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(54) **GAS BURNER HEAD**

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(57) **ABSTRACT**

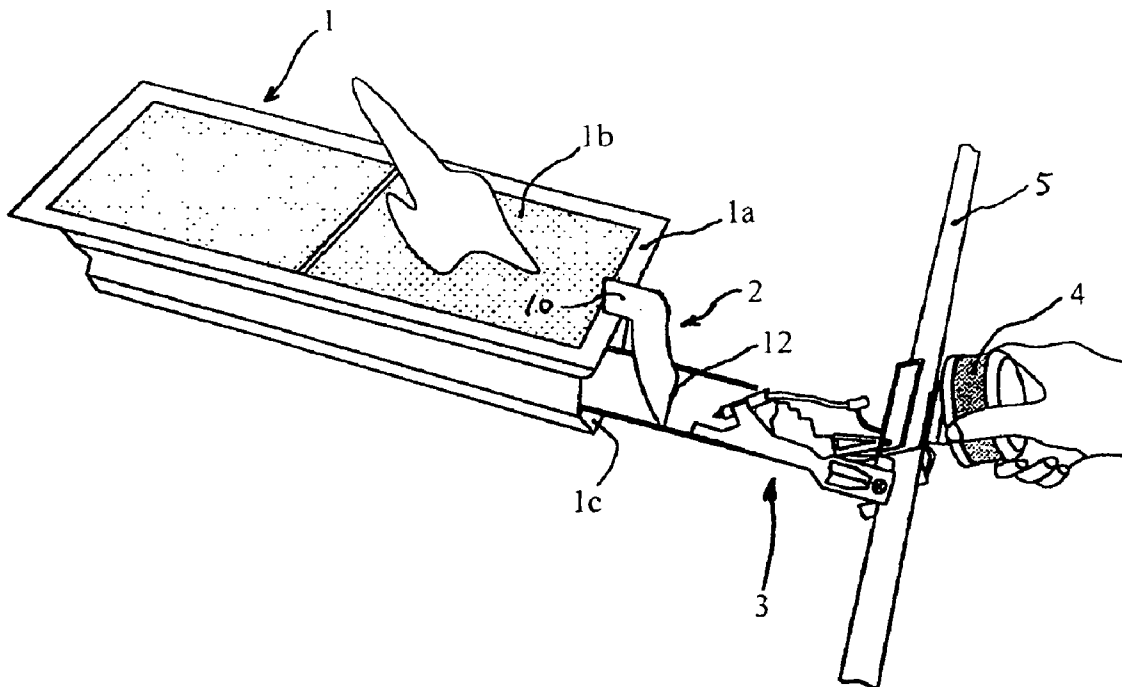
A gas burner head assembly characterized by a flame-leading pipe strategically positioned between a burning plate and an igniter to provide a climbing path for the flame. The igniter is a part of a standard gas oven and has a fixed height. The burning plate rests on top of a housing that confines a gas-air mixing chamber. The upper open end of the flame-leading pipe is secured on an upper rim of a peripheral wall of the housing. The lower open end of the flame-leading pipe is aligned to the igniter and the main gas nozzle of a valve module mounted on the oven body. By leading the ignited flame to climb from a lower level located by the igniter to a higher level positioned by the burning plate, the gas burner head effectively eliminates the undesirable ignition obstruction while accommodating the standard gas oven valve assembly and igniter.

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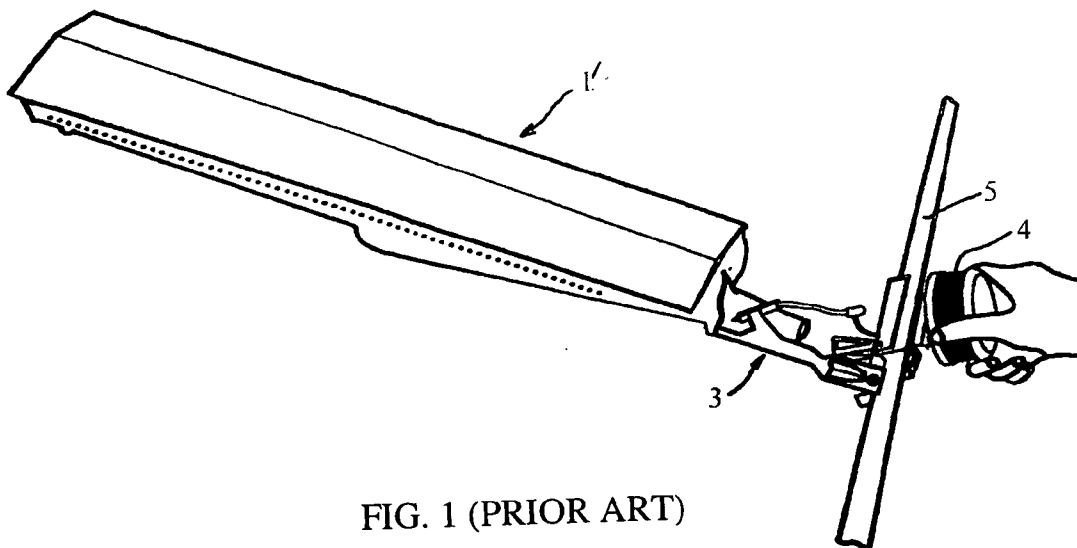


FIG. 1 (PRIOR ART)

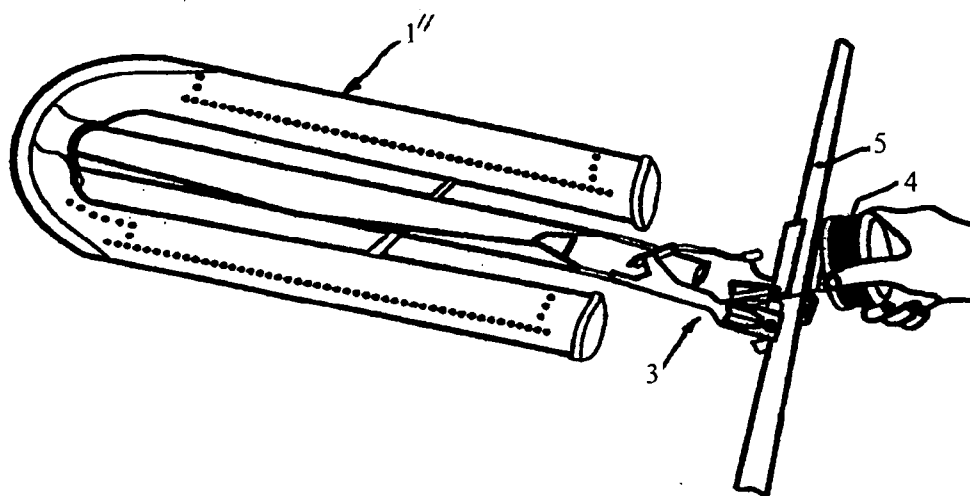


FIG. 2 (PRIOR ART)

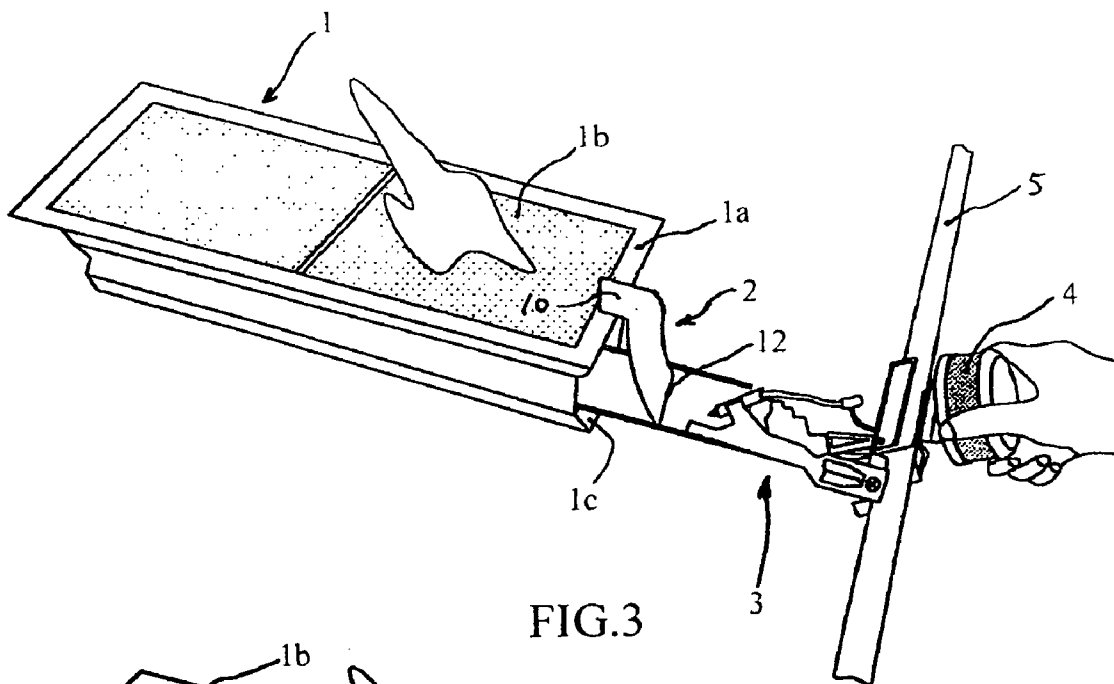


FIG. 3

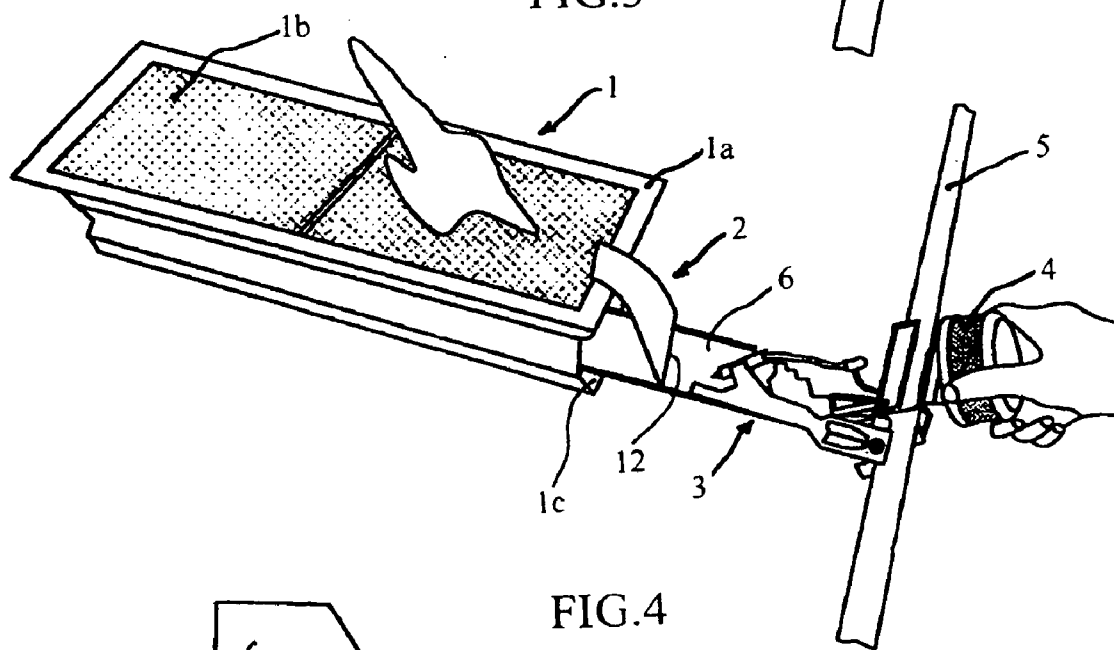


FIG. 4

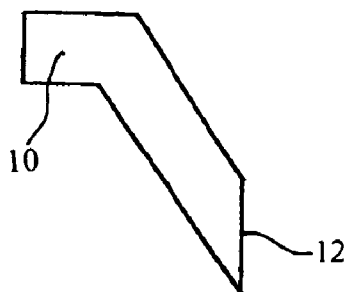


FIG. 5

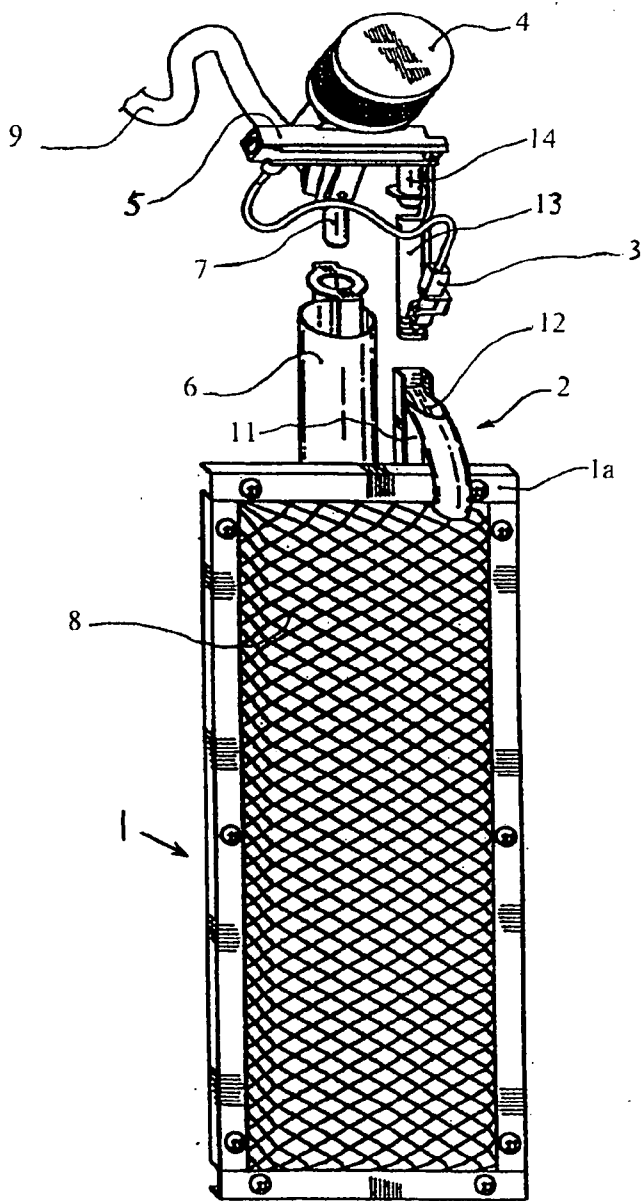


FIG. 6

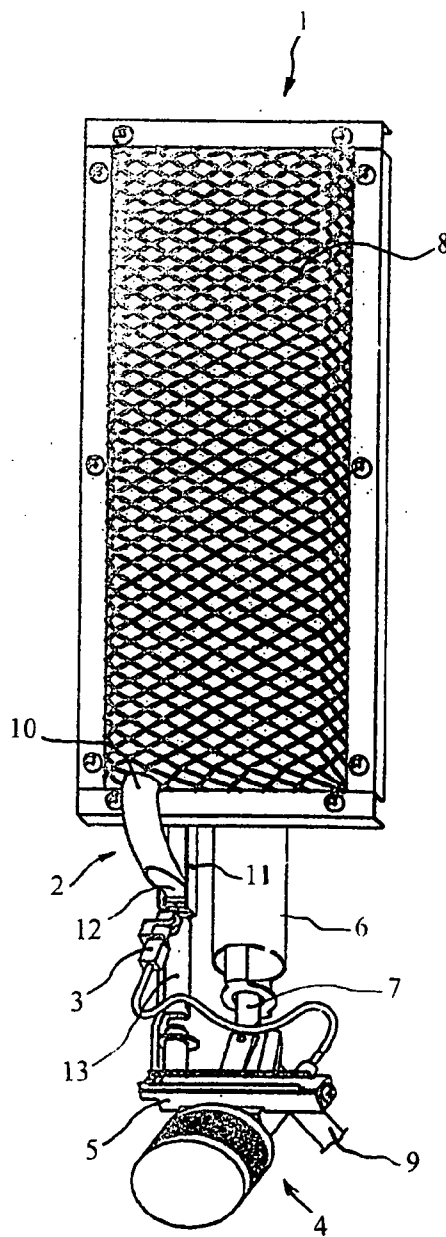


FIG. 7

GAS BURNER HEAD

FIELD OF THE INVENTION

[0001] The present invention relates generally to a gas powered burning apparatus and more particularly to a multi-function cooking and broiling gas powered burner.

BACKGROUND OF THE INVENTION

[0002] Multi-use gas ovens are highly desirable for general purpose cooking, baking, and broiling foodstuff. Unfortunately, standard gas ovens are often limited to serving basic cooking needs and do not provide desirable features such as broiling. A possible way to expand or upgrade a standard gas oven's functionality is to exchange, replace, or retrofit the gas burner head. However, currently there lacks an easy, practical, and viable solution to the problem.

[0003] In conventional gas ovens, the igniter and gas injector nozzle disposed on a standard valve has a fixed height. On the other hand, existing gas burner heads generate different heights of burning surface level. The poor height match between the burning surface level and the level located by the igniter would obstruct the ignition of the burner, or cause poor flame flare-ups on the upper surface of the burning plate. This height mismatch is a serious obstacle.

[0004] Clearly, there is a continuing need in the art for a new gas burner head that overcomes the height mismatch obstacle and eliminates the obstruction of ignition, thereby fulfilling the desire that a standard gas burner can functionally provide multiple usages suitable for a variety of cooking applications. The present invention addresses this need.

SUMMARY OF THE INVENTION

[0005] The present invention provides a burner head assembly that can replace the burner head in a standard gas oven. By leading the ignited flame from a lower level located by the igniter to climb to a higher level positioned by the burning plate, the gas burner head of the present invention solves the aforementioned ignition obstruction problem caused by the height mismatch.

[0006] As a gas fired broiling burner assembly, the burner head is preferably of the infrared type. It burns a combustible mixture of propane or natural gas and air as an energy source. The gas burner head has its level of burning surface higher than the level positioned by a conventional tubing type burner head. A flame-leading pipe is strategically positioned between the top surface of the burning plate of the burner head and the igniter of the burner to provide a climbing path for the flame.

[0007] The burner head of the present invention includes a housing confining a chamber to accommodate the gas-air mixture. Preferably, the housing has a rectangular shape with its top end completely opened for accommodating a burning plate rested thereon. In an embodiment, the burning plate is formed from a ceramic material and has a plurality of penetrating burner holes. A metal screen cover is secured on the top surface of the burner head over the burning plate. A gas mixing tube is secured on and penetrating to a vertical wall of the housing. The tube serves as a communication passage of the gas-air mixture between the chamber of the gas burner head and the gas supply pipe through a gas injection nozzle of a valve module or assembly mounted on the oven body.

[0008] The present invention is characterized by a flame-leading pipe having its upper open end secured on an upper rim of a peripheral wall of the housing. The flame-leading pipe is higher than the upper surface of the burning plate. The upper open end of the flame-leading pipe is secured by welding or with a ring shaped fastener. The other, lower open end of the flame-leading pipe is aligned to the main gas nozzle of the valve module. Preferably, the gas burner head has a brace, bracket, or holder for supporting or securing the lower open end of the flame-leading pipe. In an embodiment, the brace is securely attached to the bottom surface or other suitable vertical wall of the housing.

[0009] The flame-leading pipe serves as a communication passage between the chamber accommodating the gas-air mixture and a gas injector disposed on the valve module of the oven body. Preferably, the flame-leading pipe has an outwardly curved shape. In some embodiments, it has a horizontal section for facilitating the secure contact and attachment to the burner head. In some embodiments, the main part of the flame-leading pipe is straight. The flame-leading pipe can have a curved, arc, or angular shape.

[0010] The configuration and shape of the flame-leading pipe may vary, so long as it effectively leads the flame to climb from the lower place, where the igniter is located, upward to the upper end of the pipe, which is located at a level slightly higher than the burning surface. The flame injected from the upper end of the flame-leading pipe first ignites the flame, making it flaring up on the upper surface of the burning plate around the area adjacent to the opening of the upper end of the pipe. The ignited flame then gradually spreads out to almost the whole area of the burning surface. The gas flaring-up takes place on the upper surface, and arouses the combustible gas filled in the chamber of the burner head housing and under the burning plate. The gas is drawn out upwardly and positively effects the igniting and spreading of the flame on the burning surface of the gas burner head.

[0011] The present invention advantageously eliminates the ignition obstruction caused by height mismatch between a standard gas oven with a fixed igniter and different types of burner heads, especially the infrared burner heads. An important advantage of the present invention is that the elimination of the ignition obstruction is achieved without changing the arrangement, positions, or construction of other standard gas oven components such as the valve assembly and the igniter. The valves, igniters, and gas nozzles are standardized products having a fixed ignition height and fixed position with respect to the body of the burner. Consumers are generally prohibited from changing and modifying these components.

[0012] The gas burner head according to the present invention is compatible with most standard gas ovens and broilers and can be easily installed without hassles. Once installed, the gas burner head enables a user of a standard gas oven to conveniently switch between different uses without having to take the oven apart.

[0013] Other objects, features and advantages of the present invention will become apparent to those skilled in the art upon reading and understanding the detailed description disclosed herein with reference to the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of a conventional gas burner head.

[0015] FIG. 2 is a perspective view of another conventional gas burner head.

[0016] FIG. 3 is a perspective view of an embodiment of the gas burner head according to the present invention.

[0017] FIG. 4 is a perspective view of another embodiment of the gas burner head according to the present invention.

[0018] FIG. 5 is a side view the flame-leading pipe according to an embodiment of the present invention.

[0019] FIG. 6 is a top view of a new gas burner head prior to being installed onto the body of a gas burner according to an embodiment of the present invention.

[0020] FIG. 7 is a top view of a new gas burner head installed onto the body of a gas burner according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0021] FIG. 1 and FIG. 2 are two exemplary conventional gas burner heads 1' and 1". The burning surfaces are at a level that is almost equal to the level positioned by the igniter and gas nozzle 3 disposed on a valve module 4, which is mounted on the oven body 5. The igniter assembly and the valve assembly are standardized products uniformly produced by manufacturers. These tubing-type conventional burner heads 1' and 1" are only suitable for standard gas burners.

[0022] FIG. 3 and FIG. 4 show two exemplary embodiments of a gas burner head 1 according to the present invention. The burner head assembly 1 can readily replace the conventional burner head and accommodate the height difference between the burning surface and the igniter in standard gas ovens, achieving the goal of enabling a standard type gas oven to have multiple uses. A standard type gas oven installed with the gas burner head assembly 1 can be easily and conveniently switched from a general-purpose oven to a special broiler, especially an infrared broiler. The present invention also provides a selection of different burning strengths. A different height of the burning head can produce a different burning strength.

[0023] Referring to FIGS. 3-7, an infrared type gas burner head 1 burns a combustible mixture of propane or natural gas and air as an energy source. The burner head 1 includes a housing confining a chamber to accommodate the gas-air mixture. The housing preferably has a rectangular shape with its top surface open to receive a burning plate 1b for performing radiation and emission of heat. In some embodiments, the burning plate 1b is formed from a ceramic material and has a plurality of penetrating burner holes. In an embodiment, the burning plate 1b is a ceramic disc.

[0024] A heat-proof mesh material such as the metal screen 8 covers the top surface of the housing. A gas mixing pipe 6 facing a gas injection nozzle 7 is secured on and penetrating to a vertical wall 1c of the housing 1. The mixing pipe 6 serves as a communication passage of a gas-air mixture between the chamber of the gas burner head 1 and the gas supply pipe 9 through the gas injection nozzle 7. The

gas injection nozzle 7 is a part of the valve assembly 4 mounted on the oven body 5.

[0025] A flame-leading pipe 2 is securely attached, at its upper open end, to an upper rim 1a of the peripheral wall 1c. In some embodiments, such as one shown in FIG. 3, the upper end has a horizontally straight portion 10 and is higher than the top surface of the burning plate 1b. In some embodiments, the upper end is attached to the upper rim 1a by welding. Alternatively, it is attached with a fastener such as a ring shaped fastener.

[0026] The opening of the lower end 12 of the flame-leading pipe 2 aligns with the passage 13 of the gas stream of the injector 14. The lower end 12 preferably has an outwardly curved shape. The flame-leading pipe 2 serves as a communication between the chamber (confined in the housing 1) accommodating the gas-air mixture and the gas injection path 13.

[0027] Preferably, the burner head has a brace 11 that is secured on the bottom or other suitable vertical wall 1c of the housing 1 for providing resting or securing of the lower open end 12 of the flame leading pipe 2. The brace 11 is preferred but not indispensable, because the horizontal section 10 of the flame-leading pipe 2 provides sufficient contact, support and secure attachment to the rim 1a and hence to the burner head 1.

[0028] The main body of the flame-leading pipe 2 can have various shapes and configurations, so long as it leads the burning flame from the lower level positioned by the igniter 3 to climb up to the upper end of the pipe 2. As discussed above, the upper end of the pipe 2 is located at a level slightly higher than the height of the burning surface 1b.

[0029] FIG. 4 shows an embodiment in which the main body of the flame-leading pipe 2 has an arc or curved shape without the short horizontal straight portion 10. The upper end of the flame-leading pipe 2 should nevertheless provide sufficient support and secure attachment to the rim 1a, for example, by welding.

[0030] FIG. 5 illustrates another embodiment in which the main body of the flame-leading pipe 2 has a non-arc shape with a short straight portion 10 at its upper end. The main body in this case can be formed by joining two straight pipes at an angle. The flame-leading pipe 2 is secured onto the rim 1a as discussed above, i.e., by welding or with a fastener.

[0031] FIGS. 6 and 7 show an embodiment of the gas burner head of the present invention before and after it is installed onto a standard gas burner. Once installed, the gas burner head enables a user of a standard gas oven to easily and conveniently select and switch between different uses and burning strengths without having to take the oven apart and/or without suffering from ignition obstruction.

[0032] Although the present invention and its advantages have been described in detail, it should be understood that the present invention is not limited to or defined by what is shown or described herein. As one of ordinary skill in the art will appreciate, various changes, substitutions, and alterations could be made or otherwise implemented without departing from the principles of the present invention. Accordingly, the scope of the present invention should be determined by the following claims and their legal equivalents.

- 1. A burner head assembly, comprising:
 - a housing confining a chamber to accommodate a gas-air mixture, said housing having an open top and an upper rim;
 - a burning plate located on said open top of said housing for performing radiation and emission of heat;
 - a gas mixing pipe secured on and penetrating to a vertical wall of said housing, wherein
 - said gas mixing pipe is positioned to receive a gas nozzle, and wherein
 - said gas mixing pipe serves as a communication passage of said gas-air mixture between said chamber and said gas nozzle; and
 - a flame-leading pipe having an upper open end and a lower open end for providing a climbing path that leads an ignited flame to climb from a lower place, where said flame is ignited by a fixed igniter, upward to said upper open end, which is located at a level slightly higher than said burning plate, wherein
 - said upper open end is securely attached to said rim, and wherein
 - said lower open end is configured and positioned to align with said ignited flame.
- 2. The burner head assembly of claim 1, wherein said burner head is an infrared gas burner head.
- 3. The burner head assembly of claim 1, wherein said flame-leading pipe is a curved hollow pipe and wherein said upper open end has a straight portion.
- 4. The burner head assembly of claim 1, wherein said flame-leading pipe is an arc-shaped pipe without a straight portion.
- 5. The burner head assembly of claim 1, wherein said upper open end is securely attached to said rim by welding.
- 6. The burner head assembly of claim 1, wherein said upper open end is securely attached to said rim with a fastener.
- 7. The burner head assembly of claim 1, further comprising a brace affixed to a bottom surface of said housing, said brace supporting said lower open end of said flame-leading pipe.
- 8. The burner head assembly of claim 1, further comprising a heat-proof mesh covering said burning plate.
- 9. The burner head assembly of claim 1, wherein said housing is a rectangular shaped case.
- 10. The burner head assembly of claim 1, wherein said flame-leading pipe is formed by joining two straight pipes.

- 11. An infrared gas burner head assembly, comprising:
 - a housing confining a chamber to accommodate a gas-air mixture, said housing having an open top and an upper rim;
 - a burning plate located on said open top of said housing for performing radiation and emission of heat;
 - a gas mixing pipe secured on and penetrating to a vertical wall of said housing, wherein
 - said gas mixing pipe is positioned to receive a gas nozzle, and wherein
 - said gas mixing pipe serves as a communication passage of said gas-air mixture between said chamber and said gas nozzle; and
 - a flame-leading pipe having an upper open end and a lower open end for providing a climbing path that leads an ignited flame to climb from a lower place, where said flame is ignited by a fixed igniter, upward to said upper open end, which is located at a level slightly higher than said burning plate, wherein
 - said upper open end is securely attached to said rim, and wherein
 - said lower open end is configured and positioned to align with said ignited flame.
- 12. The infrared gas burner head assembly of claim 11, wherein said upper open end has a straight portion.
- 13. The infrared gas burner head assembly of claim 11, wherein said flame-leading pipe has a curved, arc, or angular shape.
- 14. The infrared gas burner head assembly of claim 11, wherein said upper open end is securely attached to said rim by welding or with a fastener.
- 15. The infrared gas burner head assembly of claim 11, further comprising a holding means for supporting said lower open end of said flame-leading pipe, wherein said holding means is attached to a bottom surface of said housing.
- 16. The infrared gas burner head assembly of claim 11, further comprising a heat-proof mesh covering said burning plate.
- 17. The infrared gas burner head assembly of claim 16, wherein said mesh is attached to said rim.
- 18. The infrared gas burner head assembly of claim 11, wherein said flame-leading pipe is formed by joining straight pipes.

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