

(19)



(11)

EP 4 066 721 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.10.2022 Bulletin 2022/40

(51) International Patent Classification (IPC):
A47L 15/42^(2006.01)

(21) Application number: **22158710.8**

(52) Cooperative Patent Classification (CPC):
A47L 15/4291; A47L 15/4219

(22) Date of filing: **25.02.2022**

(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: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
• **POYRAZ, Onur**
34445 Istanbul (TR)
• **MORDOGAN, Umut**
34445 Istanbul (TR)
• **BALIKCI, Ilhan**
34445 Istanbul (TR)

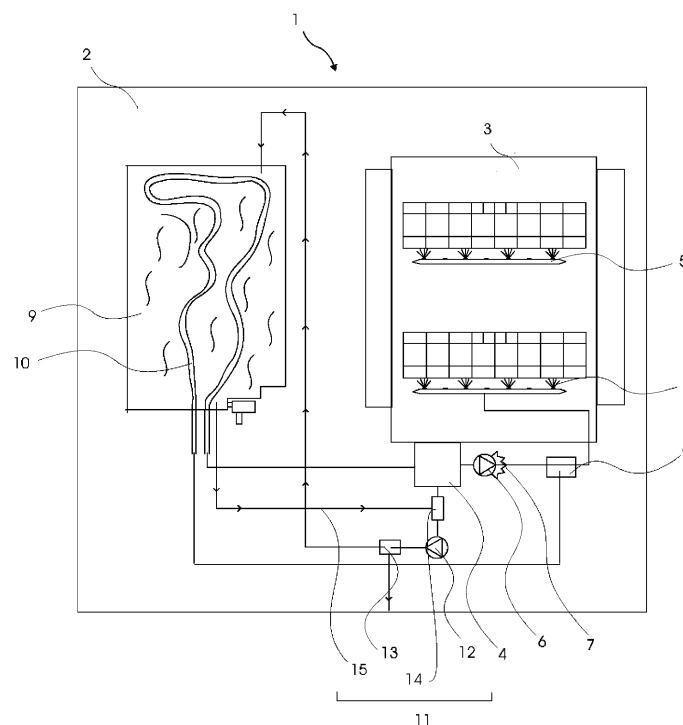
(30) Priority: **02.04.2021 TR 202105976**

(54) A DISHWASHER COMPRISING A WATER POCKET

(57) Dishwasher (1) comprising a body (2); a washing tub (3) disposed in the body (2); a sump (4) which is disposed on the base of the washing tub (3) and wherein the water coming from the washing tub (3) is collected; at least one spraying member (5) which is disposed in the washing tub (3); a circulation pump (6) which enables the water to be transferred from the sump (4) to the spraying member (5); a heater (7) which is disposed on the circulation pump (6); a multiport valve (8) which is dis-

posed between the circulation pump (6) and the spraying member (5) and which directs the water to the spraying member (5); a water pocket (9) which is disposed between the washing tub (3) and the body (2) and wherein water is collected to be used in the washing process; and a heat exchanger (10) which is connected to the sump (4) at one end and to the multiport valve (8) at the other end and which extends into the water pocket (9).

Figure 1

**EP 4 066 721 A1**

Description

[0001] The present invention relates to a dishwasher comprising a water pocket.

[0002] In dishwashers, the dishes are placed onto the racks provided in the washing tub. The cleaning process is performed by delivering water onto the racks by means of the spraying member. In certain programs, the water is heated before being delivered onto the dishes. Thus, a more effective cleaning is performed. In some dishwashers, the water taken from the mains is collected in a water pocket. The water pocket is disposed between the body and the washing tub. Heat exchange occurs between the water pocket and the washing tub. Thus, the water in the water pocket is heated a little. Energy is saved by heating the water before taking into the washing tub. In the state of the art, there are dishwashers wherein the dirty and hot water leaving the washing tub is used to heat the water in the water pocket by means of a line provided on the water pocket. The hot and dirty water used in the washing process flows through a line provided on the water pocket such that heat exchange occurs between the cold water in the water pocket and the hot and dirty water. Thus, heat recovery is provided. However, while the heat recovery process continues, the total cycle duration of the dishwasher increases. Therefore, the heat recovery process must be performed as quickly as possible. In order to increase the speed, the performance of the heat recovery process must be increased as well.

[0003] In the state of the art Patent Application No. DE102010029873, a dishwasher is disclosed, wherein the waste water is collected and heated.

[0004] The aim of the present invention is the realization of a dishwasher wherein saving in time is provided.

[0005] The dishwasher realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body; a washing tub which is disposed in the body; a sump which is disposed on the base of the washing tub; at least one spraying member which is provided in the washing tub and which provides the delivery of the water onto the kitchen items; a circulation pump which enables the water to be transferred from the sump to the spraying member; a heater which is disposed on the circulation pump; a multiport valve which provides the delivery of the water to the spraying member; a water pocket which is disposed between the washing tub and the body; and a heat exchanger which is connected to the sump at one end and to the multiport valve at the other end, and which extends into the water pocket. The water in the sump is heated by means of the circulation pump and delivered to the spraying members. The spraying member which receives the water is determined by means of the multiport valve. The hot water used in the washing process is directed to the heat exchanger by means of the multiport valve. The hot water flowing through the heat exchanger returns to the sump. Thus, the cold water taken into the water pocket is heated by means of the heat exchanger.

[0006] The dishwasher of the present invention comprises a water movement means which enables the water collected in the water pocket to move and thus contact the heat exchanger more. By means of the water movement means, the static water in the water pocket becomes dynamic. Thus, a larger amount of water contacts the heat exchanger in the unit time.

[0007] In an embodiment of the present invention, the dishwasher comprises a discharge pump which is connected to the sump; a first valve which is disposed between the discharge pump and the sump; a second valve which is connected to the discharge pump; and a delivery line which enables the water leaving the discharge pump to be delivered to the water pocket and enables the water in the water pocket to be delivered back to the discharge pump via the first valve and from there to the second valve. By means of the delivery line, the water in the water pocket is kept moving without using an additional component.

[0008] In an embodiment of the present invention, the dishwasher comprises at least one ultrasonic vibration member disposed on the water pocket. By means of the ultrasonic vibration member, the water in the water pocket is kept moving thanks to vibrations.

[0009] In an embodiment of the present invention, the dishwasher comprises the ultrasonic vibration member disposed along a surface of the water pocket. As the size of the ultrasonic vibration member increases, the water movement rate also increases. Thus, the water is heated more quickly.

[0010] In an embodiment of the present invention, the dishwasher comprises an air compressor which is disposed in the vicinity of the water pocket and an air delivery line which is connected to the air compressor. By means of the air delivery line connected to the air compressor, air bubbles are generated in the water pocket such that the water in the water pocket is kept moving.

[0011] In an embodiment of the present invention, the dishwasher comprises a mixer which is disposed longitudinally in the water pocket and a motor which controls the movement of the mixer. By means of the mixer, the water in the water pocket moves continuously and a homogeneous structure is obtained.

[0012] By means of the present invention, a dishwasher is realized, comprising a water movement means which moves the mains water collected in the water pocket such that the water is heated more quickly.

[0013] A dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of the water pocket on the dishwasher.

Figure 2 - is the schematic view of the ultrasonic vibration member and the water pocket on the dishwasher.

Figure 3 - is the schematic view of the air compressor and the water pocket on the dishwasher.

Figure 4 - is the schematic view of the mixer and the water pocket on the dishwasher.

[0014] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing tub
4. Sump
5. Spraying member
6. Circulation pump
7. Heater
8. Multiport valve
9. Water pocket
10. Heat exchanger
11. Water movement means
12. Discharge pump
13. First valve
14. Second valve
15. Delivery line
16. Ultrasonic vibration member
17. Air compressor
18. Air delivery line
19. Motor
20. Mixer

[0015] The dishwasher (1) comprises a body (2); a washing tub (3) which is disposed in the body (2) and wherein the washing process is performed; a sump (4) which is disposed on the base of the washing tub (3) and wherein the water coming from the washing tub (3) is collected; at least one spraying member (5) which is disposed in the washing tub (3) and which sprays the water coming from the sump (4) onto the kitchen items; a circulation pump (6) which enables the water to be transferred from the sump (4) to the spraying member (5); a heater (7) which is disposed on the circulation pump (6); a multiport valve (8) which is disposed between the circulation pump (6) and the spraying member (5) and which directs the water to the spraying member (5); a water pocket (9) which is disposed between the washing tub (3) and the body (2) and wherein water is collected to be used in the washing process; and a heat exchanger (10) which is connected to the sump (4) at one end and to the multiport valve (8) at the other end and which extends into the water pocket (9). The water in the sump (4) is heated by means of the circulation pump (6) and delivered to the spraying members (5). The spraying member (5) which receives the water is determined by means of the multiport valve (8). The hot water used in the washing process is directed to the heat exchanger (10) by means of the multiport valve (8). The hot water flowing through the heat exchanger (10) returns to the sump (4). Thus, the cold water taken into the water pocket (9) is heated by means of the heat exchanger (10).

[0016] The dishwasher (1) of the present invention comprises a water movement means (11) which enables

the water collected in the water pocket (9) to flow and thus contact the heat exchanger (10) more in the unit time. By means of the water movement means (11), the mains water collected in the water pocket (9) is kept moving. Thus, the amount of water which contacts the heat exchanger (10) in the unit time increases, which enables the water in the water pocket (9) to be heated more quickly.

[0017] In an embodiment of the present invention, the dishwasher (1) comprises the water movement means (1) composed of a discharge pump (12) which is connected to the sump (4) and which discharges the water in the sump (4), a first valve (13) which is disposed between the discharge pump (12) and the sump (4), a second valve (14) which is connected to the discharge pump (12) and a delivery line (15) which enables the water drawn from the second valve (14) to be delivered to the water pocket (9) and enables the water in the water pocket (9) to be delivered back to the discharge pump (12) via the first valve (13). The clean water received into the sump (4) from the mains is delivered to the discharge pump (12) via the first valve (13). The water drawn from the discharge pump (12) via the second valve (14) is delivered to the water pocket (9) through the delivery line (15). The water drawn again from the water pocket (9) by means of the delivery line (15) is delivered to the second valve (14) through the first valve (13) and the discharge pump (12). Thus, the continuous circulation of water is formed and the water in the water pocket (9) is kept moving.

[0018] In an embodiment of the present invention, the dishwasher (1) comprises the water movement means (11) which is at least one ultrasonic vibration member (16) disposed on the water pocket (9). By means of the ultrasonic vibration member (16) disposed on the water pocket (9), the water is moved thanks to vibrations. Thus, the water contacts the heat exchanger (10) more and heats up more quickly.

[0019] In an embodiment of the present invention, the dishwasher (1) comprises the ultrasonic vibration member (16) disposed along a surface of the water pocket (9). The ultrasonic vibration member (16) is disposed along a surface of the water pocket (9). As the size of the ultrasonic vibration member (16) increases, the vibrations generated by the same and the water movement rate also increase. Thus, the water is enabled to contact the heat exchanger (10) more.

[0020] In an embodiment of the present invention, the dishwasher (1) comprises the water movement means (11) comprising an air compressor (17) which is disposed in the vicinity of the water pocket (9) and at least one air delivery line (18) which is connected to the air compressor (17) at one end and which extends into the water pocket (9) at the other end. By means of the air delivery line (18) connected to the air compressor (17), air bubbles are generated in the water pocket (9) such that the water in the water pocket (9) is kept moving.

[0021] In an embodiment of the present invention, the

dishwasher (1) comprises the water movement means (11) which is a mixer (20) extending longitudinally in the water pocket (9) and moved by means of a motor (19). By means of the mixer (20), the water in the water pocket (9) moves continuously and a homogeneous structure is obtained.

[0022] By means of the present invention, a dishwasher is realized, wherein the mains water collected in the water pocket (9) is enabled to move continuously and thus to contact the heat exchanger (10) more in the unit time so as to be heated more quickly. Consequently, savings in both energy and time are provided while heating the water in the water pocket (9).

Claims

1. A dishwasher (1) comprising a body (2); a washing tub (3) which is disposed in the body (2) and wherein the washing process is performed; a sump (4) which is disposed on the base of the washing tub (3) and wherein the water coming from the washing tub (3) is collected; at least one spraying member (5) which is disposed in the washing tub (3) and which sprays the water coming from the sump (4) onto the kitchen items; a circulation pump (6) which enables the water to be transferred from the sump (4) to the spraying member (5); a heater (7) which is disposed on the circulation pump (6); a multiport valve (8) which is disposed between the circulation pump (6) and the spraying member (5) and which directs the water to the spraying member (5); a water pocket (9) which is disposed between the washing tub (3) and the body (2) and wherein water is collected to be used in the washing process; and a heat exchanger (10) which is connected to the sump (4) at one end and to the multiport valve (8) at the other end and which extends into the water pocket (9), **characterized by** a water movement means (11) which enables the water collected in the water pocket (9) to move and thus contact the heat exchanger (10) more in the unit time.
2. A dishwasher (1) as in Claim 1, **characterized by** the water movement means (11) composed of a discharge pump (12) which is connected to the sump (4) and which discharges the water in the sump (4), a first valve (13) which is disposed between the discharge pump (12) and the sump (4), a second valve (14) which is connected to the discharge pump (12) and a delivery line (15) which enables the water drawn from the second valve (14) to be delivered to the water pocket (9) and enables the water in the water pocket (9) to be delivered back to the discharge pump (12) via the first valve (13).
3. A dishwasher (1) as in Claim 1, **characterized by** the water movement means (11) which is at least

one ultrasonic vibration member (16) disposed on the water pocket (9).

4. A dishwasher (1) as in Claim 3, **characterized by** the ultrasonic vibration member (16) disposed along a surface of the water pocket (9).
5. A dishwasher (1) as in Claim 1, **characterized by** the water movement means (11) comprising an air compressor (17) which is disposed in the vicinity of the water pocket (9) and at least one air delivery line (18) which is connected to the air compressor (17) at one end and which extends into the water pocket (9) at the other end.
6. A dishwasher (1) as in Claim 1, **characterized by** the water movement means (11) which is a mixer (20) extending longitudinally in the water pocket (9) and moved by means of a motor (19).

Figure 1

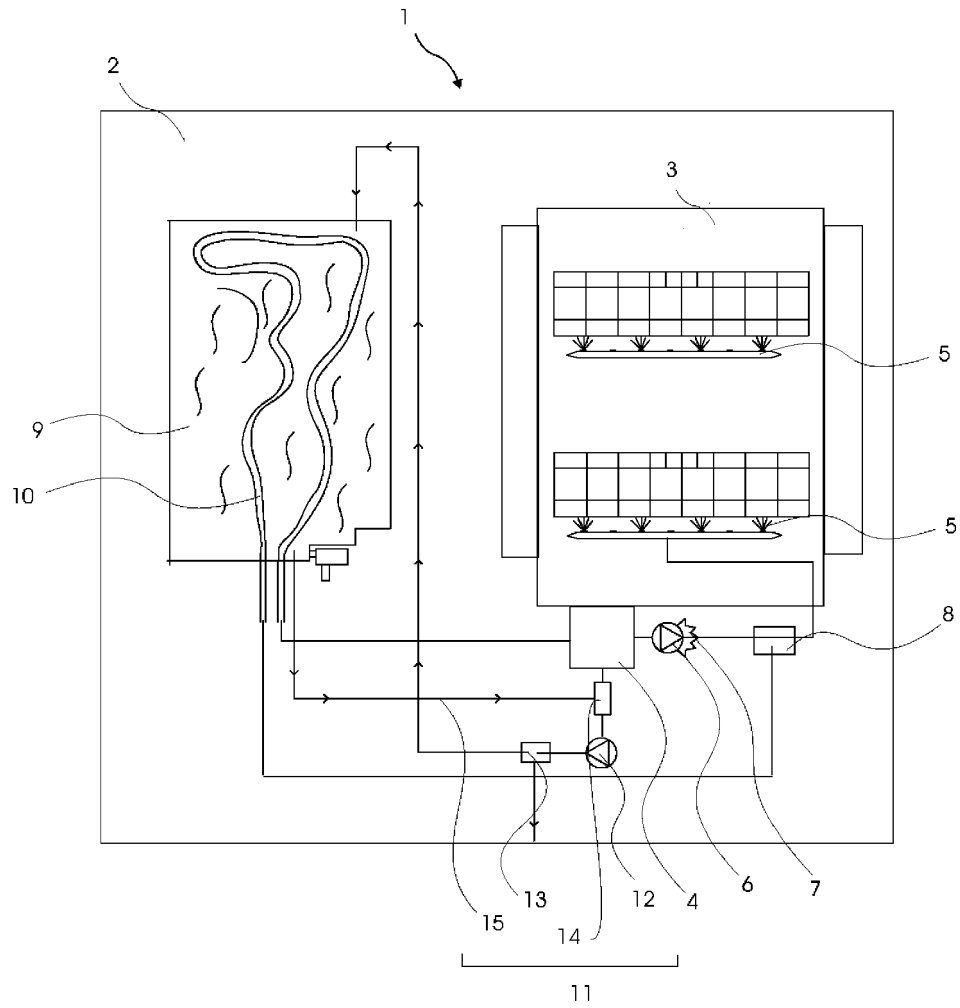


Figure 2

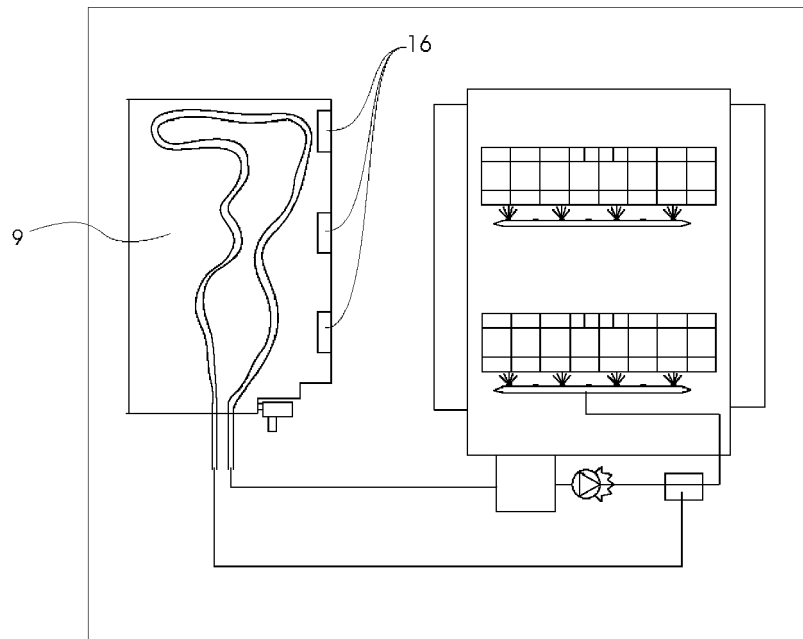


Figure 3

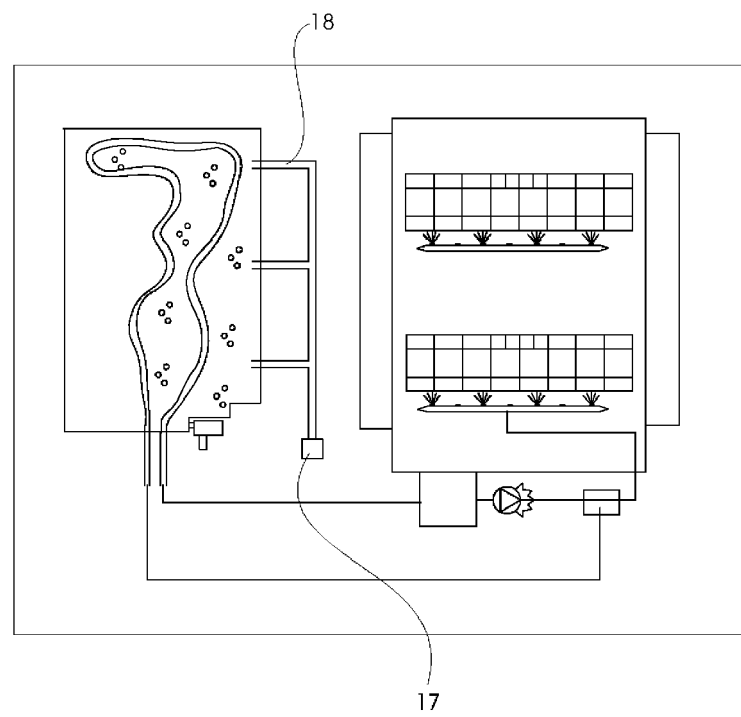
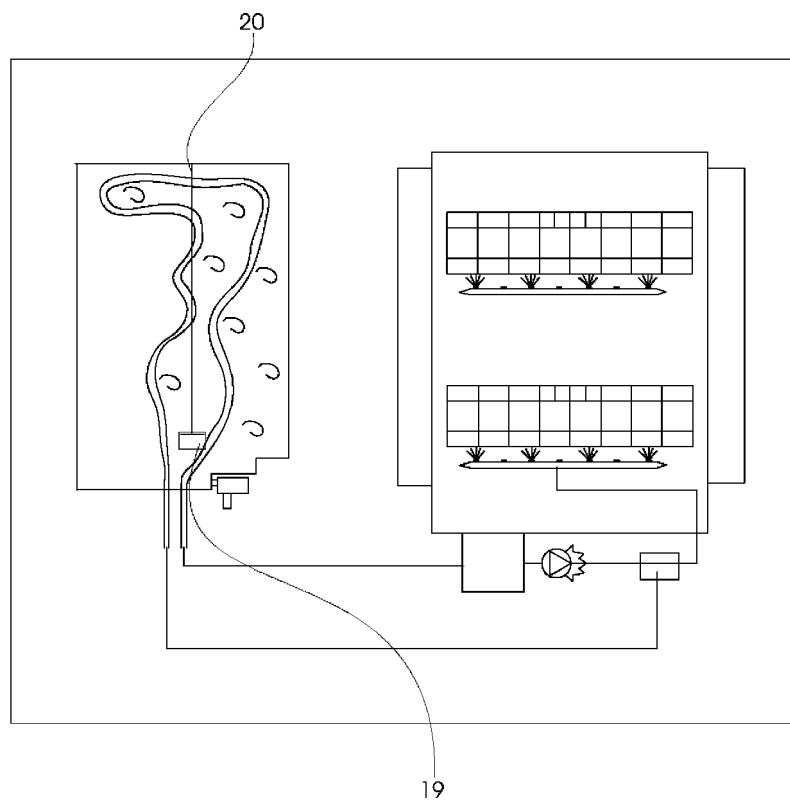


Figure 4





EUROPEAN SEARCH REPORT

Application Number

EP 22 15 8710

5

10

15

20

25

30

35

40

45

50

55

2

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)
Y	US 2020/163526 A1 (YOON SANGHEON [KR] ET AL) 28 May 2020 (2020-05-28) * paragraph [0054] - paragraph [0207]; figures *	1-6	INV. A47L15/42
Y	EP 3 788 934 A1 (MIELE & CIE [DE]) 10 March 2021 (2021-03-10) * paragraph [0027] - paragraph [0084]; figures *	1-6	
A	EP 3 639 722 A1 (WHIRLPOOL CO [US]) 22 April 2020 (2020-04-22) * paragraph [0012] - paragraph [0040]; figures *	1-6	
A	US 2020/163520 A1 (JUNG CHANGYOON [KR] ET AL) 28 May 2020 (2020-05-28) * paragraph [0057] - paragraph [0193]; figures *	1-6	
A	US 2014/007767 A1 (EICHENAUER HEIZELEMENTE GMBH [DE]) 9 January 2014 (2014-01-09) * paragraph [0056] - paragraph [0095] *	1-6	TECHNICAL FIELDS SEARCHED (IPC) A47L
A	EP 2 687 142 A2 (INDESIT CO SPA [IT]) 22 January 2014 (2014-01-22) * paragraph [0014] - paragraph [0097]; figures *	1-6	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 August 2022	Examiner Sangiorgi, Massimo
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	

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

EP 22 15 8710

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.

03-08-2022

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2020163526 A1	28-05-2020	DE 102019131949 A1	28-05-2020
		KR 20200063418 A	05-06-2020
		US 2020163526 A1	28-05-2020
EP 3788934 A1	10-03-2021	DE 102019121736 A1	18-02-2021
		EP 3788934 A1	10-03-2021
EP 3639722 A1	22-04-2020	CN 211066474 U	24-07-2020
		EP 3639722 A1	22-04-2020
		US 2020121157 A1	23-04-2020
US 2020163520 A1	28-05-2020	DE 102019131952 A1	28-05-2020
		KR 20200062946 A	04-06-2020
		US 2020163520 A1	28-05-2020
US 2014007767 A1	09-01-2014	DE 102012013322 A1	09-01-2014
		EP 2682041 A2	08-01-2014
		US 2014007767 A1	09-01-2014
EP 2687142 A2	22-01-2014	EP 2687142 A2	22-01-2014
		EP 2820997 A2	07-01-2015
		PL 2820997 T3	31-08-2017

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 102010029873 [0003]