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

(11) EP 4 513 085 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.02.2025 Bulletin 2025/09

(21) Application number: **24195699.4**

(22) Date of filing: **21.08.2024**

(51) International Patent Classification (IPC):
F23D 14/06 *(2006.01)* ***F23D 14/58*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F23D 14/583; F23D 14/065

(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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority:
21.08.2023 CN 202311058007
21.08.2023 CN 202311057979
21.08.2023 CN 202311057890
21.08.2023 CN 202322250505 U
21.08.2023 CN 202322255770 U
21.08.2023 CN 202322255811 U

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(54) BURNER AND COOKING RANGE

(57) The present disclosure discloses a burner, a burner assembly, and a cooker. The burner includes a lower plate, an upper plate disposed on the lower plate, and a partition. The lower plate has a lower hole channel. The upper plate has an upper hole channel. The partition is disposed between the lower plate and the upper plate and separates the lower hole channel from the upper hole channel. In the burner according to embodiments of the present disclosure, the partition is employed to separate the lower hole channel from the upper hole channel, and accordingly to separate the lower hole channel and the upper hole channel into two independent sub-flame holes. As a result, each of the sub-flame holes has a reduced cross-sectional area and an increased depth. In this way, a phenomenon such as flame-out noise, which is caused by burning of flames entering a gas channel through the sub-flame hole immediately upon closing a gas valve, can be avoided. In addition, an equivalent cross-sectional area formed by the lower hole channel and the upper hole channel remains unchanged, which can ensure that the burner generates intense flames.

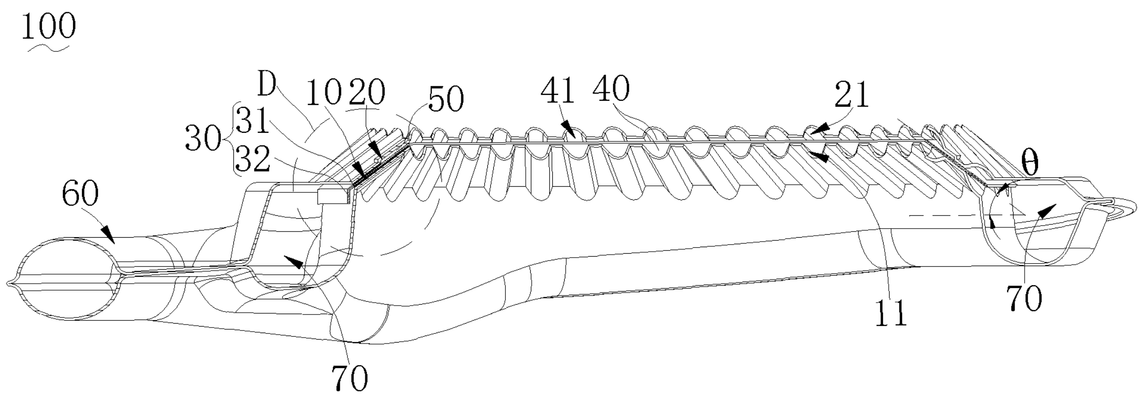

FIG. 6

Processed by Luminess, 75001 PARIS (FR)

Description

FIELD

[0001] The present disclosure relates to the technical field of kitchen appliances, and in particular, to a burner, a burner assembly, and a cooker.

BACKGROUND

[0002] In order to obtain relatively intense flames, flame holes of burners are generally designed to have a large size, and accordingly the flame holes each have a large cross-sectional area. However, such flame holes each have a relatively insufficient depth. Therefore, flames would easily enter a gas passage through the flame holes immediately upon closing a gas valve, resulting in flame-out noise and other phenomena.

SUMMARY

[0003] According to embodiments of the present disclosure, a burner, a burner assembly, and a cooker are provided.

[0004] According to a first aspect of the present disclosure, embodiments of the present disclosure provide a burner. The burner includes a lower plate, an upper plate, and a partition. The upper plate is disposed on the lower plate, and has an upper hole channel. The lower plate has a lower hole channel. The partition is disposed between the lower plate and the upper plate and separates the lower hole channel from the upper hole channel.

[0005] In the burner according to embodiments of the present disclosure, the partition is employed to separate the lower hole channel from the upper hole channel, and thus the lower hole channel and the upper hole channel are separated into two independent sub-flame holes. As a result, each of the two sub-flame holes has a reduced cross-sectional area. Correspondingly, the sub-flame hole has an increased depth. In this way, a phenomenon such as flame-out noise, which is caused by burning of flames entering a gas channel through the sub-flame holes immediately upon closing a gas valve, can be avoided. In addition, an equivalent cross-sectional area formed by the lower hole channel and the upper hole channel remains unchanged, which can ensure that the burner can generate intense flames.

[0006] In some embodiments, the upper hole channel corresponds to the lower hole channel. The lower hole channel directly faces towards the upper hole channel to form a flame hole of the burner. An angle θ of a plane where the upper plate is located relative to a depth direction of the flame hole is greater than 0° and smaller than 90°.

[0007] In the above-mentioned burner, the upper hole channel of the upper plate directly faces towards the lower hole channel of the lower plate to allow the flame holes of the burner to be formed in such a manner that the flame holes face towards each other. In this way, a total area of the flame holes of the burner is increased. Further, a flame intensity and an upper load limit of the burner are increased. In addition, each flame hole of the burner is inclined inwardly into a conical shape. In this way, a flame gathering effect of the burner is ensured. Further, the flame intensity and heating efficiency of the burner are increased.

[0008] In some embodiments, the partition includes a partition body. The partition body is located between the lower plate and the upper plate and generally in a circular ring shape. The partition further includes a flange bent from an outer peripheral edge of the partition body towards the lower plate.

[0009] In this way, the flange is bent towards the lower plate to prevent a fuel gas from entering a lower hole channel and an upper hole channel that correspond to the flange via the gas channel, to reduce gas output of the lower hole channel and the upper hole channel that correspond to the flange. Further, a length of the flame of each of the lower hole channel and the upper hole channel that correspond to the flange is reduced, to ensure uniformity of the flames through the lower hole channels and the upper hole channels.

[0010] In some embodiments, the flange has an arc angle ranging from 0 degrees to 180 degrees.

[0011] In this way, the length of the flame of each of the lower hole channel and the upper hole channel is adjusted by arranging the flange with a predetermined arc angle on the partition, which further ensures the uniformity of the flames through the lower hole channel and the upper hole channel.

[0012] In some embodiments, the flange has an arc angle ranging from 0 degrees to 150 degrees.

[0013] In this way, the length of the flame of each of the lower hole channel and the upper hole channel is further accurately adjusted, ensuring the uniformity of the flames through the lower hole channel and the upper hole channel.

[0014] In some embodiments, the lower plate includes a lower plate body, and the upper plate includes an upper plate body. Each of the lower plate body and the upper plate body is generally in a circular ring shape. A plurality of lower hole channels are provided and distributed in an inner circumference of the lower plate body. A plurality of upper hole channels are provided and distributed in an inner circumference of the upper plate body. The lower plate further includes a lower ejection pipe portion connected to the lower plate body. The lower ejection pipe portion is provided with a lower ejection pipeline. The lower plate body has a lower gas channel. The lower ejection pipeline is in communication with the plurality of lower hole channels via the lower gas channel. The upper plate further includes an upper ejection pipe portion connected to the upper plate body. The upper ejection pipe portion is provided with an upper ejection pipeline. The upper plate body has an upper gas channel. The upper ejection pipeline is in communication with the plurality of upper hole channels via the upper gas channel. The lower ejection pipe portion is assembled with the upper ejection pipe portion to form an ejection pipe of the burner, and the lower gas channel cooperates with the upper gas channel to form a gas channel of the burner. The ejection pipe is connected to the gas channel to form an ejection pipe outlet. An upper hole channel of the plurality of upper hole channels located away from the ejection pipe outlet has a greater diameter than an upper hole channel of the plurality of upper hole channels located adjacent to the ejection pipe outlet, and a lower hole channel of the plurality of lower hole channels located away from the ejection pipe outlet has a greater diameter than a lower hole channel of the plurality of lower hole channels located adjacent to the ejection pipe outlet.

[0015] In this way, when flames generated through the cooperation between the lower hole channels and the upper hole channels are cohesive, coverage of the flames to a bottom of a pot is increased, improving burning efficiency. In addition, diameters of the plurality of lower hole channels gradually decrease from a position away from the ejection pipe outlet to a position adjacent to the ejection pipe outlet, and diameter of the plurality of upper hole channels gradually decrease from the position away from the ejection pipe outlet to the position located to the ejection pipe outlet. In this way, it is ensured that flames formed by a fuel gas passing through the lower hole channel and the upper hole channel that are located away from the ejection pipe outlet is also intense. Further, the uniformity of the flames through the lower hole channels and the upper hole channels is ensured.

[0016] In some embodiments, the lower plate is depressed downwardly to form the lower hole channels. The upper plate is arched upwardly to form upper hole channels.

[0017] In some embodiments, an angle θ of a plane where the upper plate is located relative to a depth direction of each of the flame holes is greater than 0° and smaller than 90°.

[0018] In this way, each flame hole of the burner is inclined inwardly into the conical shape. In this way, the flame gathering effect of the burner is ensured. Further, the flame intensity and the heating efficiency of the burner are increased.

[0019] In some embodiments, the angle θ is greater than from 0° and smaller than 60°.

[0020] In this way, a flame gathering capability of the burner is ensured, improving the heating efficiency.

[0021] In some embodiments, the angle θ is 40°.

[0022] In this way, the intensity of the flames generated by the burner is ensured to be large, providing a better heating effect of a bottom of a cooking appliance.

[0023] In some embodiments, flame transfer gaps are formed between the upper plate and/or the lower plate and the partition. Two adjacent flame holes are in communication with each other via each flame transfer gap.

[0024] In this way, two adjacent independent flame holes are communicated with each other, ensuring an integrated formation of flames, further improving a flame transfer capability and resistance to a separation of flames from the flame holes of the burner.

[0025] In some embodiments, the upper plate is in a circular ring shape and includes an upper-plate inner ring portion and an upper-plate outer ring portion. The upper-plate inner ring portion is arched upwardly relative to the upper-plate outer ring portion and is spaced apart from the partition to form the flame transfer gaps.

[0026] In some embodiments, the lower plate is in a circular ring shape and includes a lower-plate inner ring portion and a lower-plate outer ring portion. The lower-plate inner ring portion is depressed downwardly relative to the lower-plate outer ring portion and is spaced apart from the partition to form the flame transfer gaps.

[0027] In this way, flames can be transferred among adjacent flame holes between the upper-plate inner ring portion and the partition or adjacent flame holes between the lower-plate inner ring portion and the partition. In addition, during burning, air can reach the flame holes through the flame transfer gaps, which effectively supplements secondary air required for burning, improving the burning efficiency of the burner.

[0028] In some embodiments, the flame transfer gaps are distributed at an inner edge of the upper-plate inner ring portion by a radian ranging from 0° to 360°.

[0029] In this way, the flame transfer gaps are formed into an annular channel, ensuring that the burner generates an integrated annular flame, improving flame stability.

[0030] In some embodiments, a ratio of a radial length of the upper-plate inner ring portion to a total length of the upper-plate inner ring portion and the upper-plate outer ring portion satisfies $0.3 < \frac{a1}{a1+b1} < 0.8$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is a radial length of the upper-plate outer ring portion.

[0031] In some embodiments, a ratio of a radial length of the lower-plate inner ring portion to a total length of the lower-plate inner ring portion and the lower-plate outer ring portion satisfies $0.3 < \frac{a2}{a2+b2} < 0.8$, where a2 is the radial length of the lower-plate inner ring portion, and b2 is a radial length of the lower-plate outer ring portion.

[0032] In this way, it is ensured that each flame transfer gap has a suitable radial length, improving a flame transfer and flame stabilization effect. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is smaller than 0.3, the radial length of the upper-plate inner ring portion is too short, making the radial length of each flame transfer gap too short. In this case, a flame transfer and flame stabilization capability are insufficient, easily resulting in a flame-out phenomenon. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is greater than 0.8, the radial length of the upper-plate inner ring portion is too long, making the radial length of each flame transfer gap too long. In this case, the flame easily flows back into the gas channel and generates deflagration noise, resulting in safety hazards.

[0033] In some embodiments, the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is $0.45<\frac{a1}{a1+b1}<0.55$.

[0034] In some embodiments, the ratio of the radial length of the lower-plate inner ring portion to the total length of the lower-plate inner ring portion and the lower-plate outer ring portion is $0.45<\frac{a2}{a2+b2}<0.55$.

[0035] In this way, a more suitable radial length of each flame transfer gap is preferably selected, providing better flame transfer and flame stabilization effect of the flame transfer gaps. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is smaller than 0.45, the radial length of the upper-plate inner ring portion is relatively short, making the radial length of each flame transfer gap relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is greater than 0.55, the radial length of the upper-plate inner ring portion is relatively long, making the radial length of each flame transfer gap relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0036] Embodiments of the present disclosure provide a burner assembly. The burner assembly includes at least one burner as described according to any one of the above embodiments. The burner assembly includes an oil cup disposed below the burner. The burner assembly further includes a deflector disposed adjacent to the burner. The deflector is configured to guide oil droplets falling into the burner assembly to slide into the oil cup during cooking.

[0037] In this way, it is ensured that the burner assembly is clean and tidy during cooking, to reduce cleaning steps and improve user experience.

[0038] In some embodiments, the burner assembly further includes a support. The at least one burner and the oil cup are fixed on the support.

[0039] In this way, stability of the burner assembly is improved. In addition, the support is low in production costs and is simple and convenient.

[0040] In some embodiments, the partition is provided with a protrusion. The protrusion is configured to be in contact with an electric arc generated by an ignition needle.

[0041] In this way, the protrusion is formed on the partition and is in contact with the electric arc generated by the ignition needle to prevent the electric arc from uncontrollably moving. Therefore, an ignition success rate is increased and the user experience is enhanced.

[0042] Embodiments of the present disclosure provide a cooker. The cooker includes the burner and the burner assembly that are described according to the above embodiments.

[0043] In the cooker according to embodiments of the present disclosure, the partition is employed to separate the lower hole channels from the upper hole channels, and thus the lower hole channels and the upper hole channels are separated into the two independent sub-flame holes. As a result, each of the two sub-flame holes has a reduced cross-sectional area. Correspondingly, each of the two sub-flame holes has an increased depth. In this way, the phenomenon such as flame-out noise, which is caused by the burning of the flames entering the gas channel through the sub-flame hole immediately upon closing the gas valve, can be avoided. In addition, the equivalent cross-sectional area formed by the lower hole channels and the upper hole channels remains unchanged, which can ensure that the burner produces intense flames.

[0044] According to a second aspect of the present disclosure, embodiments of the present disclosure provide a burner. The burner includes a lower plate and an upper plate disposed on the lower plate. The lower plate has lower hole channels. The upper plate has upper hole channels corresponding to the lower hole channels. The lower hole channels directly face towards the upper hole channels to form flame holes of the burner. An angle θ of a plane where the upper plate is located relative to a depth direction of each of the flame holes is greater than 0° and smaller than 90°.

[0045] In the above-mentioned burner, the upper hole channels of the upper plate directly face towards the lower hole channels of the lower plate, to allow the flame holes of the burner to be formed in such a manner that the flames holes face towards each other. In this way, the total area of the flame holes of the burner is increased. Further, the flame intensity and the upper load limit of the burner are increased. In addition, each flame hole of the burner is inclined inwardly into the conical shape. In this way, the flame gathering effect of the burner is ensured. Further, the flame intensity and heating efficiency of the burner are increased.

[0046] In some embodiments, the angle θ is greater than 0° and smaller than 60°.

[0047] In this way, the flame gathering capability of the burner is ensured, improving the heating efficiency.

[0048] In some embodiments, the angle θ is 40°.

[0049] In this way, the intensity of the flames generated by the burner is ensured to be large, making the heating effect for the bottom of the cooking appliance better.

[0050] In some embodiments, the burner further includes a partition disposed between the lower plate and the upper plate and separating the lower hole channels from the upper hole channels.

[0051] In this way, the partition is employed to separate the flame holes into the lower hole channels and the upper hole channels, and thus each flame hole is separated into two independent sub-flame holes. As a result, each of the two sub-flame holes has a reduced cross-sectional area. Correspondingly, each of the sub-flame holes has an increased depth. In this way, the phenomenon such as flame-out noise, which is caused by the burning of the flames when entering the gas channel through the sub-flame hole immediately upon closing the gas valve, can be avoided. In addition, an equivalent cross-sectional area of the flame holes remains unchanged, which can ensure that the burner produces large flames.

[0052] In some embodiments, flame transfer gaps are formed between the upper plate and the partition.

[0053] In this way, the two adjacent independent flame holes are connected communicated with each other, ensuring the integral formation of flame, further improving the flame transfer capability and resistance to a separation of flames from the flame holes of the burner.

[0054] In some embodiments, the upper plate is in a circular ring shape and includes an upper-plate inner ring portion and an upper-plate outer ring portion. The upper-plate inner ring portion is arched upwardly relative to the upper-plate outer ring portion and is spaced apart from the partition to form the flame transfer gaps between the upper plate and the partition.

[0055] In this way, the flames can be transferred among the adjacent flame holes between the upper-plate inner ring portion and the partition. In addition, during burning, air can reach the flame holes through the flame transfer gaps, which effectively supplements secondary air required for burning, improving the burning efficiency of the burner.

[0056] In some embodiments, a lower part of the upper-plate outer ring portion, a lower part of the partition, and a lower part of the lower plate are tightly fixed through spot welding.

[0057] In this way, stable formation of the flame holes is ensured, ensuring the stability of the burner, which in turn providing stable and uniform flames.

[0058] In some embodiments, the flame transfer gaps are distributed at an inner edge of the upper-plate inner ring portion by a radian ranging from 0° to 360°.

[0059] In this way, the flame transfer gaps are formed into an annular channel, ensuring that the burner generates the integrated annular flame, improving the flame stability.

[0060] In some embodiments, each of the lower plate, the partition, and the upper plate is formed into one piece by using a stainless-steel thin plate. The lower plate is depressed downwardly to form arc-shaped lower hole channels. The upper plate is arched upwardly to form arc-shaped upper hole channels. The flame holes are formed by the lower hole channels and the upper hole channels, and each flame hole is in an oval shape.

[0061] In this way, each of the lower plate, the partition, and the upper plate is formed into one piece by using the stainless-steel thin plate, making an inner wall of the burner relatively smooth. In this way, airflow resistance is reduced, effectively ensuring an air supply required for complete burning of the fuel gas. In addition, the burner has a simple structure and low cost.

[0062] In some embodiments, the partition includes a partition body located between the lower plate and the upper plate The partition body is generally in a circular ring shape. The partition further includes a flange bent from an outer peripheral edge of the partition body towards the lower plate.

[0063] In this way, the flange is generally in the circular ring shape to prevent the fuel gas from entering flame holes corresponding to the flange from the gas channel, reducing a gas output of each flame hole corresponding to the flange. In this way, a length of the flame from each flame hole corresponding to the flange is further reduced, to ensure the uniformity of the flames at the flame holes.

[0064] In some embodiments, the partition is provided with a protrusion. The protrusion is configured to be in contact with an electric arc generated by an ignition needle.

[0065] In this way, the protrusion is formed on the partition and is in contact with the electric arc generated by the ignition needle to prevent the electric arc from uncontrollably moving. In this way, the ignition success rate is increased and the user experience is enhanced.

[0066] Embodiments of the present disclosure provide a cooker including the burner as described according to the above embodiments.

[0067] In the cooker, the upper hole channels of the upper plate directly face towards the lower hole channels of the lower plate, to allow the flame holes of the burner to be formed in such a manner that the flames holes face towards each other. In this way, a total area of the flame holes of the burner is increased. Further, an upper load limit of the burner is increased. In addition, each flame hole of the burner is inclined inwardly into the conical shape. In this way, flame gathering effect of the burner is ensured. Further, the flame intensity and the heating efficiency of the burner are increased.

[0068] According to a third aspect of the present disclosure, the embodiments of the present disclosure provide a burner. The burner includes: a lower plate having lower hole channels; an upper plate disposed on the lower plate; and a partition disposed between the lower plate and the upper plate and separating the lower hole channels from the upper hole channels. The upper plate has upper hole channels. Flame transfer gaps are formed between the upper plate and the partition.

[0069] In the above-mentioned burner, by forming each flame transfer gap between the two adjacent independent upper hole channels, flames between the upper plate and the partition have high connectability to form an annular flame. In this way, a flame transfer capability and resistance to a separation of flames from the flame holes of the burner during ignition are improved, ensuring that flame-out and flame extinguishment do not easily occur.

[0070] In some embodiments, the upper plate is in a circular ring shape and includes an upper-plate inner ring portion and an upper-plate outer ring portion. The upper-plate inner ring portion is arched upwardly relative to the upper-plate outer ring portion, and is spaced apart from the partition to form the flame transfer gaps.

[0071] In some embodiments, the lower plate is in a circular ring shape and includes a lower-plate inner ring portion and a lower-plate outer ring portion. The lower-plate inner ring portion is depressed downwardly relative to the lower-plate outer ring portion and is spaced apart from the partition to form the flame transfer gaps.

[0072] In this way, the flame can be transferred among adjacent flame holes between the upper-plate inner ring portion and the partition or among adjacent flame holes between the lower-plate inner ring portion and the partition can transfer. In addition, during burning, the air can reach the flame hole through the flame transfer gaps, which effectively supplements the secondary air required for burning, improving the burning efficiency of the burner.

[0073] In some embodiments, the flame transfer gaps are set to range from 0° to 360° in a circumferential direction.

[0074] In this way, the flame transfer gaps are formed into an annular channel, ensuring that the burner generates an integrated annular flame, improving the flame stability.

[0075] In some embodiments, a lower part of the upper-plate outer ring portion, a lower part of the partition, and a lower part of the lower plate are tightly fixed through spot welding.

[0076] In some embodiments, a lower part of the lower-plate outer ring portion, a lower part of the partition, and a lower part of the upper plate are tightly fixed through spot welding.

[0077] In this way, the stability of the burner is ensured, which further provides the stable and uniform flames.

[0078] In some embodiments, a ratio of a radial length of the upper-plate inner ring portion to a total length of the upper-plate inner ring portion and the upper-plate outer ring portion satisfies $0.3<\frac{a1}{a1+b1}<0.8$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is a radial length of the upper-plate outer ring portion.

[0079] In some embodiments, a ratio of a radial length of the lower-plate inner ring portion to a total length of the lower-plate inner ring portion and the lower-plate outer ring portion satisfies $0.3<\frac{a2}{a2+b2}<0.8$, where a2 is the radial length of the lower-plate inner ring portion, and b2 is a radial length of the lower-plate outer ring portion.

[0080] In this way, it is ensured that each flame transfer gap has a suitable radial length, improving the flame transfer and flame stabilization effect. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is smaller than 0.3, the radial length of the upper-plate inner ring portion is too short, making the radial length of each flame transfer gap too short. In this case, the flame transfer and flame stabilization capability is insufficient, easily resulting in the flame-out phenomenon. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is greater than 0.8, the radial length of the upper-plate inner ring portion is too long, making the radial length of each flame transfer gap too long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0081] In some embodiments, a ratio of a radial length of the upper-plate inner ring portion to a total length of the upper-plate inner ring portion and the upper-plate outer ring portion satisfies $0.45<\frac{a1}{a1+b1}<0.55$, where a1 is the radial length of the upper-plate inner ring portion, and b1 is a radial length of the upper-plate outer ring portion.

[0082] In some embodiments, a ratio of a radial length of the lower-plate inner ring portion to a total length of the lower-plate inner ring portion and the lower-plate outer ring portion satisfies $0.45<\frac{a2}{a2+b2}<0.55$, where a2 is the radial length of the lower-plate inner ring portion, and b2 is a radial length of the lower-plate outer ring portion.

[0083] In this way, a more suitable radial length of each flame transfer gap is preferably selected, providing better flame transfer and flame stabilization effect of the flame transfer gaps. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is smaller than 0.45, the radial length of the upper-plate inner ring portion is relatively short, making the radial length of each flame transfer gap relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon. When the ratio of the radial length of the upper-plate inner ring portion to the total length of the upper-plate inner ring portion and the upper-plate outer ring portion is greater than 0.55, the radial length of the upper-plate inner ring portion is relatively long, making the radial length of each flame transfer gap relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0084] In some embodiments, a gap between the upper-plate inner ring portion and the partition is greater than from 0 mm and smaller than 3 mm.

[0085] In some embodiments, a gap between the lower-plate inner ring portion and the partition is greater than 0 mm and smaller than 3 mm.

[0086] In this way, it is ensured that the flame transfer gaps can realize a normal flame transfer flame transfer and flame stabilization, ensuring a normal operation of the burner.

[0087] In some embodiments, the gap between the upper-plate inner ring portion and the partition is greater than 1 mm and smaller than 2 mm.

[0088] In some embodiments, the gap between the lower-plate inner ring portion and the partition is greater than 1 mm and smaller than 2 mm.

[0089] In this way, a suitable gap is ensured to be formed between the upper-plate inner ring portion and the partition, improving the flame transfer and flame stabilization effect of the flame transfer gaps.

[0090] In some embodiments, each of the lower plate, the partition, and the upper plate is formed into one piece by using the stainless-steel thin plate.

[0091] In this way, each of the lower plate, the lower plate, the partition, and the upper plate is formed into one piece by using the stainless-steel thin plate, making the inner wall of the burner relatively smooth. In this way, the airflow resistance is reduced, effectively ensuring the air supply required for the complete burning of the fuel gas. In addition, the burner has a simple structure and low cost.

[0092] In some embodiments, thicknesses of the lower plate, the partition, and the upper plate are substantially same.

[0093] In this way, a wall thickness of the burner is ensured to be uniform, allowing the burner to be heated evenly and to have good stability.

[0094] In some embodiments, the thickness of each of the lower plate, the partition, and the upper plate is greater than 0.5 mm and smaller than 2 mm.

[0095] In this way, the normal operation of the burner is ensured to provide uniform flames. When the thickness of each of the lower plate, the partition, and the upper plate is smaller than 0.5 mm, the thickness of each of the lower plate, the partition, and the upper plate is too small, and thus the lower plate, the partition, and the upper plate are easily heated excessively, resulting in deformation and flame leakage of the lower plate, the partition, and the upper plate, occurring safety hazards. When the thickness of each of the lower plate, the partition, and the upper plate is greater than 2 mm, each of the lower plate, the partition, and the upper plate has a too great thickness, a large weight, and high production cost.

[0096] In some embodiments, the thickness of each of the lower plate, the partition, and the upper plate is greater than 0.8 mm and smaller than 1.5 mm.

[0097] In this way, the burner with a suitable thickness is formed to improve its flame uniformity. When the thickness of each of the lower plate, the partition, and the upper plate is smaller than 0.8 mm, each of the lower plate, the partition, and the upper plate has a small thickness, and thus the lower plate, the partition, and the upper plate are easily heated excessively, resulting in the deformation and flame leakage of each of the lower plate, the partition, and the upper plate, occurring the safety hazards. When the thickness of each of the lower plate, the partition, and the upper plate is greater than 1.5 mm, each of the lower plate, the partition, and the upper plate has a great thickness, a large weight, and high production cost.

[0098] In some embodiments, the lower plate is depressed downwardly to form the lower hole channels, and the upper plate is arched upwardly to form the upper hole channels.

[0099] In some embodiments, the lower hole channels directly face towards the upper hole channels to form flame holes of the burner.

[0100] In this way, the flame holes of the burner are formed in such a manner that the flame holes 40 face towards each other, which increases a total area of the flame holes of the burner to further increase the flame intensity and the upper load limit of the burner.

[0101] In some embodiments, an angle θ of a plane where the upper plate is located relative to a depth direction of each of the flame holes is greater than 0° and smaller than 90°.

[0102] In this way, each flame hole of the burner is inclined inwardly into the conical shape. In this way, the flame gathering effect of the burner is ensured. Further, the flame intensity and the heating efficiency of the burner are increased.

[0103] In some embodiments, the angle θ is greater than 0° and smaller than 60°.

[0104] In this way, the flame gathering capability of the burner is ensured, improving the heating efficiency.

[0105] In some embodiments, the angle θ is 40°.

[0106] In this way, the intensity of the flames generated by the burner is ensured to be large, providing better heating effect for the bottom of the cooking appliance.

[0107] Embodiments of the present disclosure provide a cooker including the burner as described according to the above embodiments.

[0108] In the cooker, by forming each flame transfer gap between the two adjacent independent upper hole channels, the flames between the upper plate and the partition have high connectability to form an annular flame. In this way, the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner during ignition are improved, ensuring that the flame-out and flame extinguishment do not easily occur.

[0109] Additional aspects and advantages of the present disclosure will be in part set forth below, become apparent in part from the following description, or can be learned by practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0110] The above and/or additional aspects and advantages of the present disclosure will become more apparent and more understandable from the following description of embodiments taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side view of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 2 is a top view of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 3 is a bottom view of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 4 is a partially schematic structural view of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 5 is an enlarged view of Part C in FIG. 4.
FIG. 6 is another partially schematic structural view of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 7 is an enlarged view of Part D in FIG. 6.
FIG. 8 is a schematic structural view of a cooker according to an embodiment of a first aspect of the present disclosure.
FIG. 9 is a schematic structural view of a partition of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 10 is a schematic view of an arrangement position of a flange of a burner according to an embodiment of a first aspect of the present disclosure.
FIG. 11 and FIG. 12 are schematic perspective assembly views of a burner assembly according to an embodiment of the present disclosure;
FIG. 13 is a schematic perspective exploded view of a burner assembly according to an embodiment of a first aspect of the present disclosure.
FIG. 14 is another schematic perspective assembly view of a burner assembly according to an embodiment of a first aspect of the present disclosure.
FIG. 15 is a partially schematic structural view of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 16 is an enlarged view of Part B in FIG. 15.
FIG. 17 is another partially schematic structural view of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 18 is an enlarged view of Part C in FIG. 17.
FIG. 19 is a side view of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 20 is a top view of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 21 is a bottom view of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 22 is a schematic structural view of a partition of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 23 is a schematic view of an arrangement position of a flange of a burner according to an embodiment of a second aspect of the present disclosure.
FIG. 24 is a schematic structural view of a cooker according to an embodiment of a second aspect of the present disclosure.
FIG. 25 is a partially schematic structural view of a burner according to an embodiment of a third aspect of the present disclosure.
FIG. 26 is an enlarged view of Part B in FIG. 25.
FIG. 27 is another partially schematic structural view of a burner according to an embodiment of a third aspect of the present disclosure.
FIG. 28 is an enlarged view of Part C in FIG. 27.
FIG. 29 is a side view of a burner according to an embodiment of a third aspect of the present disclosure.
FIG. 30 is a top view of a burner according to an embodiment of a third aspect of the present disclosure.
FIG. 31 is a schematic structural view of a cooker according to an embodiment of a third aspect of the present disclosure.
FIG. 32 is a bottom view of a burner according to an embodiment of a third aspect of the present disclosure.

[0111] Main Reference Signs of Components: cooker-1000, burner-100, burner assembly-200, lower plate-10, upper plate-20, partition-30, flame hole-40, flame transfer gap-50, ejection pipe-60, gas channel-70, lower hole channel-11, lower plate body-12, lower ejection pipe portion-13, upper hole channel-21, upper plate body-22, upper ejection pipe portion-23, partition body-31, flange-32, protrusion-33, sub-flame hole-41, ejection pipe outlet-61, lower gas channel-71, upper gas channel-72, lower-plate inner ring portion-121, lower-plate outer ring portion-122, lower ej ection pipeline-131, upper-plate inner ring portion-221, upper-plate outer ring portion-222, upper ejection pipeline-231, oil cup-210, deflector-220, support-230, fixing plate-240, ignition needle-250.

DETAILED DESCRIPTION

[0112] The embodiments of the present disclosure will be described in detail below with reference to examples thereof as illustrated in the accompanying drawings, throughout which same or similar elements, or elements having same or similar functions, are denoted by same or similar reference numerals. The embodiments described below with reference to the accompanying drawings are exemplary, only used to explain the present disclosure, and should not be construed as limitation of the present disclosure.

[0113] In the description of the present disclosure, it needs to be understood that, orientation or position relationship indicated by terms such as "center", "longitudinal", "lateral", "length", "width", "thickness", "over", "below", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom", "in", "out", "clockwise", and "anticlockwise", is based on the orientation or position relationship shown in the accompanying drawings, and is merely for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the associated device or element must have a specific orientation, or be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation on the present disclosure. In the description of the embodiments of the present disclosure, "plurality" means two or more, unless defined otherwise explicitly and specifically.

[0114] In the description of the present disclosure, it needs to be noted that, unless specified and defined otherwise explicitly, the terms "install", "connect", "connect to", and the like should be interpreted in a broad sense. For example, it may be a fixed connection or a detachable connection or connection as one piece; mechanical connection or electrical connection; direct connection or indirect connection through an intermediate; internal communication of two components or the interaction relationship between two components. For those of ordinary skill in the art, the specific meaning of the above-mentioned terms in the present disclosure can be understood according to specific circumstances.

[0115] In the present disclosure, unless expressly stipulated and defined otherwise, the first feature being "on" or "under" the second feature may include the first feature being in direct contact with the second feature, or the first feature being not in direct contact with the second feature, but being in contact with the second feature through another feature therebetween. Moreover, the first feature being "above" the second feature includes the first feature being directly above or obliquely above the second feature, or simply mean that a level of the first feature is higher than a level of the second feature. The first feature being "below" the second feature may mean that the first feature is directly below or obliquely below the second feature, or simply mean that a level of the first feature is lower than a level of the second feature.

[0116] The disclosure herein provides many different embodiments or examples for implementing different structures of the present disclosure. In order to simplify the present disclosure, components and arrangements of specific examples are described herein. Of course, they are only examples and are not intended to limit the present disclosure. In addition, the present disclosure may use repeated reference numerals and/or reference letters in different examples. Such repetition is for the purpose of simplicity and clarity and does not in itself indicate the relation between various embodiments and/or arrangements as discussed. In addition, the present disclosure provides examples of various specific processes and materials, but applications of other processes and/or the use of other materials are conceivable for those of ordinary skill in the art.

[0117] Referring to FIG. 1 to FIG. 8, embodiments of the present disclosure provide a burner 100. The burner 100 includes a lower plate 10, an upper plate 20 disposed on the lower plate 10, and a partition 30. The lower plate 10 has a lower hole channel 11. The upper plate 20 has upper hole channel 21. The partition 30 is disposed between the lower plate 10 and the upper plate 20 and separates the lower hole channel 11 from the upper hole channel 21.

[0118] In the burner 100 according to the embodiments of the present disclosure, the partition 30 is employed to separate the lower hole channel 11 from the upper hole channel 21, and thus the lower hole channel 11 and the upper hole channel 21 are separated into two independent sub-flame holes 41. As a result, each of the two sub-flame holes 41 has a reduced cross-sectional area. Correspondingly, the sub-flame hole 41 has an increased depth. In this way, a phenomenon such as flame-out noise, which is caused by burning of flames entering a gas channel through the sub-flame holes 41 immediately upon closing a gas valve, can be avoided. In addition, an equivalent cross-sectional area formed by the lower hole channel 11 and the upper hole channel 21 remains unchanged, which can ensure that the burner 100 can generate intense flames.

[0119] In combination with FIG. 8, embodiments of the present disclosure also provide a cooker 1000. The cooker 1000 includes the burner 100 according to the above-described embodiments. For example, the cooker 1000 may be a natural gas cooker, a liquefied gas cooker, or a coal gas cooker. The cooker 1000 includes a burner assembly 200. The burner assembly 200 includes at least one burner 100. The cooker 1000 may be a single-stove cooker, a double-stove cooker, or a multi-stove cooker. FIG. 8 is a schematic structural view of the double-burner cooker. As illustrated in FIG. 8, the burner assembly 200 includes at least one burner 100. The burner 100 may be an outer ring burner, an inner ring burner, or a double ring burner formed by combining the outer ring burner and the inner ring burner, which is not specifically limited herein.

[0120] The partition 30 is disposed between the lower plate 10 and the upper plate 20, and is employed to separate each of a plurality of lower hole channels 11 and each of a plurality of upper hole channels 21 into two sub-flame holes 41, enabling sub-flame holes 41 located at upper and lower sides of the partition 30 to be independent of each other. That is, each of the sub-flame holes 41 has a reduced cross-sectional area and an increased depth. Immediately upon closing the fuel gas valve, a path for the flames to flow back into the gas channel becomes relatively long. When the flames reach the gas channel, it is insufficient to satisfy limiting conditions for deflagration. Therefore, a problem of flame-out noise of the burner 100 can be effectively solved.

[0121] Since the partition 30 is disposed between the lower hole channels 11 and the upper hole channels 21, the partition 30 may be made of a high-temperature and corrosion-resistant material. In an embodiment, the partition 30 may be a stainless-steel partition. In other embodiments, the partition 30 may be an aluminum alloy partition, a copper alloy partition, or made of other materials, which is not specifically limited herein.

[0122] Referring to FIG. 1, in some embodiments, each of the lower plate 10 and the upper plate 20 is formed into one piece by using stainless steel.

[0123] In this way, since each of the lower plate 10 and the upper plate 20 is formed into one piece by using the stainless steel, an inner wall of the burner 100 is relatively smooth. In this way, airflow resistance is reduced, effectively ensuring an air supply required for complete burning of the fuel gas. In addition, the burner 100 is simple in structure and low in cost.

[0124] In an embodiment, the lower plate 10 may be used for forming the lower hole channels 11. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material. That is, the lower plate 10 may be formed into one piece by using a stainless-steel material, to shorten production time and save production costs. In other embodiments, the lower plate 10 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0125] Similarly, the upper plate 20 may be used for forming the upper hole channels 21. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material. That is, the upper plate 20 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the upper plate 20 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0126] In an embodiment, the lower plate 10 and the upper plate 20 may be connected to each other through a welding process to form the burner 100. In another embodiment, the lower plate 10 and the upper plate 20 may also be connected to each other through a screwing process to form the burner 100. In other embodiments, the lower plate 10 and the upper plate 20 may also be connected to each other through other processes to form the burner 100, and the processes are not specifically limited herein.

[0127] In another embodiment, each of the lower plate 10 and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, allowing the burner 100 to have a small thickness and a smooth inner wall. In this way, it is ensured that a mixed gas of the fuel gas and air can be delivered smoothly. Further, operation efficiency of the burner 100 is improved. In addition, each of the lower plate 10 and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, allowing thicknesses of the lower plate 10 and the upper plate 20 to be uniform and ensuring that the lower plate 10 and the upper plate 20 are uniformly heated. Further, uniformity of the flames through each of the lower hole channels 11 and the upper hole channels 21 is improved.

[0128] Referring to FIG. 4 and FIG. 6, in some embodiments, the lower plate 10 is depressed downwardly to form the lower hole channels 11. The upper plate 20 is arched upwardly to form the upper hole channels 21. The lower hole channels 11 directly face towards the upper hole channels 21 to form flame holes 40 of the burner 100. An angle θ of a plane where the upper plate 20 is located relative to a depth direction of each of the flame holes 40 is greater than 0° and smaller than 90°.

[0129] In this way, the flame holes 40 of the burner 100 are formed in such a manner that the flame holes 40 face towards each other, increasing a total area of the flame holes 40 of the burner, which in turn increases a flame intensity and an upper load limit of the burner 100. In addition, each flame hole 40 of the burner 100 is inclined inwardly to be formed into a conical shape. In this way, a flame gathering effect of the burner 100 is ensured. Further, the flame intensity and heating efficiency of the burner 100 are increased.

[0130] In an exemplary embodiment of the present disclosure, the lower plate 10 may be used for forming the flame hole 40. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material.

[0131] In an embodiment, the lower plate 10 may be made of an aluminum alloy material to ensure bending performance of the lower plate 10, ensuring the formation of the lower hole channels 11. In other embodiments, the lower plate 10 may be made of other materials, which is not specifically limited herein.

[0132] Similarly, the upper plate 20 may be used with the lower plate 10 for forming the fir holes 40. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material.

[0133] In an embodiment, the upper plate 20 may be made of the same material as the lower plate 10 to ensure bending performance of the upper plate 20, ensuring the formation of the upper hole channels 21. In other embodiments, the upper plate 20 may be made of other materials, which is not specifically limited herein.

[0134] It can be understood that the lower hole channels 11 directly face towards the upper hole channels 21 to form flame holes 40 of a circular ring shape. Compared to lower hole channels 11 in a misaligned arrangement or upper hole channels 21 in a misaligned arrangement, the total area of the flame holes 40 is increased, which can increase fuel gas burning amount, increasing the flame intensity of the burner 100.

[0135] In an exemplary embodiment of the present disclosure, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is greater than 0° and smaller than 90° in such a manner that the flame hole 40 of the burner 100 is inclined inwardly to be formed into the conical shape, ensuring the flame gathering effect of the burner 100. Further, the flame intensity of the burner 100 is increased to ensure a heating rate for a bottom of a cooking appliance.

[0136] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 90°, the flames of the burner 100 are spread along an outer periphery of the burner 100, which results in a poor flame gathering effect, and thus a user may be easily got burned and a flame-out phenomenon also easily occurs.

[0137] In an embodiment, the angle θ is greater than 0° and smaller than 90°, i.e. $0°<\theta<90°$. In an example, the angle θ may be 5°, 10°, 30°, 45°, 60°, 75°, 85°, or other value that is greater than 0° and smaller than 90°.

[0138] In some embodiments, the angle θ is greater than 0° and smaller than 60°.

[0139] In this way, a flame gathering capability of the burner 100 is ensured, improving the heating efficiency.

[0140] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is greater than 0° and smaller than 60°, in such a manner that the flame hole 40 of the burner 100 is inclined inwardly to be formed into the conical shape, ensuring that flames generated by the flame holes 40 of the burner 100 better covers the bottom of the cooking appliance. Further, a heating rate of the burner 100 is increased.

[0141] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 60°, an inclination angle of the flame of the burner 100 is increased, which weakens the flame gathering effect, reducing the heating rate of the burner 100.

[0142] In an embodiment, the angle θ is greater than 0° and smaller than 60°, i.e. $0°<\theta<60°$. In an example, the angle θ may be 5°, 10°, 15°, 25°, 30°, 45°, 50°, or other value that is greater than 0° and smaller than 60°.

[0143] In some embodiments, the angle θ is 40°.

[0144] In this way, the intensity of the flames generated by the burner 100 are ensured to be intense, providing a better heating effect for the bottom of the cooking appliance.

[0145] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 may be 40°. In a case where each flame hole 40 of the burner 100 is ensured to be inclined inwardly into the conical shape, the flames are cohesive to cover and heat the bottom of the cooking appliance, ensuring a better heating effect for the bottom of the cooking appliance.

[0146] It can be understood that when the angle θ is 40°, the flames generated by the burner 100 may better cover the bottom of the cooking appliance to ensure the heating effect for the bottom of the cooking appliance, increasing a fuel gas utilization rate, which in turn increases the heating rate of the burner 100.

[0147] Referring to FIG. 5 and FIG. 7, in some embodiments, flame transfer gaps 50 are formed between the upper plate 20 and the partition 30. Two adjacent flame holes 40 are in communication with each other via each flame transfer gap 50.

[0148] In this way, two adj acent independent flame holes 40 are communicated with each other, ensuring an integral formation of the flames, which can improve a flame transfer capability and resistance to a separation of flames from the flame holes of the burner.

[0149] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 5 and FIG. 7, in an embodiment, the flame transfer gaps 50 may be a channel with a predetermined width d for transferring the flames.

[0150] It can be understood that, as illustrated in FIG. 4 and FIG. 6, each flame transfer gap 50 is formed between two adjacent upper hole channels 21 by the upper plate 20 and the partition 30, which allows the two adjacent upper hole channels 21 to be in communication with each other. As a result, flames at sub-flame holes 41 of the upper hole channels 21 are stable and uniform.

[0151] That is, the flame may be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, to improve flame transfer capability between the two adjacent flame holes 40 of the burner 100.

[0152] In an embodiment, the width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, allowing two adjacent independent sub-flame holes 41 to be connected to each other. As a result, the flame transfer capability of the burner 100 can be ensured.

[0153] The width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, i.e. 0.50 mm≤d≤0.80 mm. In an example, d may be 0.50 mm, 0.57 mm, 0.62 mm, 0.68 mm, 0.70 mm, 0.71 mm, 0.80 mm, or other value that is greater than 0.50 mm and smaller than 0.80 mm.

[0154] In other embodiments, the flame transfer gaps 50 may be formed between the lower plate 10 and the partition 30, or formed between the upper plate 20 and the partition 30 as well as between the lower plate 10 and the partition 30, which is not specifically limited herein.

[0155] Referring to FIG. 2 and FIG. 7, in some embodiments, the upper plate 20 is in a circular ring shape and includes an upper-plate inner ring portion 221 and an upper-plate outer ring portion 222. The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, and is spaced apart from the partition 30 to form the flame transfer gaps 50. Optionally, the lower plate 10 is in a circular ring shape and includes a lower-plate inner ring portion 121 and a lower-plate outer ring portion 122 (as illustrated in FIG. 32). The lower-plate inner ring portion 121 is depressed downwardly relative to the lower-plate outer ring portion 122 (not shown), and is spaced apart from the partition 30 to form the flame transfer gaps 50.

[0156] In this way, the flame can be transferred among adjacent flame holes 40 between the upper-plate inner ring portion 221 and the partition 30 or adjacent flame holes 40 between the lower-plate inner ring portion 121 and the partition 30 can transfer the flame. In addition, during burning, air can reach the flame holes 40 through the flame transfer gaps 50, which effectively supplements secondary air required for burning, improving the burning efficiency of the burner 100.

[0157] In an exemplary embodiment of the present disclosure, the upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, allowing the upper-plate inner ring portion 221 to be spaced apart from the partition 30 to form the flame transfer gaps 50, ensuring that the flame can be transferred between two adjacent upper hole channels 21 at the upper plate 20.

[0158] The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, allowing the upper-plate outer ring portion 222 to be tightly attached to the partition 30 to form a closed environment. In this way, the flames at the upper hole channels 21 can be prevented from flowing back along the upper-plate outer ring portion 222 from the flame transfer gaps 50 to avoid safety hazards.

[0159] Referring to FIG. 28, in some embodiments, a ratio of a radial length of the upper-plate inner ring portion 221 to a total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 satisfies $0.3<\frac{a1}{a1+b1}<0.8$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is a radial length of the upper-plate outer ring portion; or a ratio of a radial length of the lower-plate inner ring portion 121 to a total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 satisfies $0.3<\frac{a2}{a2+b2}<0.8$, where a2 is the radial length of the lower-plate inner ring portion 121, and b2 is a radial length of the lower-plate outer ring portion (not shown).

[0160] In this way, it is ensured each flame transfer gap 50 has a suitable radial length, improving a flame transfer and flame stabilization effect.

[0161] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28, an appropriate ratio of the radial length a1 of the upper-plate inner ring portion 221 to the total length (a1+b1) of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 should be selected to improve the flame transfer and flame stabilization effect.

[0162] In an embodiment, $\frac{a1}{a1+b1}$ may be greater than 0.3 and smaller than 0.8. In some examples, $\frac{a1}{a1+b1}$ may be 0.35, 0.38, 0.4, 0.45, 0.5, 0.7, 0.75, or other value that is greater than 0.3 and smaller than 0.8.

[0163] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is smaller than 0.3, the radial length of the upper-plate inner ring portion 221 is too short, making the radial length of each flame transfer gap 50 too short. In this case, the flame transfer and flame stabilization capability is insufficient, easily resulting in the flame-out phenomenon.

[0164] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is greater than 0.8, the radial length of the upper-plate inner ring portion 221 is too long, making the radial length of each flame transfer gap 50 too long. In this case, the flame easily flows back into the gas channel and generates deflagration noise, resulting in the safety hazards.

[0165] Similarly, in another embodiment, a suitable ratio (not shown) of the radial length a2 of the lower-plate inner ring portion 121 and the total length (a2+b2) of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 should be selected to improve the flame transfer and flame stabilization effect.

[0166] In an embodiment, $\frac{a2}{a2+b2}$ may be greater than 0.3 and smaller than 0.8. In some examples, $\frac{a2}{a2+b2}$ may be 0.35, 0.38, 0.4, 0.45, 0.5, 0.7, 0.75, or other value that is greater than 0.3 and smaller than 0.8.

[0167] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is smaller than 0.3, the radial length of the lower-plate inner ring portion 121 is too short, making the radial length of each flame transfer gap 50 too short. In this case, the flame transfer and flame stabilization capability are insufficient, easily resulting in the flame-out phenomenon.

[0168] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is greater than 0.8, the radial length of the lower-plate inner ring portion 121 is too long, making the radial length of each flame transfer gap 50 too long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0169] In some embodiments, the ratio of a radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 satisfies $0.45<\frac{a1}{a1+b1}<0.55$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is the radial length of the upper-plate outer ring portion; or the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 satisfies $0.45<\frac{a2}{a2+b2}<0.55$, where a2 is the radial length of the lower-plate inner ring portion, and b2 is the radial length of the lower-plate outer ring portion.

[0170] In this way, a more suitable radial length of each flame transfer gap 50 may be selected, providing better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0171] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28, preferably, the ratio of the radial length a1 of the upper-plate inner ring portion 221 to the total length (a1+b1) of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 may be greater than 0.45 and smaller than 0.5, to allow for a better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0172] In some examples, $\frac{a1}{a1+b1}$ may be 0.46, 0.48, 0.49, 0.50, 0.52, 0.53, 0.54, or other value that is greater than 0.45 and smaller than 0.55.

[0173] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is smaller than 0.45, the radial length of the upper-plate inner ring portion 221 is relatively short, making the radial length of each flame transfer gap 50 relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon.

[0174] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is greater than 0.55, the radial length of the upper-plate inner ring portion 221 is relatively long, making the radial length of each flame transfer gap 50 relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0175] Similarly, in another embodiment, preferably, the ratio of the radial length a2 of the lower-plate inner ring portion 121 to the total length (a2+b2) of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 may be greater than 0.45 and smaller than 0.55 (not shown), to allow for a better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0176] In some examples, $\frac{a2}{a2+b2}$ may be 0.46, 0.48, 0.49, 0.50, 0.52, 0.53, 0.54, or other value that is greater than 0.45 and smaller than 0.55.

[0177] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is smaller than 0.45, the radial length of the lower-plate inner ring portion 121 is relatively short, making the radial length of each flame transfer gap 50 relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon.

[0178] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is greater than 0.55, the radial length of the lower-plate inner ring portion 121 is relatively long, making the radial length of each flame transfer gap 50 relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0179] In an embodiment, an integrated annular flame is formed by several adjacent sub-flame holes 41 of the upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0180] That is, the flame transfer gaps 50 may connect several adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, and may also connect two adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, to generate the integrated annular flame. As a result, it can be ensured that a complete flame is formed between the upper plate 20 and the partition 30, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0181] In some embodiments, the flame transfer gaps 50 are distributed at an inner edge of the upper-plate inner ring portion 221 by a radian ranging from 0° to 360°.

[0182] In this way, the flame transfer gaps 50 are formed into an annular channel, ensuring that the burner 100 generates an integrated annular flame. Therefore, flame stability can be improved.

[0183] In an exemplary embodiment of the present disclosure, the flame transfer gaps 50 are formed into a channel with an annular radian at the inner edge of the upper-plate inner ring portion 221, to ensure that flames of several adjacent upper hole channels 21 are in an integrated annular shape. In this way, flame stability of the upper hole channels 21 is improved. Further, the flame stability of the burner 100 is improved.

[0184] It can be understood that the flame transfer gaps 50 are an annular channel to improve the flame stability, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0185] In an embodiment, the radian by which the flame transfer gaps 50 are distributed at the inner edge of the upper-plate inner ring portion 221 ranges from 0° to 360°. For example, in some examples, the radian by which the flame transfer gaps 50 are distributed may be 0°, 90°, 180°, 270°, 360°, or other angle ranging from 0° to 360°.

[0186] It is worth noting that the larger the radian by which the flame transfer gaps 50 are distributed, for example, the radian by which the flame transfer gaps 50 are distributed is 360°, the better flame stability of the flame holes 40, and the stronger the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0187] In some embodiments, the lower plate 10 is spaced apart from the partition 30 to form the flame transfer gap 50 between two adjacent lower hole channels 11, and/or the upper plate 20 is spaced apart from the partition 30 to form the flame transfer gap 50 between the two adjacent upper hole channels 21.

[0188] In this way, two adjacent independent lower hole channels 11 and/or two adjacent independent upper hole channels 21 are communicated with each other, ensuring the integrated formation of the flame, which in turn improves the flame transfer capability and resistance to a separation of flames from the flame holes of the burner 100.

[0189] In an exemplary embodiment of the present disclosure, the upper plate 20 may be spaced apart from the partition 30, allowing the two adjacent upper hole channels 21 to be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved. In addition, an integrated annular flame is formed by several adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0190] That is, the flame transfer gaps 50 may connect several adjacent sub-flame holes 41 of the upper hole channels 21 together, and may also connect two adjacent sub-flame holes 41 of the upper hole channels 21 together, to generate the integrated annular flame. Therefore, the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100 can be improved.

[0191] In an embodiment, the lower plate 10 may be spaced apart from the partition 30, allowing the two adjacent lower hole channels 11 to be in communication with each other. An effect in the case where the lower plate 10 is spaced apart from the partition 30 is the same as an effect in the case where the upper plate 20 is spaced apart from the partition 30, and details thereof are omitted herein for avoidance of redundancy.

[0192] The width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, allowing two adjacent independent sub-flame holes 41 to communicate with each other. Therefore, the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100 can be ensured.

[0193] The width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, i.e. 0.50 mm≤d≤0.80 mm. In an example, d may be 0.50 mm, 0.57 mm, 0.62 mm, 0.68 mm, 0.70 mm, 0.71 mm, 0.80 mm, or other value ranging from 0.50 mm to 0.80 mm.

[0194] In an embodiment, the lower plate 10 is attached to the partition 30, and the upper plate 20 is spaced apart from the partition 30. In this case, two adjacent lower hole channels 11 at the lower plate 10 are not in communication with each other. Two adjacent sub-flame holes 41 of the lower hole channels 11 are independent of each other, and thus the flame cannot be transferred between two adjacent sub-flame holes 41. The two adjacent upper hole channels 21 at the upper plate 20 may be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved.

[0195] In another embodiment, the upper plate 20 is attached to the partition 30, and the lower plate 10 is spaced apart from the partition 30. In this case, the two adjacent upper hole channels 21 at the upper plate 20 are not in communication with each other. The two adjacent sub-flame holes 41 of the upper hole channels 21 are independent of each other, and thus the flame cannot be transferred between two adjacent sub-flame holes 41. The two adjacent lower hole channels 11 at the lower plate 10 may be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the lower hole channels 11, and thus the flame transfer capability of the burner 100 can be improved.

[0196] In other embodiments, the lower plate 10 is spaced apart from the partition 30. Further, the upper plate 20 is spaced apart from the partition 30. The lower plate 10 may be spaced apart from the partition 30, allowing the two adjacent lower hole channels 11 to be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the lower hole channels 11, and thus the flame transfer capability of the burner 100 can be improved. In addition, the integrated annular flame is formed by several adjacent sub-flame holes 41 of the lower hole channels 11, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes. The upper plate 20 is spaced apart from the partition 30, allowing the two adjacent upper hole channels 21 to be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved. In addition, the integrated annular flame is formed by several adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0197] It is worth noting that the partition 30 separates the flame holes 40 into the lower hole channels 11 and the upper hole channels 21, and the integrated annular flame is formed by the plurality of lower hole channels 11 and the plurality of upper hole channels 21 together. Therefore, the flame is uniform and complete without occurrence of the phenomenon of the separation of the flames from the flame holes.

[0198] Referring to FIG. 2 and FIG. 3, in some embodiments, the lower plate 10 includes a lower plate body 1. The upper plate 20 includes an upper plate body 22. Each of the lower plate body 12 and the upper plate body 22 is generally in a circular ring shape. A plurality of lower hole channels 11 are provided and distributed in an inner circumference of the lower plate body 12. A plurality of upper hole channels 21 are provided and distributed in an inner circumference of the upper plate body 12. The lower plate 10 further includes a lower ejection pipe portion 13 connected to the lower plate body 12. The lower ejection pipe portion 13 is provided with a lower ejection pipeline 131. The lower plate body 12 has a lower gas channel 71. The lower ejection pipeline 131 is in communication with the plurality of lower hole channels 11 via the lower gas channel 71. The upper plate 20 further includes an upper ejection pipe portion 23 connected to the upper plate body 22. The upper ejection pipe portion 23 is provided with an upper ejection pipeline 231. The upper plate body 22 has an upper gas channel 72. The upper ejection pipeline 231 is in communication with the plurality of upper hole channels 21 via the upper gas channel 72. The lower ejection pipe portion 13 is assembled with the upper ejection pipe portion 23 to form an ejection pipe 60 of the burner 100. The lower gas channel 71 cooperates with the upper gas channel 72 to form a gas channel 70 of the burner 100. The ejection pipe 60 is connected to the gas channel 70 to form an ejection pipe outlet 61. A flame hole 40 located away from the ejection pipe outlet 61 has a greater diameter than a flame hole 40 located adjacent to the ejection pipe outlet 61.

[0199] In this way, when flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are cohesive, coverage of the flames to a bottom of a pot is increased, improving the burning efficiency. In addition, the diameters of the lower hole channels 11 gradually decrease from a position away from the ejection pipe outlet 61 to a position adjacent to the ejection pipe outlet 61, and the diameters of the upper hole channels 21 gradually decrease from the position away from the ejection pipe outlet 61 to the position adjacent to the ejection pipe outlet 61. In this way, it is ensured that flames generated by a fuel gas passing through the flame hole 40 located away from the ejection pipe outlet is also intense. Further, the uniformity of the flames at the flame holes 40 of the burner 100 is ensured.

[0200] In an exemplary embodiment of the present disclosure, the plurality of lower hole channels 11 are distributed in the inner circumference of the lower plate body 12 and arranged in a circular ring shape on the lower plate 10, allowing the flames from the sub-flame holes 41 of the plurality of lower hole channels 11 to be dense and strong.

[0201] The plurality of upper hole channels 21 are distributed in the inner circumference of the upper plate body 22 and arranged in a circular ring shape under the upper plate 20, allowing the flames from the sub-flame holes 41 of the plurality of upper hole channels 21 to be dense and strong.

[0202] That is, the plurality of flame holes 40 are formed by cooperating the plurality of lower hole channels 11 and the plurality of upper hole channels 21 with each other, to ensure that the plurality of flame holes 40 are distributed in a circular ring shape, allowing flames at the flame holes 40 to be cohesive. As a result, the burning efficiency can be improved. In addition, the plurality of flame holes 40 are distributed in a circular ring shape, which increases the coverage of the flames on the bottom of the pot and improves a convection heat-exchange coefficient between the flames and the bottom of the pot. Therefore, a fuel gas use amount can be saved.

[0203] In an embodiment, the ejection pipe 60 is connected to the gas channel 70 and is used for uniformly mixing a mixed gas of the fuel gas and the air and delivering the mixed gas to the gas channel 70.

[0204] The gas channel 70 is connected to the flame holes 40 and may uniformly re-mix the mixed gas of the fuel gas and the air to generate uniform flames at the flame holes 40.

[0205] As illustrated in FIG. 2, in an embodiment, the diameter of the flame hole 40 located adjacent to the ejection pipe outlet 61 is small, and the diameter of the flame hole 40 located away from the ejection pipe outlet 61 is large. In addition, the diameters of the flame holes 40 gradually increases from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. The flame hole 40 at the position M has a maximum diameter.

[0206] That is, the diameters of the flame hole 40 gradually increase from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61, to ensure that a flame generated by a fuel gas flowing through the flame hole 40 at the point M is also intense. In this way, it is ensured that lengths of flames generated by the plurality of flame holes 40 are constant. Further, it can be ensured that the flames at the flame holes 40 of the burner 100 are uniform.

[0207] Referring to FIG. 2, in some embodiments, a center line L of the ejection pipe 60 is substantially tangent to a center circle R of the gas channel 70.

[0208] In this way, after the fuel gas enters the gas channel 70 from the ejection pipe 60, the fuel gas can quickly flow along the gas channel 70 of a circular ring shape to continuously supply the flame holes 40 with the fuel gas. Therefore, a fuel gas supply speed of the flame hole 40, further ensuring that the flames at the flame holes 40 are continuous and uniform.

[0209] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 2, the gas channel 70 is in a circular ring shape. When the center line L of the ejection pipe 60 is substantially tangent to the center circle R of the gas channel 70, a tangent point between the center line Land the center circle R is N. As a result, the fuel gas can quickly enter the gas channel 70 from the ejection pipe 60, and thus a resistance of the inner wall of the gas channel 70 on the fuel gas is reduced. In addition, after the fuel gas enters the gas channel 70 from the ejection pipe 60, the fuel gas may quickly flow along the gas channel 70 of the circular ring shape, which ensures the fuel gas feed speed of the flame holes 40 and further ensures that the flames at the flame holes 40 are continuous and uniform.

[0210] Referring to FIG. 2 and FIG. 3, in some embodiments, a cross-sectional area of a part of the gas channel 70 located away from the ejection pipe outlet 61 is smaller than a cross-sectional area of a part of the gas channel 70 located adjacent to the ejection pipe outlet 61.

[0211] In this way, the gas channel 70 has a cross-sectional area gradually increasing from the position away from the ejection pipe outlet 61 to the position adjacent to the ejection pipe outlet 61. That is, the cross-sectional area of the part of the gas channel 70 located adj acent to the ejection pipe outlet 61 is large, which allows for uniform gas mixing, a relatively low fuel gas flow velocity, and the small diameter of the flame hole 40. Moreover, the cross-sectional area of the part of the gas channel 70 located away from the ejection pipe outlet 61 is small, which allows for a relatively large fuel gas flow velocity and the large diameter of the flame hole 40. In this way, uniformity of the flames at the flame holes 40 is improved.

[0212] In an exemplary embodiment of the present disclosure, the cross-sectional area of the part of the gas channel 70 located adjacent to the ejection pipe outlet 61 is large. The cross-sectional area of the part of the gas channel 70 located away from the ejection pipe outlet 61 is small. Moreover, the gas channel 70 has the cross-sectional area gradually decreasing from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. A part of the gas channel 70 at the point M has a minimal cross-sectional area.

[0213] When a flow rate of the fuel gas is constant, the gas channel 70 has a large cross-sectional area at the position adjacent to the ejection pipe outlet 61. Correspondingly, the fuel gas has a small flow velocity at the position adjacent to the ejection pipe outlet 61, which facilitates uniform mixing of the fuel gas and the air. The gas channel 70 has a small cross-sectional area at the position M away from the ejection pipe outlet 61. Correspondingly, the fuel gas has a large flow velocity at the position M away from the ejection pipe outlet 61, which is convenient to quickly guide the fuel gas and the air that have been uniformly mixed to the flame holes 40.

[0214] It is worth noting that the gas channel 70 has the cross-sectional area gradually decreasing from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. Moreover, the diameters of the flame holes 40 gradually increase from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. In this way, the cross-sectional area of the gas channel 70 and the diameters of the flame holes 40 cooperate with each other to improve the uniformity of the flames at the flame holes 40.

[0215] Referring to FIG. 9, in some embodiments, the partition 30 includes a partition body 31 located between the lower plate 10 and the upper plate 20. The partition body 31 is generally in a circular ring shape. The partition 30 further includes a flange 32 bent from an outer peripheral edge of the partition body 31 towards the lower plate 10. The flange 32 is generally in an arc shape and corresponds to the ejection pipe outlet 61 to block the fuel gas from entering flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70.

[0216] In this way, when all flame holes 40 have the same size, the gas channel 70 has a cross-sectional area gradually increasing from the position away from the ejection pipe outlet 61 to the position adjacent to the ejection pipe outlet 61. The flange 32 is generally in an arc shape and corresponds to the ejection pipe outlet 61 to block the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. In this way, gas output of each flame hole 40 corresponding to the flange 32 is reduced. Further, the length of the flame from each flame hole 40 corresponding to the flange 32 are reduced, to ensure the uniformity of the flames at the flame holes 40.

[0217] In an exemplary embodiment of the present disclosure, when the diameters of the flame holes 40 are constant, in an embodiment, the gas channel 70 has a cross-sectional area gradually decreasing from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. It is possible to ensure the uniformity of the flames through all the flame holes 40 by providing the flange 32 on the partition 30.

[0218] In an embodiment, the flange 32 may be bent towards the lower plate 10 to restrict flow rates of the fuel gas in different flame holes 40. Therefore, it can be ensured that all flame holes 40 have the same flame length, ensuring the uniformity of the flames at the flame holes 40.

[0219] In another embodiment, the flange 32 may also be bent towards the upper plate 20 to restrict the flow rates of the fuel gas in different flame holes 40. Therefore, it can be ensured that all flame holes 40 have the same flame length, ensuring the uniformity of the flames at the flame holes 40.

[0220] In other embodiments, the flange 32 may be bent towards both the lower plate 10 and the upper plate 20 to ensure that all flame holes 40 have the same flame length. Therefore, the uniformity of the flames at the flame holes 40 can be ensured.

[0221] Referring to FIG. 10, in some embodiments, the flange 32 has an arc angle ranging from 0 degrees to 180 degrees.

[0222] In this way, the flange with a predetermined arc angle is disposed on the partition 30 to adjust the length of the flame from each flame hole 40, ensuring the uniformity of the flames at the flame holes 40.

[0223] In an exemplary embodiment of the present disclosure, the flange 32 is located on the partition 30 and connected to the partition body 31. The flange 32 may be employed to prevent the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. That is, the flange 32 may be made of a high-temperature and corrosion-resistant material. In an embodiment, the flange 32 may be made of a stainless-steel material. In other embodiments, the flange 32 may be made of an aluminum alloy material, a copper alloy material, or other materials, which is not specifically limited herein.

[0224] Preferably, in an embodiment, as illustrated in FIG. 10, the flange 32 on the partition 30 has an arc angle of A. The arc angle A is selected to range from 0 degrees to 180 degrees, to prevent the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. As a result, the gas output of each flame holes 40 corresponding to the flange 32 can be reduced, further reducing the flame length of each flame hole 40 corresponding to the flange 32. Therefore, the uniformity of the flames at the flame holes 40 can be ensured.

[0225] The arc angle A is selected to range from 0 degrees to 180 degrees, i.e., $0° \leq A \leq 180°$. In an example, the arc angle A may be 0°, 45°, 90°, 120°, 135°, 150°, 180°, or other values ranging from 0° to 180°.

[0226] In some embodiments, the flange has an arc angle ranging from 0 degrees to 150 degrees.

[0227] In this way, the length of each flame hole 40 is further accurately adjusted, ensuring the uniformity of the flames at the flame holes 40.

[0228] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 10, the flange 32 on the partition 30 has an arc angle of B.

[0229] It can be understood that the arc angle B is selected to range from 0 degrees to 150 degrees, to prevent the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70, which reduces the gas output of each flame hole 40 corresponding to the flange 32, further reducing the length of the flame from each flame hole 40 corresponding to the flange 32, to ensure the uniformity of the flames at the flame holes 40.

[0230] In an embodiment, the arc angle B is selected to range from 0 degrees to 150 degrees, i.e. $0° \leq B \leq 150°$. In an example, the arc angle B may be 0°, 45°, 90°, 100°, 120°, 135°, 150°, or other values ranging from 0° to 150°.

[0231] In another embodiment, the arc angle B of the flange 32 on the partition 30 may also be set to be 360 degrees. For example, it is possible to change amounts of the fuel gas supplied into the flame holes 40 by changing a length or an inclination angle of the flange 32 at different positions, to ensure the same amount of the fuel gas supplied into the flame holes 40, further ensuring the uniformity of the flames at the flame holes 40.

[0232] In other embodiments, the arc angle A of the flange 32 may be set to be any value ranging from 0 degrees to 360 degrees as long as the same amount of the fuel gas supplied into the flame holes 40 is ensured to ensure the uniformity of the flames at the flame holes 40, and there is no specific limitation here.

[0233] Referring to FIG. 2 and FIG. 3, in some embodiments, a depth direction of each lower hole channel 11 is inclined relative to a radial direction of the lower plate body 12, and/or a depth direction of each upper hole channel 21 is inclined relative to a radial direction of the upper plate body 22.

[0234] In this way, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are concentrated, which allows for strong flames, improving burning efficiency of the fuel gas.

[0235] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 3, an angle of the depth direction of each lower hole channel 11 relative to the radial direction of the lower plate body 12 is E. A depth direction of one of the lower hole channels 11 refers to a direction of a solid line representing the angle E. A radial direction of the corresponding lower plate body 12 refers to a direction of a dashed line representing the angle E.

[0236] The depth direction of each lower hole channel 11 is inclined relative to the radial direction of the lower plate body 12, which allows flames at sub-flame holes 41 of the lower hole channels 11 to be gathered towards the inner circumference of the lower plate body 12, allowing for the strong flames improving the burning efficiency of the fuel gas.

[0237] As illustrated in FIG. 2, an angle of the depth direction of each upper hole channel 21 relative to the radial direction of the upper plate body 22 is F. A depth direction of one of the upper hole channels 21 refers to a direction of a solid line representing the angle F. A radial direction of the corresponding the upper plate bodies 22 refers to a direction of a dashed line representing the angle F.

[0238] The depth direction of each upper hole channel 21 is inclined relative to the radial direction of the upper plate body 22, which allows flames at sub-flame holes 41 of the upper hole channels 21 to be gathered towards the inner circumference of the upper plate body 22, allowing for the strong flames and improving the burning efficiency of the fuel gas.

[0239] In summary, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are concentrated, which allows for the strong flames, further improving the burning efficiency of the fuel gas.

[0240] In some embodiments, the lower plate body 12 includes a lower-plate inner ring portion 121. The lower hole channels 11 are formed at the lower-plate inner ring portion 121. The lower-plate inner ring portion 121 is arched radially towards the upper plate 20 from outside to inside. The upper plate body 22 includes an upper-plate inner ring portion 221. The upper hole channels 21 are formed at the upper-plate inner ring portion 221. The upper-plate inner ring portion 221 is arched radially away from the lower plate 10 from outside to inside.

[0241] In this way, the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 have the same arrangement direction to ensure that the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 are assembled with each other to form a plurality of flame holes 40 facing upwards and having a same orientation as each of the lower hole channels 11 and the upper hole channels 21, which allows the flames at the flame holes 40 to be closer to the bottom of the pot. Therefore, heat transfer efficiency between the flames and the bottom of the pot can be improved.

[0242] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 1 and FIG. 3, the lower-plate inner ring portion 121 is in a circular ring shape and is arched radially towards the upper plate 20 from outside to inside for supporting the upper-plate inner ring portion 221. Therefore, stability of the upper-plate inner ring portion 221 can be improved.

[0243] As illustrated in FIG. 1 and FIG. 2, the upper-plate inner ring portion 221 is in a circular ring shape and arched radially away from the lower plate 10 from outside to inside, to be assembled with the lower-plate inner ring portion 121 to form a plurality of flame holes 40 distributed in a circular ring shape, which allows the flame holes 40 to be closer to the bottom of the pot, to improve the heat transfer efficiency between the flames and the bottom of the pot.

[0244] Referring to FIG. 11 to FIG. 13, embodiments of the present disclosure provide a burner assembly. The burner assembly 200 includes at least one burner 100 as described according to any one of the above embodiments. The burner assembly 200 includes an oil cup 210 disposed below the burner 100. The burner assembly 200 further includes a deflector 220 disposed adjacent to the burner 100. The deflector 220 is configured to guide oil droplets falling into the burner assembly 200 to slide into the oil cup 210 during cooking.

[0245] In this way, it is ensured that the burner assembly 200 is clean and tidy during cooking, and thus cleaning steps and improve user experience can be reduced.

[0246] In an exemplary embodiment of the present disclosure, the deflector 220 is in a funnel shape and disposed between a plurality of burners 100 (e.g., an inner ring burner and an outer ring burner), and may be used for guiding oil droplets generated during the cooking to flow into the oil cup 210 along an inner wall of the oil cup 210, to improve a cleanliness degree of the burner assembly 200.

[0247] In addition, the deflector 220 of the funnel shape is disposed between the plurality of burners 100 (for example, the inner ring burner and the outer ring burner), and can be used for increasing spaces of the plurality of burners 100, to ensure secondary air supply and improve the burning efficiency of the burner assembly 200.

[0248] The deflector plate 220 of the funnel shape is disposed between the plurality of burners 100, and can also be used for shielding an internal structure of the burner assembly 200, allowing for a beautiful and simple appearance of the burner assembly 200.

[0249] In an embodiment, the oil cup 210 may be used for collecting the oil droplets flowing down along the deflector 220 during cooking, to improve a cleanliness degree of a kitchen. Therefore, user experience can be improved.

[0250] Referring to FIG. 13 and FIG. 14, in some embodiments, the burner assembly 200 further includes a support 230. The at least one burner 100 and the oil cup 210 are fixed on the support 230.

[0251] In this way, the stability of the burner assembly 200 is improved. In addition, the support 230 is low in production costs and is simple and convenient.

[0252] In an exemplary embodiment of the present disclosure, the support 230 may be disposed at a bottom of the burner assembly 200. Moreover, the support 230 has a cylindrical inner cavity for accommodating the oil cup 210. Therefore, it can be ensured that the burner assembly 200 is clean and sanitary.

[0253] In an embodiment, the support 230 includes a plurality of claws for fixedly supporting the at least one burner 100 and the oil cup 210, to ensure stable operation of the burner assembly 200 and improve cooking safety of the kitchen.

[0254] In an embodiment, the support 230 may be formed into one piece by an aluminum alloy material to reduce its weight and production costs. In addition, the support 230 may be used for fixing a plurality of components to improve mounting efficiency of the burner assembly 200.

[0255] In an embodiment, the support 230 may be formed through a die-casting process or other processes, which is not specifically limited herein.

[0256] In an embodiment, the burner assembly 200 further includes a fixing plate 240 and an ignition needle

250.

[0257] The fixing plate 240 may be fixed to the support 230 by screws to reinforce the burner 100, further improving stability of the burner 100.

[0258] The ignition needle 250 may be mounted by engaging with the deflector 220 to be fixed on the support 230. In this way, an electric arc is generated to ignite the fuel gas at the flame holes 40 of the burner 100, and thus uniform flames are generated.

[0259] Referring to FIG. 11 and FIG. 12, in some embodiments, the partition 30 is provided with a protrusion 33. The protrusion 33 is configured to be in contact with the electric arc generated by the ignition needle 250.

[0260] In this way, by arranging the protrusion 33 the partition 30 and bringing the protrusion 30 into contact with the electric arc generated by the ignition needle 250, the electric arc can be prevented from uncontrollably moving. Therefore, an ignition success rate is increased and user experience is enhanced.

[0261] In an exemplary embodiment of the present disclosure, the protrusion 33 is disposed on the partition 30 for attracting the electric arc generated by the ignition needle 250. As a result, a fuel gas at the protrusion 33 can be ignited by the electric arc to form the flames. Therefore, a discharge arc of the ignition needle 250 can be prevented from deviating from the partition 30, increasing the ignition success rate of the burner 100.

[0262] It can be understood that each flame transfer gap 50 is formed by the upper plate 20 and the partition 30 between the two adjacent upper hole channels 21. When the electric arc generated by the ignition needle 250 is in contact with the protrusion 33, efficiency of the flame holes 40 forming the integrated annular flame can be improved. Therefore, the ignition success rate of the burner 100 is increased.

[0263] In addition, a burner in the related art includes an upper plate and a lower plate. The upper plate is arched upwardly to form an upper flame hole. The lower plate is depressed downwardly to form a lower flame hole. The upper flame hole is staggered from the lower flame hole to avoid phenomena such as flame-out noise. However, in this case, the flame holes each has a small area, which makes it difficult to obtain intense flames.

[0264] In view of this, according to a second aspect of the present disclosure, embodiments of the present disclosure provide a burner and a cooker, which can increase a total area of the flame holes of the burner, which in turn further increases a flame intensity and an upper load limit of the burner. In addition, flame gathering effect of the burner is ensured. Further, the flame intensity and a heating efficiency of the burner are increased.

[0265] Hereinafter, the burner 100 and the cooker 1000 according to the embodiments of the second aspect of the present disclosure will be described in detail with reference to FIG. 15 to FIG. 24.

[0266] Referring to FIG. 15 to FIG. 19, embodiments of the present disclosure provide a burner 100. The burner 100 includes a lower plate 10 and an upper plate disposed on the lower plate 10. The lower plate 10 has lower hole channels 11. The upper plate 20 has upper hole channels 21 corresponding to the lower hole channels 11. The lower hole channels 11 directly face towards the upper hole channels 21 to form flame holes 40 of the burner 100. An angle θ of a plane where the upper plate 20 is located relative to a depth direction of each of the flame holes 40 is greater than 0° and smaller than 90°.

[0267] In the above-mentioned burner 100, the upper hole channels 21 of the upper plate 20 directly face towards the lower hole channels 11 of the lower plate 10, to allow the flame holes 40 of the burner 100 be formed in such a manner that the flames holes face towards each other. In this way, the total area of the flame holes 40 of the burner 100 is increased. Further, the flame intensity and the upper load limit of the burner 100 are increased. In addition, each flame hole 40 of the burner 100 is inclined inwardly into a conical shape. In this way, the flame gathering effect of the burner 100 is ensured. Further, the flame intensity and the heating efficiency of the burner 100 are increased.

[0268] In an exemplary embodiment of the present disclosure, the lower plate 10 may be used for forming the flame holes 40. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material.

[0269] In an embodiment, the lower plate 10 may be made of an aluminum alloy material to ensure bending performance of the lower plate 10, ensuring the formation of the lower hole channels 11. In other embodiments, the lower plate 10 may be made of other materials, which is not specifically limited herein.

[0270] Similarly, the upper plate 20 may be used with the lower plate 10 for forming the fir holes 40. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material.

[0271] In an embodiment, the upper plate 20 may be made of the same material as the lower plate 10 to ensure bending performance of the upper plate 20, ensuring the formation of the upper hole channels 21. In other embodiments, the upper plate 20 may be made of other materials, which is not specifically limited herein.

[0272] It can be understood that the lower hole channels 11 directly face towards the upper hole channels 21 to form the flame hole 40 of circular ring shape. Compared to lower hole channels 11 in a misaligned arrangement or upper hole channels 21 in a misaligned arrangement, the total area of the flame holes 40 is increased, which can increase the higher fuel gas burning amount, increasing the flame intensity of the burner 100.

[0273] In an embodiment, an angle θ of a plane where the upper plate 20 is located relative to a depth direction of each of the flame holes 40 is greater than 0° and smaller than 90°, in such a manner that each of the flame holes 40 of the burner 100 is inclined inwardly to be formed into a conical shape, ensuring the flame gathering effect of the burner 100. Further, the flame intensity of the burner 100 is increased to ensure the heating rate of a bottom of a cooking appliance.

[0274] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 90°, the flames of the burner 100 are spread along an outer periphery of the burner 100, which results in a poor flame gathering effect, and thus a user may be easily got burned and a flame-out phenomenon also easily occurs.

[0275] In an embodiment, the angle θ is greater than 0° and smaller than 90°, i.e. 0°<θ<90°. In an example, the angle θ may be 5°, 10°, 30°, 45°, 60°, 75°, 85°, or other value that is greater than 0° and smaller than 90°.

[0276] In some embodiments, the angle θ is greater than 0° and smaller than 60°.

[0277] In this way, the flame gathering capability of the burner 100 is ensured, improving the heating efficiency.

[0278] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is greater than 0° and smaller than 60°, in such a manner that the flame hole 40 of the burner 100 is inclined inwardly to be formed into the conical shape, ensuring that the flames formed by the flame holes 40 of the burner 100 better cover the bottom of the cooking appliance. Further, a heating rate of the burner 100 is increased.

[0279] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 60°, an inclination angle of the flame of the burner 100 is increased, which weakens the flame gathering effect, reducing the heating rate of the burner 100.

[0280] In an embodiment, the angle θ is greater than 0° and smaller than 60°, i.e. 0°<θ<60°. In an example, the angle θ may be 5°, 10°, 15°, 25°, 30°, 45°, 50°, or other value that is greater than 0° and smaller than 60°.

[0281] In some embodiments, the angle θ is 40°.

[0282] In this way, the intensity of the flames generated by the burner 100 are ensured to be intense, providing a better heating effect for the bottom of the cooking appliance better.

[0283] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 may be 40°. In a case where each flame holes 40 of the burner 100 is ensured to be inclined inwardly into the conical shape, the flames are cohesive to cover and heat the bottom of the cooking appliance, ensuring a better heating effect for the bottom of the cooking appliance.

[0284] It can be understood that when the angle θ is 40°, the flames generated by the burner 100 may better cover the bottom of the cooking appliance to ensure the heating effect for the bottom of the cooking appliance, increasing the fuel gas utilization rate, which in turn increases the heating rate of the burner 100.

[0285] Referring to FIG. 15 and FIG. 17, in some embodiments, the burner 100 includes a partition 30 that is disposed between the lower plate 10 and the upper plate 20 and separates the lower hole channels 11 from the upper hole channels 21.

[0286] In this way, the partition 30 is employed to separate the flame holes 40 into the lower hole channels 11 and the upper hole channels 21, and thus the flame holes 40 are divided into two independent sub-flame holes 41. As a result, each of the two sub-flame holes 41 has a reduced cross-sectional area. Correspondingly, the sub-flame hole 41 has an increased depth. In this way, the phenomenon such as flame-out noise, which is caused by burning of the flames entering a gas channel through the sub-flame holes 41 immediately upon closing a gas valve, can be avoided. In addition, an equivalent cross-sectional area of the flame holes 40 remains unchanged, which can ensure that the burner 100 can generate intense flames.

[0287] In an exemplary embodiment of the present disclosure, the partition 30 is disposed between the lower plate 10 and the upper plate 20, and is employed to separate each flame hole 40 into two sub-flame holes 41, enabling sub-flame holes 41 located at upper and lower sides of the partition 30 to be independent of each other.

[0288] It can be understood that each of the sub-flame holes 41 has a relatively reduced cross-sectional area and a relatively increased depth. Immediately upon closing the fuel gas valve, a path for the flames to flow back into the gas channel becomes relatively long. When the flames reach the gas channel, it is insufficient to satisfy limiting conditions for deflagration. Therefore, a problem of flame-out noise of the burner 100 can be effectively solved.

[0289] It is worth noting that the partition 30 is employed to separate flame holes 40 into the lower hole channels 11 and the upper hole channels 21, and an integrated annular flame is formed by a plurality of lower hole channels 11 and a plurality of upper hole channels 21 together. Therefore, the flames are uniform and complete without occurrence of a phenomenon of a separation of the flames from the flame holes.

[0290] That is, the partition 30 is disposed between the lower plate 10 and the upper plate 20, without affecting the flame intensity of the flame holes 40, and thus the flame intensity of the burner 100 can be maintained at a greater level.

[0291] Since the partition 30 is disposed at the flame holes 40, the partition 30 may be made of a high-temperature and corrosion-resistant material. In an embodiment, the partition 30 may be a stainless-steel partition. In other embodiments, the partition 30 may be an aluminum alloy partition, a copper alloy partition, or a partition made of other materials, which is not specifically limited herein.

[0292] In some embodiments, flame transfer gaps 50 are formed between the upper plate 20 and the partition 30.

[0293] In this way, two adj acent independent flame holes 41 are communicated with each other, ensuring an integral formation of the flames, which can improve a flame transfer capability of the burner 100.

[0294] In an exemplary embodiment of the present disclosure, the flame transfer gaps 50 may be a channel with a predetermined width d for transferring the flames.

[0295] It can be understood that, each flame transfer gaps 50 is formed by the upper plate 20 and the partition 30 between the two adjacent upper hole channels 21, which allows the two adjacent upper hole channels 21 to be in communication with each other. As a result, flames at sub-flame holes 41 of the upper hole channels 21 are stable and uniform.

[0296] That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved.

[0297] In an embodiment, the width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, allowing the two adjacent independent sub-flame holes 41 to be communicated with each other, to ensure the flame transfer capability of the burner 100.

[0298] The width d of each flame transfer gap 50 is selected to range from 0.50 mm to 0.80 mm, i.e. 0.50 mm≤d≤0.80 mm. In an example, d may be 0.50 mm, 0.57 mm, 0.62 mm, 0.68 mm, 0.70 mm, 0.71 mm, 0.80 mm, or other value ranging from 0.50 mm to 0.80 mm.

[0299] Referring to FIG. 20, in some embodiments, the upper plate 20 is in a circular ring shape and includes an upper-plate inner ring portion 221 and an upper-plate outer ring portion 222. The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, and is spaced apart from the partition 30 to form the flame transfer gaps 50 between the upper plate 20 and the partition 30.

[0300] In this way, the flame can be transferred among adjacent flame holes 40 between the upper-plate inner ring portion 221 of the upper plate 20 and the partition 30. In addition, during burning, air can reach the flame holes 40 through the flame transfer gaps 50, which effectively supplements the secondary air required for burning, improving the burning efficiency of the burner 100.

[0301] In an exemplary embodiment of the present disclosure, the upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, allowing the upper-plate inner ring portion 221 to be spaced apart from the partition 30 to form the flame transfer gaps 50, ensuring that the flame can be transferred between two adjacent upper hole channels 21 at the upper plate 20.

[0302] The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, allowing the upper-plate outer ring portion 222 to be tightly attached to the partition 30 to form the closed environment. Therefore, the flames in the upper hole channels 21 are prevented from flowing back along the upper-plate outer ring portion 222 from the flame transfer gaps 50 to avoid safety hazards.

[0303] In an embodiment, an integrated annular flame is formed by several adjacent sub-flame holes 41 of the upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0304] That is, the flame transfer gaps 50 may connect several adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, and may also connect two adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, to generate the integrated annular flame. As a result, it can be ensured that a complete flame is formed between the upper plate 20 and the partition 30, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0305] In an embodiment, the lower plate 10 is attached to the partition 30, and the upper plate 20 is spaced apart from the partition 30. In this case, the two adjacent lower hole channels 11 at the lower plate 10 are not in communication with each other. Two adjacent sub-flame holes 41 of the lower hole channels 11 are independent of each other, and thus the flame cannot be transferred between two adjacent sub-flame holes 41. The two adjacent upper hole channels 21 at the upper plate 20 may be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved.

[0306] In another embodiment, the upper plate 20 is attached to the partition 30, and the lower plate 10 is spaced apart from the partition 30. In this case, the two adjacent upper hole channels 21 at the upper plate 20 are not in communication with each other. Two adjacent sub-flame holes 41 of the upper hole channels 21 are independent of each other, and thus the flame cannot be transferred between two adjacent sub-flame holes 41. The two adjacent lower hole channels 11 at the lower plate 10 may be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the lower hole channels 11, and thus the flame transfer capability of the burner 100 can be improved.

[0307] In other embodiments, the lower plate 10 is spaced apart from the partition 30. Further, the upper plate 20 is spaced apart from the partition 30. The lower plate 10 may be spaced apart from the partition 30, allowing the two adjacent lower hole channels 11 to be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the lower hole channels 11, and thus the flame transfer capability of the burner 100 can be improved. In addition, the integrated annular flame is formed by several adjacent sub-flame holes 41 of the lower hole channels 11, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes. The upper plate 20 is spaced apart from the partition 30, allowing the two adjacent upper hole channels 21 to be in communication with each other. That is, the flame can be transferred between two adjacent sub-flame holes 41 of the two upper hole channels 21, and thus the flame transfer capability of the burner 100 can be improved. In addition, the integrated annular flame is formed by several adjacent sub-flame holes 41 of the upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0308] Referring to FIG. 17 and FIG. 18, in some embodiments, a lower part of the upper-plate outer ring portion 222, a lower part of the partition 30, and a lower part of the lower plate 10 are tightly fixed through spot welding.

[0309] In this way, stable formation of the flame holes 40 is ensured to ensure the stability of the burner 100, which in turn provides stable and uniform flames.

[0310] In an exemplary embodiment of the present disclosure, the upper-plate outer ring portion 222 and the partition 30 may be tightly fixed through a welding process to improve stability of the upper-plate outer ring portion 222 and the partition 30.

[0311] It can be understood that the upper-plate outer ring portion 222 and the partition 30 may be tightly fixed through the welding process, and thus each flame transfer gap 50 cannot extend through the upper-plate outer ring portion 222. Therefore, the flames at the upper hole channels 21 are prevented from flowing back into the gas channel along the upper-plate outer ring portion 222 from the flame transfer gaps 50 to avoid the safety hazards.

[0312] In an embodiment, the partition 30 and the lower plate 10 may be tightly fixed through the welding process to improve stability of the partition 30 and the lower plate 10.

[0313] It can be understood that the partition 30 and the lower plate 10 may be tightly fixed through the welding process, and thus no flame transfer gap 50 is formed by the lower plate 10 and the partition 30. Therefore, stability and a support strength of the lower plate 10 can be further enhanced

[0314] In summary, the upper-plate outer ring portion 222, the partition 30, and the lower plate 10 may be connected and fixed through the spot welding to ensure that the burner has a stable flame hole structure, further ensuring the uniformity and intensity of the flames.

[0315] In an embodiment, the lower plate 10 and the upper plate 20 may also be connected through a screwing process to form the burner 100. In another embodiment, the lower plate 10 and the upper plate 20 may also be connected through a pressing process to form the burner 100. In other embodiments, the lower plate 10 and the upper plate 20 may also be connected to each other through other processes to form the burner 100, and the processes are not specifically limited herein.

[0316] Referring to FIG. 20 and FIG. 21, in some embodiments, the flame transfer gaps 50 are distributed at an inner edge of the upper-plate inner ring portion 221 by a radian ranging from 0° to 360°.

[0317] In this way, an annular channel is formed by the flame transfer gaps 50, ensuring that the burner 100 generates an integrated annular flame. Therefore, the flame stability can be improved.

[0318] In an exemplary embodiment of the present disclosure, the flame transfer gaps 50 are formed into a channel with an annular radian at the inner edge of the upper-plate inner ring portion 221, to ensure that flames of several adjacent upper hole channels 21 are in an integrated annular shape. In this way, flame stability of the upper hole channels 21 is improved. Further, the flame stability of the burner 100 is improved.

[0319] It can be understood that the flame transfer gaps 50 are an annular channel to improve the flame stability, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0320] In an embodiment, the radian by which the flame transfer gaps 50 are distributed at the inner edge of the upper-plate inner ring portion 221 ranges from 0° to 360°. For example, in some examples, the radian by which the flame transfer gaps 50 are distributed may be 0°, 90°, 180°, 270°, 360°, or other angle ranging from 0° to 360°.

[0321] It is worth noting that the larger the radian by which the flame transfer gaps 50 are distributed, for example, the radian by which the flame transfer gaps 50 are distributed is 360°, the better the flame stability of the flame holes 40, and the stronger the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0322] In some embodiments, each of the lower plate 10, the partition 30, and the upper plate 20 is formed into one piece by using a stainless-steel thin plate. The lower plate 10 is depressed downwardly to form arc-shaped lower hole channels 11. The upper plate 20 is arched upwardly to form arc-shaped upper hole channels 21. The flame holes 40 are formed by the lower hole channels 11 and the upper hole channels 21. Each the flame hole is in an oval shape.

[0323] In this way, each of the lower plate 10, the partition 30, and the upper plate 20 is formed into one piece by using the stainless-steel thin plate, making the inner wall of the burner 100 relatively smooth. In this way, the airflow resistance is reduced, effectively ensuring the air supply required for the complete burning of the fuel gas. In addition, the burner is simple in structure and low in cost.

[0324] In an exemplary embodiment of the present disclosure, the lower plate 10 may be used for forming the flame hole 40. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material. That is, the lower plate 10 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the lower plate 10 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0325] In an embodiment, the partition 30 may be employed to separate the flame holes 40 from each other. Therefore, the partition 30 may be made of a high-temperature and corrosion-resistant material. That is, the partition 30 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the partition 30 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0326] Similarly, the upper plate 20 may be used with the lower plate 10 for forming the fir hole 40. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material. That is, the upper plate 20 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the upper plate 20 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0327] In an embodiment, each of the lower plate 10, the partition 30, and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, allowing the burner 100 to have a small thickness and a smooth inner wall. In this way, it is ensured that a mixed gas of the fuel gas and air can be delivered smoothly. Further, operation efficiency of the burner 100 is improved. In addition, each of the lower plate 10, the partition 30, and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, allowing thicknesses of the lower plate 10 and the upper plate 20 to be uniform and ensuring that the lower plate 10 and the upper plate 20 are uniformly heated. Further, uniformity of the flames through each of the lower hole channels 11 and the upper hole channels 21 is improved.

[0328] In an embodiment, in combination with FIG. 15, each lower hole channel 11 is in an arc shape and is depressed downwardly to ensure that each lower hole channel 11 has a suitable inner cavity space, ensuring safe and rapid delivery of the fuel gas.

[0329] Similarly, each upper hole channel 21 is in an arc shape and is arched upwardly to ensure that each upper hole channel 21 has a suitable inner cavity space, ensuring the safe and rapid delivery of the fuel gas.

[0330] It can be understood that the lower hole channels 11 directly face towards and cooperates with the upper hole channels 21 to form flame holes 40 of the oval shape, to ensure that each flame hole 40 has a great cross-sectional area. Meanwhile, a fuel gas amount delivered by the flame holes 40 is large, ensuring that the intensity of the flames is great, further improving the flame uniformity and the heating efficiency.

[0331] In some embodiments, each of the lower plate 10 and the upper plate 20 is generally in a circular ring shape. A plurality of lower hole channels 11 are provided and distributed in an inner circumference of the lower plate 10. A plurality of upper hole channels 21 are provided and distributed in an inner circumference of the upper plate 20.

[0332] In this way, when flames at the flame holes 40 formed by the cooperation between the lower hole channels 11 and the upper hole channels 21 are cohesive, coverage of the flames to a bottom of a pot is increased, which improves the convection heat-exchange coefficient and the burning efficiency, saves the fuel gas use amount, and is green and environmentally friendly.

[0333] In an exemplary embodiment of the present disclosure, the plurality of lower hole channels 11 are distributed in the inner circumference of the lower plate 10 and arranged in a circular ring shape on the lower plate 10, allowing the flames from the sub-flame holes 41 of the plurality of lower hole channels 11 to be dense and strong.

[0334] The plurality of upper hole channels 21 are distributed in the inner circumference of the upper plate 20 and arranged in a circular ring shape under the upper plate 20, allowing the flames from the sub-flame holes 41 of the plurality of upper hole channels 21 to be dense and strong.

[0335] That is, the plurality of flame holes 40 are formed by cooperating the plurality of lower hole channels 11 and the plurality of upper hole channels 21 with each other, to ensure that the plurality of flame holes 40 are distributed in a circular ring shape, allowing the flames at the flame holes 40 to be cohesive. As a result, the burning efficiency can be improved. In addition, the plurality of flame holes 40 are distributed in a circular ring shape, which increases the coverage of the flames to the bottom of the pot and improves a convection heat-exchange coefficient between the flames and the bottom of the pot. Therefore, the fuel gas use amount can be saved.

[0336] In some embodiments, a depth direction of each lower hole channel 11 is inclined relative to a radial direction of the lower plate 10, and/or a depth direction of each upper hole channel 21 is inclined relative to a radial direction of the upper plate 20.

[0337] In this way, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 between the upper hole channels 21 are concentrated, which allows for strong flames and improves burning efficiency of the fuel gas.

[0338] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 21, an angle of the depth direction of each lower hole channel 11 relative to the radial direction of the lower plate 10 is E. A depth direction of one of the lower hole channels 11 refers to a direction of a solid line representing the angle E. A radial direction of the corresponding lower plate 10 refers to a direction of a dashed line representing the angle E.

[0339] The depth direction of each lower hole channel 11 is inclined relative to the radial direction of the lower plate 10, which allows the flames from the sub-flame holes 41 of the lower hole channels 11 to be gathered towards the inner circumference of the lower plate 10, allowing for the strong flames and improving the burning efficiency of the fuel gas.

[0340] As illustrated in FIG. 20, an angle of the depth direction of each upper hole channel 21 relative to the radial direction of the upper plate 20 is F. A depth direction of one of the upper hole channels 21 refers to a direction of a solid line representing the angle F. A radial direction of the corresponding upper plate 20 refers to a direction of a dashed line representing the angle F.

[0341] The depth direction of each upper hole channel 21 is inclined relative to the radial direction of the upper plate 20, which allows the flame of the sub-flame hole 41 of the upper hole channels 21 to be gathered towards the inner circumference of the upper plate 20, allowing for the strong flame and improving the burning efficiency of the fuel gas.

[0342] In summary, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are concentrated, which allows for the strong flame, further improving the burning efficiency of the fuel gas.

[0343] In some embodiments, the lower plate 10 includes a lower-plate inner ring portion 121. The lower hole channels 11 are formed at the lower-plate inner ring portion 121. The lower-plate inner ring portion 121 is arched radially towards the upper plate 20 from outside to inside. The upper plate 20 includes an upper-plate inner ring portion 221. The upper hole channels 21 are formed in the upper-plate inner ring portion 221. The upper-plate inner ring portion 221 is arched radially away from the lower plate 10 from outside to inside.

[0344] In this way, the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 have the same arrangement direction to ensure that the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 are assembled with each other to form the plurality of flame holes 40 facing upwards and having the same orientation as the lower hole channels 11 and the upper hole channels 21, which allows the flames at the flame holes 40 to be closer to the bottom of the pot. Therefore, the heat transfer efficiency between the flames and the bottom of the pot can be improved.

[0345] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 20 and FIG. 21, the lower-plate inner ring portion 121 is in a circular ring shape and is arched radially towards the upper plate 20 from outside to inside for supporting the upper-plate inner ring portion 221. Therefore, the stability of the upper-plate inner ring portion 221 can be improved.

[0346] As illustrated in FIG. 20 and FIG. 21, the upper-plate inner ring portion 221 is in a circular ring shape and arched radially away from the lower plate 10 from outside to inside, and is used for being assembled with the lower-plate inner ring portion 121 to form a plurality of flame holes 40 distributed in a circular ring shape, which allows the flame holes 40 to be closer to the bottom of the pot, to improve the heat transfer efficiency between the flames and the bottom of the pot.

[0347] Referring to FIG. 20 and FIG. 21, in some embodiments, the lower plate 10 includes a lower ejection pipe portion 13 connected to the lower-plate inner ring portion 121. The lower ejection pipe portion 13 is provided with a lower ejection pipeline 131. The lower plate 10 has a lower gas channel 71. The lower ejection pipeline 131 is in communication with the lower hole channels 11 via the lower gas channel 71. The upper plate 20 further includes an upper ejection pipe portion 23 connected to the upper plate 20. The upper ejection pipe portion 23 is provided with an upper ejection pipeline 231. The upper plate 20 has an upper gas channel 72. The upper ejection pipeline 231 is in communication with the upper hole channels 21 via the upper gas channel 72. The lower ejection pipe portion 13 is assembled with the upper ejection pipe portion 23 to form an ejection pipe 60 of the burner 100. The lower gas channel 71 cooperates with the upper gas channel 72 to form the gas channel 70 of the burner 100. The ejection pipe 60 is connected to the gas channel 70 to form the ejection pipe outlet 61. A flame hole 40 located away from the ejection pipe outlet 61 has a greater diameter than a flame hole 40 located adjacent to the ejection pipe outlet 61.

[0348] In this way, the diameters of the flame holes 40 gradually decrease from the position away from the ejection pipe outlet 61 to the position adjacent to the ejection pipe outlet 61. In this way, it is ensured that the flame generated by the fuel gas flowing through the flame hole 40 located away from the ejection pipe outlet is also intense. Further, it is ensured that the flames at the flame holes 40 of the burner 100 are uniform.

[0349] In an exemplary embodiment of the present disclosure, the ejection pipe 60 is connected to the gas channel 70 and is used for uniformly mixing the mixed gas of the fuel gas and the air and delivering the mixed gas to the gas channel 70.

[0350] The gas channel 70 is connected to the flame holes 40 and may uniformly re-mix the mixed gas of the fuel gas and the air to generate uniform flames through the flame holes 40.

[0351] As illustrated in FIG. 20, in an embodiment, the diameter of the flame hole 40 located adjacent to the ejection pipe outlet 61 is small, and the diameter of the flame hole 40 located away from the ejection pipe outlet 61 is large. In addition, the flame hole 40 has a diameter gradually increasing from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61. The flame hole 40 at the point M has a maximum diameter.

[0352] That is, the diameters of the flame hole 40 gradually increase from the position adjacent to the ejection pipe outlet 61 to the position M away from the ejection pipe outlet 61, to ensure that a flame generated by a fuel gas flowing through the flame hole 40 at the point M is also intense. In this way, it is ensured that the lengths of the flames generated by the plurality of flame holes 40 are constant. Further, it can be ensured that the flames at the flame holes 40 of the burner 100 are uniform.

[0353] Referring to FIG. 20, in some embodiments, a center line L of the ejection pipe 60 passes through a center of a center circle R of the gas channel 70.

[0354] In this way, after the fuel gas enters the gas channel 70 from the ejection pipe 60, the fuel gas can uniformly flow along the gas channel 70 of a circular ring shape, which is beneficial to an increasing in an ignition success rate of the protrusion 33.

[0355] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 20, the gas channel 70 is in a circular ring shape. Moreover, the center line L of the ejection pipe 60 passes through the center O of the center circle R of the gas channel 70. As a result, the mixed gas of the fuel gas and the air can flow uniformly towards two sides of the gas channel 70 after entering the gas channel 70 from the ejection pipe 60, which ensures uniform distribution of the mixed gas of the fuel gas and the air in the gas channel 70, and facilitates an ignition of the mixed gas of the fuel gas and the air by the discharge arc, to generate the integral flame in a circular ring shape. Therefore, the ignition success rate of the protrusion 33 can be increased.

[0356] Referring to FIG. 22 and FIG. 23, in some embodiments, the partition 30 includes a partition body 31 located between the lower plate 10 and the upper plate 20. The partition body 31 is generally in a circular ring shape. The partition 30 further includes a flange 32 bent from the outer peripheral edge of the partition body 31 towards the lower plate 10. The flange 32 is generally in an arc shape and corresponds to the ejection pipe outlet 61 to block the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70.

[0357] In this way, when all gas channels 70 have the same cross-sectional area and all flame holes 40 have the same size, the flange 32 is generally in an arc shape and corresponds to the ejection pipe outlet 61 to block the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. As a result, a gas output of each flame hole 40 corresponding to the flange 32 is reduced, further reducing a length of the flame from each flame hole 40 corresponding to the flange 32. Therefore, the uniformity of the flames at the flame holes 40 can be ensured.

[0358] In an exemplary embodiment of the present disclosure, the mixed gas of the fuel gas and the air has a high pressure and a high flow velocity at the position adjacent to the ejection pipe outlet 61. The flame hole 40 located adjacent to the ejection pipe outlet 61 may generate a long flame when all gas channels 70 have the same cross-sectional area and all flame holes 40 have the same size.

[0359] Similarly, as illustrated in FIG. 23, the mixed gas of the fuel gas and the air has a low pressure and a low flow velocity at the position away from the ejection pipe outlet 61 (e.g., the position M). The flame hole 40 located adjacent to the ejection pipe outlet 61 may generate a short flame when all gas channels 70 have the same cross-sectional area and all flame holes 40 have the same size.

[0360] In summary, in the embodiments of the present disclosure, by arranging the flange 32 of the arc shape on the partition 30, the fuel gas can be prevented from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. Therefore, the gas output of each flame hole 40 corresponding to the flange 32 can be reduced, to ensure the uniformity of the flames through all flame holes 40.

[0361] In an embodiment, the flange 32 may be bent towards the lower plate 10 to restrict flow rates of the fuel gas in different flame holes 40. Therefore, it can be ensured that all flame holes 40 have the same flame length, ensuring the uniformity of the flames at the flame holes 40.

[0362] In another embodiment, the flange 32 may also be bent towards the upper plate 20 to restrict the flow rates of the fuel gas in different flame holes 40. Therefore, it can be ensured that all flame holes 40 have the same flame length, ensuring the uniformity of the flames at the flame holes 40.

[0363] In other embodiments, the flange 32 may be bent towards both the lower plate 10 and the upper plate 20 to ensure that all flame holes 40 have the same flame length. Therefore, the uniformity of the flames at the flame holes 40 can be ensured.

[0364] Referring to FIG. 22 and FIG. 23, in some embodiments, the flange 32 has an arc angle A ranging from 0° to 60°.

[0365] In this way, the flange with a predetermined arc angle A is disposed on the partition 30 to adjust the length of the flame from each flame hole 40, ensuring the uniformity of the flames at the flame holes 40.

[0366] In an exemplary embodiment of the present disclosure, the flange 32 is located on the partition 30 and connected to the partition body 31. The flange 32 may be employed to prevent the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. That is, the flange 32 may be made of a high-temperature and corrosion-resistant material. In an embodiment, the flange 32 may be made of a stainless-steel material. In other embodiments, the flange 32 may be made of an aluminum alloy material, a copper alloy material, or other materials, which is not specifically limited herein.

[0367] Preferably, in an embodiment, as illustrated in FIG. 23, the flange 32 on the partition 30 has an arc angle of A. The arc angle A is selected to range from 0° to 60°, to prevent the fuel gas from entering the flame holes 40 corresponding to the flange 32 from the ejection pipe outlet 61 via the gas channel 70. As a result, the gas output of each flame hole 40 corresponding to the flange 32 can be reduced, further reducing the length of the flame from each flame hole 40 corresponding to the flange 32, to ensure the uniformity of the flames at the flame holes 40.

[0368] In an embodiment, the arc angle A of the flange 32 on the partition 30 is selected to range from 0° to 60°, to ensure the uniformity of the flames at the flame holes 40.

[0369] The arc angle A is selected to range from 0° to 60°, i.e. 0°≤A≤60°. In an example, the arc angle A may be 8°, 10°, 24°, 38°, 42°, 55°, 60°, or other value ranging from 0° to 60°.

[0370] In another embodiment, the arc angle A of the flange 32 on the partition 30 may also be set to be 360 degrees. For example, it is possible to change the amounts of the fuel gas supplied into the flame holes 40 by changing the length or the inclination angle of the flange 32 at different positions, to ensure the same amount of the fuel gas supplied into the flame holes 40, further ensuring the uniformity of the flames at the flame holes 40.

[0371] In other embodiments, the arc angle A of the flange 32 may also be set to be any value ranging from 0 degrees to 360 degrees, as long as the same amount of the fuel gas supplied into the flame hole 40 is ensured to ensure the uniformity of the flames at the flame holes 40, and there is no specific limitation here.

[0372] In some embodiments, the partition 30 is provided with a protrusion 33. The protrusion 33 is configured to be in contact with the electric arc generated by the ignition needle.

[0373] In this way, by arranging the protrusion 30 on the partition 33 and bringing the protrusion 30 into contact with the electric arc generated by the ignition needle, the electric arc can be prevented from uncontrollably moving. Therefore, the ignition success rate is increased and the user experience is enhanced.

[0374] In an exemplary embodiment of the present disclosure, the protrusion 33 is disposed on the partition 30 for attracting the electric arc generated by the ignition needle 250. As a result, fuel gas at the protrusion 33 can be ignited by the electric arc to form the flames. Therefore, the discharge arc of the ignition needle can be prevented from deviating from the partition 30, increasing the ignition success rate of the burner 100.

[0375] It can be understood that each flame transfer gap 50 is formed by the upper plate 20 and the partition 30 between the two adjacent upper hole channels 21. When the electric arc generated by the ignition needle 250 is in contact with the protrusion 33, the efficiency of the flame holes 40 forming the integrated annular flame can be improved. Therefore, the ignition success rate of the burner 100 is increased.

[0376] Referring to FIG. 24, embodiments of the present disclosure provide a cooker 1000. The cooker 1000 includes the burner 100 according to the above-described embodiments.

[0377] In the cooker 1000, the upper hole channels of the upper plate directly face towards the lower hole channels of the lower plate, to allow the flame holes of the burner to be formed in such a manner that the flames holes face towards each other. In this way, the total area of the flame holes of the burner is increased. Further, the upper load limit of the burner is increased. In addition, each flame hole 40 of the burner 100 is inclined inwardly into the conical shape. In this way, the flame gathering effect of the burner 100 is ensured. Further, the flame intensity and the heating efficiency of the burner 100 are increased.

[0378] In an exemplary embodiment of the present disclosure, the cooker 1000 may be a natural gas cooker, a liquefied gas cooker, or a coal gas cooker.

[0379] It can be understood that the cooker 1000 includes a burner assembly or a stove 200. The burner assembly or the stove 200 includes the burner 100. The cooker 1000 may be a single-stove cooker, a double-stove cooker, or a multi-stove cooker.

[0380] FIG. 24 is a schematic structural view of a double-stove cooker. As illustrated in FIG. 24, each stove 200 includes at least one burner 100.

[0381] In an embodiment, the burner 100 may be an inner ring burner, an outer ring burner, or a double ring burner formed by combining the inner ring burner and the outer ring burner, which is not specifically limited herein.

[0382] In addition, in the related art, a burner generally has a ring of flame holes that are arranged at intervals. However, an ignition needle is typically only adjacent to one or two of the flame holes. During ignition, flames from only one or two flame holes adjacent to the ignition needle are ignited by the ignition needle, and then flames from other adjacent flame holes are ignited by the ignited flames. In this way, burning of the flames from the whole ring of flame holes is realized. However, since the flame holes are arranged at intervals, a flame transfer capability of the flames is poor. In addition, a flame-out phenomenon may also occur.

[0383] In view of this, according to a third aspect of the present disclosure, embodiments of the present disclosure provide a burner and a cooker, which can improve a flame transfer capability of the burner and resistance of a separation of flames from flame holes of the burner during ignition, ensuring that the flame-out and flame extinguishment do not easily occur.

[0384] Hereinafter, the burner 100 and the cooker 1000 according to the embodiments of the third aspect of the present disclosure will be described in detail with reference to FIG. 25 to FIG. 32.

[0385] Referring to FIG. 25 to FIG. 29, embodiments of the present disclosure provide a burner 100. The burner 100 includes a lower plate 10, an upper plate 20 disposed on the lower plate 10, and a partition 30. The lower plate 10 has lower hole channels 11. The upper plate 20 has upper hole channels 21. The partition 30 is disposed between the lower plate 10 and the upper plate 20 and separates the lower hole channels 11 from the upper hole channels 21. Flame transfer gaps 50 are formed between the upper plate 20 and the partition 30.

[0386] In the above-mentioned burner 100, by forming each flame transfer gap 50 between the two adjacent independent upper hole channels 21, flames between the upper plate 20 and the partition 30 have high connectability to form an annular flame. In this way, the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100 during ignition are improved, ensuring that the flames are not easily separated from flame holes and flame-out does not easily occur.

[0387] In an exemplary embodiment of the present disclosure, the partition 30 is disposed between the lower plate 10 and the upper plate 20, and is employed to separate a plurality of lower hole channels 11 and a plurality of upper hole channels 21 into a plurality of sub-flame holes 41, making the sub-flame holes 41 formed at the upper and lower sides of the partition 30 independent of each other. That is, each of the sub-flame holes 41 has a reduced cross-sectional area and an increased depth. Immediately upon closing a fuel gas valve, a path for the flames to flow back into a gas channel becomes relatively long. When the flames reach the gas channel, it is insufficient to satisfy limiting conditions for deflagration. Therefore, a problem of flame-out noise of the burner 100 can be effectively solved.

[0388] In an embodiment, the partition 30 may have a sharp protrusion 33 (as illustrated in FIG. 30) to attract a discharge arc to ignite fuel gas at outlets of the lower hole channels 11 and the upper hole channels 21. As a result, an uncontrolled movement of the electric arc can be avoided, improving the ignition efficiency of the burner 100.

[0389] Since the partition 30 is disposed between the lower hole channels 11 and the upper hole channels 21, the partition 30 may be made of a high-temperature and corrosion-resistant material.

[0390] In an embodiment, the partition 30 may be a stainless-steel partition. In other embodiments, the partition 30 may be an aluminum alloy partition, a copper alloy partition, or a partition made of other materials, which is not specifically limited herein.

[0391] In an embodiment, the flame transfer gaps 50 are formed between the upper plate 20 and the partition 30 to ensure that a communicable gap is formed between two adjacent upper hole channels 21 at the upper plate 20, and thus flame transfer and flame stabilization can be provided.

[0392] It can be understood that during the ignition of the burner 100, a fuel gas at one of outlets of the upper hole channels 21 is ignited through a discharge arc by an ignition needle (not shown), and the flame is transferred to two adjacent upper hole channels 21 through the flame transfer gap 50. In this way, a continuous flame is formed. Further, the flame transfer efficiency and the ignition success rate are ensured.

[0393] During continuous operation of the burner 100, it is ensued that, by communicating two adjacent upper hole channels 21 via the flame transfer gap 50 and continuously supplementing the secondary air, the fuel gases in the two adjacent upper hole channels 21 are adequately burned, allowing the burner 100 to form an integrated continuous flame. In this way, a high flame intensity and good stability are ensured. Further, the resistance of the separation of the flames from flames holes of the burner 100 is improved to achieve the flame stabilization.

[0394] In an embodiment, each flame transfer gap 50 may range from 0.50 mm to 0.80 mm. In this way, the two adjacent independent upper hole channels 21 are communicated with each other, to ensure the flame transfer capability and flame stabilization capability of the burner 100.

[0395] That is, each flame transfer gap 50 ranges from 0.50 mm to 0.50 mm, i.e. 0.80 mm, i.e., 0.5 mm≤d≤0.80 mm. In some examples, each flame transfer gap 50 may be 0.50 mm, 0.57 mm, 0.62 mm, 0.68 mm, 0.70 mm, 0.71 mm, 0.80 mm, or other value ranging from 0.50 mm to 0.80 mm.

[0396] When the flame transfer gap 50 is smaller than 0.50 mm, the flame transfer gap 50 is too small, resulting in low flame transfer efficiency and low secondary air supplement efficiency. In this case, the flame transfer capability of the burner 100 is poor.

[0397] When the flame transfer gap 50 is greater than 0.80 mm, the flame transfer gap 50 is too large, resulting in low flame stability. In this case, the resistance of the separation of the flames from the flame holes of the burner 100 is poor, easily resulting in a flame-out and extinguishment phenomenon.

[0398] In an embodiment, the lower plate 10 is tightly fixed to the partition 30 to improve stability and support strengths of the partition 30 and the upper plate 20. As a result, the stability and safety of the burner 100 can be improved.

[0399] In other embodiments, the flame transfer gaps 50 may also be formed between the lower plate 10 and the partition 30, or may be formed between the upper plate 20 and the partition 30 as well as between the lower plate 10 and the partition 30, which is not specifically limited herein.

[0400] Referring to FIG. 28 to FIG. 30, in some embodiments, the upper plate 20 is in a circular ring shape and includes an upper-plate inner ring portion 221 and an upper-plate outer ring portion 222. The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, and is spaced apart from the partition 30 to form the flame transfer gaps 50; or the lower plate 10 is in a circular ring shape and includes a lower-plate inner ring portion 121 and a lower-plate outer ring portion 122 (as illustrated in FIG. 32). The lower-plate inner ring portion 121 is depressed downwardly relative to the lower-plate outer ring portion 122 (not shown), and is spaced apart from the partition 30 to form the flame transfer gaps 50.

[0401] In this way, the adjacent flame holes 40 between the upper-plate inner ring portion 221 and the partition 30 or the adjacent flame holes 40 between the lower-plate inner ring portion 121 and the partition 30 can transfer the flames. In addition, during burning, air can reach the flame holes 40 through the flame transfer gaps 50, which effectively supplements the secondary air required for burning, therefore, the burning efficiency of the burner 100 is improved.

[0402] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28 and FIG. 29, the upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, enabling the upper-plate inner ring portion 221 to be spaced apart from the partition 30 to form the flame transfer gaps 50. Therefore, it can be ensured that the flames can be transferred between two adjacent upper hole channels 21 at the upper plate 20.

[0403] The upper-plate inner ring portion 221 is arched upwardly relative to the upper-plate outer ring portion 222, enabling the upper-plate outer ring portion 222 to be tightly attached to the partition 30 to form a closed environment. Therefore, the flames at the upper hole channels 21 can be prevented from flowing back along the upper-plate outer ring portion 222 from the flame transfer gaps 50 to avoid safety hazards.

[0404] In an embodiment, an integrated annular flame is formed between several adjacent sub-flame holes 41 of the upper hole channels 21, and thus the formed integrated annular flame is stable without easily occurring the phenomenon of the separation of the flames from the flame holes. Therefore, the burner 100 has improved resistance to the separation of the flames from the flame holes.

[0405] That is, the flame transfer gaps 50 may connect several adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, and may also connect the two adjacent sub-flame holes 41 of the upper hole channels 21 at the upper-plate inner ring portion 221 together, to generate the integrated annular flame. As a result, it can be ensured that the complete flame is formed between the upper plate 20 and the partition 30, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0406] Similarly, in another embodiment, the lower-plate inner ring portion 121 is depressed downwardly relative to the lower-plate outer ring portion 122 (not shown), enabling the lower-plate inner ring portion 121 to be spaced apart from the partition 30 to form the flame transfer gaps 50. Therefore, it can be ensured that the flame can be transferred between two adjacent lower hole channels 11 at the lower plate 10. In this way, it is ensured that the complete flame is formed between the lower plate 10 and the partition 30, and details thereof are omitted herein for the avoidance of redundancy.

[0407] In some embodiments, the flame transfer gaps 50 are set to range from 0° to 360° in a circumferential direction.

[0408] In this way, the flame transfer gaps 50 are formed into an annular channel, ensuring that the burner 100 generates the integrated annular flame, improving the flame stability.

[0409] In an exemplary embodiment of the present disclosure, the flame transfer gaps 50 are formed into a channel with the annular radian at the inner edge of the upper-plate inner ring portion 221, to ensure that flames of several adjacent upper hole channels 21 are in an integrated annular shape. In this way, the flame stability of the upper hole channels 21 is improved. Further, the flame stability of the burner 100 is improved.

[0410] It can be understood that the flame transfer gaps 50 are an annular channel to improve the flame stability, improving the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0411] In an embodiment, a radian by which the flame transfer gaps 50 are distributed at the inner edge of the upper-plate inner ring portion 221 ranges from 0° to 360°. For example, in some examples, the radian by which the flame transfer gaps 50 are distributed may be 0°, 90°, 180°, 270°, 360°, or other angle ranging from 0° to 360°.

[0412] It can be understood that the larger the radian by which the flame transfer gaps 50 are distributed, for example, the radian by which the flame transfer gaps 50 are distributed is 360°, the better the flame stability of the flame hole 40, and the stronger the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100.

[0413] It is worth noting that the partition 30 separates the flame holes 40 into the lower hole channels 11 and the upper hole channels 21, and the integrated annular flame is formed by the plurality of lower hole channels 11 and the plurality of upper hole channels 21 together. The flame is uniform and complete without occurrence the phenomenon of the separation of the flames from the flame holes.

[0414] That is, the partition 30 is disposed between the lower plate 10 and the upper plate 20, without affecting the flame intensity of the flame hole 40, and thus the flame intensity of the burner 100 can be maintained at a greater level.

[0415] Referring to FIG. 28, in some embodiments, a lower part of the upper-plate outer ring portion 222, a lower part of the partition 30, and a lower part of the lower plate 10 are tightly fixed through spot welding, or a lower part of the lower-plate outer ring portion 122, a lower part of the partition 30, and a lower part of the upper plate 20 are tightly fixed through spot welding.

[0416] In this way, the stable formation of the flame holes 40 is ensured, ensuring the stability of the burner 100, which further provides the stable and uniform flames.

[0417] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28, the upper-plate outer ring portion 222 and the partition 30 may be tightly fixed through the welding process to improve the stability of the upper-plate outer ring portion 222 and the partition 30.

[0418] It can be understood that the upper-plate outer ring portion 222 and the partition 30 may be tightly fixed through the welding process, and thus each flame transfer gap 50 cannot extend through the upper-plate outer ring portion 222. Therefore, the flames at the upper hole channels 21 are prevented from flowing back into the gas channel from the flame transfer gaps 50 along the upper-plate outer ring portion 222 to avoid the safety hazards.

[0419] In an embodiment, the partition 30 and the lower plate 10 may be tightly fixed through the welding process to improve the stability of the partition 30 and the lower plate 10.

[0420] It can be understood that the partition 30 and the lower plate 10 may be tightly fixed through the welding process, and thus no flame transfer gap 50 is formed by the lower plate 10 and the partition 30. Therefore, the stability and the support strength of the lower plate 10 can be further enhanced.

[0421] In summary, the upper-plate outer ring portion 222, the partition 30, and the lower plate 10 may be connected and fixed through the spot welding to ensure that the burner 100 has a stable flame hole structure, which in turn ensures the uniformity and intensity of the flames.

[0422] Similarly, in another embodiment, the lower-plate outer ring portion 122 and the partition 30 may be tightly fixed through the welding process (not shown), to improve stability of the lower-plate outer ring portion 122 and the partition 30 while ensuring that the flame transfer gaps 50 are formed by the lower-plate inner ring portion 121 and the partition 30 simultaneously. In this case, no flame transfer gap 50 is formed by the upper plate 20 and the partition 30, and details thereof are omitted herein for the avoidance of redundancy.

[0423] In an embodiment, the lower plate 10 and the upper plate 20 may also be connected through a screwing process to form the burner 100. In another embodiment, the lower plate 10 and the upper plate 20 may also be connected through a pressing process to form the burner 100. In other embodiments, the lower plate 10 and the upper plate 20 may also be connected through other processes to form the burner 100, and the processes are not specifically limited herein.

[0424] Referring to FIG. 28, in some embodiments, a ratio of a radial length of the upper-plate inner ring portion 221 to a total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 satisfies $0.3<\frac{a1}{a1+b1}<0.8$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is a radial length of the upper-plate outer ring portion; or a ratio of a radial length of the lower-plate inner ring portion 121 to a total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 satisfies $0.3<\frac{a2}{a2+b2}<0.8$, where a2 is the radial length of the lower-plate inner ring portion 121, and b2 is a radial length of the lower-plate outer ring portion (not shown).

[0425] In this way, it is ensured that each flame transfer gap 50 has a suitable radial length, improving the flame transfer and flame stabilization effect.

[0426] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28, an appropriate ratio of the radial length a1 of the upper-plate inner ring portion 221 to the total length (a1+b1) of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 should be selected to improve the flame transfer and flame stabilization effect.

[0427] In an embodiment, $\frac{a1}{a1+b1}$ may r be greater than 0.3 and smaller than 0.8. In some examples, $\frac{a1}{a1+b1}$ may be 0.35, 0.38, 0.4, 0.45, 0.5, 0.7, 0.75, or other values that is greater than 0.3 and smaller than 0.8.

[0428] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is smaller than 0.3, the radial length of the upper-plate inner ring portion 221 is too short, making the radial length of each flame transfer gap 50 too short. In this case, the flame transfer and flame stabilization capability is insufficient, easily resulting in the flame-out phenomenon.

[0429] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is greater than 0.8, the radial length of the upper-plate inner ring portion 221 is too long, making the radial length of each flame transfer gap 50 too long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0430] Similarly, in another embodiment, a suitable ratio (not shown) of the radial length a2 of the lower-plate inner ring portion 121 and the total length (a2+b2) of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 should be selected, to improve the flame transfer and flame stabilization effect.

[0431] In an embodiment, $\frac{a2}{a2+b2}$ may be greater than 0.3 and smaller than 0.8. In some examples, $\frac{a2}{a2+b2}$ may be 0.35, 0.38, 0.4, 0.45, 0.5, 0.7, 0.75, or other value that is greater than 0.3 and smaller than 0.8.

[0432] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is smaller than 0.3, the radial length of the lower-plate inner ring portion 121 is too short, making the radial length of each flame transfer gap 50 too short. In this case, the flame transfer and flame stabilization capability is insufficient, easily resulting in the flame-out phenomenon.

[0433] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is greater than 0.8, the radial length of the lower-plate inner ring portion 121 is too long, making the radial length of each flame transfer gap 50 too long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0434] In some embodiments, the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 satisfies $0.45<\frac{a1}{a1+b1}<0.55$, where a1 is the radial length of the upper-plate inner ring portion, and b 1 is the radial length of the upper-plate outer ring portion; or the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 satisfies $0.45<\frac{a2}{a2+b2}<0.55$, where a2 is the radial length of the lower-plate inner ring portion, and b2 is the radial length of the lower-plate outer ring portion.

[0435] In this way, a more suitable radial length of each flame transfer gap 50 is preferably selected, providing better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0436] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 28, preferably, the ratio of the radial length a1 of the upper-plate inner ring portion 221 to the total length (a1+b1) of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 may be greater than 0.45 and smaller than 0.5, to allow for a better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0437] In some examples, $\frac{a1}{a1+b1}$ may be 0.46, 0.48, 0.49, 0.50, 0.52, 0.53, 0.54, or other values that is greater than 0.45 and smaller than 0.55.

[0438] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is smaller than 0.45, the radial length of the upper-plate inner ring portion 221 is relatively short, making the radial length of each flame transfer gap 50 relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon.

[0439] When the ratio of the radial length of the upper-plate inner ring portion 221 to the total length of the upper-plate inner ring portion 221 and the upper-plate outer ring portion 222 is greater than 0.55, the radial length of the upper-plate inner ring portion 221 is relatively long, making the radial length of each flame transfer gap 50 relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0440] Similarly, in another embodiment, preferably, the ratio of the radial length a2 of the lower-plate inner ring portion 121 to the total length (a2+b2) of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 may be greater than 0.45 and smaller than 0.55 (not shown), to allow for a better flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0441] In some examples, $\frac{a2}{a2+b2}$ may be 0.46, 0.48, 0.49, 0.50, 0.52, 0.53, 0.54, or other value that is greater than 0.45 and smaller than 0.55.

[0442] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is smaller than 0.45, the radial length of the lower-plate inner ring portion 121 is relatively short, making the radial length of each flame transfer gap 50 relatively short. In this case, the flame transfer and flame stabilization capability is poor, easily resulting in the flame-out phenomenon.

[0443] When the ratio of the radial length of the lower-plate inner ring portion 121 to the total length of the lower-plate inner ring portion 121 and the lower-plate outer ring portion 122 is greater than 0.55, the radial length of the lower-plate inner ring portion 121 is relatively long, making the radial length of each flame transfer gap 50 relatively long. In this case, the flame easily flows back into the gas channel and generates the deflagration noise, resulting in the safety hazards.

[0444] In some embodiments, a gap between the upper-plate inner ring portion 221 and the partition 30 is greater than 0 mm and smaller than 3 mm, or a gap between the lower-plate inner ring portion 121 and the partition 30 is greater than 0 mm and smaller than 3 mm.

[0445] In this way, it is ensured that the flame transfer gaps 50 can realize a normal flame transfer and flame stabilization, ensuring a normal operation of the burner 100.

[0446] In an exemplary embodiment of the present disclosure, the gap between the upper-plate inner ring portion 221 and the partition 30 may be understood as a thickness of each flame transfer gap 50. That is, the gap between the upper-plate inner ring portion 221 and the partition 30 should be selected to have an appropriate thickness to ensure that the flame transfer gaps 50 can realize the normal flame transfer and flame stabilization, providing the stable and uniform flames.

[0447] In an embodiment, the gap between the upper-plate inner ring portion 221 and the partition 30 may be greater than 0 mm and smaller than 3 mm. In some examples, the gap between the upper-plate inner ring portion 221 and the partition 30 may be 0.3 mm, 0.5 mm, 0.9 mm, 1.2 mm, 1.5 mm, 2.3 mm, 2.7 mm, or other value that is greater than 0 mm and smaller than 3 mm.

[0448] When the gap between the upper-plate inner ring portion 221 and the partition 30 is greater than 3 mm, the thickness of each transfer gap 50 is too large, which results in a too large inner cavity space of the flame transfer gap 50, easily causing the flow velocity of the fuel gas to be much greater than a burning speed of the fuel gas. In this way, the fuel gas is burned insufficiently, resulting in too low burning efficiency.

[0449] Similarly, in another embodiment, the gap between the lower-plate inner ring portion 121 and the partition 30 may be understood as the thickness of the flame transfer gap 50. That is, the gap between the upper-plate inner ring portion 121 and the partition 30 should be selected to have an appropriate thickness to ensure that the flame transfer gaps 50 can realize the normal flame transfer and flame stabilization function, providing the stable and uniform flames.

[0450] In an embodiment, the gap between the lower-plate inner ring portion 121 and the partition 30 may be greater than from 0 mm and smaller than 3 mm. In some examples, the gap between the lower-plate inner ring portion 121 and the partition 30 may be 0.3 mm, 0.5 mm, 0.9 mm, 1.2 mm, 1.5 mm, 2.3 mm, 2.7 mm, or other value that is greater than 0 mm and smaller than 3 mm.

[0451] When the gap between the lower-plate inner ring portion 121 and the partition 30 is greater than 3 mm, the thickness of each flame transfer gap 50 is too large, which results in a too larger inner cavity space of the flame transfer gap 50, easily causing the flow velocity of the fuel gas to be much greater than the burning speed of the fuel gas. In this way, the fuel gas is burned insufficiently, resulting in too low burning efficiency.

[0452] In some embodiments, the gap between the upper-plate inner ring portion 221 and the partition 30 is greater than 1 mm and smaller than 2 mm, or the gap between the lower-plate inner ring portion 121 and the partition 30 is greater than 1 mm and smaller than 2 mm.

[0453] In this way, the suitable gap is ensured to be formed between the upper-plate inner ring portion 221 and the partition 30 or between the lower-plate inner ring portion 121 and the partition 30, improving the flame transfer and flame stabilization effect of the flame transfer gaps 50.

[0454] In an exemplary embodiment of the present disclosure, preferably, the gap between the upper-plate inner ring portion 221 and the partition 30 may be greater than 1 mm and smaller than 2 mm to ensure that the suitable gap is formed between the upper-plate inner ring portion 221 and the partition 30, improving the flame transfer and flame stabilization effect of the flame transfer gap 50.

[0455] In some examples, the gap between the upper-plate inner ring portion 221 and the partition 30 may be 1.1 mm, 1.3 mm, 1.5 mm, 1.6 mm, 1.7 mm, 1.8 mm, 1.9 mm, or other value that is greater than 1 mm and smaller than 2 mm.

[0456] When the gap between the upper-plate inner ring portion 221 and the partition 30 is greater than 2 mm, the thickness of the flame transfer gap 50 is large, which resulting in a relatively large inner cavity space of the flame transfer gap 50, easily causing the flow velocity of the fuel gas to be greater than the burning speed of the fuel gas. In this way, the fuel gas is burned insufficiently, resulting in too low burning efficiency.

[0457] When the gap between the upper-plate inner ring portion 221 and the partition 30 is smaller than 1 mm, the thickness of the flame transfer gap 50 is small, which results in a relatively small inner cavity space of the flame transfer gap 50, causing the flow velocity of the fuel gas to be smaller than the burning speed of the fuel gas, which easily results in the flame-out phenomenon.

[0458] Similarly, in another embodiment, preferably, the gap between the lower-plate inner ring portion 121 and the partition 30 may be greater than 1 and smaller than 2 mm (not shown), to ensure that the suitable gap is formed between the lower-plate inner ring portion 121 and the partition 30. Therefore, the flame transfer and flame stabilization effect of the flame transfer gaps 50 can be improved.

[0459] In some examples, the gap between the lower-plate inner ring portion 121 and the partition 30 may be 1.1 mm, 1.3 mm, 1.5 mm, 1.6 mm, 1.7 mm, 1.8 mm, 1.9 mm, or other value that is greater than 1 mm and smaller than 2 mm.

[0460] When the gap between the lower-plate inner ring portion 121 and the partition 30 is greater than 2 mm, the thickness of the flame transfer gap 50 is large, which results in a relatively large inner cavity space of the flame transfer gap 50, easily causing the flow velocity of the fuel gas to be greater than the burning speed of the fuel gas. In this way, the fuel gas is burned insufficiently, resulting in too low burning efficiency.

[0461] When the gap between the lower-plate inner ring portion 121 and the partition 30 is smaller than 1 mm, the thickness of the flame transfer gap 50 is small, which results in a relatively small inner cavity space of the flame transfer gap, causing the flow velocity of the fuel gas to be smaller than the burning speed of the fuel gas, which easily results in the flame-out phenomenon.

[0462] In some embodiments, each of the lower plate 10, the partition 30, and the upper plate 20 is formed into one piece by using the stainless-steel thin plate.

[0463] In this way, each of the lower plate 10, the partition 30, and the upper plate 20 is formed into one piece by using the stainless-steel thin plate, making the inner wall of the burner 100 relatively smooth. In this way, the airflow resistance is reduced, effectively ensuring the air supply required for the complete burning of the fuel gas. In addition, the burner has a simple structure a low cost.

[0464] In an exemplary embodiment of the present disclosure, the lower plate 10 may be used for forming the flame hole 40. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material. That is, the lower plate 10 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the lower plate 10 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0465] In an embodiment, the partition 30 may be employed to separate the flame holes 40 from each other. Therefore, the partition 30 may be made of a high-temperature and corrosion-resistant material. That is, the partition 30 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the partition 30 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0466] Similarly, the upper plate 20 may be used with the lower plate 10 for forming the flame holes 40. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material. That is, the upper plate 20 may be formed into one piece by using a stainless-steel material, to shorten the production time and save the production cost. In other embodiments, the upper plate 20 may be formed into one piece by using an aluminum alloy material, or other metal materials or alloy materials, which is not specifically limited herein.

[0467] In an embodiment, each of the lower plate 10, the partition 30, and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, and thus the burner 100 has a small thickness and a smooth inner wall. In this way, it is ensured that the mixed gas of the fuel gas and the air can be delivered smoothly. Further, the operation efficiency of the burner 100 is improved.

[0468] In addition, each of the lower plate 10, the partition 30, and the upper plate 20 may be formed into one piece by using the stainless steel to form the burner 100, allowing the thicknesses of the lower plate 10 and the upper plate 20 to be uniform and ensuring that the lower plate 10 and the upper plate 20 are uniformly heated. Further, the uniformity of the flames through the lower hole channels 11 and the upper hole channels 21 is improved.

[0469] In some embodiments, thicknesses of the lower plate 10, the partition 30, and the upper plate 20 are substantially same.

[0470] In this way, a wall thickness of the burner 100 is ensured to be uniform, allowing the burner 100 to be heated evenly and to have good stability.

[0471] In an exemplary embodiment of the present disclosure, the lower plate 10, the partition 30, and the upper plate 20 are formed through welding by selecting stainless-steel thin plates of the substantially same thickness, to improve temperature consistency of the burner 100, ensuring safe use of the burner 100.

[0472] It can be understood that the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is substantially same, which allows an interior of the burner 100 to be heated evenly, reducing safety phenomena such as flame leakage or explosion due to partial overheating.

[0473] In some embodiments, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 0.5 mm and smaller than 2 mm.

[0474] In this way, it is ensured that the burner 100 operates normally to provide the uniform flames. When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is smaller than 0.5 mm, each of the lower plate 10, the partition 30, and the upper plate 20 has a too small thickness, and thus the lower plate 10, the partition 30, and the upper plate 20 are easily heated excessively, resulting in deformation and flame leakage of the lower plate 10, the partition 30, and the upper plate 20, which results in the safety hazards. When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 2 mm, each of the lower plate 10, the partition 30, and the upper plate 20 has a too grate thickness, a large weight, and high production cost.

[0475] In an exemplary embodiment of the present disclosure, each of the lower plate 10, the partition 30, and the upper plate 20 should be selected to have a suitable thickness to ensure the uniform flames of the burner 100, providing a safe and stable operation environment.

[0476] In an embodiment, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 may be greater than 0.5 mm and smaller than 2 mm. In some examples, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 may be 0.6 mm, 0.7 mm, 0.9 mm, 1.1 mm, 1.5 mm, 1.6 mm, 1.9 mm, or other value that is greater than 0.5 mm and smaller than 2 mm.

[0477] When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 2 mm, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is excessively large, and thus the burner 100 has a too large weight and too high cost.

[0478] When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is smaller than 0.5 mm, each of the lower plate 10, the partition 30, and the upper plate 20 has a too small thickness, which easily results in melting deformation and flame leakage of each of the lower plate 10, the partition 30, and the upper plate 20 due to excessive heating, occurring the safety hazards.

[0479] In some embodiments, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 0.8 mm and smaller than 1.5 mm.

[0480] In this way, the burner 100 having a suitable thickness is formed to improve the flame uniformity. When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is smaller than 0.8 mm, each of the lower plate 10, the partition 30, and the upper plate 20 has a small thickness, and thus the lower plate 10, the partition 30, and the upper plate 20 are easily heated excessively, resulting in the deformation and flame leakage of each of the lower plate 10, the partition 30, and the upper plate 20, occurring the safety hazards. When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 1.5 mm, each of the lower plate 10, the partition 30, and the upper plate 20 has a too great thickness, a large weight, and high production cost.

[0481] In an exemplary embodiment of the present disclosure, preferably, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 may be greater than 0.8 mm and smaller than 1.5 mm. In some examples, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 may be 0.9 mm, 1.0 mm, 1.1 mm, 1.2 mm, 1.3 mm, 1.4 mm, or other value that is greater than 0.8 mm and smaller than 1.5 mm.

[0482] When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is greater than 1.5 mm, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is large, and thus the burner 100 has a large weight and high cost.

[0483] When the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is smaller than 0.8 mm, the thickness of each of the lower plate 10, the partition 30, and the upper plate 20 is small, which easily leads to the melting deformation and flame leakage of each of the lower plate 10, the partition 30, and the upper plate 20 due to excessive heating, occurring the safety hazards.

[0484] Referring to FIG. 25 and FIG. 27, in some embodiments, the lower plate 10 is depressed downwardly to form the lower hole channels 11. The upper plate 20 is arched upwardly to form the upper hole channels 21. The lower hole channels 11 directly face towards the upper hole channels 21 to form the flame holes 40 of the burner 100.

[0485] In this way, the flame holes 40 of the burner 100 are formed in such a manner that the flame holes 40 face towards each other, increasing the total area of the flame holes 40 of the burner 100 to further increase the flame intensity and the upper load limit of the burner 100.

[0486] In an exemplary embodiment of the present disclosure, the lower plate 10 may be used for forming the flame holes 40. Therefore, the lower plate 10 may be made of a high-temperature and corrosion-resistant material.

[0487] In an embodiment, the lower plate 10 may be made of an aluminum alloy material to ensure bending performance of the lower plate 10, ensuring the formation of the lower hole channels 11. In other embodiments, the lower plate 10 may be made of other materials, which is not specifically limited herein.

[0488] Similarly, the upper plate 20 may be used with the lower plate 10 for forming the fir hole 40. Therefore, the upper plate 20 may be made of a high-temperature and corrosion-resistant material.

[0489] In an embodiment, the upper plate 20 may be made of the same material as the lower plate 10 to ensure the bending performance of the upper plate 20, ensuring the formation of the upper hole channels 21. In other embodiments, the upper plate 20 may be made of other materials, which is not specifically limited herein.

[0490] It can be understood that the lower hole channels 11 directly face towards the upper hole channels 21 to form the flame holes 40 of a circular ring-like shape. Compared to lower hole channels 11 in a misaligned arrangement or upper hole channels 21 in a misaligned arrangement, the total area of the flame holes 40 is increased, which results in a higher fuel gas burning amount, increasing the flame intensity of the burner 100.

[0491] In addition, compared to a burner without the partition 30, the equivalent cross-sectional area of the flame holes 40 of the present disclosure remains unchanged, which can ensure that the burner 100 has excellent flame transfer and flame stabilization effects while generating intense flames.

[0492] In some embodiments, an angle θ of the plane where the upper plate 20 is located relative to a depth direction of each of the flame holes 40 is greater than 0° and smaller than 90°.

[0493] In this way, each flame hole 40 of the burner 100 is inclined inwardly into a conical shape. In this way, the flame gathering effect of the burner 100 is ensured. Further, the flame intensity and the heating efficiency of the burner 100 are increased.

[0494] In an exemplary embodiment of the present disclosure, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is greater than 0° and smaller than 90°, in such a manner that the flame hole 40 of the burner 100 is inclined inwardly to be formed into the conical shape, ensuring the flame gathering effect of the burner 100. Further, the flame intensity of the burner 100 is increased to ensure the heating rate of a bottom of a cooking appliance.

[0495] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 90°, the flames of the burner 100 are spread along the outer periphery of the burner 100, which results in the poor flame gathering effect, and a user may be easily got burned and a flame-out phenomenon also easily occurs.

[0496] In an embodiment, the angle θ is greater than 0° and smaller than 90°, i.e. $0° < \theta < 90°$. In an example, the angle θ may be 5°, 10°, 30°, 45°, 60°, 75°, 85°, or other value that is greater than 0° and smaller than 90°.

[0497] In some embodiments, the angle θ is greater than 0° and smaller than 60°.

[0498] In this way, the flame gathering capability of the burner 100 is ensured, improving the heating efficiency.

[0499] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is greater than 0° and smaller than 60°, in such a manner that the flame hole 40 of the burner 100 is inclined inwardly to be formed into the conical shape. Therefore, it can be ensured that the flames formed by the flame holes 40 of the burner 100 better covers the bottom of the cooking appliance. Further, the heating rate of the burner 100 is increased.

[0500] It can be understood that when the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 is not greater than 0° and is not smaller than 60°, the inclination angle of the flame of the burner 100 is increased, which weakens the flame gathering effect, and thus the heating rate of the burner 100 is reduced.

[0501] In an embodiment, the angle θ is greater than 0° and smaller than 60°, i.e. $0°<\theta<60°$. In an example, the angle θ may be 5°, 10°, 15°, 25°, 30°, 45°, 50°, or other value that is greater than 0° and smaller than 60°.

[0502] In some embodiments, the angle θ is 40°.

[0503] In this way, the intensity of the flames generated by the burner 100 is ensured to be large, providing better heating effect for the bottom of the cooking appliance.

[0504] In an exemplary embodiment of the present disclosure, preferably, the angle θ of the plane where the upper plate 20 is located relative to the depth direction of each of the flame holes 40 may be 40°. In the case where each flame hole 40 of the burner 100 is ensured to be inclined inwardly into the conical shape, the flames are cohesive to cover and heat the bottom of the cooking appliance, ensuring the better heating effect for the bottom of the cooking appliance.

[0505] It can be understood that when the angle θ is 40°, the flames generated by the burner 100 may better cover the bottom of the cooking appliance to ensure the heating effect for the bottom of the cooking appliance. Therefore, the fuel gas utilization rate is improved, which in turn increases the flame intensity and the heating rate of the burner 100.

[0506] Referring to FIG. 31, embodiments of the present disclosure provide a cooker 1000. The cooker 1000 includes a burner 100 according to the above-described embodiments.

[0507] In this way, in the cooker 1000, by forming the flame transfer gaps 50 between the two adjacent independent upper hole channels 21, the flames between the upper plate 20 and the partition 30 have high connectability to form the annular flame. In this way, the flame transfer capability and the resistance to the separation of the flames from the flame holes of the burner 100 during ignition are improved, ensuring that the flame-out and flame extinguishment do not easily occur.

[0508] In an exemplary embodiment of the present disclosure, the cooker 1000 may be a natural gas cooker, a liquefied gas cooker, or a coal gas cooker.

[0509] It can be understood that the cooker 1000 includes a burner assembly or a stove 200. The burner assembly or the stove 200 includes the burner 100. The cooker 1000 may be a single-stove cooker, a double-stove cooker, or a multi-stove cooker.

[0510] FIG. 31 is a schematic structural view of a double-stove cooker. As illustrated in FIG. 31, each stove 200 includes at least one burner 100.

[0511] In an embodiment, the burner 100 may be an inner ring burner, an outer ring burner, or a double ring burner formed by combining the inner ring burner and the outer ring burner, which is not specifically limited herein.

[0512] Referring to FIG. 30 and FIG. 32, in some embodiments, each of the lower plate 10 and the upper plate 20 are generally in a circular ring shape. A plurality of lower hole channels 11 are provided and distributed in the inner circumference of the lower plate 10. A plurality of upper hole channels 21 are provided and distributed in the inner circumference of the upper plate 20.

[0513] In this way, when the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are cohesive, coverage of the flames to the bottom of the pot is increased, which improves the convection heat-exchange coefficient and the burning efficiency, saves the fuel gas use quantity, and is green and environmentally friendly.

[0514] In an exemplary embodiment of the present disclosure, the plurality of lower hole channels 11 are distributed in the inner circumference of the lower plate 10 and arranged in a circular ring shape on the lower plate 10, allowing the flames from the sub-flame holes 41 of the plurality of lower hole channels 11 to be dense and strong.

[0515] The plurality of upper hole channels 21 are distributed in the inner circumference of the upper plate 20 and arranged in a circular ring shape under the upper plate 20, allowing the flames from the sub-flame holes 41 of the plurality of upper hole channels 21 to be dense and strong.

[0516] That is, the plurality of flame holes 40 are formed by cooperating the plurality of lower hole channels 11 and the plurality of upper hole channels 21 with each other, to ensure that the plurality of flame holes 40 are distributed in a circular ring shape, allowing the flames at the flame holes 40 to be cohesive to improve the burning efficiency. In addition, the plurality of flame holes 40 are distributed in a circular ring shape, which increases the coverage of the flames to the bottom of the pot to improve the convection heat-exchange coefficient between the flames and the bottom of the pot. Therefore, a fuel gas use amount is saved.

[0517] In some embodiments, a depth direction of each lower hole channel 11 is inclined relative to the radial direction of the lower plate 10, and/or a depth direction of each upper hole channel 21 is inclined relative to the radial direction of the upper plate 20.

[0518] In this way, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are concentrated, which allows for the strong flames and improves the burning efficiency of the fuel gas.

[0519] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 32, an angle of the depth direction of each lower hole channel 11 relative to the radial direction of the lower plate 10 is E. A depth direction of one of the lower hole channels 11 refers to a direction of a solid line representing the angle E. A radial direction of the corresponding lower plate 10 refers to a direction of a dashed line representing the angle E.

[0520] The depth direction of each lower hole channel 11 is inclined relative to the radial direction of the lower plate 10, which allows the flames from the sub-flame holes 41 of the lower hole channels 11 to be gathered towards the inner circumference of the lower plate 10, allowing for the strong flames and improving the burning efficiency of the fuel gas.

[0521] As illustrated in FIG. 30, an angle of the depth direction of each upper hole channel 21 relative to the radial direction of the upper plate 20 is F. A depth direction of one of upper hole channels 21 refers to a direction of a solid line representing the angle F. A radial direction of the corresponding upper plate 20 refers to a direction of a dashed line representing the angle F.

[0522] The depth direction of each upper hole channel 21 is inclined relative to the radial direction of the upper plate 20, which allows the flames from the sub-flame holes 41 of the upper hole channels 21 to be gathered towards the inner circumference of the upper plate 20, allowing for the strong flame and improving the burning efficiency of the fuel gas.

[0523] In summary, the flames at the flame holes 40 formed through the cooperation between the lower hole channels 11 and the upper hole channels 21 are concentrated, which allows for the strong flames, further improving the burning efficiency of the fuel gas.

[0524] In some embodiments, the lower plate 10 includes a lower-plate inner ring portion 121. The lower hole channels 11 are formed at the lower-plate inner ring portion 121. The lower-plate inner ring portion 121 is arched radially towards the upper plate 20 from outside to inside. The upper plate 20 includes an upper-plate inner ring portion 221. The upper hole channels 21 are formed in the upper-plate inner ring portion 221. The upper-plate inner ring portion 221 is arched radially away from the lower plate 10 from outside to inside.

[0525] In this way, the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 have the same arrangement direction to ensure that the lower-plate inner ring portion 121 and the upper-plate inner ring portion 221 are assembled with each other to form the plurality of flame holes 40 facing upwards and having the same orientation as the lower hole channels 11 and the upper hole channels 21, which allows the flames at the flame holes 40 to be closer to the bottom of the pot. Therefore, the heat transfer efficiency between the flames and the bottom of the pot can be improved.

[0526] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 30 and FIG. 32, in an embodiment, the lower-plate inner ring portion 121 is in a circular ring shape and is arched radially towards the upper plate 20 from outside to inside for supporting the upper-plate inner ring portion 221. Therefore, the stability of the upper-plate inner ring portion 221 can be improved.

[0527] As illustrated in FIG. 30 and FIG. 32, the upper-plate inner ring portion 221 is in a circular ring shape and arched radially away from the lower plate 10 from outside to inside, to be assembled with the lower-plate inner ring portion 121 to form the plurality of flame holes 40 distributed in a circular ring shape, which allows the flame holes 40 to be closer to the bottom of the pot. Therefore, the heat transfer efficiency between the flames and the bottom of the pot can be improved.

[0528] In the present disclosure, the description with reference to the terms "an embodiment", "some embodiments", "an illustrative embodiment", "an example", "a specific example", or "some examples", etc., means that specific features, structures, materials, or characteristics described in conjunction with the embodiments or examples are included in at least one embodiment or example of the present disclosure. In this specification, the schematic representations of the above terms do not necessarily refer to the same embodiment or example. In addition, the particular features, structures, materials, or characteristics described may be combined in any suitable manner in one or more embodiments or examples.

Claims

1. A burner (100), comprising:

   a lower plate (10) having a lower hole channel (11);
   an upper plate (20) disposed on the lower plate (10), the upper plate (20) having an upper hole channel (21); and
   a partition (30) disposed between the lower plate (10) and the upper plate (20) and separating the lower hole channel (11) from the upper hole channel (21).

2. The burner (100) according to claim 1, wherein:

   the upper hole channel (21) corresponds to the lower hole channel (11);
   the lower hole channel (11) directly faces towards the upper hole channel (21) to form a flame hole (40) of the burner (100); and
   an angle θ of a plane where the upper plate (20) is located relative to a depth direction of the flame hole (40) is greater than 0° and smaller than 90°.

3. The burner (100) according to claim 1 or 2, wherein the partition (30) comprises:

   a partition body (31) located between the lower plate (10) and the upper plate (20), the partition

body (31) being generally in a circular ring shape; and
a flange (32) bent from an outer peripheral edge of the partition body (31) towards the lower plate (10).

4. The burner (100) according to claim 3, wherein the flange (32) has an arc angle ranging from 0 degrees to 180 degrees, and optionally from 0 degrees to 150 degrees.

5. The burner (100) according to any one of claims 1 to 4, wherein:

the lower plate (10) comprises a lower plate body (12), and the upper plate (20) comprises an upper plate body (22), each of the lower plate body (12) and the upper plate body (22) being generally in a circular ring shape;
a plurality of lower hole channels (11) are provided and distributed in an inner circumference of the lower plate body (12);
a plurality of upper hole channels (21) are provided and distributed in an inner circumference of the upper plate body (12);
the lower plate (10) further comprises a lower ejection pipe portion (13) connected to the lower plate body (12), and the lower ejection pipe portion (13) is provided with a lower ejection pipeline (131);
the lower plate body (12) has a lower gas channel (71), and the lower ejection pipeline (131) is in communication with the plurality of lower hole channels (11) via the lower gas channel (71);
the upper plate (20) further comprises an upper ejection pipe portion (23) connected to the upper plate body (22), and the upper ejection pipe portion (23) is provided with an upper ejection pipeline (231);
the upper plate body (22) has an upper gas channel (72), and the upper ejection pipeline (231) is in communication with the plurality of upper hole channels (21) via the upper gas channel (72);
the lower ejection pipe portion (13) is assembled with the upper ejection pipe portion (23) to form an ejection pipe (60) of the burner (100);
the lower gas channel (71) cooperates with the upper gas channel (72) to form a gas channel (70) of the burner (100);
the ejection pipe (60) is connected to the gas channel (70) to form an ejection pipe outlet (61);
an upper hole channel (21) of the plurality of upper hole channels (21) located away from the ejection pipe outlet (61) has a greater diameter than an upper hole channel (21) of the plurality of upper hole channels (21) located adjacent to the ejection pipe outlet (61); and
a lower hole channel (11) of the plurality of lower hole channels (11) located away from the ejection pipe outlet (61) has a greater diameter than a lower hole channel (11) of the plurality of lower hole channels (21) located adjacent to the ejection pipe outlet (61).

6. The burner (100) according to any one of claims 2 to 4, wherein:

the lower plate (10) is depressed downwardly to form the lower hole channel (11); and
the upper plate (20) is arched upwardly to form the upper hole channel (21).

7. The burner (100) according to claim 6, wherein the angle θ is greater than 0° and smaller than 60°, and ptionally the angle θ is 40°.

8. The burner (100) according to claim 6, wherein flame transfer gaps (50) are formed between the upper plate (20) and/or the lower plate (10) and the partition (30), and two adjacent flame holes (40) are in communication with each other via each flame transfer gap (50).

9. The burner (100) according to claim 8, wherein:

the upper plate (20) is in a circular ring shape and comprises an upper-plate inner ring portion (221) and an upper-plate outer ring portion (222), the upper-plate inner ring portion (221) is arched upwardly relative to the upper-plate outer ring portion (222), and the upper-plate inner ring portion (221) is spaced apart from the partition (30) to form the flame transfer gaps (50); or
the lower plate (10) is in a circular ring shape and comprises a lower-plate inner ring portion (121) and a lower-plate outer ring portion (122), the lower-plate inner ring portion (121) is depressed downwardly relative to the lower-plate outer ring portion (122), and the lower-plate inner ring portion (121) is spaced apart from the partition (30) to form the flame transfer gaps (50).

10. The burner (100) according to claim 9, wherein flame transfer gaps (50) are distributed at an inner edge of the upper-plate inner ring portion (221) by a radian ranging from 0° to 360°.

11. The burner (100) according to claim 9 or 10, wherein:

a ratio of a radial length of the upper-plate inner ring portion (221) to a total length of the upper-plate inner ring portion (221) and the upper-plate outer ring portion (222) satisfies

$0.3<\frac{a1}{a1+b1}<0.8$, where a1 is the radial length of the upper-plate inner ring portion (221), and b1 is a radial length of the upper-plate outer ring portion (222), optionally the ratio of the radial length of the upper-plate inner ring portion (221) to the total length of the upper-plate inner ring portion (221) and the upper-plate outer ring portion (222) is $0.45<\frac{a1}{a1+b1}<0.55$; or

a ratio of a radial length of the lower-plate inner ring portion (121) to a total length of the lower-plate inner ring portion (121) and the lower-plate outer ring portion (122) is $0.3<\frac{a2}{a2+b2}<0.8$, where a2 is the radial length of the lower-plate inner ring portion (121), and b2 is a radial length of the lower-plate outer ring portion (122), optionally the ratio of the radial length of the lower-plate inner ring portion (121) to the total length of the lower-plate inner ring portion (121) and the lower-plate outer ring portion (122) is $0.45<\frac{a2}{a2+b2}<0.55$.

12. A burner assembly (200), comprising:

at least one burner (100) according to any one of claims 1 to 11;
an oil cup (210) disposed below the at least one burner (100); and
a deflector (220) disposed adjacent to the burner (100) and configured to guide oil droplets falling into the burner assembly (200) to slide into the oil cup (210) during cooking.

13. The burner assembly (200) according to claim 12, further comprising a support (230), wherein the at least one burner (100) and the oil cup (210) are fixed on the support (230).

14. The burner assembly (200) according to claim 12 or 13, wherein the partition (30) is provided with a protrusion (33), and the protrusion (33) is configured to be in contact with an electric arc generated by an ignition needle (250).

15. A cooker, comprising the burner assembly (200) according to any one of claims 12 to 14.

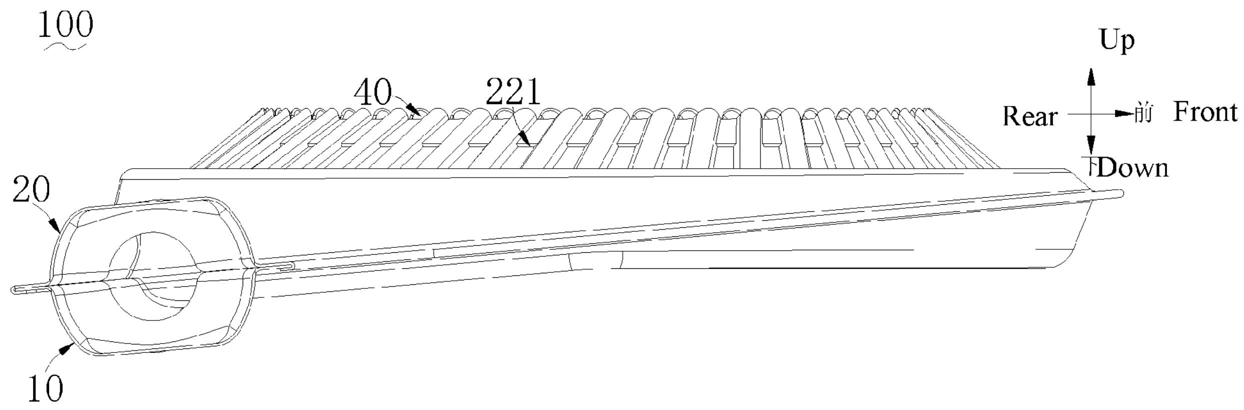
100
40
221
20
10
Up
Rear
前
Front
下
Down

FIG. 1

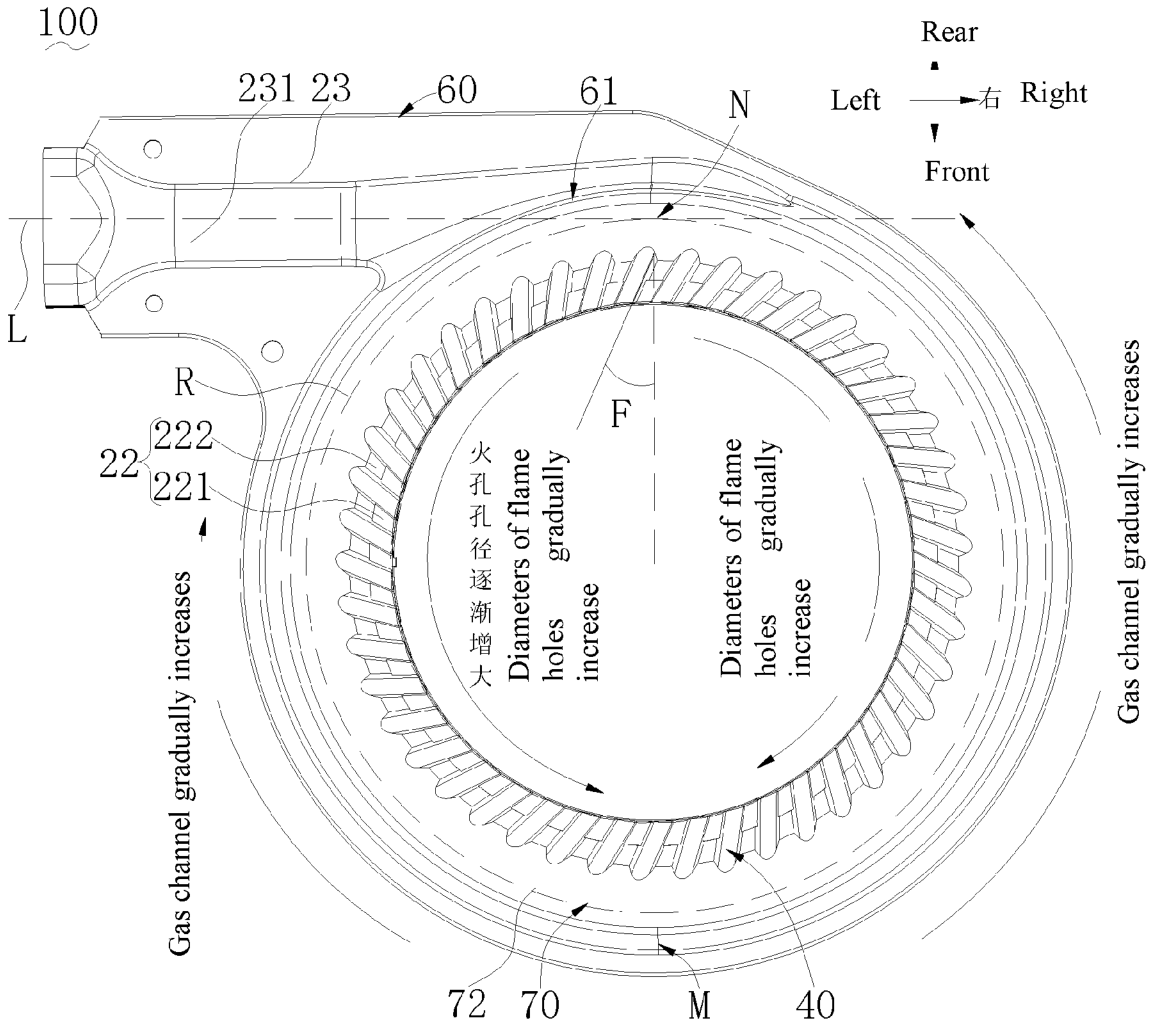
100
231 23
60
61
N
Rear
Left
右
Right
Front
L
R
F
22
222
221
火孔孔径逐渐增大
Diameters of flame holes gradually increase
Diameters of flame holes gradually increase
Gas channel gradually increases
Gas channel gradually increases
72
70
M
40

FIG. 2

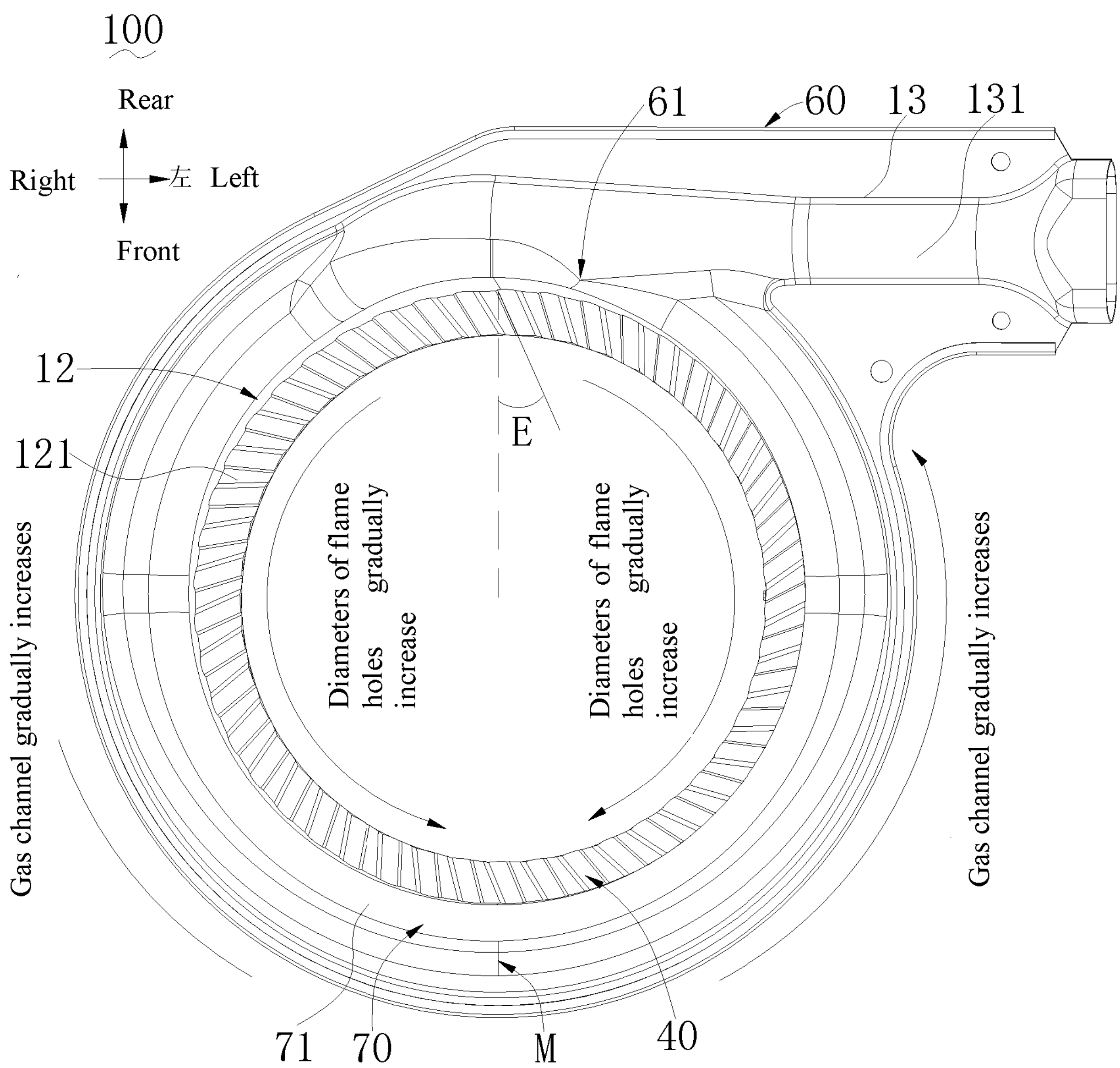
100
Rear
Right
左 Left
Front
61
60
13
131
12
121
E
Diameters of flame holes gradually increase
Diameters of flame holes gradually increase
Gas channel gradually increases
Gas channel gradually increases
71
70
M
40

FIG. 3

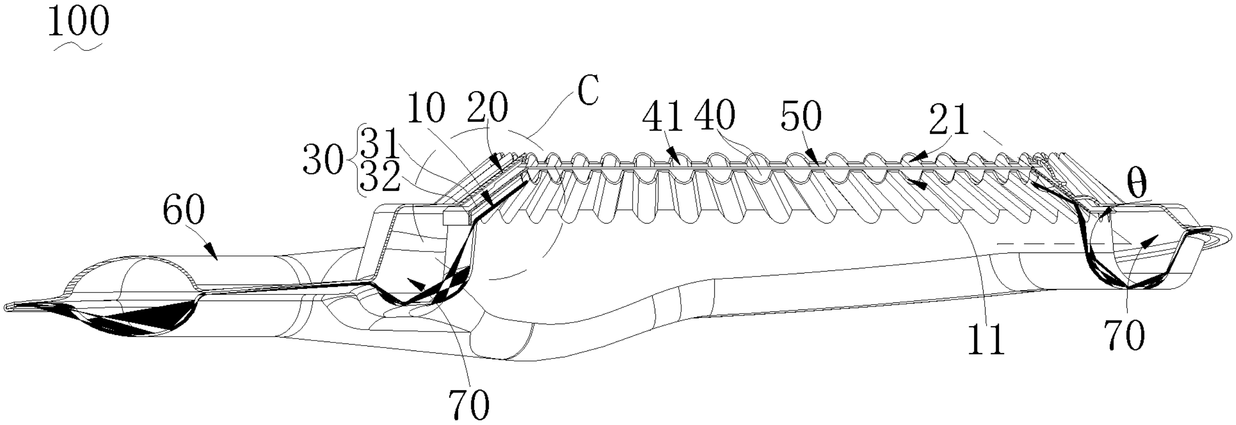
100
C
10
20
41
40
50
21
30
31
32
θ
60
11
70
70

FIG. 4

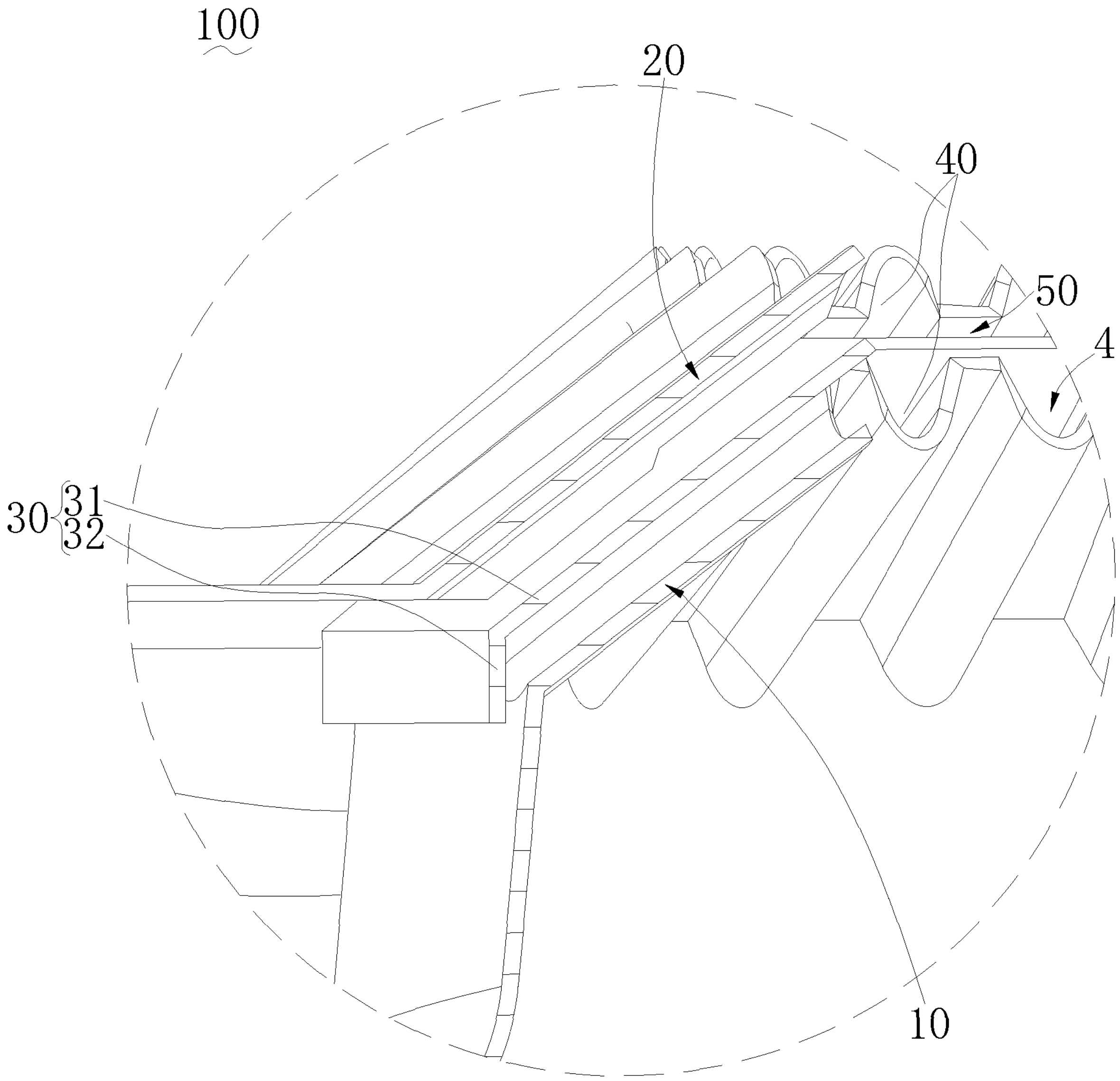
100
20
40
50
41
30
31
32
10

FIG. 5

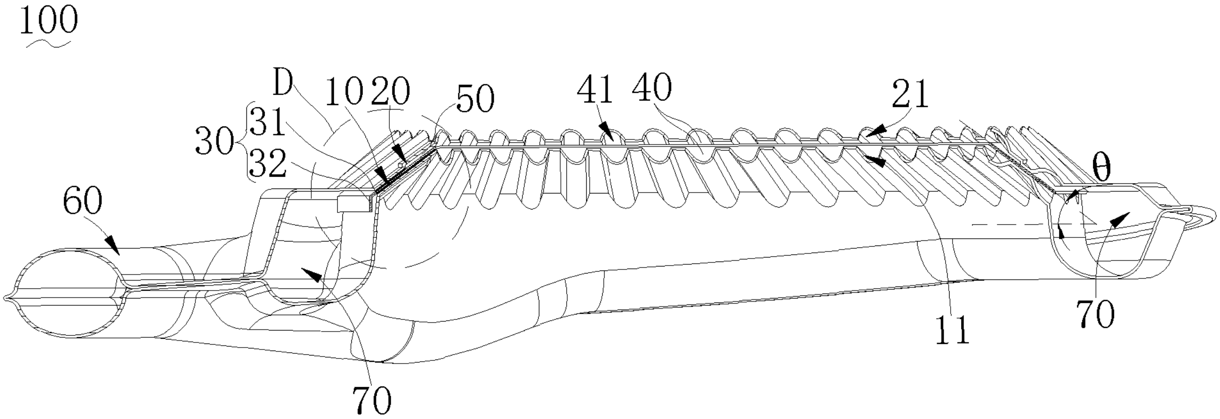
100
D
10
20
50
41
40
21
30
31
32
θ
60
70
11
70

FIG. 6

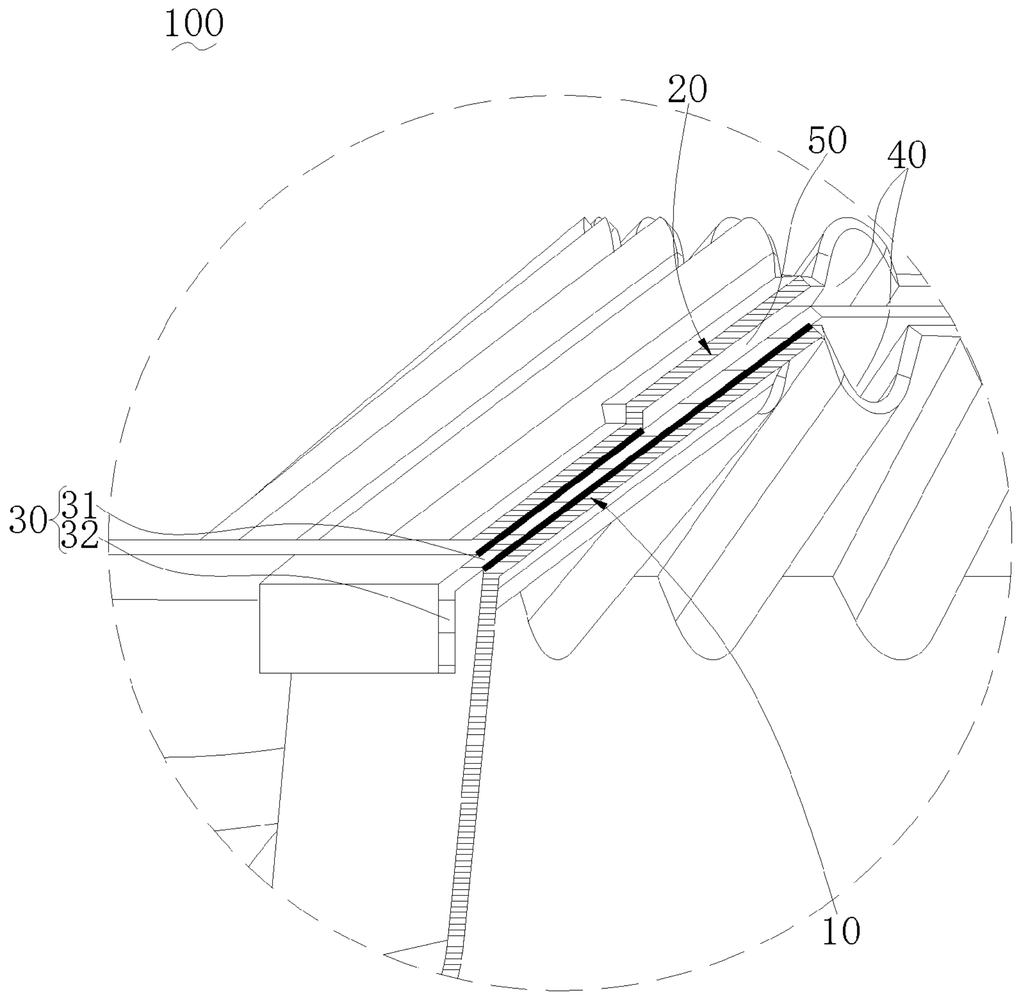

FIG. 7

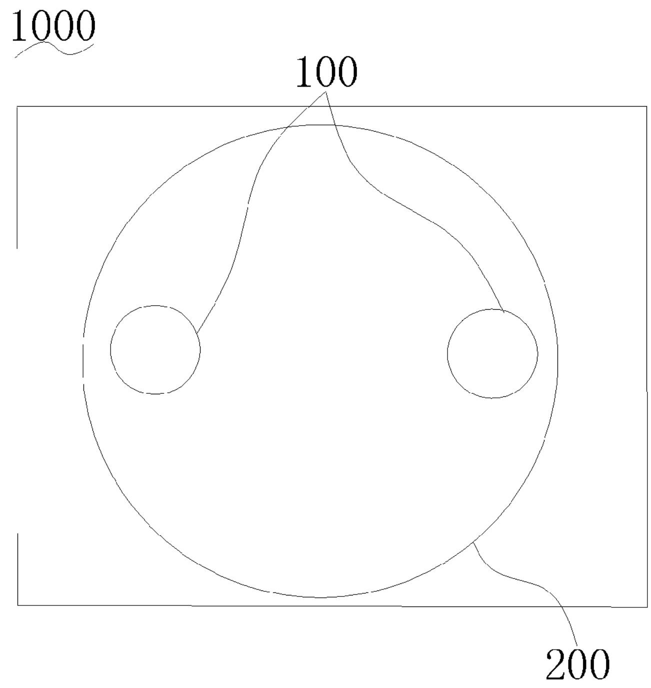

FIG. 8

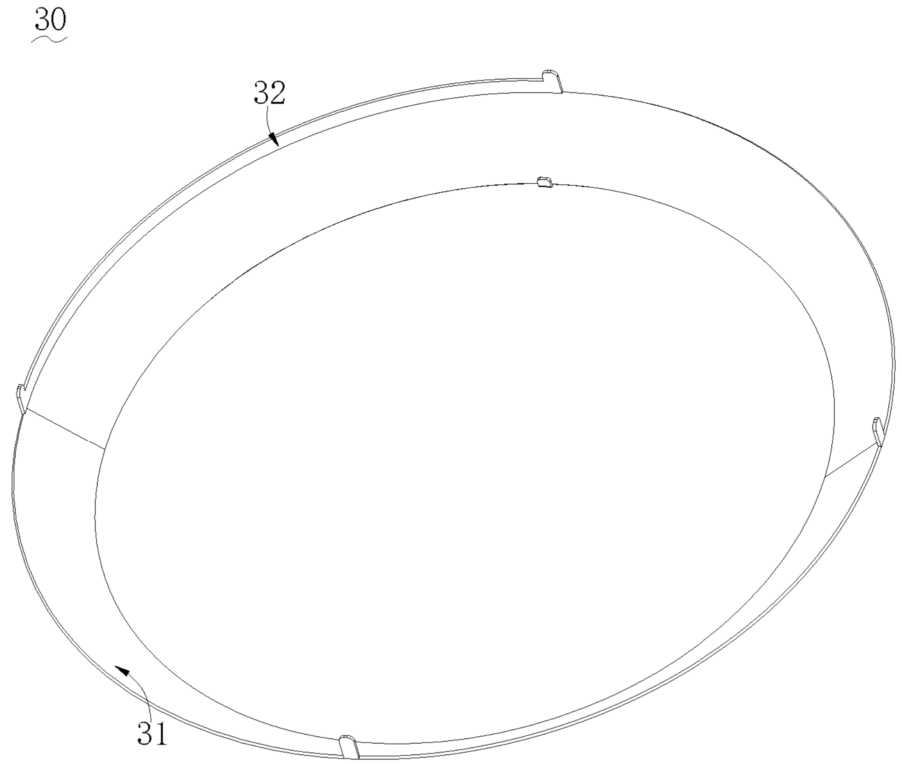
30
32
31

FIG. 9

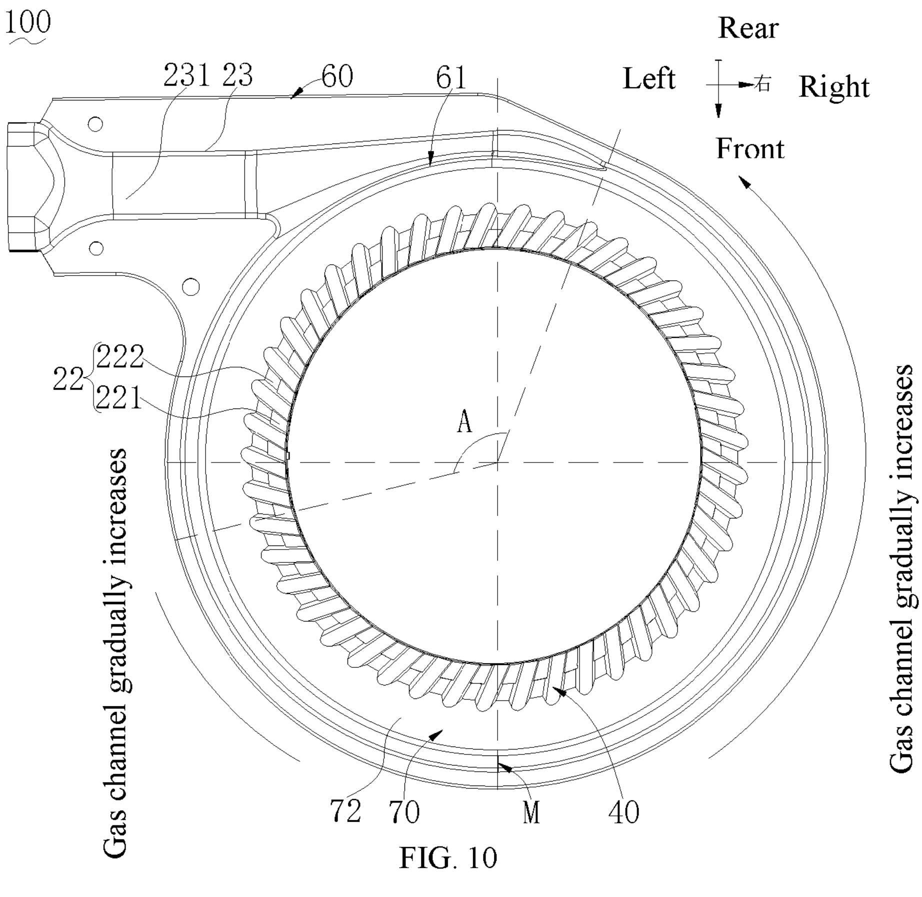
100
Rear
Left
右
Right
Front
231
23
60
61
22
222
221
A
Gas channel gradually increases
Gas channel gradually increases
72
70
M
40

FIG. 10

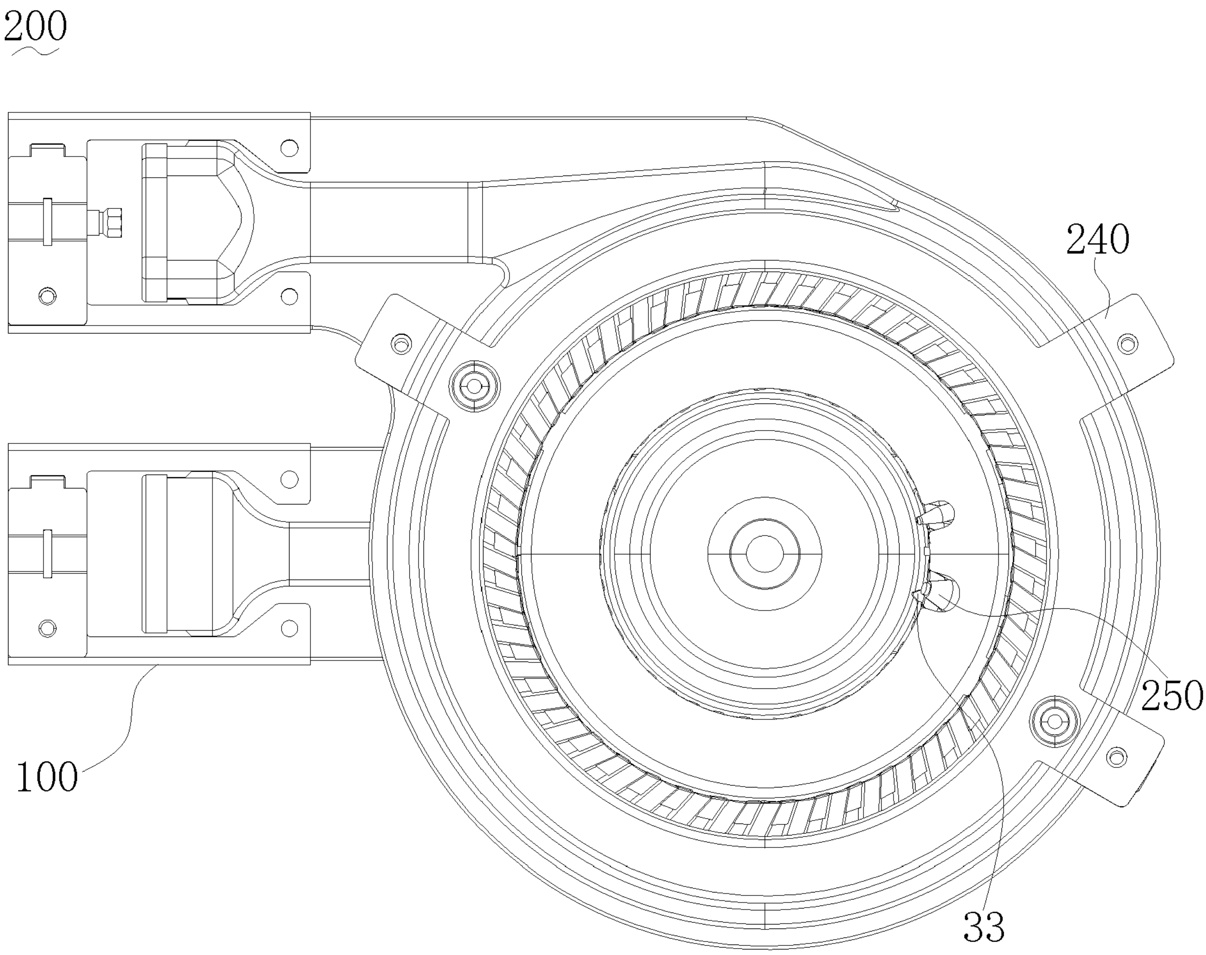

FIG. 11

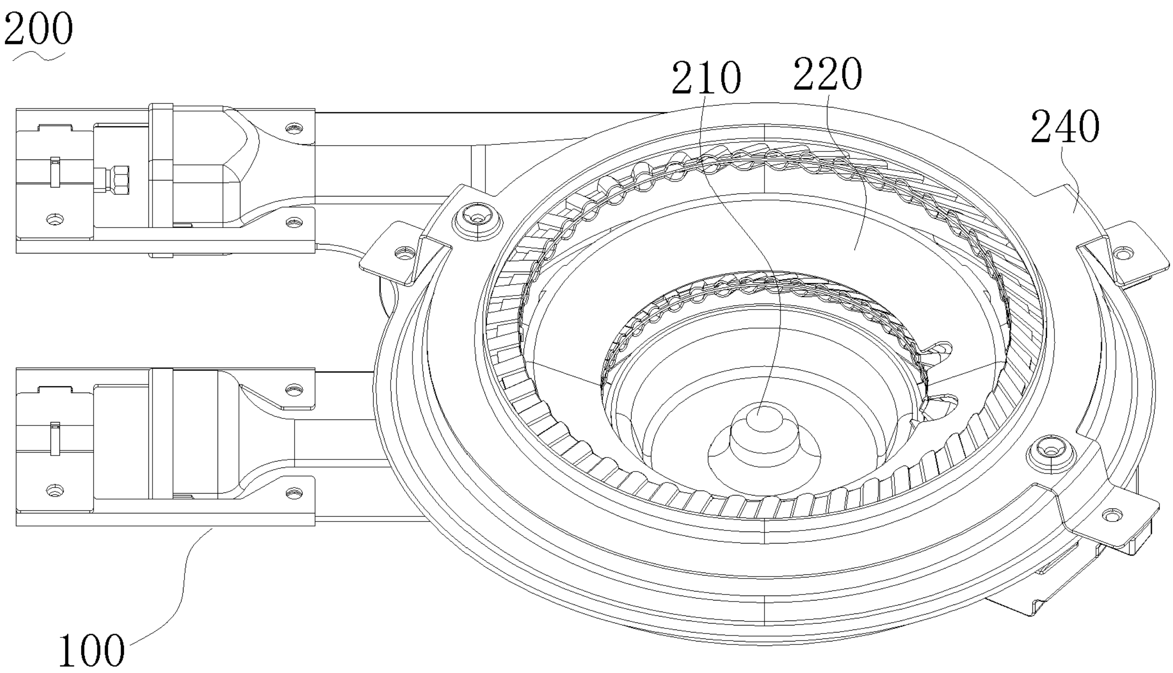

FIG. 12

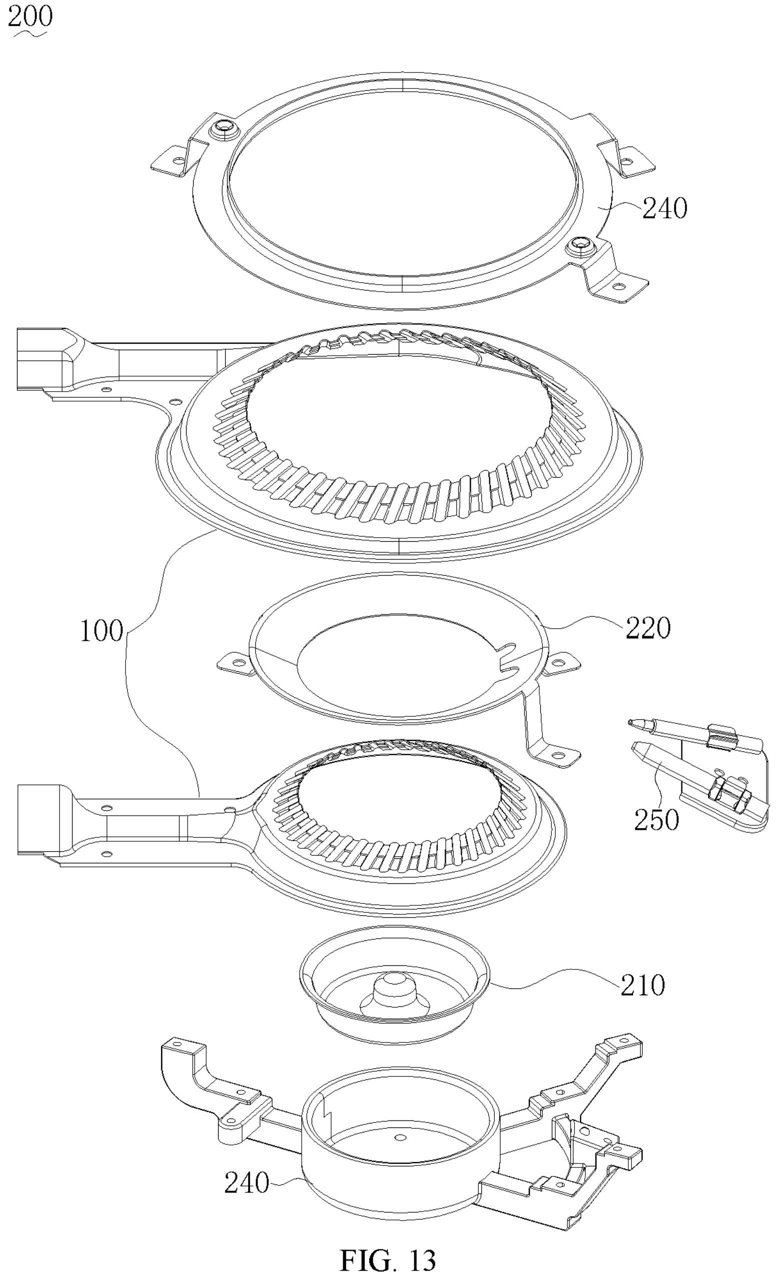

FIG. 13

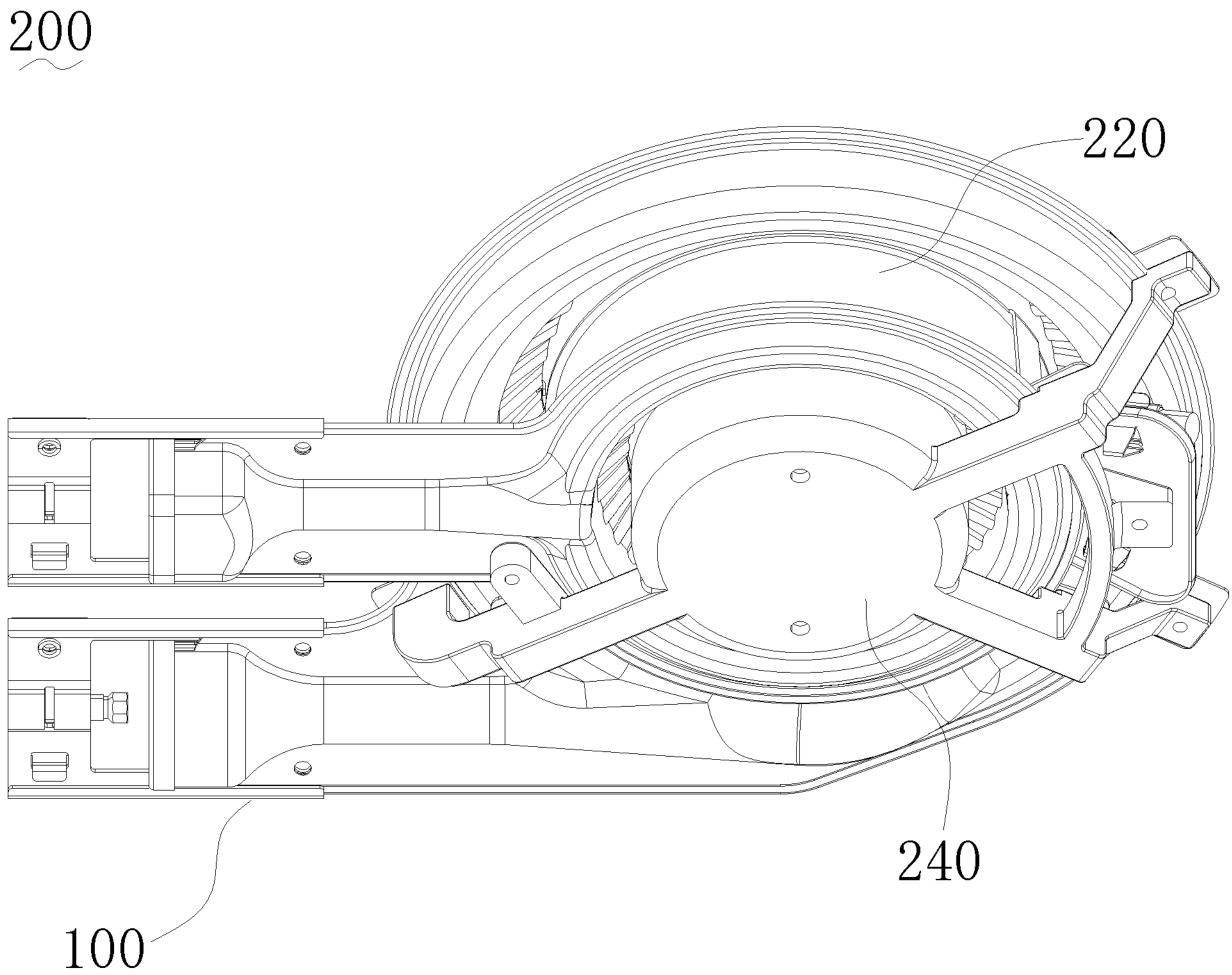

FIG. 14

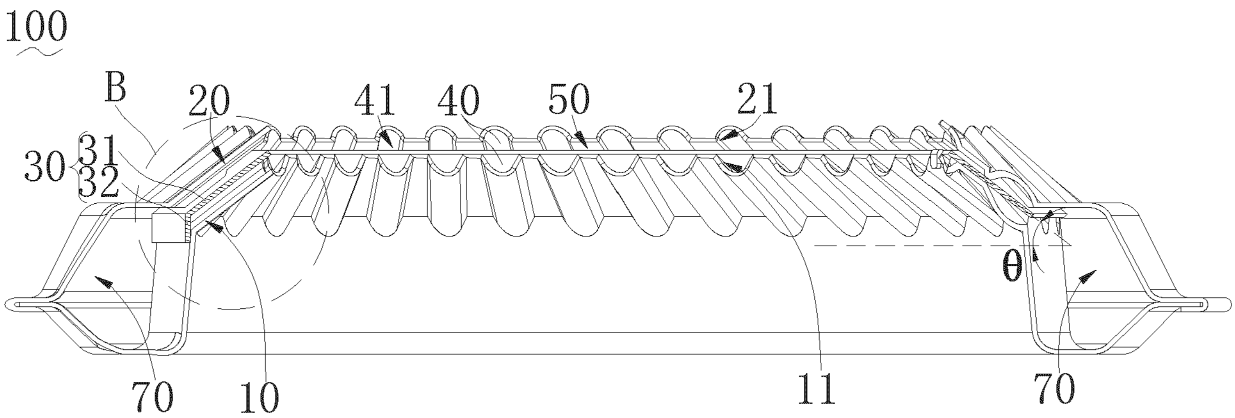

FIG. 15

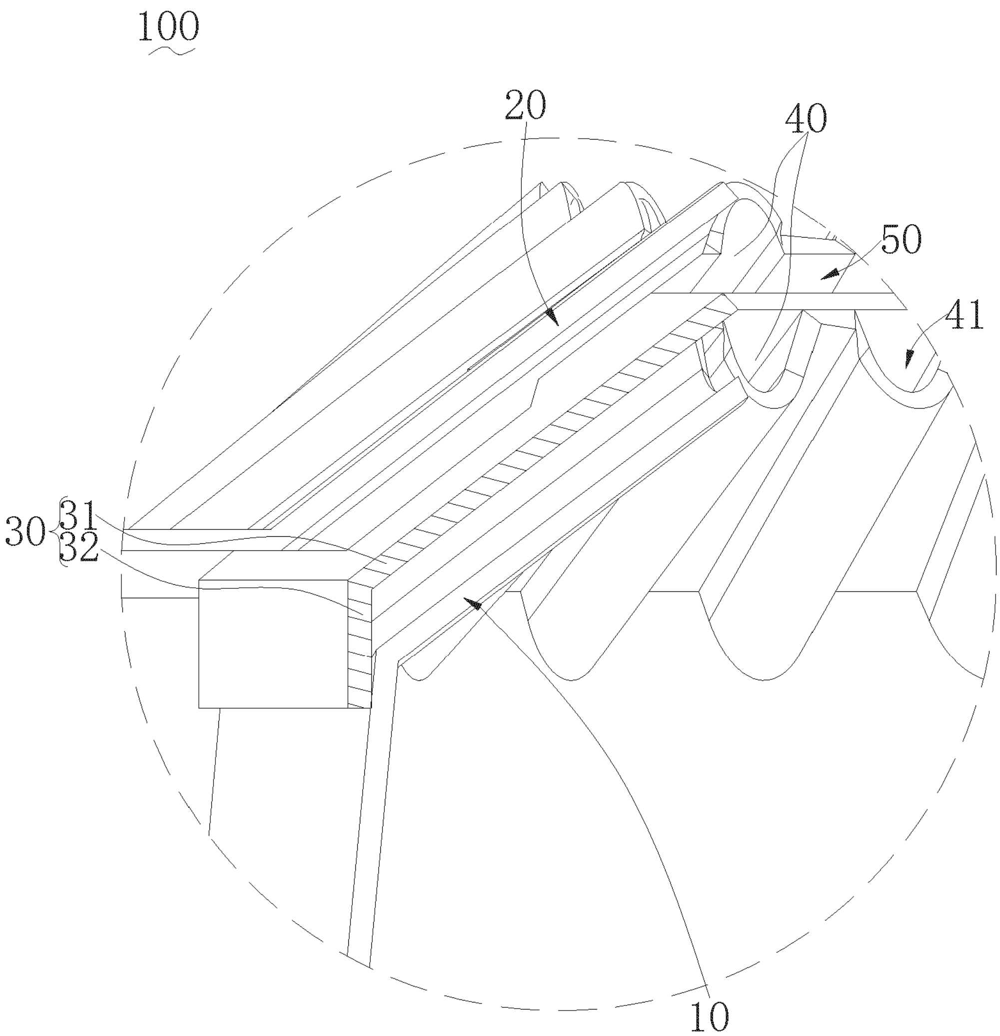

FIG. 16

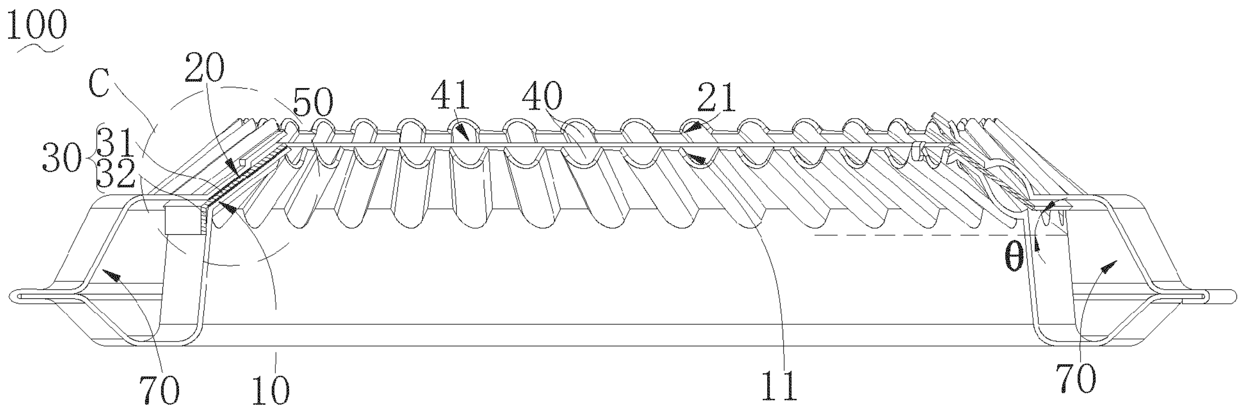

FIG. 17

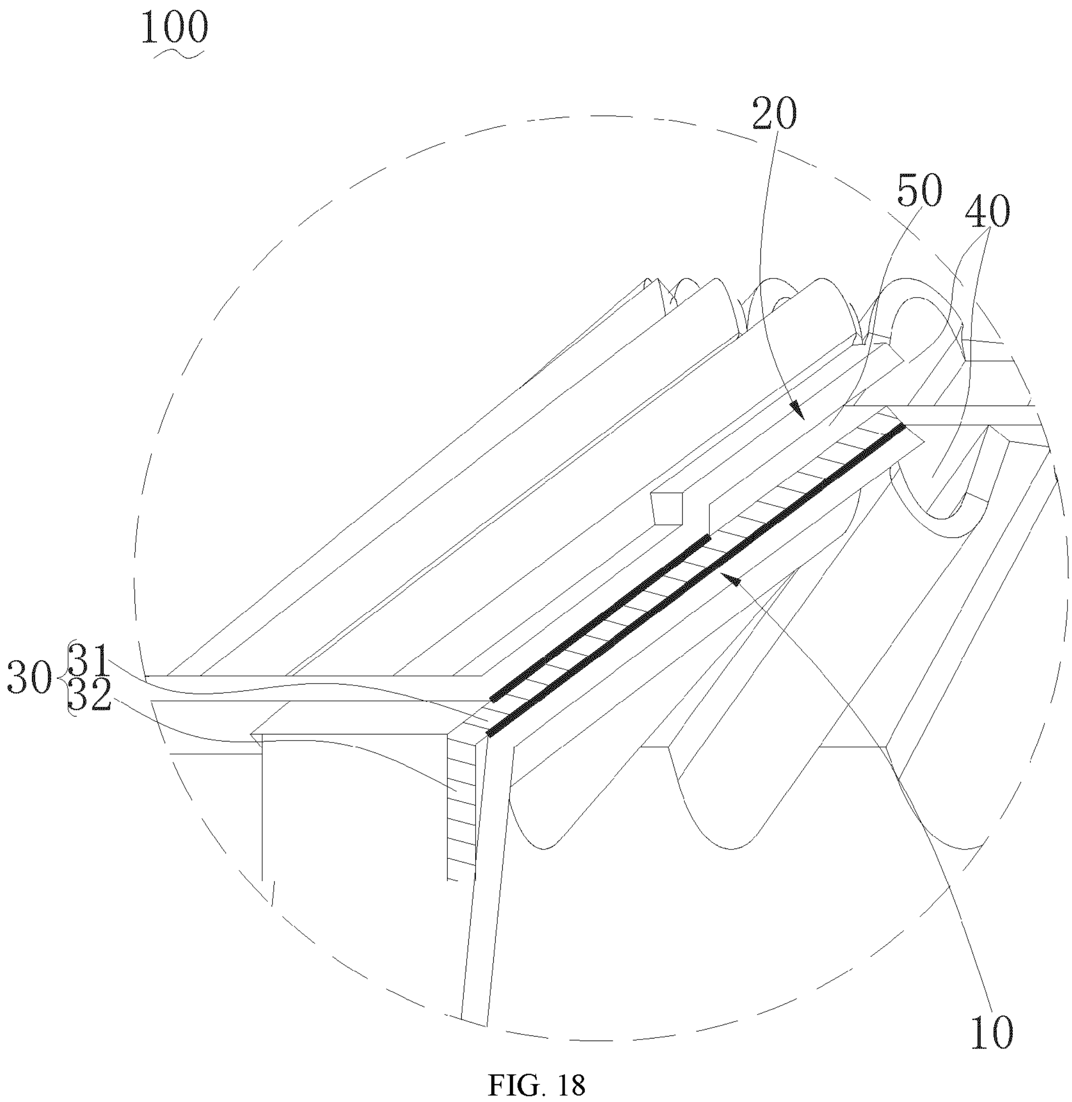

FIG. 18

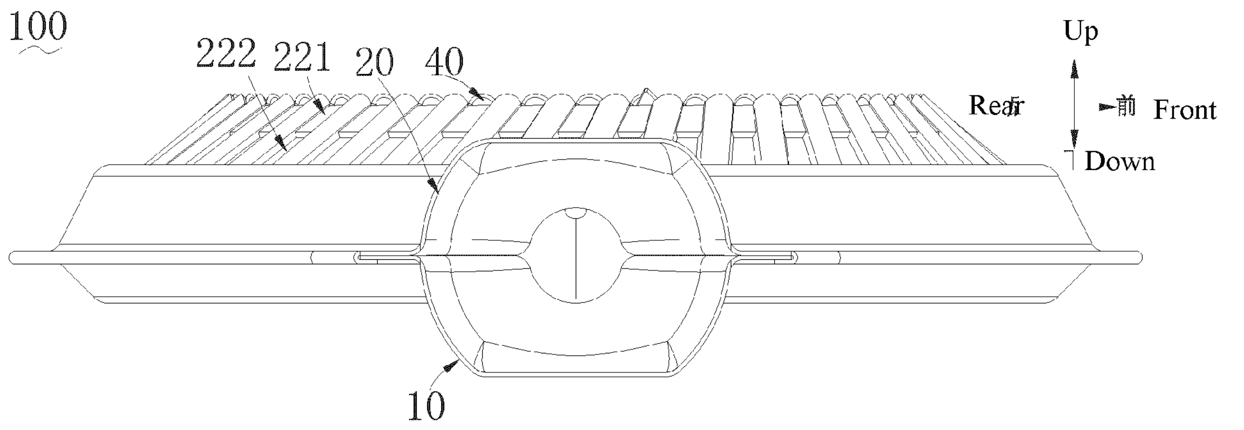
100
222
221
20
40
Up
Rear
Front
Down
10

FIG. 19

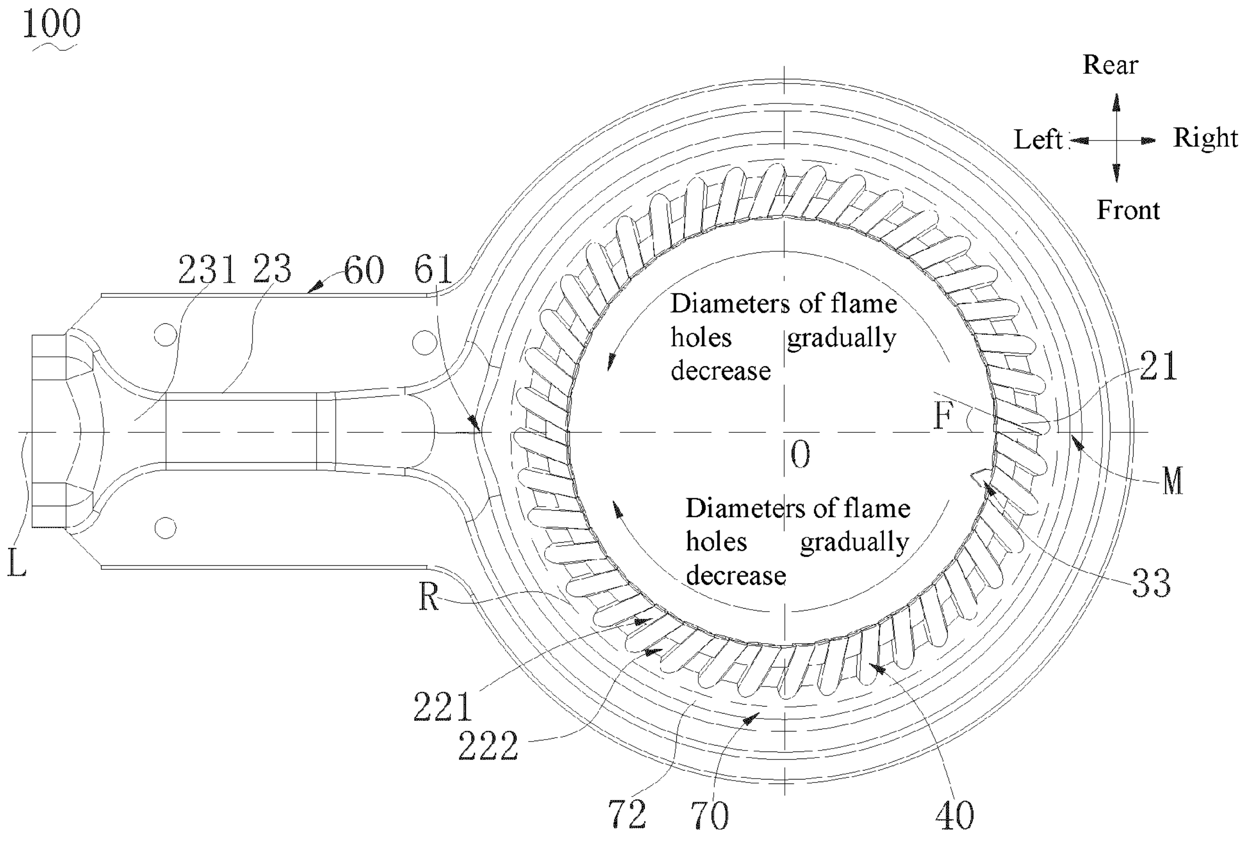
100
Rear
Left
Right
Front
231
23
60
61
Diameters of flame holes gradually decrease
21
F
O
M
Diameters of flame holes gradually decrease
33
L
R
221
222
72
70
40

FIG. 20

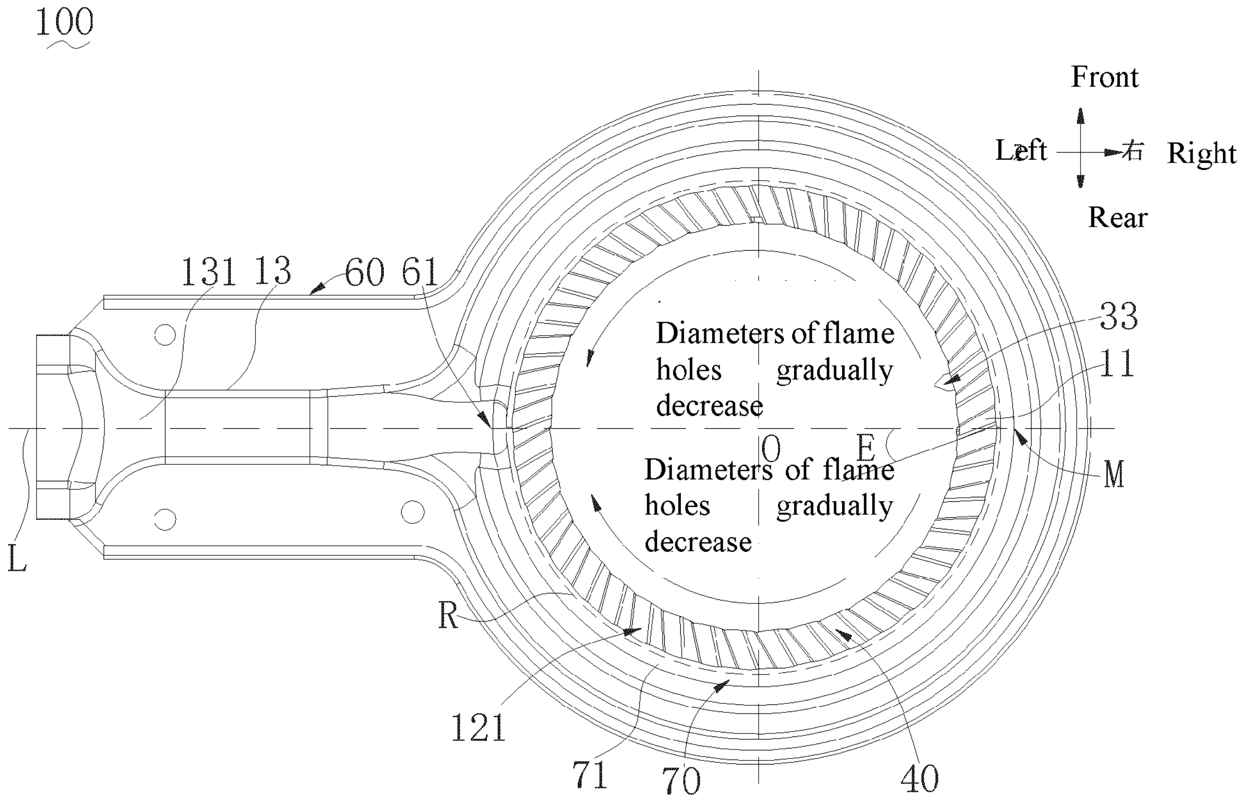
100
Front
Left
右
Right
Rear
131 13 60 61
33
11
Diameters of flame holes gradually decrease
O
E
M
Diameters of flame holes gradually decrease
L
R
121
71
70
40

FIG. 21

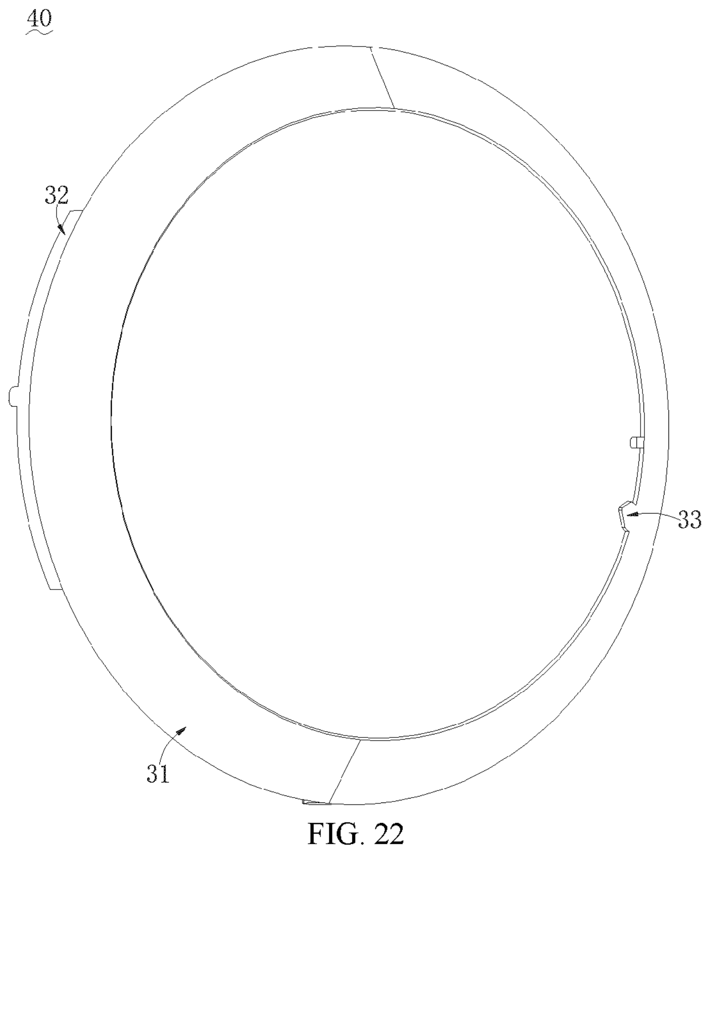
40
32
33
31

FIG. 22

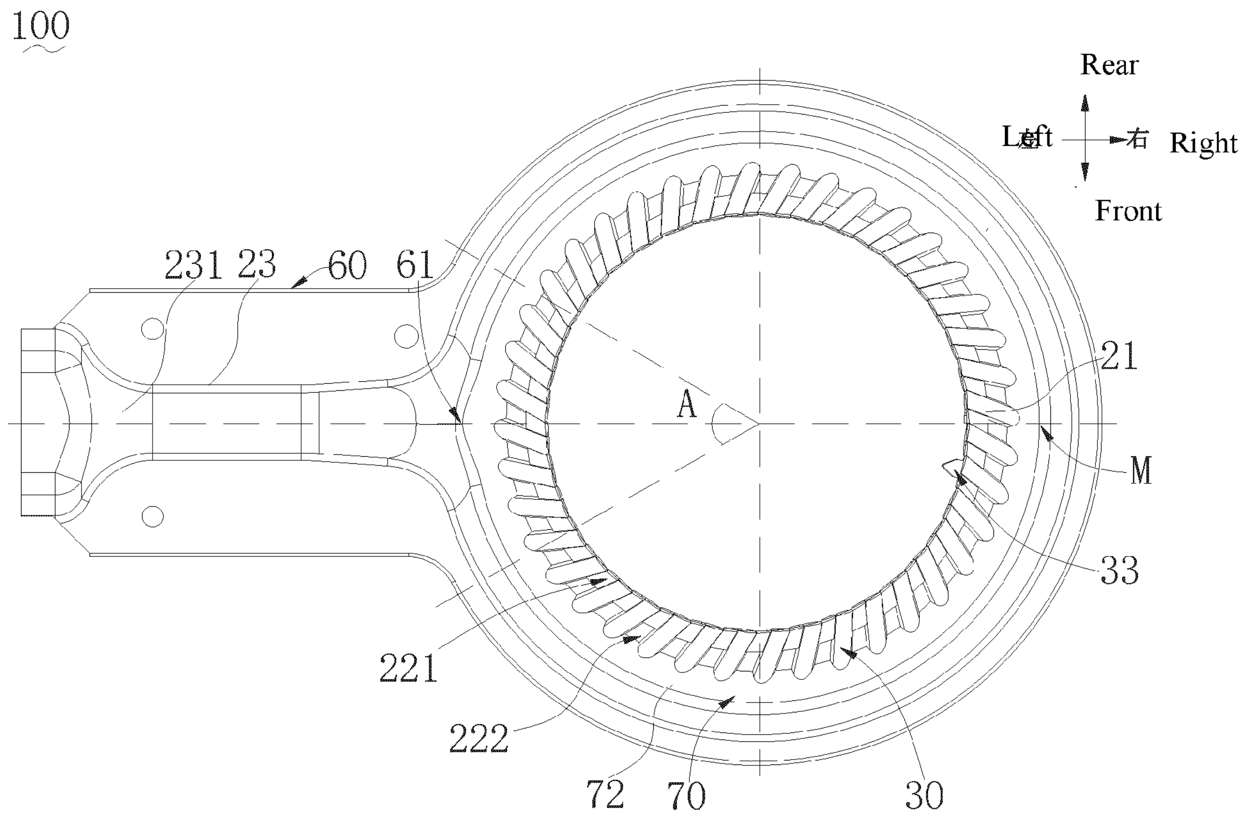
100
Rear
Left
左
右
Right
Front
231
23
60
61
21
A
M
33
221
222
72
70
30

FIG. 23

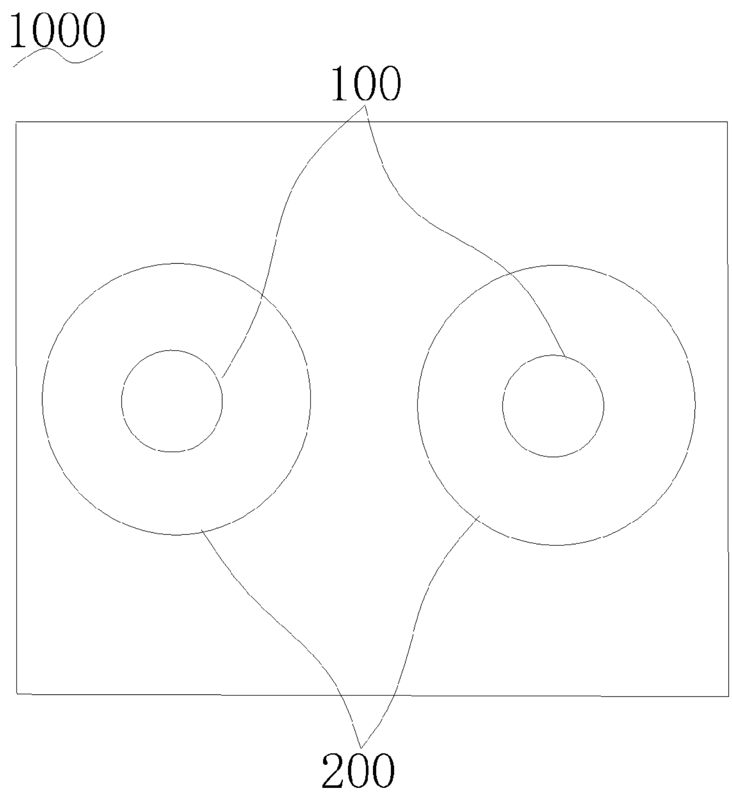
1000
100
200

FIG. 24

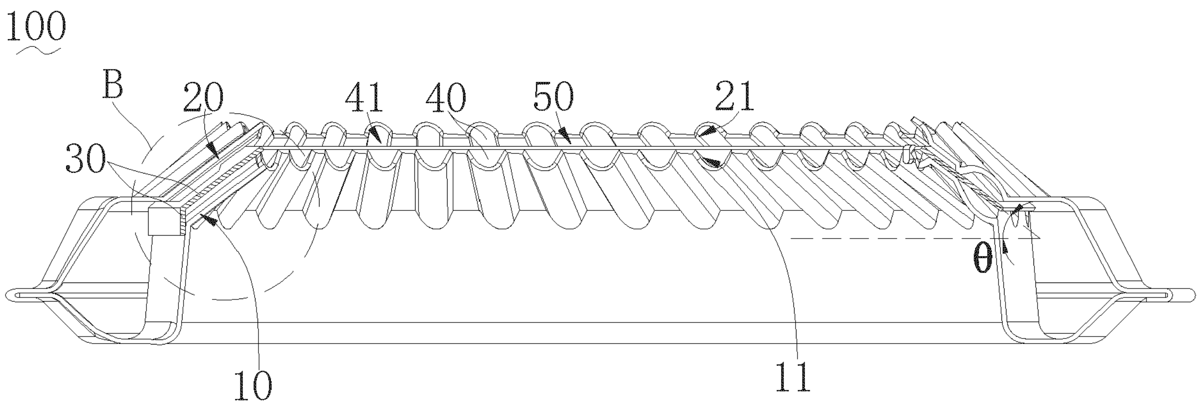

FIG. 25

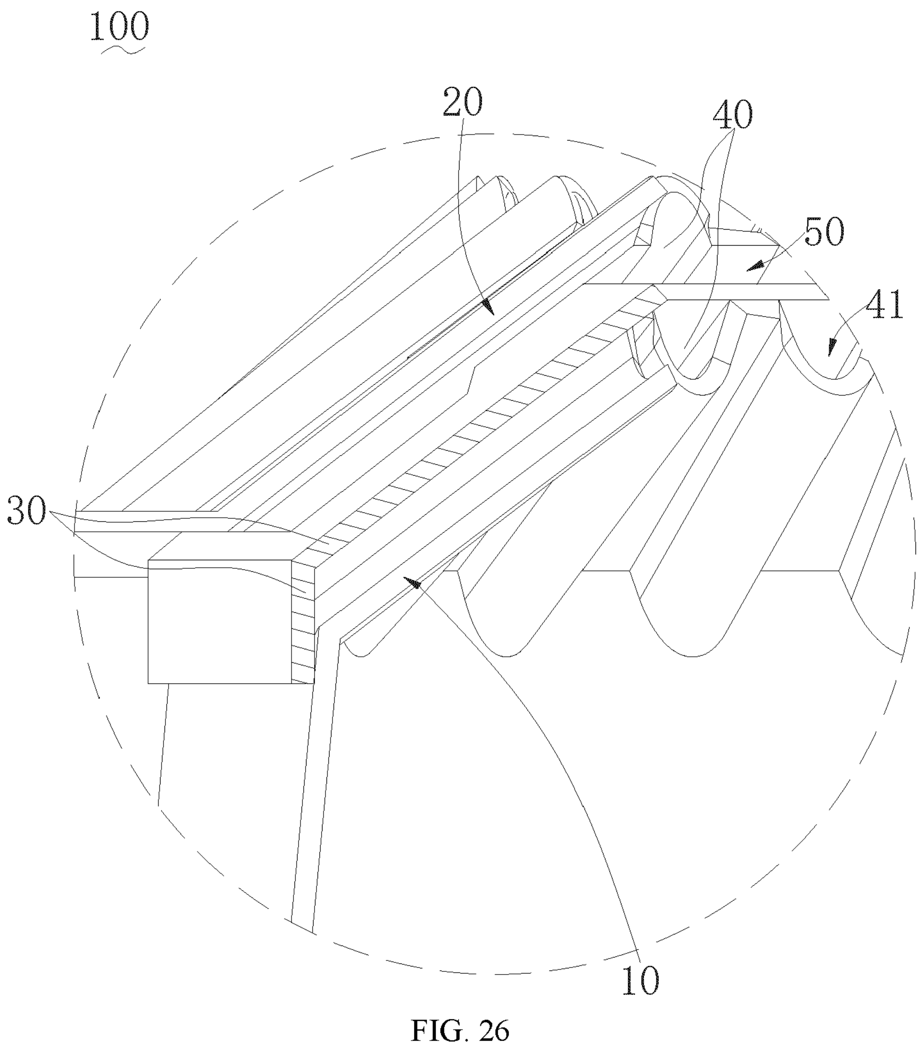

FIG. 26

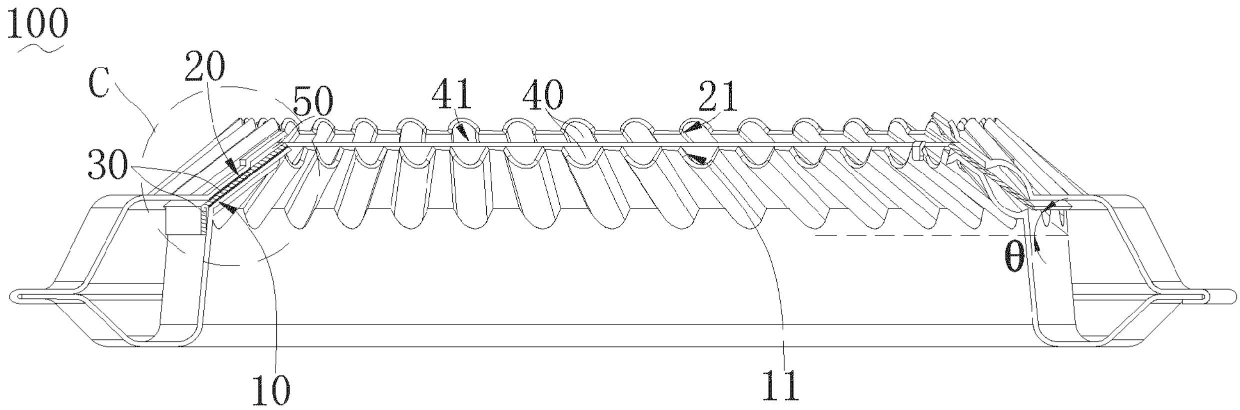

FIG. 27

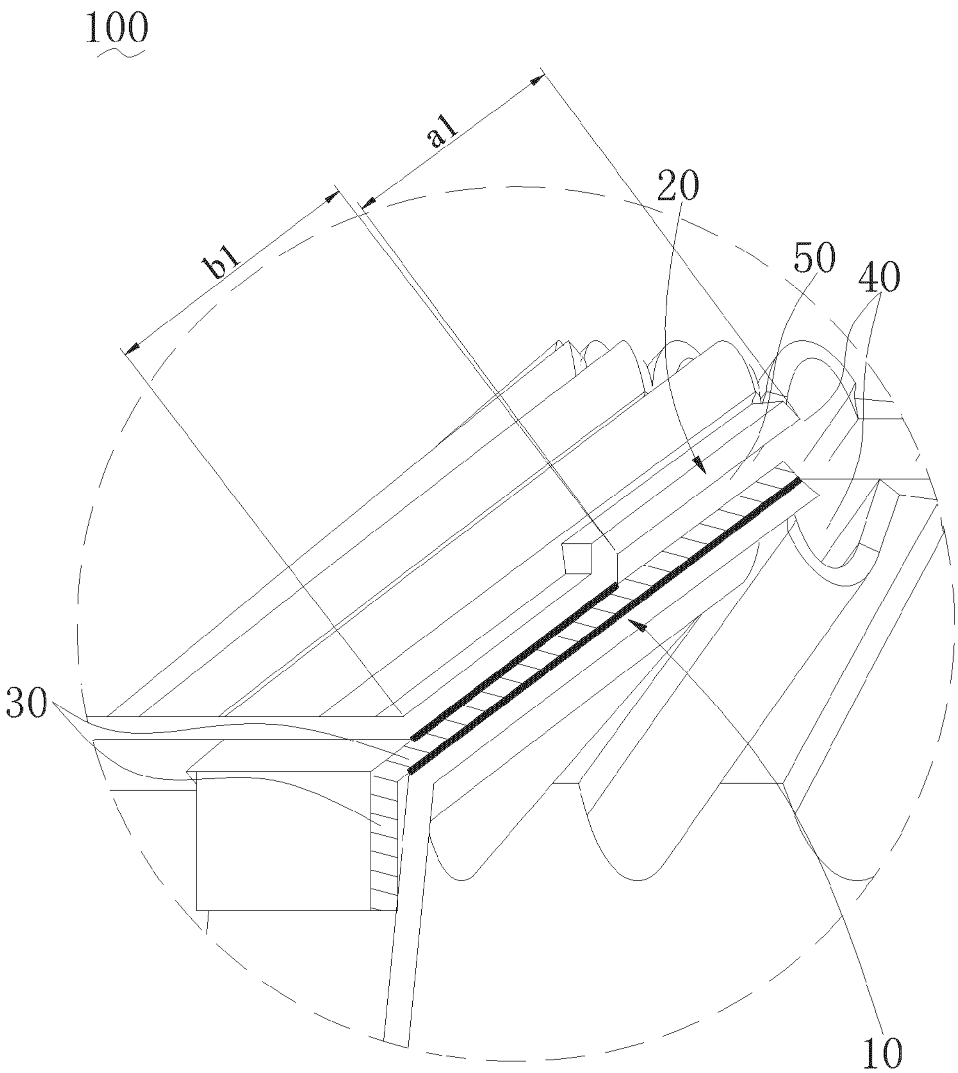

FIG. 28

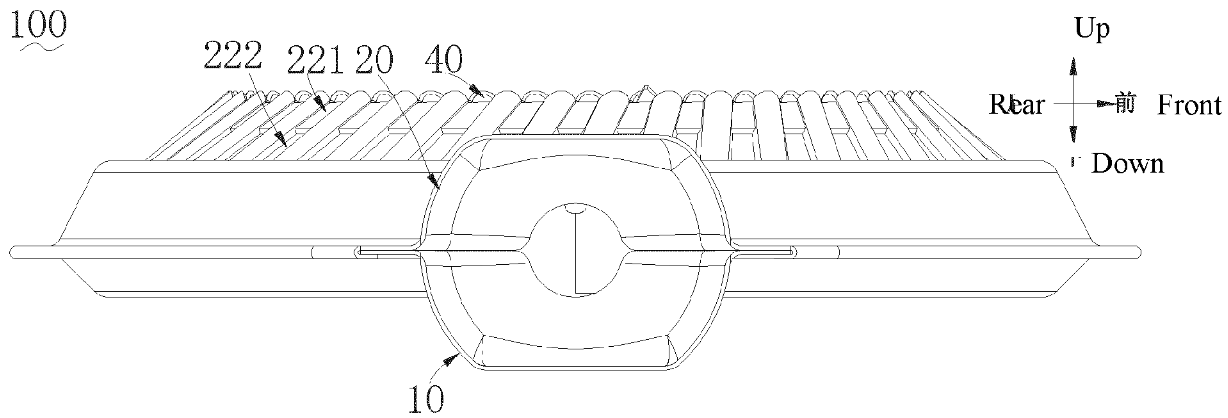
100
222
221
20
40
Up
Rear
前
Front
Down
10

FIG. 29

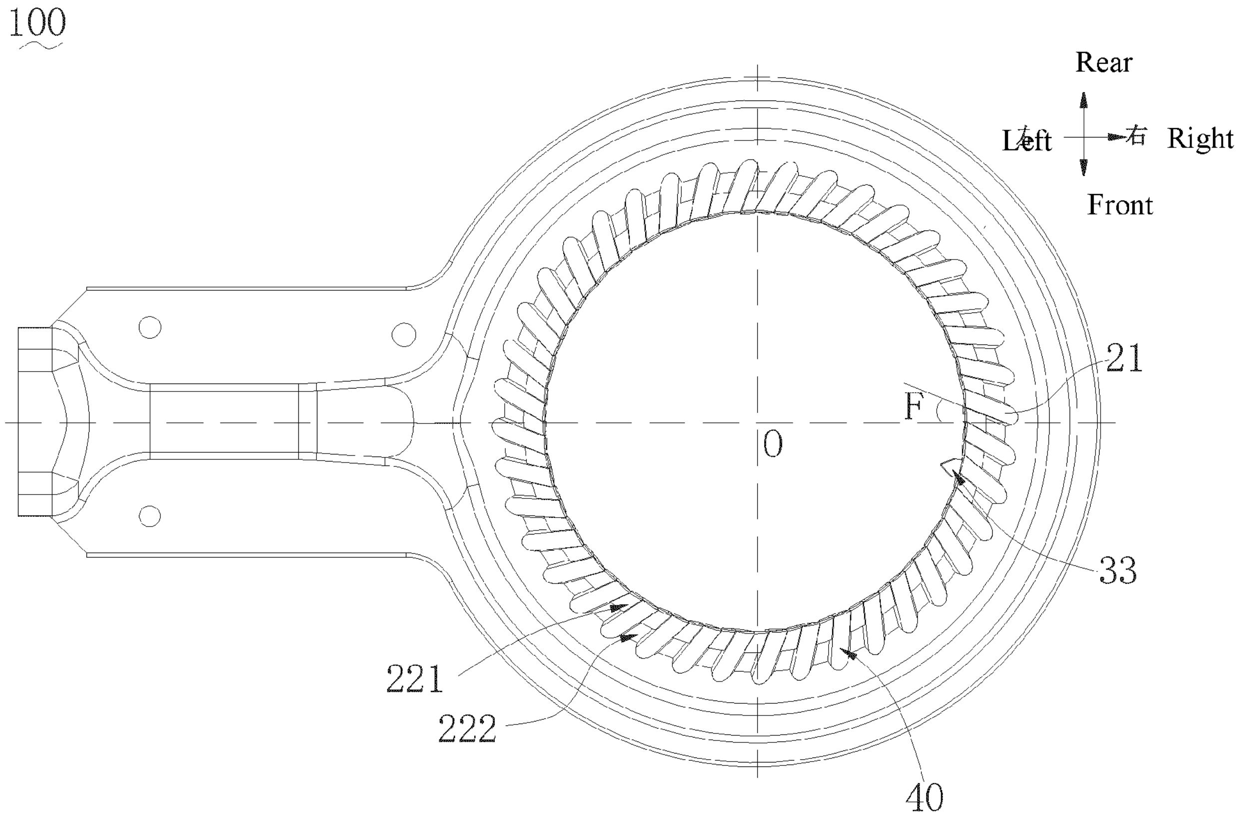
100
Rear
Left
右
Right
Front
21
F
O
33
221
222
40

FIG. 30

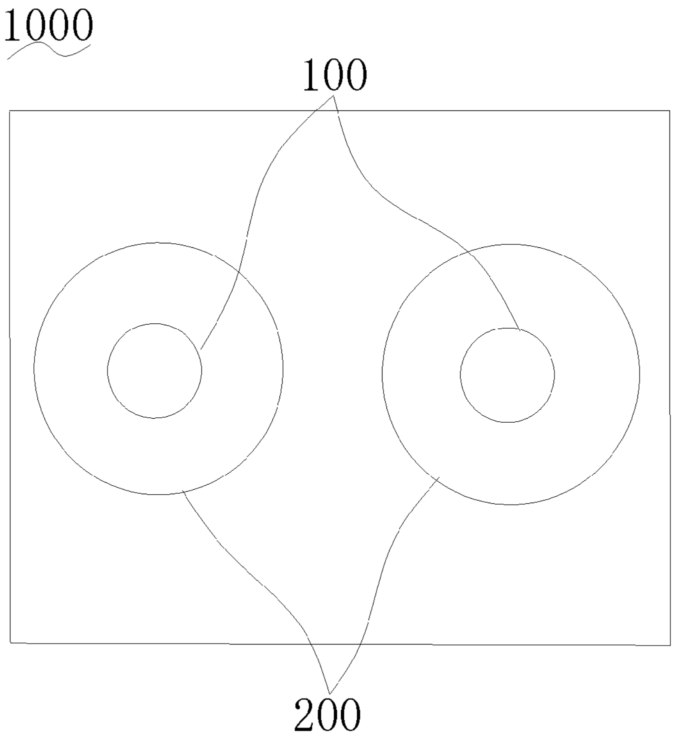

FIG. 31

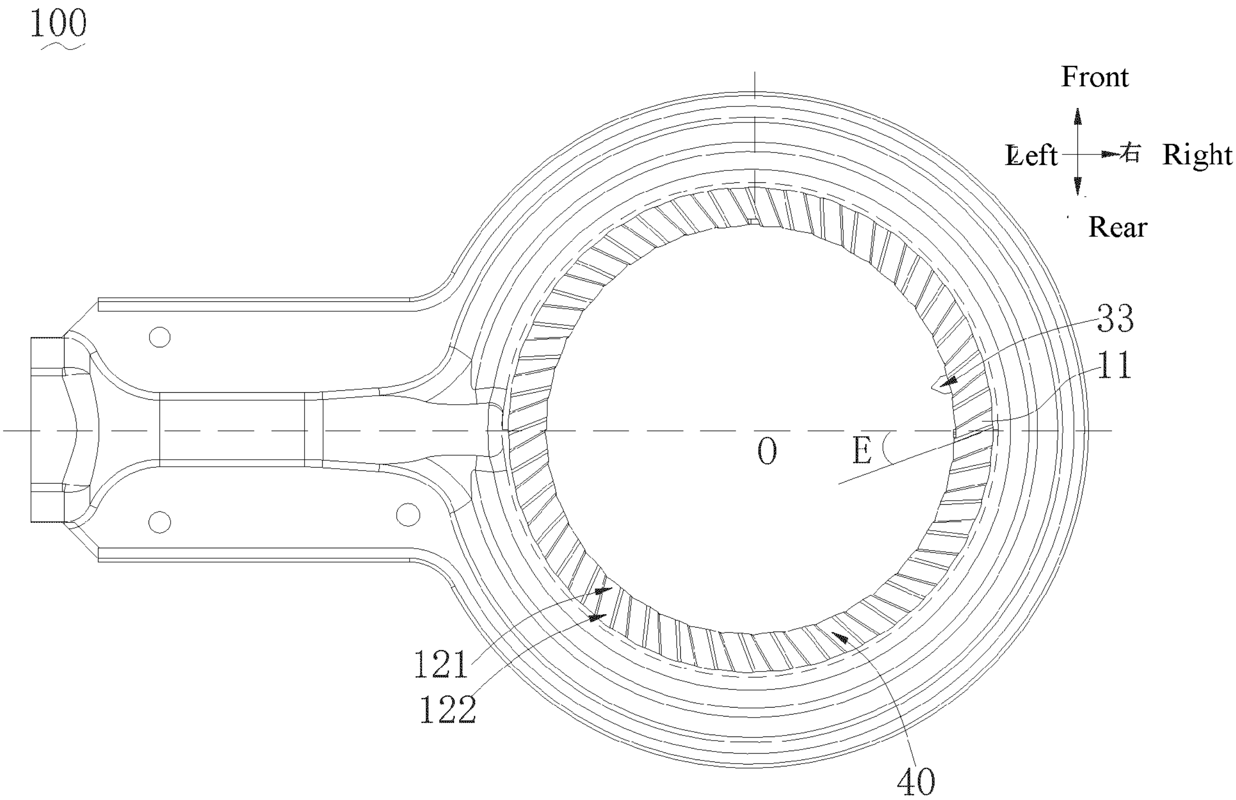

FIG. 32

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EUROPEAN SEARCH REPORT

Application Number
EP 24 19 5699

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	GB 1 491 221 A (TI DOMESTIC APPLIANCES LTD) 9 November 1977 (1977-11-09) * page 1, line 10; figures 1-6 * * page 1, line 76 - page 2, line 16 * * page 2, line 56 - line 81 * -----	1,2,6-8, 12,13,15 3-5, 9-11,14	INV. F23D14/06 F23D14/58
X,P	CN 220 541 087 U (WUHU MIDEA INTELLIGENT KITCHEN APPLIANCE MFG CO LTD) 27 February 2024 (2024-02-27) * the whole document * -----	1-15	

TECHNICAL FIELDS SEARCHED (IPC)
F23D

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	17 January 2025	Hauck, Gunther

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17-01-2025

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1491221 A	09-11-1977	AU 7770175 A	29-07-1976
		GB 1491221 A	09-11-1977
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82