(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 940 397 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
04.11.2015 Bulletin 2015/45

(21) Application number: **13867891.7**

(22) Date of filing: **12.12.2013**

(51) Int Cl.:
F24H 9/18 *(2006.01)* ***F23D 14/46*** *(2006.01)*
F23M 5/00 *(2006.01)*

(86) International application number:
PCT/KR2013/011552

(87) International publication number:
WO 2014/104625 (03.07.2014 Gazette 2014/27)

(84) Designated Contracting States:
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
Designated Extension States:
BA ME

(30) Priority: **27.12.2012 KR 20120154238**

(71) Applicant: **Kyungdong Navien Co., Ltd.**
Pyeongtaek-si, Gyeonggi-do 450-818 (KR)

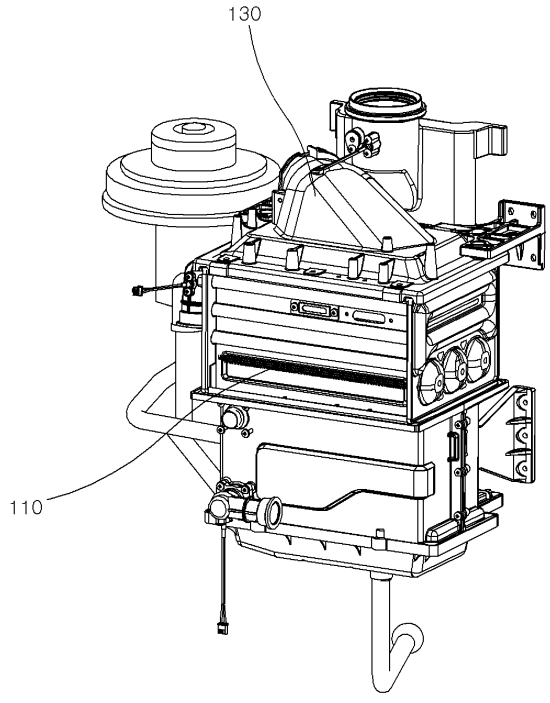
(72) Inventors:
- **PARK, Jun Kyu**
  Incheon 406-840 (KR)
- **LEE, Dong Yong**
  Yangsan-si
  Gyeongsangnam-do 626-812 (KR)

(74) Representative: **Habermann, Hruschka & Schnabel**
Montgelasstrasse 2
81679 Munich (DE)

(54) GAS BOILER IN WHICH OVERHEATING OF BURNER FLANGE IS PREVENTED

(57) The present invention relates to a gas boiler, including: a burner that combusts a pre-mixed gas and has a burner flange formed in the circumferential direction; a gas supply chamber in which the upper portion of the burner is received and coupled so as to supply the pre-mixed gas to said burner, and in which a chamber flange is formed such that same is coincident in shape with the burner flange so as to be in surface contact with said burner flange; and a sealing member disposed between the burner and the gas supply chamber such that the pre-mixed gas, which is supplied from the gas supply chamber to the burner, is prevented from leaking between the gas supply chamber and the burner.

Fig. 1



EP 2 940 397 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a gas boiler in which overheating of a burner flange is prevented, and more particularly, to a gas boiler having a structure that is capable of being preventing a burner for receiving a pre-mixed gas from a gas supply chamber to burn the pre-mixed gas from being overheated.

BACKGROUND ART

[0002] Boilers used for providing heating and hot water in general homes may be categorized into oil boilers and gas boilers according to fuel for use. The gas boilers may use LPG as fuel. However, LNG is mostly being used for the gas boilers, which is clean fuel that is capable of minimizing air pollution because the LNG contains few sulfur contents when compared to diesel fuel or kerosene. In the oil and gas boilers, fluids are heated by using heat generated while oil and gas are being oxidized, and the fluids heated to be heat-exchanged circulate to increase an indoor temperature and supply hot water.

[0003] Recently, condensing boilers to which condensing heat exchangers are applied so that a burner is disposed on a top or side surface of a heat exchanger to allow a combustion gas to flow downward, and a temperature of an exhaust gas of the heat exchanger is reduced to a dew point temperature or less, are being used.

[0004] However, when the burner burns the gas in the gas boiler, flames of the burner generated by the combustion may be shorten in length according to low load combustion. If the flames of the burner is shorten in length, the flames may overheat a surface of the burner. In particular, in the downward combustion type such as the condensing boiler, since the flames of the burner stay very close to the surface of the burner, the surface (especially, a flange of the burner) of the burner is further overheated. Also, in this high temperature environment, there is a small choice in materials of sealing member.

DISCLOSURE OF THE INVENTION

TECHNICAL PROBLEM

[0005] An object of the present invention is to provide a gas boiler capable of preventing a burner from being overheated by heat-exchanging a pre-mixed gas and preventing the gas from leaking while the burner tightly surface-contacts a gas supply chamber, and including a packing that has a wide choice in material.

TECHNICAL SOLUTION

[0006] The present invention provides a gas boiler including: a burner on which a burner flange is disposed in a circumferential direction, the burner burning a pre-mixed gas; a gas supply chamber seated and coupled to an upper portion of the burner to supply the pre-mixed gas to the burner, the gas supply chamber having a chamber flange that is shape-matched to the burner flange to surface-contact the burner flange; and a sealing member disposed between the burner and the gas supply chamber to prevent the pre-mixed gas supplied from the gas supply chamber to the burner from leaking between the gas supply chamber and the burner.

ADVANTAGEOUS EFFECTS

[0007] The gas boiler according to the present invention has the following effects.

[0008] First, since the burner flange of the burner and the chamber flange of the gas supply chamber are shape-matched to surface-contact each other to allow heat of the burner itself to be dissipated to the chamber flange of the gas supply chamber when the burner operates, the overheating of the burner (particularly, the flange of the burner) may be prevented.

[0009] Second, the leakage of the pre-mixed gas that is supplied from the gas supply chamber to the burner may be prevented from leaking between the burner and the gas supply chamber by the sealing member disposed between the burner and the gas supply chamber.

[0010] Third, since the protrusion inclinedly protruding from the body of the sealing member is lain toward the body when the burner is coupled to the gas supply chamber, the burner flange may further stably surface-contact the chamber flange while being shape-matched to prevent the burner from being overheated through the heat-exchanging between the burner flange and the chamber flange. Thus, the sealing member may have a wide choice of materials.

[0011] Fourth, since the heat dissipation fin is disposed between the burner and the gas supply chamber, the over-

heating of the burner may be further prevented by the heat dissipation fin that is cooled by the pre-mixed gas having a low temperature supplied from the gas supply chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a perspective view of an entire structure of a gas boiler according to an embodiment of the present invention.
FIGS. 2 and 3 are partially enlarged cross-sectional views partially enlarging and illustrating a section of the gas boiler according to the embodiment of FIG. 1.
FIG. 4 is a cross-sectional view of a sealing member of FIGS. 2 and 3.
FIGS. 5 and 6 are partially enlarged cross-sectional views partially enlarging and illustrating a section of a gas boiler according to another embodiment of the present invention.
FIG. 7 is a perspective view of a heat dissipation fin of FIGS. 5 and 6.
FIG. 8 is a perspective view illustrating a modified example of the heat dissipation fin of FIG. 7.

Descriptions of reference numerals

[0013]

110:	Burner	111:	Burner flange
130:	Gas supply chamber	131:	Chamber flange
133:	Groove	150:	Sealing member
151:	Body	153:	Protrusion
170:	Heat dissipation fin		

MODE FOR CARRYING OUT THE INVENTION

[0014] A gas boiler according to an embodiment of the present invention is illustrated in FIGS. 1 to 4.

[0015] Referring to FIGS. 1 to 4, the gas boiler includes a burner 110, a gas supply chamber 130, and a sealing member 150. The gas boiler according to an embodiment of the present invention has a shape and structure as illustrated in FIG. 1. Thus, accurate positions of the burner 110 and the gas supply chamber 130 in the gas boiler may be recognized with reference to FIG. 1. The burner 110 may receive a pre-mixed gas to burn the pre-mixed gas. The burner 110 may receive the pre-mixed gas in which air is pre-mixed with a gas at an optimal combustion mixing ratio from the gas supply chamber 130 that will be described later. The pre-mixed gas may be completely burnt. Thus, the burner has high combustion efficiency and may realize complete combustion at a low air ratio. Generally, a metal fiber burner may be applied to the burner 110. An example of the metal fiber burner is disclosed in Korean Patent Publication No. 10-2002-0069530.

[0016] The above-described burner 110 is not limited to the shape thereof and may have various shapes. Also, a burner flange 111 may be disposed on a side surface of the burner 110 along a circumferential direction.

[0017] The gas supply chamber 130 may supply the pre-mixed gas to be burnt by the burner 110 to the burner 110 as described above. The gas supply chamber 130 is seated on and coupled to an upper portion of the burner 110. A chamber flange 131 that is shape-matched to the burner flange 111 when the gas supply chamber 130 is seated on and coupled to the upper portion of the burner 110 is disposed on the gas supply chamber 130. Since the burner flange 111 has a shape that matches to that of the chamber flange 131, the burner flange 111 surface-contacts the chamber flange 131.

[0018] In general, each of the burner 111 and the gas supply chamber 130 is formed of a metal material. Since the burner flange 111 is shape-matched to the chamber flange 131, leakage of the pre-mixed gas supplied from the gas supply chamber 130 to the burner 110 may be prevented. However, since the leakage of the pre-mixed gas is not perfectly prevented by the shape-matched coupling of the burner flange 111 and the chamber flange 131, a component that is capable of preventing the gas from leaking is needed between the burner 110 and the gas supply chamber 130.

[0019] Thus, a sealing member is disposed between the burner 110 and the gas supply chamber 130. However, the burner 110 may be slightly separated from the gas supply chamber 130 without being shape-matched due to the installation of the sealing member. Thus, the sealing member 150 according to the present invention solves the limitation. Therefore, the burner flange 111 of the burner 110 may be completely shape-matched and coupled to the chamber flange 131 of the gas supply chamber 130 so that the burner flange 111 surface-contacts the chamber flange 131. More particularly, the sealing member 150 is disposed between the burner flange 111 and the chamber flange 131 when the

burner flange 111 is shape-matched to the chamber flange 131. Thus, a groove 133 is defined in the chamber flange 131 so that the sealing member 150 is disposed therein.

[0020] The sealing member 150 includes a body 151, a protrusion 153 formed on the body 151. The body 151 has a width that is less than a height of the groove 133 so that the body 151 is inserted to the groove 13. The body 151 may have a column shape having a circular or rectangular section and various shapes.

[0021] A plurality of protrusions 153 protruding from the body 151 is formed on the body 151. When the sealing member 150 is installed between the burner 110 and the gas supply chamber 130, one portion of the protrusions 153 may be inclined toward an inner surface of the groove 133 defined in the chamber flange 131 of the gas supply chamber 130, and the other portion of the protrusions 153 may be inclined toward the burner flange 111 of the burner 110.

[0022] Particularly, referring to FIG. 4, the protrusion 153 of the plurality of protrusions 153, which is formed toward the chamber flange 131, may be inclined upward from the body 151. Also, the protrusion 153 of the plurality of protrusions 153, which is formed toward the burner flange 111, may be inclined downward from the body 151. That is, the plurality of protrusions 153 are formed toward the insides of the gas supply chamber 130 and the burner 110.

[0023] When the sealing member 150 is installed between the burner 110 and the gas supply chamber 130, the plurality of protrusions 153 are disposed and installed toward the insides of the burner 110 and the gas supply chamber 130. The sealing member 150 may have a height that is greater than that of the groove 133 by the plurality of protrusions 153. However, since the sealing member 150 is formed of a flexible rubber material, the plurality of protrusions 153 may flexibly move to allow the sealing member 150 to be installed between the burner 110 and the gas supply chamber 130. That is, when the sealing member 150 is installed to the groove 133, as illustrated in FIGS. 3 and 4, the plurality of protrusions 153 of the sealing member 150 may be installed to the groove 133 while being lain toward the body 151 in an arrow direction.

[0024] Thus, the burner flange 111 of the burner 110 may be perfectly shape-matched and coupled to the chamber flange 131 of the gas supply chamber 130 even though the sealing member 150 is installed, and the burner flange 111 may surface-contact the chamber flange 131. Since the burner flange 111 surface-contacts the chamber flange 131, if a surface of the burner 110 is overheated because flames of the burner 110 have short lengths due to the combustion with a low heat generation amount, heat-exchanging may be performed between the burner flange 111 and the chamber flange 131 to prevent the burner 110 from being overheated.

[0025] The pre-mixed gas supplied from the gas supply chamber 130 to the burner 110 may leak between the burner 110 and the gas supply chamber 130. However, as described in the present invention, when the sealing member 150 is disposed between the burner 110 and the gas supply chamber 130, the leakage of the pre-mixed gas may be prevented by the sealing member 150. Particularly, since the plurality of protrusions 153 formed on the sealing member 150 are formed toward the inside the gas supply chamber 130 and the burner 110, the plurality of protrusions 153 may prevent the pre-mixed gas from leaking once again.

[0026] A gas boiler according to another embodiment of the present invention is illustrated in FIGS. 5 to 8. Like reference numerals in the foregoing embodiment denote like elements, and thus differences between the foregoing embodiment and the following embodiment will be mainly described.

[0027] If the pre-mixed gas is burnt in the burner 110, the flames of the burner may be shorten in length at the time of low load combustion to overheat the surface of the burner 110. In order to this limitation, the gas boiler may further include a heat dissipation fin 170. As illustrated in FIGS. 5 and 6, the heat dissipation fin 170 is disposed between the burner 110 and the gas supply chamber 130. More particularly, the heat dissipation fin 170 has one end that is fixed to the burner flange 111 and the other end that extends toward the inside of the gas supply chamber 130. The other end of the heat dissipation fin 170 extending toward the inside the gas supply chamber 130 contacts the pre-mixed gas supplied from the gas supply chamber 130. Here, since the pre-mixed gas has a low temperature, heat-exchanging between the other end of the heat dissipation fin 170 cooled by the pre-mixed gas and the one end of the heat dissipation fin 170 fixed to the burner flange 111 may be performed to cool the burner 110.

[0028] Referring to a detailed shape of the heat dissipation fin 170 of FIG. 7, the heat dissipation fin 170 includes a first plate 171 fixed to the burner flange 111 to extend toward the inside of the burner 110 and a second plate 172 extending from a front end of the first plate 171, wherein the second plate 172 is inclinedly bent upward toward the gas supply chamber 130 when the heat dissipation fin 170 is installed between the burner 110 and the gas supply chamber 130.

[0029] The second plate contacting the pre-mixed gas may be bent several times while alternately forming a convex part 172a and a concave part 172b to increase a contact area with the pre-mixed gas. Referring to FIG. 7, each of the convex part 172a and the concave part 172b is sharply bent and has a shape such as a thread.

[0030] FIG. 8 is a view illustrating a modified example of a heat dissipation fin 170'. Referring to FIG. 8, although the heat dissipation fin 170' includes first and second plates 171' and 172' like as the above-described heat dissipation fin 170, each of a convex part 172a' and a concave part 172b' formed in the second plate 172' has a shape different from that of FIG. 7. Although each of the convex part 172a and the concave part 172b of the heat dissipation fin 170 of FIG. 7 has a sharp shape such as a thread as described above, each of the convex part 172a' and the concave part 172b' of the heat dissipation fin 170' of FIG. 8 has a curved surface.

[0031] The second plates 172 and 172' are not limited to the shapes of FIGS. 7 and 8 and may have various shapes capable of increasing a contact area with the pre-mixed gas.

[0032] Since each of the heat dissipation fins 170 and 170' has to be easily cooled when each of the heat dissipation fins 170 and 170' contacts the pre-mixed gas and be heat-exchanged with the burner 110 to which each of the heat dissipation fins 170 and 170' are fixed, it is preferable that each of the heat dissipation fins 170 and 170' may be formed of a metal material having good heat transfer efficiency or a heat conductive plastic material.

[0033] Like this, when each of the heat dissipation fins 170 and 170' is disposed between the burner 110 and the gas supply chamber 130, as described above, each of the heat dissipation fins 170 and 170' may be cooled while contacting the pre-mixed gas supplied from the gas supply chamber 130 to cool the burner 110 through the heat-exchanging between each of the heat dissipation fins 170 and 170' and the burner 110. Particularly, at the time of low load combustion, when the pre-mixed gas is burnt by the burner 110, the flames of the burner 110 may be shorten in length to overheat the surface of the burner 110. However, the heat dissipation fin 170 may prevent the surface of the burner 110 from being overheated.

[0034] When the surface of the burner 110 is overheated, the sealing member 150 disposed between the burner 110 and the gas supply chamber 130 to prevent the pre-mixed gas from leaking may have a small choice of materials. Particularly, when the surface of the burner 110 is overheated, a sealing member formed of a material having improved heat-resistance has to be provided. Thus, the sealing member has a small choice of materials and also is increased in material cost or production cost due to the use of a high-functional material. Therefore, when the heat dissipation fin 170 is disposed between the burner 110 and the gas supply chamber 130, the overheating of the surface of the burner 110 may be prevented through the heat-exchanging. Thus, the sealing member 150 disposed between the burner 110 and the gas supply chamber 130 may have a wide choice in material and a cost saving effect.

[0035] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

Claims

1. A gas boiler comprising:

a burner on which a burner flange is disposed in a circumferential direction, the burner burning a pre-mixed gas;
a gas supply chamber seated and coupled to an upper portion of the burner to supply the pre-mixed gas to the burner, the gas supply chamber having a chamber flange that is shape-matched to the burner flange to surface-contact the burner flange; and
a sealing member disposed between the burner and the gas supply chamber to prevent the pre-mixed gas supplied from the gas supply chamber to the burner from leaking between the gas supply chamber and the burner.

2. The gas boiler of claim 1, wherein a groove to which the sealing member is installed is defined in the chamber flange of the gas supply chamber.

3. The gas boiler of claim 1, wherein the sealing member comprises:

a body inserted into the groove; and
a plurality of protrusions of which one portion protrudes from the body toward the gas supply chamber and the other portion protrudes toward the burner,
wherein the plurality of protrusions extend from the body,
wherein the one portion of the plurality of protrusions inclinedly protrudes upward to the gas supply chamber, and the other portion of the plurality of protrusions inclinedly protrudes downward to the burner, and
when the sealing member is disposed in the groove, and the burner is coupled to the gas supply chamber, the plurality of protrusions are lain and pushed toward the body.

4. The gas boiler of claim 1, further comprising a heat dissipation fin disposed between the gas supply chamber and the burner,
wherein the heat dissipation fin has one end that is fixed to the burner flange and the other end that extends toward the gas supply chamber and is heat-exchanged with the pre-mixed gas to cool the burner.

5. The gas boiler of claim 4, wherein the heat dissipation fin comprises:

a first plate extending from the burner flange toward the inside of the burner; and
a second plate extending from a front end of the first plate, and the second plate being inclinedly disposed upward to the gas supply chamber.

6. The gas boiler of claim 5, wherein the heat dissipation fin comprises a convex part and a concave part that are alternately bent several times on the second plate so that a contact area between the heat dissipation fin and the pre-mixed gas increases.

Amended claims under Art. 19.1 PCT

1. A gas boiler comprising:

a burner on which a burner flange is disposed in a circumferential direction, the burner burning a pre-mixed gas;
a gas supply chamber seated and coupled to an upper portion of the burner to supply the pre-mixed gas to the burner, the gas supply chamber having a chamber flange that is shape-matched to the burner flange to surface-contact the burner flange; and
a sealing member disposed between the burner and the gas supply chamber to prevent the pre-mixed gas supplied from the gas supply chamber to the burner from leaking between the gas supply chamber and the burner.

(Original) 2. The gas boiler of claim 1, wherein a groove to which the sealing member is installed is defined in the chamber flange of the gas supply chamber.

(Amended) 3. The gas boiler of claim 2, wherein the sealing member comprises:

a body inserted into the groove; and
a plurality of protrusions of which one portion protrudes from the body toward the gas supply chamber and the other portion protrudes toward the burner,
wherein the plurality of protrusions extend from the body,
wherein the one portion of the plurality of protrusions inclinedly protrudes upward to the gas supply chamber, and the other portion of the plurality of protrusions inclinedly protrudes downward to the burner, and
when the sealing member is disposed in the groove, and the burner is coupled to the gas supply chamber, the plurality of protrusions are lain and pushed toward the body.

(Original) 4. The gas boiler of claim 1, further comprising a heat dissipation fin disposed between the gas supply chamber and the burner,
wherein the heat dissipation fin has one end that is fixed to the burner flange and the other end that extends toward the gas supply chamber and is heat-exchanged with the pre-mixed gas to cool the burner.

(Original) 5. The gas boiler of claim 4, wherein the heat dissipation fin comprises:

a first plate extending from the burner flange toward the inside of the burner; and
a second plate extending from a front end of the first plate, and the second plate being inclinedly disposed upward to the gas supply chamber.

(Original) 6. The gas boiler of claim 5, wherein the heat dissipation fin comprises a convex part and a concave part that are alternately bent several times on the second plate so that a contact area between the heat dissipation fin and the pre-mixed gas increases.

Fig. 1

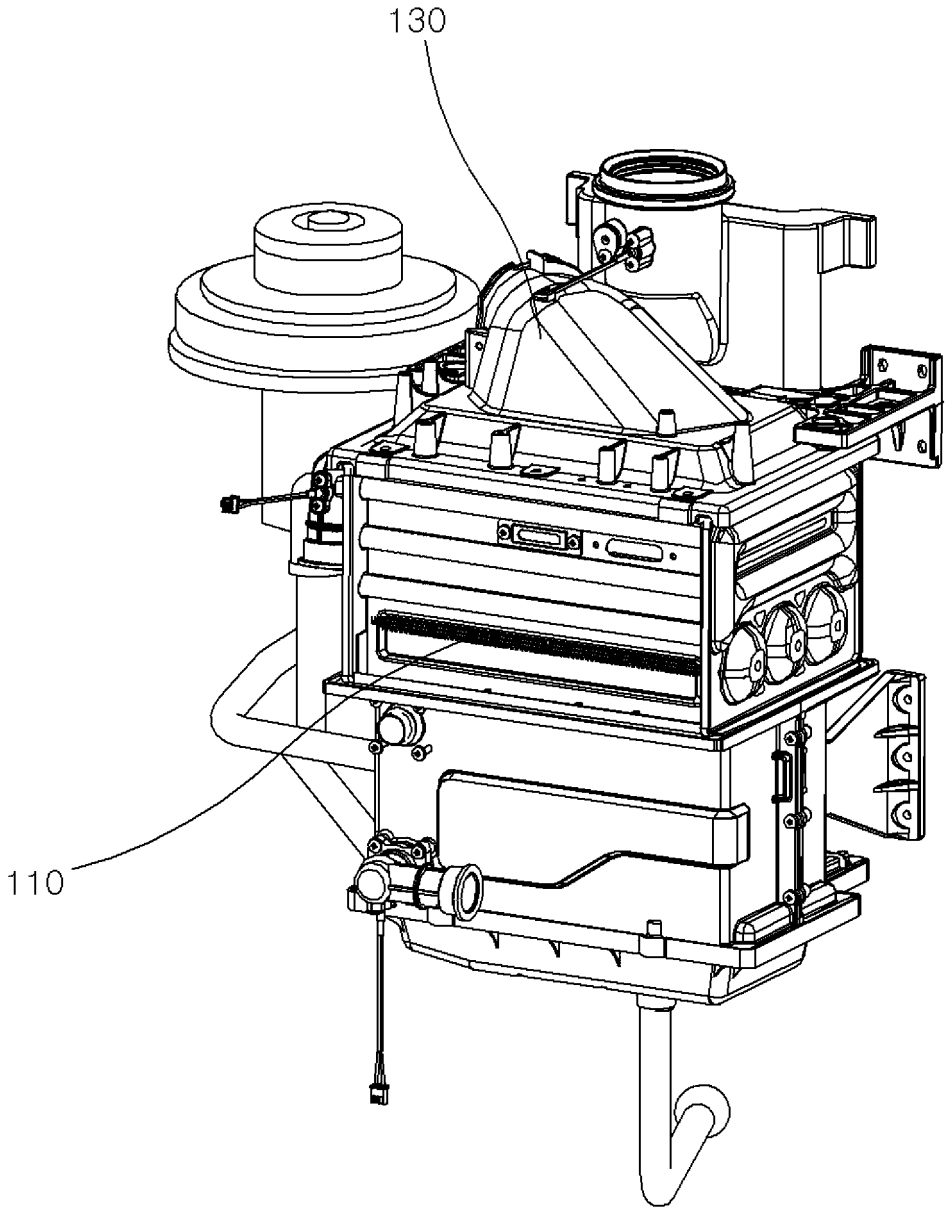


Fig. 2

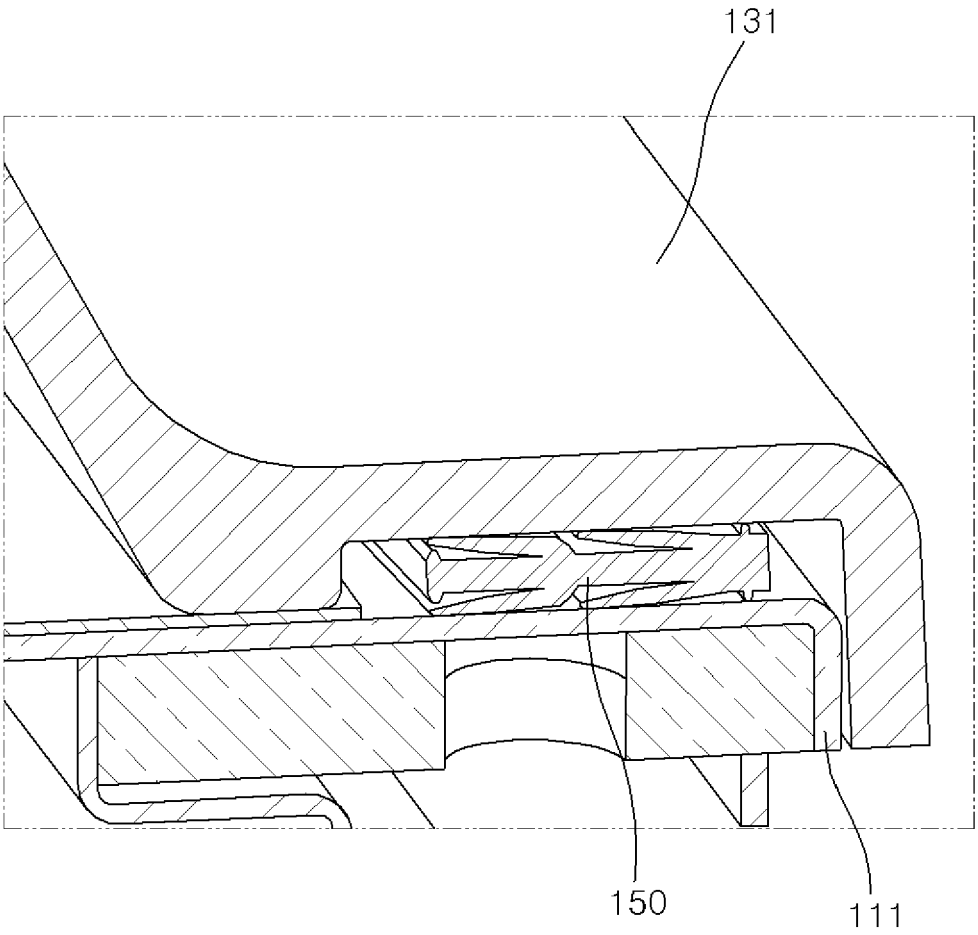


Fig. 3

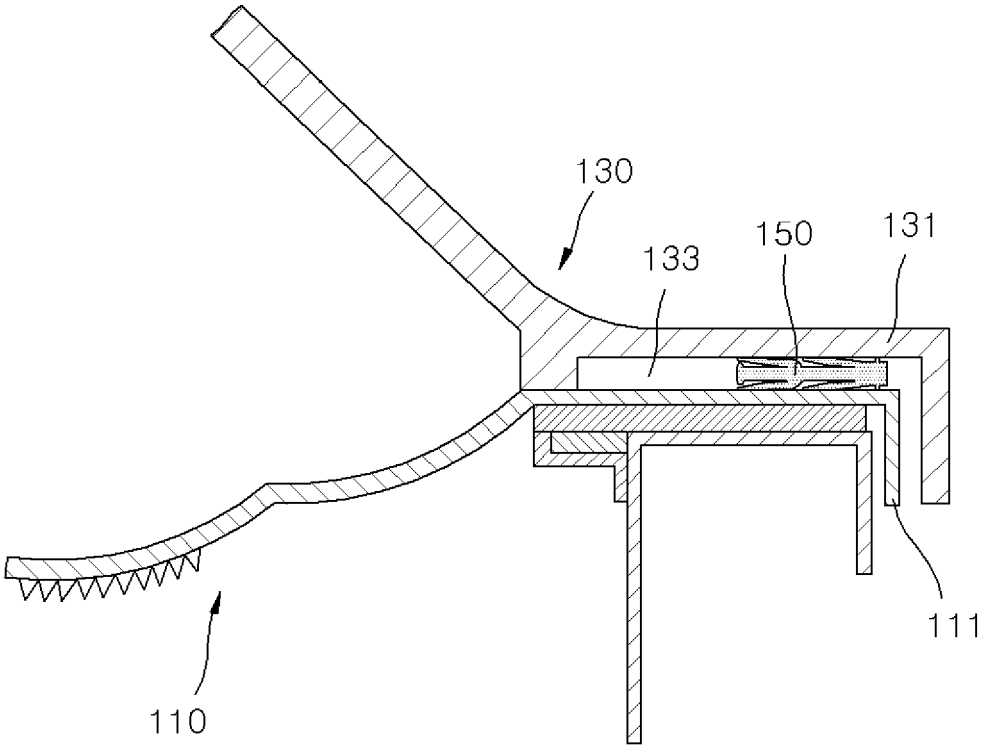


Fig. 4

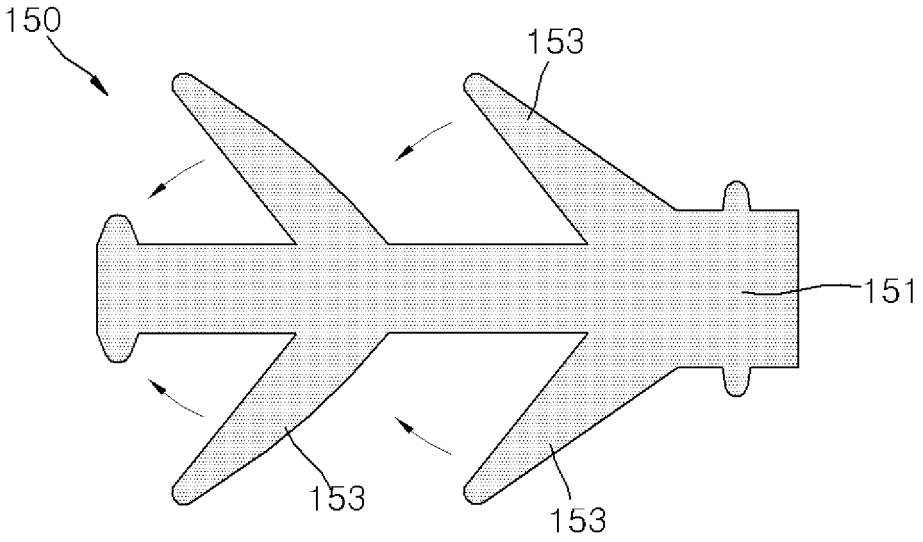


Fig. 5

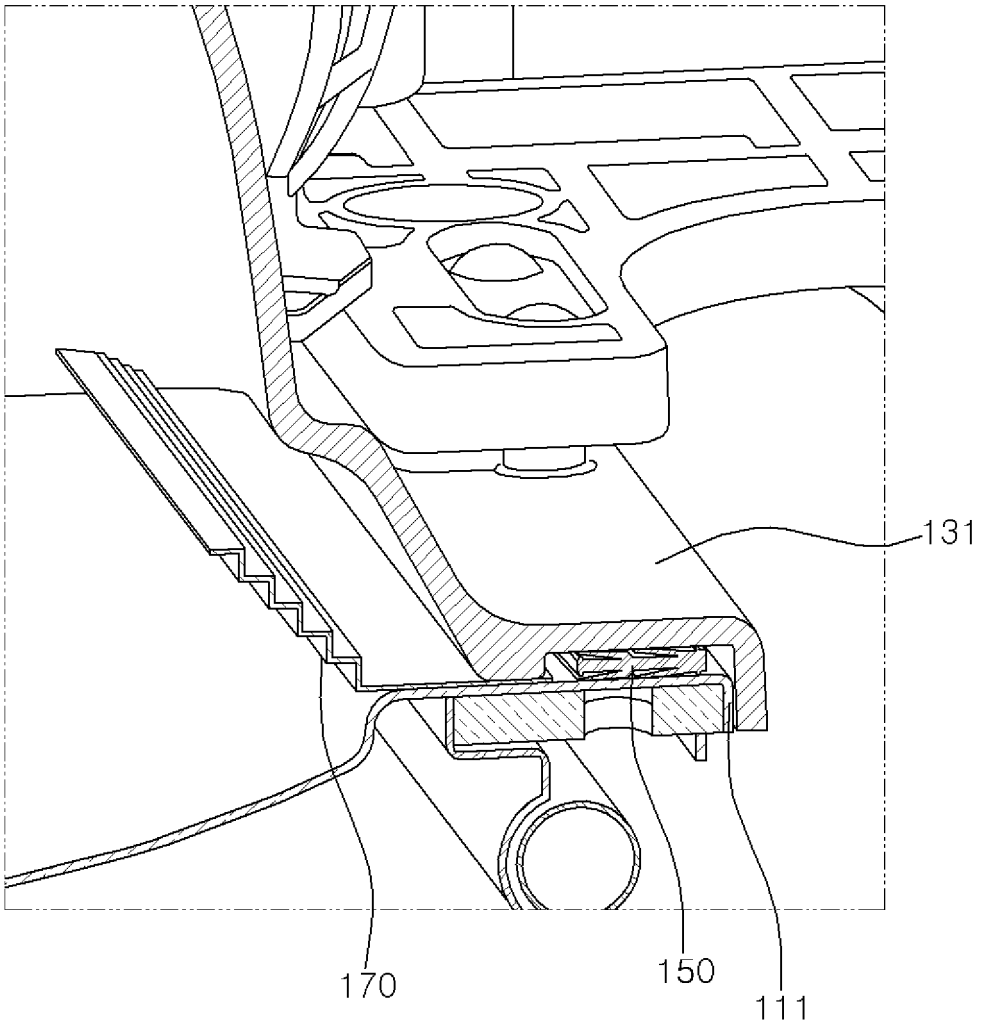


Fig. 6

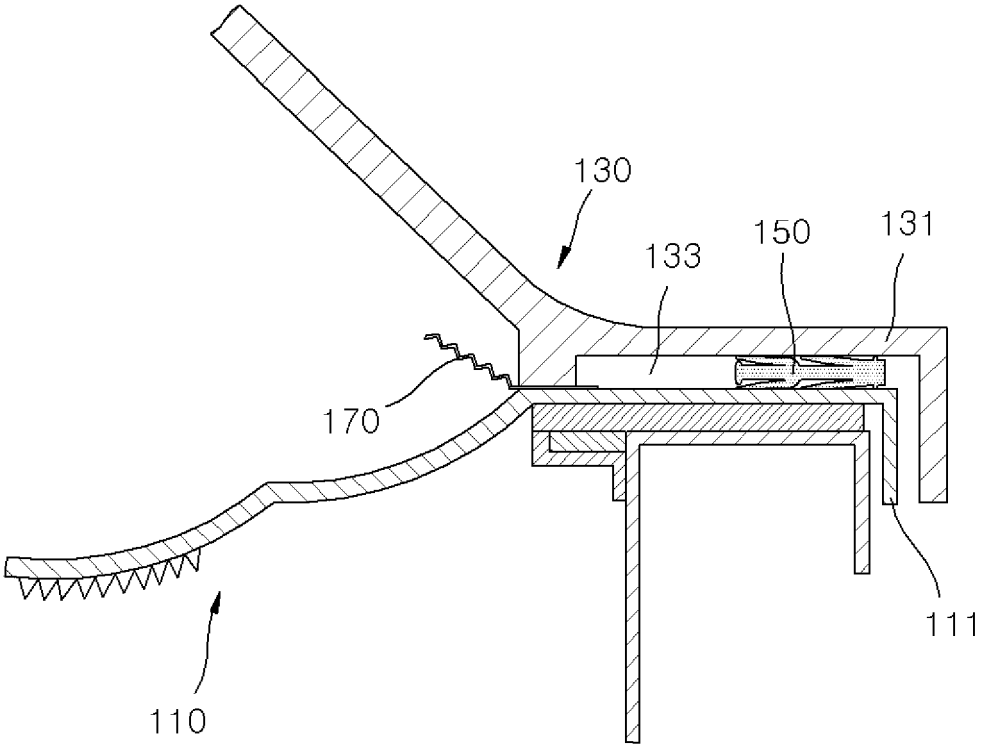


Fig. 7

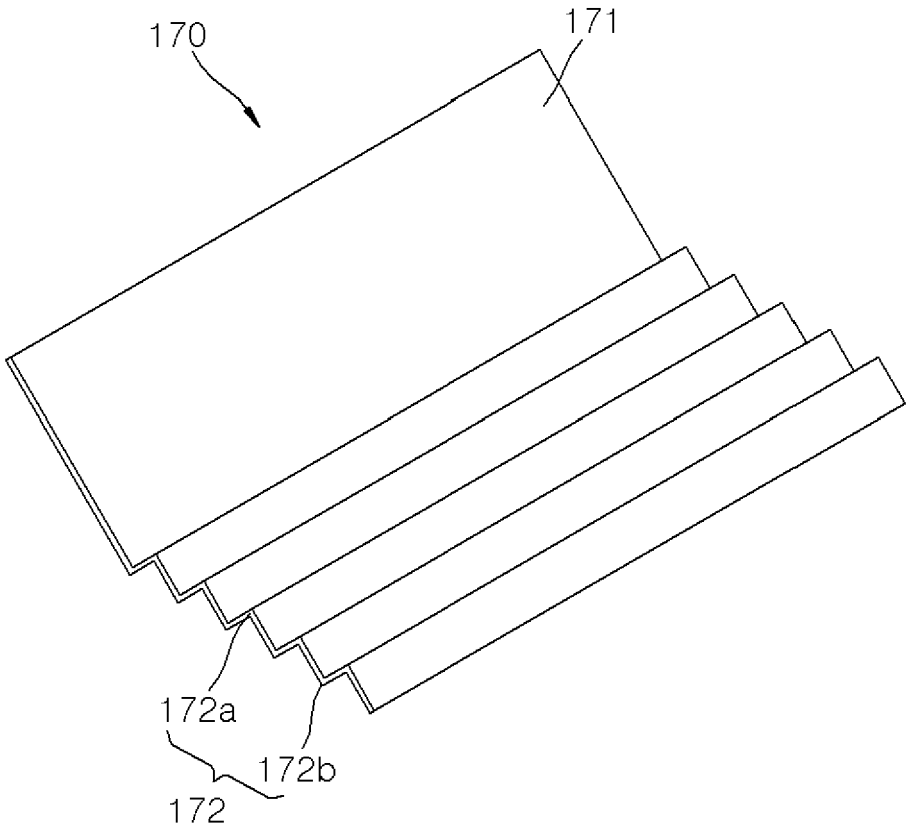
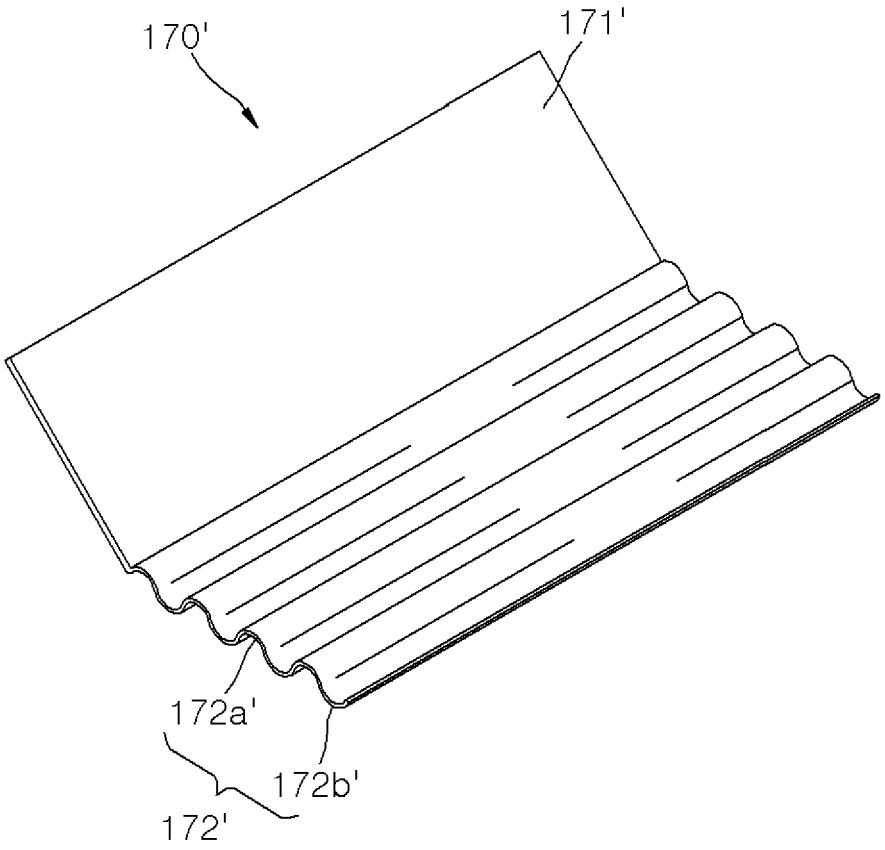


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2013/011552

A. CLASSIFICATION OF SUBJECT MATTER

F24H 9/18(2006.01)i, F23D 14/46(2006.01)i, F23M 5/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24H 9/18; B01D 3/28; F16J 15/10; F16J 15/02; B01D 53/18; F23D 14/00; F16L 17/00; F23D 14/46; F23M 5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: burner, burning, sealing, heat radiation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20-0363824 Y1 (LOTTE ENGINEERING & MACHINERY MFG CO., LTD.) 06 October 2004 See claims 1 to 3, page 3 and figures 1 to 3.	1,2
Y	See claims 1 to 3, page 3 and figures 1 to 3.	3-6
Y	KR 20-2000-0019135 U (KWON, Yun Rno et al.) 06 November 2000 See claims 1, 3 and figures 1, 2, 4, 5.	3
Y	KR 10-0242970 B1 (KYUNGDONG NAVIEN CO., LTD.) 02 March 2000 See paragraph 29 and figure 1.	4-6
A	JP 2530119 B2 (RASCHIG AG) 04 September 1996 See claims 1 to 3 and figure 1.	6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 JANUARY 2014 (07.01.2014)	**07 JANUARY 2014 (07.01.2014)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2013/011552

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 20-0363824 Y1	06/10/2004	NONE	
KR 20-2000-0019135 U	06/11/2000	NONE	
KR 10-0242970 B1	02/03/2000	NONE	
JP 2530119 B2	04/09/1996	DE3414267 A1	07/11/1985
		DE3414267 C2	14/05/1992
		EP 0158917 A2	23/10/1985
		EP 0158917 A3	02/03/1988
		EP 0158917 B1	04/09/1991
		JP 2017-530119B	04/09/1996
		JP 60-238101A	27/11/1985
		US 04643853 A	17/02/1987

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- KR 1020020069530 **[0015]**