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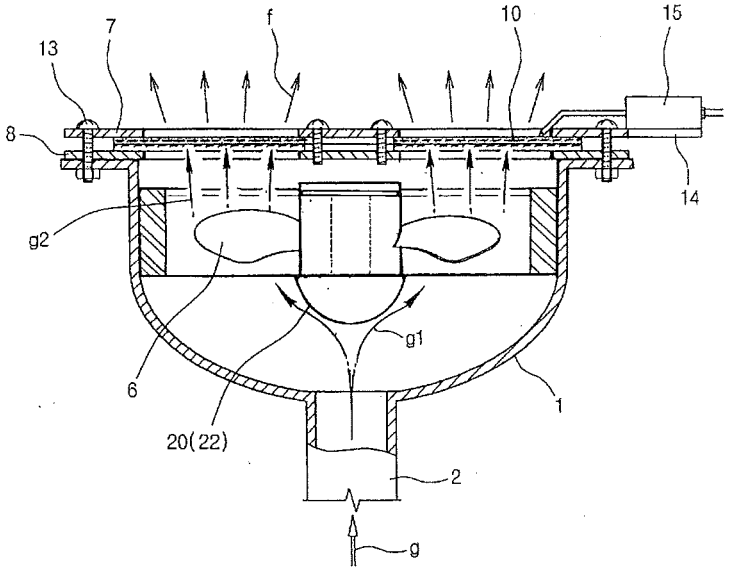
(54) FAN-METAL FIBER GAS BURNER

(57) Disclosed is a fan metal fiber gas burner in which a metal fiber pad is installed and gas is supplied through a blow pressure to be burn. The burner is capable of uniformly distributing gas to the entire pad so that the flame can be uniformly exploded from all portions of the pad and the noise problem can be solved. The burner includes a detachable metal fiber pad installed to a combustion part of a burner head, a supply pipe connected to a central portion of a bottom of the burner head, a blower to supply oxygen necessary to burn gas through the supply pipe, and an idle-type dispersing blade provided below the metal fiber pad in the burner head and having a guide plate to uniformly dispersing gas in all directions while being pure-rotated according to a gas supplying pressure, and a guide plate having a curved surface.

【Fig. 6】



EP 2 801 760 A1

Description

[Technical Field]

[0001] The present invention relates to an industrial gas burner used in a restaurant or a communal feeding facility, and more particularly, to a fan-metal fiber gas burner capable of widely and uniformly dispersing flame by a mesh-type metal fiber pad installed on a burner head and an idle-type dispersing blade installed at an inside of the burner head, so that cooking time can be shortened and burning noise may be greatly reduced when the gas is exhausted.

[Background Art]

[0002] In general, as shown in FIG. 1, an industrial gas burner is classified into a burner having two holes/two lines or three holes/three lines, a double-pipe burner, and a jet burner according to an arrangement of nozzles formed in the burner head. In such a gas burner, since gas is exhausted through a nozzle, the flame of a burning part is limited to the surroundings of the nozzle and is not steady so that the flame is flickered.

[0003] Further, since the range of flame is limited, it is difficult to uniformly heat an entire bottom of a cooking utensil so that a longer time than an expected tine is taken to roast or boil food ingredients. In addition, as an amount of burned gas is increased, the noise is more increased.

[0004] In addition, when food such as dish gravy is scorched and sticks to a nozzle, a hole diameter of the nozzle is narrowed, or if aggravated, the nozzle is obstructed so that the combustion of gas is incomplete, so the thermal efficiency of gas energy is deteriorated.

[0005] As shown in FIG. 2, a gas burner using a metal fiber, which is capable of uniformly dispersing flame to shorten heating and cooking time and to greatly reduce noise in consideration of the above, has been known in the art. According to the metal fiber gas burner, the metal fiber, which serves as a combustion member, is installed at an upper end of a burner head.

[0006] When the metal fiber, which is made of a metallic material, is used for the gas burner, differently from a nozzle type burner, the metal fiber has a flat combustion structure so that the entire surface may be used as a combustion surface. Thus, since the metal fiber gas burner has combustion efficiency and heating power greater than those of the nozzle type gas burner, the use of the metal fiber gas burner has been increased.

[0007] Typical exemplary structures of a gas burner using a metal fiber as a combustion member according to the related art include are depicted in FIG. 2 and disclosed in Korean Patent Unexamined Publication No. 2011-0106785 and Korean Utility Model Registration No. 328095, respectively.

[0008] The gas burner depicted in FIG. 2 among the related arts mentioned above includes a metal fiber b flatly installed on an upper end of a burner head a. Gas and air suitably mixed with each other by a blower and a gas supply apparatus are supplied through a pipe member c to the burner head a, so that the gas is spouted out upwardly through a mesh of the metal fiber. When the gas is ignited over the metal fiber, as a conventional wick, the metal fiber is operated as a combustion member so that the gas is burned.

[0009] However, in the above-described structure, since the gas pressure is not uniformly distributed to the entire surface of the metal fiber but concentrated on the central portion of the metal fiber, the gas is intensively spouted out to the central portion of the metal fiber, so that it is difficult to obtain uniform heating power. In addition, when the area of the combustion member is enlarged, such an unstable phenomenon may be more aggravated.

[0010] The gas burner disclosed in Korean Patent Unexamined Publication No. 2011-0106785 among the related arts includes a metal fiber pad which is formed by overlapping several metallic mesh members having mutually different fiber diameters and net knots and substitutes for a nozzle. The metal fiber pad is installed on a top surface of a gas burner head so that relatively uniform flame is exploded through the entire mesh member. A distribution plate, which is attached to an end of a mixture on a pipe line, which is placed under the pad while passing upwardly through a central portion of a bottom of the burner head, prevents the gas spouted out to the end of the mixture from being concentrated on the central portion of the pad, so that the gas is induced to be spouted out in all directions.

[0011] However, the number of metallic meshes constituting the pad of the gas burner is too many, so that the fabrication of the pad is difficult and the weight of the pad is heavy. In addition, the juice and residue of food get in between meshes and stick to the meshes so that the mesh holes are narrowed. Thus, as the gas burner is frequently used, the heating power of flame exploded through the pad is lowered and the cleaning of the pad becomes worse.

[0012] In addition, a previous scheme of controlling flame intensity by controlling the gas feeding rate has low gas diffusion so that the flame exploded from the pad is rough differently from the quiet and gorgeous flame caused while the gas is being burned at an infrared ray pad. Thus, the previous scheme is insufficient to uniformly heat food and is debased in visual esthetic feeling although a gas burner is used. In addition, although the flame intensity is decreased, the noise still remains as a research subject.

[0013] As shown in FIGS. 3 and 4, the gas burner disclosed in Korean Utility Model Registration No. 328095 among the related arts includes a stainless pad which substitutes for a gridiron and is formed of overlapping several metal meshes having mutually different wire diameters and mesh shapes. The stainless pad is installed to a combustion part of the burner head. A resistance plate is installed to a central portion of burner head under

the pad, so that the inflow gas bumps against the resistance plate so that the gag is spread in all directions.

[0014] According to the related art, even though the gas bumps against the resistance plate in the burner head so that the gag is spread in all directions, the gas is clustered on one edge of the pad if the gas pressure is elevated. To the contrary, if the gas pressure is lowered, the gas is engulfed in the flame so that the gas tends to be clustered on the central portion of the pad.

[0015] As described above, when the supplied gas is concentrated on a specific portion, it is difficult to expect the flam uniformly distributed to the whole of the pad. If the flame is not uniform, the time taken to roast or boil food is longer than the time expected when taking into consideration the amount of used gas, so that the gas cost is more increased.

[0016] In addition, as a blow pressure is raised, although the gas bumping against the resistance plate flare is irregularly clustered on an edge of the pad so that strong flame is exploded from the edge, weak flame is exploded from the central portion. That is, it is also difficult to expect uniform flame on the whole of the pad from the related arts.

[Disclosure]

[Technical Problem]

[0017] An object of the present invention is to provide a fan metal fiber gas burner, in which a metal fiber pad is installed and gas is supplied through a blow pressure to be burn, capable of uniformly distributing gas to the entire pad so that the flame can be uniformly exploded from all portions of the pad and the noise problem can be solved.

[Technical Solution]

[0018] To achieve the above object of the present invention, there is provided a fan-metal fiber gas burner which includes a detachable metal fiber pad installed to a combustion part of a burner head, a supply pipe connected to a central portion of a bottom of the burner head, and a blower to supply oxygen necessary to burn gas through the supply pipe. The fan-metal fiber gas burner includes an idle-type dispersing blade provided below the metal fiber pad in the burner head to uniformly dispersing gas in all directions while being pure-rotated according to a gas supplying pressure, and a guide plate having a curved surface.

[Advantageous Effects]

[0019] According to the present invention, the idle-type dispersing blade, which is sensitively operated in response to a pressure of blowing air including gas regardless of the blow air, uniformly mixes the blowing air with the gas, and disperses softly and uniformly the mixture like spread of fog, so that the flame can be uniformly exploded on the entire pad.

[0020] In addition, according to the present invention, since the blow pressure, a path of which is varied due to the collision of the induce plate with the curved surface, is operated as rotation energy, the idle-type dispersing blade can be economically operated without consuming any energy and any operation noise is not almost generated.

[Description of Drawings]

[0021]

FIG. 1 is a view showing a state of a nozzle type gas burner according to the related art.

FIGS. 2 and 3 are schematic views showing a gas burner to which is applied a metal fiber according to the related art.

FIG. 4 is a concept view showing the whole of a gas burner having a blower according to the related art.

FIG. 5 is an exploded perspective view showing a gas burner head according to the present invention.

FIG. 6 is an assembly view of a gas burner according to the present invention.

FIG. 7 is a detail view showing a central low end of a fan installed to a burner head according to the present invention.

[Best Mode]

[0022] A fan-metal fiber gas burner according to the present invention includes a detachable metal fiber pad installed to a combustion part of a burner head, a supply pipe connected to a central portion of a bottom of the burner head, a blower to supply oxygen necessary to burn gas through the supply pipe, and a gas supply apparatus. In addition, the fan-metal fiber gas burner includes an idle-type dispersing blade fixed below the metal fiber pad of the burner head and pure-rotated according to a pressure of blow air including gas; and a curve-shaped inducing plate attached to a low end of a central shaft of the idle-type dispersing blade and to disperse uniformly and upwardly a rising gas pressure.

[Mode for Invention]

[0023] As shown in FIG. 1, a fan-metal fiber gas burner according to the present invention includes a burner head 1, a supply pipe 2 connected to the central portion of a bottom of the burner head 1 to communicate with an inside of the burner head 1, a pad 3 mounted on a combustion part of the burner head 1, a blower 4 installed to a rear end of the supply pipe 2, a gas supply apparatus 5 installed to the supply pipe 2 at the front of the blower 4 and an idle-type dispersing blade 6 installed to an inside of the burner head 1.

[0024] The pad 3 is formed by sequentially stacking a

metal mesh 9 and a metal fiber 10 and fixed between an upper fixing rim and a lower fixing rim 8. The pad 3 utilizes a tissue property of the metal fiber 10, so that the gas is uniformly spread out through the entire surface of the pad 3 and burned to quietly explode flame.

[0025] The blower 4, which is an air volume variable blower capable of controlling an air flow rate, supplies an air together with gas through the supply pipe 2.

[0026] The gas supply apparatus 5 includes a gas hose connected to a gas barrel and the supply pipe 2 and continuously supplies gas by using the gas pressure and the air flow rate.

[0027] The idle-type dispersing blade 6 is a non-electric adaptive blade which is pure-rotated in sensitive response to the pressure of blowing air including the gas flowing into the burner head 1 through the supply pipe 2 and is installed to an inside of the burner head 1 below the pad 3.

[0028] The pad 3 and the idle-type dispersing blade 6 are preferably spaced apart from each other by at least a distance in the range of 5 cm to 10 cm. Since a space is formed between the pad 3 and the idle-type dispersing blade 6, the resistance against the rotor is reduced so that the rotation is smoothly performed and the mixing and diffusion of gas are improved.

[0029] The metal mesh 9 of the pad 3 is formed of stainless having excellent corrosion and heat resistance and excellent durability. The metal mesh 9 supports the metal fiber 10 to prevent the metal fiber 10 from drooping due to strong flame.

[0030] The metal fiber 10 may have the same standard as the metal mesh 9 and a single metal fiber 10 may be used. The metal mesh 9 and the metal fiber 10 are sequentially stacked and after the upper fixing rim 8 is placed on the metal fiber 10 and the coupling holes of the metal fiber 10, the metal mesh 9, the upper and lower fixing rims 7 and 8 are aligned with those of a flange 16, the metal fiber 10, the metal mesh 9, the upper and lower fixing rims 7 and 8 are coupled to the flange 16 with screws 13.

[0031] A curve-shaped inducing plate 20 for dispersing the gas pressure rising upwardly is integrally installed to the low end of the central shaft around which the idle-type dispersing blade 6 is fitted. The inducing plate 20 included a curve shaped inducing plate and a hemisphere shaped including plate.

[0032] The inducing plate 20 has a diameter W larger than an inner diameter H of the supply pipe 2 placed below the inducing plate 20. After the rising gas pressure which collides against the curved surface 22 is dispersed in all directions as the arrow of FIG. 6, the gas collides against the idle-type dispersing blade so that rotation energy is continuously supplied to the idle-type dispersing blade. Thus, the idle-type dispersing blade 6 is continuously rotated. When a size of the inducing plate 20 is equal to or less than the inner diameter of the supply pipe 2, the collision area is reduced so that the diffusion efficiency cannot be obtained.

[0033] Reference numeral '14' denotes ignition member attaching piece extending toward one side of the upper fixing rim 7 and reference numeral '15' denotes a piezoelectric type ignition member.

[0034] According to the present invention, the gas g1 flowing through the supply pipe 3 while a blow pressure is maintained allows the idle-type dispersing blade 6 to be driven and is burned while the gas g1 is being dispersed upwardly through the pad 3.

[0035] As shown in FIGS. 6 and 7, the gas collides against one end of the curved surface 22 of the guide plate 20 and at the same time, is dispersed in all directions. In the meantime, the gas g2 is softly stirred with the idle-type dispersing blade 6 which is rotated by the gas g1 to which the blow pressure is applied, so that the gas g2 is dispersed like spread of fog.

[0036] The dispersed gas g2 uniformly permeates into the whole of the metal fiber 10 by the upward blow pressure so that the gas g2 is smoothly burn, so the flame f having uniform heating power explodes from all portions.

[0037] The curved surface 22, which is placed just on the upper end of the supply pipe 2 in the structure of the gas burner, experts the greatest effect on the primary task of dispersing the gas flowing into the supply pipe 2. In addition, the diameter W of the curved surface 22 is larger than the inner diameter H of the supply pipe 2, so that the dispersion after the rising gas collides against the curved surface can be improved.

[Industrial Applicability]

[0038] According to the present invention, the idle-type dispersing blade, which is sensitively operated in response to a pressure of blowing air including gas regardless of the blow air, uniformly mixes the blowing air with the gas, and disperses softly and uniformly the mixture like spread of fog, so that the flame can be uniformly exploded on the entire pad. In addition, since the blow pressure, a path of which is varied due to the collision of the induce plate with the curved surface, is operated as rotation energy, the idle-type dispersing blade can be economically operated without consuming any energy and any operation noise is not almost generated, so that the present invention has very great industrial applicability.

Claims

1. A fan-metal fiber gas burner including a detachable metal fiber pad installed to a combustion part of a burner head, a supply pipe connected to a central portion of a bottom of the burner head, a blower to supply oxygen necessary to burn gas through the supply pipe, and a gas supply apparatus, the fan-metal fiber gas burner comprising:

   an idle-type dispersing blade fixed below the

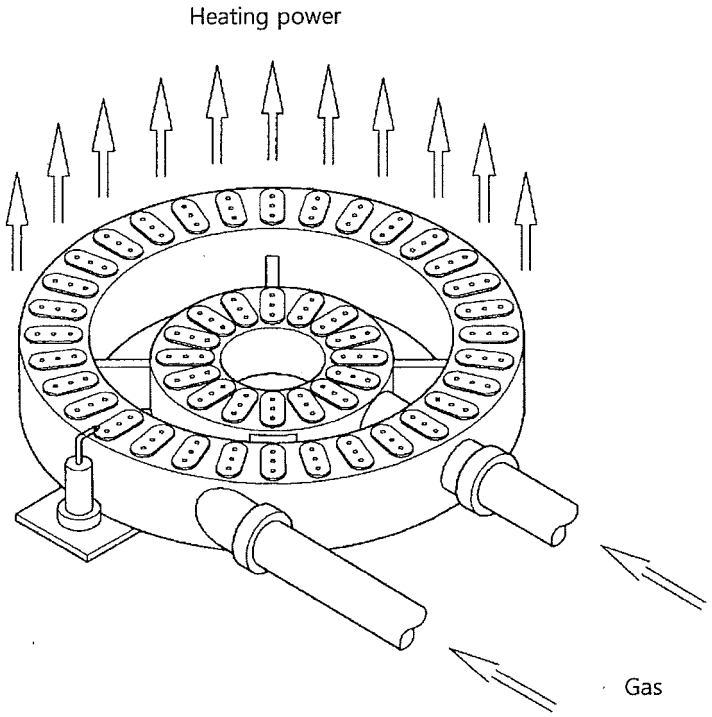
metal fiber pad of the burner head and idly rotated corresponding to a pressure of blowing air containing gas; and

a curved guide plate attached to a low end of a central shaft of the idle-type dispersing blade to uniformly disperse a rising gas pressure in an upward direction.

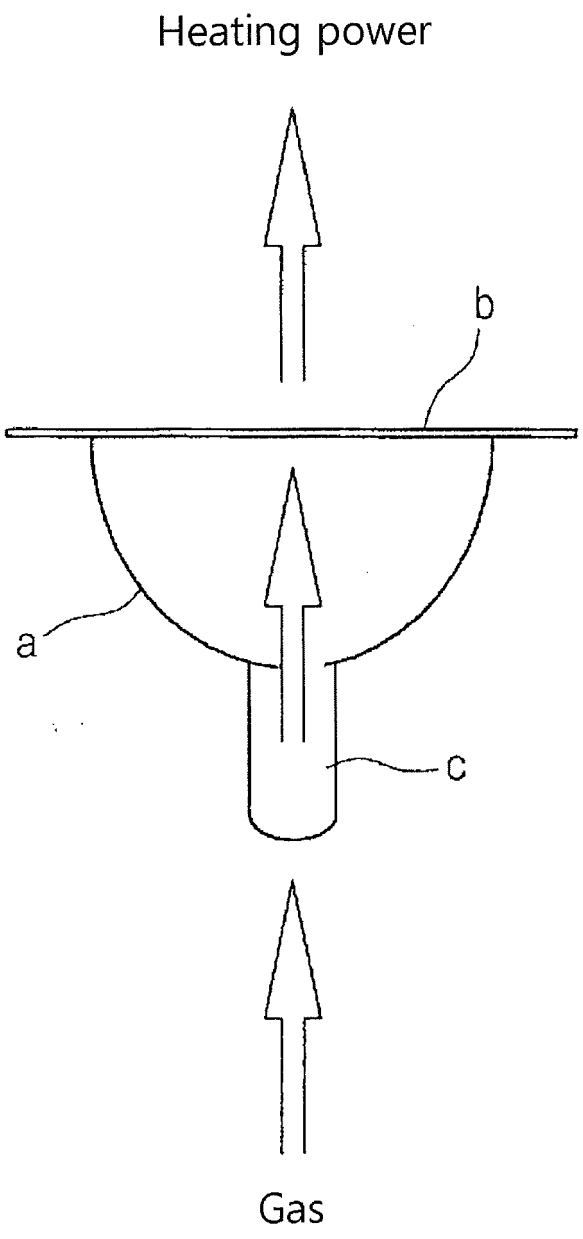
2. The fan-metal fiber gas burner of claim 1, wherein the idle-type dispersing blade has a non-electric structure that does not require a motor or electric power.

3. The fan-metal fiber gas burner of claim 1, wherein the curved guide plate has a diameter larger than an inner diameter of the supply pipe.

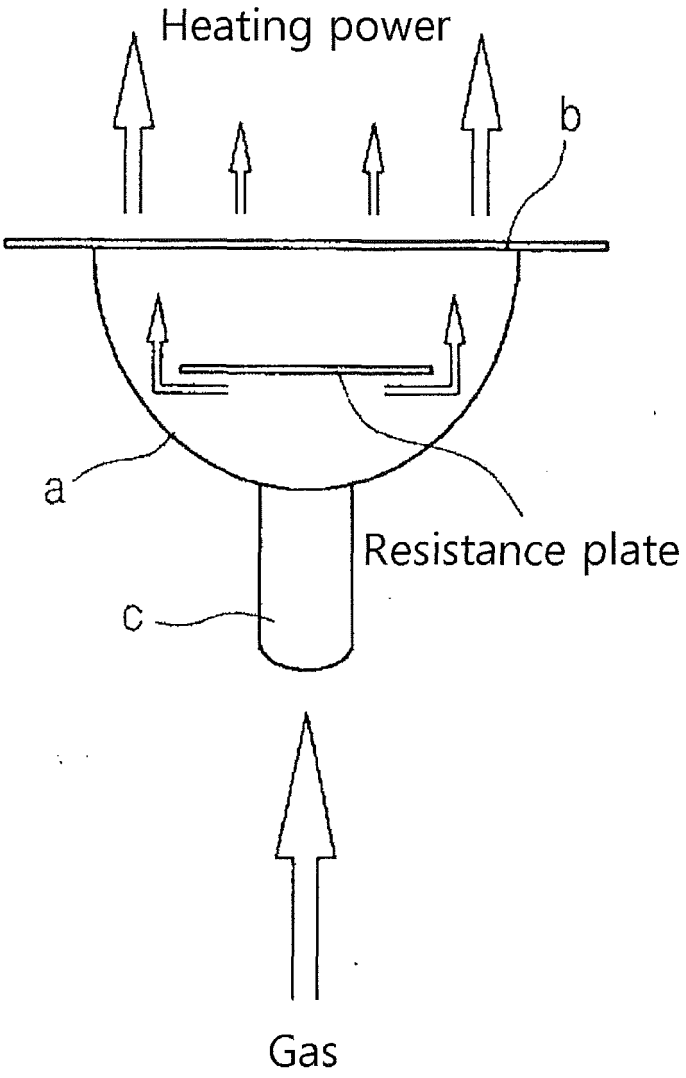
【Fig. 1】



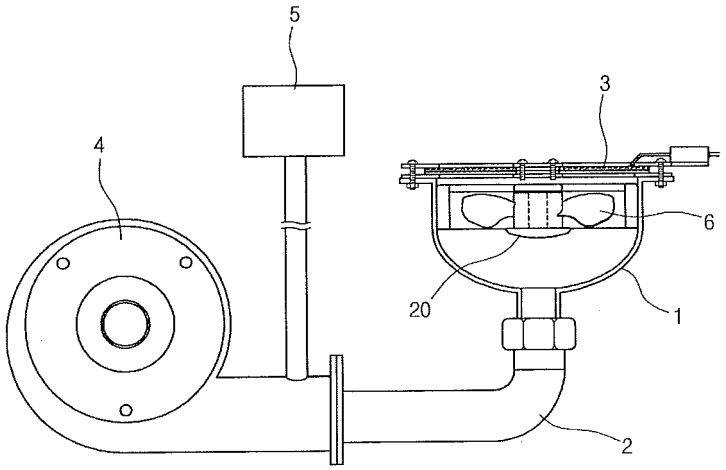
【Fig. 2】



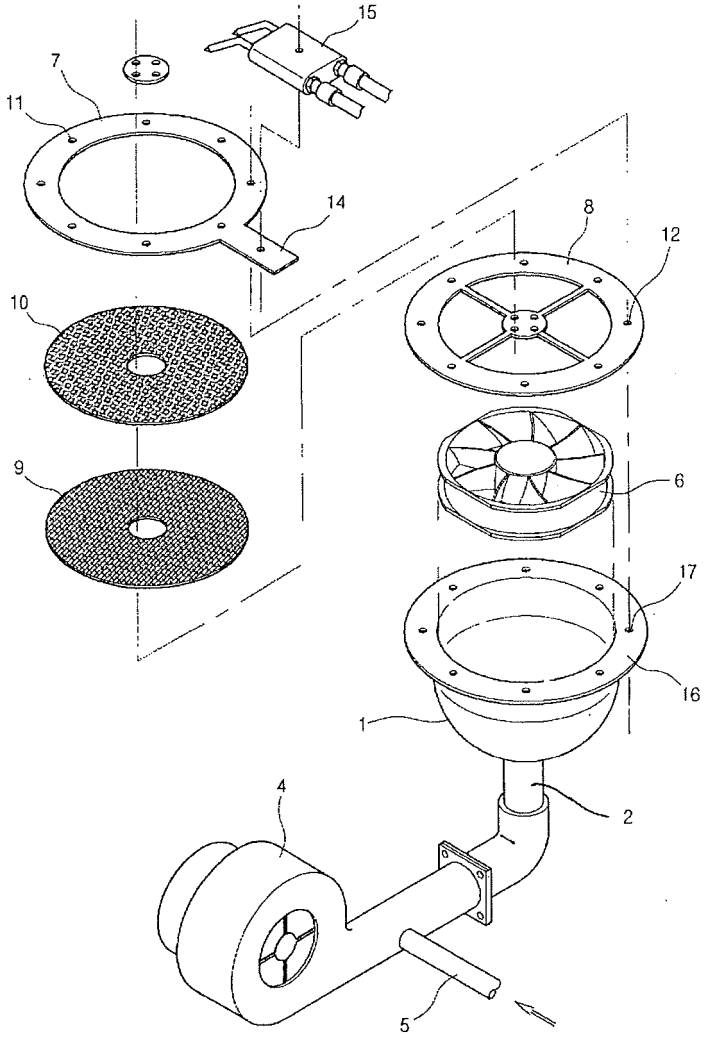
【Fig. 3】



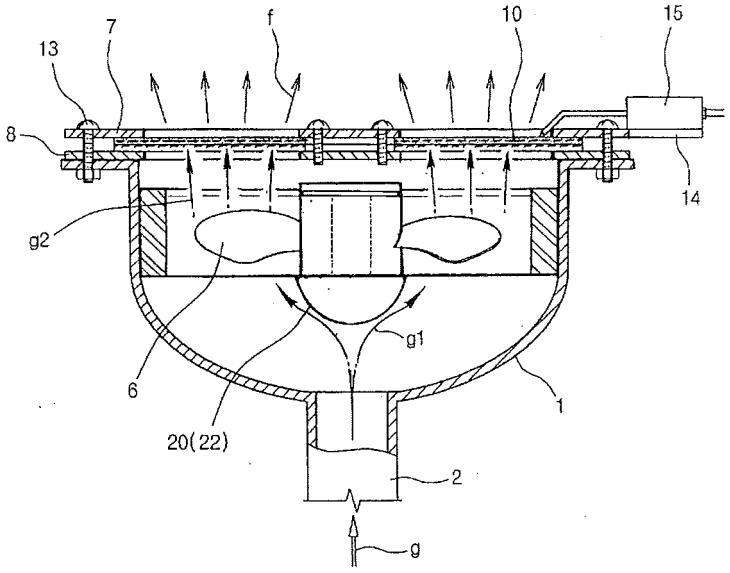
【Fig. 4】



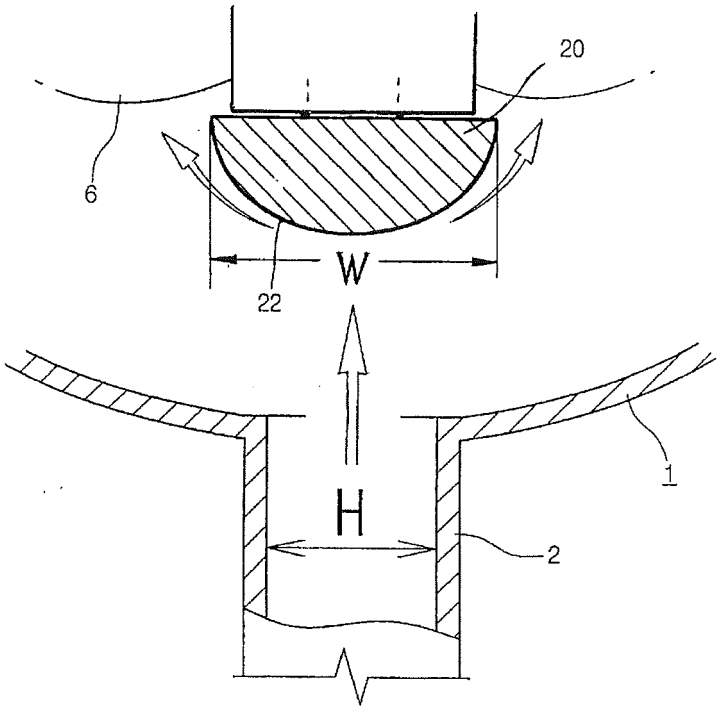
【Fig. 5】



【Fig. 6】



【Fig. 7】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2013/008629

A. CLASSIFICATION OF SUBJECT MATTER

F23D 14/14(2006.01)i, F23D 14/48(2006.01)i, F24C 3/10(2006.01)i, F24C 3/04(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)

F23D 14/14; F24C 3/08; F23D 14/46; F23D 14/00; F23D 14/06; F23D 14/48; F24C 3/10; F24C 3/04

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: metal fiber, wind path, gas burner, blade, revolving, whirlpool, dispersion, rectification

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-0687832 B1 (KIM, Yun Hyung) 02 March 2007 See abstract; claim 1; figures 1-2	1-3
A	KR 10-2007-0047642 A (LS CORP.) 07 May 2007 See abstract; figure 3	1-3
A	KR 10-2001-0058836 A (KOREA GAS CORPORATION) 06 July 2001 See abstract; claim 1; figure 1	1-3

☐ 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
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"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
12 NOVEMBER 2013 (12.11.2013)	**13 NOVEMBER 2013 (13.11.2013)**
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/KR2013/008629

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 10-0687832 B1	02/03/2007	NONE	
KR 10-2007-0047642 A	07/05/2007	NONE	
KR 10-2001-0058836 A	06/07/2001	NONE	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 20110106785 **[0007] [0010]**
- KR 328095 **[0007] [0013]**