



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
21.02.2024 Bulletin 2024/08

(43) Date of publication A2:
20.12.2023 Bulletin 2023/51

(21) Application number: **23165324.7**

(22) Date of filing: **30.03.2023**

(51) International Patent Classification (IPC):
F23D 11/00 (2006.01) **F23D 11/40** (2006.01)
F23D 14/02 (2006.01) **F23N 5/08** (2006.01)

(52) Cooperative Patent Classification (CPC):
F23D 14/02; F23D 11/001; F23D 11/404;
F23N 5/082; F23D 2208/10; F23D 2900/11403;
F23N 2229/00; F23N 2239/04; F23N 2239/06;
F23N 2241/04; F23N 2900/05005

(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

(30) Priority: **13.06.2022 KR 20220071768**

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(54) **WATER HEATING DEVICE WITH FLAME SENSOR**

(57) Disclosed is a water heating device including a combustion chamber provided with an interior space, in which a combustion reaction occurs, a burner that causes the combustion reaction in the interior space, a heat exchanger including a heat exchange pipeline, in which water flows along an interior thereof, and that heats the water by using heat generated by the combustion reaction, a flame detecting sensor that senses flames generated in the interior space, an upper housing covering an upper side of the interior space, and having a mounting hole such that the flame detecting sensor is mounted therein, a flame tube including a tube part that surrounds at least some of the flames on a lower side of the upper housing, and an extending part surrounding a sensing hole formed at a location corresponding to the mounting hole such that the flames are sensed by the flame detecting sensor, and extending from the tube part toward the mounting hole, and a tube packing disposed between an inner surface of the upper housing, which defines the mounting hole and the extending part.

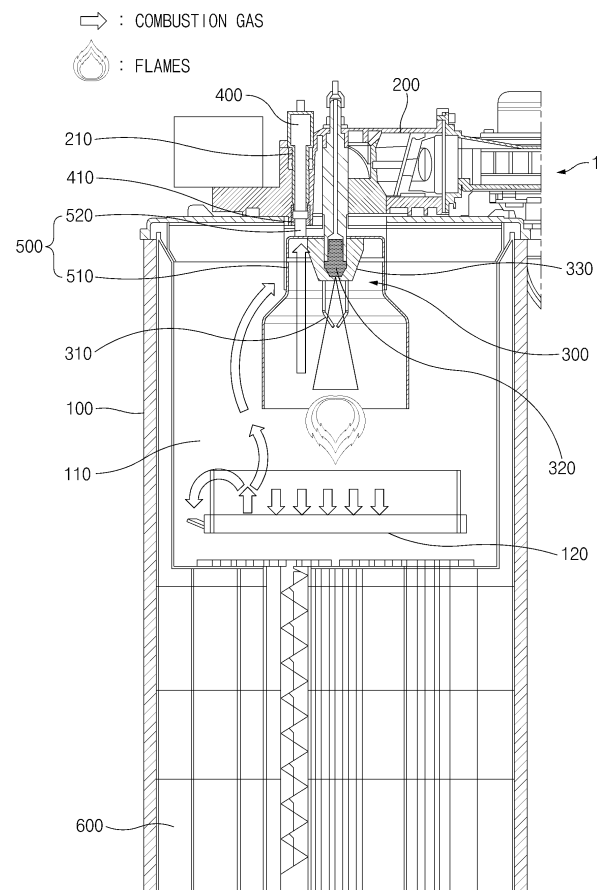


FIG. 1



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	KR 2020 0127764 A (KYUNG DONG NAVIEN CO LTD [KR]) 11 November 2020 (2020-11-11) * paragraphs [0222] - [0235] * * figures 5, 8, 9 * -----	1-4, 6	
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X	KR 2020 0128322 A (KYUNG DONG NAVIEN CO LTD [KR]) 12 November 2020 (2020-11-12) * paragraphs [0219] - [0233] * * figures 5, 8, 9 * -----	1-4, 6	TECHNICAL FIELDS SEARCHED (IPC) F23D F23N
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 23 October 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	



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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.

☐ Only part 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 inventions in respect of which search fees have been paid, namely claims:

☒ 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:

1-6

☐ 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

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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: 1-6**Details of the extending part**

2. claims: 7-9, 15**Details of the sensor packing**

3. claims: 10-14**Details of the flame sensor**

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

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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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