May 28, 1968 T. E. RASMUSSEN ET AL 3,385,651

GAS BURNER

Filed March 17, 1966

Fig. 1.

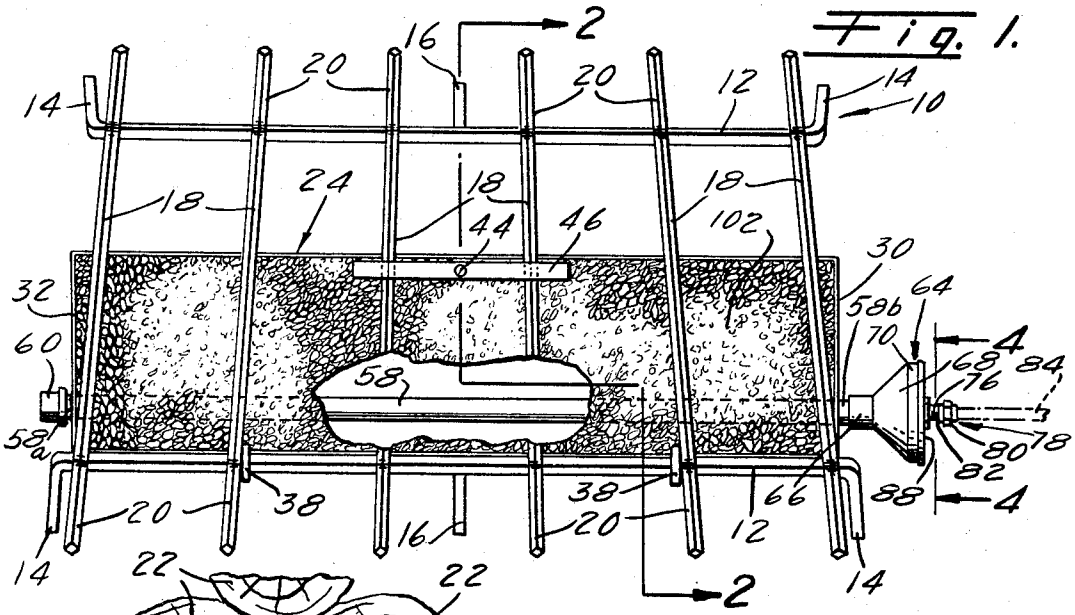


Fig. 2.

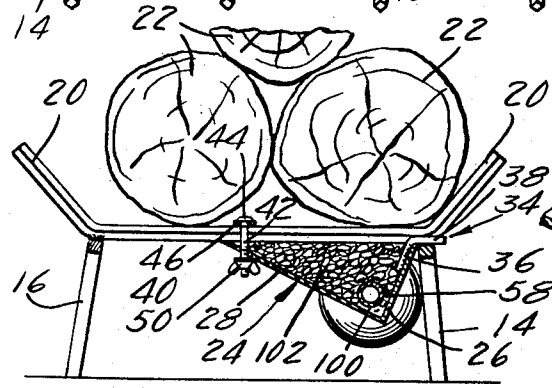


Fig. 3.

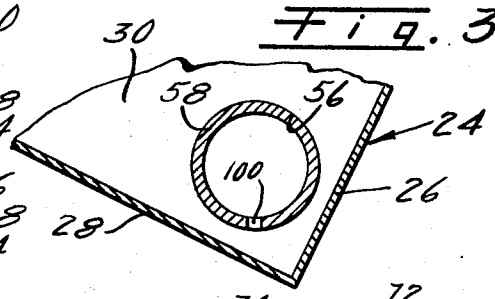


Fig. 4.

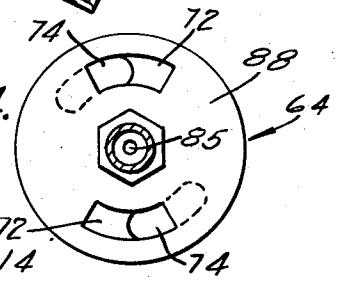
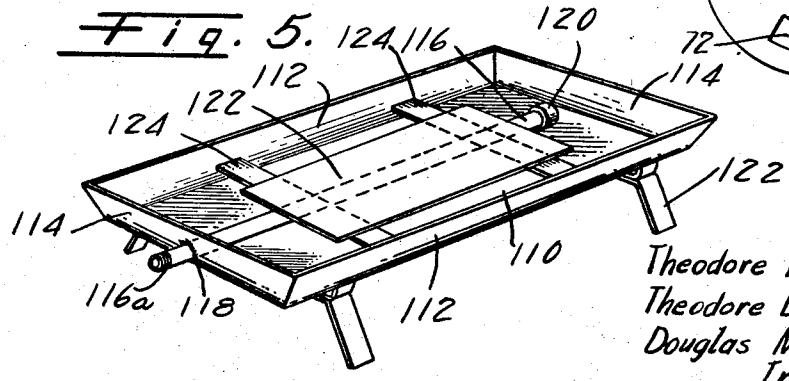


Fig. 5.



Theodore E. Rasmussen,
Theodore E. Rasmussen, Jr.,
Douglas M. Rasmussen,
Inventors.

by J. C. Baierl
Attorney

United States Patent Office 3,385,651 Patented May 28, 1968

3,385,651

GAS BURNER

Theodore E. Rasmussen, 1407 E. Linda Vista, Whittier, Calif. 90602, and Theodore E. Rasmussen, Jr., 16020 E. Ocean Ave., and Douglas M. Rasmussen, 16043 Amber Valley Drive, both of Whittier, Calif. 90604

Filed Mar. 17, 1966, Ser. No. 535,127
1 Claim. (Cl. 431—328)

ABSTRACT OF THE DISCLOSURE

A burner apparatus for fireplaces having an elongated pan for granular refractory material generally V-shaped in cross section with a gas conducting pipe extending longitudinally thereof and adjacent the lowermost part of the V and having longitudinally spaced small gas discharge openings therein.

This invention relates generally to gas burners and relates more particularly to gas burners for fireplaces and the like.

The problem of providing a satisfactory and safe gas burner for fireplaces and the like involves certain difficulties. For example, certain types of fireplace burners are provided with a pan in which there is fine sand and the gas is introduced into the pan adjacent the bottom thereof and into said mass of sand. The spaces between the fine grains or particles of the sand are very small and the gas introduced into the mass of said sand must pass upwardly to the surface of the sand through such small spaces. The gas is burned at the surface of the sand mass in the pan. Ceramic logs are placed on the sand and the flames play about the logs giving the appearance of the burning of natural logs.

Such burners produce yellow flames. These flames in turn produce a large amount of carbon which accumulates on the logs and blackens them and also gets into the air of the room in which the fireplace is located. Such flames also produce carbon monoxide gas which, as is well known, is poisonous and when given off into the air of a room in which the fireplace is located is very harmful to health and can be deadly under certain conditions as when the room is poorly ventilated.

It is therefore an object of the present invention to provide a gas burner for fireplaces and the like that overcomes these difficulties, the burner producing a blue flame that forms little or no carbon and forms little or no carbon monoxide gas.

Because of the small passages between the particles or grains of sand used in prior types of burners as described above, there is considerable back pressure in the burner which is, of course, undersirable, and it is another object of the invention to provide a gas burner wherein back pressure is for all practical purposes eliminated.

These objects are attained by providing a gas burner wherein the material in the pan comprises relatively large or coarse granular particles or pieces that will not burn and are of irregular shape thereby providing sufficiently large spaces therebetween so as to permit practically free flow of gas through the mass of such material in the burner pan, thus minimizing or eliminating back pressure. The gas discharged downwardly in the pan and flows or passes upwardly to the surface of the material therein where it is burned, said gas being diffused throughout the mass of said material. The burner also has a short venturi air mixer which is adjustable so as to provide a flame having the exact characteristics desired.

In commercial practice fireplace burners are often sold as a unit package which includes the material for the pan. Sand is relatively heavy and hence costs become an important price factor, especially when these packaged units are shipped considerable distances.

It is therefore still another object of the present invention to provide a relatively light material for the pan and thereby materially reduce shipping costs.

The characteristics and advantages of the invention are further sufficiently referred to in connection with the following detailed description of the accompanying drawings which represent certain embodiments. After considering these examples skilled persons will understand that many variations may be made without departing from the principles disclosed and we contemplate the employment of any structures, arrangements or modes of operation that are properly within the scope of the appended claims.

Referring to the drawings, which are for illustrative purposes only:

FIG. 1 is a top plan view of a grate with a burner of the present invention operably mounted thereto;

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1 but with artificial logs disposed on the grate;

FIG. 3 is an enlarged fragmentary sectional view of the burner;

FIG. 4 is a sectional view taken on line 4—4 of FIG. 1; and

FIG. 5 is a perspective view of an alternative burner arrangement.

Referring more particularly to FIGS. 1 there is shown a grate, indicated generally at **10**, which has a pair of longitudinally extending, laterally spaced members **12** having downturned ends **14** which serve as supporting legs. There is also an intermediate leg **16** for each member **12**, said legs having their upper ends connected or attached to the respective member **12** by welding, brazing or other suitable means.

There are laterally arranged cross members **18** which are spaced apart longitudinally of the grate and which have end portions **20** laterally beyond the longitudinal members **12** which are outwardly and upwardly inclined and on which artificial logs **22** are laid and supported. These logs are of well known character being of refractory material or the like.

A burner is provided and beneath the lateral members **18** and inwardly of one of the longitudinal members but adjacent to said member. The burner is indicated generally at **24** and comprises a pan that is generally V-shaped in cross section, one side of the V comprises a sharply upwardly and outwardly inclined side wall **26**. The other side comprises a wall **28** that is wider than the wall **26** and has a smaller angle to the horizontal. The top edges of the pan are in substantially the same horizontal plane. There are end members **30** and **32** forming the end walls of the pan.

The means for mounting the burner to the grate comprises a pair of brackets, indicated generally at **34**, each comprising a pair of arms **36** and **38** respective forming an obtuse angle. The brackets **34** are spaced longitudinally of the pan with the arms **36** secured to the inner side of the wall **26** adjacent the top thereof by welding, brazing or other suitable means. Arms **38** project outwardly over the upper free edge of the wall **26** and rest on one of the longitudinally extending members **12** which thereby supports one side of said pan. The upper edge of said wall **26** is closely adjacent to said longitudinal member **12**.

Adjacent the free edge of wall **28** there is an opening **40** for a bolt **42** which has a head **44** at its upper end, said bolt also extends through an opening provided therefor in an elongated supporting member **46** spanning the space between the cross members **18** adjacent the longitudinal center of the grate and resting on said cross mem-

bers. Bolt 42 extends downwardly through the opening 40 in the pan in the pan wall 28 and the lower threaded portion of said bolt is provided with a nut, such as wing nut 50, there being a washer disposed on the bolt between said nut 50 and the adjacent part of wall 28. Thus by tightening the nut 50 the free edge of the wall 28 is drawn up against the under side of the lateral or cross members 18 so that the burner is securely and operably attached to the grate. One of the end walls of the pan, as for example end wall 30, is provided with an opening 56 therein adjacent the bottom of the V formed by walls 26 and 28 for reception of a gas conducting pipe or conduit 58 which is secured in said opening by any suitable means such as welding or the like. Pipe 58 extends longitudinally of the pan just above the junction of the walls 26 and 28 and through an opening, not shown, in the opposite end wall as end wall 32. This end of the pipe is secured in said opening provided therefor by welding or other suitable means. Pipe 58 has a short externally threaded end portion 58*a* extending outwardly beyond wall 32 on which a cap 60 is screwed to close this end of the pipe.

A short externally threaded portion 58*b* of the pipe 58 extends outwardly beyond the wall 30 and has a short venturi air mixer, indicated generally at 64, attached thereto.

Air mixer 64 has an internally nipple 66 which is screwed onto the threaded end portion 58*b* of pipe 58. From nipple 66 there is a flaring frusto-conical hollow body 68. There is a short cylindrical free end or flange 70 extending outwardly of the body 68 and an outer or front end wall 72 having air inlet orifices 74. Front end wall 72 has a tapped axial opening, not shown, therein for reception of an externally threaded inner end portion 76 of a nipple, indicated generally at 78, said nipple being of well known type which includes a central integral nut 80 from which extends outwardly an integral externally threaded end portion 82 to which a supply conduit 84 is attached and which is connected to a source of gas for supplying gas to the burner, there being a metering orifice 85, FIG. 4, in said nipple 78.

There is a movable valve member or plate 88 having an axial opening, not shown, therein through which the nipple part 82 is received and on which said plate 88 is adapted to rotate, a nut 90 being provided on the nipple part 82 for operably securing said plate in position.

Plate 88 has an annular flange 92 which extends a free edge portion of the flange 70, and said plate has a pair of oppositely arranged openings 98 which are adapted to register with the air openings 74 of the body of the mixer. By rotating said plate adjustment of the effective size of the air inlet orifices 74 may be regulated to provide the proper air-gas mixture for proper combustion, the mixing of the gas and air occuring within the body of the mixer.

Pipe 58 is provided with a plurality of gas outlet openings 100. These openings may be variously positioned but fine results are obtained by having said openings along the under side, said openings being longitudinally spaced apart and direct the gas or gas mixture downwardly at and toward the bottom part of the pan.

Gas diffuser means is provided and comprises a loose mass of relatively large, irregularly shaped granules of what is termed herein refractory material, indicated generally at 102, which substantially fills the pan 24. This materal is refractory material in the sense that it will withstand high temperatures and will not burn.

Because of the relatively large, irregularly shaped granules of this material there are relatively large spaces between the granules to allow a very free flow of gas throughout the mass of material in the pan and upwardly to the surface of said material where combustion occurs. Thus back pressure is susbtantially eliminated.

One material that has been found to provide exceptionally satisfactory diffusion is expanded perlite. Expanded perlite also has the added advantage of being a very light weight material so that the required amount thereof may be included in the shipping carton of the burner. As to the size of the granules, expanded perlite graded at about 5/16 of an inch has been found to perform very well.

Of course there are other materials that at least in part satisfy the requirements of a satisfactory material, the important characteristic being that the granules be relatively large and so shaped as to provide adequate spaces between the granules to permit a substantially free flow of gas through the mass of material.

The expanded perlite has about 1/10 the weight of sand.

Volcanic cinders may also be used but is much heavier than the expanded perlite being about ½ the weight of sand.

The artificial logs 22 may be used and placed in or on the grate, as shown in FIG. 2. These logs are of well known material so that no detailed description thereof will be made.

By adjusting the plate 88 of the air mixer the flames of the burning gas play about the logs and can be regulated to burn blue so that little or no carbon is formed and little or no carbon monoxide produced. Of course, if a yellow type of flame is desired such flame may be secured by the adjustment of the plate 88.

The arrangement shown in FIG. 5 has an equally sided pan with a substantially flat, horizontal bottom 110, the sidewalls 112 and end walls 114 being outwardly and upwardly inclined. One end has an opening therein adjacent the center thereof for conduit 116 which is welded as at 118 or otherwise secured therein, said conduit having downwardly discharging outlet openings not shown. There is a short externally threaded portion 116*a* to which an air mixer, such as air mixer 64, is attached. Conduit 116 extends longitudinally of the pan with the inner end somewhat short of the adjacent end wall. This inner end has an externally threaded portion on which a cap 120 is screwed to close said end. Cap 120 is welded or otherwise secured to the bottom 110 of the pan.

Means is provided for distributing the gas from the conduit 116 over a substantial area and comprises a baffle 122 horizontally disposed over a portion of said conduit 116. The baffle edges are spaced from the respective side walls and end walls of the pan.

Support means for the baffle 122 is provided and comprises a pair of transversely extending support members 124 spaced apart longitudinally relative to said baffle and welded or otherwise secured thereto. The support members 124 extend laterally outwardly of the baffle and the ends rest on the outwardly and upwardly inclined inner sides of the side walls 112. Of course the support members could extend longitudinally and rest on the ends walls. In either event, the baffle is disposed close to or rests upon the conduit 116. Alternatively the baffle could be welded to said conduit to support it and maintain it in a horizontal position.

Gas discharged from the discharge orifices of the conduit 116 in the area of the baffle follows the under side of the baffle and flows upwardly about the edges of said baffle.

Diffuser material, such as described above, is disposed in the pan and over the baffle so that gas flowing about the edges of said baffle flows upwardly through the diffuser material. Of course gas from discharge openings in conduit 116 beyond the ends of said baffle also flows upwardly through said diffuser material, all of said gas burning at the top level of said diffuser material.

If desired a baffle may be provided over at least a portion of the conduit or pipe 58, of the arrangement first dscribed. Such a baffle may be supported with support members or be welded to said conduit 58. The edges of such baffle would be spaced from the adjacent walls 26 and 28 and end walls 30 and 32 to permit gas to flow about the edges of said baffle.

The pan may be suitably supported by legs **126** which may be permanently secured to the bottom of the pan or may be removably attached.

The invention and its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts of the invention without departing from the spirit and scope thereof or sacrificing its material advantages, the arrangements hereinbefore described being merely by way of example, and I do not wish to be restricted to the specific forms shown or uses mentioned except as defined in the accompanying claims, wherein various portions have been separated for clarity of reading and not for emphasis.

We claim:

1. In a burner for fireplaces and the like, an elongated pan having sides and ends, said pan being generally V-shaped in cross section and a gas conducting pipe extending longitudinally of the pan adjacent the lowermost part thereof, said pipe having a plurality of longitudinally spaced small gas discharge openings for the discharge of gas and wherein said V-shaped pan has one side of the V longer and at a smaller angle to the horizontal; a substantial mass of coarse, granular refractory material disposed in said pan and over said pipe and the pipe is disposed adjacent the bottom of said V with the pipe outlets discharging into the angle of the V, the gas flowing upwardly through the spaces between the granules and being diffused throughout said mass.

References Cited

UNITED STATES PATENTS

1,158,652	11/1915	Doyle	126—92
1,839,515	1/1932	Wetherbee	158—99
3,042,109	7/1962	Peterson	126—92 X
3,150,711	9/1964	Brown et al.	158—116
3,173,470	3/1965	Wright	158—99

FREDERICK L. MATTESON, JR., *Primary Examiner.*

E. G. FAVORS, *Assistant Examiner.*