



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 731 831 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

13.12.2006 Bulletin 2006/50

(21) Application number: **05425482.6**

(22) Date of filing: **07.07.2005**

(51) Int Cl.:

F23B 50/10 (2006.01)

F23B 40/00 (2006.01)

F23G 7/10 (2006.01)

F23K 3/14 (2006.01)

F23L 5/02 (2006.01)

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

Designated Extension States:

AL BA HR MK YU

(30) Priority: **06.06.2005 IT BG20050035**

(71) Applicant: **Jolly-Mec Caminetti S.p.a.**
24060 Telgate BG (IT)

(72) Inventor: **Manenti, Emilio**
24060 Telgate (Bergamo) (IT)

(74) Representative: **Gatti, Enrico et al**
Gianbrocono & C. S.p.a.,
3, Via E. Zambianchi
24121 Bergamo (IT)

(54) High efficiency burner

(57) A burner with a dispenser part (1) and a combustion part (2), said dispenser part comprising an inlet opening (6) for the fuel, said burner being characterised by comprising a drum (8) which in its interior contains flame arrester walls (10) fixed to a flame arrester shaft (9) rotating about its axis, under said drum (8) there being disposed a secondary screw shaft (11) for feeding fuel

from the dispenser part (1) to a basket (12) located within the combustion part (2), said burner further comprising a primary screw shaft (7) positioned upstream of said drum (8) to feed the fuel to said inlet opening (6), said flame arrester shaft (9), said secondary shaft 11 and said primary shaft (7) being driven synchronously by a transmission member driven by a gearmotor (17).

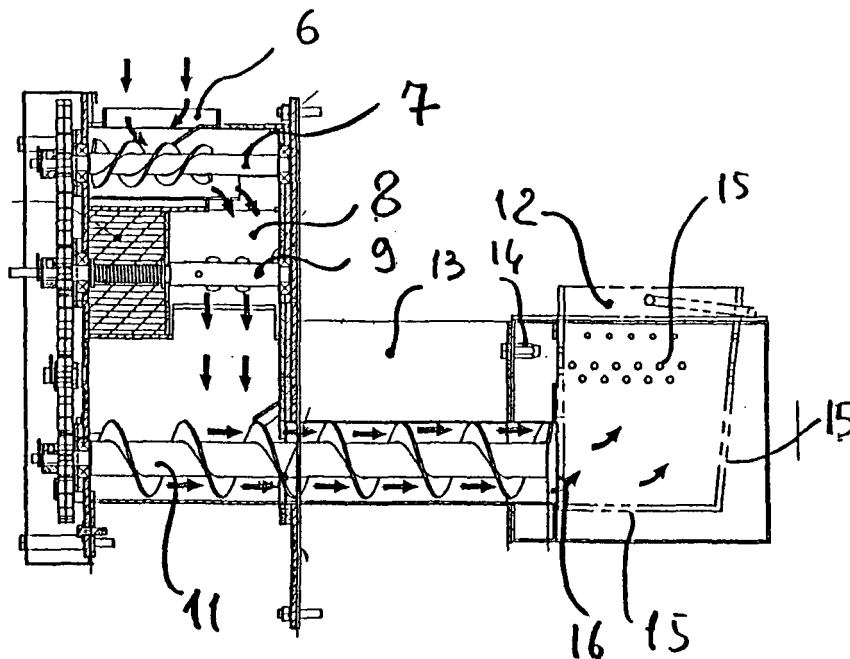


FIG. 3

EP 1 731 831 A1

Description

[0001] The present invention relates to a burner in accordance with the introduction to the main claim.

[0002] The state of the art includes burners which use ecological fuel generally crushed into small-dimension pieces known as pellets. This fuel is conveyed to the burner, to which an air stream is also fed for the combustion reaction.

[0003] The fuel is currently dispensed by a plate of controlled inclination which also behaves as a flame arrester to prevent the combustion reaction passing to the fuel reserve upstream of the plate.

[0004] Ideally, the fuel and combustion air should be in stoichiometric ratio to achieve optimum combustion. However the fuel is currently unable to be accurately dispensed so that it enters the burner in excess and does not participate completely in the combustion reaction. This results in a reduced burner efficiency and fuel wastage. Moreover, to achieve good mixing between the air and fuel, this latter is dropped from above with the result that a part is dispersed by convective movements without contributing to the combustion.

[0005] The object of the present invention is therefore to provide a burner which enables the stated drawback to be overcome, and in particular a burner able to accurately dispense the fed fuel, in order to achieve higher efficiency.

[0006] Said object is attained by a burner the inventive characteristics of which are defined by the accompanying claims.

[0007] The invention will be more apparent from the following detailed description of a preferred embodiment thereof, provided by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a side view of the burner according to the invention;

Figure 2 is a view of the burner of the invention taken from above;

Figure 3 is a longitudinal section through the burner of the invention;

Figure 4 is a cross-section through the burner on the plane 4-4 of Figure 1.

[0008] With reference to the figures, the burner according to the invention comprises a dispenser part 1 connected to a combustion part 2 via a feed section 3. To the side of the dispenser part 1 there is a gear-type transmission member 4 driven by a gearmotor 17. An air blower 5 is disposed external to the dispenser part 1. The dispenser part 1 also presents an inlet opening 6 for fuel entry.

[0009] With reference to Figures 3 and 4, it can be seen that in the interior of the dispenser part 1 a primary screw shaft 7 is provided, rotated at predetermined speed. Below the primary shaft there is a fixed drum 8 internally carrying a rotating shaft 9 to which flame ar-

rester and smoke arrester walls 10 are fixed, they dividing the drum into four sectors to form a rotary valve. The drum 8 laterally presents two openings, one upper and one lower, for fuel passage. A secondary screw shaft 11 is disposed below the drum 8 and extends through the feed section 3 to reach a basket 12 which is disposed within the combustion part 2 and is extractable therefrom. The basket 12, raised from the floor by suitable supports, not shown, presents small holes 15 in its sides and base to allow air passage, and a lateral hole of greater dimensions to allow entry of the fuel conveyed by the secondary screw shaft 11. The feed section 3 upperly comprises a channel 13 enabling the air originating from the blower 5 to enter the basket 12 through the area external to the basket 12 and the small holes 15 in the basket 12. An igniter 14 is positioned close to the basket 12.

[0010] The primary shaft 7 is of smaller dimensions than the secondary shaft 11, its screw being likewise of smaller pitch than that of the secondary shaft 11, to achieve accurate fuel dispensing.

[0011] During operation, the fuel, the path of which is indicated by the arrows of Figures 3 and 4, enters the burner through the inlet opening 6 and is dispensed with accuracy by the primary screw shaft 7, to enter the drum 8 divided into sectors. Rotation of the rotary shaft 9 causes the sectors formed by the flame arrester walls 10 to rotate, to pour the fuel onto the secondary shaft 11 which is also provided with a screw. The movement of the secondary shaft 11, driven by the transmission member 4, feeds the fuel into the basket 12. At the same time the blower 5 feeds air under pressure into the channel 13 from which it passes into the combustion part 2 to enter the basket 12. Air and fuel then mix in the basket 12 in which the combustion reaction takes place, when triggered.

[0012] As the basket 12 is extractable, the combustion residues can be advantageously eliminated by extracting the basket 12.

[0013] Because of the presence of the primary shaft 7, which is provided with a screw, the fuel can be accurately dispensed to obtain an optimum air-fuel ratio, enabling maximized fuel efficiency to be obtained without fuel wastage.

[0014] The transmission member 4 enables the three elements of the dispenser part 1, i.e. the primary shaft 7, the rotary valve 9 and the secondary shaft 11 to be synchronized. The fuel feed is increased or decreased depending on the heat quantity required.

[0015] The air flow from the blower 5 is also suitably regulated by an electrical/electronic control circuit, not shown.

[0016] Because of the presence of small holes 15 in the sides and base of the basket 12, the air mixes well with the fuel, which can be fed into the bottom of the basket 12, so avoiding the need for the fuel to fall from above.

Claims

1. A burner with a dispenser part (1) and a combustion part (2), said dispenser part comprising an inlet opening (6) for the fuel, said burner being **characterised by** comprising a drum (8) which in its interior contains flame arrester walls (10) fixed to a flame arrester shaft (9) rotating about its axis, under said drum (8) there being disposed a secondary screw shaft (11) for feeding fuel from the dispenser pan (1) to a basket (12) located within the combustion part (2), said burner further comprising a primary screw shaft (7) positioned upstream of said drum (8) to feed the fuel to said inlet opening (6), said flame arrester shaft (9), said secondary shaft 11) and said primary shaft (7) being driven synchronously by a transmission member driven by a gearmotor (17). 5
10
2. A burner as claimed in claim 1, **characterised by** further comprising a blower (5) for feeding air into the basket (12). 20
3. A burner as claimed in claim 1, **characterised in that** said primary screw shaft (7) is disposed within the dispenser part (1). 25
4. A burner as claimed in claim 1, **characterised in that** said primary shaft (7) has smaller dimensions than the secondary shaft (11). 30
5. A burner as claimed in claim 1, **characterised in that** the pitch of the screw on said primary shaft (7) is less than that of the screw on the secondary shaft (11). 35
6. A burner as claimed in claim 1, **characterised by** comprising holes (15) provided in the basket (12) for air feed. 40
7. A burner as claimed in claim 5, **characterised in that** said holes (15) are provided in the base of the basket (12). 45
8. A burner as claimed in claim 5, **characterised in that** said holes (15) are provided in the side walls of the basket (12). 50
9. A burner as claimed in claim 5, **characterised in that** said basket (12) comprises a lateral hole (16) for fuel feed. 55
10. A burner as claimed in claim 8, **characterised in that** said lateral hole (16) is located in proximity to the basket base.

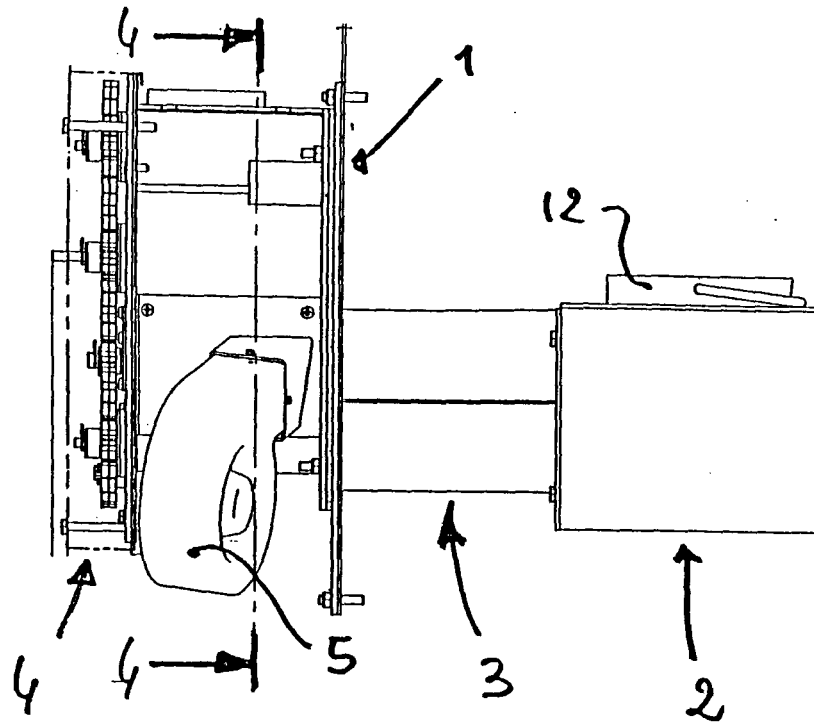


FIG. 1

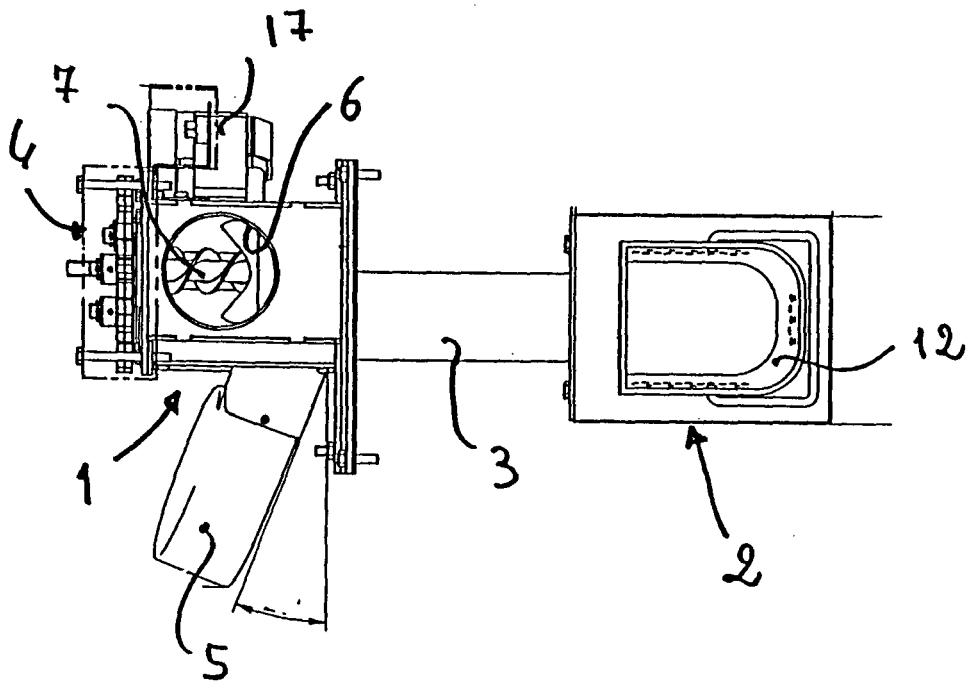


FIG. 2

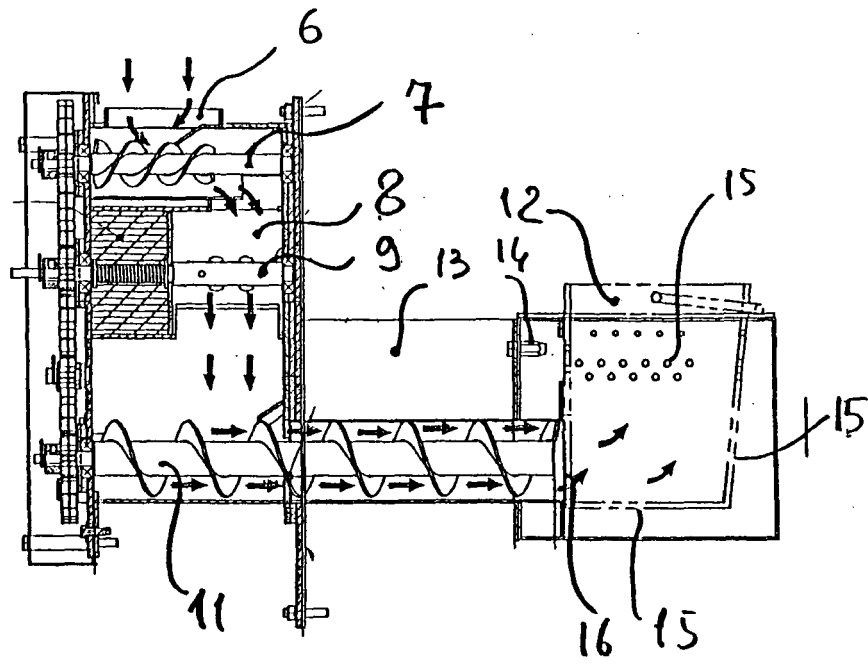


FIG. 3

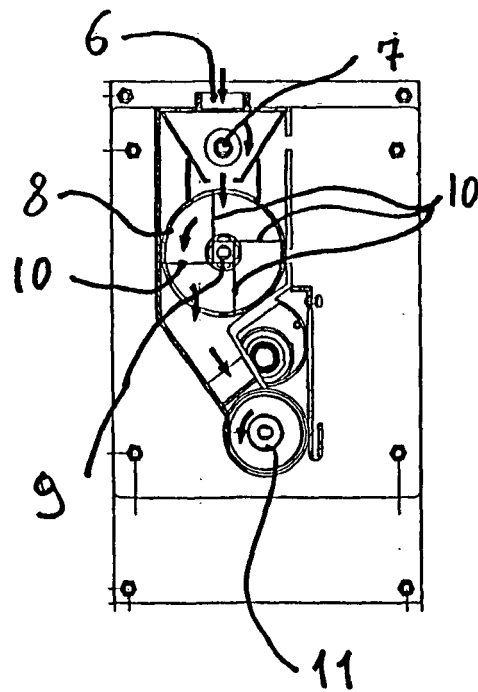


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5482

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 0 915 289 A (PYRO INDUSTRIES, INC) 12 May 1999 (1999-05-12) * column 1, line 5 - line 8 * * column 9, line 12 - column 10, line 55; figures 3,5 *	1-3,6-10	F23B50/10 F23B40/00 F23G7/10 F23K3/14 F23L5/02
Y	AT 398 826 B (RAGGAM AUGUST DR. TECHN) 27 February 1995 (1995-02-27) * page 3, line 44 - page 4, line 5 * * page 4, line 53 - line 55 * * claim 1; figure *	1-3,6-10	
A	EP 1 462 721 A (SWEDISH BIOBURNER SYSTEM AKTIEBOLAG) 29 September 2004 (2004-09-29) * column 4, line 39 - column 6, line 26; figures 1a-1c *	1	
A	DE 201 09 084 U1 (JOOS, BERND) 31 October 2001 (2001-10-31) * page 18, last paragraph - page 21, paragraph 3; figure 1 *	1	
A	EP 0 513 440 A (BIOTERM ENERGY SYSTEMS, INC) 19 November 1992 (1992-11-19) * page 4, line 1 - line 47; figure 1 *	1	F23B F23G F23K F23L
A	US 6 120 567 A (CORDELL ET AL) 19 September 2000 (2000-09-19) * column 3, line 32 - column 4, line 14 * * column 13, line 58 - column 14, line 8 *	1	
A	DE 36 32 354 A1 (SAARBERGWERKE AG) 31 March 1988 (1988-03-31) * the whole document *	1	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 March 2006	Examiner Gavriliu, C
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	

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 42 5482

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-03-2006

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0915289	A	12-05-1999	NO US	985121 A 5893358 A	05-05-1999 13-04-1999

AT 398826	B	27-02-1995	AT	171787 A	15-07-1993

EP 1462721	A	29-09-2004	SE SE	524993 C2 0300806 A	09-11-2004 26-09-2004

DE 20109084	U1	31-10-2001	NONE		

EP 0513440	A	19-11-1992	CA US	2058103 A1 5138957 A	16-11-1992 18-08-1992

US 6120567	A	19-09-2000	NONE		

DE 3632354	A1	31-03-1988	NONE		
