



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.10.2020 Bulletin 2020/43

(51) Int Cl.:
A47L 15/42 (2006.01)

(21) Application number: **20164172.7**

(22) Date of filing: **19.03.2020**

(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: **Candy S.p.A.**
20900 Monza (MB) (IT)

(72) Inventor: **SERGI, Leonardo**
20900 Monza MB (IT)

(74) Representative: **Perani & Partners S.p.A.**
Piazza Armando Diaz, 7
20123 Milano (IT)

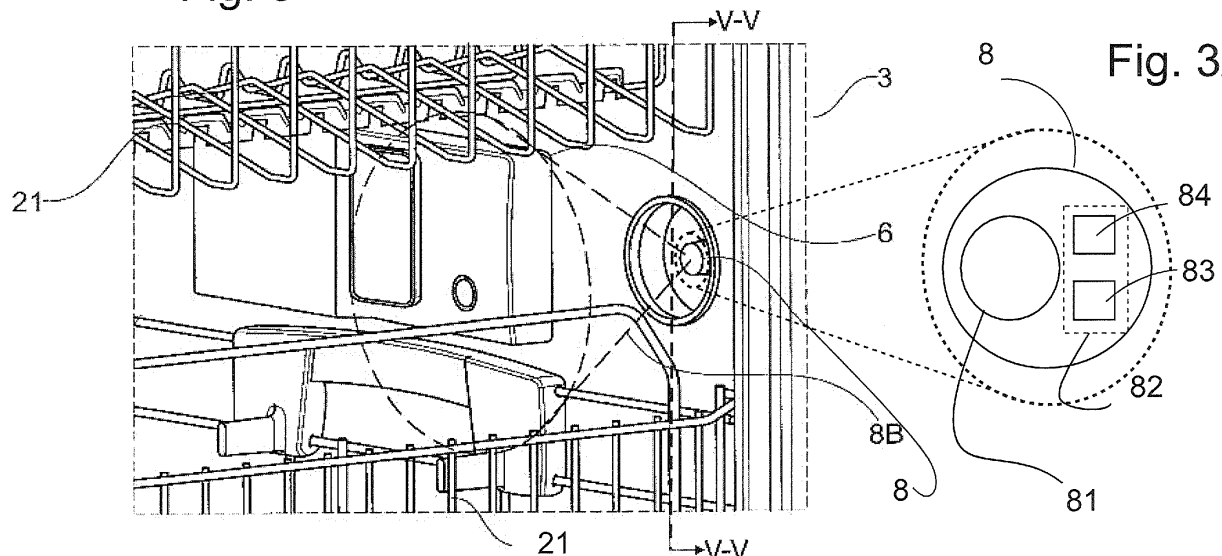
(30) Priority: **27.03.2019 IT 201900004605**

(54) **DISHWASHER WITH OPTICAL DEVICE AND ILLUMINATION DEVICE**

(57) The present invention concerns a dishwasher (1) comprising: a pump (12) that can be connected to a mains water inlet for taking water from the mains, a washing zone (2) in fluid communication with said pump (12), said washing zone (2) being defined by a plurality of walls (2A, 2B, 2C, 2D, 2E), a door (3), configured to switch between a closed configuration in which it precludes access to said washing zone (2) and at least one open configuration in which it allows access to said washing zone (2), one or more illumination, sanitizing and image acquisition complexes (8) comprising an illumination device (82) facing said washing zone (2) and having a first light source (83) configured to emit a radiation in the visible spectrum and a second light source (84) configured

to emit a radiation in the ultraviolet spectrum, an optical device (81) facing said washing zone (2) and configured to acquire digital images (J) of said washing zone (2). The dishwasher comprises a control unit (4) placed in signal communication with one or more illumination, sanitizing and image acquisition complexes (8) to control said one or more illumination, sanitizing and image acquisition complexes (8). A characteristic is that one or more walls of the plurality of walls (2A, 2B, 2C, 2D, 2E) of the washing zone (2) comprise, within their thickness, a seat (2F) configured to house one or more of the afore-said illumination, sanitization and image acquisition complexes (8).

Fig. 3



Description

Technical Field

[0001] The present invention relates to a dishwasher with an optical device provided with an integrated illumination device, in accordance with claim 1.

[0002] The dishwasher according to the present invention is usefully employed in domestic environments but also in environments such as bars or restaurants.

State of the Art

[0003] Dishwashers provided with optical devices such as photo cameras, cameras or video cameras are known in the prior art. For example, documents WO2016008699 and US2012/0138092 illustrate the aforesaid dishwashers.

[0004] These optical devices are arranged in a fixed or movable position with respect to a washing zone to check the load of the dishes or the degree of cleanliness of the dishes.

[0005] Using the optical devices it is possible to choose the washing program based on the conditions of the load of dishes.

[0006] Documents DE 10 2009 023252 A1, WO 2019/015996 A1, US 2012/138092 A1, DE 10 2007 022572 A1 and DE 102 56 168 A1 also show dishwashers provided with optical devices such as photo cameras, cameras or video cameras.

[0007] In particular, documents DE 10 2009 023252 A1, WO 2019/015996 A1, US 2012/138092 A1 show a dishwasher with an optical device (photo camera or video camera) and an illumination device paired to the optical device, which allows the acquisition of images thereof.

[0008] Document DE 10 2007 022572 A1 shows a dishwasher having an ultraviolet lamp or LED for sterilizing the washing tank.

[0009] Document DE 102 56 168 A1 shows a dishwasher which comprises a light bulb designed to indicate the state of the door.

[0010] A control unit is in signal communication with these optical devices and allows the user to manage or modify the operating functions of the dishwasher.

[0011] The dirt and residues accumulated during the loading and washing step are collected by a filter. This filter is positioned at the bottom of the washing zone, so as to be able to filter the water during the washing cycle, in order to collect and retain any deposits of dirt and food.

[0012] A further function of the filter is to prevent residues of food and/or other objects being able to be introduced into the washing and draining circuits of the product.

[0013] The filter requires periodic cleaning to remove the retained residues.

Problem of the Prior Art

[0014] Disadvantageously, the periodic cleaning of the filter is not sufficient to completely eliminate the accumulated dirt, as it allows only for the largest residues to be removed. The micro-deposits, difficult to remove, therefore remain trapped inside the filter, giving rise to the formation of unwanted microorganisms such as bacteria, viruses and molds. These microorganisms stagnate in the filter and therefore contaminate the washing water at each cycle, spreading inside the dishwasher and on the dishes. In the event of frequent washing cycles, the proliferation and accumulation of the pathogenic microorganisms mentioned above are accentuated, also producing a bad smell.

[0015] In known dishwashers, there is also the problem of poor visibility inside the dishwasher. Consequently, when it is dark or when the environment onto which the dishwasher faces is not very bright, the operation of loading the dirty dishes inside the dishwasher before washing is not easy for the user, as well as the observation of the washed dishes in order to check their final state.

[0016] Furthermore, in documents DE 10 2009 023252 A1, WO 2019/015996 A1 and US 2012/138092 A1 the light source is described in relation to the optical device, to allow the acquisition of images.

[0017] In document DE 10 2007 022572 A1 instead, the UV source only is mentioned, without the photo camera and without the visible light source to illuminate the tank when the door is open.

[0018] An illumination device is present in DE 102 56 168 A1, but it is used to signal if the door is open, while the photo camera is not present.

[0019] These prior art documents therefore teach to house the optical device with its own light source and the UV source in portions of the dishwasher frame that are separate and distinct from each other. This obliges to make more expensive molds of the washing tank since they must have several compartments in which the various members are to be housed, such as the optical device, light source as well as the UV source.

SUMMARY OF THE INVENTION

[0020] In this context, the technical objective underlying the present invention is to propose a dishwasher which obviates the drawbacks in the prior art as described above.

[0021] In particular, it is an object of the present invention to provide a dishwasher capable of allowing the disinfection from the microorganisms that usually accumulate in the washing zone.

[0022] A further object of the present invention is to provide a dishwasher capable of facilitating the user during the arrangement of the dishes, making them more visible.

[0023] The defined technical task and the specified aims are substantially achieved by a dishwasher, com-

prising the technical characteristics set forth in one or more of the appended claims.

Advantages of the invention

[0024] This dishwasher solves the technical problem in that it comprises an illumination device capable of illuminating the washing zone with visible radiation or ultraviolet radiation. In particular, the visible radiation allows the user to better see the dishes while the ultraviolet radiation has a germicidal action.

[0025] Thanks to the illumination device according to the present invention, it is possible to illuminate the washing zone with visible radiation to check the state of the dishes and to load the dishwasher more easily without having to turn on the light.

[0026] Thanks to the illumination device according to the present invention, it is also possible to illuminate the washing zone with ultraviolet radiation to sanitize and sterilize the washing zone and the dishes from the accumulated pathogenic microorganisms.

[0027] Thanks to the present invention it is possible to have a seat in a wall of the washing tank within which to store a single integrated device, having both the optical device and the two light sources.

[0028] Furthermore, thanks to the present invention, it is possible to make a dishwasher in which the same illumination device has both a first light source for illuminating the washing tank (during the cycle or when the door is opened) and a second light source for sanitizing.

[0029] Finally, the dishwasher with an optical device and associated illumination device is simpler and cheaper to produce.

LIST OF FIGURES

[0030] Further characteristics and advantages of the present invention will become more apparent from the approximate and thus non-limiting description of a preferred, but non-exclusive, embodiment of a dishwasher with an optical device and an illumination device, as illustrated in the accompanying drawings, wherein:

- Figure 1 shows a front perspective view of a built-in dishwasher, with some parts removed to better show others;
- Figure 2 shows a perspective view of the dishwasher of Figure 1 without some of the components thereof and the dishes;
- Figure 3 shows a detailed view of a washing zone of the dishwasher of Figure 1;
- Figure 3A shows a schematic representation of a detail of the dishwasher of Figure 1;
- Figure 4 is a sectional view along the line V-V of Figure 3;
- Figure 5 shows a schematic representation of the operation of the dishwasher according to the present invention.

DETAILED DESCRIPTION

[0031] Even when not explicitly highlighted, the individual features described with reference to the specific embodiments must be considered as accessories and/or exchangeable with other features, described with reference to other embodiments.

[0032] With reference to the appended figures, 1 indicates a dishwasher according to the present invention. Said dishwasher 1 can be, for example, of the type built-in to a kitchen unit and is shown free from finishing panels for a better understanding of the internal volumes.

[0033] The dishwasher 1 comprises a washing zone 2 and a door 3.

[0034] The washing zone 2 defines the volume within which the dishes S are arranged.

[0035] In the following description the term dishes S means for example a plate, cutlery, a glass, a saucepan, etc.

[0036] The dishwasher 1 identifies a base 1A, usually dedicated to housing the necessary mechanisms/devices for the performance of the main operations of the dishwasher 1.

[0037] The washing zone 2 is defined by a plurality of walls such as the base wall 2A, the side walls 2B and 2C, the top 2D and the bottom wall 2E and identifies an upper portion 2' and a lower portion 2".

[0038] The term upper/lower must be interpreted in light of the correct installation and condition of use of the dishwasher 1. In such scenario, the term upper relates to the more distant part from the base 1A while the term lower relates to the more proximal part to the base 1A.

[0039] The door 3 can be activated by hand by the user and/or with an electrical servomechanism and has the aim of hermetically closing the washing zone 2 so as to prevent any losses of washing liquid during the performance of the washing cycle.

[0040] In particular, the door 3 is configured to switch between a closed configuration in which it precludes access to the washing zone 2 and at least an open configuration in which it allows access to the washing zone 2.

[0041] In the dishwasher 1 according to the present invention, the door 3 can also be positioned in a further approached configuration, in which this door 3 is located in proximity to the washing zone 2. In other words, the door 3 is open but precludes access to the washing zone 2 when it is in the approached configuration.

[0042] The dishwasher also comprises one or more impellers 5. They are of the type known per se and therefore shall not be described. It is worth highlighting here that there may be one or, preferably, two impellers arranged in the washing zone 2. In particular, the first impeller is placed in the lower zone 2' in proximity to the base 1A and the other one in the upper zone 2", preferably in the lower part of the upper zone.

[0043] In the lower zone 2' and/or in the upper zone 2" a respective dish holder basket 21 is arranged which has the function of housing the various dishes S, accord-

ing to techniques known in the art and therefore not described.

[0044] The term dish holder basket 21 means any device and/or accessory dedicated to the positioning thereof and therefore suitable for supporting the dishes S.

[0045] Such basket and/or accessory must be compatible with the dimensions of the washing zone 2 of the dishwasher 1.

[0046] The dishwasher 1 comprises a dispenser 6 conformed so as to define a suitable volume for housing the products or detergents necessary for cleaning the dishes S.

[0047] For example, these detergents can be powder, tablet or tab detergents but also liquid/gel detergents.

[0048] Such dispenser 6 may comprise one or more compartments each intended to receive a specific washing product.

[0049] According to one aspect, also with reference to Figure 1, the dispenser 6 is located on the door 3, in particular on the side turned towards the washing zone 2, at a predefined height. More in particular, the dispenser 6 is housed within the thickness of the door 3.

[0050] The dishwasher 1 comprises a pump 12, for example arranged in the base 1A. The pump 12 can be connected, according to techniques known to a person skilled in the art and therefore not described, with a mains water inlet to take the water necessary for the washing cycle from the mains.

[0051] The washing zone 2 is in fluid communication with the pump 12. In particular, the pump 12 has the task of making water flow into the impellers 5 arranged inside the washing zone.

[0052] The dishwasher 1 comprises one or more optical devices 81, facing the washing zone 2. The optical devices 81 are designed to acquire digital images J of the washing zone 2. Such images J can be fixed and/or sequential two-dimensional digital images, with a predetermined capture speed, such as for example a single frame, or a burst of images J, or an uninterrupted stream of images J. Advantageously, it is possible to obtain data from the acquired images J in such a way as to determine some parameters, such as the load of dishes S, for optimizing the washing cycle and reduce consumption.

[0053] The optical devices 81, for example, are embodied in a photo camera and/or a video camera. Such devices are known in the sector and therefore will not be described in detail in the present description.

[0054] The dishwasher 1 also comprises one or more illumination devices 82. The one or more illumination devices 82 face onto the washing zone 2 and are configured to illuminate the washing zone 2 with visible or ultraviolet light.

[0055] In particular, each illumination device 82 comprises at least:

- a first light source 83 configured to emit an electromagnetic radiation in the visible spectrum and/or
- a second light source 84 configured to emit an elec-

tromagnetic radiation in the ultraviolet spectrum.

[0056] Advantageously, in this way it is possible to illuminate the washing zone 2 with visible radiation for a facilitated observation for the user of the dishes S.

[0057] Alternatively or jointly, it is also possible to illuminate the washing zone 2 with ultraviolet radiation for better cleaning the dishes S or the washing zone 2 itself.

[0058] By way of example, the first light source 83 comprises one or more LED light sources each capable of emitting a flash of visible light in a range of power varying between a few Watts and a few tens of Watts, preferably between 5 and 40W.

[0059] By way of example, the second light source 84 is embodied by LED light sources.

[0060] Preferably, the second light source 84 is configured to emit ultraviolet radiation in the short ultraviolet band. This radiation has in fact a germicidal action. Advantageously, it is possible to sterilize the washing zone 2 from pathogenic microorganisms that accumulated as a result of the dirt of the dishes S, eliminating bad smells due to the microorganisms.

[0061] It is worth highlighting that in the dishwasher 1 according to a preferred embodiment it comprises at least one light source 83, 84 associated with a respective optical device 81.

[0062] Preferably, the first light source 83 is associated with a respective optical device 81. In particular, the first light source 83 is integrated with a respective optical device 81.

[0063] Furthermore, the second light source 84 is adjacent to the first light source 83. The first light source 83 and the second light source 84 form with the optical device 81 an illumination, sanitization and image acquisition complex 8.

[0064] Preferably, the second light source 84 is associated with the first light source 83. In other words, the second light source 84 is integrated with the first light source 83.

[0065] Consequently, in a preferred embodiment, the complex 8 is a single integrated device in which the illumination device 82, comprising the first light source 83 and the second light source 84 integrated together, is associated with the optical device 81.

[0066] Advantageously, the integration of the illumination device 82 with the optical device 81 allows optimizing the space occupied in the dishwasher 1.

[0067] Preferably, the dishwasher according to the present invention comprises two or more complexes 8.

[0068] In greater detail, each wall 2A, 2B, 2C, 2D and/or 2E of the washing zone 2 can house, within its thickness, one or more of the aforesaid complexes 8. For this purpose, a seat 2F is provided for each complex 8, obtained in the thickness of one of the four side walls 2A, 2B, 2C, 2D. In this seat 2F all the electrical and electronic elements necessary for the operation of the complex 8 are available.

[0069] The seat 2F defines a suitable volume to house

the respective complex 8.

[0070] Preferably, for protecting the light sources 83, 84 and the optics of the optical device 81 from water, dirt or impacts, the complex 8 comprises a covering panel 8A.

[0071] In particular, the covering panel 8A is transparent both to visible light and to ultraviolet light. For example, the covering panel is made of glass, quartz, PMMA or other plastics, or of materials having similar technical properties.

[0072] The covering panel 8A is preferably arranged so as to be substantially flush or slightly projecting from the surface of the wall 2A, 2B, 2C, 2D or 2E.

[0073] In an embodiment, it is provided that the seat 2F, within which the optical device 81 and the illumination device 82 are arranged, is configured so as to be water-tight, for example by using sealing techniques.

[0074] It should be noted that the illumination device 82 has an illumination field 8B which allows illuminating the dishes S and/or areas of the washing zone 2 falling within it. According to a preferred embodiment, the dishwasher 1 comprises two or more illumination devices 82, integrated in particular in respective complexes 8 and positioned in diametrically opposite points of the washing zone 2. Advantageously, it is possible to illuminate the washing zone 2 more efficiently.

[0075] The dishwasher 1 comprises a control unit 4, for example arranged in the thickness of the door 3. The control unit 4 is provided with an electronic card on which the usual electrical and electronic devices are located. The control unit 4 is configured to control and monitor the operating functions of the dishwasher 1.

[0076] In the context of the present description, the control unit 4 will be divided into a plurality of functional modules. This is done for greater clarity, but does not necessarily reflect the implementation of the control unit 4. The modules can in fact comprise one or more hardware components and/or one or more software programs. The implementation of the control unit 4 can be made on local hardware, in one or more virtual machines and/or can be distributed on one or more devices connected in the network via cables or wireless connections.

[0077] With particular reference to Figure 5, the control unit 4 comprises a memory module 41 and/or an acquisition module 42 and/or a processing module 43 and/or an actuation module 44. The control unit 4 further comprises a series of I/O ports for receiving and outputting data (not shown in the accompanying figures).

[0078] At least one cleaning program P is permanently stored in a portion of the memory module 41. The cleaning program P is the result of one or a combination of more than one of the following parameters:

- duration of the washing/drying step;
- pressure of the wash pump;
- temperature of the washing and drying steps;
- use of a water softening system
- quantity of dispensed detergent.

[0079] The program P may also comprise other parameters not indicated here for description simplicity purposes. According to the selected cleaning program P, the control unit 4 controls the various components suitable for carrying out the washing cycle.

[0080] Furthermore, as will be discussed in detail in a later part of the present description, the control unit 4 is placed in signal communication with the complex 8 in particular through the I/O ports to control both the optical device 81 and the illumination device 82 and therefore the light sources 83 and 84.

[0081] In particular, the acquisition module 42 is designed to receive one or more images J acquired by the optical device 81, as described above. The processing module 43 processes the images J so as to obtain data which are compared with data previously saved in the memory module 41. The actuation module 44 therefore acts on various parameters of the cleaning program P. For example, the actuation module 44 regulates the flow F of the pump 12.

[0082] The control unit 4 is also placed in signal communication with the illumination device 82 so as to control the illumination device 82. Advantageously, it is possible to use a single control unit 4 to control both the optical device 81 and the illumination device 82.

[0083] An illumination program L is stored in a portion of the memory module 41 of the control unit 4. In greater detail, the control unit 4 is configured to send an activation signal A for activating the first light source 83 and/or the second light source 84. The control unit 4 is further configured to send a deactivation signal D for deactivating the first 83 light source and/or the second light source 84, for example after a predetermined time interval has elapsed from activation.

[0084] The dishwasher 1 according to the present invention comprises sensor means 11 associated with the door 3 and in signal communication with the control unit 4.

[0085] These sensor means 11 are configured to detect the position X and/or the movement M of the door 3.

[0086] According to an embodiment, the sensor means 11 comprise a first sensor 111 configured to detect the position X of the door 3 and/or a second sensor 112 configured to detect the movement M of the door 3. The first sensor 111 and the second sensor 112 are configured to send data to the control unit 4.

[0087] The first sensor 111 can for example be a switch capable of defining the open/closed state of door 3.

[0088] The second sensor 112 can be, for example, a gyroscope or an accelerometer, therefore configured to detect the movement M of the door 3, for example through variations in position X and/or in speed of the door 3.

[0089] In particular, the sensor means 11 are configured to emit a first signal S1 when the door 3 switches from the closed configuration to an open configuration. The control unit 4 is configured to receive the first signal S1 from the sensor means 11 and activate the first light source 83, i.e. the light source configured to emit visible radiation.

[0090] The sensor means 11 are configured to also emit a second signal S2 when the door 3 is in the approached configuration. The control unit 4 is configured to receive the second signal S2 from the sensor means 11 and to deactivate the first light source 83.

[0091] Advantageously, when the dishwasher 1 is off, after the washing cycle has been completed, and the user approaches the door 3 without closing it, the light remains off.

[0092] The sensor means 11 are configured to emit a third signal S3 when the door 3 is in the closed configuration. The control unit 4 is configured to receive the third signal S3 from the sensor means 11 and to activate the second light source 84.

[0093] With particular reference to Figure 5, the acquisition module 42 of the control unit 4 is designed to receive the signals S1, S2, S3 emitted by the sensor means 11.

[0094] The processing module 43 processes the acquired data by comparing them with data previously saved in the memory module 41.

[0095] Therefore, the actuation module 44 provides for sending the activation signal A or the deactivation signal D to the illumination device 83. In particular, the actuation module is configured to turn on the second light source 84 if the door 3 is in the closed configuration, to turn on the first light source 83 and/or to turn off the second light source 84 if the door 3 is in an open configuration, to turn off the first light source 83 if the door 3 is in the approached configuration.

[0096] In one embodiment, the dishwasher 1 according to the present invention can be provided with multiple sensors to detect the position X and/or the movement M of the door 3 so as to define the state of the door 3 in one of the open configurations, in the closed configuration or in the approached one.

[0097] According to a preferred embodiment of the dishwasher 1, the control unit 4 is configured to activate said second light source 84 outside the washing cycle. Advantageously this makes it possible to sterilize the washing zone 2 when the dishwasher 1 is empty, i.e. free from dishes S.

[0098] Alternatively, the control unit 4 is configured to activate the second light source 84, during a step preceding and/or following the washing cycle.

[0099] According to an embodiment, the control unit 4 is configured to activate the second light source 84 outside the washing cycle and before and/or after the washing cycle. In this way it is possible to sterilize the dishes S, the washing zone 2 or both.

[0100] The dishwasher 1 comprises a user interface 9, i.e. the command and control interface through which the user can control and manage the operations and functions of the dishwasher 1 itself.

[0101] For that purpose, the user interface 9 is in signal communication with the control unit 4 through its I/O ports in order to receive the data processed by the processing module 43 of the control unit itself.

[0102] In one embodiment, the user interface 9 is a screen 23 integrated into the dishwasher 1 so that it can be visible to a user during its normal use and/or with the addition of a buzzer (not shown in the accompanying figures).

[0103] According to one aspect, with reference to Figure 1, the user interface 9 is integrated into the door 3 so that the screen faces onto the washing zone 2 externally.

[0104] It is worth highlighting that the screen 23 of the user interface 9 is configured to display luminous indications, text messages and/or single or continuous images J. In particular, the images J that can be displayed on the screen may be images J of the washing zone 2 and of the related objects provided there acquired by the optical devices 81.

[0105] In particular, the screen may be of the touch type (or controllable by touch).

[0106] In another embodiment, the user interface 9 comprises one or more analog buttons and/or a combination of analog/digital controls and/or a combination of analog/digital controls and a screen, the latter for example of the touch type.

[0107] The buzzer of the user interface 9 has the aim of reporting any operating conditions or situations to the user through an acoustic signal.

[0108] In one embodiment, the dishwasher 1 comprises a radio transceiver device which is configured to create a signal communication with a wired and/or wireless network. For example, the wireless network may be a network based on an internet protocol through a Wi-Fi connection or a WPAN (Wireless Personal Area Network) based on Bluetooth protocol.

[0109] In this hypothesis, the user interface 9 comprises a software portion 26 installed on a portable device (i.e. transportable or graspable by a hand of a user) 22 such as, for example, a smartphone, a tablet, a pc or similar instruments.

[0110] In other words, the user interface 9 comprises both the usual control interface of the dishwasher 1 and the screen of the portable device 22.

[0111] In particular, the portable device 22 comprises its own radio transceiver device which is configured to establish a signal communication with the radio transceiver device of the dishwasher 1.

[0112] According to one aspect, the portable device 22 as well as being able to communicate with the control unit 4 of the dishwasher 1 can also connect through the internet, e.g. through a mobile data network, with one or more remote servers 24 in order to perform the archiving, saving and/or processing operations of data on the images J acquired by the optical devices 81.

[0113] Furthermore, according to an embodiment, through the user interface 9 the user can create, eliminate or modify further cleaning programs P and/or illumination programs L.

[0114] With particular reference to the illumination programs L, for example the user can regulate the illumina-

tion time interval, or temporarily deactivate the illumination device 82.

[0115] In other words, the portable device 22 is suitable for connecting both directly with the dishwasher 1 and with the internet through the mobile data network. In this scenario, therefore, a system is configured comprising the dishwasher 1 and the software portion 26 of the portable device 22, with each other in signal communication through mobile data network, Wi-Fi connection and/or a WPAN.

[0116] Obviously a person skilled in the art will be able to make numerous equivalent modifications to the variants set forth above, without thereby abandoning the scope of protection as defined by the appended claims.

Claims

1. A dishwasher (1) comprising:

- a pump (12) that can be connected to a mains water inlet for taking water from the mains,
 - a washing zone (2) in fluid communication with said pump (12), said washing zone (2) being defined by a plurality of walls (2A, 2B, 2C, 2D, 2E);
 - a door (3), configured to switch between a closed configuration in which it precludes access to said washing zone (2) and at least one open configuration in which it allows access to said washing zone (2),
 - one or more illumination, sanitizing and image acquisition complexes (8) comprising:
 - an illumination device (82) facing said washing zone (2) and having a first light source (83) configured to emit a radiation in the visible spectrum and a second light source (84) configured to emit a radiation in the ultraviolet spectrum,
 - an optical device (81) facing said washing zone (2) and configured to acquire digital images (J) of said washing zone (2),
 - a control unit (4) placed in signal communication with one or more illumination, sanitizing and image acquisition complexes (8) to control said one or more illumination, sanitizing and image acquisition complexes (8),
- characterized in that** one or more walls of the plurality of walls (2A, 2B, 2C, 2D, 2E) of the washing zone (2) comprise, within their thickness, a seat (2F) configured to house one or more of the aforesaid illumination, sanitization and image acquisition complexes (8).

2. The dishwasher (1) according to claim 1, wherein said first light source (83) is associated with a respective optical device (81) and said second light source (84) is adjacent to and integrated with said first light source (83).

3. The dishwasher (1) according to claim 1, wherein said control unit (4) is configured to send an activation signal (A) for activating said first light source (83) and/or said second light source (84), said control unit (4) being further configured to send a deactivation signal (D) for deactivating said first (83) and/or said second (84) light source after a predetermined time interval has elapsed from activation.

4. The dishwasher (1) according to claim 1, comprising sensor means (11) in signal communication with said control unit (4) and associated with the door (3) to detect the position (X) and/or the movement (M) of the door (3), said sensor means (11) being configured to emit a first signal (S1) when the door (3) switches from the closed configuration to an open configuration, said control unit (4) being configured to receive said first signal (S1) from said sensor means (11) and to activate said first light source (83).

5. The dishwasher (1) according to claim 4, wherein the door (3) can be positioned in an approached configuration in which it is in proximity to the washing zone (2), said sensor means (11) being configured to emit a second signal (S2) when said door (3) is in the approached configuration.

6. The dishwasher (1) according to claim 5, wherein said control unit (4) is configured to receive said second signal (S2) from said sensor means (11) and to deactivate said first light source (83).

7. The dishwasher (1) according to claim 4, wherein said sensor means (11) are configured to detect variations in position and/or in movement speed of said door (3).

8. The dishwasher (1) according to claim 1, wherein said control unit (4) is configured to activate said second light source (84) when the door (3) is in the closed configuration.

9. The dishwasher (1) according to claim 1, wherein said control unit (4) is configured to activate said second light source (84) when the door (3) is in the closed configuration before the washing cycle and/or outside the washing cycle.

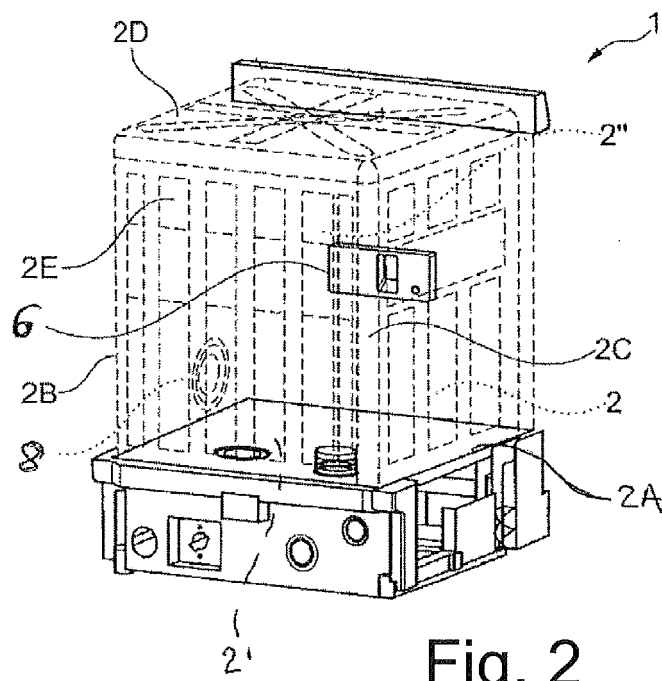
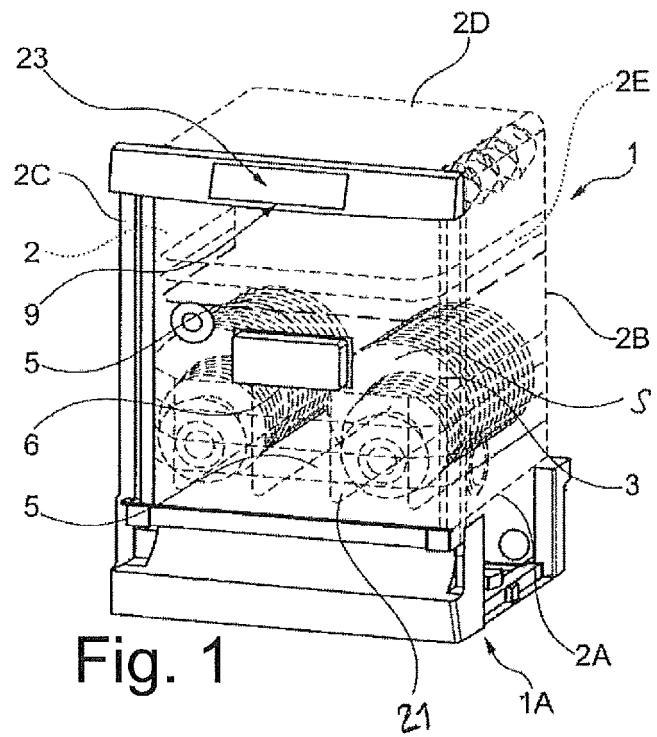


Fig. 3

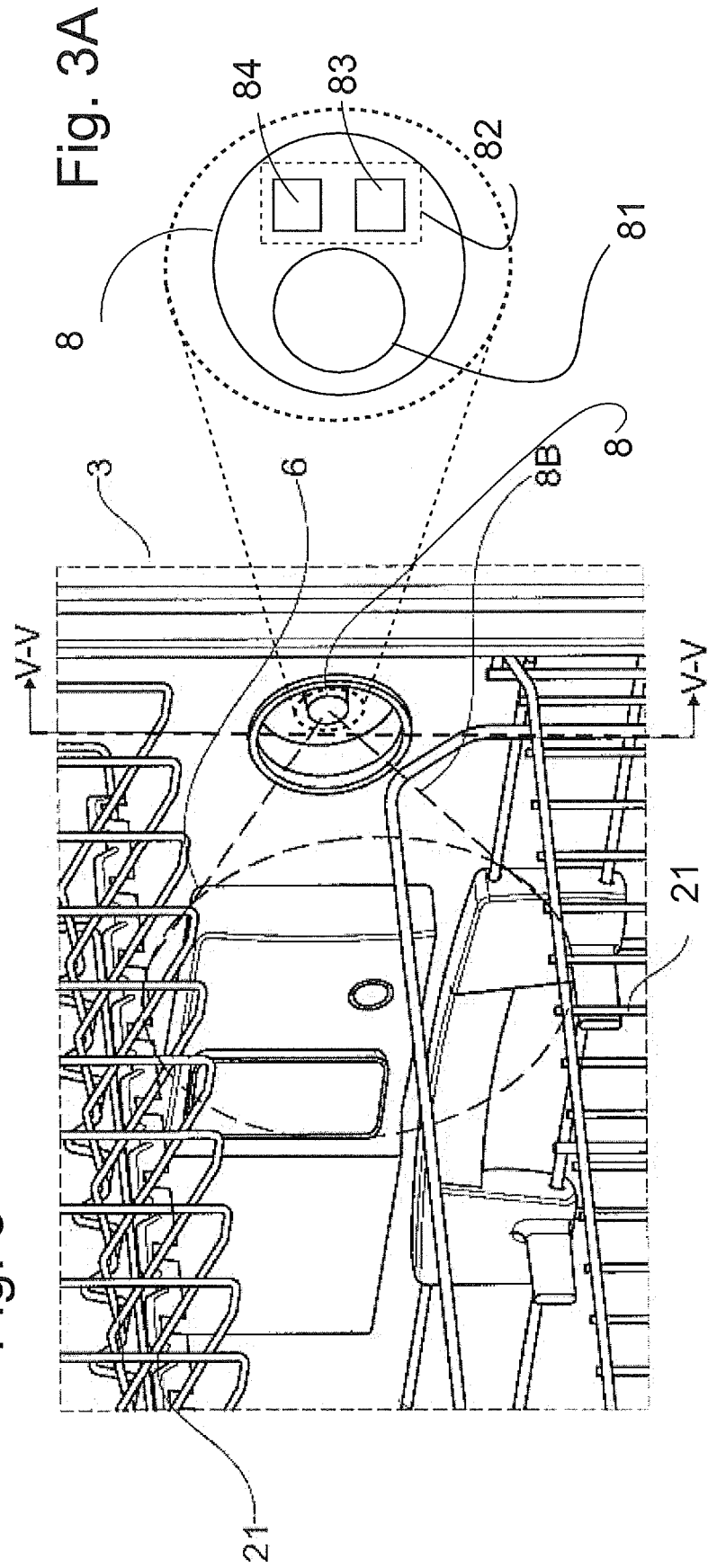
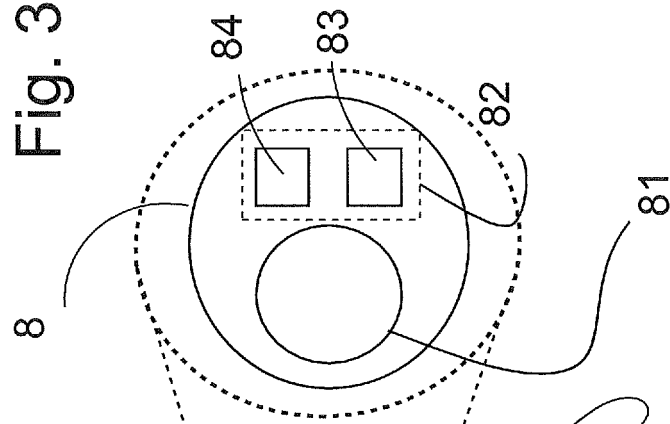


Fig. 3A



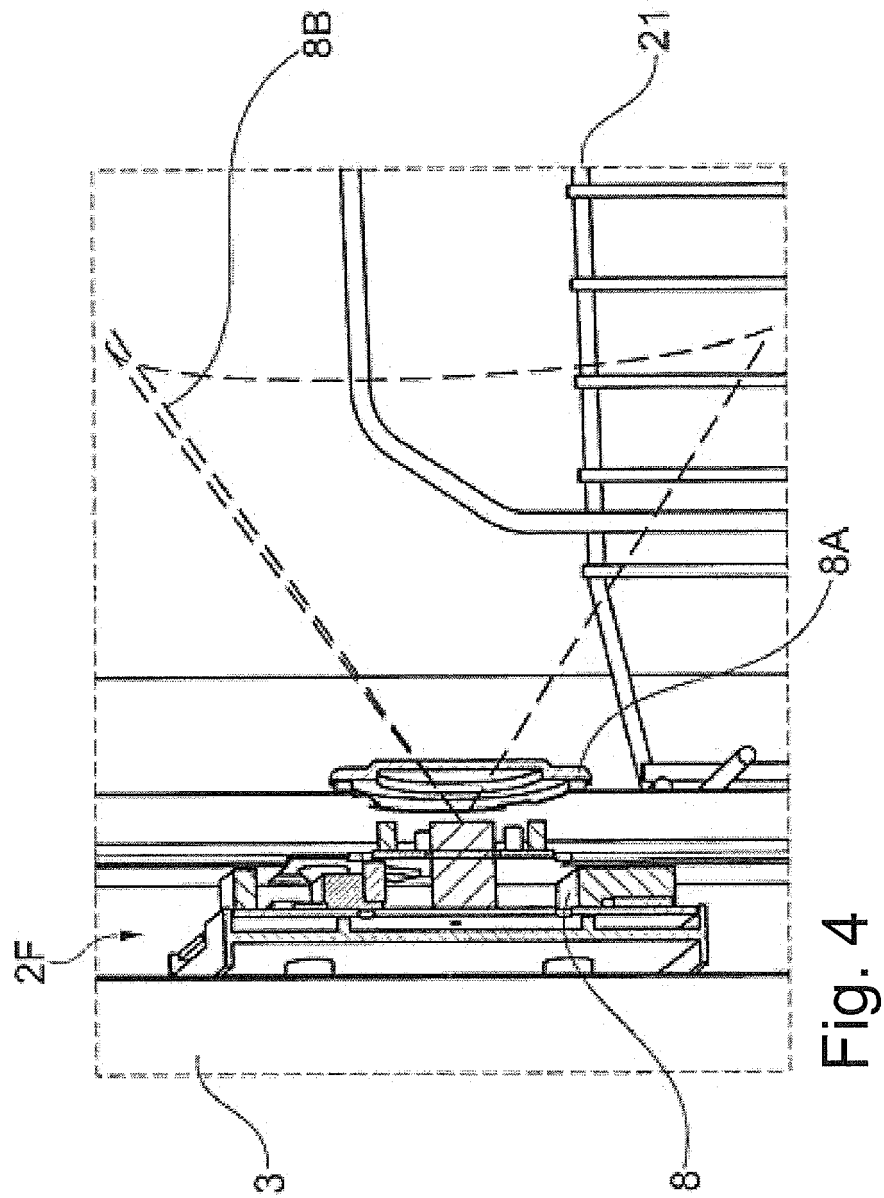


Fig. 4

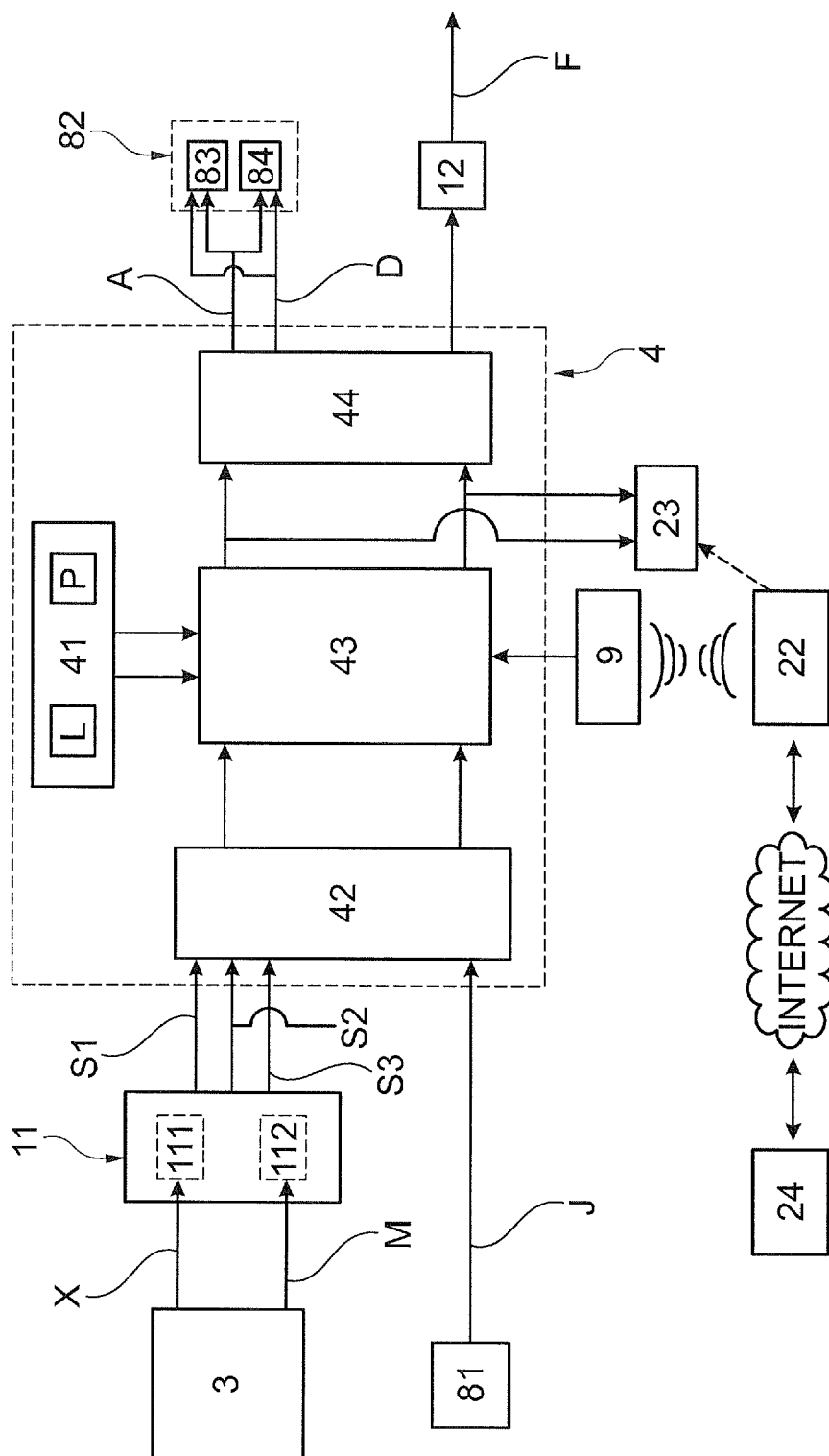


Fig. 5



EUROPEAN SEARCH REPORT

 Application Number
EP 20 16 4172

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)
A	DE 10 2009 023252 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 2 December 2010 (2010-12-02) * paragraphs [0049] - [0051] * * paragraphs [0056] - [0059] * * paragraphs [0064] - [0068] * * figures 1, 2 *	1-9	INV. A47L15/42
A	WO 2019/015996 A1 (BSH HAUSGERAETE GMBH [DE]) 24 January 2019 (2019-01-24) * page 4, line 17 - page 5, line 26 * * page 13, line 17 - page 15, line 38 * * figures 1, 2 *	1-9	
A	US 2012/138092 A1 (ASHRAFZADEH FARHAD [US] ET AL) 7 June 2012 (2012-06-07) * paragraphs [0015] - [0020] * * paragraphs [0041] - [0044] * * figures 1-3 *	1-9	
A	DE 10 2007 022572 A1 (LG ELECTRONICS INC [KR]) 22 November 2007 (2007-11-22) * paragraphs [0019] - [0034] * * figures 1-3 *	1	TECHNICAL FIELDS SEARCHED (IPC) A47L
A	DE 102 56 168 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 9 June 2004 (2004-06-09) * paragraphs [0016] - [0020] * * figures 1, 2 *	4-9	
A	DE 100 48 081 A1 (MIELE & CIE [DE]) 18 April 2002 (2002-04-18) * paragraphs [0013] - [0019] * * figures 1-4 *	1	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 September 2020	Examiner Weidner, Maximilian
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 20 16 4172

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.

09-09-2020

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 102009023252 A1	02-12-2010	DE 102009023252 A1	02-12-2010
		EP 2434936 A2	04-04-2012
		PL 2434936 T3	30-11-2018
		US 2012060875 A1	15-03-2012
		WO 2010136294 A2	02-12-2010

WO 2019015996 A1	24-01-2019	CN 110944564 A	31-03-2020
		DE 102017212333 A1	24-01-2019
		EP 3654819 A1	27-05-2020
		WO 2019015996 A1	24-01-2019

US 2012138092 A1	07-06-2012	NONE	

DE 102007022572 A1	22-11-2007	CN 101077294 A	28-11-2007
		DE 102007022572 A1	22-11-2007
		KR 20070110591 A	20-11-2007
		US 2007274856 A1	29-11-2007

DE 10256168 A1	09-06-2004	AT 354308 T	15-03-2007
		AU 2003289865 A1	23-06-2004
		CN 1719996 A	11-01-2006
		DE 10256168 A1	09-06-2004
		EP 1569545 A1	07-09-2005
		ES 2281680 T3	01-10-2007
		US 2008099059 A1	01-05-2008
		WO 2004049895 A1	17-06-2004

DE 10048081 A1	18-04-2002	NONE	

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

- WO 2016008699 A [0003]
- US 20120138092 A [0003]
- DE 102009023252 A1 [0006] [0007] [0016]
- WO 2019015996 A1 [0006] [0007] [0016]
- US 2012138092 A1 [0006] [0007] [0016]
- DE 102007022572 A1 [0006] [0008] [0017]
- DE 10256168 A1 [0006] [0009] [0018]