

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 83200133.3

51 Int. Cl.³: **F 23 C 3/00**
F 23 D 13/40

22 Date of filing: 25.01.83

30 Priority: 26.01.82 NL 8200272

43 Date of publication of application:
10.08.83 Bulletin 83/32

84 Designated Contracting States:
BE DE FR GB IT NL

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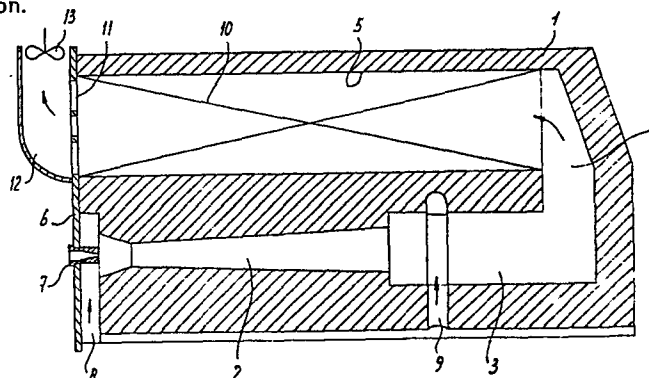
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54 **Burner.**

57 A burner in particular a gas burner for e.g. a central heating installation. The burner comprises a mixing zone or a mixing tube 2 and opening therein at its one end at least one injection nozzle 7 for supplying pressurized fuel, in particular a gaseous fuel in drawing at least primary combustion air from the atmosphere. Further, the burner comprises a discharge 12 for combustion gases. At its other end the mixing zone or mixing tube 2 is in communication with a substantially closed combustion chamber 3 which is in communication with the discharge 12 for combustion gases. The walls of said combustion chamber 3 consist of a refractory material having relatively poor heat conduction.

fig-1



Burner.

The invention relates to a burner, in particular a gas burner for an apparatus, for example a central heating installation, comprising a mixing zone or mixing tube and at least one injection nozzle which opens into the mixing zone at the one end thereof for
5 supplying pressurized fuel, in particular a gaseous fuel, indrawing at least primary combustion air from the atmosphere and a discharge for combustion gases. Such a burner is generally known and is called an atmospheric burner, because all of combustion air is supplied under atmospheric pressure.

10 In the known burner a complete combustion of fuel is guaranteed more or less by a high flame-length and a high excess of air by which much space is necessary and the apparatus efficiency is relatively low. Moreover, said known burner is constructed for one gas quality having narrow tolerances, whereas the pressure under which said gas
15 is supplied, may not vary substantially.

For obtaining a relatively small flame-length it is known, to use a completely premixing burner in which thus, the fuel is premixed with the total quantity of required combustion air in the mixing zone, but said burner has the disadvantage of a high sensitivity for
20 dirt and a very high burner temperature, by which the burner is expensive, while often a higher gas pressure than the normal distribution pressure is necessary.

The invention has the object to provide a burner of mentioned type not having said disadvantages.

25 This object is achieved in that in the burner according to the invention the mixing zone or mixing tube is at its other end in communication with a substantially closed combustion chamber which is in communication with the discharge for the combustion gases, the walls of said combustion chamber consisting of a refractory material having
30 a relatively poor heat conduction.

By the poor heat conduction the wall temperature of the combustion chamber will be approximately as high as that of the combustion gases, by which the combustion gases do not cool in the combustion chamber and the length of the flame becomes small and it

needs to be operated with only a very low excess of air. Moreover, any dirt particles in the combustion air are completely burnt by the high temperature, so that fouling of the burner cannot occur.

Because the mixing zone or mixing tube substantially merges into
5 the substantially closed combustion chamber, the combustion air may be metered e.g. by a control of the draught or the resistance such that the excess of air is very low without the occurrence of an incomplete combustion, so that the apparatus efficiency is relatively high. Further gases of widely divergent qualities may be used and
10 gases supplied under different pressures without the necessity of a modification of the burner and without endangering complete combustion of said gases. Moreover, in operation relatively little noise is produced.

In an embodiment of the invention in which in injecting the fuel
15 only primary combustion air is drawn, near the connection of the mixing chamber with the mixing zone or mixing tube, at least one aperture is provided for supplying secondary combustion air from the atmosphere.

In an advantageous way in a burner in which a heat exchanger is
20 provided between the burner and the discharge for combustion gases, according to the invention the heat exchanger is lined by the same material as that of the walls of the combustion chamber.

Because the combustion gases produced by the burner have a high temperature, said gases are not allowed to contact a metal, unless
25 said metal is cooled in some way. In order to prevent the heat exchanger from having an expensive water or air cooled wall of metal, the heat exchanger according to the invention is lined by the same material as that of the walls of the combustion chamber, preferably, said lining being obtained by accommodating the heat exchanger in a
30 cavity formed in a block of refractory material having a relatively poor heat conduction, in which also at least the combustion chamber is formed, by which a very simple burner unit having low manufacturing costs is obtained.

Preferably, said refractory material having a relatively poor
35 heat conduction is a ceramic material.

The invention is described in detail by reference to the drawing in which:

Fig. 1 shows in axial section an embodiment of a burner according to the invention having a supply for secondary combustion air, and

Fig. 2 shows a burner according to the invention in which the total quantity of required combustion air is drawn at the injection nozzle.

As shown in Fig. 1 the burner comprises a block 1 of a ceramic material. In said block a mixing tube 2 and connected therewith a combustion chamber 3 are formed, said chamber being in communication with the cavity 5 through passage 4, and the mixing tube 2 and the cavity 5 being open at one side of the block 1 but covered by a covering plate 6. In the covering plate 6 an injection nozzle 7 is fixed, which can be connected to a source of pressurized gas. At 8 a passage for supplying primary combustion air from the atmosphere is formed, said air being drawn in by injecting gas through the injection nozzle 7, after which said air is mixed with the gas in the mixing tube 2

In the external wall of the combustion chamber 3 an aperture 9 is provided for drawing in secondary combustion air from the atmosphere. In the combustion chamber 3 the gas is combusted completely, the secondary air being supplied in metered quantities such that the excess of air is only very low.

In the cavity 5 a heat exchanger 10 indicated only schematically is provided, through which the hot combustion gases coming from the combustion chamber 3 flow. Because the heat exchanger 10 is entirely enclosed by the walls of the cavity 5, said walls being of a ceramic material, i.e. a refractory material having a relatively low heat conduction, the heat exchanger does not need to have an expensive water cooled or air cooled wall.

The combustion gases leave the heat exchanger through the apertures 11 in the covering plate 6 and then flow into the discharge 12 in which a fan 13 may be provided for controlling the draught.

As shown in Fig. 2 the burner consists of block 14 of ceramic material. In said block a mixing zone 15 and connected therewith a combustion chamber 16 are formed, said chamber being in communication with the cavity 18 through the passage 17, the mixing zone 15 and the cavity 18 being open at one side of the block 14, but are covered by

a covering plate 19. In the covering plate 19 an injection nozzle 20 is fixed which can be connected to a source of pressurized gas. At 21 a passage for supplying all combustion air from the atmosphere is formed, said air being mixed with the gas in the mixing zone 15. In 5 the cavity 18 again a heat exchanger 22 is provided in the same way as in the embodiment according to Fig. 1, the combustion gases flowing through the apertures 23 into the discharge 24, in which discharge a fan 25 may be provided.

It will be clear that other embodiments are possible without 10 leaving the scope of the invention.

CLAIMS.

1. Burner in particular a gas burner for e.g. a central heating installation, comprising a mixing zone or a mixing tube and at least one injection nozzle which opens into the mixing zone at the one end
5 thereof for supplying pressurized fuel, in particular a gaseous fuel in drawing at least primary combustion air from the atmosphere and a discharge for the combustion gases, characterized in that at its other end the mixing zone or mixing tube is in communication with a substantially closed combustion chamber which is in communication
10 with the discharge for the combustion gases, the walls of said combustion chamber consisting of a refractory material having relatively poor heat conduction.

2. Burner according to claim 1, characterized in that near the connection of the mixing chamber with the mixing zone or mixing tube,
15 at least one aperture is provided for supplying secondary combustion air from the atmosphere.

3. Burner according to claim 1 or 2, in which a heat exchanger is provided between the burner and the discharge of the combustion gases, characterized in that the heat exchanger is lined by the same
20 material as from which the walls of the combustion chamber consist.

4. Burner according to claim 3, characterized in that the heat exchanger is accommodated in a cavity formed in a block of refractory material having a relatively poor heat conduction, in which also at least the combustion chamber is formed.

25 5. Burner according to claims 1-4, characterized in that said refractory material having a relatively poor heat conduction is a ceramic material.

Fig-1

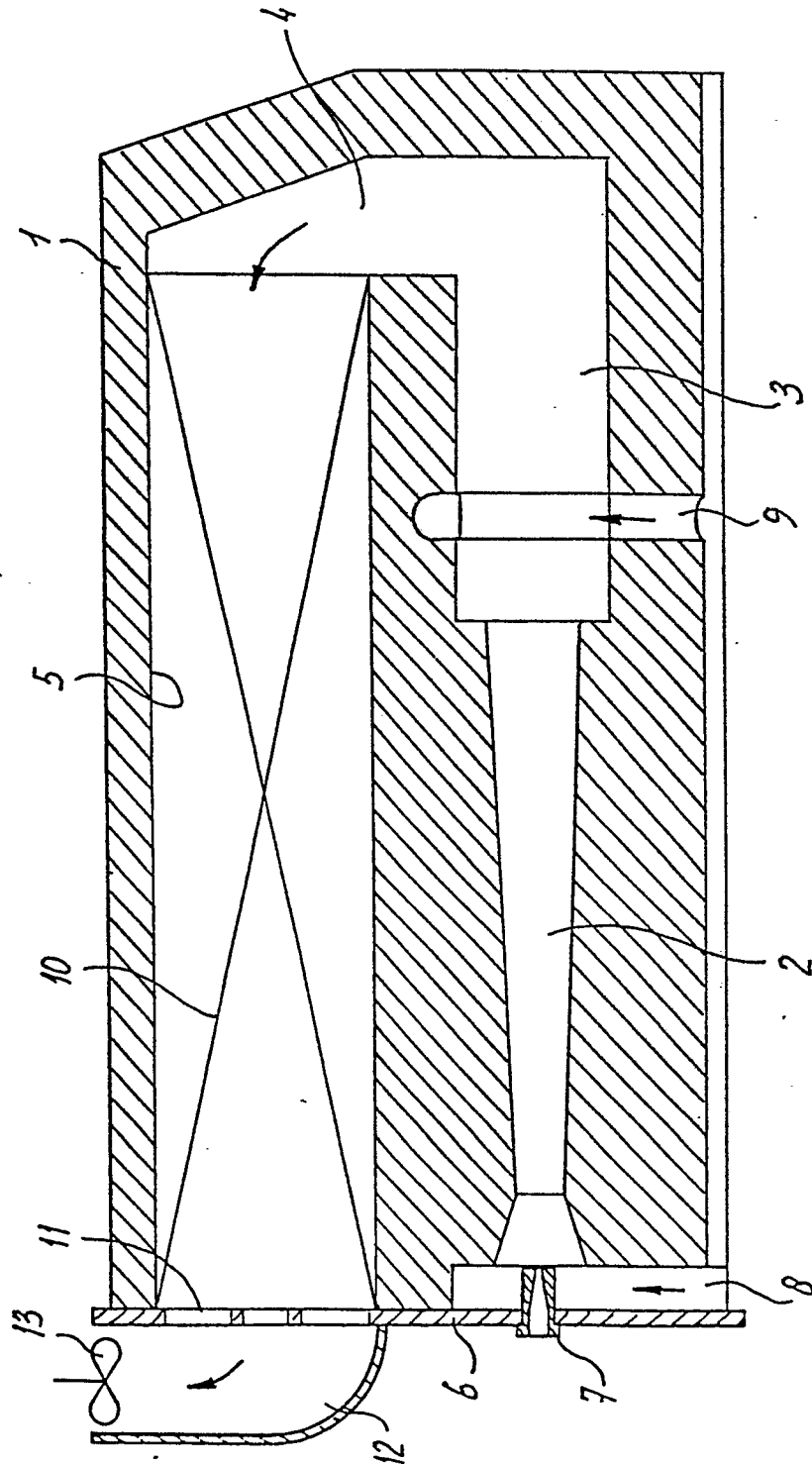
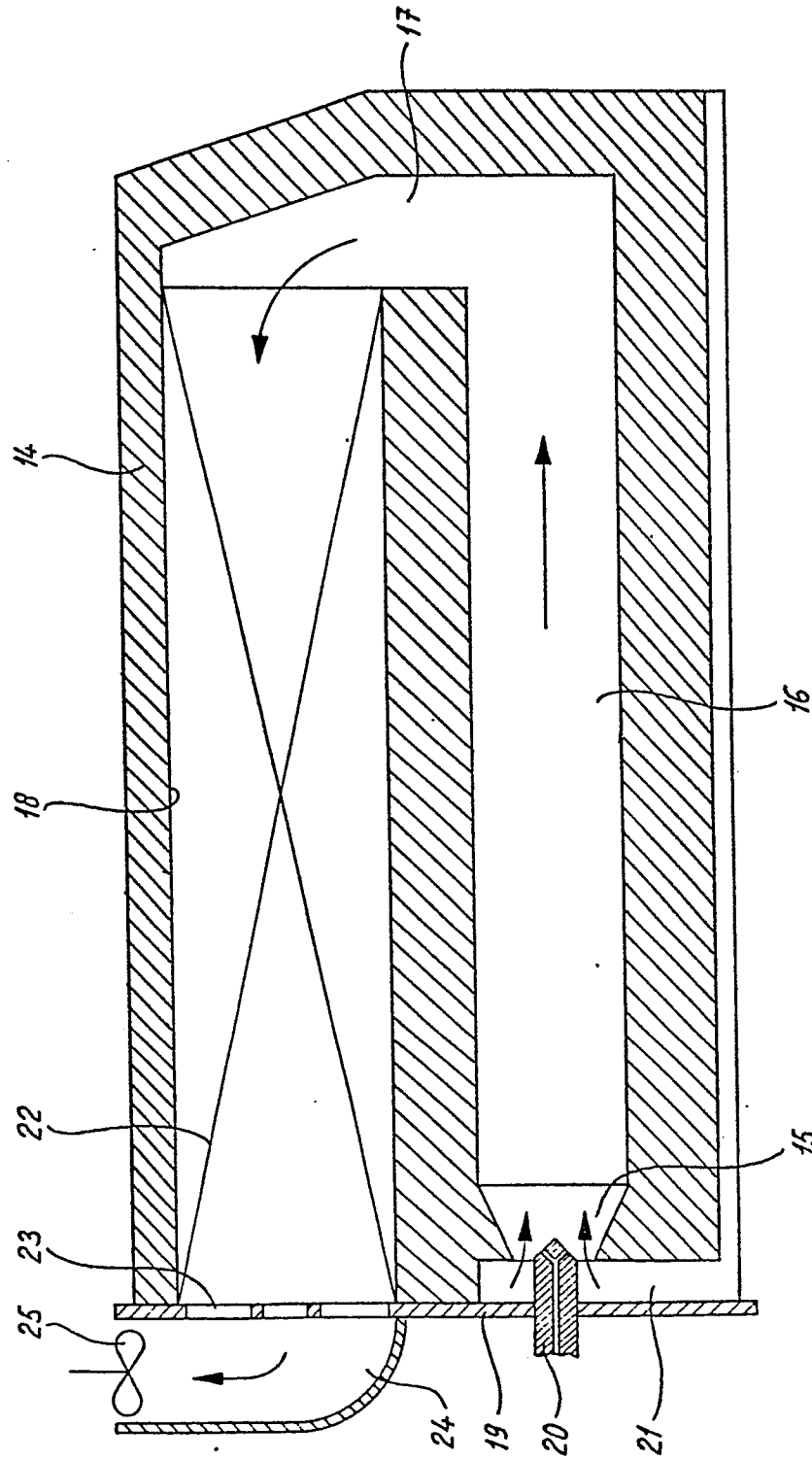


fig-2





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	BE-A- 396 309 (THE GAS LIGHT AND COKE CO.) *Page 3, line 15 - page 4, line 27; figures 1-3*	1,4	F 23 C 3/00 F 23 D 13/40
A	--- EP-A-0 021 035 (RUHRGAS) *Page 7, line 28 to page 8, line 1; figure 2*	1,5	
A	--- GB-A- 602 919 (STEVENS) *Page 1, line 78 to page 2, line 61; figure 1*	2	
A	--- NL-A-8 000 460 (LEENAARS) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			F 23 C F 23 D F 24 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-05-1983	Examiner PHOA Y.E.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	