Sept. 22, 1970 K. KRIEGER 3,529,916

RADIANT BURNER

Filed June 26, 1968 2 Sheets-Sheet 1

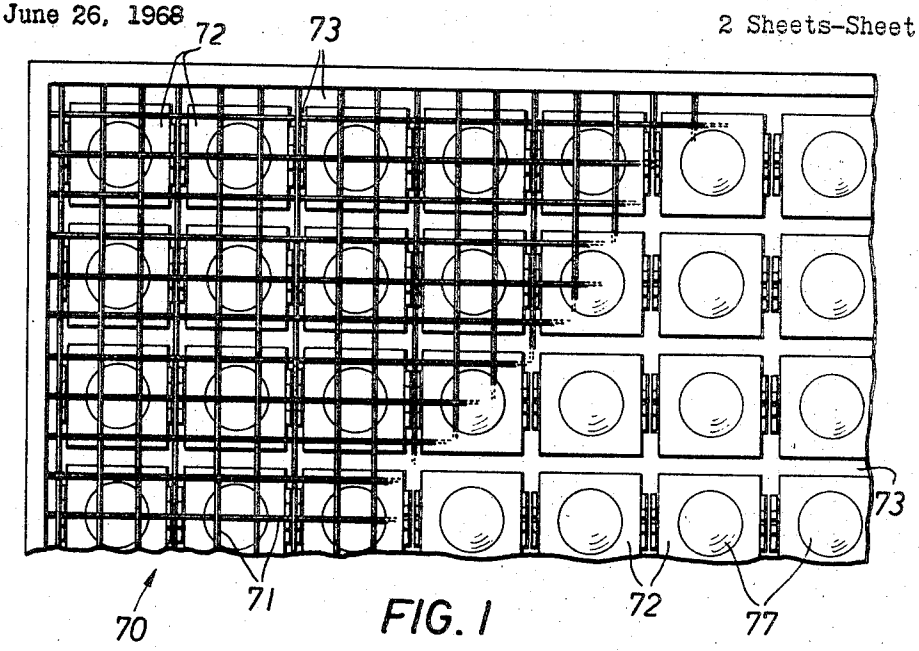


FIG. 1

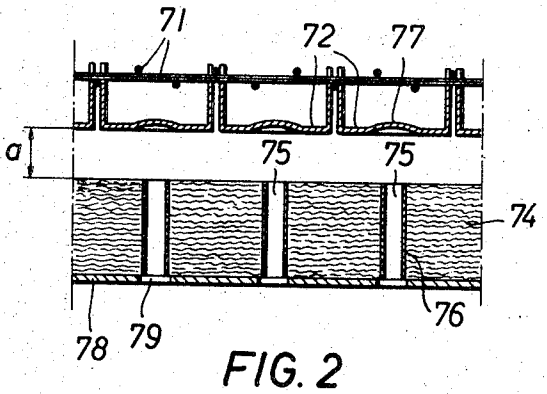


FIG. 2

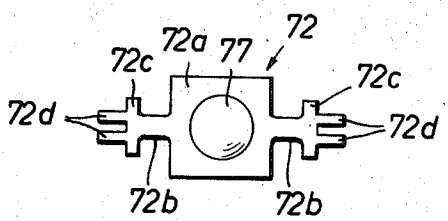


FIG. 3

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RADIANT BURNER

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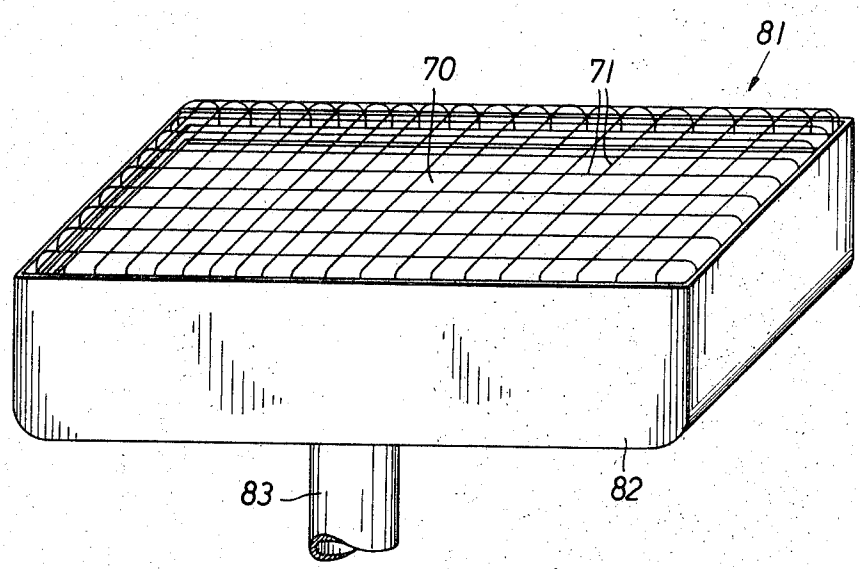


FIG. 4

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3,529,916

RADIANT BURNER

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Int. Cl. F23d 13/14
U.S. Cl. 431—329 8 Claims

ABSTRACT OF THE DISCLOSURE

A radiant burner for burning a mixture of air and gas or fuel vapor, which burner takes the form of a housing having means for supplying the fuel mixture thereto and a radiant gas-permeable plate forming the top surface of the housing. This burner plate is made up of a plurality of separate plate parts. Furthermore, an insulating layer of heat resisting fibrous fleece is spaced from the burner plate within the housing, there being openings in the insulating layer.

The invention relates to a burner, in particular a radiant burner, in which a gas/air or fuel vapor/air mixture is supplied via a distribution chamber to a gas-permeable burner head comprising a plate having apertures and made of heat resistant metal. Juxtaposed to this plate is an insulating layer of heat resistant or fireproof material, preferably fibrous fleece, which insulating layer has discrete apertures.

The object of the invention is to improve the properties and construction of such burners and to develop them in an advantageous manner.

With this object in view, the apertured plate is formed, in accordance with the invention of a plurality of individual parts. It has been found that such division into individual parts gives considerable advantages. A burner constructed in this way may find application in cases in which formely it was not suitable to use burners, or their use presented great difficulty. An example of such a case is that in which the turning on and off takes place frequently and possibly also at short intervals. The burner according to the invention is fully adapted to meet the stresses occasioned thereby. Undesirable phenomena, such as for instance damage occasioned by heat stress, cracks, deformation and so on, do not make an appearance. The burner of the invention, even under heavy duty, has a long life.

It is possible for instance for one or more edges of the plate-parts to overlap each other to a certain extent, so as to give each other mutual support in spite of the existence of the possibility of expansion. In a preferred embodiment of the invention the individual plate-parts are held independently of each other. As a result there will be no mutual influencing, which could be a disturbing factor. The holding means take many forms. The invention provides an arrangement in particular in which the plate-parts are held by a grating or the like, arranged above or in front of them. Such grating is frequently present in any case, so that no additional expenditure occurs for its provision. The individual plate-parts may be provided directly with tongues or other members used as fixing means.

Although the invention does not exclude in principle an arrangement of the individual plate-parts in close proximity to each other, it is advisable for spaces or gaps to be left between the said parts. The invention provides in particular that the spaces between the plate-parts form the only passage openings. The plate-parts themselves do not then need to be provided with bores or holes. The size of the gaps may furthermore be selected so that the desired total passage cross section occurs, which may

for instance amount to 15% to 30% of the total surface taken up by the plate-parts.

There is substantial freedom as regards the shape of the said plate-parts. These are advisably constructed in such a way that a four-sided, in particular a square surface results.

In accordance with a further feature of the invention, the plate-parts have domed portions directed outwardly, i.e. towards the top of the burner. This has been found to be particularly advantageous in reference to the capacity of the burner. In this connection it is furthermore advisable for the domed portions to be arranged over the openings provided in the insulating layer.

As materials which may be used for the plate-parts, alloys with nickel and chromium are particularly concerned. An alloy having 70% Ni and 30% Cr has been found to be particularly advantageous, also in reference to flame impingement.

In the drawings is shown an embodiment of the burner according to the invention, in which:

FIG. 1 is a partial top view of the burner;

FIG. 2 is a vertical part-section through the burner head,

FIG. 3 is an arrangement for a plate-part;

FIG. 4 is a perspective view of the burner as a whole; and with details omitted.

The burner **81** has a burner housing **82** having a supply pipe **83** for a gas/air mixture opening into its base, and a burner head which is given the general reference **70**, in the form of a rectangular surface fitted with a wire grating **71**. In FIG. 1, the latter is shown partly broken away. The wire grating **71** holds individual plate-parts **72** composed of an Ni-Cr alloy, which together form a burner plate.

The openings of this burner plate are provided by gaps **73** left between the individual plate-parts **72**. The size of the gaps and accordingly of the total passage cross-section forms a determinable proportion of the total surface areas of the burner head, for instance 25%.

Spaced by a distance *a* from the plate-parts **72**, an insulating layer **74** is provided, as can be seen in FIG. 2, which may be a fleece of ceramic fibres, or fibres based on oxides. The insulating layer **74** has passage openings **75** which are formed by small metal tubes **76**, for instance small tubes of copper or of an alloy of nickel and chromium or some other metal.

A metal plate **78**, for instance of alloy steel, is arranged underneath the insulating layer, the plate having passage openings **79**. The number and arrangement of the passage openings **79** is the same as those of the insulating layer, and they may be the same size, or larger.

In the embodiment illustrated, the arrangement of the passage openings **75** in the insulating layer **74** is such that their axes pass through the centres of the plate-parts **72**. This has been found to provide a satisfactory distribution of the combustion gases.

The plate-parts **72** have domed parts **77** directed outwardly, i.e. towards the top side of the burner head, The arrangement is such that the parts **77** are located over the passage openings **75** in the insulating layer **74**, as this has been found to be advantageous for the movement of the combustion gases and for the method of working and capacity of the burner.

In the embodiment shown in FIG. 3, the plate-parts **72** consist in each case of a square central part **72***a* with the domed part **77**, and two attachments referred to generally as **72***b* which in the installed position are bent off at a right angle from the central part **72***a*. Each of the attachments comprises a broadened abutment part **72***c* and two fixing prongs **72***d*. The latter, when arranged on the wire grating **71** enclose a wire between them, which

then abuts against the abutment part 72*c*. The fixing prongs 72*d* are bent towards one another above the wire, with the result that the fixing and holding of the plate-part to the wire grating is made secure.

What is claimed is:

1. A radiant burner for burning a mixture of air and a component selected from a group consisting essentially of gas or fuel vapor, said burner comprising a housing; means for supplying to said housing said mixture; a radiant, gas-permeable burner plate made up of a plurality of separate plate parts forming a surface of said housing; and an insulating layer of heat resisting fibrous fleece between said supplying means and spaced from said burner plate, there being openings through said insulating layer.

2. A burner as claimed in claim 1 wherein said separate plate parts are supported independently of one another.

3. A burner as claimed in claim 2 wherein said plate parts are supported by a grating arranged above them and attached to said housing.

4. A burner as claimed in claim 1 wherein said plate parts are spaced from each other thereby forming gaps.

5. A burner as claimed in claim 4 wherein said gaps are the means whereby said burner plate is gas-permeable.

6. A burner as claimed in claim 1 wherein said plate parts are rectangular in plan view.

7. A burner as claimed in claim 1 wherein said plate parts have a concave dome portion on their surface facing said insulating layer.

8. A burner as claimed in claim 7 wherein said concave domed portions are positioned over said openings in said insulating layer.

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EDWARD G. FAVORS, Primary Examiner