The atmospheric gas burner for a decorative fire has a mixing chamber (1) closed on an upper side thereof by a burner mat (2) providing a flame-bearing surface and a pre-mixing burner gas/air supply system (4) connected with the mixing chamber (1) on a bottom side thereof. The pre-mixing burner gas/air supply system has a combustion gas injection nozzle (3) and at least one opening (6) for supplying primary air. In order to provide a gas burner which is compact, creates a realistic flame impression with high flames and has a small input gas energy as well as a low pressure drop, a small blower (8) is arranged in the mixing chamber and has a rotor blade or blades (8) that rotate substantially horizontally in operation.
FLAT OR PLANAR ATMOSPHERIC GAS BURNER, ESPECIALLY FOR MIMICKING A WOOD FIRE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

The present invention relates to an atmospheric gas burner for a decorative fire, especially for mimicking a wood fire, which comprises a mixing chamber, which is closed on its upper side by a burner medium providing a flame-bearing surface and on its bottom side a pre-mixing burner gas/air supply system is connected, which has a combustion gas injector nozzle and at least one opening for supplying primary air.

[0002] According to the invention a small blower or small fan is arranged or integrated in the mixing chamber and has rotor blades that run or rotate substantially horizontally in operation.

[0003] The above-described disadvantages of the known relevant burner (not compact, high pressure loss) are avoided and the above-mentioned market requirements are fulfilled because of the integration of a small blower according to the invention. The invention is successful in providing a compact gas burner for a decorative fire, which produces a realistic flame impression or appearance with high yellow flames, which has a comparatively small pressure drop and which requires comparatively small input gas energy.

[0004] An atmospheric gas burner for a decorative fire is known from GB 2 345 956 A. In this gas burner a device with various flame shapes or blade shapes is rotated in a chamber by means of an alternating current motor or alternatively by means of a low voltage direct current motor for flowing combustion gas to a burner plate in order to influence the shape of the flames. The chamber, which is supplied with the combustion gas by means of the rotating device, is filled with a granulate of a material, which is not combustible and which acts to distribute the combustible gas, so that the distribution of the granulate is changeable to influence the shape of the flames, when the rotating device acts as a sort of stirring device.

[0005] The mixing chamber of the atmospheric gas burner according to the present invention only contains the combustion gas/air mixture without any granulate of the sort present according to GB 2 345 956 A in preferred embodiments of the invention.

[0006] Another atmospheric gas burner for a decorative fire is known from GB 2 381 309 A. This atmospheric gas burner has a horizontally arranged rotatably mounted burner pipe. Combustion gas is supplied to the interior of the burner pipe, which has outlet openings distributed over its periphery for the flames. Under this burner pipe a small blower is arranged with a rotating shaft horizontally extending along the burner pipe in some embodiments. The rotating shaft has a plurality of radially extending water-mill-like blades attached to it and is rotatably driven by an electric motor. The air swirls around the burner pipe by rotation of this small blower, whereby the flames arising from the burner pipe are further varied.

[0007] The gas burners for making a decorative fire known from these GB references have a structure that differs from that according to the invention. In the former case an agitated granulate, which is not present in the case of the present invention, acts to distribute the gas in different ways to produce variable flames instead of a small blower. In the case of the latter GB reference the rotor blades do not rotate in a horizontal plane as they do in the case of the present invention.

SUMMARY OF THE INVENTION

[0008] Furthermore two requirements essential for marketing limit the possibilities for this sort of gas burner.

[0009] The market demands small compact gas fires.

[0010] Gas fires of the above-described type are included in living rooms more and more as furniture. They have relinquished their role as a heating source. They are supplied with a low gas energy.

[0011] It is an object of the present invention to provide a gas burner for a decorative fire of the above-described kind, which is compact, which has a realistic and not static flame appearance with higher flames, which has a low pressure drop and which requires only a comparatively small input gas energy, which typically is in a range of from 2 to 4 KW.

[0012] This object and others, which will be made more apparent hereinafter, is attained in an atmospheric gas burner for a decorative fire, which comprises a mixing chamber, which is closed on an upper side thereof by a burner medium providing a flame-bearing surface, and a pre-mixing combustion gas/air supply system is connected with the mixing chamber on a bottom side thereof, the pre-mixing combustion gas/air supply system having a combustion gas injection nozzle and at least one opening for supplying primary air.

[0013] According to the invention a small blower or small fan is arranged or integrated in the mixing chamber and has rotor blades that run or rotate substantially horizontally in operation.

[0014] The above-described disadvantages of the known relevant burner (not compact, high pressure loss) are avoided and the above-mentioned market requirements are fulfilled because of the integration of a small blower according to the invention. The invention is successful in providing a compact gas burner for a decorative fire, which produces a realistic flame impression or appearance with high yellow flames, which has a comparatively small pressure drop and which requires comparatively small input gas energy.

BRIEF DESCRIPTION OF THE DRAWING

[0015] The objects, features and advantages of the invention will now be described in more detail with the aid of the...
following description of a preferred embodiment, with reference to the sole FIGURE, which is a diagrammatic cross-sectional view of an atmospheric gas burner for producing a decorative fire according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0020] The embodiment shown in the FIGURE is an atmospheric gas burner for a decorative fire, which has a mixing chamber 1 provided in a conventional manner, which is closed on a top side by a burner medium providing a flame-bearing surface in the form of a burner mat 2. In preferred embodiments the burner mat 2 and/or the planar flame-bearing surface are flat or planar or substantially flat or planar.

[0021] The burner medium can be realized with common conventional means, e.g., with a fleece-like burner mat made of ceramic or metallic fibers, and/or from a ceramic foam, from a ceramic perforated plate, from a porous stone plate or from a perforated metal plate.

[0022] The mixing chamber 1 can have many geometric forms. In the case of the illustrated embodiment the mixing chamber is formed as a parallelepiped-shaped can. However it can also have a multi-cornered, round or oval shape, i.e. in principle any desired geometry. That is also true for the burner mat.

[0023] The mixing chamber 1 has a bottom part 3 with a central opening 3a. Furthermore a pre-mixed combustion gas/air supply system 4 is fixed to this bottom part 3, with a single combustion gas injection nozzle 5 and a symbolically illustrated opening 6 for primary air, which is pre-mixed with combustion gas in the combustion gas/air supply system 4, which especially is formed by a Venturi pipe. The type of combustion gas actually used determines the actual number of openings 6. For example, liquified gas requires more openings than natural gas. The perforations can be round, but also triangular and/or can generally have an arbitrary configuration. The amount of supplied primary air should be selected by suitable construction of the perforations 6, so that a yellow flame is guaranteed.

[0024] The outlet opening of the combustion gas/air supply system 4 coincides with the central opening 3a, so that the pre-mixed combustion gas/air mixture flows into the mixing chamber 1 and swirls there. A conventional distributor plate 7 in the mixing chamber 1 distributes the mixture uniformly under the burner mat 2.

[0025] A small blower or fan 8 is integrated in the mixing chamber 1, whose rotor blades 8a are positioned horizontally in the bottom part 3 above the opening 3a and rotate substantially horizontally in operation, i.e., in a plane that is more or less parallel with the flat or planar burner mat 2. The terms “small fan” and “small blower” are synonymous. This term “small blower” or “small fan” is defined as a blower or fan characterized by a capacity of 5 to 20 l/min or at least 5 to 20 l/min. Furthermore the small blower 8 has an electric motor 8b, which is arranged outside of the mixing chamber, because of the danger of an explosion. It can be a 24 V direct current (D.C.) motor or a 220 V alternating current motor. Its vertically aligned drive shaft 8c passes through the bottom portion of the pre-mixing combustion gas air supply system 4. A seal 9 for gas-tight closure is provided around the shaft 8c where it passes through the bottom portion.

[0026] The motor of the blower or fan 8 has an appropriate comparatively small rotation speed according to the required small blower capacity or power. The pressure drop of the gas burner in the combustion chamber is no longer so relevant because of the assisted flow provided by the small blower 8. This allows the designer to reduce the combustion surface of the gas burner, i.e. to provide a compact gas burner. Since the small blower 8 directs the flow of gas vertically upward because the rotor blades rotate substantially horizontally in operation, long vertical flames are produced. The small blower produces turbulence in the mixing chamber 1, which significantly improves the actual flame appearance 10 of the gas burner. The distributor plate 7 influences the combustion only slightly.

[0027] Furthermore the required amounts of combustion gas can be reduced by the capacity of the small blower in comparison to the prior art systems.

[0028] The gas burner has a continuous burner surface. However it can also have several spaced-apart burner surfaces.


[0030] While the invention has been illustrated and described as embodied in a flat or planar atmospheric gas burner, especially for mimicking a wood fire, it is not intended to be limited to the details shown, since various modifications and changes may be made without departing in any way from the spirit of the present invention.

[0031] Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

[0032] What is claimed is new and is set forth in the following appended claims.

I claim:

1. An atmospheric gas burner for a decorative fire, said atmospheric burner comprising:

   a mixing chamber (1) closed on an upper side thereof by a burner mat (2) providing a flame-bearing surface;

   a pre-mixing burner gas/air supply system (4) connected with the mixing chamber (1) on a bottom side thereof, said pre-mixing burner gas/air supply system having a combustion gas injection nozzle (5) and at least one opening (6) for supplying primary air; and

   a small blower (8) is arranged in the mixing chamber (1), wherein said small blower (8) comprises a rotor blade or blades (8) that rotate substantially horizontally in operation.

2. The atmospheric gas burner as defined in claim 1, wherein the mixing chamber (1) has an opening (3a), the pre-mixing burner gas/air supply system (4) has an outlet opening connected to the opening (3a) and the small blower (8) is arranged in the vicinity of the outlet opening.
3. The atmospheric gas burner as defined in claim 1, wherein the small blower (8) has an electric motor (8b) acting as drive means for the rotor blade or blades, said electric motor (8b) is arranged outside of the mixing chamber (1) and the combustion gas/air supply system (4), and the electric motor (8b) has a vertically oriented drive shaft (8c) guided from outside of the mixing chamber (1) to an interior of the mixing chamber (1) via a gas-tight seal (9).

4. The atmospheric gas burner as defined in claim 3, wherein the electric motor (8b) is a low-voltage direct current motor.

5. The atmospheric gas burner as defined in claim 3, wherein the electric motor (8b) is an alternating current motor.

6. The atmospheric gas burner as defined in claim 1, wherein the small blower (8) is characterized by a capacity in a range from 5 to 20 l/min.

7. The atmospheric gas burner as defined in claim 1, wherein the at least one opening (6) for supplying primary air is designed so that a primary airflow rate has a value sufficient to produce a yellow flame appearance.

8. The atmospheric gas burner as defined in claim 1, wherein the mixing chamber (1) does not contain a granulate for varying flame appearance during operation.

9. The atmospheric gas burner as defined in claim 1, wherein the flame-bearing surface is substantially flat or planar.

* * * * *