



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
09.08.2023 Bulletin 2023/32

(51) International Patent Classification (IPC):
F25B 47/02 (2006.01) **F25B 49/02** (2006.01)
F25B 13/00 (2006.01) **F25D 21/00** (2006.01)

(43) Date of publication A2:
12.04.2023 Bulletin 2023/15

(52) Cooperative Patent Classification (CPC):
F25B 47/025; F25B 13/00; F25B 49/02;
F25D 21/002; F25B 2500/19; F25B 2500/31;
F25B 2600/23; F25B 2700/2106; F25B 2700/21175

(21) Application number: **22196221.0**

(22) Date of filing: **16.09.2022**

(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 MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **LGL France S.A.S.**
94710 Maisons-Alfort Cedex (FR)

(72) Inventor: **JOVET, Bastien**
Peisey-Nancroix (FR)

(74) Representative: **Barker Brettell LLP**
100 Hagley Road
Edgbaston
Birmingham B16 8QQ (GB)

(30) Priority: **06.10.2021 US 202117494955**

(54) **PROPER DEICING END DETECTION AND DEFROST CYCLE OPTIMIZATION**

(57) A method (300) of defrost operation optimization in a heat pump includes launching (305) a heating mode after completion of a performed defrost operation, measuring (310), after launching the heating mode, a heat transfer capability, determining (315) if the measured

heat transfer capability is less than or equal to a predetermined heat transfer capability limit for a non-iced condition, and reinforcing (320) a next defrost operation if the measured heat transfer capability is greater than the predetermined gap limit.

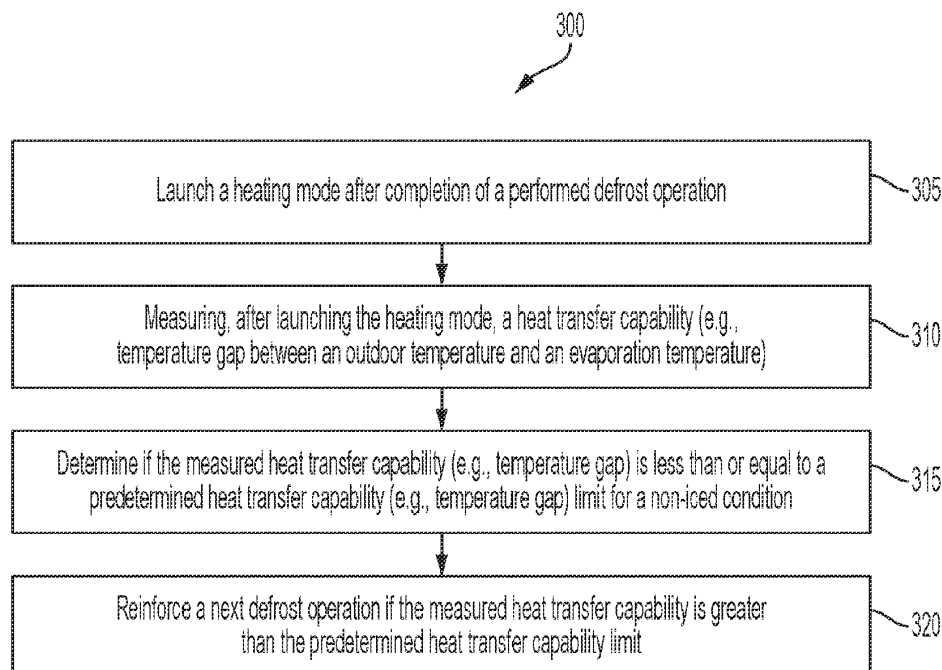


FIG. 3



PARTIAL EUROPEAN SEARCH REPORT

Application Number

under Rule 62a and/or 63 of the European Patent Convention.
This report shall be considered, for the purposes of
subsequent proceedings, as the European search report

EP 22 19 6221

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	EP 3 505 850 A1 (MITSUBISHI HEAVY IND THERMAL SYSTEMS LTD [JP]) 3 July 2019 (2019-07-03) * the whole document *	1-3, 5-9	INV. F25B47/02 F25B49/02 F25B13/00 F25D21/00
X	EP 2 436 999 A1 (DAIKIN IND LTD [JP]) 4 April 2012 (2012-04-04) * the whole document *	1, 2, 4-8	
A	EP 2 157 380 A1 (MITSUBISHI ELECTRIC CORP [JP]) 24 February 2010 (2010-02-24) * the whole document *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			F25B F25D

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

1

Place of search	Date of completion of the search	Examiner
Munich	28 June 2023	Lucic, Anita
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 (P04E07)

INCOMPLETE SEARCH
SHEET C

Application Number

EP 22 19 6221

5

Claim(s) completely searchable:
1-9

10

Claim(s) not searched:
10-15

Reason for the limitation of the search:

15

The search has been restricted to the subject-matter without an indication and reply of the Applicant to the invitation pursuant to Rule 62a(1) EPC. The search report has been drawn up on the basis of independent claim 1 and its associated dependent claims 2-9.

20

25

30

35

40

45

50

55

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

EP 22 19 6221

5

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.

28-06-2023

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 3505850	A1	03-07-2019	AU	2018274982 A1		18-07-2019
			EP	3505850 A1		03-07-2019
			JP	6980520 B2		15-12-2021
			JP	2019120417 A		22-07-2019

EP 2436999	A1	04-04-2012	AU	2010253331 A1		19-01-2012
			CN	102449408 A		09-05-2012
			EP	2436999 A1		04-04-2012
			ES	2672818 T3		18-06-2018
			JP	4711020 B2		29-06-2011
			JP	2011007485 A		13-01-2011
			KR	20120016151 A		22-02-2012
			US	2012060530 A1		15-03-2012
			WO	2010137344 A1		02-12-2010

EP 2157380	A1	24-02-2010	EP	2157380 A1		24-02-2010
			EP	2980497 A1		03-02-2016
			EP	2980498 A1		03-02-2016
			JP	5528119 B2		25-06-2014
			JP WO2009093297	A1		26-05-2011
			WO	2009093297 A1		30-07-2009
