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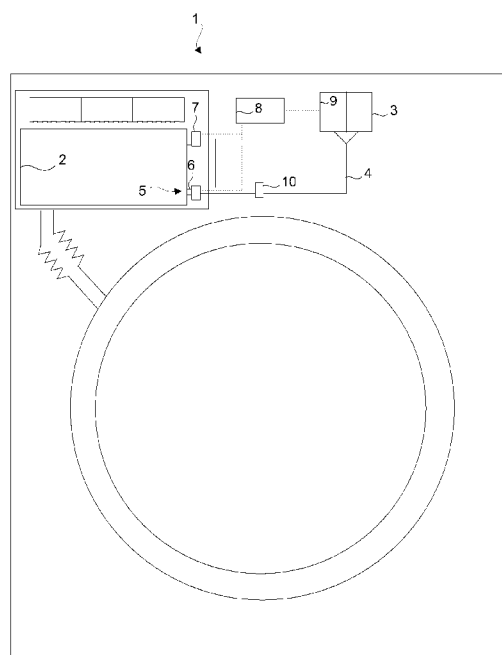
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(54) Title: A WASHER COMPRISING A LIGHT SOURCE

Figure 1



(57) Abstract: The present invention relates to a washer (1) comprising a receptacle (2) such as filter housing, detergent drawer, etc., washed with the washing water and wherein residues are tried to be swept by the washing water; at least one light source (3) that, when activated, eliminates the microorganisms in the receptacle (2) by means of ultraviolet beam, and a fiber optic cable (4) that is placed between the light source (3) and the receptacle (2), enabling the beam emitted by the light source (3) to be transmitted into the receptacle (2) with minimum loss.



Description**A WASHER COMPRISING A LIGHT SOURCE**

[0001] The present invention relates to a washer comprising a light source.

[0002] In washers, microorganism formation is observed as a result of the moisture in receptacles such as detergent drawer and filter housing wherein residues are swept, and as a result of the residues that cannot be removed. The microorganisms that grow in time cause microbial accumulation and biofilm formation that poses health risks. In order to prevent biofilm formation, the receptacle must be cleaned, dried and dehumidified after use. However, the users cannot perform this process every time. Washing the receptacles after use does not prevent the biofilm formation, because the interior of the receptacles remains wet due to not being dried. In the state of the art, it is known that the interior of the receptacle is treated with ultraviolet beam in order to prevent the microorganism formation. In these embodiments, the ultraviolet light source is isolated in the appliance so as not to harm the user and the beam is transmitted into the receptacle by means of various types of light guides. However, the beam cannot be transferred onto all surfaces of the receptacle and the biofilm formation cannot be prevented. Furthermore, the removal of the formed biofilm layer requires a very hard physical and mechanical process.

[0003] In the state of the art International Patent Application No. WO2008052975, a washer is disclosed, comprising a detergent drawer wherein cleaning agents are placed.

[0004] The aim of the present invention is the realization of a washer wherein the microorganism formation is minimized in the receptacles washed by the washing water and the formed biofilm layer is removed.

[0005] The washer that is realized in order to attain the aim of the present invention and explicated in the claims comprises an optical mechanism that enables the beam to be dispersed or focused, wherein the tip of a fiber optic cable providing the transmission of the beam emitted by the light source to an opening on the receptacle is inserted, and a movement mechanism that enables the dispersed or focused beam to be redirected

and thus, transmitted to all the surfaces of the receptacle. By means of the movement mechanism, the beam can be transferred to all the surfaces of the receptacle, and by means of the optical mechanism, the intensity of the light is maximized or the beam is enabled to be transferred to almost all the surfaces.

- [0006] In an embodiment of the present invention, by means of a control unit that controls the movement mechanism and the optical mechanism, the beam is focused and a desired point in the receptacle is cleansed of microorganisms. In this embodiment, the microbial layer present in the receptacle is enabled to be cleaned. By means of this embodiment, the need for the user to remove the receptacle for cleaning is eliminated.
- [0007] In another embodiment of the present invention, the control unit enables the beam to be dispersed by means of the optical mechanism and enables the dispersed beam to sweep all the surfaces of the receptacle by means of the movement mechanism. The primary aim of this embodiment is to prevent the microorganism formation in the receptacle. In a version of this embodiment, the control unit enables the interior of the receptacle to be swept by the dispersed beam after the receptacle is used and the microorganisms are prevented from growing on the surfaces of the receptacle.
- [0008] In another embodiment of the present invention, the washer comprises an infrared light source for treating the interior of the receptacle with infrared radiation in addition to the ultraviolet radiation. By means of this embodiment, in addition to dehumidifying the interior of the receptacle, the microorganisms in the receptacle are burnt and destroyed (by being locally overheated). Furthermore, the interior of the receptacle is heated by taking advantage of the heating effect of the infrared beam and thus, the relative humidity in the receptacle is decreased.
- [0009] In another embodiment of the present invention, by placing a multiplexor on the fiber optic cable that transmits the beam, the beam is enabled to be separated into several branches. In this embodiment, the control unit controls the movement mechanisms together or separately, which determine the directions that the beam reaches the interior of the

receptacle. In a version of this embodiment, the control unit enables all the surfaces of the receptacle to be swept more quickly by directing the beams towards different directions during the sweeping process with the dispersed beam after the use of the receptacle. Thereby, the need for operating the washer for treating the interior of the receptacle with ultraviolet and/or infrared radiation after the washing process is completed is obviated, and the sweeping process is performed during the washing process after the receptacle is used.

- [0010] In further embodiments of the present invention, the sweeping process using dispersed beam is shorter than the cleaning process using focused beam and/or it is performed more frequently. By means of this embodiment, the microbial formations in the receptacle are prevented at the start of the process.
- [0011] In another embodiment of the present invention, the optical mechanism has a circular housing and the lenses enabling the beam to be focused or dispersed are placed on the housing. The movement mechanism rotates the housing and aligns the corresponding lens with the tip of the fiber optic cable and tilts the housing to enable the beam to be brought onto the desired region in the receptacle.
- [0012] In another embodiment of the present invention, a metal ring or a magnet is disposed onto the fiber optic cable and the movement mechanism energizes electromagnetic elements thereon so as to enable the fiber optic cable to be directed electromagnetically. In this embodiment, the fiber optic cable is directed in the same way as the beam is directed in CRT televisions. Thus, the beam can be transferred to all the surfaces of the receptacle.
- [0013] In another embodiment of the present invention, the lenses enabling the beam to be focused or dispersed are placed on at least one plate. In a version of this embodiment, the lenses are placed onto a single plate and the movement mechanism moves the plate so that the lens aligns with the tip of the fiber optic cable. In another version of this embodiment, each lens is placed on a plate and the movement mechanism slides the plate whereon the lens not to be used away from the tip of the fiber optic cable.

- [0014] In another embodiment of the present invention, the movement mechanism has a spherical form similar to the form of an eye. Thus, by rotating the sphere right/left and downwards/upwards, the beam can be directed towards any direction.
- [0015] In the washer of the present invention, the ultraviolet beam that kills the microorganisms can be transferred to the entire receptacle by means of the optical mechanism and the movement mechanism. Thus, the microorganism formation in the receptacle is prevented at the start of the process and in case of a microbial formation such as mold, the related region is cleaned by focusing the beam.
- [0016] The washer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0017] Figure 1 – is the schematic view of a washer.
- [0018] Figure 2 - is the perspective view of the receptacle in another embodiment of the present invention.
- [0019] Figure 3 - is the perspective view of the movement mechanism and the optical mechanism in an embodiment of the present invention.
- [0020] The elements illustrated in the figures are numbered as follows:
1. Washer
 2. Receptacle
 3. Light source
 4. Fiber optic cable
 5. Opening
 6. Optical mechanism
 7. Movement mechanism
 8. Control unit
 9. Second light source
 10. Multiplexor
 11. Housing
 12. Lens
- [0021] The washer (1) comprises a receptacle (2) such as filter housing, detergent drawer, etc., washed with the washing water and wherein residues are tried to be swept by the washing water and the residues that

cannot be swept cause microorganism formation; at least one light source (3) that, when activated, eliminates the microorganisms in the receptacle (2) by means of ultraviolet beam, and a fiber optic cable (4) that is placed between the light source (3) and the receptacle (2), enabling the beam emitted by the light source (3) to be transmitted into the receptacle (2) with minimum loss. In the washer (1), the beam emitted by the light source (3) is carried into the receptacle (2) by means of the fiber optic cable (4), and used to eliminate the microorganisms in the receptacle (2).

[0022] The washer (1) of the present invention comprises at least one opening (5) on the surface of the receptacle (2), allowing the beam to enter the receptacle (2), and a movement mechanism (7) that has an optical mechanism (6) positioned on the opening (5), wherein the fiber optic cable (4) is inserted, enabling the beam leaving the tip of the fiber optic cable (4) to be collected, enabling the beam to be dispersed into the receptacle (2) or focused on a specific point, wherein the movement mechanism (7) enables the beam to be directed towards a predetermined region in the receptacle (2).

[0023] The beam that is carried from the light source (3) by the fiber optic cable (4) and that preferably has an ultraviolet wavelength can be focused on a specific point or dispersed so as to provide the treatment of several points by means of the optical mechanism (6) wherein the tip of the fiber optic cable (4) is inserted. The beam that is focused by means of the movement mechanism (7) wherein the optical mechanism (6) is placed can be directed on a desired point in the receptacle (2) or the dispersed beam can be delivered to all the surfaces of the receptacle (2). The movement mechanism (7) is placed into an opening (5) on the receptacle (2) and rotates/tilts around its axis so as to enable the beam to be redirected. The beam emitted by the light source (3) is focused on a desired point by means of the optical mechanism (6), and the beam that is focused on a point is transmitted to a desired region in the receptacle (2) by means of the movement mechanism (7). Thus, by means of the movement mechanism (7) that redirects the beam so as to sweep the interior of the receptacle (2), the microorganisms causing biofilm formation in the

receptacle (2) are eliminated.

[0024] In an embodiment of the present invention, the washer (1) comprises a control unit (8) that determines the regions wherein the microbial accumulation occurs based on the feedback received from a sensor (not shown in figures) that senses microbial accumulation and/or the feedback received from the user and controls the movement mechanism (7) so as to enable the focused beam to be redirected towards the respective region. The control unit (8) determines the regions in the receptacle (2) wherein the biofilm formation is observed according to the feedback received. The information related to the region in the receptacle (2) where the biofilm forms is transmitted to the control unit (8) by the user via the user interface of the washer (1) or by a sensor such as a humidity sensor or a sensor such as a camera that can capture the view of the interior of the receptacle (2) or a sensor that detects the reflection rate of the light delivered into the receptacle (2). The control unit (8) enables the optical mechanism (6) to focus the beam and enables the movement mechanism (7) to direct the beam towards the region where the biofilm formation occurs, and thus enables the beam to eliminate the microorganisms in the related region. In a version of this embodiment, the control unit (8) enables the relevant region to be treated with the focused beam until the control unit (8) receives feedback from the sensor or the user indicating that the biofilm is eliminated.

[0025] In another embodiment of the present invention, the control unit (8) controls the movement mechanism (7) so as to enable the surfaces of the receptacle (2) to be swept with the beam that is dispersed by the optical mechanism (6). In order to prevent the detergent residues or organic residues in the receptacle (2) from forming biofilm on the surfaces of the receptacle (2), the control unit (8) directs the beam dispersed by the optical mechanism (6) by means of the movement mechanism (7) and enables all the surfaces of the receptacle (2) to be treated with the beam and the microorganisms to be eliminated before growing.

[0026] In a version of this embodiment, the control unit (8) enables the receptacle (2) surfaces to be swept with the dispersed beam for a predetermined

period of time after the receptacle (2) is used. The microorganisms grow rapidly after the receptacle (2) is used, since the receptacle (2) surfaces are wet and humid. In this embodiment, the control unit (8) enables the receptacle (2) surfaces to be swept with the dispersed beam for a predetermined period of time. Thus, the microorganisms are eliminated before microbial accumulation forms in the receptacle (2).

[0027] In another embodiment of the present invention, the washer (1) comprises a second light source (9) that emits infrared beams that are directed into the receptacle (2) by means of the optical mechanism (6) and the movement mechanism (7), and the control unit (8) enables the infrared beam of the second light source (9) to be directed towards a predetermined region in the receptacle (2) together with the focused ultraviolet beam. By using infrared beam in addition to the ultraviolet beam, relative humidity in the receptacle (2) is decreased and the microorganisms are eliminated with heat. By decreasing the relative humidity in the receptacle (2) by means of the heating effect of the infrared beam, the receptacle (2) is prevented from creating a suitable living environment for microorganisms and the microorganism growth in the receptacle (2) is avoided. Moreover, the microorganisms that grow in the receptacle (2) are eliminated by being burned at micro level.

[0028] In another embodiment of the present invention, the washer (1) comprises a multiplexor (10) on the fiber optic cable (4), enabling the beam emitted from the light sources (3, 9) to be divided into at least two branches, and the control unit (8) controls the movement mechanisms (7) together or separately, which are located on each opening (5) and which enable the beams coming from the branches to be directed. By transmitting the beam through different openings in different regions, especially during the sweeping of the interior of the receptacle (2) with the dispersed beam, the beam is enabled to reflect on all the surfaces at almost all the angles. By means of this embodiment, the beam is also enabled to reach every single point in the receptacle (2).

[0029] In another embodiment of the present invention, the control unit (8) enables the sweeping process to be completed in a shorter period of time

by directing at least two dispersed beams towards different regions of the receptacle (2) after the receptacle (2) is used. The beams entering the receptacle (2) through at least two openings (5) enable the interior of the receptacle (2) to be swept faster by means of the movement mechanisms (7) that are controlled separately. Thus, the microorganism formation is prevented in a short period of time and during the normal operation of the washer (1), after the receptacle (2) is used, for example, after the detergent intake is completed, the sweeping process is performed and the microorganism formation prevention process is performed during the washing program. The washer (1) is not required to be operated further for this process after the regular operation cycle.

[0030] In another embodiment of the present invention, the control unit (8) performs the sweeping process with the dispersed beam for a shorter time than the sweeping of a predetermined region with the focused beam. By means of sweeping the receptacle (2) with dispersed beam after each use, the sweeping process is not required to be carried out for a long time and thus, the receptacle (2) is prevented from being unreachable by the user for a long period of time.

[0031] In another embodiment of the present invention, the control unit (8) performs the sweeping process with the dispersed beam more frequently than the sweeping of a predetermined region with the focused beam. In addition to the embodiment described above, the sweeping process preventing microorganism formation is performed more frequently than the microbial formation cleaning process. By means of this embodiment, the mold formation in the receptacle (2) is prevented and the user satisfaction is increased.

[0032] In another embodiment of the present invention, the optical mechanism (6) has a circular housing (11) and at least two different lenses (12) placed on the housing (11), and the movement mechanism (7) enables the housing (11) to be rotated and tilted around its central axis. The lenses (12) that enable the beam to be focused on a specific point and dispersed to all the surfaces are placed on the housing (11). The movement mechanism (7) enables the beam to be focused or dispersed by enabling the housing (11)

to be rotated around its axis while the fiber optic cable (4) is kept stationary, and enables the beam to be directed towards the desired region in the housing (2) by tilting the housing (11) around its central axis.

[0033] In another embodiment of the present invention, the movement mechanism (7) comprises a magnet (not shown in figures) or a metal ring that reacts to the electrostatic attraction forces at the tip of the fiber optic cable (4), and at least one separately controllable magnetic element (not shown in figures) that is arranged around the optical mechanism (6) and, when activated, that enables the fiber optic cable (4) to be directed so as to be aligned with the desired lens (12). The magnet is arranged at the tip of the fiber optic cable (4) so as to surround the fiber optic cable (4). The movement mechanism (7) energizes the corresponding magnetic element according to the signal received from the control unit (8) and enables the magnetic element to be magnetized or electrified, and by means of the resulting Lorentz force, the fiber optic cable (4) is enabled to be directed towards the desired direction.

[0034] In another embodiment of the present invention, the optical mechanism (6) has a plate (not shown in figures) and at least two different lenses (12) arranged on the plate and the movement mechanism (7) enables the plate to be moved in the placement direction of the lenses (12) and enables the plate to be tilted around a direction perpendicular to the plate plane. The lenses (12) that enable the beam to be focused or dispersed are arranged on the plate, and the movement mechanism (7) enables the beam and the lens (12) to be used to be aligned by moving the plate backwards and forwards in the placement direction of the lenses. Moreover, the movement mechanism (7) enables the beam to be directed towards the desired region in the housing (2) by tilting the plate.

[0035] In another embodiment of the present invention, the optical mechanism (6) has at least two plates (not shown in figures) arranged one after another, each for placing one of at least two lenses (not shown in figures) one after another, and the movement mechanism (7) enables the plate with the lens (12) desired to be used to be aligned with the fiber optic cable (4) so as to be matched with the fiber optic cable (4), and the other plate to be moved

away from the fiber optic cable (4). In this embodiment, the plates are arranged one after another so that the lenses (12) thereon are aligned in the same direction and the plate whereon the lens (12) not to be used is placed is moved so as not to block the beam.

- [0036] In another embodiment of the present invention, the movement mechanism (7) is spherical and receives the optical mechanism (6). In this embodiment, the spherical movement mechanism (7) enables the beam to be directed towards the desired region by moving right/left or down/up like an eye, and receives the optical mechanism (6) having the lenses (12) like the lens in an eye.
- [0037] In alternative embodiments of the present invention, the receptacle (2) can be the filter housing of a dishwasher, the detergent drawer of a washing machine or a receptacle (2) in a washer (1) that may get wet allowing for the microorganism growth. By forming the opening (5) on the receptacle (2) and arranging the optical mechanism (6) and the movement mechanism (7) in the opening (5), the ultraviolet and/or the infrared beam can be transmitted to all the surfaces of the receptacle (2).
- [0038] In the washer (1) of the present invention, by periodically sweeping the interior of the receptacle (2) with ultraviolet beam, microbial formation on the receptacle (2) surfaces is prevented. When microbial accumulation as a result of microorganisms occurs on the receptacle (2) surfaces, the receptacle (2) is cleansed of microorganisms by focusing the beam and increasing the optical intensity.

Claims

1. A washer (1) **comprising** a receptacle (2) such as filter housing, detergent drawer, etc., washed with the washing water and wherein residues are tried to be swept by the washing water; at least one light source (3) that, when activated, eliminates the microorganisms in the receptacle (2) by means of ultraviolet beam, and a fiber optic cable (4) that is placed between the light source (3) and the receptacle (2), enabling the beam emitted by the light source (3) to be transmitted into the receptacle (2) with minimum loss, **characterized by** at least one opening (5) on the surface of the receptacle (2), allowing the beam to enter the receptacle (2), and a movement mechanism (7) that has an optical mechanism (6) positioned on the opening (5), wherein the fiber optic cable (4) is inserted, enabling the beam leaving the tip of the fiber optic cable (4) to be collected, enabling the beam to be dispersed into the receptacle (2) or focused on a specific point, wherein the movement mechanism (7) enables the beam to be directed towards a predetermined region in the receptacle (2).
2. A washer (1) as in Claim 1, **characterized by** a control unit (8) that determines the regions wherein the microbial accumulation occurs based on the feedback received from a sensor that senses microbial accumulation and/or the feedback received from the user and controls the movement mechanism (7) so as to enable the focused beam to be redirected towards the respective region.
3. A washer (1) as in Claim 2, **characterized by** the control unit (8) the receptacle (2) that enables the beam dispersed by the optical mechanism (6) to sweep the surfaces of the receptacle (2) by controlling the movement mechanism (7).
4. A washer (1) as in Claim 2 or 3, **characterized by** the control unit (8) that enables the receptacle (2) surfaces to be swept with the dispersed beam for a predetermined period of time after the receptacle (2) is used.
5. A washer (1) as in any one of the Claims 2 to 4, **characterized by** a second light source (9) generating infrared beam that is directed into the receptacle (2) by means of the optical mechanism (6) and the movement mechanism (7), and the control unit (8) that enables the infrared beam of the second light source (9) to be directed towards a predetermined region in the receptacle (2) together with the ultraviolet beam.

6. A washer (1) as in Claim 5, **characterized by** a multiplexor (10) on the fiber optic cable (4), enabling the beam emitted from the light sources (3, 9) to be divided into at least two branches and the control unit (8) that controls the movement mechanisms (7) together or separately, which are located on each opening (5) and which enable the beams coming from the branches to be directed.
7. A washer (1) as in Claim 6, **characterized by** the control unit (8) that enables the sweeping process to be completed in a shorter period of time by directing at least two dispersed beams towards different regions of the receptacle (2) after the receptacle (2) is used.
8. A washer (1) as in any one of the Claims 2 to 7, **characterized by** the control unit (8) that performs the sweeping process with the dispersed beam in a shorter period of time than the sweeping of a predetermined region with the focused beam.
9. A washer (1) as in Claim 8, **characterized by** the control unit (8) that performs the sweeping process with the dispersed beam more frequently than the sweeping of a predetermined region with the focused beam.
10. A washer (1) as in any one of the above claims, **characterized by** the optical mechanism (6) that has a circular housing (11) and at least two different lenses (12) placed on the housing (11), and the movement mechanism (7) that enables the housing (11) to be rotated and tilted around its central axis.
11. A washer (1) as in any one of the Claims 1 to 9, **characterized by** the optical mechanism (6) that has a circular housing (11) and at least two different lenses (12) arranged on the housing (11), and the movement mechanism (7) that has a magnet/metal ring at the tip of the fiber optic cable (4) and at least one magnetic element arranged around the optical mechanism (6) and that, when activated, pushes or pulls the magnet/metal ring so as to enable fiber optic cable (4) to be directed so as to align with the desired lens (12).
12. A washer (1) as in any one of the Claims 1 to 9, **characterized by** the optical mechanism (6) that has a plate and at least two different lenses (12) arranged on the plate, and the movement mechanism (7) that enables the plate to be moved in the direction of the lenses (12) and to be tilted around a direction perpendicular to the plate plane.

13. A washer (1) as in any one of the Claims 1 to 9, **characterized by** the optical mechanism (6) that has at least two plates arranged one after another, each for placing one of at least two lenses (12) one after another, and the movement mechanism (7) that enables the plate with the lens (12) desired to be used to be aligned with the fiber optic cable (4) so as to be matched with the fiber optic cable (4), and the other plate to be moved away from the fiber optic cable (4).
14. A washer (1) as in any one of the above claims, **characterized by** the movement mechanism (7) that has a spherical form and that receives the optical mechanism (6).

Figure 1

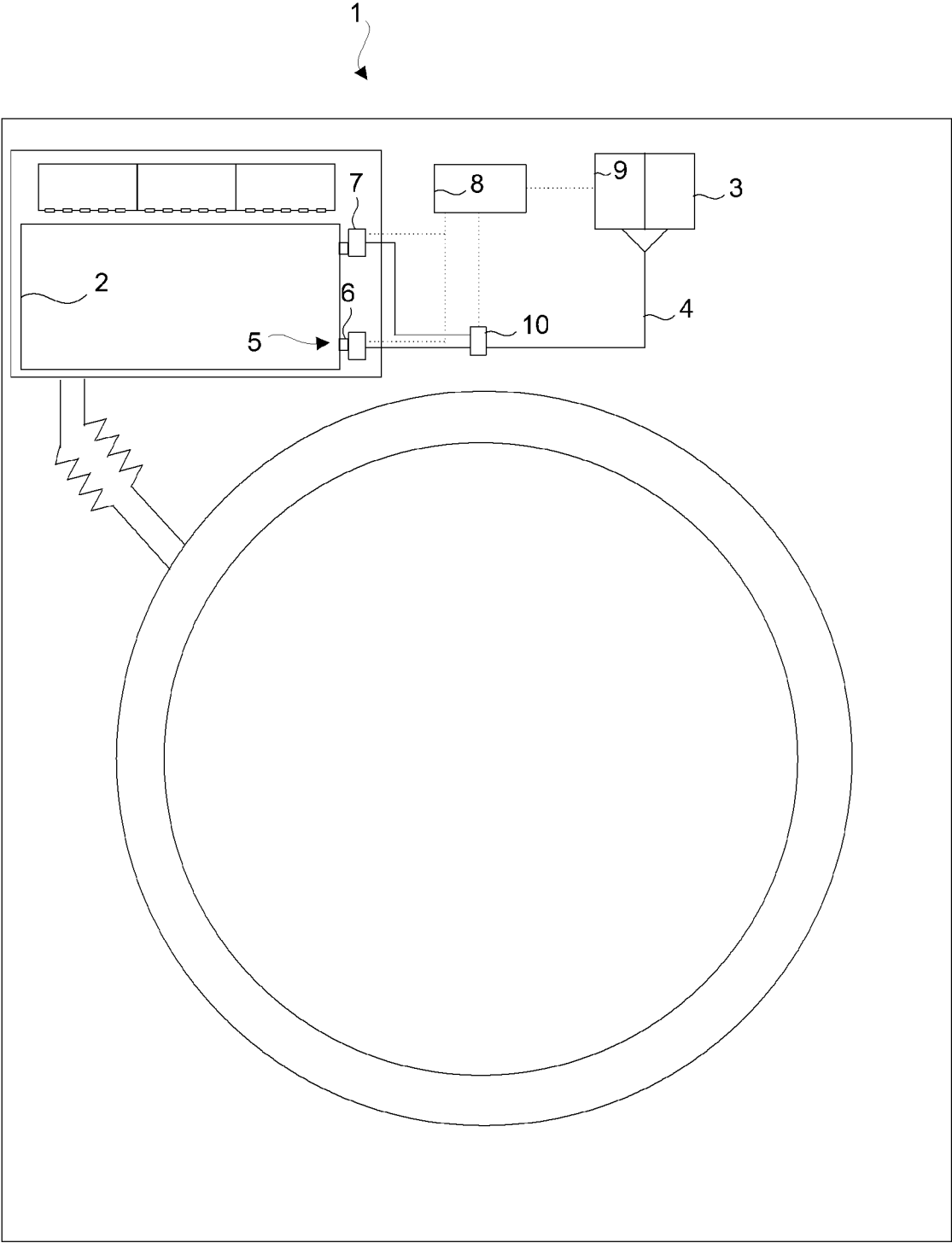


Figure 2

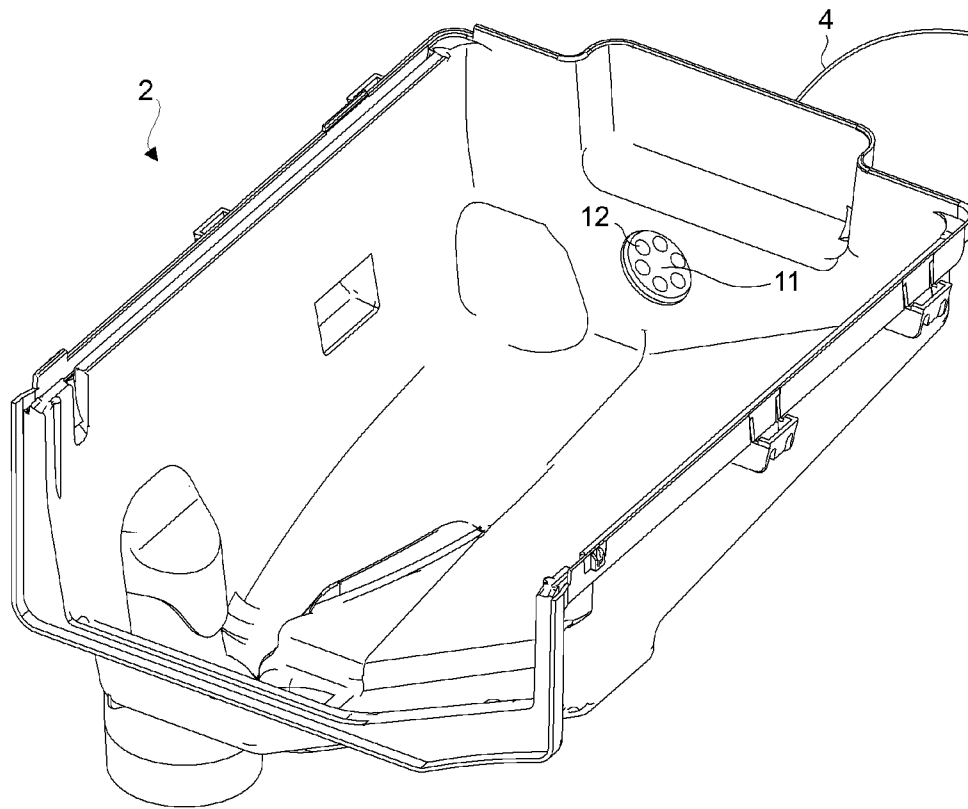
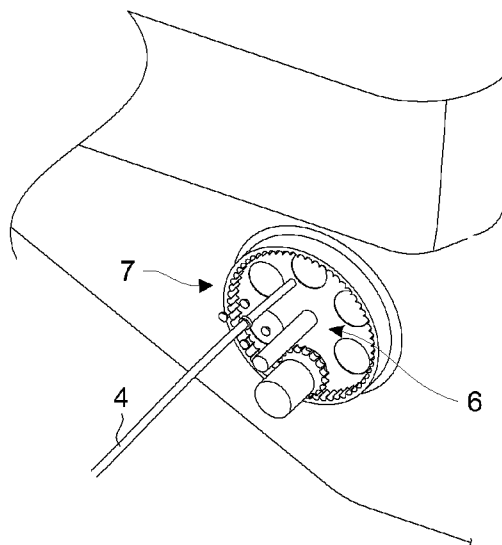


Figure 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/056387

A. CLASSIFICATION OF SUBJECT MATTER INV. D06F39/14 D06F37/26 D06F39/12 D06F39/02 A47L15/42 D06F39/10 ADD. According to International Patent Classification (IPC) or to both national classification and IPC																	
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) D06F A47L Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Category*</th> <th style="width: 70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width: 20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>US 2016/089460 A1 (JEONG JAE-HAK [KR] ET AL) 31 March 2016 (2016-03-31) paragraphs [0040] - [0054]; figure 1 -----</td> <td style="text-align: center;">1-14</td> </tr> <tr> <td style="text-align: center;">A</td> <td>WO 2008/065062 A1 (ARCELIK AS [TR]; CEVIKKALP ERMAN [TR]; BOZTAS ONUR [TR]) 5 June 2008 (2008-06-05) claims; figure 1 -----</td> <td style="text-align: center;">1-14</td> </tr> <tr> <td style="text-align: center;">A</td> <td>WO 2014/102319 A1 (ARCELIK AS [TR]; SAYGIN PERVIN [TR]; YAKARTAS BURCU [TR]; DUMAN EMINE) 3 July 2014 (2014-07-03) paragraphs [0031] - [0033]; figure 1 -----</td> <td style="text-align: center;">1-14</td> </tr> <tr> <td style="text-align: center;">A</td> <td>DE 20 2005 013207 U1 (SCHAEFER SILKE [DE]) 28 September 2006 (2006-09-28) paragraphs [0005] - [0007]; figure 1 -----</td> <td style="text-align: center;">1-14</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	US 2016/089460 A1 (JEONG JAE-HAK [KR] ET AL) 31 March 2016 (2016-03-31) paragraphs [0040] - [0054]; figure 1 -----	1-14	A	WO 2008/065062 A1 (ARCELIK AS [TR]; CEVIKKALP ERMAN [TR]; BOZTAS ONUR [TR]) 5 June 2008 (2008-06-05) claims; figure 1 -----	1-14	A	WO 2014/102319 A1 (ARCELIK AS [TR]; SAYGIN PERVIN [TR]; YAKARTAS BURCU [TR]; DUMAN EMINE) 3 July 2014 (2014-07-03) paragraphs [0031] - [0033]; figure 1 -----	1-14	A	DE 20 2005 013207 U1 (SCHAEFER SILKE [DE]) 28 September 2006 (2006-09-28) paragraphs [0005] - [0007]; figure 1 -----	1-14
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Date of the actual completion of the international search 18 May 2018		Date of mailing of the international search report 11/06/2018															
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Stroppa, Giovanni															

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/056387

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