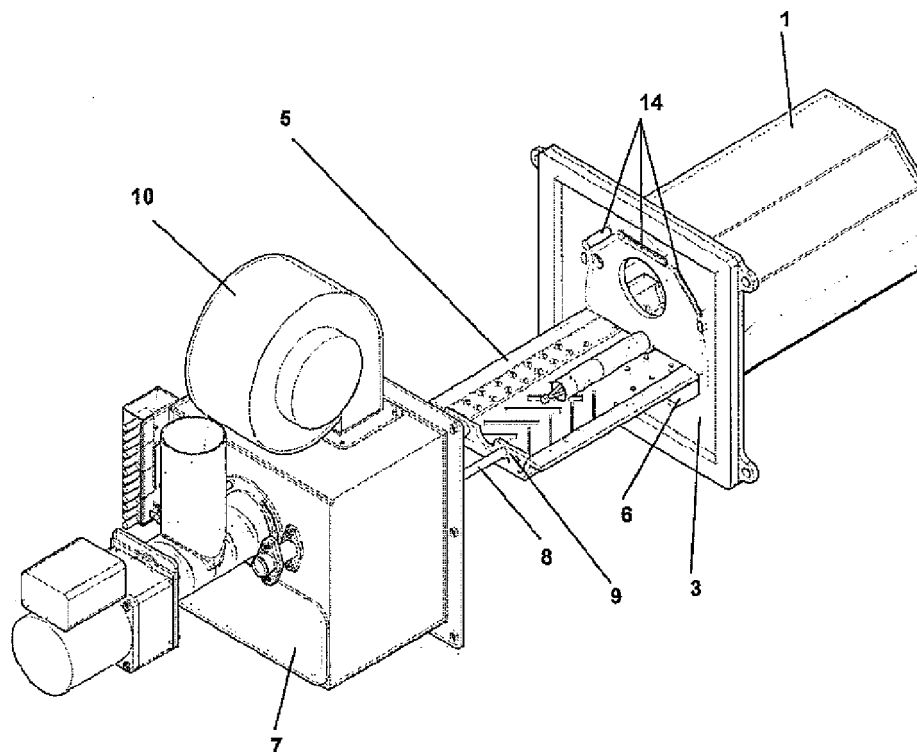


Fig. 3

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Description

TECHNICAL FIELD

[0001] The current invention refers to a biomass burner, composed by a combustion chamber and an pre-chamber, whose combustion chamber has a burner grill for the biomass, and whose pre-chamber has means for the supply of the biomass to the chamber of combustion, as well as for the supply to the above mentioned chamber of combustion of the necessary air to achieve a suitable combustion.

[0002] The combustion chamber and the pre-chamber are separated by a partition that has several openings for the supply the biomass and air flow rate into the combustion chamber.

BACKGROUND ART

[0003] Frequently the combustion chamber of biomass burners needs to be cleaned specially for the ashes extraction.

[0004] Nowadays the existing cleaner or eraser devices of ashes need an elevate time of maintenance as well as are too complicated to make it, because it needs to be dismantled to accede to the burning area, extract the grill, if it exists and is not fixed, and to proceed to his cleanliness. Generally, the grill has to be extracted from the front part of the burner and in case it lacks one, it is necessary to dismantle the burner for the cleanliness.

[0005] On the other hand, the existing biomass burners present direct fire on the walls of the combustion chamber which produces a wear of the materials that compose the above walls of the chamber, producing in consequence a reduction of the useful life of the burner.

DISCLOSURE OF THE INVENTION

[0006] The present invention has the aim of eliminating the exposed problems. Making a burner that allows extracting in an easy and rapid way the grill from the back of the burner, without dismantling any element or component of the burner.

[0007] On the other side, the burner of the invention has means to lead an air flow on the surfaces of the walls of the burner, preventing the flames from reaching directly these walls and reducing the temperature reached by the same ones, managing with all this to lengthen the life of the burner and reducing the functioning problems.

[0008] The burner of the invention is of the type initially indicated, composed by a chamber of combustion with a burning grill and an pre-chamber that includes the means for the supply of the fuel and of the air for his combustion, being the chamber and pre-chamber separated by an intermediate partition wall that has opening entries of the fuel and air.

[0009] According to the invention, the combustion chamber is provided with longitudinal guides on which

the grill is assembled and is able to slide. The partition that separates the combustion chamber and the pre-chamber has a window that is facing the grill and the contour is the same as of the above mentioned grill.

[0010] On the other hand, the pre-chamber has a rear gate which you can open to access the grill and extract it.

[0011] With the commented constitution, the burning grill can occupy an operative position of functioning, inside the combustion chamber and, by opening the rear gate of the inside grill accede to the burning grill and extract it through the window of the partition that separates the combustion chamber and the pre-chamber, all this in order to be able to carry out in a rapid and simple way the cleanliness of the burning grill.

[0012] When the burning grill is in its operative position, inside the combustion chamber, the rear wall of this grill closes the window of the partition that separates the combustion chamber and the pre-chamber, preventing the combustion gases to go into the pre-chamber.

[0013] The constitution described facilitates cleaning the grill and the combustion chamber, without having to remove any element or component, reducing the cleaning time and thus optimizing the maintenance of the burner.

[0014] According to another feature of the invention, the burner combustion chamber comprises an inner wall and an outer wall in which it is delimited a peripheral chamber which communicates with the pre-chamber and the combustion chamber through openings that serve as ways for the air to enter to the combustion chamber. The outer wall surrounds, at least partially, the inner wall from the intermediate partition wall between the combustion chamber and the pre-chamber.

[0015] The openings communicating the peripheral chamber with the combustion chamber are fitted with baffle plates arranged so as to direct air inlet along the inner surface of the inner wall of this chamber. In this way the combustion air flowing through the outer surface and the inner surface of the combustion chamber, reducing the temperature of this wall and preventing the flames affect directly on it. This is done to reduce the wear of the materials, thus prolonging the life of the appliance.

BRIEF DESCRIPTION OF THE DRAWING

[0016] A biomass burner is seen in the attached drawings constituted according to the invention and are given as nonlimiting example. In the drawings:

Figure 1 is a perspective of a biomass burner, constituted according to the invention.

Figure 2 is a perspective of the burner, similar to Figure 1 with the burning grill in extracted position.

Figure 3 is a perspective view similar to Figure 2, with the combustion chamber and pre-chambers separated and the grill partially extracted.

Figure 4 shows the combustion chamber in perspective from the front part.

Figure 5 is a perspective view similar to Figure 4, from a different angle, showing the inner guides on which the grid burned is mounted.

Figure 6 is a longitudinal section of the burner.

MODE(S) FOR CARRYING OUT THE INVENTION

[0017] The burner shown in the accompanying drawings comprises a combustion chamber (1) and pre-chamber (2) which, as is seen in Figure 3, are separated by an intermediate partition wall (3).

[0018] As can be seen in Figure 5, the combustion chamber (1) is internally provided with longitudinal guides (4) on which is mounted, with sliding power along the same, and a burner grill (5).

[0019] The intermediate partition wall (3) which separates the combustion chamber (1) of the pre-chamber (2) has a window (6), figure 3, which is facing the burner grill (5) and is coincident with the boundary of this grill.

[0020] Furthermore, the pre-chamber (2) has a gate (7), with a sliding, practicable or hinged mechanism through which it can be accessed to the handle (8) of the burner grill (5).

[0021] With this constitution, by opening the gate (7) it is accessed to the handle (8) and pulling the burning grill (5) can be extracted through the window (6), being located outside the burner, as shown in Figure 2.

[0022] According to a possible variant achievement, the pre-chamber (2) may be hinged to the wall intermediate partition (3), so that by its separation of opening there is access to the handle (8) of the grill (5).

[0023] The rear wall (9) of the grill (5) is coincident with the contour of the window (6) so that when the grill is in its operational position, inside the combustion chamber, the rear wall (9) of the grill closes the window (6), preventing the passage of combustion gases from the combustion chamber (1) to the pre-chamber (2).

[0024] In the pre-chamber (2) a fan (10) is mounted which is responsible for supplying the necessary air for the combustion into the chamber (1).

[0025] As is seen in Figure 4, the combustion chamber (1) comprises an inner wall (11) and an outer wall (12) between which delimits a peripheral chamber (13). The outer chamber (12) at least partially surrounds the inner wall (11) from the intermediate partition wall (3).

[0026] The peripheral chamber (13) communicates with the pre-chamber (2) through openings (14), figure 3, carried out in the intermediate partition wall (3), whereas the combustion chamber (1) communicates via openings (15), figure 4.

[0027] As can be seen in Figure 6, the air supplied by the fan (10) enters in the pre-chamber (2), from where it goes to the peripheral chamber (13) through the openings (14) of the intermediate partition wall (3). From this

peripheral chamber (13) air enters in the combustion chamber (1) through openings (15) which, as is seen in Figure 6, are provided with baffle plates (16) which serve to direct the air flow within the combustion chamber (1) along the inner wall surface (11) of the chamber.

[0028] In Figure 6 it is shown by arrows the airflow supplied by the fan (10). The same figure shows the burner grill (5) within the pre-chamber (2) and the auger (17) responsible for supplying fuel into the combustion chamber (1).

[0029] The fan (10) could be in any of the lateral walls that has the pre-chamber (2), even on the gate (7).

[0030] The pre-chamber (2) may be hinged to the intermediate partition wall (3), through its opening there is access to the handle (8) of the grill (5).

[0031] With the constitution described, the burner of the invention is provided by means to remove the burner grill (5) from the rear of the burner without having to remove any element or component.

[0032] Moreover, the air supply to the combustion chamber is made so as to protect the inner wall of the chamber against direct flame and high temperatures, thus prolonging its life.

[0033] As can be seen in Figure 6, the pipe that contains the auger (17), inside the pre-chamber (2), has several orifices (18), which serve to prevent a backflow of the combustion gases that might enter this auger through the opening communicating with the combustion chamber. These gases would be recirculated to the top of the pre-chamber (2), through the orifices (18), where along with the air stream supplied by the fan (10) would pass through the slots (14), figure 3, to the peripheral chamber (13).

Claims

1. Biomass burner comprising a combustion chamber (1) with a burner grill (5) and a pre-chamber (2) including means (17) for fuel supply and means (10) for air supply, whose camera (1) and pre-chamber (2) are separated by an intermediate partition wall (3) provided with apertures for the passage of fuel and air, **characterized in that:**

- The combustion chamber (1) has longitudinal guides (4) on which the burner grill (5) is mounted and can be sided for removal from an operative position within the chamber;
- The intermediate partition wall (3) separating the combustion chamber (1) and pre-chamber (2) has a window (6) facing the burner grill (5) through which the grill is removable towards the pre-chamber;
- The pre-chamber (2) has a rear gate (7) through which the burner grill (5) is accessible and can be removed;
- The window (6) of the partition (3) separating

the combustion chamber (1) and pre-chamber (2) is closed by the burner grill (5) when the grill is placed in the operative position within the combustion chamber.

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2. Burner according to claim 1, **characterized in that** the combustion chamber (1) comprises an inner wall (11) and an outer wall (12), whose outer wall surrounds at least partially the inner wall from the intermediate partition wall (3) separating the combustion chamber (1) and pre-chamber (2) and defines with the inner wall a peripheral chamber (13) communicating with the pre-chamber (2) and combustion chamber (1) through openings (14 and 15) for the entrance of air to combustion chamber. 10 15
3. Burner according to claim 2, **characterized in that** the openings (15) communicating the peripheral chamber (13) with the combustion chamber (1) are equipped with baffles (16) that direct the entrance of air along the inner surface of the inner wall (11) of the chamber. 20
4. Burner according to claim 1, **characterized in that** the pre-chamber (2) is hinged to the intermediate partition wall (3). 25

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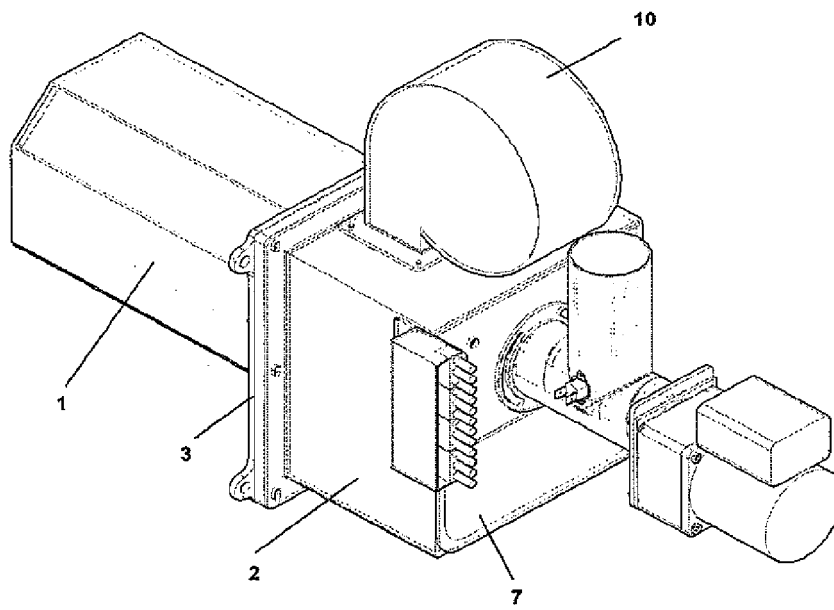


Fig. 1

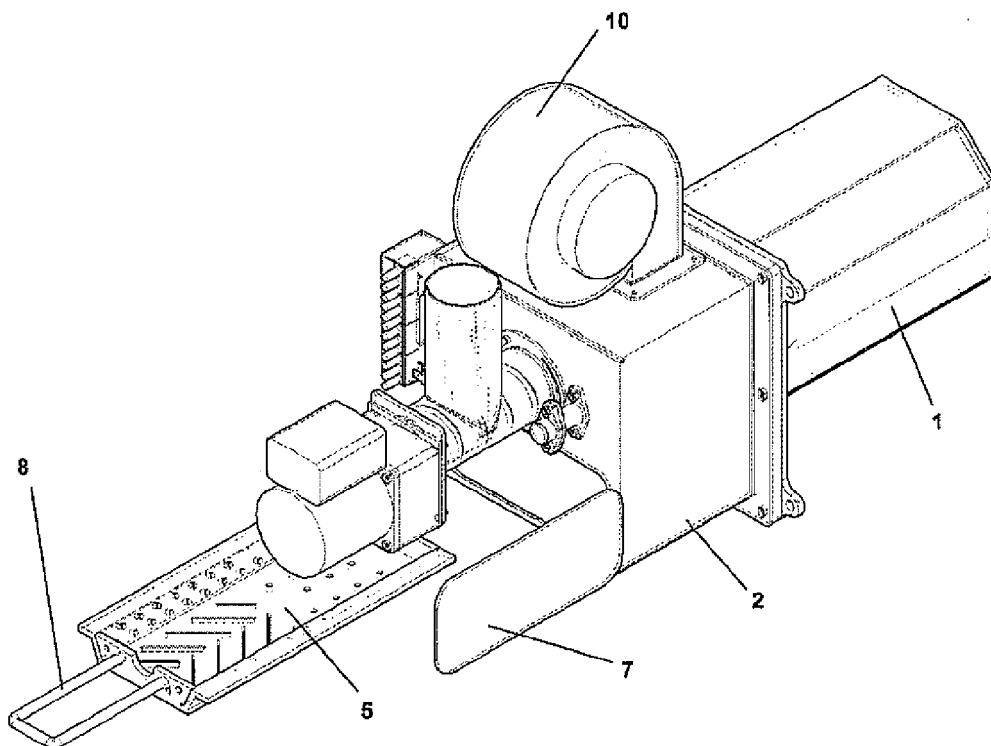


Fig. 2

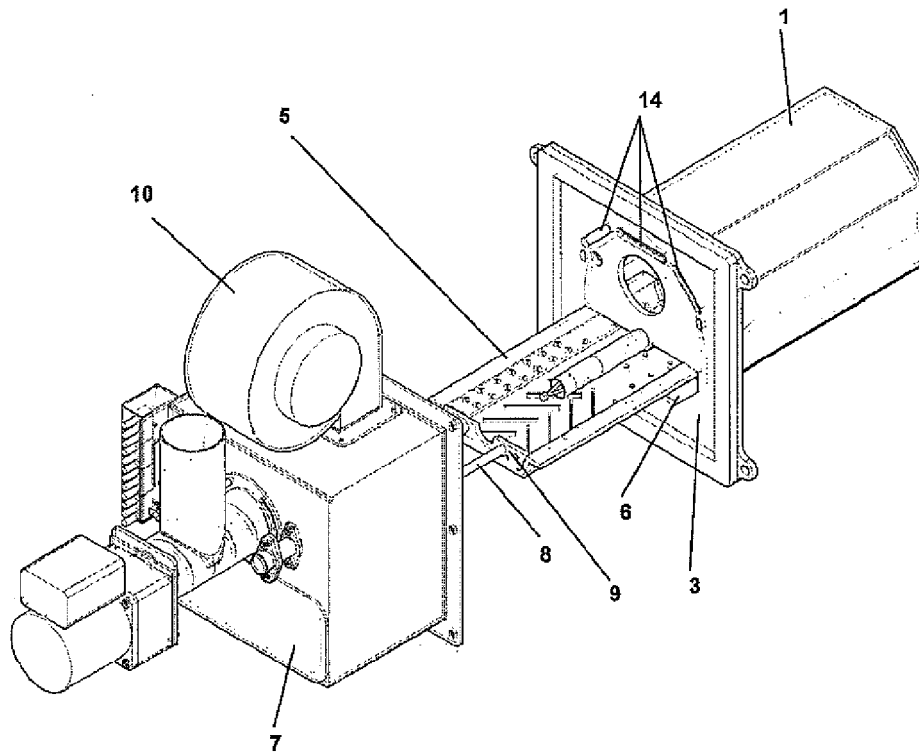


Fig. 3

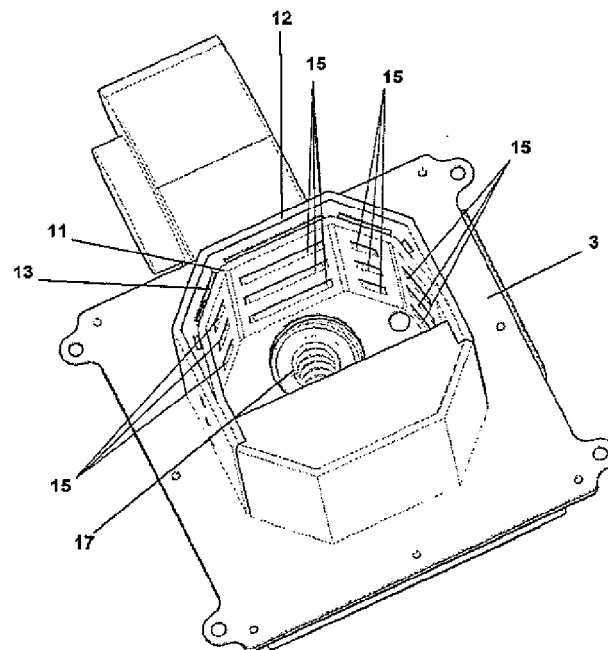


Fig. 4

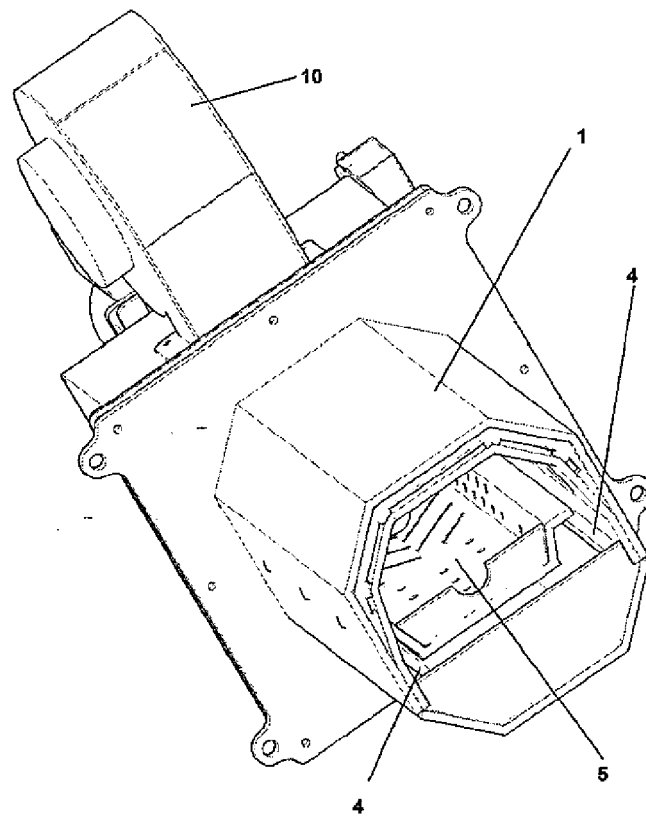


Fig. 5

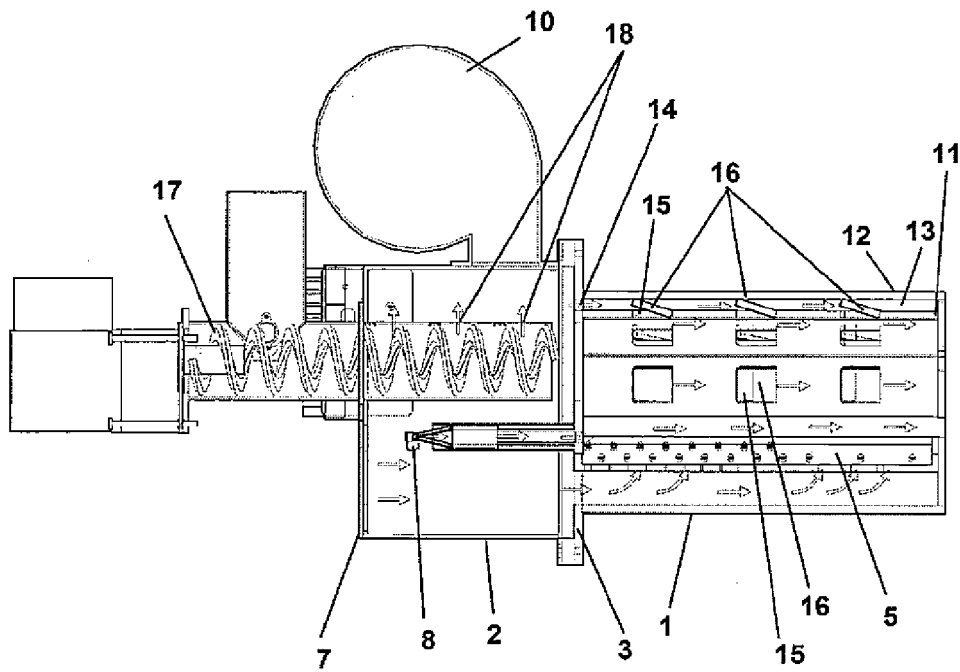


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 13 38 2166

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	WO 2012/027805 A1 (GAUTHIER THIERRY CONSTANT EDDY FRANCOIS [BR]) 8 March 2012 (2012-03-08) * page 1, lines 1-3 * * page 7, line 1 - page 8, line 9 * * claims 1-7; figures 1-7 * -----	1,2	INV. F23B40/02 F23B60/02 F23H15/00 F23L9/02 F23M9/04 F23B50/12
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A	WO 01/23808 A1 (BUCKNER CARROL E [US]) 5 April 2001 (2001-04-05) * the whole document * -----	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			F23B F23C F23M F23L F23J F23H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 August 2013	Examiner Vogl, Paul
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 13 38 2166

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