



(11)

EP 4 050 282 A1

(12)

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

(43) Date of publication:
31.08.2022 Bulletin 2022/35

(21) Application number: **20881291.7**

(22) Date of filing: **30.10.2020**

(51) International Patent Classification (IPC):
F24H 9/18 ^(2022.01) **F24H 9/00** ^(2022.01)
F23D 14/00 ^(2006.01)

(52) Cooperative Patent Classification (CPC):
F23D 14/00; F24H 9/00; F24H 9/18

(86) International application number:
PCT/CN2020/125334

(87) International publication number:
WO 2021/083338 (06.05.2021 Gazette 2021/18)

(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
Designated Validation States:
KH MA MD TN

(30) Priority: **31.10.2019 CN 201911054574**
29.10.2020 CN 202011181533
29.10.2020 CN 202022458519 U

(71) Applicants:
• **Wuhu Midea Kitchen and Bath Appliances Mfg. Co., Ltd.**
Wuhu, Anhui 241009 (CN)

• **Midea Group Co., Ltd.**
Foshan, Guangdong 528311 (CN)

(72) Inventors:
• **XUE, Chaoxiong**
Anhui 241009 (CN)
• **GOU, Jian**
Anhui 241009 (CN)
• **LIANG, Guorong**
Anhui 241009 (CN)
• **XU, Guoping**
Anhui 241009 (CN)

(74) Representative: **RGTH**
Patentanwälte PartGmbB
Neuer Wall 10
20354 Hamburg (DE)

(54) **GAS DEVICE**

(57) The present invention provides a gas device, the gas device comprises a frame and a baffle; the baffle is arranged in the frame, the baffle comprises an air guide portion and an insulation portion, the air guide portion and the frame are enclosed to form a first air guide channel, and the air guide portion is provided with a first air outlet, the first air outlet communicates with the first air guide channel, and faces the insulation portion. In the gas device provided by the present invention, a baffle is arranged on the inner side of the gas device, and the baffle can reduce the heat transferred from the inside of the gas device to the gas device, thereby reducing the temperature of the gas device, and reduce the impact of the high temperature generated by the burner on the sheet metal components such as the gas device, thereby prolonging the service life of the sheet metal components such as the gas device.

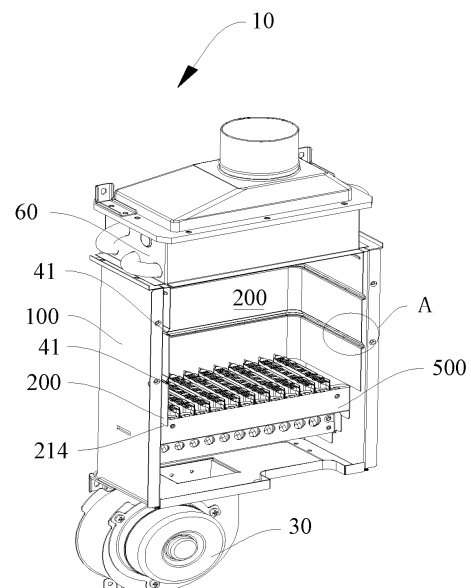


FIG. 1

EP 4 050 282 A1

Description

[0001] This application claims priority to Chinese Patent Application No. 201911054574.6 filed with China National Intellectual Property Administration on October 31, 2019 and entitled "Gas Device", and claims priority to Chinese Patent Application No. 202011181533.6 filed with China National Intellectual Property Administration on October 29, 2020 and entitled "Gas Device", and claims priority to Chinese Patent Application No. 202022458519.8 filed with China National Intellectual Property Administration on October 29, 2020 and entitled "Gas Device", the entire contents of which are herein incorporated by reference.

FIELD

[0002] The present disclosure relates to the field of gas heating, in particular, to a gas device.

BACKGROUND

[0003] At present, a gas water heater is a device that heats cold water by burning gas.

[0004] In the related art, the main combustion method adopted by the gas water heater is flame combustion. With the continuous development of combustion technology, the burning intensity of the burner is increasing, the working temperature of the combustion chamber is increased, and the high temperature will affect the service life of the sheet metal components of the burner.

SUMMARY

[0005] The present disclosure aims to solve at least one of the technical problems existing in the prior art or related technologies.

[0006] To this end, a first aspect of the present disclosure provides a gas device.

[0007] A second aspect of the present disclosure provides a gas device.

[0008] A third aspect of the present disclosure provides a gas device.

[0009] In view of this, the first aspect of the present disclosure provides a gas device with good air cooling effect and long service life of components.

[0010] The gas device according to the embodiment of the present disclosure, comprises a frame, defining a chamber; a burner, being arranged at a bottom side of the chamber; a fan, being arranged on an outside of the frame, an outlet of the fan facing the burner; and a baffle, being arranged at an inner side of the frame, and spaced apart from at least a portion of an inner wall of the frame to form an air duct, wherein air sent out by the fan comprises a portion that flows into the air duct, and another portion that flows into the burner, the baffle provided with a plurality of air outlets along a flow direction of the air duct.

[0011] The gas device according to the embodiment of the present disclosure, by constructing an air duct for air-cooling the frame on the frame and the baffle, the baffle is provided with a plurality of air outlets on the flow direction of the air duct, forming an air film on the inner side of the baffle to block the flow of hot air toward the baffle, improving the air cooling effect of the air in the air duct on the frame, effectively avoiding the conduction of high temperature to the outside of the frame, and improving the service life of the components of the gas device.

[0012] In addition, according to the embodiment of the present disclosure, the gas device may also have the following additional technical features.

[0013] In some embodiments presented in the disclosure, a plurality of steering portions are formed on the baffle, and protrudes from inside to outside of the baffle, the air outlet provided on the steering portion.

[0014] In one embodiment, the steering portion comprises a first section extending outward in a horizontal direction, a second section connected to the first section at one end and extending upward in a vertical direction, and a third section connected to the second section at one end and extending obliquely in an up-down direction, wherein the air outlet is formed on the first section.

[0015] Further optionally, the air outlet is a strip-shaped hole extending along a horizontal direction.

[0016] In an optional example, the air outlet is evenly distributed along a circumferential direction of the baffle.

[0017] In an optional example, the air inlet area of the air duct is larger than the air outlet area.

[0018] Further optionally, the ratio of the air inlet area to the air outlet area of the air duct is between 5:2 and 4:3.

[0019] In one embodiment, an air inlet surface of the air duct is lower than a burning surface of the burner.

[0020] In one embodiment, an upper part of the baffle is further provided with a hollow convex column, extending toward the frame, a cavity of the hollow convex column forming the air outlet.

[0021] In an optional example, a distance between the hollow convex column and a top surface of the air duct is d , wherein a height of the air duct is h , and wherein d/h is between $1/20$ and $1/10$.

[0022] The second aspect of the present disclosure provides a gas device, comprising: a frame; a burner, being arranged in the frame; a baffle, being arranged at an inner side of the frame, and spaced apart from at least a portion of an inner wall of the frame to form an air duct, wherein air sent out by the fan comprises a portion that flows into the air duct, and another portion that flows into the burner, and the baffle is provided with a plurality of air outlets along a flow direction of the air duct.

[0023] The gas device according to the embodiment of the present disclosure, by constructing an air duct for air-cooling the frame on the frame and the baffle, and the baffle is provided with a plurality of air outlets on the air duct flow direction, forming an air film on the inner side of the baffle to block the flow of hot air toward the baffle, improving the air cooling effect of the air in the air duct

on the frame, effectively avoiding the conduction of high temperature to the outside of the frame, and improving the service life of the components of the gas device.

[0024] In addition, according to the embodiment of the present disclosure, the gas device may also have the following additional technical features.

[0025] In an embodiment of the present disclosure, the gas device further comprising: the fan, being arranged outside the frame, an outlet of the fan facing the burner, and being used to send air into the frame.

[0026] In an embodiment of the present disclosure, the frame defines a chamber, and the burner is arranged at a bottom side of the chamber.

[0027] In some embodiments presented in the disclosure, a plurality of steering portions are formed on the baffle, and protrudes from inside to outside of the baffle, and the air outlet is provided on the steering portion.

[0028] In one embodiment, the steering portion comprises a first section extending toward a sidewall of the frame, a second section connected to the first section at one end and extending upward, wherein the air outlet is provided on the first section.

[0029] Further optionally, the air outlet is a strip-shaped hole extending along a horizontal direction.

[0030] In an optional example, the air outlet is evenly distributed along a circumferential direction of the baffle.

[0031] In some embodiments presented in the disclosure, wherein the baffle is connected to a sidewall of the frame, wherein the baffle comprises a heat insulation portion arranged obliquely with respect to a sidewall of the frame, wherein one end of the heat insulation portion away from a sidewall of the frame bends outward to form a steering portion, and/or one end of the heat insulation portion closer to a sidewall of the frame bends inward to form a steering portion.

[0032] In some embodiments presented in the disclosure, the baffle further comprises an air guide portion, wherein one end of the air guide portion is connected to the frame, the other end of the air guide portion connected to the heat insulation portion, and the air inlet of the air duct being provided guide portion, wherein a first air guide channel is surrounded by the air guide portion and the sidewall of the frame, the air guide portion provided with a first air outlet, wherein the first air outlet communicates with the first air guide channel and faces the heat insulation portion.

[0033] In an embodiment of the present disclosure, the heat insulation portion comprises a first heat insulation section and a second heat insulation section. A second air guide channel surrounded by, the first heat insulation section and the frame, the second air guide channel communicates with the first air guide channel. A second air outlet is arranged on the steering portion formed by bending the top of the first heat insulation section to the sidewall of the frame, and the second air outlet communicates with the second air guide channel. The second air outlet is arranged on the steering portion of the first heat insulation section to face the second heat insulation section.

[0034] In this embodiment, the air blown from the first air outlet can be blown to the first heat insulation section, and while cooling the first heat insulation section, it can also form a layer of air film on the first heat insulation section, reducing the temperature of the first heat insulation section. A second air guide channel is arranged between the first heat insulation section and the frame, and the air flowing in the second air guide channel can cool down the first heat insulation section again, further reducing the temperature of the first heat insulation section. There is a second air outlet communicated with the second air guide channel on the first heat insulation section. The gas in the second air guide channel can be blown to the second heat insulation section by the second air outlet. While cooling the second heat insulation section, a layer of air film is formed on the second heat insulation section, reducing the temperature of the second heat insulation section.

[0035] In an embodiment of the present disclosure, the first heat insulation section comprises a plurality of insulation sub-sections, and the plurality of insulation sub-sections are connected in sequence, one of the plurality of insulation sub-sections is connected to the air guide portion and arranged opposite to the first air outlet, and another one of the plurality of insulation sub-sections is connected to the second heat insulation section, and is provided with the second air outlet, wherein the plurality of insulation sub-sections comprise adjacent insulation sub-sections, and one of the adjacent insulation sub-sections closer to the air guide portion is provided with a third air outlet, facing the other one of the adjacent insulation sub-sections.

[0036] In this embodiment, the first heat insulation section is provided with a plurality of insulation sub-sections, and the first air outlet faces the insulation sub-section connected to the air guide portion, realizing the cooling of the insulation sub-section. The second air outlet is arranged on the insulation sub-section connected to the second heat insulation section, the air in the second air guide channel can be blown to the second heat insulation section, cooling the second heat insulation section. All the insulation sub-sections are connected in sequence, in the adjacent insulation sub-sections, the insulation sub-section closer to the air guide portion is provided with a third air outlet. The air in the second air guide channel is blown to the insulation sub-section closer to the second heat insulation section through the third air outlet to cool the insulation sub-section closer to the second heat insulation section.

[0037] In an embodiment of the present disclosure, the first heat insulation section is connected to the second heat insulation section, and one end of the second heat insulation section connected to the first heat insulation section is in contact with the frame.

[0038] In this embodiment, the second heat insulation section is in contact with the frame, the air in the second air guide channel will not continue to flow when it flows to the second air outlet, but will be blown to the second

heat insulation section by the second air outlet. In this way, the diversion of the air in the second air guide channel is realized, the utilization rate of the air in the second air guide channel is improved, and the heat dissipation efficiency of the second heat insulation section is improved.

[0039] In an embodiment of the present disclosure, a height of the air inlet is lower than a burning surface of the burner in vertical direction.

[0040] In this embodiment, above the top of the burner, high temperature flue gas or high temperature air will be generated due to the combustion of the flame. Set the air inlet below the burning surface of the burner to prevent the high temperature flue gas or high temperature air from entering the first air guide channel, the temperature of the gas in the first air guide channel is lowered, and the thermal insulation effect of the baffle and the air film is improved.

[0041] In an embodiment of the present disclosure, the heat insulation portion is arranged obliquely relative to the sidewall of the frame.

[0042] In this embodiment, the extension direction of the heat insulation portion is at a certain angle with the air outlet direction of the first air outlet, the gas blown out of the first air outlet will exert a certain pressure on the heat insulation portion while moving along the heat insulation portion, forming a heat insulating gas film on the surface of the heat insulation portion. The heat insulating gas film can slow down the speed of the air inside the frame transferring heat to the heat insulation portion, reducing the temperature of the heat insulation portion.

[0043] In an embodiment of the present disclosure, an angle between the heat insulation portion and a sidewall of the frame is at least 3 degrees and not more than 30 degrees.

[0044] In this embodiment, the angle between the air outlet direction of the first air outlet and the heat insulation portion is 3 degrees to 30 degrees. The gas flowing out from the first air outlet can evenly form a layer of heat insulating gas film on the heat insulation portion, reducing the temperature of the heat insulation portion.

[0045] In an embodiment of the present disclosure, the burner is an atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion.

[0046] In this embodiment, the burner belongs to the atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion, the heat insulation portion can effectively prevent the heat generated by the fire exhaust assembly from being transferred to the frame, further improving the thermal insulation effect of the heat insulation portion.

[0047] In an embodiment of the present disclosure, a plurality of heat insulation portions are provided, and the plurality of heat insulation portions being arranged on two sides of the burner or around the burner.

[0048] In this embodiment, the burner is arranged on the inner side of the frame, and the heat insulation portion

is being arranged on two sides of the burner, or around the burner, which prevents the heat generated by the burner from being transferred to the frame to cause aging or deformation of the frame, and can reduce the heat loss inside the frame, and improve the heating efficiency of the burner.

[0049] In an embodiment of the present disclosure, a height of the heat insulation portion above the burner is at least 40 mm and not more than 120 mm

[0050] In this embodiment, set a height of the heat insulation portion to be 40 mm to 120 mm higher than the top of the burner to ensure that the heat insulation portion can effectively insulate the heat generated by the burner and avoid material waste due to the high height of the heat insulation portion.

[0051] The third aspect of the present disclosure provides a gas device, comprising: a frame; a burner, being arranged in the frame; and a baffle, being connected to a sidewall of the frame, wherein the baffle comprises a first heat insulation portion arranged obliquely with respect to a sidewall of the frame, the first heat insulation portion spaced apart from at least a portion of an inner wall of the frame to form a cooling gap.

[0052] In this embodiment, by setting the first heat insulation portion on the inner side of the frame, and setting a cooling gap between the first heat insulation portion and the frame, the heat transferred from the inside of the frame to the frame can be reduced, reducing the temperature of the frame, reducing the impact of the high temperature generated by the burner on the frame and other sheet metal components, extending the service life of the frame and other sheet metal components. A cooling gap is arranged between the first heat insulation portion and at least a portion of the inner wall of the frame. If air flows through the cooling gap, the temperature of the first heat insulation portion can be lowered, and the heat transferred from the inside of the frame to the frame through the first heat insulation portion can be further reduced.

[0053] In addition, according to the embodiment of the present disclosure, the gas device may also have the following additional technical features.

[0054] One end of the first heat insulation portion away from a sidewall of the frame is folded outward to form a steering portion, and/or one end of the first heat insulation portion closer to a sidewall of the frame is folded inward to form a steering portion, at least one of the steering portions is provided with an air outlet.

[0055] In this embodiment, the air is blown out from the air outlet after passing through the cooling gap, and blows to the first heat insulation portion. While realizing the cooling of the first heat insulation portion, a layer of heat insulating gas film can also be formed on the surface of the first heat insulation portion. The heat insulating gas film can reduce the heat transferred from the inside of the frame to the first heat insulation portion, further reduce the temperature of the first heat insulation portion, reducing the heat transferred from the inside of the frame to the frame through the first heat insulation portion, re-

ducing the heat loss inside the frame, and improving the heating efficiency of the burner.

[0056] In an embodiment of the present disclosure, a top end of the first heat insulation portion further comprises a second heat insulation portion arranged parallel to a sidewall of the frame.

[0057] In this embodiment, by setting the second heat insulation portion, the thermal insulation range of the baffle is extended, and the thermal insulation effect of the baffle is further improved.

[0058] In an embodiment of the present disclosure, a gap between the second heat insulation portion and a sidewall of the frame is larger than or equal to a gap between the first heat insulation portion and a sidewall of the frame. One end away from the sidewall of the frame bends outward to form a steering portion, and/or one end of the heat insulation portion closer to the sidewall of the frame bends inward to form a steering portion, and an air outlet is provided on the steering portion.

[0059] In an embodiment of the present disclosure, the heat insulation portion comprises: a first heat insulation section and a second heat insulation section, wherein the first air outlet faces the first heat insulation section, a second air guide channel is surrounded by the first heat insulation section and the frame, the second air guide channel communicates with the first air guide channel, and the first heat insulation section is provided with a second air outlet, and the second air outlet communicates with the second air guide channel; and the second air outlet towards the second heat insulation section.

[0060] In this embodiment, the air blown from the first air outlet can be blown to the first heat insulation section, and while cooling the first heat insulation section, it can also form a layer of air film on the first heat insulation section, reducing the temperature of the first heat insulation section. A second air guide channel is arranged between the first heat insulation section and the frame, and the air flowing in the second air guide channel can cool down the first heat insulation section again, further reducing the temperature of the first heat insulation section. There is a second air outlet communicated with the second air guide channel on the first heat insulation section. The gas in the second air guide channel can be blown to the second heat insulation section by the second air outlet. While cooling the second heat insulation section, a layer of air film is formed on the second heat insulation section, reducing the temperature of the second heat insulation section.

[0061] In an embodiment of the present disclosure, the first heat insulation section comprises a plurality of heat insulation sub-sections, and the plurality of heat insulation sub-sections are connected in sequence, one of the plurality of heat insulation sub-sections is connected to the air guide portion and arranged opposite to the first air outlet, and another one of the plurality of heat insulation sub-sections is connected to the second heat insulation section, and is provided with the second air outlet, wherein the plurality of heat insulation sub-sections com-

prise adjacent insulation sub-sections, and one of the adjacent insulation sub-sections closer to the air guide portion is provided with a third air outlet facing the other one of the adjacent insulation sub-sections.

[0062] In this embodiment, the first heat insulation section is provided with a plurality of heat insulation sub-sections, and the first air outlet faces the insulation sub-section connected to the air guide portion, realizing the cooling of the insulation sub-section. The second air outlet is arranged on the insulation sub-section connected to the second heat insulation section, the air in the second air guide channel can be blown to the second heat insulation section, cooling the second heat insulation section. All the insulation sub-sections are connected in sequence, in the adjacent insulation sub-sections, the insulation sub-section closer to the air guide portion is provided with a third air outlet. The air in the second air guide channel is blown to the insulation sub-section closer to the second heat insulation section through the third air outlet to cool the insulation sub-section closer to the second heat insulation section.

[0063] In an embodiment of the present disclosure, the first heat insulation section is connected to the second heat insulation section, and one end of the second heat insulation section connected to the first heat insulation section is in contact with the frame.

[0064] In this embodiment, the second heat insulation section is in contact with the frame, the air in the second air guide channel will not continue to flow when it flows to the second air outlet, but will be blown to the second heat insulation section by the second air outlet. In this way, the diversion of the air in the second air guide channel is realized, the utilization rate of the air in the second air guide channel is improved, and the heat dissipation efficiency of the second heat insulation section is improved.

[0065] In an embodiment of the present disclosure, a height of the air inlet is lower than a burning surface of the burner in vertical direction.

[0066] In this embodiment, above the top of the burner, high temperature flue gas or high temperature air will be generated due to the combustion of the flame. Set the air inlet below the burning surface of the burner to prevent the high temperature flue gas or high temperature air from entering the first air guide channel, the temperature of the gas in the first air guide channel is lowered, and the thermal insulation effect of the baffle and the air film is improved.

[0067] In an embodiment of the present disclosure, an angle between the heat insulation portion and a sidewall of the frame is at least 3 degrees and not more than 30 degrees.

[0068] In this embodiment, the angle between the sidewall of the frame and the heat insulation portion is 3 degrees to 30 degrees, the gas flowing out of the first air outlet can evenly form a layer of heat insulating gas film on the heat insulation portion, reducing the temperature of the heat insulation portion.

[0069] In an embodiment of the present disclosure, the burner is an atmospheric type burner, and the burner comprises a fire exhaust assembly arranged in parallel with the heat insulation portion.

[0070] In this embodiment, the burner belongs to the atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion, the heat insulation portion can effectively prevent the heat generated by the fire exhaust assembly from being transferred to the frame, further improving the thermal insulation effect of the heat insulation portion.

[0071] In an embodiment of the present disclosure, a plurality of the heat insulation portions are provided, and the plurality of heat insulation portions being arranged on two sides of the burner or around the burner.

[0072] In this embodiment, the burner is arranged on the inner side of the frame, and the heat insulation portion is being arranged on two sides of the burner, or around the burner, which prevents the heat generated by the burner from being transferred to the frame to cause aging or deformation of the frame, and can reduce the heat loss inside the frame, and improve the heating efficiency of the burner.

[0073] In an embodiment of the present disclosure, a height of the heat insulation portion above the burner is at least 40 mm and not more than 120 mm

[0074] In this embodiment, set a height of the heat insulation portion to be 40 mm to 120 mm higher than the top of the burner to ensure that the heat insulation portion can effectively insulate the heat generated by the burner and avoid material waste due to the high height of the heat insulation portion.

[0075] Additional aspects and advantages of the present disclosure will become apparent in the following description, or are understood by the practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0076] The above and/or additional aspects and advantages of the present disclosure will become apparent and readily understood from the following description of embodiments in conjunction with the drawings:

Fig. 1 is a partial perspective view of a gas device according to some embodiments of the present disclosure;

Fig. 2 is a cross-sectional view of a gas device according to some embodiments of the present disclosure;

Fig. 3 is a front view of a gas device according to some embodiments of the present disclosure;

Fig. 4 is an enlarged view of A in Fig. 1;

Fig. 5 shows a schematic diagram of a gas device

according to one embodiment of the present disclosure;

Fig. 6 shows a side view of a gas device according to one embodiment of the present disclosure;

Fig. 7 is a partial schematic diagram of a gas device at B according to one embodiment of the present disclosure shown in Fig. 6;

Fig. 8 shows a schematic diagram of a heat insulation portion according to one embodiment of the present disclosure;

Fig. 9 shows a side view of a heat insulation portion according to one embodiment of the present disclosure;

Fig. 10 shows a side view of a heat insulation portion according to another embodiment of the present disclosure;

Fig. 11 shows a side view of a heat insulation portion according to yet another embodiment of the present disclosure;

Fig. 12 is a cross-sectional view along C-C of a heat insulation portion according to one embodiment of the present disclosure shown in Fig. 8;

Fig. 13 is a cross-sectional view along D-D of a heat insulation portion according to one embodiment of the present disclosure shown in Fig. 8;

Fig. 14 is a cross-sectional view along E-E of a heat insulation portion according to one embodiment of the present disclosure shown in Fig. 8;

Fig. 15 shows an assembly schematic diagram of a burner and a frame according to one embodiment of the present disclosure;

Fig. 16 is a cross-sectional view along F-F of a burner and a frame according to one embodiment of the present disclosure shown in Fig. 15; and

Fig. 17 is a partial schematic diagram of a burner and a frame at G according to one embodiment of the present disclosure shown in Fig. 16.

[0077] The corresponding relationship between the reference signs and component names in Figs. 1-17 is as follows:

[0078] 100 frame, 200 baffle, 210 air guide portion, 212 first air outlet, 214 air inlet, 220 heat insulation portion, 222 first heat insulation section, 2222 first insulation sub-section, 2224 second insulation sub-section, 2226 third insulation sub-section, 2228 forth insulation sub-section,

224 second air outlet, 226 second heat insulation section, 228 third air outlet, 300 first air guide channel, 400 second air guide channel, 500 burner, 700 heat exchanger, 10 gas device, 11 chamber, 30 fan, 41 steering portion, 411 first section, 412 second section, 413 third section, 42 hollow convex column, 50 air duct, 52 air outlet, 60 heat exchanger.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0079] In order that the above-mentioned objectives, features and advantages of the present disclosure can be understood more clearly, a further detailed description of the present disclosure will be given below in connection with the accompanying drawings and specific embodiments. It should be noted that the embodiments of the present disclosure and the features in the embodiments can be combined with each other if there is no conflict.

[0080] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. However, the present disclosure can also be implemented in other manners than those described herein. Therefore, the protection scope of the present disclosure is not limited to the specific embodiments disclosed below.

[0081] A gas device according to some embodiments of the present disclosure is described below with reference to Figs. 1 to 17.

Embodiment 1

[0082] As shown in Figs. 1 to 3, the gas device 10 is provided with a heat exchanger 60, a burner 500 and a fan 30 in sequence from top to bottom. wherein, the burner 500 is arranged on the inner side of the frame 100, the fan 30 is arranged on the outside of the frame 100, the heat exchanger 60 can be arranged outside the frame 100 or inside the frame 100, the heat exchanger 60 can also be partially arranged in the frame 100, and another part can be arranged outside the frame 100.

[0083] Specifically, as shown in Figs. 1 to 3, the frame 100 defines a chamber 11, the burner 500 is arranged above the bottom side of the chamber 11, the fan 30 is arranged on the outside of the frame 100, and the outlet of the fan 30 faces the burner 500. That is, when the fan 30 is started, the air will be sent into the chamber 11 and mixed with the gas entering the burner 500 to form the air-fuel mixed gas to be burned. The air-fuel mixed gas is ignited in the burner 500, and the generated high temperature flue gas enters the upper side of the chamber 11 and flows to the heat exchanger 60 to heat the water in the heat exchanger 60.

[0084] In order to avoid the heat of the high temperature flue gas being conducted out of the frame 100 and causing damage to the components of the gas device 10, the inner side of the frame 100 is further provided with a baffle 200. The baffle 200 spaced apart from at least a portion of the inner wall of the frame 100, con-

structing the air duct 50. For example, when the frame 100 is a square frame, the baffle 200 spaced apart from at least one sidewall of the frame 100 (at least one of left wall, right wall, front wall and rear wall). In other words, the frame 100 is arranged in the circumferential direction of the baffle 200, one or more air ducts 50 distributed along the circumferential direction are constructed by the frame 100 and the baffle 200. The air duct 50 can form a single-cavity air duct in the circumferential direction, it is also possible to form multiple mutual air ducts in the circumferential direction.

[0085] Wherein, air sent out by the fan 30 comprises a portion that flows into the air duct 50, and another portion that flows into the burner 500. That is, a portion of the air enters the burner 500 to participate in combustion, and another part enters the air duct 50 for air cooling the frame 100, which prevents the frame 100 from being overheated.

[0086] After many tests, the applicant found that after the air flows in the air duct 50 for a certain distance, the air temperature will rise to a higher temperature, and the frame 100 cannot be cooled, resulting in partial cooling failure of the frame 100. Under the action of heat conduction, the part of the frame 100 that has been cooled will inevitably be heated again, and ultimately the purpose of cooling the frame 100 cannot be achieved.

[0087] In this embodiment, the baffle 200 is provided with a plurality of air outlets 52 in the flow direction of the air duct 50. In this way, with the flow of air in the air duct 50, multiple air flows are sprayed into the chamber 11 step by step, forming an air film on the inner side of the baffle 200. The air film can block the flow of hot air to the baffle 200; which prevents the air temperature in the air duct 50 from rising too high and the frame 100 cannot be cooled by air.

[0088] In short, according to the gas device 10 of the embodiment of the present disclosure, by constructing an air duct 50 for air-cooling the frame 100 on the frame 100 and the baffle 200, and the baffle 200 is provided with a plurality of air outlets 52 on the flow direction of the air duct 50, forming an air film on the inner side of the baffle 200 to block the flow of hot air toward the baffle 200, improving the air cooling effect of the air in the air duct 50 on the frame 100, effectively avoiding the conduction of high temperature to the outside of the frame 100, and improving the service life of the components of the gas device 10.

[0089] The chamber 11 defined by the frame 100 is a closed chamber 11, the outside of the frame 100 is provided with a fan 30, and the fan 30 sends air into the frame 100.

[0090] The fan 30 is arranged below the frame 100; the air sent into the frame 100 by the fan 30 moves from the lower part to the upper part of the chamber 11, part of the air enters the burner, and is mixed with the gas in the burner and burned at the fire exhaust. Another part of the air enters into the air duct 50, and continues to move upward in the air duct 50, and then flows out from

the air outlet 52 to form a flowing air film on the inner side of the baffle 200.

Embodiment 2

[0091] As shown in Figs. 1 to 4, a plurality of steering portions 41 are formed on the baffle 200, the steering portion 41 protrudes from inside to outside, and the air outlet 52 is provided on the steering portion 41. Referring to the wind direction indicator arrow in Fig. 2, the airflow flows from bottom to top along the air duct 50, and after encountering the steering portion 41, a portion of the airflow is led to the direction of the burner 500, that is, it flows out from the air outlet 52 provided in the steering portion 41. In other words, the steering portion 41 acts as a block for the airflow in the air duct 50, a portion of the airflow is branched out from the air outlet 52, forming an air film on the inner wall surface of the baffle 200, preventing the hot airflow from flowing in the direction of the frame 100.

[0092] In an alternative embodiment, as shown in Figs. 1 to 4, the steering portion 41 comprises a first section 411 extending outward in a horizontal direction, a second section 412 connected to the first section 411 at one end and extending upward in a vertical direction, and a third section 413 connected to the second section 412 at one end and extending obliquely in an up-down direction, wherein the air outlet 52 is formed on the first section 411. Due to the blocking of the first section 411 of the steering portion 41, the flow area of the air duct 50 is suddenly reduced, a portion of the airflow can flow out from the air outlet 52, and another part of the airflow continues to flow upward, and flows out from the air outlet 52 of another steering portion 41. In addition, the obliquely extending third section 413 can gradually increase the flow area of the air duct 50, the airflow can flow upwards more smoothly.

Embodiment 3

[0093] The air outlet 52 is a strip-shaped hole extending along the horizontal direction. The strip-shaped air outlet structure can increase the air outlet surface as much as possible. This enables the entire circumferential inner wall surface of the baffle 200 to form an air film, which blocks the thermal airflow from approaching the frame 100 and further prevents the frame 100 from rising too high.

[0094] In an optional example, the air outlet 52 is evenly distributed along the circumferential direction of the baffle, which forms a uniform air film on the entire circumferential inner wall surface of the baffle 200, block the hot air flow closer to the frame 100, and ensure that the temperature of each part of the entire frame 100 is similar.

Embodiment 4

[0095] The air inlet area of the air duct 50 is larger than

the air outlet area. That is, the total air inlet surface of the bottom side of the air duct 50 is larger than the total air outlet surface of the air outlet 52 on the baffle 200. In this way, it can be ensured that there is sufficient air flow to the entire air duct 50, when the air is at a certain height of the air duct 50, the air cannot continue to flow upward due to insufficient air, causing the heat flow in the combustion chamber to flow back into the air duct 50. Optionally, the air inlet 214 of the air duct 50 surrounds the burner 500.

[0096] In an alternative embodiment, the ratio of air inlet area to air outlet area of air duct 50 is between 5:2 and 4:3. In order to obtain a better ratio of the air inlet area to the air outlet area, the applicant has done a lot of experiments, because the input air provided by the fan 30 is mainly used for the combustion of the burner 500. Under the condition that the air intake volume of the fan 30 remains the same, to transport a portion of the air into the air duct 50 will inevitably lead to a decrease in the intake air volume in the burner 500, which may affect whether the gas in the burner 500 can be fully burned, that is, whether it will lead to the problem of excessive emission of waste gas. Therefore, under the condition of comprehensive consideration of various factors, the applicant set the ratio of air inlet area to air outlet area of the air duct 50 between 5:2 and 4:3, which can ensure that there is enough air in the air duct 50, it can also ensure that the gas is fully burned.

Embodiment 5

[0097] As shown in Figs. 1 to 3, the air inlet surface of the air duct 50 is lower than the burning surface of the burner 500. In this way, the smoke generated by the burning surface is blocked by the baffle 200 and can be collected in the chamber 11 to prevent the smoke from acting on the frame 100.

[0098] In an alternative embodiment, as shown in Figs. 1 to 3, the upper part of the baffle is further provided with a hollow convex column 42, the hollow convex column 42 extending in the direction of the frame 100, and the cavity of the hollow convex column 42 forms an air outlet 52. The hollow convex column 42 can force the airflow to flow upward after being bent, that is, to form a vortex area at the upper part of the air duct 50. The airflow can not only reach the top of the air duct 50, but also flow out of the air duct 50 through the hollow convex column 42, which ensures that the upper part of the air duct 50 can also be cooled by air, and can also form an air film on the baffle 200.

[0099] Considering that when the air flow reaches the upper part of the air duct 50, the wind pressure is relatively small. Therefore, the distance between the hollow convex column 42 and the top surface of the air duct 50 should not be set too long, which may cause the air pressure to be insufficient to push the airflow to the top of the air duct 50. Preferably, the distance between the hollow convex column 42 and the top surface of the air duct 50

is d , wherein the height of the air duct 50 is h , and d/h is between $1/20$ and $1/10$. In this way, an air film with better air pressure can be formed on the inner wall surface of the baffle 200, and the air can also be sent to the top of the air duct 50, which obtains a better air cooling effect and ensure that the temperature rise of the frame 100 is within a controllable range.

Embodiment 6

[0100] As shown in Figs. 1 to 3, the gas device 10 is provided with a heat exchanger 60, a burner 500 and a fan 30 in sequence from top to bottom, wherein, the burner 500 is arranged on the inner side of the frame 100, the fan 30 is arranged on the outside of the frame 100, the heat exchanger 60 can be arranged outside the frame 100 or inside the frame 100, the heat exchanger 60 can also be partially arranged in the frame 100, and another part can be arranged outside the frame 100.

[0101] Specifically, as shown in Figs. 1 to 3, the frame 100 defines a chamber 11, the burner 500 is arranged above the bottom side of the chamber 11, the fan 30 is arranged on the outside of the frame 100, and the outlet of the fan 30 faces the burner 500. That is, when the fan 30 is started, the air will be sent into the chamber 11 and mixed with the gas entering the burner 500 to form the air-fuel mixed gas to be burned. The air-fuel mixed gas is ignited in the burner 500, and the generated high temperature flue gas enters the upper side of the chamber 11 and flows to the heat exchanger 60 to heat the water in the heat exchanger 60.

[0102] In order to avoid the heat of the high temperature flue gas being conducted out of the frame 100 and causing damage to the components of the gas device 10, the inner side of the frame 100 is further provided with a baffle 200. The baffle 200 spaced apart from at least a portion of the inner wall of the frame 100, constructing the air duct 50. For example, when the frame 100 is a square frame, the baffle 200 spaced apart from at least one sidewall of the frame 100 (at least one of left wall, right wall, front wall and rear wall). In other words, the frame 100 is arranged in the circumferential direction of the baffle 200, one or more air ducts 50 distributed along the circumferential direction are constructed by the frame 100 and the baffle 200. The air duct 50 can form a single-cavity air duct in the circumferential direction, it is also possible to form multiple mutual air ducts in the circumferential direction.

[0103] Wherein, air sent out by the fan 30 comprises a portion that flows into the air duct 50, and another part flow into the burner 500. That is, a portion of the air enters the burner 500 to participate in combustion, and another part enters the air duct 50 for air cooling the frame 100, which prevents the frame 100 from being overheated.

[0104] After many tests, the applicant found that after the air flows in the air duct 50 for a certain distance, the air temperature will rise to a higher temperature, and the frame 100 cannot be cooled, resulting in partial cooling

failure of the frame 100. Under the action of heat conduction, the part of the frame 100 that has been cooled will inevitably be heated again, and ultimately the purpose of cooling the frame 100 cannot be achieved.

[0105] In this embodiment, the baffle 200 is provided with a plurality of air outlets 52 in the flow direction of the air duct 50. In this way, with the flow of air in the air duct 50, multiple air flows are sprayed into the chamber 11 step by step, forming an air film on the inner side of the baffle 200. The air film can block the flow of hot air to the baffle 200; which prevents the air temperature in the air duct 50 from rising too high and the frame 100 cannot be cooled by air.

[0106] In short, according to the gas device 10 of the embodiment of the present disclosure, by constructing an air duct 50 for air-cooling the frame 100 on the frame 100 and the baffle 200, and the baffle 200 is provided with a plurality of air outlets 52 on the flow direction of the air duct 50, forming an air film on the inner side of the baffle 200 block the flow of hot air toward the baffle 200, improving the air cooling effect of the air in the air duct 50 on the frame 100, effectively avoiding the conduction of high temperature to the outside of the frame 100, and improving the service life of the components of the gas device 10.

Embodiment 7

[0107] As shown in Figs. 1 to 4, a plurality of steering portions 41 are formed on the baffle 200, the steering portion 41 protrudes from inside to outside, and the air outlet 52 is formed on the steering portion 41. Referring to the wind direction indicator arrow in Fig. 2, the airflow flows from bottom to top along the air duct 50, and after encountering the steering portion 41, a portion of the airflow is led to the direction of the burner 500, that is, it flows out from the air outlet 52 provided in the steering portion 41. In other words, the steering portion 41 acts as a block for the airflow in the air duct 50, a portion of the airflow is branched out from the air outlet 52, forming an air film on the inner wall surface of the baffle 200, preventing the hot airflow from flowing in the direction of the frame 100.

[0108] In an alternative embodiment, as shown in Figs. 1 to 4, the steering portion 41 comprises a first section 411 extending toward a sidewall of the frame, a second section 412 connected to the first section at one end and extending upward, wherein the air outlet 52 is formed on the first section 411. Due to the blocking of the first section 411 of the steering portion 41, the flow area of the air duct 50 is suddenly reduced, a portion of the airflow can flow out from the air outlet 52, and another part of the airflow continues to flow upward, and flows out from the air outlet 52 of another steering portion 41. In addition, the obliquely extending third section 413 can gradually increase the flow area of the air duct 50, the airflow can flow upwards more smoothly.

Embodiment 8

[0109] The air outlet 52 is a strip-shaped hole extending along the horizontal direction. The strip-shaped air outlet structure can increase the air outlet surface as much as possible. This enables the entire circumferential inner wall surface of the baffle 200 to form an air film, which blocks the thermal airflow from approaching the frame 100 and further prevents the frame 100 from rising too high.

[0110] In an optional example, the air outlet 52 is evenly distributed along the circumferential direction of the baffle, which forms a uniform air film on the entire circumferential inner wall surface of the baffle 200, block the hot air flow closer to the frame 100, and ensure that the temperature of each part of the entire frame 100 is similar.

Embodiment 9

[0111] The air inlet area of the air duct 50 is larger than the air outlet area. That is, the total air inlet surface of the bottom side of the air duct 50 is larger than the total air outlet surface of the air outlet 52 on the baffle 200. In this way, it can be ensured that there is sufficient air flow to the entire air duct 50, when the air is at a certain height of the air duct 50, the air cannot continue to flow upward due to insufficient air, causing the heat flow in the combustion chamber to flow back into the air duct 50. Optionally, the air inlet 214 of the air duct 50 surrounds the burner 500.

[0112] In an alternative embodiment, the ratio of air inlet area to air outlet area of air duct 50 is between 5:2 and 4:3. In order to obtain a better ratio of the air inlet area to the air outlet area, the applicant has done a lot of experiments, because the input air provided by the fan 30 is mainly used for the combustion of the burner 500. Under the condition that the air intake volume of the fan 30 remains the same, to transport a portion of the air into the air duct 50 will inevitably lead to a decrease in the intake air volume in the burner 500, which may affect whether the gas in the burner 500 can be fully burned, that is, whether it will lead to the problem of excessive emission of waste gas. Therefore, under the condition of comprehensive consideration of various factors, the applicant set the ratio of air inlet area to air outlet area of the air duct 50 between 5:2 and 4:3, which can ensure that there is enough air in the air duct 50, it can also ensure that the gas is fully burned.

Embodiment 10

[0113] As shown in Figs. 1 to 3, the air inlet surface of the air duct 50 is lower than the burning surface of the burner 500. In this way, the smoke generated by the burning surface is blocked by the baffle 200 and can be collected in the chamber 11 to prevent the smoke from acting on the frame 100.

[0114] In an alternative embodiment, as shown in Figs.

1 to 3, the upper part of the baffle is further provided with a hollow convex column 42, the hollow convex column 42 extending in the direction of the frame 100, and the cavity of the hollow convex column 42 forms an air outlet 52. The hollow convex column 42 can force the airflow to flow upward after being bent, that is, to form a vortex area at the upper part of the air duct 50. The airflow can not only reach the top of the air duct 50, but also flow out of the air duct 50 through the hollow convex column 42, which ensures that the upper part of the air duct 50 can also be cooled by air, and can also form an air film on the baffle 200.

[0115] Considering that when the air flow reaches the upper part of the air duct 50, the wind pressure is relatively small. Therefore, the distance between the hollow convex column 42 and the top surface of the air duct 50 should not be set too long, which may cause the air pressure to be insufficient to push the airflow to the top of the air duct 50. Preferably, the distance between the hollow convex column 42 and the top surface of the air duct 50 is d , wherein the height of the air duct 50 is h , and d/h is between $1/20$ and $1/10$. In this way, an air film with better air pressure can be formed on the inner wall surface of the baffle 200, and the air can also be sent to the top of the air duct 50, which obtains a better air cooling effect and ensure that the temperature rise of the frame 100 is within a controllable range.

Embodiment 11

[0116] The baffle is connected to a sidewall of the frame, the baffle comprises a heat insulation portion arranged obliquely with respect to a sidewall of the frame, one end of the heat insulation portion away from a sidewall of the frame bends outward to form a steering portion, and/or one end of the heat insulation portion closer to a sidewall of the frame bends inward to form a steering portion.

[0117] The baffle further comprises an air guide portion, one end of the air guide portion is connected to the frame, the other end of the air guide portion connected to the heat insulation portion, and the air inlet 214 of the air duct being provided guide portion, the air guide portion is enclosed with a sidewall of the frame to form a first air guide channel, and the air guide portion is provided with a first air outlet, the first air outlet communicates with the first air guide channel and faces the heat insulation portion.

Embodiment 12

[0118] As shown in Figs. 5 and 9, the heat insulation portion 220 comprises a first heat insulation section 222 and a second heat insulation section 226.

[0119] As shown in Fig. 7, the first air outlet 212 faces the first heat insulation section 222, the first heat insulation section 222 is enclosed with the frame 100 to form a second air guide channel 400, the second air guide

channel 400 communicates with the first air guide channel 300, and the first heat insulation section 222 is provided with a second air outlet 224, and the second air outlet 224 communicates with the second air guide channel 400; and the second heat insulation section 224 towards the second heat insulation section 226.

[0120] In this embodiment, as shown in Figs. 6 and 7, the air blown from the first air outlet 212 can be blown to the first heat insulation section 222, and while cooling the first heat insulation section 222, it can also form a layer of air film on the first heat insulation section 222, reducing the temperature of the first heat insulation section 222. A second air guide channel 400 is arranged between the first heat insulation section 222 and the frame 100, and the air flowing in the second air guide channel 400 can cool down the first heat insulation section 222 again, further reducing the temperature of the first heat insulation section 222. There is a second air outlet 224 communicated with the second air guide channel 400 on the first heat insulation section 222. The gas in the second air guide channel 400 can be blown to the second heat insulation section 226 by the second air outlet 224. While cooling the second heat insulation section 226, a layer of air film is formed on the second heat insulation section 226, reducing the temperature of the second heat insulation section 226.

[0121] The heat insulation portion 220 comprises at least two insulation sections, namely a first heat insulation section 222 and a second heat insulation section 226, which further reduces the temperature of the heat insulation portion 220 and improves the cooling effect of the heat insulation portion 220.

Embodiment 13

[0122] As shown in Figs. 8 and 9, the lower part of the first heat insulation section 222 is connected to the air guide portion 210 and is arranged opposite to the first air outlet 212, and the upper part of the first heat insulation section is connected to the second heat insulation section 226 and is arranged with the second air outlet 224. The top of first heat insulation section 222 is bent to connect with the frame.

[0123] As shown in Figs. 8 and 9, the first heat insulation section 222 is connected to the second heat insulation section 226, and one end of the second heat insulation section 226 connected to the first heat insulation section 222 is in contact with the frame 100.

[0124] In this embodiment, the second heat insulation section 226 is in contact with the frame 100, the air in the second air guide channel 400 will not continue to flow when it flows to the second air outlet 224, but will be blown to the second heat insulation section 226 by the second air outlet 224. In this way, the diversion of the air in the second air guide channel 400 is realized, the utilization rate of the air in the second air guide channel 400 is improved, and the heat dissipation efficiency of the second heat insulation section 226 is improved.

Embodiment 14

[0125] As shown in Fig. 10, the plurality of heat insulation sub-sections comprise adjacent insulation sub-sections, and one of the adjacent insulation sub-sections closer to the air guide portion 210 is provided with a third air outlet 228, the third air outlet 228 towards another one of the adjacent insulation sub-sections.

[0126] In this embodiment, the first heat insulation section 222 is provided with a plurality of heat insulation sub-sections, and the first air outlet 212 faces the insulation sub-section connected to the air guide portion 210; realizing the cooling of the insulation sub-section. The second air outlet 224 is arranged on the insulation sub-section connected to the second heat insulation section 226, the air in the second air guide channel 400 can be blown to the second heat insulation section 226, cooling the second heat insulation section 226. All the insulation sub-sections are connected in sequence, in the adjacent insulation sub-sections, the insulation sub-section closer to the air guide portion 210 is provided with a third air outlet 228. The air in the second air guide channel 400 is blown to the insulation sub-section closer to the second heat insulation section 226 through the third air outlet 228 to cool the insulation sub-section closer to the second heat insulation section 226.

[0127] As shown in Fig. 10, the heat insulation portion 220 comprises four insulation sections, that is, the first heat insulation section 222 comprises three insulation sub-sections, which are respectively the first insulation sub-section 2222, the second insulation sub-section 2224 and the third insulation sub-section 2226. The first side of the first insulation sub-section 2222 is connected to the air guide portion 210, and another side is connected to one side of the second insulation sub-section 2224, another side of the second insulation sub-section 2224 is connected to one side of the third insulation sub-section 2226, and another side of the third insulation sub-section 2226 is connected to the second heat insulation section 226.

[0128] The first insulation sub-section 2222 and the second insulation sub-section 2224 are arranged adjacent to each other, and between the first insulation sub-section 2222 and the second insulation sub-section 2224, the first insulation sub-section 2222 is closer to the air guide portion 210. Therefore, a third air outlet 228 is arranged on the first insulation sub-section 2222, and the third air outlet 228 on the first insulation sub-section 2222 is arranged towards the second insulation sub-section 2224.

[0129] The second insulation sub-section 2224 and the third insulation sub-section 2226 are located adjacent to each other, and between the second insulation sub-section 2224 and the third insulation sub-section 2226, the second insulation sub-section 2224 is closer to the air guide portion 210. Therefore, the third air outlet 228 is further arranged on the second insulation sub-section 2224, and the third air outlet 228 on the second heat

insulation section 226 is arranged towards the third insulation sub-section 2226.

Embodiment 15

[0130] As shown in Fig. 11, the heat insulation portion 220 comprises five insulation sections, that is, the first heat insulation section 222 comprises four insulation sub-sections, which are respectively the first insulation sub-section 2222, the second insulation sub-section 2224, the third insulation sub-section 2226, and the fourth insulation sub-section 2228. The first side of the first insulation sub-section 2222 is connected to the air guide portion 210, another side is connected to one side of the second insulation sub-section 2224, and another side of the second insulation sub-section 2224 is connected to the third insulation sub-section 2226, another side of the third insulation sub-section 2226 is connected to one side of the fourth insulation sub-section 2228, and another side of the fourth insulation sub-section 2228 is connected to the second heat insulation section 226.

[0131] The first insulation sub-section 2222 and the second insulation sub-section 2224 are arranged adjacent to each other, and between the first insulation sub-section 2222 and the second insulation sub-section 2224, the first insulation sub-section 2222 is closer to the air guide portion 210. Therefore, the first insulation sub-section 2222 is provided with a third air outlet 228, and the third air outlet 228 on the first insulation sub-section 2222 is arranged towards the second insulation sub-section 2224.

[0132] The second insulation sub-section 2224 and the third insulation sub-section 2226 are arranged adjacent to each other, and between the second insulation sub-section 2224 and the third insulation sub-section 2226, the second insulation sub-section 2224 is closer to the air guide portion 210. Therefore, the second insulation sub-section 2224 is further provided with a third air outlet 228, and the third air outlet 228 on the second insulation sub-section 2224 is arranged towards the third insulation sub-section 2226.

[0133] The third insulation sub-section 2226 and the fourth insulation sub-section 2228 are arranged adjacent to each other, and between the third insulation sub-section 2226 and the fourth insulation sub-section 2228, the third insulation sub-section 2226 is closer to the air guide portion 210. Therefore, the third insulation sub-section 2226 is further provided with a third air outlet 228, and the third air outlet 228 on the third insulation sub-section 2226 is arranged towards the fourth insulation sub-section 2228.

[0134] As shown in Figs. 15 to 17, a height of the air inlet 214 is lower than a burning surface of the burner in vertical direction.

[0135] Above the top of the burner 500, high temperature flue gas or high temperature air will be generated due to the combustion of the flame. Set the air inlet 214 below the burning surface of the burner 500 to prevent

the high temperature flue gas or high temperature air from entering the first air guide channel 300, the temperature of the gas in the first air guide channel 300 is lowered, and the thermal insulation effect of the baffle 200 and the air film is improved.

Embodiment 16

[0136] An angle between the heat insulation portion 220 and a sidewall of the frame is at least 3 degrees and not more than 30 degrees.

[0137] In this embodiment, the angle between the sidewall of frame and the heat insulation portion 220 is 3 degrees to 30 degrees. The gas flowing out from the first air outlet 212 can evenly form a layer of heat insulating gas film on the heat insulation portion 220, reducing the temperature of the heat insulation portion 220.

[0138] As shown in Fig. 13, a plurality of first air outlet 212 is arranged, and the plurality of first air outlet 212 is evenly arranged along the length direction or width direction of the frame. The air outlet direction of the first air outlet 212 is the same as the direction of the flue gas flow, and the air outlet direction of the second air outlet 224 and the third air outlet 228 is the same as the air outlet direction of the first air outlet 212.

[0139] As shown in Fig. 14, a plurality of second air outlet 224 is arranged, and the plurality of second air outlet 224 is evenly arranged along the length direction or width direction of the frame. The angle between the air outlet direction of the second air outlet 224 and the insulation section corresponding to the second air outlet 224 is 3 degrees to 30 degrees.

[0140] A plurality of third air outlet 228 is arranged, and the plurality of third air outlet 228 is evenly arranged along the length direction or width direction of the frame. The angle between the air outlet direction of third air outlet 228 and the insulation section corresponding to third air outlet 228 is 3 degrees to 30 degrees.

Embodiment 17

[0141] As shown in Fig. 1, the burner 500 is an atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion 220. In this embodiment, the burner 500 belongs to the atmospheric type burner, the burner 500 comprises a fire exhaust assembly arranged in parallel with the heat insulation portion 220, the heat insulation portion 220 can effectively prevent the heat generated by the fire exhaust assembly from being transferred to the frame, further improving the thermal insulation effect of the heat insulation portion 220.

Embodiment 18

[0142] As shown in Figs. 1 and 7, a plurality of heat insulation portions 220 is arranged, and the heat insulation portions 220 are being arranged on two sides of the

burner 500 or around the burner 500.

[0143] In this embodiment, the burner 500 is arranged on the inner side of the frame, and the heat insulation portion 220 is being arranged on two sides of the burner 500, or around the burner 500, which prevents the heat generated by the burner 500 from being transferred to the frame to cause aging or deformation of the frame, and can reduce the heat loss inside the frame, and improve the heating efficiency of the burner 500.

Embodiment 19

[0144] As shown in Fig. 16, the heat insulation portion 220 is located above the burner 500, and the corresponding height h above the combustion chamber cavity is at least 40 mm.

[0145] In this embodiment, set a height of the heat insulation portion 220 to be 40 mm to 120 mm higher than the top of the burner 500 to ensure that the heat insulation portion 220 can effectively insulate the heat generated by the burner 500.

[0146] The height of the bottom end of the baffle 200 is lower than or equal to the height of the top surface of the burner 500, which covers the burning part of the burner for thermal insulation.

[0147] The height of the baffle 200 is determined according to the height of the combustion chamber in the gas device 10.

[0148] The gas device 10 further comprises a heat exchanger 700, and the heat exchanger 700 is arranged above the burner 500, and the water in the heat exchanger 700 can exchange heat with the high-temperature gas in the combustion chamber.

Embodiment 20

[0149] The gas device 10 further comprises a casing, the gas device 10 is arranged in the casing, an air inlet is arranged on the casing, and a fan is arranged at the air inlet to feed air into the casing, and the air is used for burning the burner and cooling the gas device 10.

Embodiment 21

[0150] A gas device, comprising a frame 100, a burner, a frame; and a baffle 200, the burner is arranged in the frame 100, the baffle 200 is connected to a sidewall of the frame 100, the baffle 200 comprises a first heat insulation portion arranged obliquely with respect to a sidewall of the frame 100, and the first heat insulation portion 220 spaced apart from at least a portion of an inner wall of the frame 100 to form a cooling gap.

[0151] In this embodiment, by setting the first heat insulation portion 220 on the inner side of the frame 100, and setting a cooling gap between the first heat insulation portion 220 and the frame 100, the heat transferred from the inside of the frame 100 to the frame 100 can be reduced, reducing the temperature of the frame 100, re-

ducing the impact of the high temperature generated by the burner on the frame 100 and other sheet metal components, extending the service life of the frame 100 and other sheet metal components. A cooling gap is arranged between the first heat insulation portion 220 and at least a portion of the inner wall of the frame 100. If air flows through the cooling gap, the temperature of the first heat insulation portion 220 can be lowered, and the heat transferred from the inside of the frame 100 to the frame 100 through the first heat insulation portion 220 can be further reduced.

Embodiment 22

[0152] As shown in Fig. 12, one end of the first heat insulation portion 220 away from a sidewall of the frame 100 is folded outward to form a steering portion, and/or one end of the first heat insulation portion 220 closer to a sidewall of the frame 100 is folded inward to form a steering portion, at least one of the steering portions is provided with an air outlet.

[0153] In this embodiment, the air is blown out from the air outlet after passing through the cooling gap, and blows to the first heat insulation portion 220. While realizing the cooling of the first heat insulation portion 220, a layer of heat insulating gas film can also be formed on the surface of the first heat insulation portion 220. The heat insulating gas film can reduce the heat transferred from the inside of the frame 100 to the first heat insulation portion 220, further reduce the temperature of the first heat insulation portion 220, reducing the heat transferred from the inside of the frame 100 to the frame 100 through the first heat insulation portion 220, reducing the heat loss inside the frame 100, and improving the heating efficiency of the burner.

Embodiment 23

[0154] A top end of the first heat insulation portion 220 further comprises a second heat insulation portion 220 arranged parallel to a sidewall of the frame 100.

[0155] In this embodiment, by setting the second heat insulation portion 220, the thermal insulation range of the baffle 200 is extended, and the thermal insulation effect of the baffle 200 is further improved.

Embodiment 24

[0156] A gap between the second heat insulation portion 220 and a sidewall of the frame 100 is larger than or equal to a gap between the first heat insulation portion 220 and a sidewall of the frame 100. One end away from the sidewall of the frame 100 bends outward to form a steering portion, and/or one end of the heat insulation portion 220 closer to the sidewall of the frame 100 bends inward to form a steering portion, and an air outlet is provided on the steering portion.

Embodiment 25

[0157] As shown in Figs. 9 and 5, the heat insulation portion 220 comprises: a first heat insulation section 222 and a second heat insulation section 226, wherein the first air outlet 212 faces the first heat insulation section 222, the first heat insulation section 222 is enclosed with the frame 100 to form a second air guide channel 400, the second air guide channel 400 communicates with the first air guide channel 300, and the first heat insulation section 222 is provided with a second air outlet 224, and the second air outlet 224 communicates with the second air guide channel 400; and the second heat insulation section 224 towards the second heat insulation section 226.

[0158] In this embodiment, as shown in Figs. 6 and 7, the air blown from the first air outlet 212 can be blown to the first heat insulation section 222, and while cooling the first heat insulation section 222, it can also form a layer of air film on the first heat insulation section 222, reducing the temperature of the first heat insulation section 222. A second air guide channel 400 is arranged between the first heat insulation section 222 and the frame 100, and the air flowing in the second air guide channel 400 can cool down the first heat insulation section 222 again, further reducing the temperature of the first heat insulation section 222. There is a second air outlet 224 communicated with the second air guide channel 400 on the first heat insulation section 222. The gas in the second air guide channel 400 can be blown to the second heat insulation section 226 by the second air outlet 224. While cooling the second heat insulation section 226, a layer of air film is formed on the second heat insulation section 226, reducing the temperature of the second heat insulation section 226.

[0159] The heat insulation portion 220 comprises at least two insulation sections, that is, a first heat insulation section 222 and a second heat insulation section 226, which further reduces the temperature of the heat insulation portion 220 and improves the cooling effect of the heat insulation portion 220.

[0160] As shown in Figs. 8 and 9, the first heat insulation section 222 comprises a plurality of heat insulation sub-sections, and the plurality of heat insulation sub-sections are connected in sequence, one of the plurality of heat insulation sub-sections is connected to the air guide portion 210 and arranged opposite to the first air outlet 212, and another one of the plurality of heat insulation sub-sections is connected to the second heat insulation section 226, and is provided with the second air outlet 224, wherein the plurality of heat insulation sub-sections comprise adjacent insulation sub-sections, and one of the adjacent insulation sub-sections closer to the air guide portion 210 is provided with a third air outlet 228, the third air outlet 228 towards another one of the adjacent insulation sub-sections.

[0161] In this embodiment, the first heat insulation section 222 is provided with a plurality of heat insulation sub-

sections, and the first air outlet 212 faces the insulation sub-section connected to the air guide portion 210; realizing the cooling of the insulation sub-section. The second air outlet 224 is arranged on the insulation sub-section connected to the second heat insulation section 226, the air in the second air guide channel 400 can be blown to the second heat insulation section 226, cooling the second heat insulation section 226. All the insulation sub-sections are connected in sequence, in the adjacent insulation sub-sections, the insulation sub-section closer to the air guide portion 210 is provided with a third air outlet 228. The air in the second air guide channel 400 is blown to the insulation sub-section closer to the second heat insulation section 226 through the third air outlet 228 to cool the insulation sub-section closer to the second heat insulation section 226.

Embodiment 26

[0162] As shown in Fig. 10, the heat insulation portion 220 comprises four insulation sections, that is, the first heat insulation section 222 comprises three insulation sub-sections, which are respectively the first insulation sub-section 2222, the second insulation sub-section 2224 and the third insulation sub-section 2226. The first side of the first insulation sub-section 2222 is connected to the air guide portion 210, and another side is connected to one side of the second insulation sub-section 2224, another side of the second insulation sub-section 2224 is connected to one side of the third insulation sub-section 2226, and another side of the third insulation sub-section 2226 is connected to the second heat insulation section 226.

[0163] The first insulation sub-section 2222 and the second insulation sub-section 2224 are arranged adjacent to each other, and between the first insulation sub-section 2222 and the second insulation sub-section 2224, the first insulation sub-section 2222 is closer to the air guide portion 210. Therefore, a third air outlet 228 is arranged on the first insulation sub-section 2222, and the third air outlet 228 on the first insulation sub-section 2222 is arranged towards the second insulation sub-section 2224.

[0164] The second insulation sub-section 2224 and the third insulation sub-section 2226 are located adjacent to each other, and between the second insulation sub-section 2224 and the third insulation sub-section 2226, the second insulation sub-section 2224 is closer to the air guide portion 210. Therefore, the third air outlet 228 is further arranged on the second insulation sub-section 2224, and the third air outlet 228 on the second heat insulation section 226 is arranged towards the third insulation sub-section 2226.

Embodiment 27

[0165] As shown in Fig. 11, the heat insulation portion 220 comprises five insulation sections, that is, the first

heat insulation section 222 comprises four insulation sub-sections, which are respectively the first insulation sub-section 2222, the second insulation sub-section 2224, the third insulation sub-section 2226, and the fourth insulation sub-section 2228. The first side of the first insulation sub-section 2222 is connected to the air guide portion 210, another side is connected to one side of the second insulation sub-section 2224, and another side of the second insulation sub-section 2224 is connected to the third insulation sub-section 2226, another side of the third insulation sub-section 2226 is connected to one side of the fourth insulation sub-section 2228, and another side of the fourth insulation sub-section 2228 is connected to the second heat insulation section 226.

[0166] The first insulation sub-section 2222 and the second insulation sub-section 2224 are arranged adjacent to each other, and between the first insulation sub-section 2222 and the second insulation sub-section 2224, the first insulation sub-section 2222 is closer to the air guide portion 210. Therefore, the first insulation sub-section 2222 is provided with a third air outlet 228, and the third air outlet 228 on the first insulation sub-section 2222 is arranged towards the second insulation sub-section 2224.

[0167] The second insulation sub-section 2224 and the third insulation sub-section 2226 are arranged adjacent to each other, and between the second insulation sub-section 2224 and the third insulation sub-section 2226, the second insulation sub-section 2224 is closer to the air guide portion 210. Therefore, the second insulation sub-section 2224 is further provided with a third air outlet 228, and the third air outlet 228 on the second insulation sub-section 2224 is arranged towards the third insulation sub-section 2226.

[0168] The third insulation sub-section 2226 and the fourth insulation sub-section 2228 are arranged adjacent to each other, and between the third insulation sub-section 2226 and the fourth insulation sub-section 2228, the third insulation sub-section 2226 is closer to the air guide portion 210. Therefore, the third insulation sub-section 2226 is further provided with a third air outlet 228, and the third air outlet 228 on the third insulation sub-section 2226 is arranged towards the fourth insulation sub-section 2228.

Embodiment 28

[0169] As shown in Figs. 8 and 9, the first heat insulation section 222 is connected to the second heat insulation section 226, and one end of the second heat insulation section 226 connected to the first heat insulation section 222 is in contact with the frame 100.

[0170] In this embodiment, the second heat insulation section 226 is in contact with the frame 100, the air in the second air guide channel 400 will not continue to flow when it flows to the second air outlet 224, but will be blown to the second heat insulation section 226 by the second air outlet 224. In this way, the diversion of the air

in the second air guide channel 400 is realized, the utilization rate of the air in the second air guide channel 400 is improved, and the heat dissipation efficiency of the second heat insulation section 226 is improved.

Embodiment 29

[0171] As shown in Figs. 15 to 17, a height of the air inlet 214 is lower than a burning surface of the burner in vertical direction.

[0172] Above the top of the burner 500, high temperature flue gas or high temperature air will be generated due to the combustion of the flame. Set the air inlet 214 below the burning surface of the burner 500 to prevent the high temperature flue gas or high temperature air from entering the first air guide channel 300, the temperature of the gas in the first air guide channel 300 is lowered, and the thermal insulation effect of the baffle 200 and the air film is improved.

Embodiment 30

[0173] As shown in Fig. 6, the heat insulation portion 220 is arranged obliquely relative to the sidewall of the frame 100.

[0174] In this embodiment, the extension direction of the heat insulation portion 220 is at a certain angle with the sidewall of the frame 100, the gas blown out of the first air outlet 212 will exert a certain pressure on the heat insulation portion 220 while moving along the heat insulation portion 220, forming a heat insulating gas film on the surface of the heat insulation portion 220. The heat insulating gas film can slow down the speed of the air inside the frame transferring heat to the heat insulation portion 220, reducing the temperature of the heat insulation portion 220.

Embodiment 31

[0175] An angle between the heat insulation portion 220 and a sidewall of the frame 100 is at least 3 degrees and not more than 30 degrees.

[0176] In this embodiment, the angle between the sidewall of frame and the heat insulation portion 220 is 3 degrees to 30 degrees. The gas flowing out from the first air outlet 212 can evenly form a layer of heat insulating gas film on the heat insulation portion 220, reducing the temperature of the heat insulation portion 220.

[0177] As shown in Fig. 13, a plurality of first air outlet 212 is arranged, and the plurality of first air outlet 212 is evenly arranged along the length direction or width direction of the frame. The air outlet direction of the first air outlet 212 is the vertical direction, and the air outlet direction of the second air outlet 224 and the third air outlet 228 is the same as the air outlet direction of the first air outlet 212.

[0178] As shown in Fig. 14, a plurality of second air outlet 224 is arranged, and the plurality of second air

outlet 224 is evenly arranged along the length direction or width direction of the frame. The angle between the air outlet direction of the second air outlet 224 and the insulation section corresponding to the second air outlet 224 is 3 degrees to 30 degrees.

[0179] A plurality of third air outlet 228 is arranged, and the plurality of third air outlet 228 is evenly arranged along the length direction or width direction of the frame. The angle between the air outlet direction of third air outlet 228 and the insulation section corresponding to third air outlet 228 is 3 degrees to 30 degrees.

Embodiment 32

[0180] As shown in Fig. 8, the burner 500 is an atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion 220. In this embodiment, the burner 500 belongs to the atmospheric type burner, the burner 500 comprises a fire exhaust assembly arranged in parallel with the heat insulation portion 220, the heat insulation portion 220 can effectively prevent the heat generated by the fire exhaust assembly from being transferred to the frame, further improving the thermal insulation effect of the heat insulation portion 220.

Embodiment 33

[0181] As shown in Figs. 1 and 7, a plurality of heat insulation portions 220 is arranged, and the heat insulation portions 220 are arranged on two sides of the burner 500 or around the burner 500.

[0182] In this embodiment, the burner 500 is arranged on the inner side of the frame, and the heat insulation portion 220 is arranged on two sides of the burner 500, or around the burner 500, which prevents the heat generated by the burner 500 from being transferred to the frame to cause aging or deformation of the frame, and can reduce the heat loss inside the frame, and improve the heating efficiency of the burner 500.

Embodiment 34

[0183] As shown in Fig. 16, the height h of heat insulation portion 220 above the burner 500 is at least 40 mm and not more than 120 mm.

[0184] In this embodiment, set a height of the heat insulation portion 220 to be 40 mm to 120 mm higher than the top of the burner 500 to ensure that the heat insulation portion 220 can effectively insulate the heat generated by the burner 500 and avoid material waste due to the high height of the heat insulation portion 220.

[0185] The height of the baffle 200 is 220 mm to 260 mm, and the height of the baffle 200 is determined according to the height of the combustion chamber in the gas device 10.

[0186] The gas device 10 further comprises a heat exchanger 700, and the heat exchanger 700 is arranged

above the burner 500, and the water in the heat exchanger 700 can exchange heat with the high-temperature gas in the combustion chamber.

Embodiment 35

[0187] The gas device 10 further comprises a casing, the gas device 10 is arranged in the casing, an air inlet 214 is arranged on the casing, and a fan is arranged at the air inlet 214 to feed air into the casing, and the air is used for burning the burner and cooling the gas device 10. In the description of the present disclosure, the term "plurality" refers to two or more, unless expressly limited otherwise, the orientation or position relationships indicated by the terms "upper", "lower" and the like are the orientation or position relationships based on what is shown in the drawings, are merely for the convenience of describing the present disclosure and simplifying the description, and do not indicate or imply that the device or element referred to must have a particular orientation and is constructed and operated in a specific orientation, and thus cannot be understood as the limitation of the present disclosure. The terms "connection", "mounting", "fixing" and the like should be understood in a broad sense. For example, "connection" may be a fixed connection, a removable connection or an integral connection; and may refer to direct connection and may also refer to indirect connection through an intermediary. A person of ordinary skills in the art could understand the specific meaning of the terms in the present disclosure according to specific situations.

[0188] In the description of the present specification, the descriptions of the terms "one embodiment", "some embodiments" and "specific embodiments" and the like mean that specific features, structures, materials or characteristics described in conjunction with the embodiment(s) or example(s) are comprised in at least one embodiment or example of the present disclosure. In the specification, the schematic representation of the above terms does not necessarily refer to the same embodiment or example. Moreover, the particular features, structures, materials or characteristics described may be combined in a suitable manner in any one or more embodiments or examples.

[0189] The descriptions above are only preferred embodiments of the present disclosure, which are not used to limit the present disclosure. For a person skilled in the art, the present disclosure may have various changes and variations. Any modifications, equivalent substitutions, improvements etc. within the spirit and principle of the present disclosure shall all be comprised in the protection scope of the present disclosure.

Claims

1. A gas device, comprising: a frame, defining a chamber; a burner, being arranged at a bottom side of the

- chamber; a fan, being arranged outside the frame, an outlet of the fan facing the burner; and a baffle, being arranged at an inner side of the frame, and spaced apart from at least a portion of an inner wall of the frame to form an air duct, wherein air sent out by the fan comprises a portion that flows into the air duct, and another portion that flows into the burner, the baffle being provided with a plurality of air outlets along a flow direction of the air duct.
2. The gas device according to claim 1, wherein a plurality of steering portions are formed on the baffle, and protruding from inside to outside of the baffle, wherein the air outlet is provided on the steering portion.
 3. The gas device according to claim 2, wherein the steering portion comprises a first section extending outward in a horizontal direction, a second section connected to the first section at one end and extending upward in a vertical direction, and a third section connected to the second section at one end and extending obliquely in an up-down direction, wherein the air outlet is provided on the first section.
 4. The gas device according to any one of claims 1 to 3, wherein the air outlet is a strip-shaped hole extending along a horizontal direction.
 5. The gas device according to claim 4, wherein the air outlet is evenly distributed along a circumferential direction of the baffle.
 6. The gas device according to any one of claims 1 to 3, wherein an air inlet area of the air duct is larger than an air outlet area.
 7. The gas device according to claim 6, wherein a ratio of the air inlet area to the air outlet area is between 5:2 and 4:3.
 8. The gas device according to claim 1, wherein an air inlet surface of the air duct is lower than a burning surface of the burner.
 9. The gas device according to claim 1, wherein an upper part of the baffle is further provided with a hollow convex column, extending toward the frame, a cavity of the hollow convex column forming the air outlet.
 10. The gas device according to claim 9, wherein a distance from the hollow convex column to a top surface of the air duct is d , wherein a height of the air duct is h , and wherein d/h is between $1/20$ and $1/10$.
 11. A gas device, comprising: a frame; a burner, being arranged in the frame; a baffle, being arranged at an inner side of the frame, and spaced apart from at least a portion of an inner wall of the frame to form an air duct, wherein air sent by the fan comprises a portion that flows into the air duct, and another portion that flows into the burner, and the baffle is provided with a plurality of air outlets along a flow direction of the air duct.
 12. The gas device according to claim 11, further comprising: the fan, being arranged outside the frame, an outlet of the fan facing the burner, and being used to send air into the frame.
 13. The gas device according to claim 12, wherein the frame defines a chamber, and the burner is arranged at a bottom side of the chamber.
 14. The gas device according to claim 13, wherein a plurality of steering portions are formed on the baffle, and protrude from inside to outside of the baffle, and the air outlet is formed on the steering portion.
 15. The gas device according to claim 14, wherein the steering portion comprises a first section extending toward a sidewall of the frame, a second section connected to the first section at one end and extending upward, wherein the air outlet is formed on the first section.
 16. The gas device according to any one of claims 11 to 35, wherein the air outlet is a strip-shaped hole extending along a horizontal direction.
 17. The gas device according to claim 16, wherein the air outlet is evenly distributed along a circumferential direction of the baffle.
 18. The gas device according to claim 11, wherein the baffle is connected to a sidewall of the frame, wherein the baffle comprises a heat insulation portion arranged obliquely with respect to the sidewall of the frame; wherein one end of the heat insulation portion away from the sidewall of the frame bends outward to form the steering portion, and/or one end of the heat insulation portion closer to the sidewall of the frame bends inward to form the steering portion.
 19. The gas device according to claim 18, wherein the baffle further comprises an air guide portion; wherein one end of the air guide portion is connected to the frame, another end of the air guide portion connected to the heat insulation portion, and the air inlet of the air duct being provided on the air guide portion; wherein a first air guide channel is surrounded by the air guide portion and the sidewall of the frame, the air guide portion is provided with a first air outlet, wherein the first air outlet communicates with the first air guide channel and faces the heat insulation portion.

20. The gas device according to claim 19, wherein a height of the air inlet is lower than a burning surface of the burner in vertical direction.
21. The gas device according to claim 18, wherein an angle between the heat insulation portion and the sidewall of the frame is at least 3 degrees and not more than 30 degrees.
22. The gas device according to any one of claims 18 to 21, wherein the burner is an atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion.
23. The gas device according to any one of claims 18 to 21, wherein a plurality of heat insulation portions are provided, the plurality of heat insulation portions being arranged on two sides of the burner or around the burner.
24. A gas device, comprising: a frame; a burner, being arranged in the frame; and a baffle, being connected to a sidewall of the frame, wherein the baffle comprises a first heat insulation portion arranged obliquely with respect to the sidewall of the frame, the first heat insulation portion spaced apart from at least a portion of an inner wall of the frame to form a cooling gap.
25. The gas device according to claim 24, wherein one end of the first heat insulation portion away from the sidewall of the frame is folded outward to form a steering portion, and/or one end of the first heat insulation portion closer to the sidewall of the frame is folded inward to form a steering portion, at least one of the steering portions is provided with an air outlet.
26. The gas device according to claim 24, wherein a top end of the first heat insulation portion further comprises a second heat insulation portion arranged parallel to the sidewall of the frame.
27. The gas device according to claim 26, wherein a gap between the second heat insulation portion and the sidewall of the frame is larger than or equal to a gap between the first heat insulation portion and the sidewall of the frame.
28. The gas device according to claim 27, wherein the baffle further comprises an air guide portion, one end of the air guide portion is connected to the frame, an other end of the air guide portion connected to the heat insulation portion, and an air inlet of the cooling gap is formed on the air guide portion, wherein a first air guide channel is surrounded by the air guide portion and the sidewall of the frame, the air guide portion being provided with a first air outlet, the first air outlet communicates with the first air guide channel and faces the heat insulation portion.
29. The gas device according to claim 28, wherein the heat insulation portion comprises: the first heat insulation section, wherein the first air outlet faces the first heat insulation section, a second air guide channel surrounded by, the first heat insulation section and the frame, the second air guide channel communicating with the first air guide channel, the first heat insulation section is provided with a second air outlet, and the second air outlet communicating with the second air guide channel; and a second heat insulation section, wherein the second air outlet faces the second heat insulation section.
30. The gas device according to claim 29, wherein the first heat insulation section comprises a plurality of heat insulation sub-sections connected in sequence; wherein one of the plurality of heat insulation sub-sections is connected to the air guide portion and arranged opposite to the first air outlet, and wherein another one of the plurality of heat insulation sub-sections is connected to the second heat insulation section, and is provided with the second air outlet; wherein the plurality of heat insulation sub-sections comprise adjacent heat insulation sub-sections, one of the adjacent heat insulation sub-sections closer to the air guide portion being provided with a third air outlet, facing towards an other one of the adjacent heat insulation sub-sections.
31. The gas device according to claim 30, wherein the first heat insulation section is connected to the second heat insulation section, and wherein one end of the second heat insulation section connected to the first heat insulation section is in contact with the frame.
32. The gas device according to claim 28, wherein a height of the air inlet is lower than a burning surface of the burner in vertical direction.
33. The gas device according to claim 32, wherein an angle between the heat insulation portion and a sidewall of the frame is at least 3 degrees and not more than 30 degrees.
34. The gas device according to any one of claims 24 to 33, wherein the burner is an atmospheric type burner, and comprises a fire exhaust assembly arranged in parallel with the heat insulation portion.
35. The gas device according to any one of claims 24 to 33, wherein a plurality of heat insulation portions are provided, and the plurality of heat insulation portions arranged on both sides of the burner or around the burner.

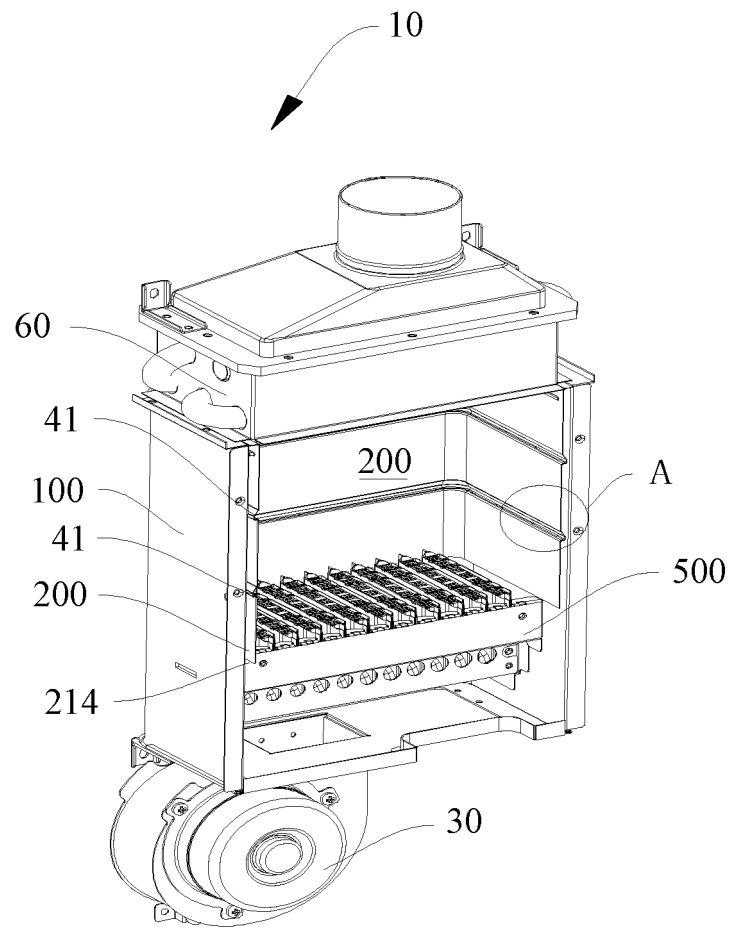


FIG. 1

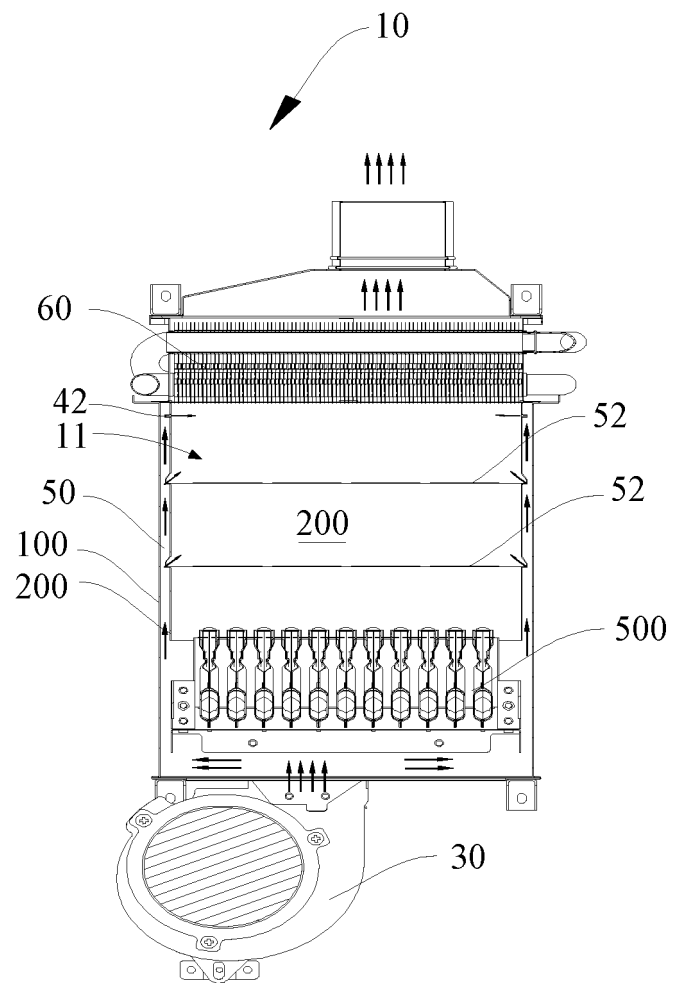


FIG. 2

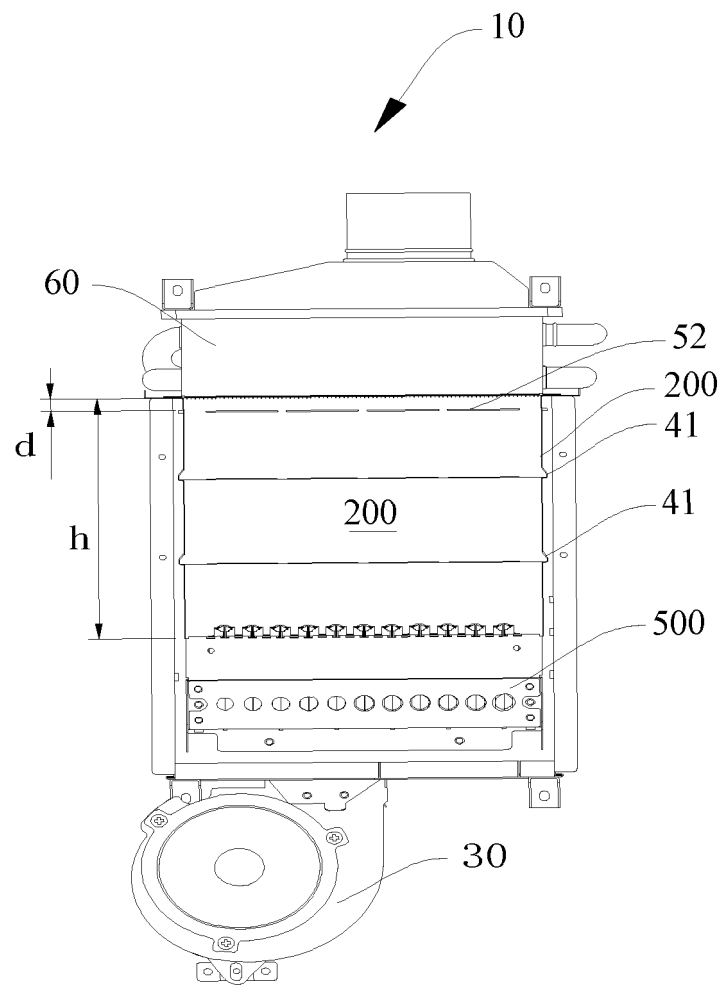


FIG. 3

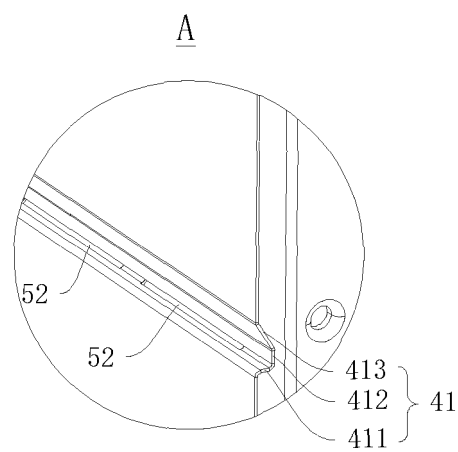


FIG. 4

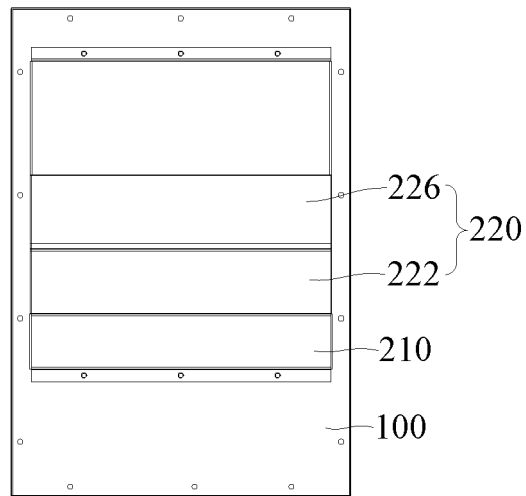


FIG. 5

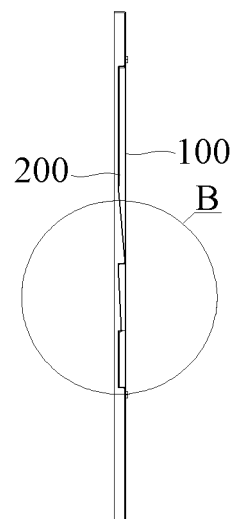


FIG. 6

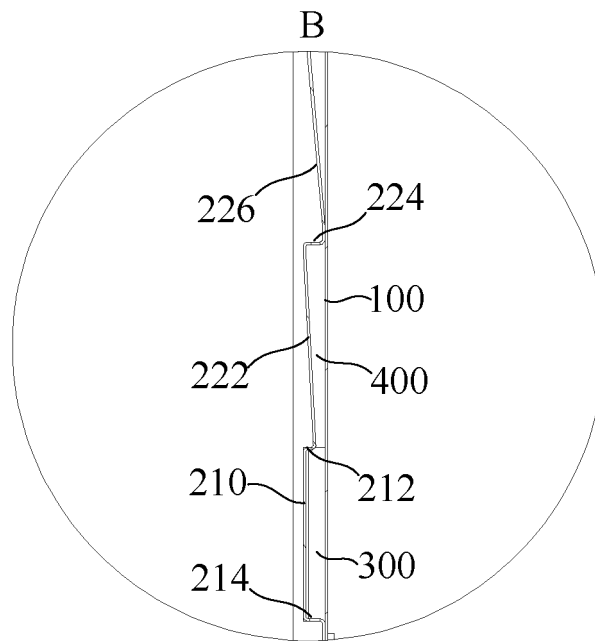


FIG. 7

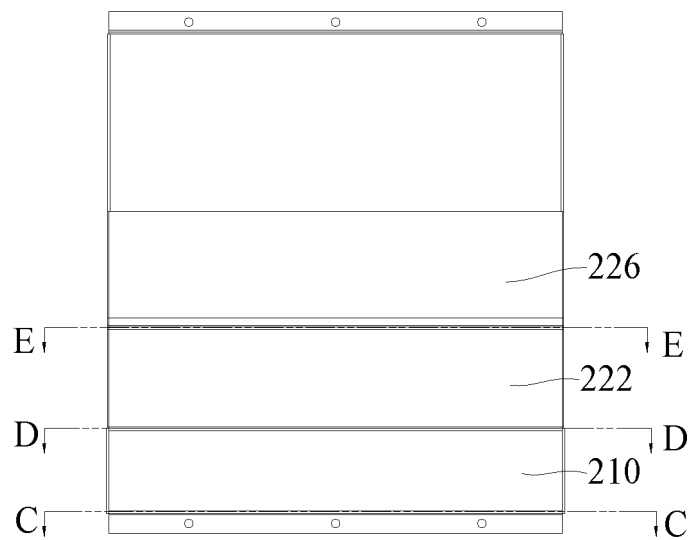


FIG. 8



FIG. 9

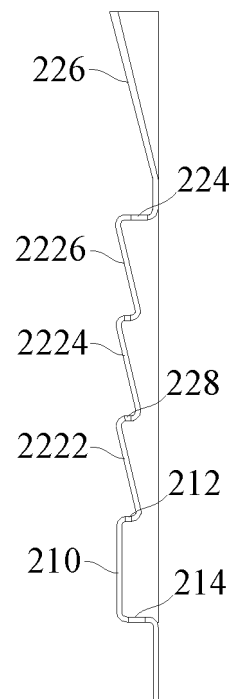


FIG. 10

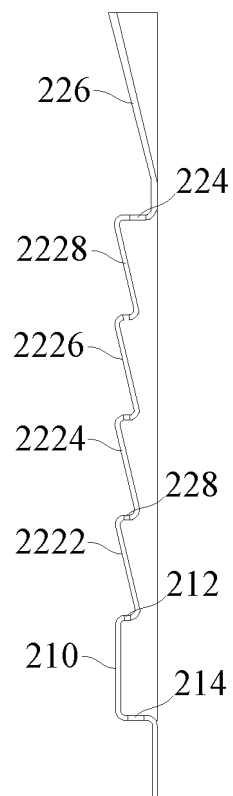


FIG. 11

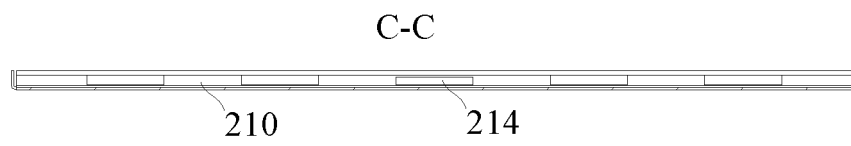


FIG. 12

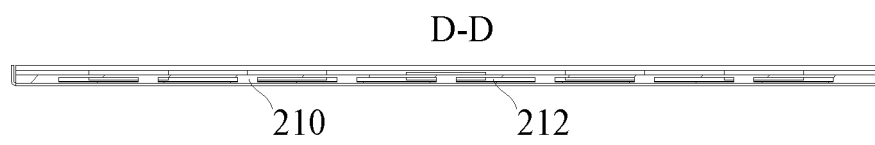


FIG. 13

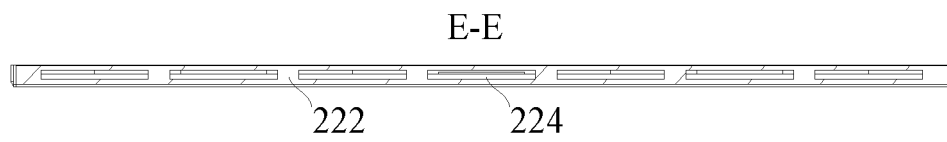


FIG. 14

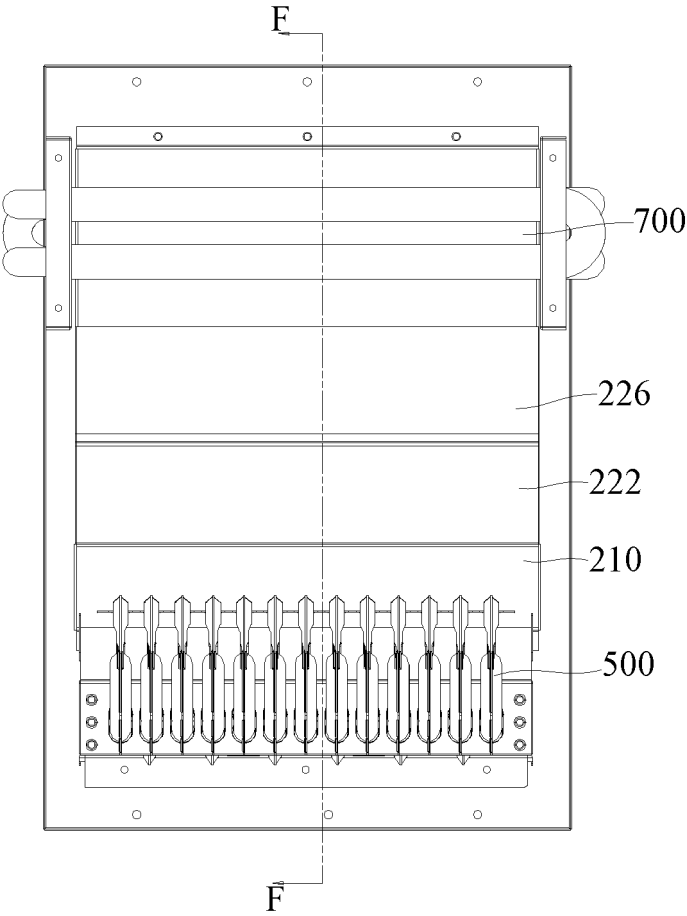


FIG. 15

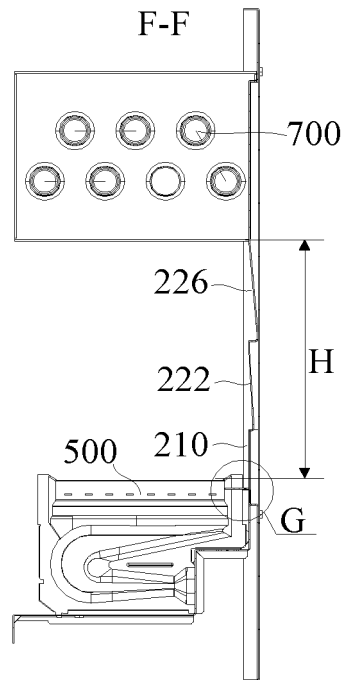


FIG. 16

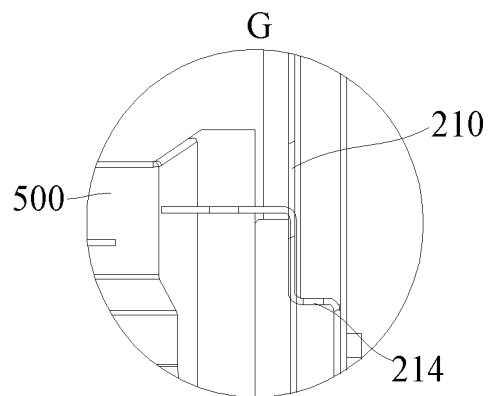


FIG. 17

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/125334

A. CLASSIFICATION OF SUBJECT MATTER F24H 9/18(2006.01)i; F24H 9/00(2006.01)i; F23D 14/00(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;F23D Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched	
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS, CNTXT, CNKI, VEN, EPTXT, JPABS, USTXT, WOTXT: 美的, 华帝, 万和, 万家乐, 史密斯, 薛超雄, 勾健, 梁国荣, 徐国平, 燃气热水器, 出风口, 口, 缝, 气幕, 气膜, 降温, 冷却, 燃烧器, 隔热板, 隔板, gas water heater, combustion chamber, air film, opening?, hole?, groove?, cool+, 冷却空气		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 108489074 A (A. O. SMITH (CHINA) WATER HEATER CO., LTD.) 04 September 2018 (2018-09-04) description, paragraphs [0054]-[0073], and figures 4 and 5	24
Y	CN 108662782 A (WUHU MIDEA KITCHEN & BATH APPLIANCES MANUFACTURING CO., LTD. et al.) 16 October 2018 (2018-10-16) description paragraphs [0024]-[0030] and [0036]-[0066], and figures 1-5	1-35
Y	US 4380906 A (UNITED TECHNOLOGIES CORPORATION) 26 April 1983 (1983-04-26) description, column 2, line 35 to column 3, line 51, and figures 1 and 2	1-23
Y	US 6079199 A (PRATT & WHITNEY CANADA INC.) 27 June 2000 (2000-06-27) description, column 3, line 35 to column 5, line 27, and figures 1 and 2	18-35
PX	CN 111442522 A (NINGBO FOTILE KITCHEN WARE CO., LTD.) 24 July 2020 (2020-07-24) description, paragraphs [0072]-[0086], and figures 1-5	1, 4-13, 16, 17
PX	CN 211695436 U (WUHU MIDEA KITCHEN & BATH APPLIANCES MANUFACTURING CO., LTD. et al.) 16 October 2020 (2020-10-16) description, paragraphs [0043]-[0066], and figures 1-5	1, 4-13, 16, 17
☒ 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 02 December 2020	Date of mailing of the international search report 22 January 2021	
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.	

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/125334

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 204176685 U (BEIJING HUAQING GAS TURBINE AND INTEGRATED GASIFICATION COMBINED CYCLE ENGINEERING TECHNOLOGY CO., LTD.) 25 February 2015 (2015-02-25) entire document	1-35
A	CN 204404242 U (WANG, Qiwen) 17 June 2015 (2015-06-17) entire document	1-35
A	CN 203769943 U (AECC COMMERCIAL AIRCRAFT ENGINE CO., LTD.) 13 August 2014 (2014-08-13) entire document	1-35
A	US 3777484 A (GENERAL ELECTRIC COMPANY) 11 December 1973 (1973-12-11) entire document	1-35
A	US 4077205 A (UNITED TECHNOLOGIES CORPORATION) 07 March 1978 (1978-03-07) entire document	1-35

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/125334

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 108489074 A	04 September 2018	CN 208588072 U	08 March 2019
CN 108662782 A	16 October 2018	CN 206831840 U	02 January 2018
US 4380906 A	26 April 1983	AU 545846 B2	01 August 1985
		FR 2498252 B1	12 September 1986
		IL 64730 D0	31 March 1982
		JP S57142422 A	03 September 1982
		SE 8200307 L	23 July 1982
		CA 1164667 A	03 April 1984
		NL 190855 C	16 September 1994
		NL 8200037 A	16 August 1982
		NL 190855 B	18 April 1994
		IT 1150144 B	10 December 1986
		AU 7925582 A	29 July 1982
		BE 891859 A1	17 May 1982
		FR 2498252 A1	23 July 1982
		KR 830009358 A	19 December 1983
		KR 880002469 B1	14 November 1988
		DE 3200972 A1	12 August 1982
		GB 2093177 B	24 October 1984
		BR 8200239 A	16 November 1982
		IT 8219242 D0	22 January 1982
		GB 2093177 A	25 August 1982
		IL 64730 A	31 October 1985
		DE 3200972 C2	01 March 1990
		JP H031582 B2	10 January 1991
		SE 453612 B	15 February 1988
		SE 8200307 A	23 August 1982
US 6079199 A	27 June 2000	WO 9963274 A1	09 December 1999
		DE 69911600 T2	29 April 2004
		EP 1084371 B1	24 September 2003
		CA 2333932 A1	09 December 1999
		JP 2002517663 A	18 June 2002
		DE 69911600 D1	30 October 2003
		CA 2333932 C	24 July 2007
		EP 1084371 A1	21 March 2001
CN 111442522 A	24 July 2020	None	
CN 211695436 U	16 October 2020	None	
CN 204176685 U	25 February 2015	None	
CN 204404242 U	17 June 2015	None	
CN 203769943 U	13 August 2014	None	
US 3777484 A	11 December 1973	JP S4864307 A	06 September 1973
		GB 1344800 A	23 January 1974
US 4077205 A	07 March 1978	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

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

- CN 201911054574 [0001]
- CN 202011181533 [0001]
- CN 202022458519 [0001]