



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.01.2019 Bulletin 2019/05

(51) Int Cl.:

A47L 15/42^(2006.01) A47L 15/00^(2006.01)

(21) Application number: 17183487.2

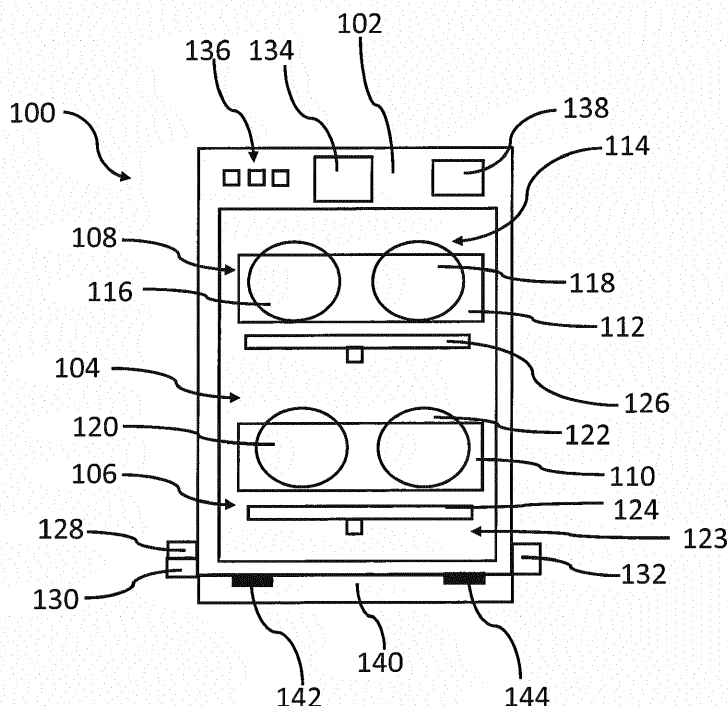
(22) Date of filing: 27.07.2017

(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: MA MD (71) Applicant: Vestel Elektronik Sanayi ve Ticaret A.S. 45030 Manisa (TR)	(72) Inventor: ÖZEL, Ahmet 45030 Manisa (TR) (74) Representative: Flint, Adam Page White & Farrer Bedford House John Street London WC1N 2BF (GB)
---	--

(54) DISHWASHER, METHOD OF OPERATING A DISHWASHER, AND COMPUTER PROGRAM

(57) There is disclosed a dishwasher comprising a washing compartment for holding one or more items to be washed, and a door arranged to be movable between a closed position and an open position to enable access to the washing compartment. The dishwasher further comprises a washing mechanism for washing the one or more items to be washed, a controller for controlling the washing mechanism, and at least one sensor configured for communication with the controller. The controller is configured to receive from the at least one sensor information associated with how dirty at least one of the one or more items to be washed is; and the controller is configured to initiate a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor.

Figure 1



Description

Technical Field

[0001] The present disclosure relates to a dishwasher, and a method and computer program for operating a dishwasher.

Background

[0002] Dishwashers are used for washing items such as crockery and cutlery. A known dishwasher comprises a washing compartment for holding one or more items to be washed, and a washing mechanism for washing those items. Typically a user can select from a plurality of pre-defined washing cycles via a user interface on a front face of the dishwasher.

Summary

[0003] According to a first aspect disclosed herein, there is provided a dishwasher comprising: a washing compartment for holding one or more items to be washed; a door arranged to be movable between a closed position and an open position to enable access to the washing compartment; a washing mechanism for washing the one or more items to be washed; a controller for controlling the washing mechanism; and at least one sensor configured for communication with the controller; the controller configured to receive from the at least one sensor information associated with how dirty at least one of the one or more items to be washed is; and the controller configured to initiate a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor.

[0004] According to an example, the controller is configured to select the one or more washing cycle parameters based upon information obtained from a test washing cycle of the one or more items to be washed.

[0005] According to an example, the controller is configured to determine, based on information pertaining to the test washing cycle received from the at least one sensor, of a type of dirt on the one or more items to be washed.

[0006] According to an example, the type of dirt comprises one of: dirt that is easily removable; dirt that is not easily removable.

[0007] According to an example, the at least one sensor comprises a first sensor arranged to sense at least one item in a lower portion of the dishwasher, and a second sensor arranged to sense at least one item in an upper portion of the dishwasher.

[0008] According to an example, each portion comprises a washing mechanism capable of being controlled independently of the other by the controller.

[0009] According to an example, the controller is configured to select a reference item from the one or more

items to be washed, the reference item being an item determined to be most dirty amongst a plurality of items to be washed, the controller configured to select the one or more washing cycle parameters based upon the reference item.

[0010] According to an example, the one or more washing cycle parameters comprising one or more of: duration; water temperature; quantity of water used; quantity of detergent used.

[0011] According to an example, the dishwasher has an option which enables a user to disable the function in which the controller initiates a washing cycle according to one or more washing cycle parameters selected by the controller.

[0012] According to an example when the function is disabled, the dishwasher is configured to notify the user when the user selects a washing cycle which is determined by the controller to be inadequate to clean the at least one item to be washed.

[0013] According to an example, the at least one sensor comprises at least one camera.

[0014] According to an example, the controller is in communication with at least one memory storing a plurality of reference images of items to be washed, and the selected one or more washing cycle parameters being based upon a comparison of an image of at least one item to be washed taken by the at least one camera, and the plurality of reference images.

[0015] According to an example the one or more items to be washed comprises one or more of: at least one plate or bowl; one or more glasses; one or more cups or mugs; one or more knives; one or more spoons; one or more forks.

[0016] In a second aspect there is provided a method of operating a dishwasher comprising: receiving, at a controller from at least one sensor, information associated with how dirty at least one of one or more items to be washed in a washing compartment of the dishwasher is; and initiating, by the controller, a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor.

[0017] According to an example, the method comprises carrying out a test washing cycle prior to the washing cycle in order to determine a type of dirt on the one or more items to be washed.

[0018] In a third aspect there is provided a computer program stored in memory and executable by a processor to carry out the method of the second aspect.

Brief Description of the Drawings

[0019] To assist understanding of the present disclosure and to show how embodiments may be put into effect, reference is made by way of example to the accompanying drawings in which:

Figure 1 shows schematically a dishwasher accord-

- ing to an example;
 Figure 2 shows schematically a dishwasher according to an example;
 Figure 3 shows schematically a dishwasher according to an example;
 Figure 4 is a flow-chart of a method according to an example.

Detailed Description

[0020] The present disclosure has applicability to dishwashers or dishwashing machines. Dishwashers are used to automate the washing of items associated with food preparation and/or cooking and/or eating. Such items include crockery such as plates, bowls, cups, mugs etc. Such items may also include cutlery such as knives, forks, spoons, or indeed any other cooking or eating utensil. Other items that may be washed include glassware, food containers etc.

[0021] Figure 1 schematically shows an example of a dishwasher 100. The dishwasher 100 comprises a main body 102, within which there is a washing compartment 104. The washing compartment 104 comprises a lower portion 106 and an upper portion 108. The lower portion 106 comprises a tray or rack 110 for holding items to be washed, and the upper portion 108 comprises a tray or rack 112 for holding items to be washed. The racks 110 and 112 can be moved in and out of the washing compartment 104 on roller assemblies.

[0022] Items to be washed are schematically shown at 114. In this case the items to be washed are schematically represented by plates 116 and 118 on rack 112, and plates 120 and 122 on rack 120. Of course there may alternatively be any other type of item to be washed or combination of items to be washed. In the example of Figure 1 a washing mechanism 123 comprises spray arm 124 in lower portion 106, and spray arm 126 in upper portion 108. In other examples the upper spray arm 126 is omitted. Each spray arm comprises a series of holes or nozzles which can spray water upwardly towards the items to be washed 114, while the spray arms 124 and 126 rotate.

[0023] The dishwasher 100 further comprises water inlet 128 and water outlet 130 for enabling water to be fed to and taken away from the dishwasher respectively. In some examples a heater element (not shown) is provided for heating water as necessary. In other examples hot and cold water is drawn from a building's supply as required. A power connection is schematically shown at 132, which enables the dishwasher to be connected to mains electrical power for powering the dishwasher.

[0024] A controller is schematically shown at 134 for controlling operations of the dishwasher. The controller 134 can, for example, cause the dishwasher to operate according to one or more pre-determined washing cycles selected via a user interface 136. The available washing cycles may differ from each other by temperature and/or duration, for example. Via the user interface 136 a user

may also be able to select whether the washing cycle is for a full or half load. A display 138 is also provided which can display information to the user. This may include information such as confirming a user's washing cycle selection, as well as information such as time remaining of a washing cycle that is in progress.

[0025] A door of the dishwasher is schematically shown at 140. The door 140 is connected to main body 120 via hinges 142 and 144. In Figure 1 the door is in an open position enabling access to washing compartment 104. The door 140 may be moved to a closed position so that the washing compartment 104 is then substantially enclosed. The door 140 may also include a receptacle for holding dishwashing detergent (e.g. a dishwasher cube) which can be released in to the dishwasher during a wash. The receptacle for holding washing detergent may of course also be positioned elsewhere within the dishwasher. The dishwasher may also include one or more further receptacles for containing dishwasher salt and/or rinse aid, for example.

[0026] The present inventor has realised that known dishwashing machines may inefficiently use resources such as electricity, water and detergent when performing a washing cycle. For example if a washing load is only slightly dirty or soiled, then it may be a waste of resources to perform a long washing cycle at a high temperature. Likewise if a washing load is very dirty, then a subsequent, second (or more) washing cycle(s) may be required to remove all dirt, again potentially wasting resources. A user cannot necessarily be relied upon to choose a correct or optimum washing cycle.

[0027] Document US2007/0181162A1 discloses a dishwashing machine which employs an image detection system to obtain a three-dimensional image of the washing chamber to evaluate a washing load. It does not evaluate how dirty or clean the washing load is. Document KR2006/0100620A discloses a dishwasher with image pickup means. Using the image pickup means an image of the inside of the dishwasher can be displayed to a user on a display of the dishwasher. This enables the user to determine, at the end of a washing cycle, whether the load has been adequately washed without having to open the dishwasher.

[0028] An example will now be described in which a dishwasher can set a washing cycle based upon a determination of how dirty or soiled the washing load is. The dishwasher can then initiate the washing cycle accordingly. It may be considered that the dishwasher automatically selects the optimum washing parameters taking in to account the dirtiness of the washing load. By tailoring the washing parameters to the actual dirtiness of the washing load then resources can be used accordingly, thus leading to efficient use of those resources.

[0029] In this regard Figure 2 shows an example dishwasher 200 comprising a door 240. The dishwasher 200 further comprises at least one sensor 250. In this example the at least one sensor 250 is located on an inside of the door 240. In this example the at least one sensor com-

prises a first sensor 252 and a second sensor 254. The first sensor is arranged so as to be proximate or adjacent to a lower portion 206 of the dishwasher when the door 240 is closed, and the second sensor 254 is arranged so as to be proximate to an upper portion 208 of the dishwasher when the door 240 is closed.

[0030] This is shown in more detail in Figure 3, in which the door is shown in a nearly closed position. As shown, when the door 240 is in this position (and when the door 240 is closed) the sensor 252 is positioned proximate or adjacent to lower rack 210, and sensor 254 is positioned proximate to or adjacent upper rack 212. The sensor 252 can then be used to determine how dirty item(s) 220 to be washed in the lower rack 210 are. The sensor 254 can be used to determine how dirty item(s) 216 to be washed in the upper rack 212 are.

[0031] The sensor can for example be a camera that can take and store still images or motion picture images of the washing load in order to determine how dirty the washing load is. The sensor may alternatively be an optical sensor which monitors output and reflected signals which may vary based upon how dirty the load is.

[0032] The dishwasher 200 comprises a controller shown schematically at 234. The controller 234 comprises a memory 233 and a processor 235. The controller is also communicatively connected to user interface shown schematically at 236, and a display shown schematically at 238. The controller can control operations of the dishwasher, as described with respect to Figure 1. For example the controller may control the washing mechanism 223, which in this example comprises spray arms 224 and 226. In one example the spray arms 224 and 226 can be controlled independently, and thus the items in the upper and lower portions of the dishwasher can be subjected to different washing parameters, if deemed necessary.

[0033] In one example the memory 233 stores a plurality of reference images of items of varying dirtiness/soiling. Where the sensor is a camera, the controller can then compare images of items to be washed inside the dishwasher 200 with the plurality of reference images to determine how dirty the load is. Each reference image may also be associated in the memory 233 with corresponding one or more suitable washing parameters to wash an item of that dirtiness. These associations may be stored, for example, in a look-up table. The one or more washing cycle parameters may comprise one or more of: duration; water temperature; quantity of water used; quantity of detergent used etc.

[0034] According to an example the controller 234 is configured to determine a "reference" item to be washed within the washing load. In one example the reference item to be washed is the item that is determined to be most dirty in the load. That is the reference item may be a single item. If washing cycle parameters are chosen to ensure that the most dirty item is cleaned properly, then it is fair to assume that those parameters will also adequately wash less dirty items. Again, the controller 234

may be configured to wash items in the lower and upper racks 210 and 212 differently. For example, if the reference item in the lower rack 210 is more dirty than the reference item in the upper rack 212, then the lower rack may be subjected to different washing conditions (e.g. more water, and /or higher temperature, and/or longer duration etc.) than the lower rack.

[0035] In some examples the dishwasher 200 is configured to carry out a test washing cycle to determine how dirty the washing load is, and/or to determine a type of dirt adhered to one or more items in the washing load. For example the "type" of dirt may be "fresh" dirt, or "aged" or "old" dirt. Fresh dirt is typically more easily removed than old dirt, which may be more strongly adhered to one or more of the items to be washed. The test cycle may be relatively short compared to the main cycle. For example the test cycle may be less than 5 minutes. The test cycle may comprise a rinse cycle in which the load is rinsed with water, but without any detergent being used. The controller 234 can then compare information received from the at least one sensor 250 at the beginning and end of the test cycle to make a comparison between how dirty the load (or reference item) is at the beginning and end of the test cycle. If the load is determined to be cleaner at the end of the test cycle than at the beginning by more than a threshold amount, then it may be determined that the load comprises (or comprised) fresh dirt, which is relatively easy to clean. If the load is cleaner at the end of the test cycle than at the beginning by less than a threshold amount (or not at all cleaner), then it may be determined that the load comprises (or comprised) aged dirt, which is relatively difficult to clean. Thus when it is determined to be fresh dirt less intensive washing parameters may be selected compared to when it is determined to be aged dirt. The selected washing cycle which follows the test cycle may be referred to as the "main" or "full" washing cycle to differentiate from the test cycle.

[0036] It may be considered that the controller 234 is configured to automatically select the washing cycle parameters, in dependence on the information received from the at least one sensor. In some examples the controller selects from a plurality of pre-determined washing cycles. For example these may be the same washing cycles that are available to the user via the user interface 236 of the dishwasher. In some examples the controller 234 is not constrained by preset washing cycles which are available to the user, the controller being able to adjust any of the available parameters to suit the level of dirt of the load that has been sensed.

[0037] In some examples the controller 234 is arranged to start the test washing cycle and/or the main washing cycle automatically. For example the dishwasher may automatically start the test cycle and/or main cycle upon determining that the dishwasher door has been closed, or upon determining that detergent has been inserted in the dishwasher and the door has been closed. In some examples at least some user input is required to initiate

the test cycle and/or the main cycle. For example the controller may cause to be displayed on the display 238 a prompt requesting a user to confirm that the test cycle and/or main washing cycle may begin.

[0038] According to some examples a user may be able to override, deactivate or disable the automatic program selection function (in which the controller is configured to initiate a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor). In some examples the above described operation of determining how dirty the load is (i.e. by means of at least one sensor 250) may still remain operative, even when a user has chosen to deactivate the automatic program selection. Then, if a user chooses a washing cycle which is determined by the controller to be inadequate for washing the sensed load, then a warning may be provided to the user. The warning may be in the form of an audible alarm and/or a notification displayed on display 238, for example.

[0039] An example method of operating a dishwasher is shown in Figure 4.

[0040] At S1 a controller receives information from at least one sensor of how dirty at least one of one or more items to be washed in a washing compartment of the dishwasher is.

[0041] At S2 the controller initiates a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor.

[0042] The test cycle is shown as optional at S0, which precedes S1. S0 comprises carrying out a test washing cycle prior to S1 and S2, in order to determine a type of dirt on the one or more items to be washed. The type of dirt may comprise dirt that is easily removable (e.g. fresh dirt), or dirt that is not easily removable (e.g. aged dirt).

[0043] Of course, the method may also comprise any of the other aspects described herein.

[0044] It will be understood that the processor or processing system or circuitry referred to herein may in practice be provided by a single chip or integrated circuit or plural chips or integrated circuits, optionally provided as a chipset, an application-specific integrated circuit (ASIC), field-programmable gate array (FPGA), digital signal processor (DSP), graphics processing units (GPUs), etc. The chip or chips may comprise circuitry (as well as possibly firmware) for embodying at least one or more of a data processor or processors and a digital signal processor or processors, which are configurable so as to operate in accordance with the exemplary embodiments. In this regard, the exemplary embodiments may be implemented at least in part by computer software stored in (non-transitory) memory and executable by the processor, or by hardware, or by a combination of tangibly stored software and hardware (and tangibly stored firmware).

[0045] Reference is made herein to data storage for storing data. This may be provided by a single device or

by plural devices. Suitable devices include for example a hard disk and non-volatile semiconductor memory.

[0046] The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with one or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

Claims

1. A dishwasher comprising:

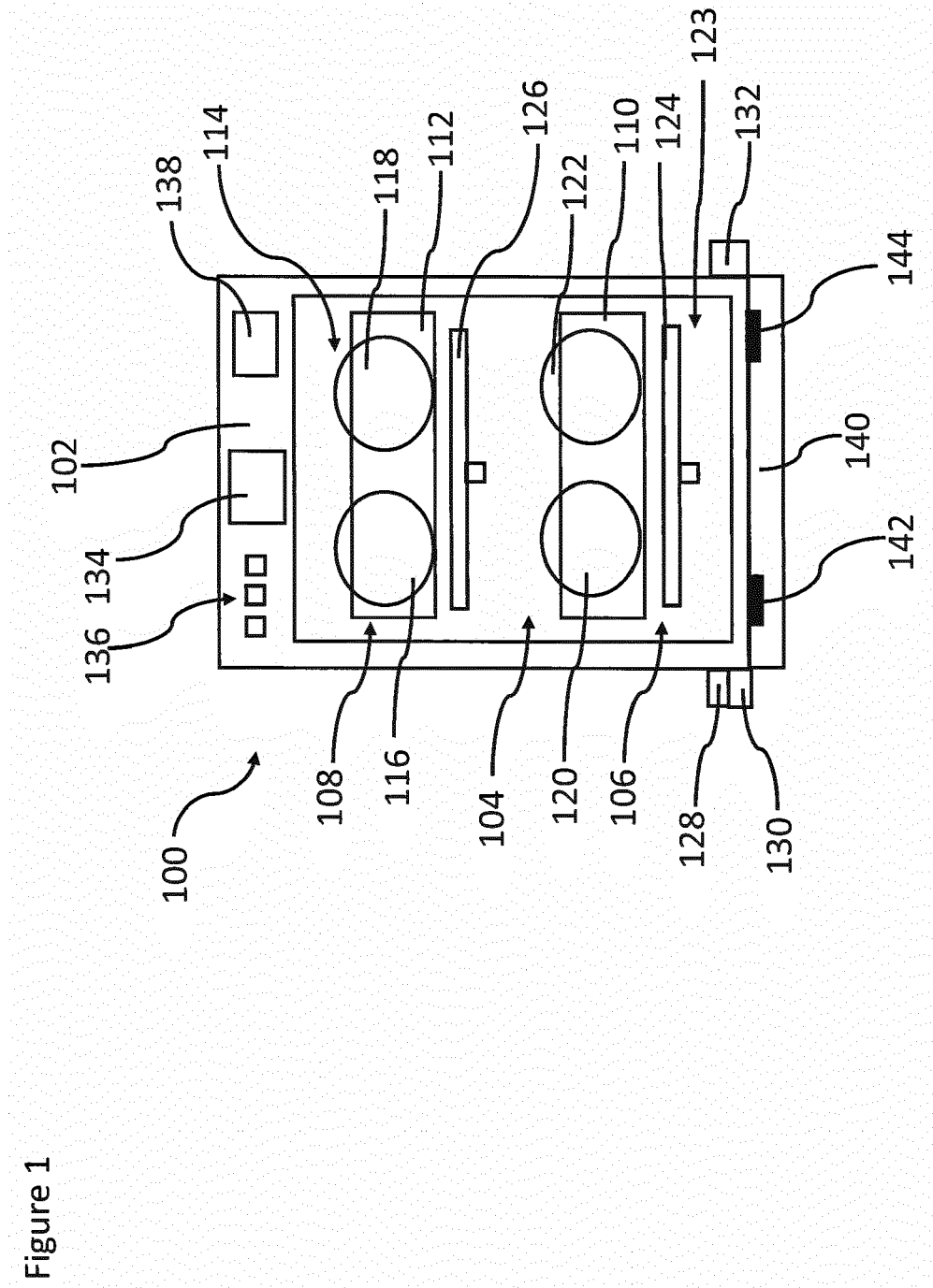
a washing compartment for holding one or more items to be washed;
a door arranged to be movable between a closed position and an open position to enable access to the washing compartment;
a washing mechanism for washing the one or more items to be washed;
a controller for controlling the washing mechanism; and
at least one sensor configured for communication with the controller;
the controller configured to receive from the at least one sensor information associated with how dirty at least one of the one or more items to be washed is; and
the controller configured to initiate a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor.

2. A dishwasher according to claim 1, the controller configured to select the one or more washing cycle parameters based upon information obtained from a test washing cycle of the one or more items to be washed.

3. A dishwasher according to claim 2, the controller configured to determine, based on information pertaining to the test washing cycle received from the at least one sensor, of a type of dirt on the one or more items to be washed.

4. A dishwasher according to claim 3, the type of dirt comprising one of: dirt that is easily removable; dirt that is not easily removable.

5. A dishwasher according to any of claims 1 to 4, the at least one sensor comprising a first sensor arranged to sense at least one item in a lower portion of the dishwasher, and a second sensor arranged to sense at least one item in an upper portion of the dishwasher. 5
6. A dishwasher according to claim 5, each portion comprising a washing mechanism capable of being controlled independently of the other by the controller. 10
7. A dishwasher according to any of claims 1 to 6, the controller configured to select a reference item from the one or more items to be washed, the reference item being an item determined to be most dirty amongst a plurality of items to be washed, the controller configured to select the one or more washing cycle parameters based upon the reference item. 15
8. A dishwasher according to any of claims 1 to 7, the one or more washing cycle parameters comprising one or more of: duration; water temperature; quantity of water used; quantity of detergent used. 20
9. A dishwasher according to any of claims 1 to 8, the dishwasher having an option which enables a user to disable the function in which the controller initiates a washing cycle according to one or more washing cycle parameters selected by the controller. 25
10. A dishwasher according to claim 9, wherein when the function is disabled, the dishwasher is configured to notify the user when the user selects a washing cycle which is determined by the controller to be inadequate to clean the at least one item to be washed. 30
11. A dishwasher according to any of claims 1 to 10, the at least one sensor comprising at least one camera. 35
12. A dishwasher according to claim 11, the controller being in communication with at least one memory storing a plurality of reference images of items to be washed, and the selected one or more washing cycle parameters being based upon a comparison of an image of at least one item to be washed taken by the at least one camera, and the plurality of reference images. 40
13. A method of operating a dishwasher comprising: 45
 - receiving, at a controller from at least one sensor, information associated with how dirty at least one of one or more items to be washed in a washing compartment of the dishwasher is; 50
 - and
 - initiating, by the controller, a washing cycle according to one or more washing cycle parameters selected by the controller, in dependence on the information received from the at least one sensor. 55
14. A method of operating a dishwasher according to claim 13, the method comprising carrying out a test washing cycle prior to the washing cycle in order to determine a type of dirt on the one or more items to be washed.
15. A computer program stored in memory and executable by a processor to carry out the method of claim 13 or claim 14.



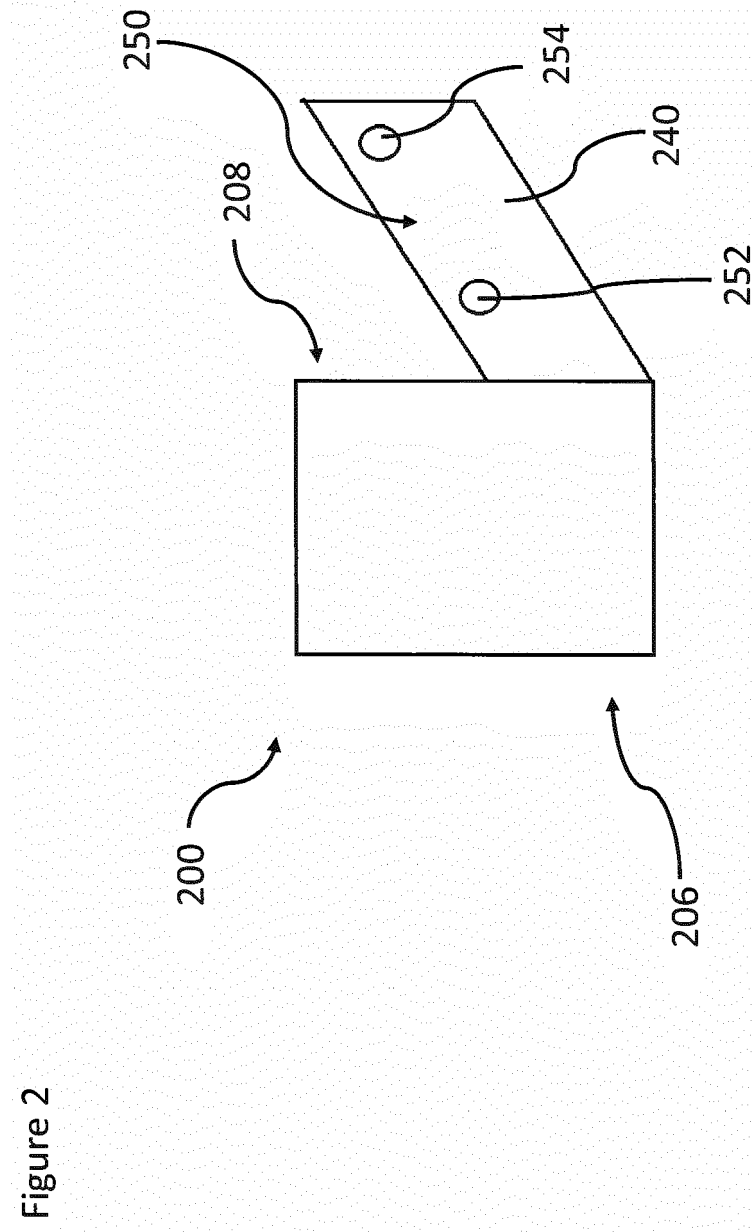
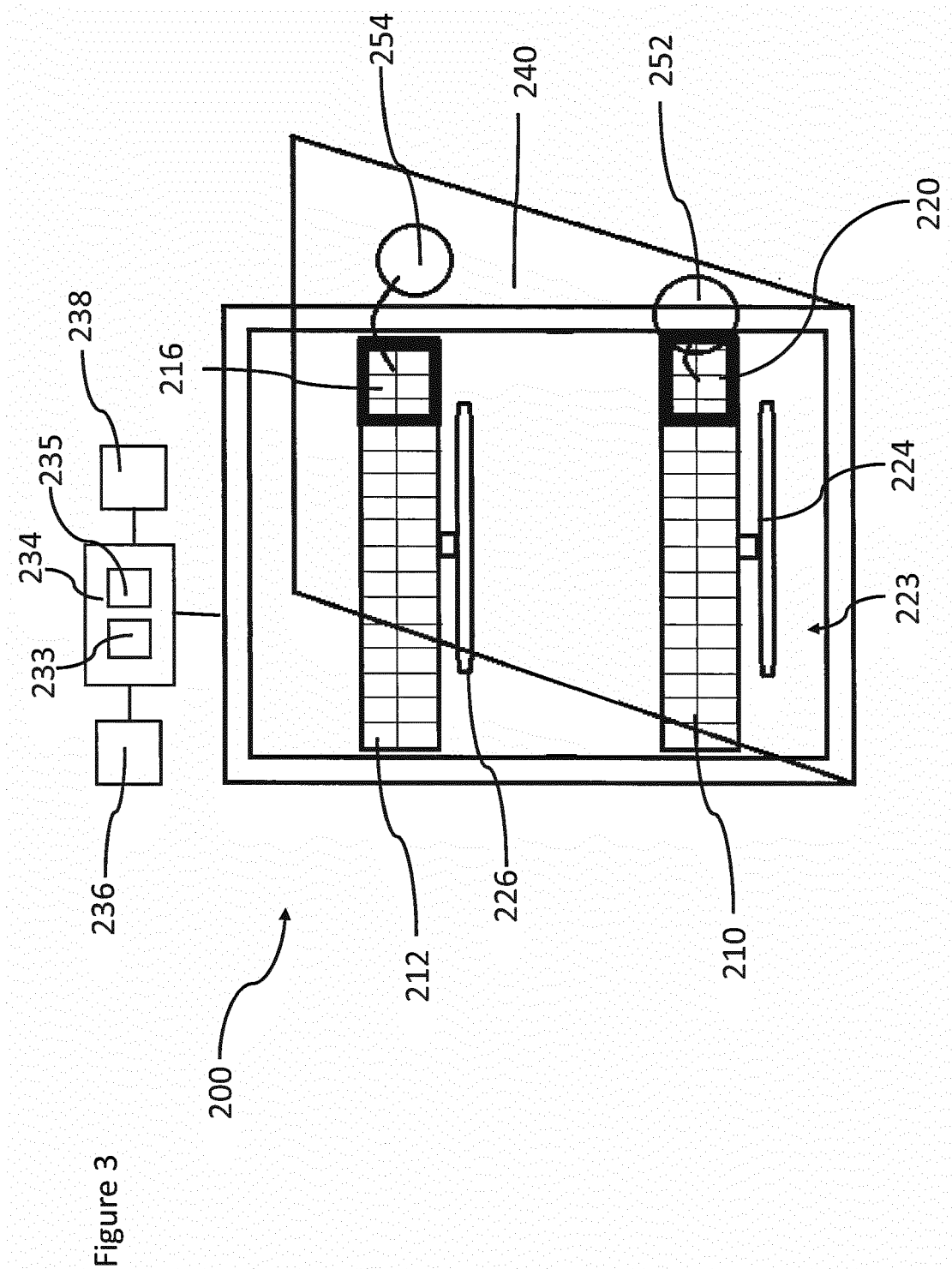
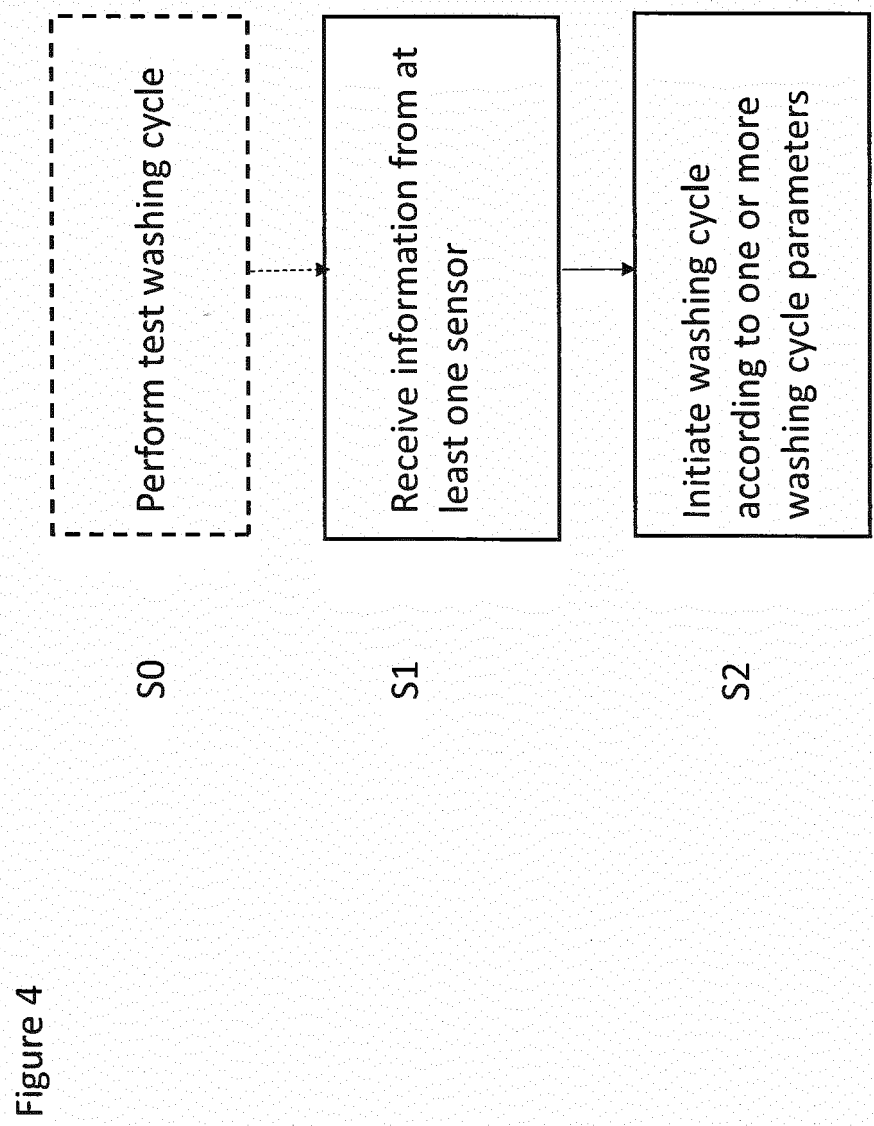


Figure 2







EUROPEAN SEARCH REPORT

 Application Number
 EP 17 18 3487

5

10

15

20

25

30

35

40

45

50

55

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	DE 100 48 086 A1 (MIELE & CIE [DE]) 11 April 2002 (2002-04-11)	1-3,5, 7-15	INV. A47L15/42
Y	* paragraphs [0007], [0013], [0014], [0017], [0018], [0020]; figure 1 *	5,6	A47L15/00
X	DE 44 15 823 A1 (LICENTIA GMBH [DE]) 9 November 1995 (1995-11-09) * column 1, line 7 - line 56 * * column 2, lines 12-22,41-55; figures 1,2 * * column 2, line 59 - column 3, line 18 *	1,4,8,13	
X	EP 1 116 471 A2 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 18 July 2001 (2001-07-18) * column 2, lines 10-27,24-57 * * paragraphs [0018], [0019], [0026], [0031], [0034]; figure 1 *	1,8,11, 13,15	
X	WO 03/051173 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]; ROSENBAUER MICHAEL [DE]; SCHESSL B) 26 June 2003 (2003-06-26)	1,8,11, 13,15	TECHNICAL FIELDS SEARCHED (IPC)
Y	* abstract * * page 2, lines 33,34 * * page 4, lines 21-32; claim 1 *	6	A47L
X	WO 2011/080232 A1 (ARCELIK AS [TR]; COSAN AHMET FERIT [TR]; YUCE AHMET IHSAN [TR]; CIRAK) 7 July 2011 (2011-07-07)	1,8,11, 13,15	
Y	* paragraphs [0003], [0020], [0023], [0025], [0026]; figure 1 *	5	
	----- -/--		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 January 2018	Examiner Uhlig, Robert
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			



EUROPEAN SEARCH REPORT

Application Number
EP 17 18 3487

5

10

15

20

25

30

35

40

45

50

55

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	Anonymous: "Geschirrspüler - Kein Verlass auf Automatik", 23 September 2004 (2004-09-23), XP055407167, Retrieved from the Internet: URL:https://www.test.de/Geschirrspueler-Kein-Verlass-auf-Automatik-1206414-2206414/[retrieved on 2017-09-15] * page 1, paragraphs 1,2 * * page 3, paragraph 1 - paragraph 3 * -----	1,8,13,15	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		4 January 2018	Uhlig, Robert
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)

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

EP 17 18 3487

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.

04-01-2018

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10048086 A1	11-04-2002	NONE	
DE 4415823 A1	09-11-1995	NONE	
EP 1116471 A2	18-07-2001	DE 19961782 A1 EP 1116471 A2	28-06-2001 18-07-2001
WO 03051173 A1	26-06-2003	AT 465668 T AU 2002352029 A1 CN 1606420 A DE 10162505 A1 EP 1458276 A1 ES 2342368 T3 JP 2005528129 A KR 20040068568 A US 2005011544 A1 WO 03051173 A1	15-05-2010 30-06-2003 13-04-2005 10-07-2003 22-09-2004 06-07-2010 22-09-2005 31-07-2004 20-01-2005 26-06-2003
WO 2011080232 A1	07-07-2011	EP 2519139 A1 PL 2519139 T3 WO 2011080232 A1	07-11-2012 30-09-2016 07-07-2011

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

- US 20070181162 A1 [0027]
- KR 20060100620 A [0027]