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(54) Suctioned or blown air multigas burner

(57) Suctioned or blown air multigas burner, of the type provided with a head in which there is one or more arrays of holes/slots (5) from which the fuel 1 gas and combustion air mixture is released and the combustion occurs. The burner is characterised in that its head is made of metal sheet shaped in a corrugated manner, with the holes/slots (5) provided on the crest of said corrugations.

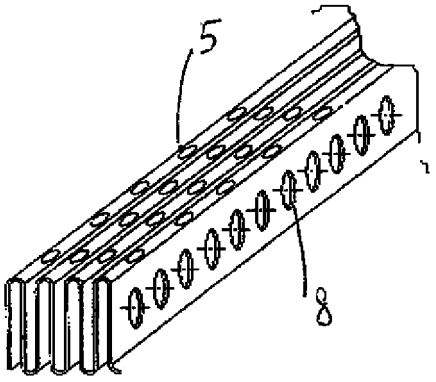

FIG. 7

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Description

[0001] The present finding regards a suctioned or blown air multigas burner according to the overview part of claim 1.

[0002] It is known that most suctioned or blown air burners have a head made of a thin metal sheet, provided with one or more arrays of holes and/or slots from which the fuel gas and combustion air mixture is released and the combustion occurs. These burners come in different shapes and configurations, depending on the particular use the same are intended for.

[0003] Usually the following characteristics would be simultaneously desired of such burners:

- High heat efficiency, obtained from a small burner;
- The possibility to regulate the flame with a wide range of variation of the gas pressure, however without implying jeopardising the efficiency of the combustion and maximum temperature reached at the burner head;
- The possibility to pass from a fuel gas to another without any modifications regarding the mechanical part of the burner, but by simply adjusting the passage of the gas from the nozzle which delivers the abovementioned gas into the burner.

[0004] Regarding the last characteristic it is known that the gas supplier at times provides for the use of various types of natural gas, which could be more or less rich in calories, or coal gas, methane, propane or other fuel gases. At times, for availability reasons, said gases can even be more or less mutually mixed. When dealing with a blown-air burner, a special automatic device provides for the regulation of the amount of air coming from the supply fan. Vice versa, when dealing with suctioned air burners, it is the same burner, automatically in this case too, which provides for regulating the amount of air suctioned by the Venturi pipe, in such a manner to adapt to the type of fuel gas.

[0005] Generally, failure to regulate the flame does not lead to serious operation problems; in other words, designing a burner capable of operating unattended at full throttle or idle (on-off) in a proper manner is not a difficult task.

[0006] Problems arise when the burner is set to operate at a very low rate, given that, in such case, the external surface temperature of the burner can even reach 1000° centigrade, hence jeopardising proper operation of the burner itself.

[0007] The presence of this high temperature causes, as the most dangerous drawback, the possibility of occurrence of the socalled backfire or, more precisely, fire in the mixing chamber. As a matter of fact, when the head heats at such temperatures, the mixture between the combustion air and the fuel gas inside the mixing chamber ends up in contact with the head and tends to ignite and continue burning inside said chamber. This is subject to causing the destruction of burner, as well as formation of CO in the combustion fumes.

[0008] In order to avoid this disastrous drawback, various solutions capable of reducing the temperature of the surface of the burner head which comes into contact with the air/gas mixture have been adopted. For example the following solutions have been adopted:

- Burner head made of ceramic material of the porous type or provided with holes of any type in any case;
- Presence of a head cooled by means of contact with a circuit where a coolant, especially water, is circulated;
- Head made of metal wires made with a weft or warped structure; this structure heats up on the external, but transfers heat to the lower part of the head, which is also the part that comes into contact with the gaseous mixture.

[0009] Actually, many more solutions capable of overcoming the high temperature of the burner head drawback have been provided, but they have all proven to be quite complicated and of high manufacturing costs.

[0010] From a principle point of view, it is clear that the simplest solution adoptable would be that of providing a head having a considerable outlet surface, as well as a substantial thickness and being provided with less material in contact with the flame, all entirely to make sure that the heat expands on the external surface in such a manner that the temperature of the internal surface is reduced to the minimum.

[0011] Unfortunately, this type of heads are rather expensive and difficult to manufacture.

[0012] The objective of the present finding is to provide a multigas burner, of the blown or suctioned air type, capable of operating without any problems at various heat ranges and free of the drawbacks described above.

[0013] This can be obtained by providing for that the burner head be made using a corrugated metal sheet, provided with holes and/or slots arranged on the crest of its corrugations.

[0014] In this manner, a head in which the flame burns externally and cannot pass inside, the gas/air passage slots being very narrow. At the same time the temperature is inherently reduced in the surface beneath the head. In practice, all this occurs as if the head involved had a considerable thickness, though, on the contrary, the sheet used is extremely thin.

[0015] Now, these and other characteristics of the finding shall be hereinafter described in detail, with reference to some of its special embodiments, provided for exemplifying and nonlimiting purposes, with the aid of the attached drawings wherein:

- Figures 1 and 2 (tab. I) illustrate two schematic side views of the embodiments of the head burner subject of the finding;
- Figure 3 illustrates a schematic side view of a burner provided with a head made according to the finding;
- Figures 4 and 5 (tab. II) illustrate two top plan views of the burner made according to the finding;
- Figures 6-9 (tab. III) illustrate some variants of the embodiment of the burner head according to the finding;
- Figures 10 and 11 (tab. IV) illustrate two cross-sectional schematic views, of special embodiments of the burner according to the finding;
- Figure 12 (tab V) illustrates a schematic view of a variant embodiment of the burner according to the finding;
- Figure 13 illustrates a partial schematic view of a variant embodiment of the burner head according to the finding;
- Figure 14 illustrates a plan view in a special embodiment of the device according to the finding.

[0016] In figures 1 and 2 it can be observed that the burner according to the finding has a head made starting from a sheet 1, made of metal material, preferably stainless steel resistant to heat. This sheet, for indicative purposes, shall be approximately 0.4-0.6 mm thick. This sheet is made in a corrugated manner, with crests 1' and valleys 1''. The sheet is cut in such a manner that the gaseous mixture outlet holes and/or slots are arranged at the crests 1'. The sheet 1 is subsequently compressed against the two ends, in such a manner to obtain the shape schematically illustrated in fig. 2. Then, the head is arranged at the top of the burner 2 (see fig. 3) and the flame 3 develops at the abovementioned top.

[0017] The shape of the head, seen from the top, is illustrated for exemplification purposes in figures 4 and 5, the slots 4 and the holes 5 being arranged at the crests 1' of a sheet; the valleys 1'' are also shown in the figures.

[0018] Obviously, the burner head subject of the finding can be of any shape. Shown, for example, are the ones illustrated by figures 6-9 as well as figures 12-14. In particular, it can be observed that, as shown in fig. 6, the burner head can be shaped as a series of packs 6 of crests and valleys, mutually separated by flat sections 7. Furthermore, as shown in particular in figures 7 and 8, holes 8 can be provided for, to reduce heat transfer from the external to the lower part of the burner.

[0019] As observable in fig. 10 provided for between the various surfaces 9' of the elements making up the burner head can be spacer bosses 9, whose purpose is to keep said surfaces mutually spaced and at the desired position. Through different methods, as visible in figure 11, it is possible to provide for that the side surfaces 9' of the various elements making up the burner head be arranged tilted and thus not parallel, hence avoiding the possibility of unexpected deformations of the entire structure.

[0020] Lastly, as shown in figure 12, it can be observed that the device subject of the finding can be provided with different shapes (for example tubular shaped).

[0021] Tests performed have proven that, through the solutions provided for in the burner subject of the invention, a burner head with a very low thickness shall be provided, but in which the internal surface, though obviously heating through conduction, has a considerably lower temperature with respect to the external surface, preventing ignition of gas inside the burner. In other words, through the solutions described and illustrated previously, it is possible to provide a head burner easy to construct, and functional, as well as capable of avoiding dangerous backfire; the burner subject of the finding is adapted to operate at any range, in particular at very low powers, given that it is inherently not subject to the backfire phenomenon.

Claims

1. SUCTIONED OR BLOWN AIR MULTIGAS BURNER, of the type provided with a head in which there is one or more arrays of holes/slots (5,4), from which the fuel gas and combustion air mixture is released and the combustion occurs, **characterised in that** the burner head is made of metal sheet (1) shaped in a corrugated manner, with the holes/slots provided on the crests of the corrugations of the said sheet.

2. BURNER, according to claim 1, **characterised in that** the sheet is made of stainless steel resistant to heat and it is approximately 0.4-0.6 mm thick.

3. BURNER according to claim 1 or 2, **characterised in that** the corrugations of the head are arranged in packs (6) mutually separated by flat sections (7).

4. BURNER, according to one or more of the preceding claims **characterised in that** it is provided with holes (8) at its side surfaces.

5. BURNER, according to one or more of the preceding claims **characterised in that** it is provided with spacer bosses (9) between the surfaces (9') of the various elements making up the head burner.

6. BURNER, according to one or more of claims 1-4 **characterised in that** the side surfaces (9') of the various elements making up the burner head are non-parallel.

7. METHOD for manufacturing a burner head, according to one or more of the preceding claims **characterised in that** it first provides for preparing a corrugated sheet (1), which is then subjected to drilling to provide the arrays of holes/slots (5,4) and **in that**, subsequently, it is compressed at the ends, to provide the desired shape of the corrugations.

8. Head burner, **characterised in that** it has characteristics according to one or more of claims 1-6.

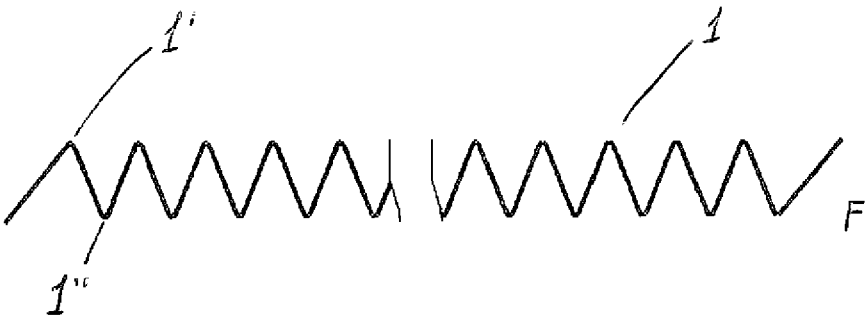

FIG. 1

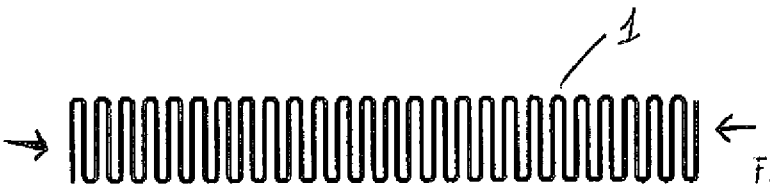

FIG. 2

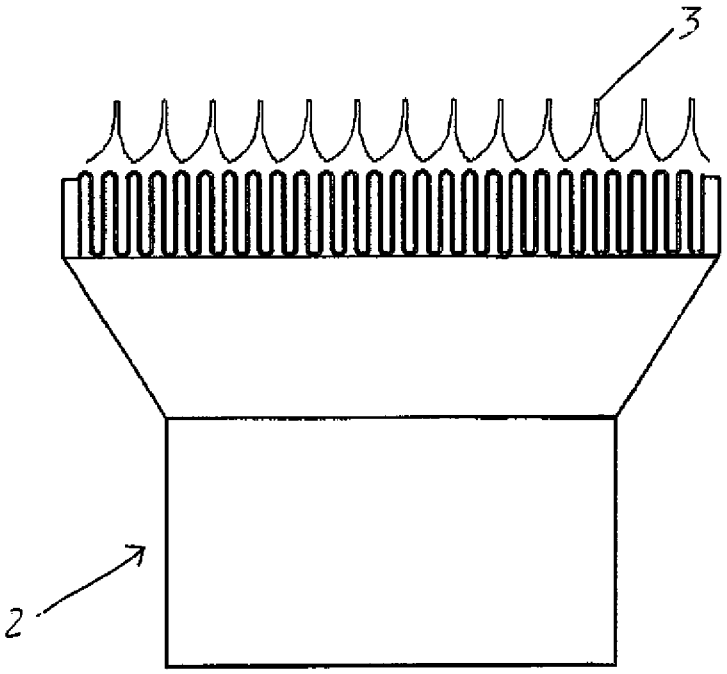

FIG. 3

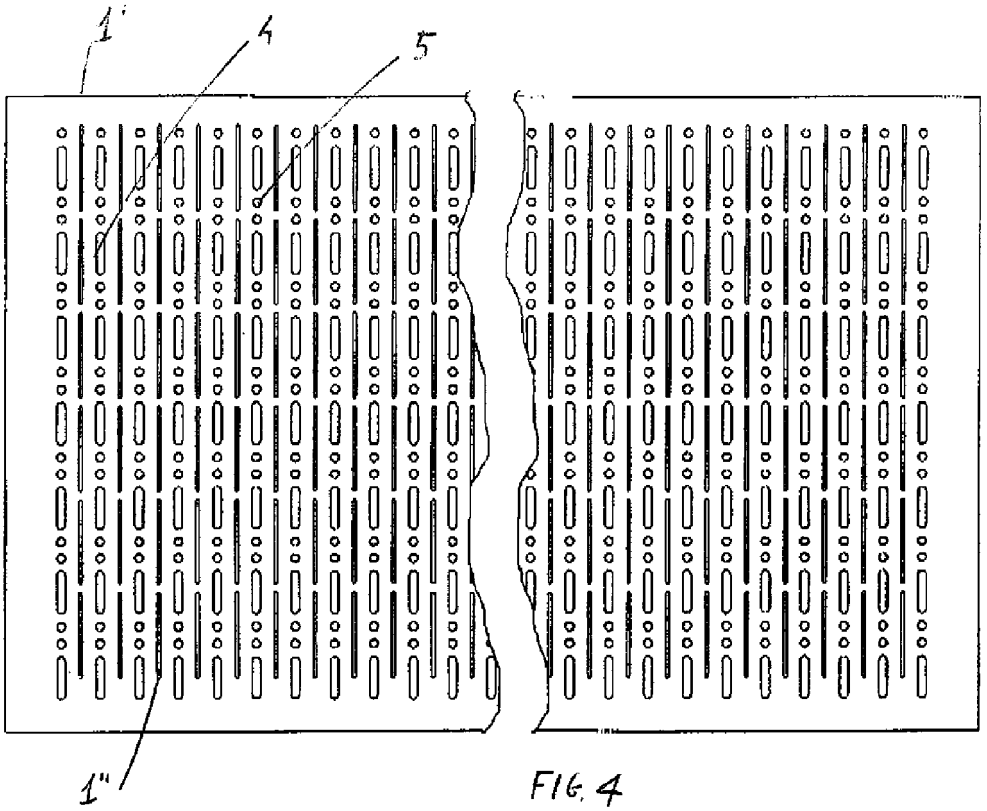

FIG. 4

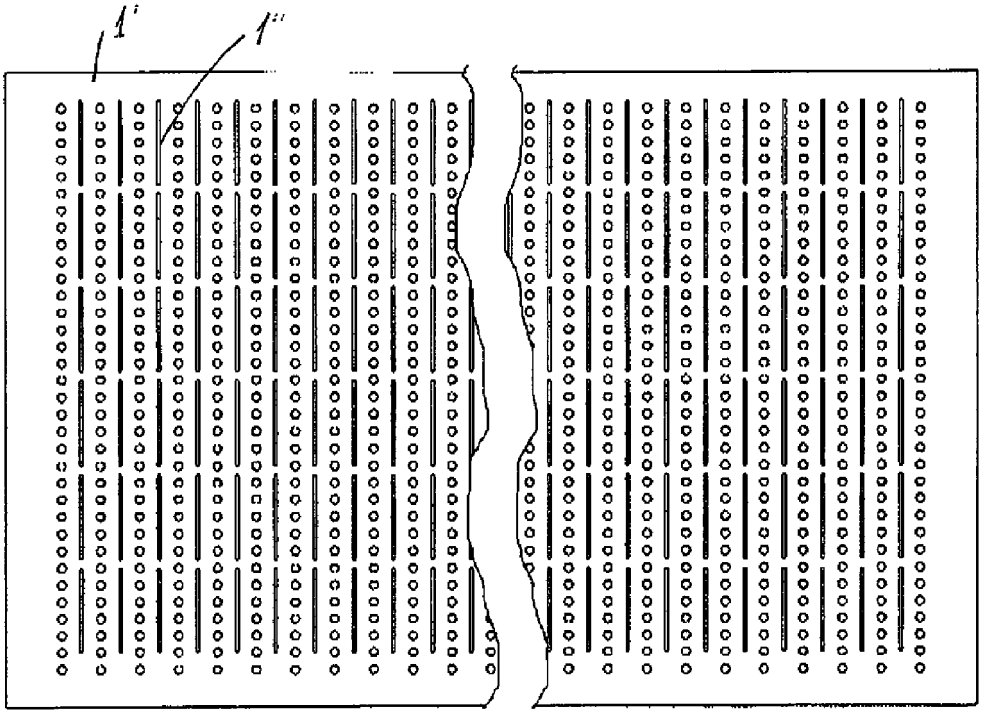

FIG. 5

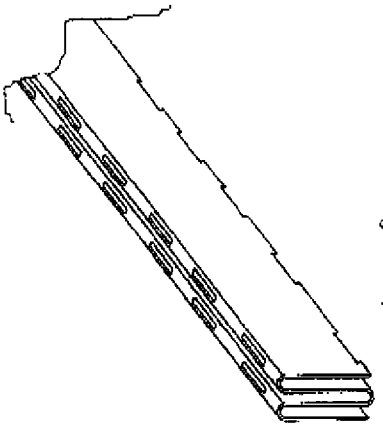

FIG. 9

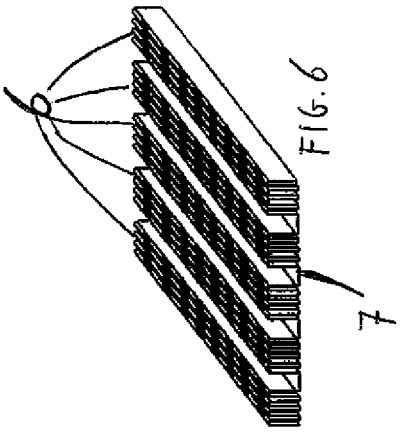

FIG. 6

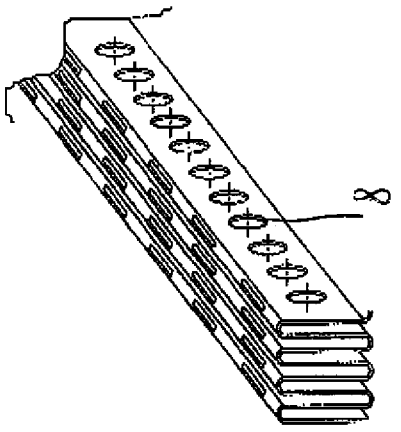

FIG. 8

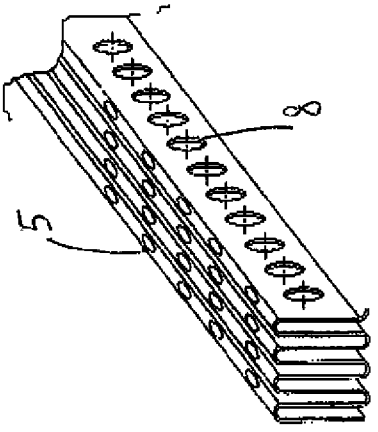

FIG. 7

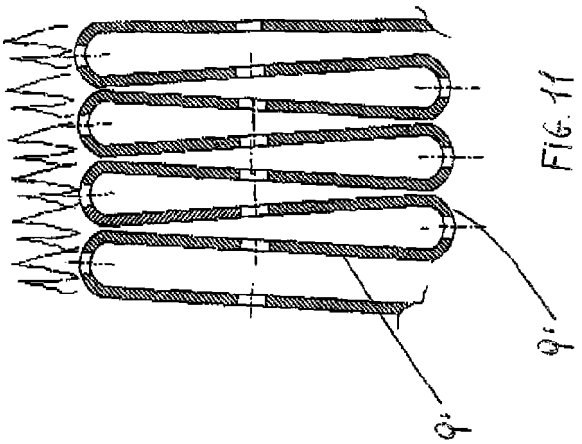

FIG. 11

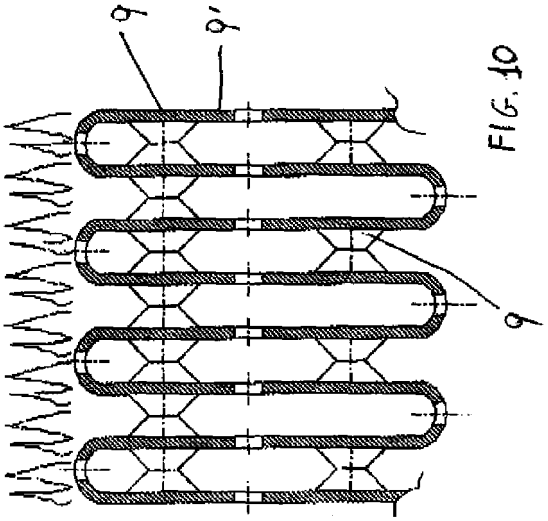

FIG. 10

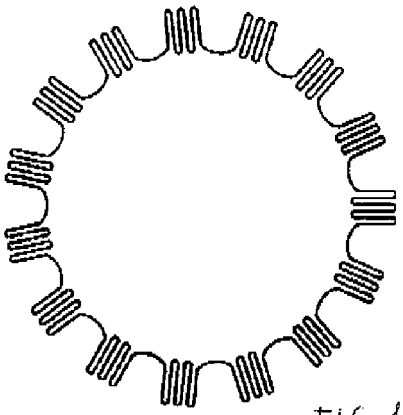

FIG. 12

FIG. 13

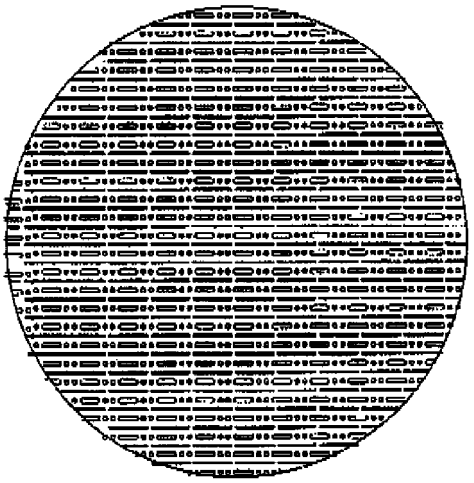

FIG. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 08 10 3534

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Y	US 3 517 887 A (DESTY DENIS HENRY) 30 June 1970 (1970-06-30) * column 2, line 65 - column 3, line 6; figure 6 * -----	7	

TECHNICAL FIELDS SEARCHED (IPC)
F23D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 December 2008	Gavriliu, Costin

CATEGORY OF CITED DOCUMENTS

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