United States Patent

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[54] **GAS INFRA-RED BURNER CONSTRUCTION**
13 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **126/4,** 126/41, 126/92; 431/328
[51] **Int. Cl.** **A47j 37/00,** F23d 13/14; F24c 3/04
[50] **Field of Search** 126/4, 41, 92, 92B; 431/328, 329

[56] **References Cited**

UNITED STATES PATENTS

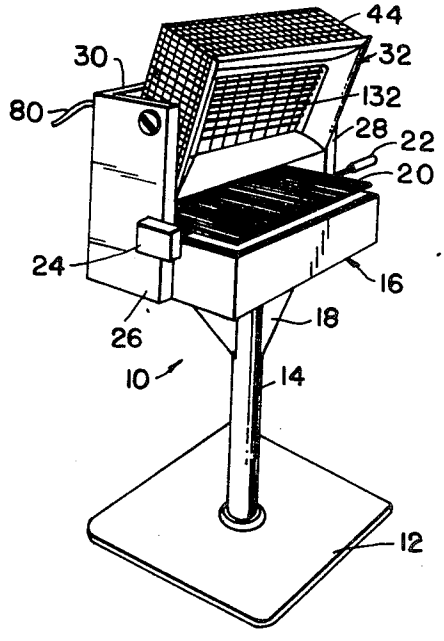
3,167,110	1/1965	Szell	431/328
3,251,356	5/1966	Prince et al.	126/92B
3,422,810	1/1969	Weiss	126/41
3,422,811	1/1969	Strand	126/92

FOREIGN PATENTS

1,470	4/1956	Germany	431/328
976,850	12/1964	Great Britain	431/328
1,240,114	7/1960	France	431/328

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ABSTRACT: The gas infrared burner construction is of the type having a chamber with ceramic plate material on one face. The ceramic plate material has a large number of small perforations through its thickness. A fuel-air mixture passes through the perforations and burns at the surface of the ceramic to heat the ceramic which then emanates infrared radiation. A venturi structure and baffle means are provided for injecting fuel-air mixtures into the chamber. This structure permits tilting of the burner structure to different positions while it is in operation, so that it may be used as a combination space heater/barbecue grill. In one embodiment, the ceramic plate material is arranged around the periphery of the burner face and tilted to provide a burner structure which is efficiently operable as a stove grill.



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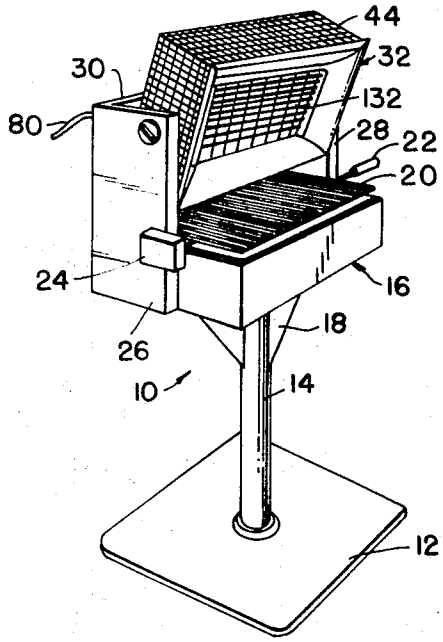


FIG.1

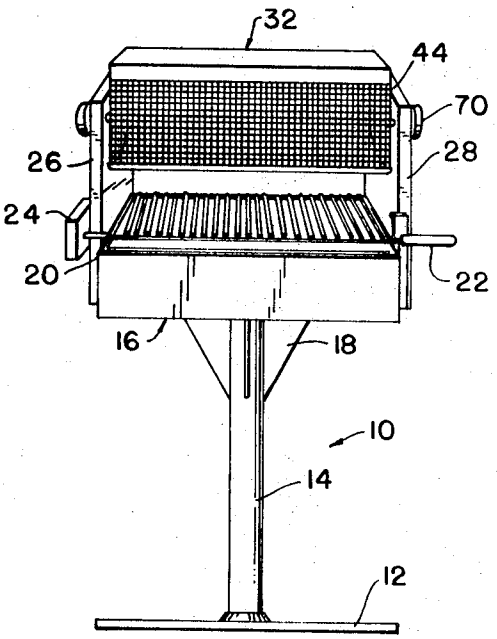


FIG.2

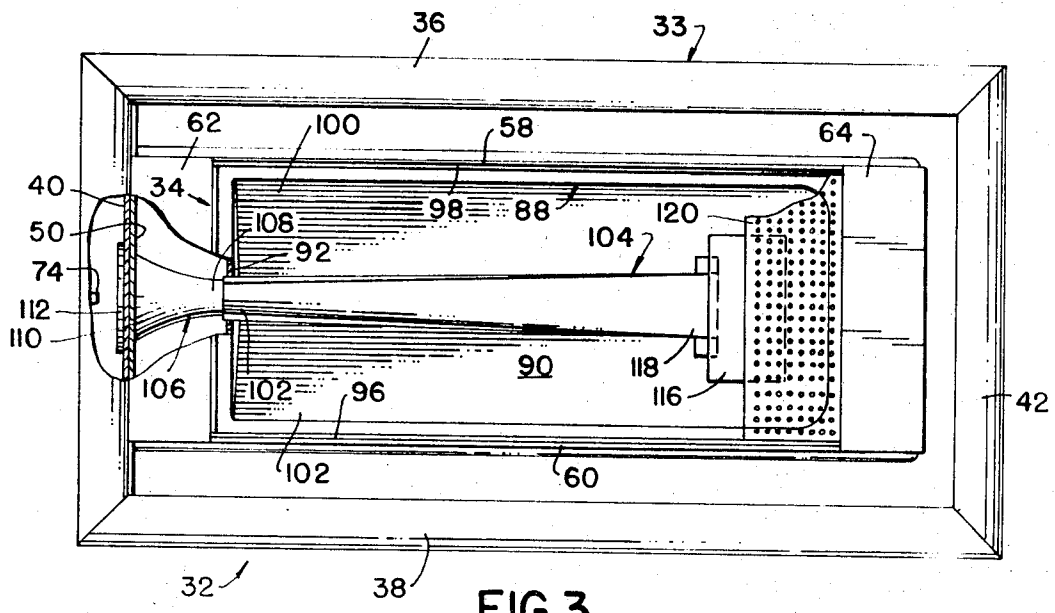


FIG.3

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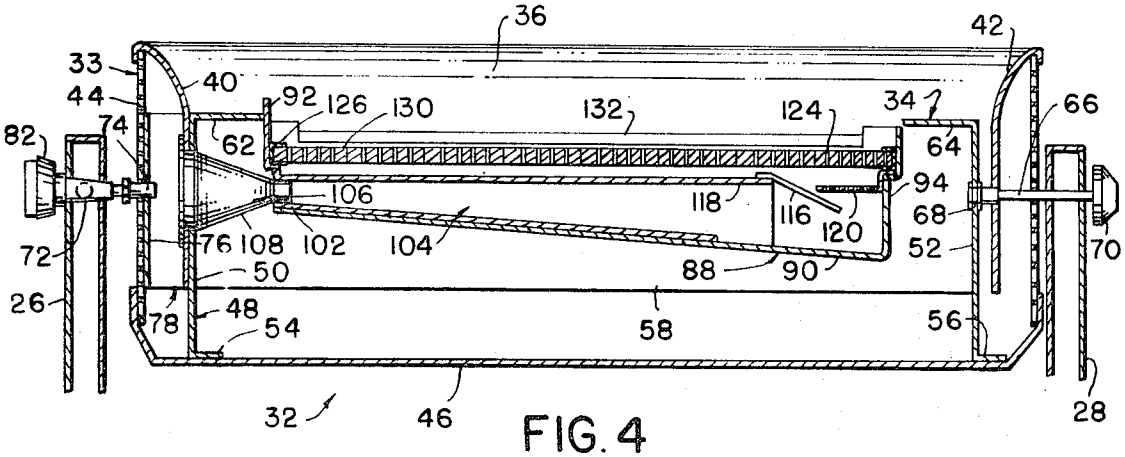


FIG. 4

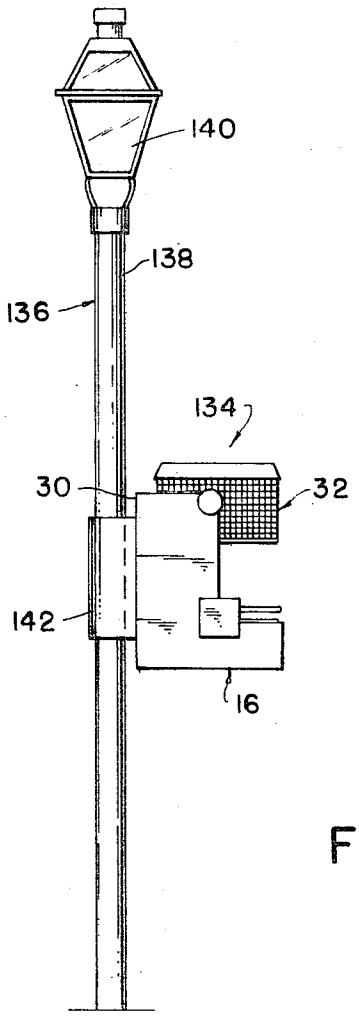


FIG. 6

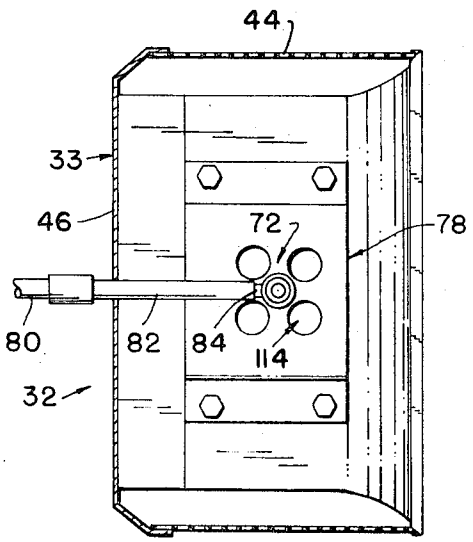


FIG. 5

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FIG.7

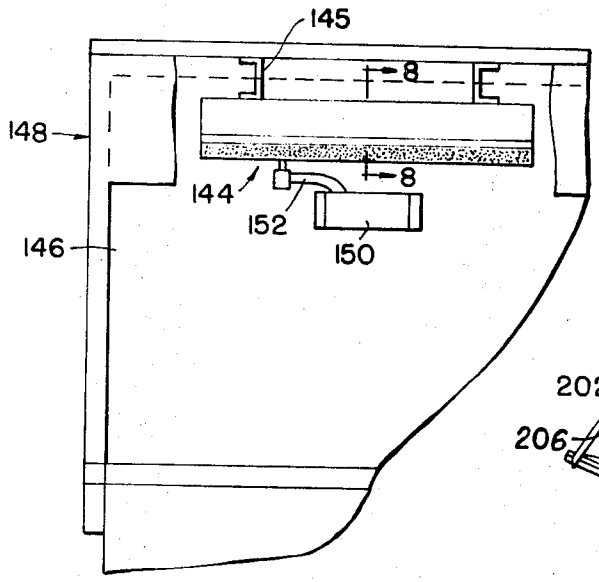


FIG.10

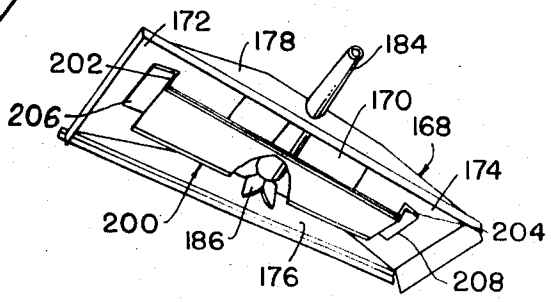
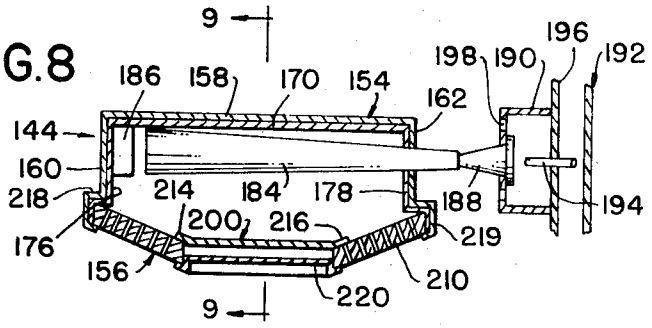


FIG.8



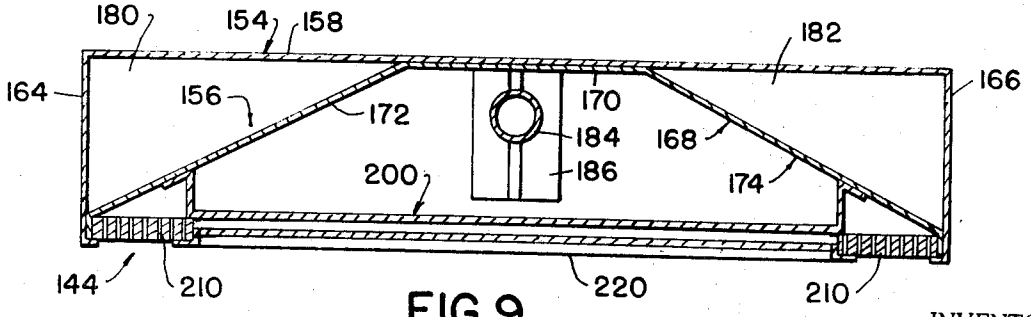


FIG.9

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GAS INFRA-RED BURNER CONSTRUCTION

BACKGROUND OF THE INVENTION

In recent years, gas burning infrared generators of the type which utilize perforated ceramic plate material on one face of a plenum chamber have come into widespread use as space heaters for drafty buildings such as factories and warehouses which are difficult to heat by ordinary convection techniques. Such infrared burners have also been used for outdoor heating in public places such as race tracks and building entrances.

Prior art constructions have not been readily adaptable to situations in which the burner must be moved to different positions. For example, a combination barbecue and space heater for a patio requires that the burner be moved to a horizontal position for cooking food and to a vertical position for warming persons sitting on the patio. Additionally, prior art burner constructions have not been well adapted for use in domestic stoves.

The present invention provides a burner construction which includes several features making it readily adaptable for pivotal mounting. The burner construction is also efficient in operation and is relatively easy to manufacture as a low cost structure. One embodiment of the burner structure is also well adapted for use in a stove as a grill unit.

SUMMARY OF THE INVENTION

The gas infrared burner construction includes a chamber having ceramic plate material with a large number of small perforations through its thickness on one face thereof. A venturi structure for intimately intermixing gaseous fuel and air and introducing said mixture into the chamber is provided. In one embodiment, the chamber is pivotally mounted for selectively positioning the ceramic plate material between horizontal and vertical planes. The gas fuel injection nozzle is utilized in this embodiment as a pivot point for the burner construction. A baffle arrangement is provided within the chamber to improve the gas flow therewithin so that tilting may be accomplished without decreasing efficiency of burning. In another embodiment, the ceramic plate material is arranged around the marginal edge of the face of the chamber and imperforate structure provided in the center of the face. The ceramic plate material along two side edges of the burner is tilted outwardly from the chamber face to improve heat radiating characteristics and operational efficiency.

In the Drawings:

FIG. 1 is a view in perspective of one embodiment of the gas infrared burner construction of the present invention forming a combination space heater and barbecue unit;

FIG. 2 is a front elevational view of the burner construction of FIG. 1;

FIG. 3 is a plan view of the burner unit with ceramic tile and front rod structure removed and portions of the casing broken away to reveal the interior plenum chamber and associated structure;

FIG. 4 is a sectional view taken through the longitudinal center of the burner structure;

FIG. 5 is an end view of the burner structure with portions removed to reveal the air and fuel inlet construction;

FIG. 6 is a side elevational view of another embodiment of the invention mounted on an outdoor gas lamp;

FIG. 7 is a front view of a stove illustrating a burner structure of the present invention mounted within the oven housing;

FIG. 8 is a sectional view of the burner structure of FIG. 7 taken along the line 8–8 looking in the direction of the arrows;

FIG. 9 is a longitudinal sectional view of the burner structure taken substantially along the line 9–9 of FIG. 8 looking in the direction of the arrows; and

FIG. 10 is a view in perspective of the interior burner structure.

Referring first to the embodiment illustrated in FIGS. 1 through 5, the combination space heater and barbecue unit 10 is constructed as a portable device and may be moved to different locations in, for example, a patio to accommodate varying seating arrangements. The combination space barbecue unit 10 includes a base 12 from which extends an upstanding post 14. An open-topped box 16 is supported on the upper end of the post 14. plurality A plurality of peripherally spaced flanges 18 extend between the upper portion of the post 14 and bottom of the box 16 to provide additional support for the box. The box 16 may be lined with metal foil and filled with absorbent material to receive cooking fat as is the usual practice in barbecuing.

A removable wire grill 20 is received on the top of the box 16. The grill 20 serves as a support surface for meat or other comestibles which are cooked on the unit. A spit 22 extends across the length of the box 16 beneath the grill 20. The spit 22 is rotatably mounted and one end thereof is received in a socket provided in a motor housing 24. The housing 24 encloses an electric motor which is connected to the socket and spit to rotate the spit in the usual manner for rotisserie cool cooking. The grill 20 is removed to provide access to the spit for rotisserie cooking.

Sidewalls 26, 28 and back wall 30 extend upwardly from the box 16. These walls serve as a support for the burner structure 32 and as an enclosure to retain heat in the space adjacent to the box 16. As will be noted in FIG. 4, the sidewalls 26, 28 are double-wall members, each providing a pair of bearing surfaces to rotatably mount the burner structure 32.

The burner structure 32 comprises an outer housing 33 which surrounds and supports a gas-fired infrared generator 34. The housing 33 comprises elongated sidewalls 36, 38 and end walls 40, 42. It will be noted that the lower marginal portions of these walls are flared outwardly. The outward flare avoids direct impingement of radiant heat onto the sidewalls. This prevents the housing 33 from becoming excessively hot and assures that the radiant energy will be directed towards the food to be cooked or the persons warmed.

A wire-work guard wall 44 is provided around the housing 33 on the sides and ends thereof. The wall 44 is spaced from the housing walls. The housing walls may become relatively hot during operation of the unit. The wall 44 prevents a person from touching the sidewalls of the housing. The exposed surface area of the wires forming the wall 44 results in the wall 44 losing heat to the atmosphere rapidly. Consequently, the wall 44 does not become hot during operation of the unit and it is safe to touch it. A back wall 46 of sheet metal completes the housing structure. The back wall 46 does not become hot during operation of the unit because all the radiant heat energy emanating from the unit is aimed in the opposite direction and does not impinge against the back wall 46.

The infrared generator 34 is supported by a frame 48 which, in turn, is supported by the housing 33. The frame 48 comprises end walls 50, 52. The walls 50, 52 have flanges 54, 56 formed at the lower marginal portions thereof. The flanges 54, 56 are attached to the back wall 46 as by sheet metal screws. Elongated sidewalls 58, 60 extend between the walls 50, 52. The end walls 50, 52 are turned over to form flanges 62, 64 which extend to the infrared generator 34, the generator 34 being shorter than the length of the sidewalls 58, 60.

An axle 66 extends from the end wall 52 through the housing wall 42 and guard wall 44 and through openings in the sidewall 28. The axle 66 is secured to the end wall 52 by means of nut structure 68 which prevents relative rotation of the axle and frame 48. The axle 66 is journaled in the wall 28 so as to be rotatable with respect thereto. A knob 70 is provided on the outer end of the axle 66 for manual rotation of the axle and thus the entire burner structure 32.

A gas valve 72 is provided on the opposite side of the burner structure 32. The gas valve 72 has an inlet nozzle 74 which extends through openings in the guard wall 44 and wall 76 of a U-shaped bracket 78. The bracket 78 is secured to the housing end wall 40 and serves as an inlet structure for air. The nozzle 74 serves as an axle for rotatably mounting the burner structure 32. The burner structure 32 may be pivoted from the

horizontal position illustrated in FIG. 2 to a vertical position as shown in FIG. 1 by manual turning of the knob 70. It will be appreciated that the gas valve 72 and associated flexible gas line 80 are not moved during pivoting of the burner structure 32. Movement of the gas valve or the gas line connected thereto is undesirable because of the possibility of developing a leak in this gas supply system. As will be noted in FIG. 5, a length of metal tubing 82 extends from the valve inlet 84 and the flexible gas line 80 is connected thereto. The gas line 80 is ultimately connected to a source of pressurized gaseous fuel, such as a commercial gas line or bottled gas. The valve 72 is provided with a knob 86 for manual turning of the valve Off or On. The valve 72 may have intermediate positions to regulate the amount of gas supplied to the burner structure 32.

The generator 34 is received in the frame 48 in the space defined by the sidewalls 58, 60 and flanges 62, 64. The infrared generator 34 comprises an open-topped casing 88 which is secured to the sidewalls 58, 60. The casing 88 includes a bottom wall 90, end walls 92, 94 and side walls 96, 98. The bottom wall 90 slopes outwardly from the end wall 92 to the opposite end wall 94. As a consequence, the interior space of the casing increases gradually from the end 92 to the end 94. Additionally, the portions 100, 102 of the bottom wall 90 adjacent the end wall 92 slope inwardly from the center of the bottom towards the edges of the sidewalls 96, 98 to thus further reduce the space at this end.

An opening is provided in the end wall 92 to receive the restricted end 102 of an elongated conical venturi tube 104. The tube 104 extends from the wall 92 and terminates short of the other end wall 94. The small diameter end 108 of a relatively short conical tube 106 is received within the small diameter end 102 of the tube 104. The large diameter end 110 of the conical tube 106 extends through registering openings in the housing end wall 40 and frame end wall 50. An annular flange 112 is provided to abut against the housing end wall 40. The tubes 104, 106, in combination, provide a venturi structure which results in intimately intermixing incoming gas and air to provide a homogeneous gas/air mixture for efficient combustion. The length of the tubes 104, 106 and the diameters thereof are related to each other to optimize the gas mixing characteristics thereof.

The nozzle 74 of the gas valve 72 is aimed at substantially the center of the tube 106 and is spaced a short distance therefrom as will be noted in the FIGS. 3 and 4 so that the jet of gas fuel which emanates therefrom is directed into the tube 106. The bracket 78 is provided with openings 114 spaced around the nozzle 74. Air is drawn through the openings 114 as a result of the reduced pressure created within the space between the bracket wall 76 and the frame wall 50. This air is drawn into the tube 106 and flows therethrough and through the tube 104 along with the gaseous fuel to form a combustible mixture which is injected into the casing 88 in the enlarged space adjacent to the end wall 94.

A platelike baffle 116 is provided on the outlet end 118 of the tube 104. The baffle 116 is angled towards the bottom wall 90 of the casing 88 and terminates approximately midway of the tube 104. The width of the baffle 116 is such that it extends to a point approximately midway between the end 118 of the tube 104 and the end wall 94 of the casing 88. The length of the baffle 116 is such that each end thereof extends beyond the tube 104 and terminates at a point approximately midway between the sidewalls 96, 98 of the casing 88 and the sides of the tube 104.

A perforated metal screen or baffle 120 is provided directly above the baffle 116. The baffle 120 extends in a plane substantially parallel to the gas flow through the tubes 104, 106. The central portion of the baffle 120 is indented to be received within the open top of the casing 88 as will be noted in FIG. 4. This places the baffle 120 closely adjacent to the baffle 116 and spaces it from the ceramic tiles 124 which extend across and enclose the open top of the casing 88.

The ceramic tiles 124 are retained in a ceramic frame 126 which is received in a peripheral recess formed in the casing 88. The tiles 124 have perforations 130 there through and are composed of a material which, when heated to an incandescence, will emit infrared radiation for heating purposes. The tiles may be constructed in accordance with the U.S. Pat. No. 2,775,294 issued to Gunther Schwank, or in accordance with other compositions and constructions now commercially available on the market. In operation of such tiles, the gas/air mixture flows through the perforations 130 in the tiles and burns as it leaves the holes. The burning takes effect at the surface of the tile thus heating the tiles to incandescence.

A plurality of rods 132 extend between the ends 92, 94 of the casing 88. The rods 132 are spaced a short distance from the face of the tiles 124. The rods 132 are formed of a metal which will withstand a high heat intensity and are of sufficient cross-sectional area to prevent distortion under their own weight at the elevated temperature at which they operate. In operation, the rods 132 are heated to incandescence which is ordinarily well above the temperature of the surface of the tiles 124. The rods reradiate heat back to the tiles, thus raising the surface temperature of the tiles which results in more efficient operation of the tiles. The rods, of course, also radiate heat directly out from the burner to accomplish the stated purpose of the burner.

In operation of the unit 10, the burner structure 32 may be turned to a horizontal position as shown in FIG. 2 to cook food which is on either the grill 20 or spit 22. The cooking time is very short because of the radiant nature of the heat which emanates from the burner structure 32. The burner structure 32 may be rotated to a vertical position as shown in FIG. 1 when it is desired to use the unit 10 as a space heater. When in this position, the burner structure 32 will emit radiant heat to the surrounding area and heat any object or person which is in the path of the heat without substantially heating the air in between. This makes the unit very efficient for use outdoors.

One of the principal advantages in the construction of the burner structure 32 is that the burner structure may be turned to different positions as illustrated in FIGS. 1 and 2 without materially affecting the efficiency of operation of the burner. In the past, burner structures have basically been designed to be mounted in a single position. The structural factors which permit operation of the burner in this fashion are the double cone venturi tube structure 104, 106, the shape of the burner casing 88, and the provision of the baffles 116, 120. The baffles 116, 120 are believed to be particularly important in contributing to the movability of the burner structure. Another important feature of the invention is the pivotal mounting of the burner structure on the nozzle 74 of the gas valve 72. This construction permits pivoting of the burner structure without damaging the gas line connections. The combination of the conical tube 106 and spaced-apart nozzle 74 to introduce gas and air into the burner without a direct connection between the gas valve and venturi structure is also important in the rotatably mounting of the burner.

FIG. 6 illustrates another embodiment of a barbecue and space heating unit 134. In FIG. 6, the unit 134 comprises an upstanding gas lamp 136 of the type which is currently popular for outdoor use on residential lawns, patios and the like. The gas lamp 136 comprises an upstanding pole 138 on the top of which is mounted a glass enclosure 140 which contains a burner element. The burner element within the enclosure 140 may be lit to provide light for the surrounding area.

The barbecue and space heating unit 134 is mounted on the pole 138 intermediate the upper and lower ends thereof. The unit 134 comprises a grill and support box 16 and burner structure 32 as previously described in the FIG. 1 embodiment. A bracket 142 is provided on the back wall 30 for attachment of the unit 134 to the pole 138. The overall combination is advantageous in providing the gas lamp, barbecue structure, and space heating structure all with a single connection to the available gas supply.

FIGS. 7 through 10 illustrate another embodiment of a burner structure 144 which is particularly adaptable for use in connection with a gas stove of the type normally used in the

ordinary home. The burner structure 144 is mounted within the oven housing 146 of gas stove 148. The burner structure 144 is mounted adjacent the upper portion of the oven housings by means of brackets 145 with the burner face directed downwardly to cook comestibles placed within the oven housing. A nozzle 194 for the burner structure 144 is connected to a gas valve 150 by a gas line 152. The gas valve 150 is, in turn, connected to a source of gas fuel. The valve 150 may be of the solenoid type to be actuated automatically by turning a switch on the front of the stove 148.

The burner structure 144 comprises an outer housing 154 which encloses an infrared generator 156. The housing 154 comprises a rectangular back wall 158 having downwardly extending side and end walls 160, 162, 164, 166.

The infrared generator 156 includes a casing 168. The casing 168 has a central back wall portion 170 which extends in a plane substantially parallel to the front of the casing and the front of the housing 154. Slanted wall portions 172, 174 extend from the back wall portion 170 at an angle towards the front face of the casing. The casing structure is completed by sidewalls 176, 178. The recess defined by the casing, which forms the plenum chamber for the fuel-air mixture, is thus of decreasing volume from the center thereof towards the ends thereof.

The casing 168 is received within the housing 154. As will be noted in FIGS. 8 and 9, the lower portions of the housing side and end walls are bent to form recesses to receive similarly bent wall portions of the casing 168 to hold the casing in place. The casing 168 has dimensions similar to those of the housing so that it will fit tightly within the housing. There are, however, relatively large air spaces 180, 182 which separate the wall portions 172, 174 of the casing 168 from the back wall 158 of the housing. These air spaces act as an insulator to prevent the back wall 158 of the housing from becoming hot. The warmest portion of the casing is that portion forming the outer marginal edges of the back wall portions 172, 174. These portions farthest away from the back wall 158 of the housing. An elongated conical venturi tube 184 extends through an opening in the sidewall 178 of the casing 168 to a point within the casing 168 adjacent the opposite sidewall 176. A flow-dividing baffle 186 is provided on the sidewall 176 in alignment with the mouth of the tube 184. The baffle 186 causes an equal amount of gases which emanate from the tube 184 to flow in opposite directions within the casing 168.

As will be noted in FIG. 8, a shorter conical tube 188 is provided on the inlet end of the tube 184. The tubes 184, 188 form a venturi mixing structure similar to that described in connection with the FIG. 1 embodiment. A bracket 190 supports the other end of the tube 188 and is attached to the back wall 192 of the oven housing. The back wall 192 is a double wall structure. The gas line 152 extends through the back wall 192 and is connected to the nozzle 194 which extends through the wall portion 196 into the space defined by the bracket 190. The nozzle 194 is aimed at the center of the tube 188. A stream of gaseous fuel under pressure is injected into the tube 188 from the nozzle 194. Openings 198 are provided in the bracket 190 for the entrance of air. Air is drawn into the tube 188 by the low pressure created within the bracket 190 in a manner similar to that described in connection with the FIG. 1 embodiment. The fuel/air mixtures passes through the venturi structure wherein it is intimately intermixed. The fuel/air mixture emanates from the tube 184 and impinges against the baffle 186 whereupon it is directed to the opposite ends of the casing 168. An elongated baffle 200 is provided centrally within the casing 168. The baffle 200 is spaced from the casing back wall by legs 202, 204 which have flanges 206, 208 secured to the back wall 170. The baffle 200 is of smaller size than the casing mouth. A space is thus provided between the edges of the baffle 200 and the casing side and end walls. A plurality of ceramic tiles 210 are provided in this space.

As will be noted in FIG. 8, the baffle 200 is spaced slightly outside of the mouth of the casing 168. The edges 214, 216 of the baffle are bent inwardly at an angle. The tiles at the side edges of the baffle extend from the edges 214, 216 into the recesses defined by the bent portions 218, 219 of the housing sidewalls 160, 162. As will be noted in FIG. 9, the ceramic tiles at the ends of the baffle 200 do not extend at an angle but are substantially parallel with the housing back wall. The ceramic tiles at both the sides and ends of the infrared generator are held in place by means of a bracket 220 which clamps on over the inner edges of the ceramic tiles. The bracket 220 is spaced from the baffle 200 to create a pocket of air which acts as a heat insulator.

Operation of the infrared generator 156 is substantially the same as operation of the infrared generator 34 previously described. The gas-air mixture passes through the perforations in the ceramic tiles and is ignited at the surface of the tiles causing this surface to become heated and radiate infrared heat rays.

The infrared generator 156 has proved to be highly efficient in operation. This is, in part, due to the high efficiency of the gas inlet and mixing structure as previously described in connection with the FIG. 1 embodiment. However, another fixture of the invention which leads to efficiency of operation is the angle of the ceramic tiles along the elongated edges of the casing 168. This slant of the tiles results in superior burning characteristics and also superior distribution patterns of the infrared rays which are emitted. Blocking off the center of the infrared generator with the baffle 200 also contributes to a superior infrared ray distribution pattern and improved burning characteristics for cooking purposes.

We claim:

1. In a gas infrared burner construction, a chamber, ceramic plate material having a large number of small perforations through its thickness on one face of the chamber, a venturi structure for intimately intermixing gaseous fuel and air and introducing said mixture into the chamber, said venturi structure comprising a first relatively short conical tube portion and a second elongated conical tube portion extending therefrom into the chamber, the large diameter end of said first conical tube portion serving as an inlet for gaseous fuel and air and the large diameter end of said second conical tube portion serving as an outlet for the gaseous fuel and air mixture into the chamber, a nozzle provided adjacent to and spaced from the large diameter end of said first conical tube portion, said nozzle being aimed to inject a stream of gaseous fuel under pressure into the first conical tube portion, enclosure structure around the nozzle, said enclosure structure having opening means for drawing air thereinto when gaseous fuel is ejected from the nozzle.

2. A burner structure as defined in claim 1, and further characterized in that said second conical tube portion extends through the chamber and terminates adjacent to one end thereof, said chamber increasing in volume from the point of entry of the elongated conical tube to the termination point thereof, a baffle provided on the large diameter end of said second conical tube portion to deflect gases away from the ceramic plate material.

3. A burner construction as defined in claim 2, and further characterized in that said baffle is a platelike member slanted towards the chamber face opposite from said ceramic plate material, the dimensions of said baffle being such that the edges thereof are spaced from any adjacent face of the chamber.

4. A burner construction as defined in claim 2, and further characterized in the provision of a perforated baffle positioned between said baffle on the end of said second conical tube portion and the ceramic plate material.

5. In a gas infrared burner construction, a chamber, ceramic plate material having a large number of small perforations through its thickness on one face of the chamber, a venturi structure for intimately intermixing gaseous fuel and air and introducing said mixture into the chamber, a nozzle connected to a source of gaseous fuel for introducing gaseous fuel into the venturi structure, said chamber being pivotally mounted for selectively positioning said ceramic plate material between

horizontal and vertical planes, said nozzle forming a pivotal mounting for said chamber.

6. A burner construction as defined in claim 5, and further characterized in that said venturi structure comprises a first relatively short conical tube portion and a second elongated conical tube portion extending therefrom into the chamber, the large diameter end of said first conical tube portion serving as an inlet for gaseous fuel and air and the large diameter end of said second conical tube portion serving as an outlet for the gaseous fuel and air mixture into the chamber, said nozzle being provided adjacent to and spaced from the large diameter end of said first conical tube portion, said nozzle being aimed to inject a stream of gaseous fuel under pressure into the first conical tube portion, enclosure structure around the nozzle, said enclosure structure having opening means for drawing air thereinto when gaseous fuel is ejected from the nozzle.

7. A burner structure as defined in claim 6, and further characterized in that said second conical tube portion extends through the chamber and terminates adjacent to one end thereof, said chamber increasing in volume from the point of entry of the elongated conical tube to the termination point thereof, a baffle provided on the large diameter end of said second conical tube portion to deflect gases away from the ceramic plate material.

8. A burner construction as defined in claim 7, and further characterized in that said baffle is a platelike member slanted towards the chamber face opposite from said ceramic plate material, the dimensions of said baffle being such that the edges thereof are spaced from any adjacent face of the chamber.

9. A burner construction as defined in claim 7, and further characterized in the provision of a perforated baffle positioned between said baffle on the end of said second conical tube portion and the ceramic plate material.

10. A burner construction as defined in claim 5, and further characterized in the provision of a grill for cooking food positioned beneath the chamber, and means to support said grill comprising an upstanding gas lamp structure.

11. In a gas infrared burner construction, a chamber, ceramic plate material having a large number of small perforations through its thickness on one face of the chamber, said ceramic plate material being arranged around the marginal edges of said face of the chamber, imperforate structure in the center of said face, and a venturi structure for intimately intermixing gaseous fuel and air and introducing said mixture into the chamber, said chamber having elongated sides, the ceramic plate material along said sides extending at an angle from the side edges of the chamber outwardly from the chamber to the imperforate structure.

12. The burner construction as defined in claim 11, and further characterized in that said venturi structure comprises a first relatively short conical tube portion and a second elongated conical tube portion extending therefrom into the chamber, the large diameter end of said first conical tube portion serving as an inlet for gaseous fuel and air and the large diameter end of said second conical tube portion serving as an outlet for the gaseous fuel and air mixture into the chamber, a nozzle provided adjacent to and spaced from the large diameter end of said first conical tube portion, said nozzle being aimed to inject a stream of gaseous fuel under pressure into the first conical tube portion.

13. The burner construction as defined in claim 11, and further characterized in that said venturi structure extends into the chamber at approximately the midpoint of one of said elongated sides, said chamber decreasing in volume from the center thereof to the ends thereof.