April 3, 1962 J. K. LAMP, JR 3,027,936

GAS BURNER

Filed March 12, 1958

FIG. 1

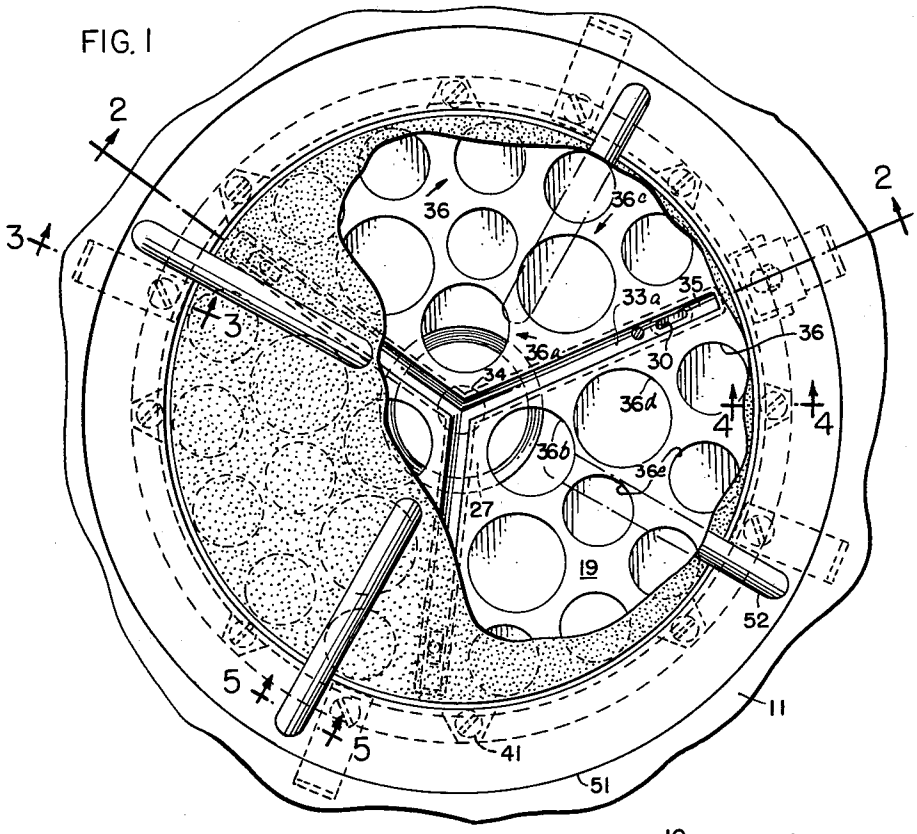


FIG. 2

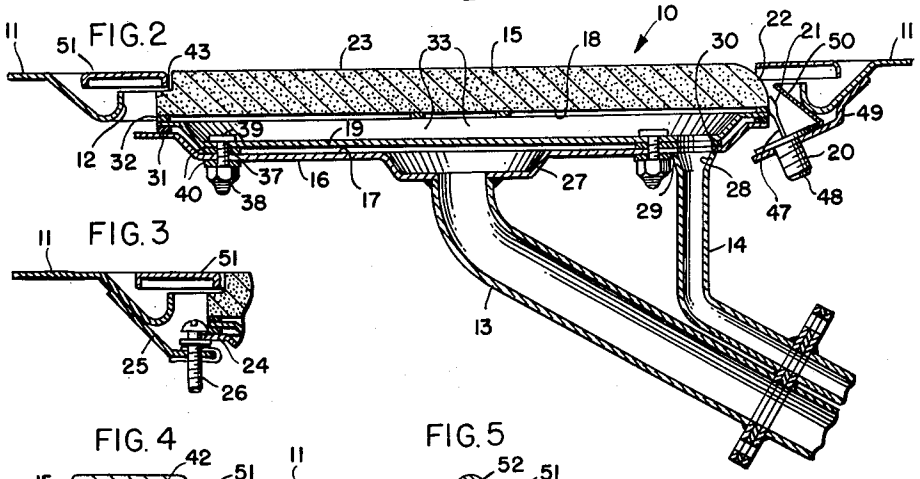


FIG. 3

FIG. 4

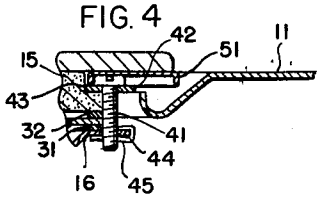
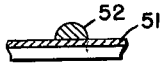


FIG. 5



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This invention relates to combustion apparatus and in particular to a fluid fuel burner.

In gas burners utilizing porous burner plates, a simmering operation has heretofore ordinarily been obtained by reducing the combustible gas flow through the entire burner plate. It is difficult to regulate accurately the gas flow at such reduced rates so that accurate control of the simmering heat output has been difficult.

Another problem presents itself in utilization of porous burner plates, namely, the difficulty of properly igniting the combustible gas passing through the burner plate. The space below the burner plate is occupied by the gas supply chamber and the gas must not be ignited in this chamber but, rather, only after it has passed through a substantial portion of the burner plate to preclude any backfiring.

The principal feature of this invention is to provide a new and improved fluid fuel burner utilizing a porous burner plate.

Another feature is the provision of such a burner utilizing only a portion of the porous burner plate to provide the simmer function.

A further feature is the provision of such a burner having a symmetrical arrangement of the simmer section.

Another feature is the provision of such a burner having new and improved ignition means.

Other features and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a plan view of a burner embodying the invention with portions thereof broken away, the burner being shown mounted on a portion of a supporting means;

FIG. 2 is a vertical section thereof taken approximately along the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary vertical section taken approximately along the line 3—3 of FIG. 1, illustrating the mounting of the burner on the support;

FIG. 4 is a fragmentary vertical section taken approximately along the line 4—4 of FIG. 1, showing the means for effecting the sealing association of the elements of the burner; and

FIG. 5 is a fragmentary vertical section taken approximately along the line 5—5 of FIG. 1 showing the overhanging support means for maintaining a superposed element above the upper surface of the burner plate.

In the exemplary embodiment of the invention as disclosed in the drawings, a burner **10** is mounted on a suitable table member **11** to extend through an opening **12** therein. Suitable combustible gas is provided to burner **10** through a main duct **13** and a simmer duct **14**. The gas delivered to burner **10** through ducts **13** and **14** is preferably premixed with a proper amount of air so that theoretical 100% proper combustion takes place.

As best seen in FIG. 2, burner **10** comprises a porous burner plate, or head, **15**, an enclosure **16** defining a chamber **17** communicating with the under side **18** of the burner plate, and a distributor plate **19** extending across chamber **17** for controlling the delivery of the combustible gas and air mixture through the burner plate. Associated with burner **10** is a pilot means **20** which ignites the combustible gas within the burner plate. As best seen in FIG. 2, pilot means **20** is secured to member **11** to direct the flame **21** thereof at a peripheral, preferably inwardly sloped, edge wall **22** of the burner plate.

The distributor plate **19** is arranged to deliver the combustible gas from simmer duct **14** to only a limited portion of the burner plate so that simmering is effected over a reduced area. Combustible gas delivered from main duct **13** is delivered through the distributor plate over substantially the entire remaining area of the burner plate so that a maximum area is available for the main burner function.

More specifically, burner plate **15** comprises a porous plate of permeable refractory material such as disclosed in the patent to Bone et al., No. 1,223,308, issued April 17, 1917. The upper surface **23** is preferably flat and flush with the upper surface of table member **11**. The periphery of the burner plate, as defined by edge wall **22**, is circular and has a slightly smaller diameter than the circular opening **12** of the table member.

Enclosure **16** comprises a dished member supported by member **11** at spaced portions **24** by suitable connecting lugs **25** and screw means **26**. An inlet **27** is provided through the center of enclosure **16**, and duct **13** is connected thereto to deliver the main supply of combustible gas and air mixture into chamber **17**. A second inlet **28** is provided adjacent the periphery of the enclosure and simmer duct **14** is connected thereto. An annular gasket **29** is interposed between enclosure **16** and distributor plate **19** sealingly connecting inlet **28** with an aligned aperture **30** in distributor plate **19**, whereby the gas and air mixture is sealingly conducted from simmer duct **14** upwardly through distributor plate **19**.

Distributor plate **19** is generally peripherally congruent with enclosure **16** and is spaced upwardly therefrom by means of a sealing peripheral gasket **31**. The distributor plate is spaced somewhat below the under side **18** of burner plate **15** by means of a similar sealing gasket **32** whereby chamber **17** is effectively sealed to have communication only with the under side **18** of the burner plate.

Distributor plate **19** comprises a generally flat, circular plate having three recessed channel portions **33** radiating outwardly from the mid-portion **34** thereof in a symmetrical angular arrangement. The channels are relatively narrow and open upwardly under corresponding narrow portions of the under side **18** of burner plate **15**. As best seen in FIG. 1, aperture **30** extends through the wall portion defining an outer end **35** of one channel **33***a* so that the combustible gas is delivered from simmer duct **14** to within that channel. The channels **33** are interconnected at mid-portion **34** of the plate **19** whereby combustible gas may flow readily from aperture **30** through all of the channels to pass upwardly therefrom through the under side of the burner plate. Thus, the simmer combustion occurs in burner plate **15** in substantially only the limited portions thereof overlying the channels **33** whereby improved control of the simmer temperature is effected. Because of the symmetrical arrangement of the channels **33**, an improved even heat distribution is provided.

Between each pair of channels, distributor plate **19** is provided with holes **36** which are distributed over substantially the entire area between the channels. To provide improved distribution of the combustion in the burner plate, holes **36** are arranged in three concentric annular configurations, namely: an inner configuration **36***a* of medium size holes **36***b* adjacent plate mid-portion **34**; an intermediate configuration **36***c* of large holes **36***d* and interposed small holes **36***e*; and an outer configuration **36***f* of small holes **36***e* adjacent the periphery of the distributor plate. As seen in FIG. 1, this distribution of holes **36** provides the greatest flow passage area at a distance inwardly from the periphery of the burner plate. Thus, the heat is directed upwardly against the bottom

of the device being heated rather than around the sides thereof, while the heat is not concentrated directly at the center of the device. Thus, combustible gas flowing from main duct **13** may pass readily upwardly through the holes to substantially the entire under side **18** of the burner plate, providing a substantially uniform combustion throughout the entire area of the burner plate.

To secure the distributor plate **19** to enclosure **16** and assure a tight seal therebetween through gasket **31**, a plurality of connectors are provided comprising threaded studs **37** extending downwardly through the distributor plate and enclosure, suitable nuts **38** being threaded to the lower end of the studs for drawing downwardly the heads **39** of the studs which are received in channels **33**. Suitable gaskets **40** may be provided for sealing the openings through distributor plate **19** and enclosure **16** through which the studs **37** extend.

Means for securing the burner plate **15** to the enclosure **16** are shown in FIG. 4. A stud **41** is passed through a clip **42** bearing against a shoulder **43** provided in the peripheral edge wall **22** of the burner plate. The stud extends downwardly through a flange **44** projecting outwardly from enclosure **16** having a threaded connecting element **45** mounted thereon. Stud **41** is threaded into the connecting element to urge the burner plate **15** downwardly toward the enclosure **16** and tightly against upper gasket **32**.

Pilot means **20** comprises a tube **47** extending from a connector **48** mounted on a bracket **49** secured to the table member **11**. Bracket **49** disposes tube **47** so that flame **21** is directed from the tube to impinge on edge wall **22** of the burner plate adjacent the outer end **35** of channel *33a*. A flame guard **50** may be secured to member **11** to assure the proper disposition of the flame **21** and preclude it from being inadvertently extinguished. Thus, when gas is admitted through aperture **30** to channel *33a*, it passes upwardly therefrom through the overlying portion of burner plate **15** and is substantially instantaneously ignited by pilot means **20**. As the gas quickly flows from inlet **30** throughout each of the channels **33** and passes upwardly therefrom through the overlying portions of the burner plate, combustion of the gas in these overlying portions is effected by the initial ignition of the gas at the end **35** of the channel *33a*. When a main burner operation is desired, combustible gas is delivered from duct **13** through holes **36** to be ignited in burner plate **15** by the previously ignited simmer gas delivered from channels **33** to the burner plate. Thus, a foolproof, automatic ignition of the combustible gas in the burner plate is effected. During normal operation, both the main burner section and the simmer burner sections are operating.

It is preferable that elements to be heated by burner **10** be prevented from resting directly on the upper surface **23** of the burner plate. To this end, a flat ring **51** is placed on the upper ends of the studs **41**, which ring is provided with a plurality of fingers **52** extending radially inwardly to overlie mid-portion **34** of the burner plate. Thus, such elements, as containers, etc., may be set on top of fingers **52** in spaced relationship with upper surface **23** of the burner plate.

Advantages emanating from my invention are that the pilot is not subject to spillage from cooking utensils and that it will not be snuffed out by the products of combustion as it would be if it were located within the surface of the burner plate. When the burner is in operation and a pan is resting on the supports above the burner head there is a higher pressure in the center of the plate and a lower pressure on the outside of the plate. This operational characteristic causes a standing pilot which is located within the surface of the burner to be snuffed out after the combustible fluid has been ignited.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claim.

I claim:

A fluid fuel burner, comprising: a continuous porous burner head; an enclosure adjacent the burner head defining a chamber between the enclosure and burner head, means substantially sealing the enclosure to the burner head in areas peripheral to the chamber; a distributor plate extending across the chamber substantially against the burner head and having a recessed portion opening outwardly to a limited portion of the burner head and a second portion having fluid passage means extending adjacent an additional portion of the burner head, the recessed portion being arranged to direct fluid fuel from said recessed portion through said limited head portion; means for delivering fuel to the recessed portion only for passage from said recessed portion outwardly through said limited portion of the burner head; means for delivering, only when desired, additional fuel to the chamber under said distributor plate exteriorly of said recessed portion for passage upwardly through said second portion of the distributor plate and through said additional portion of the burner head; and pilot means for igniting fuel delivered to the limited portion of the burner head, said additional portion of the burner head being juxtaposed to said limited portion whereby the fuel delivered to the additional portion is ignited by ignited fuel at the limited portion, said burner head being substantially circular and the fluid passage means comprising means forming holes for fuel flow therethrough, the holes being arranged to provide for a flow rate at an annular area concentric of the burner head inwardly of said peripheral areas that is greater than the flow rate immediately adjacent said peripheral areas.

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