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(54) Pilot flame burner with atmospheric sensor

(57) The pilot burner (1) with atmospheric sensor comprises a vertical tubular body (2), carried on a support plate (8), a safety thermocouple (9) and an ignition plug (10). The body (2) conveys a prior gas-air mixture from a mixing chamber (6) to a shapeable metal plate tube (7), forming an angled portion (7a) for orientation to a flat outlet faucet (11), which has a neck (17) in the middle to form two fluted parts (11a, 11b), generating two respective flame zones (15a, 15b) of a single divergent open flame, directed at the main burner and the thermocouple, respectively. There is a secondary air aperture (16) in the angled tube portion (7a) to generate and supply the flame (15).

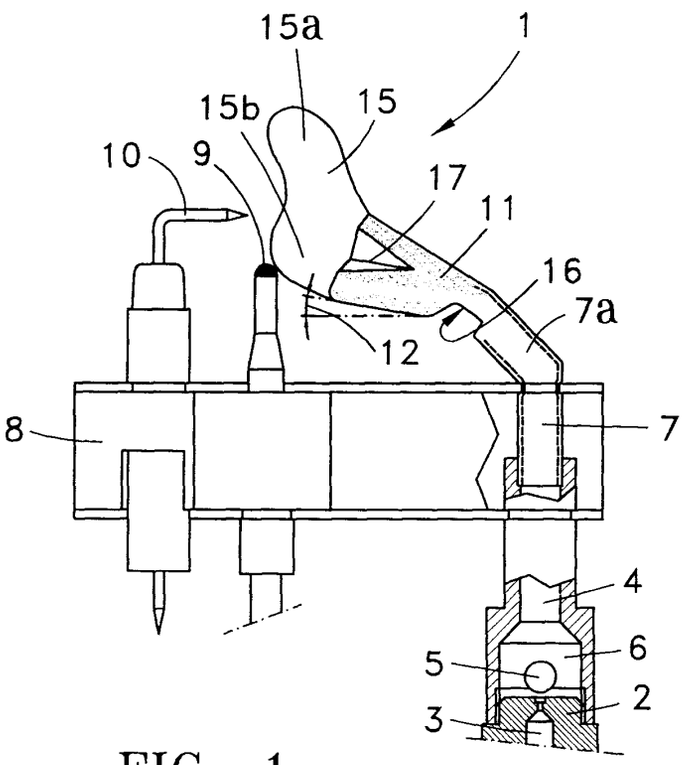

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to pilot gas burners for ignition, which at the same time act as safety devices for controlling the main burner combustion by means of a thermocouple.

PRIOR ART

[0002] Pilot flame burners need a high proportion of air in the burning mixture in order to maintain a stable ignition flame. Pilot flame burners that have a safety thermocouple to sense a pressure drop in the supply gas possess an additional flame for heating the thermocouple, which requires a proportion of gas close to the mixture rating. If the safety thermocouple is also an atmospheric sensor, it needs the heating flame to be supplied with a close proportion of air in the burning mixture in order to detect the deflexion of air oxygen. Pilot burners that only sense the atmosphere have a separate sensing flame independent of the ignition flame, which is released from the faucet due to the close proportion of air in the mixture and ceases to heat the thermocouple when the oxygen content of the atmosphere drops. For this reason pilot burners with a safety thermocouple have a fork in the mixture pipe with two outlet faucets, one for each flame, each with a secondary air intake aperture to obtain two separate flames.

[0003] ES-8405127-A (EP-100758) describes a pilot burner with a safety device for a gas burner that senses the deflexion of air oxygen for the burning mixture, for example below 18.5%. It has a single spout outlet faucet and a mixing chamber with two primary air inlet holes, which produces two separate flames, one for heating the thermocouple in the outlet faucet and the other for ignition on the spout outlet, with an intermediate secondary air intake between the two flames.

[0004] ES-U0182081 (FR-U2145168) describes a burner with a pilot flame, with a faucet that is made of metal plate and formed from the gas ducting pipe. The faucet has a baffle plate to deflect a second flame, which issues at an angle aimed at a safety thermocouple. The ignition plug and the thermocouple are carried by the same burner support plate and both stand out parallel from it in the vertical direction. The plug is inserted in the air intake aperture, where the flame is generated. The thermocouple only senses the lack of fuel through the absence of a flame, so the gas and the primary air for burning are mixed in a air suction aperture, at the place where the faucet starts widening from the tube. If the oxygen content of the room atmosphere dropped below a minimum permissible proportion, for example 18.5%, the thermocouple of this pilot burner would not detect the anomalies, because the burning mixture may be enriched through the air intake aperture, which is where the flame is generated.

DISCLOSURE OF THE INVENTION

[0005] The object of the invention is a pilot flame burner for igniting a domestic stove or water heater, fitted with a safety thermocouple, as defined in claim 1.

[0006] The pilot flame burner with a safety thermocouple according to the invention senses both the deflexion of oxygen and the drop in the burning gas pressure in the main burner supply. The simultaneous sensing of both combustion anomalies is possible by means of a flame faucet, which in the former case the part of the flame that heats the thermocouple is released, whereas in the latter case the flame contracts.

[0007] The pilot burner according to the invention has a faucet formed with metal plate, which stems from a cylindrical tube that conveys the burning mixture to the pilot burner, and is configured to obtain a single open flame which is aimed at and reaches both the main burner for its ignition, as well as the head of the safety thermocouple. To achieve both pilot flame functions, it is necessary to limit the spread, extent and direction of the pilot flame with such precision by means of the shaping of the faucet defined in the claims, and in this way the single divergent flame obtained is partitioned with two flame zones of differing extent and direction. Although a burning mixture is obtained in a lower chamber of the burner body through a primary air intake, the burner is also provided with a secondary air intake aperture for combustion, which is situated in a tubular extension of the body. The flame originates from the secondary air intake opening to be used both for igniting the main stove burner and for sensing the deflexion of the atmosphere. This aperture has an area calculated for the intake of a volume of atmospheric air so that the amount of air of the end mixture that is ignited is in the right proportion for the stoichiometry of combustion.

DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is an elevational view of the pilot burner with an atmospheric sensing flame, in accordance with the invention.

[0009] FIG. 2 and FIG. 3 are plan and profile views respectively of the pilot burner of figure 1.

DETAILED DESCRIPTION OF THE INVENTION

[0010] With reference to figures 1 to 3, a preferred embodiment of burner 1 according to the invention, comprises a vertical tubular body 2 made for instance of brass carried on a support plate 8, the safety thermocouple 9 and the ignition plug 10 carried on the same support plate 8, and pointing in a vertical direction parallely to body 2. At its lower end the burner body 2 has a gas injection tube 3, the mixing chamber 6 and a burning mixture venturi tube 4, which is connected at the top to a shapeable plate tube, which conveys the mixture to the flame faucet 11.

[0011] The primary atmospheric air for the mixture enters from the calibrated holes 5 on the mixing chamber 6. The mixture ducting tube is bent to the height of the support plate 8 forming a portion 7a of tube angled for the orientation of the faucet 11, which is flat and has a neck 17 in the middle to form two fluted parts 11a and 11b with rounded outlets. The aperture 16 for the secondary air intake is in the angled tube portion 7a, while the flame is generated from here, and is configured afterwards through faucet 11, which produces the form of a single, divergent and open flame 15 with two flame zones 15a and 15b, the former as shown in fig. 1, is of longer reach to direct itself towards the main burner, gradually separating from the thermocouple 9, whereas flame zone 15b has a tip that reaches the head of the thermocouple 9 for its precise heating, since without a sufficient supply of oxygen in the air, it has to be released, in order the thermocouple 9 to be cooled.

[0012] In case of a drop in gas pressure, the aperture 16 takes in a smaller amount of air due to the lower speed of the mixture, and flame zone 15b contracts and is diverted upwards away from its orientation towards the head of the thermocouple.

[0013] For the widthwise extent of the flame 15, the faucet 11 has an angle of divergence 13 (fig.2), for example of 30° (degrees). For the directing of the two flames zones 15a and 15b, the faucet 11 as it is viewed in its elevational position (fig.1), has a tilt angle 12 relative to the horizontal plane of the support plate 8 , for instance of 13 degrees, so as to direct the flame towards the head of the thermocouple 9, and as it is viewed from a lateral side (fig. 3), it has a tilt angle 14, for example of 26 degrees, which makes it possible to control the precise heating of the thermocouple (9) to detect a drop in gas pressure. The aperture 16 for the secondary air intake is extended (fig. 1) below the faucet up to the end of the outlets 11a and 11b (fig.3).

Claims

1. Pilot flame burner for the ignition the main burner of a domestic stove or heater, and for heating a safety thermocouple (9) for detecting combustion anomalies, that comprises a tubular burner body (2) carried on a horizontal support plate (8), an ignition plug (10) and said safety thermocouple (9), both carried on the same support plate (8) in a vertical arrangement, wherein the body (2) has a lower chamber (6) for mixing the fuel gas with primary air, which is connected to a flame outlet faucet (11), characterised in that it has a faucet for the outlet of a single flame (15) for ignition and for detecting combustion anomalies, in the form of a flat divergent duct (11a,11b) at a tilt angle (12, 14) relative to the plane of the support plate (8), to direct the flame (15) both towards the main burner and towards the safety thermocouple (9).

2. The pilot flame burner of claim 1, wherein the mixture pipe (7) ahead of the faucet (11), has an aperture (16) for the intake of secondary air for combustion ahead of the single flame (15) orientation faucet (11).

3. The pilot flame burner of claim 1, wherein the flame outlet faucet (11) has a central neck (17) for the formation of two flame zones (15a, 15b) of the single flame (15) of a different extent, and which is directed by means of a dual tilt angle (12, 14) relative to the two directions parallel to the horizontal plane of the support plate (8).

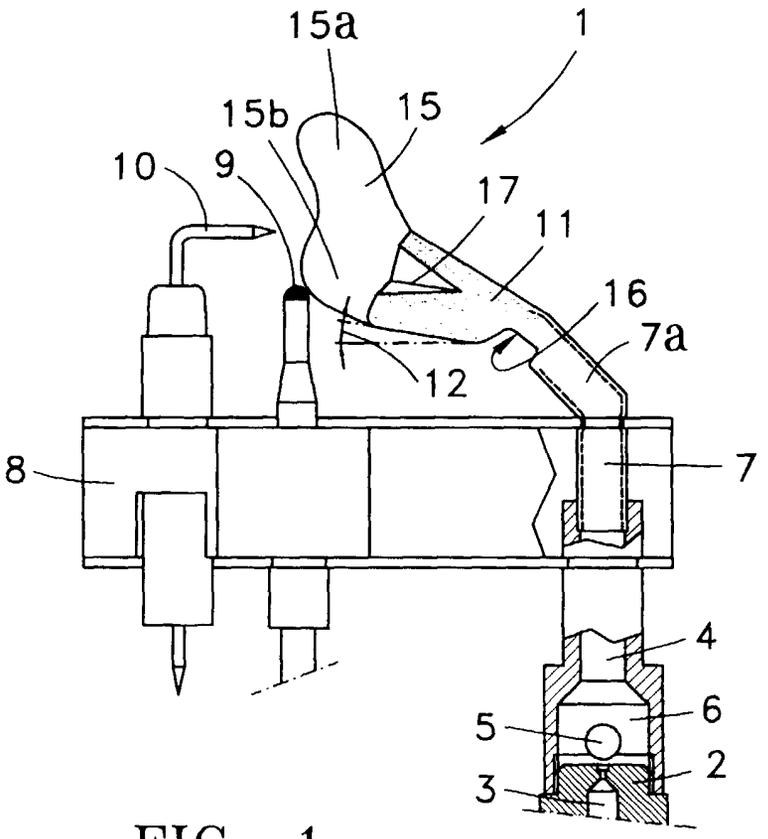

FIG. 1

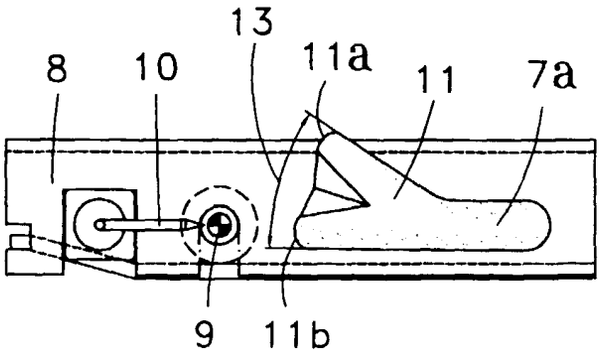

FIG. 2

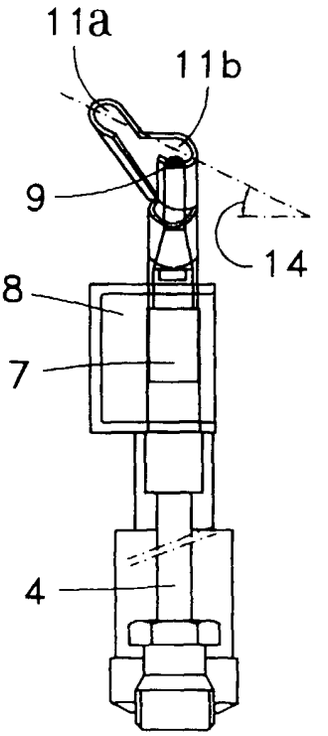

FIG. 3