

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
18.10.2023 Bulletin 2023/42

(51) International Patent Classification (IPC):
F23D 14/72 ^(2006.01) **F23N 5/20** ^(2006.01)
F23N 5/24 ^(2006.01) **F23N 1/00** ^(2006.01)

(43) Date of publication A2:
07.06.2023 Bulletin 2023/23

(52) Cooperative Patent Classification (CPC):
F23D 14/725; F23D 14/72; F23N 1/002;
F23N 5/203; F23N 5/242; F23K 2900/05002;
 F23N 2227/02; F23N 2229/00; F23N 2231/06;
 F23N 2231/10; F23N 2231/12

(21) Application number: **22202351.7**

(22) Date of filing: **19.10.2022**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
 GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
 NO PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA
 Designated Validation States:
KH MA MD TN

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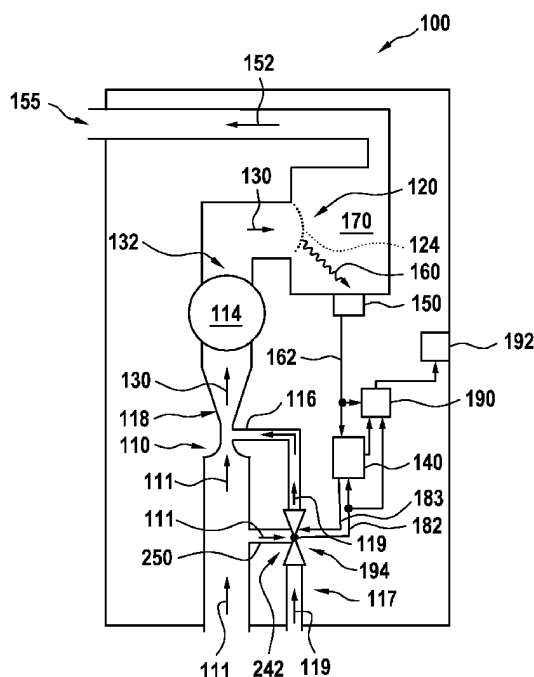
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(30) Priority: 12.11.2021 GB 202116393

(54) **A DEVICE FOR DETERMINING AN EARLIEST FLAME APPEARANCE TIME IN AN AIR-GAS MIXTURE BURNING APPLIANCE**

(57) In an air-gas mixture burning appliance (100) that comprises a burning unit (120), a flame detector (150) an air-gas mixing unit (110), a gas valve (194), and a controller (140), the controller (140) being adapted for determining an earliest flame appearance time for an ignition phase of the burning unit (120) by selecting from at least two different durations of time, wherein the controller (140) determines the earliest flame appearance time as an anticipated minimum duration of time that elapses between an opening of the gas valve (194) and the flame detector (150) sensing the presence of a flame (122) in the burning unit (120).

Fig. 2





EUROPEAN SEARCH REPORT

Application Number

EP 22 20 2351

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2014/199640 A1 (CHIAN BRENT [US] ET AL) 17 July 2014 (2014-07-17) * paragraphs [0018], [0030], [0032], [0033], [0036], [0037], [0047] - [0049] * * figures 1, 2 *	1, 2, 6-10	INV. F23D14/72 F23N5/20 F23N5/24 F23N1/00
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A	DE 199 41 978 A1 (STIEBEL ELTRON GMBH & CO KG [DE]) 15 March 2001 (2001-03-15) * paragraphs [0021] - [0025] * * figures 1-3 *	1, 9	
A	EP 0 146 690 A1 (HONEYWELL INC [US]) 3 July 1985 (1985-07-03) * page 13, line 13 - page 14, line 5 * * figures 1-4 *	1, 3-5, 9	
A	JP 2010 014336 A (RINNAI KK) 21 January 2010 (2010-01-21) * claims 1, 2; figures 1, 2 *	1, 3-5, 9	TECHNICAL FIELDS SEARCHED (IPC) F23D F23K F23N
The present search report has been drawn up for all claims			

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Place of search

Munich

Date of completion of the search

7 September 2023

Examiner

Vogl, Paul

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

EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 22 20 2351

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2, 6-10**Time until flame prediction**

2. claims: 3-5**Gas valve leak detection**

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

EP 22 20 2351

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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
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07-09-2023

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82