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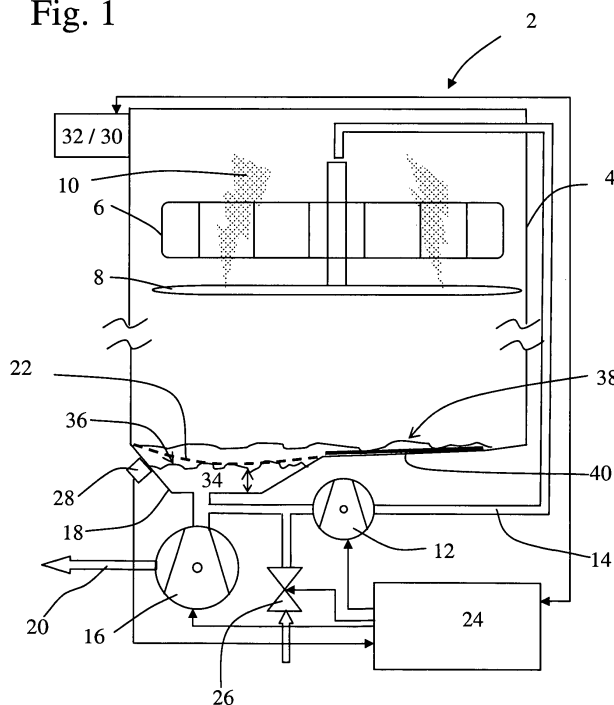
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(54) **Home appliance and operation thereof**

(57) The invention relates to a method of operating a home appliance, in particular of operating a dishwasher (2), the home appliance comprising a sink (18), a draining pump (16) for pumping a liquid in the sink (18) to the outside of the home appliance, and an antimicrobial de-

vice (22, 40), in particular the antimicrobial device being arranged at or at least partially in the sink (18) or arranged in fluid connection with the sink; wherein the method comprises intensifying or strengthening an interaction between the antimicrobial device (22, 40) and residual liquid (34) in the home appliance.

Fig. 1



Description

[0001] The invention relates to a method of operating a home appliance, in particular of operating a dishwasher, and also relates to a home appliance.

[0002] Inside a home appliance small liquid amounts are left over after treating the articles in the home appliance. For example in a sink or sump of a dishwasher a small amount of washing liquid is left over even after operating a draining pump for a while when the lowest pumpable liquid level has already been reached. In particular when there are long down times of the dishwasher, the population of bacteria, fungi or other microbial species may grow and result in a deterioration of the sanitary conditions in the dishwasher and may also result in bad smell and slime formation in the sink.

[0003] In the (up to now unpublished) European Patent Application EP 05 009 754.2, filed on May 4, 2005, a home appliance is proposed in which an antimicrobial device is arranged for example in the sink of the washing tub. The disclosure of EP 05 009 754 is incorporated herein with its full content and citations therefrom are made below.

[0004] It is an object of the invention, to provide a method of operating a home appliance to increase the sanitation efficiency of an antimicrobial device, and to provide a home appliance having an improved level of sanitation.

[0005] The invention is defined in claims 1, 4, 9 and 31, respectively.

[0006] Particular embodiments are set out in the dependent claims.

[0007] In the above mentioned EP 05 009 754 it is proposed to provide at least one antibiotic agent in a liquid-bearing domestic appliance (i.e. home appliance) such that an antimicrobial effect is achieved. Preferably the antibiotic agent is effective on stagnant water remaining for example in the sump or sink (e.g. the base of the washing or cleaning tub) of the home appliance, for example a dishwashers tub. Not in all cases it is possible or desired to arrange an antimicrobial device comprising the antibiotic agent at the lowest point of the sink or to provide a satisfactory interaction area between the remaining water and the antimicrobial device where the complete volume of the remaining water has the full benefit of the antimicrobial effect.

[0008] Another aspect is that within the home appliance there are locations where droplets or puddles may form distant to the sink or distant to the antimicrobial device such that these water volumes do not have a chance to interact with the antimicrobial device. The inventors propose a method and a home appliance having a control unit implementing the method which increase the interaction activity between residual liquid in the home appliance and the antimicrobial device. Thereby the growth of microbial organism is prevented or inhibited such that the sanitary conditions in the home appliance are improved.

[0009] According to claim 1, the interaction between

the antimicrobial device and the residual liquid in the home appliance is intensified thereby improving the efficiency of the antimicrobial device onto the residual liquid. Preferably the intensification is performed by promoting a higher surface interaction activity between the residual liquid and the antimicrobial device (the microbial active agent thereof) in direct surface contact.

[0010] Preferably the antimicrobial intensification step or steps is/are started after an articles treating program has been finished and/or before a next articles treatment program is started (see claim 6). This means that the intensification method (program) is not an articles treatment program. It is understood as home appliance self cleaning or maintenance program or method.

[0011] The "residual liquid" is a liquid which remains within the home appliance after executing an articles treatment program and which can not be removed out of the home appliance due to practical reasons. For example in a dishwasher after a dishwashing program the residual liquid is the washing liquid which can not be pumped out of the dishwasher with a draining pump. In an embodiment this residual liquid also includes liquid distributed within the surfaces and areas of the home appliance exposed to the liquid - for example droplets in spray arms, in a circulation pump, in liquid pipes running horizontally and so on. In a preferred embodiment the residual liquid also includes liquid which is additionally supplied to the sink of the home appliance, for example by supplying fresh water from a water tap or by supplying liquid from a heat exchanger which was for example filled with rinsing water after the last rinse in a dishwasher or washing machine.

[0012] In an embodiment an excessive amount of residual liquid (which is more than the residual liquid remaining after a complete draining from the home appliance) may be partially pumped out of the home appliance after the intensified treatment of the residual liquid and/or the increased amount of residual liquid can be retained in the home appliance and be used in the next articles treatment program.

[0013] An articles treatment program which will precede the intensified interaction between the antimicrobial device and the residual liquid is for example a dishwashing program, a pre-wash of a dishwasher, a laundry washing program or the like.

[0014] According to preferred embodiments, which can be used individually or can be combined in any possible way, the intensifying of the interaction between the antimicrobial device and the residual liquid is achieved by one or more of the following:

- Increasing the contact area between the antimicrobial device and the liquid. Particularly when the antimicrobial effect is a surface-effect, the contact area between the liquid and the antimicrobial device is an important parameter. The increase in the contact area can for example be achieved by increasing the immersion of the antimicrobial device with the liquid,

for example by increasing the amount (or volume) of the residual liquid. The amount is increased for example by adding additional liquid to the residual liquid from outside or inside the home appliance.

- The intensity of interaction may be increased by generating a flow within the liquid or by flowing the liquid over the antimicrobial device such that the generated or induced flow exchanges the liquid being in contact with the surface of the antimicrobial device. Thereby the diffusion is not the only effect contributing to the antimicrobial effect in the complete volume of the residual liquid.
- The antimicrobial activity of the antimicrobial device is increased, for example by applying an electrical field, by heating the antimicrobial device and/or the residual liquid, by adding activators to the residual liquid or the like.
- In particular in cases where the residual liquid is not in contact with the antimicrobial device or when there is only a restricted contact between the liquid and the surface of the antimicrobial device, the residual liquid is circulated or flown over the antimicrobial device. For example if the antimicrobial device is a filter or sieve in the sink of a dishwasher (which is normally not in contact with residual liquid), the residual liquid is pumped (several times) over the filter or sieve to achieve a surface interaction between the liquid and the antimicrobial device.

[0015] According to the method of claim 4 the operation of a draining pump of the home appliance is stopped, before the sink is drained to the lowest draining liquid level, thereby the residual liquid amount remaining in the sink is more than usually achieved when completely draining the sink up to the lowest possible draining liquid level. The operation of the draining pump is preferably the last step of a preceding article treatment program, for example the removal step for removing rinsing and/or softening liquid from the home appliance. In the latter case it can be said that this modification of a conventional (arbitrary) articles treatment program results in a higher remaining liquid amount which is retained for improving the efficiency of the antimicrobial effect of the antimicrobial device.

[0016] Alternatively or additionally to stopping the operation before completely draining the sink, after stopping the draining pump (e.g. after the draining operation), additional liquid is supplied to the sink, preferably by either adding a predetermined amount of liquid and/or by supplying liquid to a predefined liquid level in the sink. Again, the adding of additional liquid to the liquid already retained or remaining in the sink increases the volume or amount of the residual liquid for increasing the antimicrobial efficiency. As mentioned above, the additional or added liquid may be fresh water from a water tap or it

may be supplied from an internal liquid storage container which for example can be part of a condenser or heat exchanger.

[0017] According to a preferred aspect (compare also the method of claim 9), before stopping the operation of the draining pump prior to the approach to the lowest draining liquid level and/or before supplying liquid, it is determined whether articles to be treated have been removed from the home appliance or it is determined whether the article treatment program finished beforehand does not require removal of the articles to be treated. Alternatively or additionally before starting circulation or pumping the residual liquid within the home appliance (compare claim 26); one of these determining steps are performed. Thereby, in particular when the residual liquid is recirculated in the home appliance, it is avoided that the articles which have been treated by the previous program come in contact with the residual liquid which undergoes or has undergone an intensified interaction with the antimicrobial device. For example ion exchange takes place between the residual water and the antibiotic active agent of the antimicrobial device such that the ions could come into contact with the treated articles, if the articles have not previously been removed. On the other hand, if articles are not treated by a preceding program such as to be removed from the home appliance (for example only a pre-wash is performed for a later main wash), then it does not harm when the articles come in contact with the residual liquid.

[0018] In an embodiment the method for intensifying the interaction between the antimicrobial device and the residual liquid is automatically started or activated after expiration of a predetermined downtime since the execution of the last articles treatment program. For example after one, two or three days after the last articles treatment in the home appliance. Thereby an execution of the antimicrobial active program is avoided each time after finishing an articles treatment program. Alternatively or additionally the execution of the antimicrobial active program can be made after a predetermined number of articles treatment runs such that a kind of basic sterilization of the home appliance is provided.

[0019] In the method according to claim 9 the circulation of the residual liquid is only activated, after determining whether the treated articles have been removed or whether the articles do not require a removal from the home appliance (see above). Thereafter, a predetermined amount of liquid is supplied and/or the remaining liquid is circulated through the home appliance such that an intensification of the antimicrobial effect is achieved. In particular the circulation of the residual liquid results in a redistribution and recollection of water droplets or water in puddles distributed within the home appliance and a (exchange-)transportation of those water portions to the antimicrobial device.

[0020] In an embodiment the determining whether articles to be treated have been removed is made by requesting a corresponding input from a user. A user in-

dicates by such an input that she/he has removed the articles from the home appliance or that a removal of the articles is not required. Alternatively or additionally it can be detected by detectors or sensors whether the articles have been removed. For example by a door opening sensor like a switch it can be checked whether the door of the home appliance has been opened since the end of the preceding articles treatment program. If the door opening has been detected, it can be concluded by plausibility that the articles already treated have been removed by the user. In another embodiment the determining steps are skipped or not implemented and the activation of the microbial intensified method (program) is started by a user input to the home appliance.

[0021] According to one embodiment the draining pump and/or the circulation pump is short term operated (e.g. intermittently, periodically, statistically) and/or operated with a reduced rotation speed such that the remaining liquid in the sink is agitated by short time and/or soft pumping which results in a partial sucking of the liquid and a reflow into the sink with the draining pump or the circulation pump stopped or rotating with low speed.

[0022] In a further embodiment the circulation pump pumps the residual liquid into the circulation cycle of the home appliance. Preferably during liquid circulation the pumping speed is varied such that the spatial distribution within the home appliance changes resulting in a wetting of all or nearly all areas of the home appliance. If for example in a dishwasher the liquid is sprayed from spray arms with different pumping speeds, the sprayed liquid reaches different locations due to different pumping speeds. This increases the likelihood that water resting in different areas of the home appliance is exchanged by and by.

[0023] According to a preferred embodiment the antimicrobial device (its agent) releases substances (e.g. ions) into the liquid being in contact with the antimicrobial device. When these released substances provide the antimicrobial effect, the liquid containing such substances can be distributed in the home appliance resulting in antimicrobial effects remote to the antimicrobial device.

[0024] As mentioned above, the disclosure of unpublished application EP 05 009 754.2 is incorporated herein by reference to its full content. The arrangement and embodiment of the antimicrobial device mentioned above is preferably as described in EP 05 009 754.2. The embodiments are as follows:

When referring to the 'antibiotic agent' or 'antimicrobial agent', it is to be understood that this agent is part of or forming the antimicrobial device referred to in other parts of the application. This agent can for example be incorporated in the basis material of the antimicrobial device, can be deposited thereon or bound thereto or therein in any way (see also embodiments below).

[0025] The antibiotic agent, in the following also re-

ferred to as antimicrobial agent, is used to manage what is usually called control of growth. Control of growth means to prevent growth of microorganisms, in particular bacteria, fungi or algae. This control is achieved by killing microorganisms or by inhibiting growth of microorganisms. Control of growth usually involves the use of physical or chemical agents, which either kill or prevent the growth of microorganisms. Agents that kill cells are called cidal agents. Agents that inhibit the growth of cells without killing them are referred to as static agents. Thus the term bactericidal or fungicidal refers to killing bacteria or fungi and bacteriostatic refers to inhibiting the growth of bacteria cells.

[0026] In accordance with a preferred embodiment at least one antibiotic agent is provided inside the home appliance, in particular in and/or on and/or near wetted areas inside and/or on an inner surface of the home appliance.

[0027] That the antibiotic agent is provided in or on or near these areas in this context (and in the following) means, that it is directly located there and can be effective from that place or that it may at least reach these areas.

[0028] Preferably, the at least one antibiotic agent is provided in and/or on and/or near areas inside the home appliance located in stagnant liquid.

[0029] A localized use of antibiotic agents also grants good cost performances. Therefore, an object can be to focus the use of the antibiotic agent to some sensitive spots in which small amounts of the agent have great effectiveness. Besides keeping costs down, this in some cases also avoids heavy mixing of plastics with antibiotic fillers and therefore favours recyclability.

[0030] Preferably, at least part of a washing tub and/or at least part of a sump (sink) being part of the washing tub or connected to the washing tub, and/or at least part of at least one insert inside the home appliance are/is provided with at least one antibiotic agent. Inserts may be dish baskets and/or spraying arms and/or sieve systems or filters and the like. Stagnant liquid mainly remains in the sump and/or outlet and/or pipes of the home appliance, where the rinsing liquid is collected and lead away. Therefore, the antibiotic agents preferably will at least be provided in this area. But there may also be some liquid leftovers in other parts of the appliance, e.g. parts of an inserts or the washing tub, where antibiotics are advantageous to prevent growth of microorganisms.

[0031] In a preferred embodiment of the liquid-bearing home appliance at least one antibiotic agent is provided on part of the surface of the washing tub and/or the sump and/or the insert.

[0032] Preferably, at least one antibiotic agent is at least part of a surface coating, in particular a foil and/or a fabric and/or a synthetic resin and/or a paint and/or a varnish and/or a lacquer. The antibiotic agent may be mixed with the paint, lacquer, synthetic resin, etc. or raw materials for the foil or fabric. With another embodiment, the antibiotic agent itself may form a surface coating or may form one of several coating layers on the surface.

[0033] In an embodiment the at least one antibiotic agent may also be part of a construction material, in particular a resin composition and/or a plastic composition and/or a fabric, of the tub and/or the sump and/or at least one insert. In this case the agent may be incorporated by mixing it with the raw material or one of the raw materials before forming processes such as e.g. extruding or co-extruding or moulding, in particular injection-moulding or rotation-moulding; and/or subsequent thermoforming etc.

[0034] With a further advantageous embodiment at least one antibiotic agent is provided inside or on the surface of at least one replaceable or removable component which can be fixed or is fixed inside the washing tub or the sump. In this case the antibiotic agent can be provided in a very small amount which may also be very cost effective. If necessary, for example if the antibiotic agent is used up or the amount of antibiotic has been insufficient, there can be put a new or an additional antibiotic-bearing component inside the home appliance. Furthermore, the parts of the home appliance are recyclable without any problem after simply taking out the removable antibiotic-bearing component.

[0035] In particular, the antibiotic agent preferably comprises at least one of the elements silver or copper or zinc or mercury or tin or lead or bismuth or cadmium or chromium or thallium and/or at least one of the ions thereof, i.e. ions of one or more of the aforementioned elements silver, copper, zinc, mercury, tin, lead, bismuth, cadmium, chromium or thallium. With one special embodiment the antimicrobial agent comprises silver ions and/or copper and/or zinc.

[0036] Especially silver has proven to be an excellent bacteriostatic agent and it can be effectively used when bacteria get in contact with ions. It is also preferred that silver is put in contact with stagnant liquid remaining inside the home appliance, e.g. in the sump, and silver static effectiveness will be thus used all inside the liquid mass, because ions will be able to move and block bacteria inside it.

[0037] In accordance to a preferred embodiment the antibiotic agent comprises a ceramic matrix, in particular a natural and/or synthetic zeolite matrix, bearing the at least one bacteriostatic and/or at least one bactericidal and or at least one fungicidal and/or at least one anti-algal substance. The so-called antimicrobial filler may be incorporated in a surface coating or a construction material or applied on a surface of a component, insert or the wall of the washing tub and/or the sump of the home appliance. The antibiotic substances are then given out of the ceramic matrix by means of ion exchange.

[0038] The above methods, method steps and device features can be combined with each other in any arbitrary way. In particular the home appliance can be equipped with any of the above mentioned device features and/or the control unit thereof is adapted to control any of the methods and method steps.

[0039] Reference is made in detail to an exemplary

embodiment of the invention, an example of which is illustrated in the accompanying drawing:

Fig. 1 shows an overview of functional elements of a dishwasher.

[0040] The schematic illustration of a dishwasher 2 shown in Fig. 1 is not drawn to scale. Particular relations are shown exaggerated for a conceptual representation. For example the heights of the liquid levels are drawn in an exaggerated manner.

[0041] In the washing tub 4 of the dishwasher 2 only the upper basket 6 and the upper spray arm 8 are shown. Cleaning liquid is supplied to the upper spray arm 8 by sucking cleaning liquid from a sink 18 of the washing tub 4 by a circulation pump 12 and pumping the washing liquid through pipe 14 to the spray arm 8. From the spray arm 8 the liquid is sprayed - only the two exemplary spray jets 10 are shown. A draining pump 16 is also connected to the sink 18 and is activated for draining the liquid out of the dishwasher 2 via draining hose 20.

[0042] The sprayed liquid collects in the sink 18 where it passes a particle filter 22 (sieve). The water level in the sink 18 is detected by a water level sensor 28. The execution of dishwashing programs is controlled by a control unit 24 which is connected to a user panel 32 at a door (not shown) of the dishwasher 2 such as to receive signals of user input selections and to send indication signals to the user panel 32 for informing the user about operational conditions. The user panel 32 houses a door switch 30 which detects opening and closing of the dishwasher door. The control unit 24 also controls opening and closing of an inlet valve 26 for supplying a controlled amount of fresh water into the dishwasher 2.

[0043] After finishing a dish washing program, the control unit 24 activates the draining pump 16 which drains the liquid from the sink 18. The liquid can not be completely drained out of the dishwasher 2 and a residual liquid 34 remains within the sink 18 after switching off the draining pump 16. The residual liquid 34 has a lower liquid level 36 as shown in an exaggerated manner in Fig. 1.

[0044] Embedded in the structure of filter 22 is an antimicrobial agent as known for example from EP 05 009 754 which results in an antimicrobial effect on the water coming into contact with the filter material. Alternatively or additionally adjoining to the filter 22 an activator plate 40 is arranged which also comprises an antibiotic or antimicrobial agent also resulting in an antimicrobial effect when bringing the liquid into contact with the surface of the activator plate 40.

[0045] Exemplary methods for intensifying or strengthening an interaction of the residual liquid 34 with the antimicrobial active elements (filter 22 and/or activator plate 40) are described now:

[0046] When finishing a dishes cleaning program or after finishing a dishes pre-wash program, the draining pump 16 is activated and liquid collected in the sink is not completely drained out, but a residual amount of liquid

is retained which results in a higher level of residual liquid 34 having an upper liquid level 38 above the lower level 36 mentioned above. This way of retaining a higher amount of residual liquid 34 is preferably used when relatively clean rinsing liquid is available from the last rinsing step. Alternatively or additionally the draining pump 16 is operated until the lower level 36 of residual liquid 34 is attained (in this case one can say that the previous articles treatment program has been finished or completed) and the control unit 24 opens the inlet valve 26 for a predetermined time or until the water level sensor 28 detects the residual liquid reaching the upper level 38. This way of filling fresh liquid into the dishwasher is preferred when the previous residual liquid to be drained is relatively soiled, for example if a pre-wash is performed only.

[0047] In one embodiment the upper level 38 is defined by the requirement that when activating the circulation pump 12 for circulating the residual liquid 34, there must be enough liquid volume such that the circulated liquid reaches the upper spray arm 8 and can be sprayed throughout the interior of the washing tub 4. Alternatively or additionally the upper level 38 is defined such that the activator plate 40 is completely covert by the residual liquid 34 as shown in Fig. 1. Alternatively or additionally the upper lever 38 is defined such that a heating element (not shown) for heating the washing liquid is at least partially immersed in the residual liquid 34 for heating it by the heating element.

[0048] After a predefined interaction time between the residual liquid 34 and the filter 22 and/or the activator plate 40 the residual liquid 34 is drained by activating the draining pump 16 until the lower level 36 is reached. However, the residual liquid 34 with the upper level 38 can also be stored in the dishwasher 2 and can then be used in the next washing program. For example this increased amount of liquid is used for a pre-wash of the next dish washing program.

[0049] To improve the interaction between the residual liquid 34 and element 22 and/or 40 the circulation pump 12 can be operated for short times, such that eddies or flows are induced in the residual liquid 34 in the sink 18 resulting in a water exchange at the surface of elements 22 and/or 40.

[0050] In a further embodiment of the method the circulation pump 12 is activated for a longer period such that the residual liquid is circulated through the fluid circulation paths of the dishwasher 2 (i.e. the spray arms, the pipes and also spray jets wetting all elements within the washing tub 4). This has the effect that liquid which has collected in areas of the dishwasher 2 other than the sink 18 will be forcibly flown and brought into contact with the antimicrobial device 22 and/or 40. For example in the case that the residual liquid 34 is circulated, it is not necessary that the upper level 38 has a height such that the filter 22 and/or the activator plate 40 are flooded by the residual liquid 34 with the circulation pump 12 stopped, but it is sufficient to raise the residual liquid to such an upper level which is sufficient for circulating the residual

liquid.

REFERENCE NUMERAL LIST

5 [0051]

- | | |
|-------|--------------------|
| 2 | dishwasher |
| 4 | washing tub |
| 6 | upper basket |
| 10 8 | upper spray arm |
| 10 | sprayed liquid jet |
| 12 | circulation pump |
| 14 | pipe |
| 16 | draining pump |
| 15 18 | sink |
| 20 | draining hose |
| 22 | filter |
| 24 | control unit |
| 26 | inlet valve |
| 20 28 | water level sensor |
| 30 | door switch |
| 32 | user panel |
| 34 | residual liquid |
| 36 | lower level |
| 25 38 | upper level |
| 40 | activator plate |

Claims

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1. Method of operating a home appliance, in particular of operating a dishwasher (2), the home appliance comprising:

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a sink (18),
a draining pump (16) for pumping a liquid in the sink (18) to the outside of the home appliance, and
an antimicrobial device (22, 40), in particular the antimicrobial device being arranged at or at least partially in the sink (18) or arranged in fluid connection with the sink;
the method comprising:

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intensifying or strengthening an interaction between the antimicrobial device (22, 40) and the residual liquid (34) in the home appliance.

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2. Method according to claim 1, wherein the residual liquid (34) is at least partially liquid remaining in the home appliance after executing an article treatment program.

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3. Method according to claim 1 or 2, wherein the interaction is intensified by increasing the contact area between the antimicrobial device (22, 40) and the liquid (34), by generating a flow in or of the liquid at

or over the antimicrobial device, by increasing the antimicrobial activity of the antimicrobial device, by heating the residual liquid, by heating the antimicrobial device, and/or by flowing or circulating the residual liquid within the home appliance.

4. Method of operating a home appliance, in particular method according to claim 1, 2 or 3, the home appliance, in particular a dishwasher (2), comprising:

a sink (18),
a draining pump (16) for pumping a liquid in the sink (18) to the outside of the home appliance, and
an antimicrobial device (22, 40), in particular the antimicrobial device being arranged at or at least partially in the sink (18) or arranged in fluid connection with the sink (18);
the method comprising: ..

stopping the operation of the draining pump (16) before draining the sink (18) to the lowest draining liquid level (36), and/or
after stopping the operation of the draining pump (16), supplying a predetermined amount of liquid, in particular fresh liquid or water, to the sink (18) and/or supplying liquid to the sink to a predefined liquid level (38).

5. Method according to claim 4, comprising the step of:

before stopping the operation of the draining pump (16) before the lowest draining liquid level (36) and/or before supplying liquid, determining if articles to be treated by the home appliance have been removed from the home appliance, or determining whether a previous article treatment program does not require removal of the articles to be treated.

6. Method according to any of the previous claims, wherein the antimicrobial intensification steps, in particular the supply of liquid, is started after an articles treating program has been finished and/or before a next articles treatment program is started.

7. Method according to any of the previous claims, wherein the supply of liquid is started after a predetermined down time after executing the last articles treatment program.

8. Method according to any of the previous claims, wherein the supply of liquid is started after a predetermined number of articles treatment programs have been executed since the last antimicrobial treatment procedure.

9. Method of operating a home appliance, in particular according to any of the preceding claims, the home appliance, in particular a dishwasher (2), comprising:

a sink (18),
a draining pump (16) for pumping a liquid in the sink (18) to the outside of the home appliance, and
an antimicrobial device (22, 40), in particular the antimicrobial device being arranged at or at least partially in the sink (18) or arranged in fluid connection with the sink;
the method comprising:

determining if articles to be treated by the home appliance have been removed from the home appliance, or determining whether a previous article treatment program does not require removal of the articles to be treated, and then
supplying a predetermined amount of liquid, in particular fresh liquid or water., to the sink (18), and/or supplying liquid to the sink to a predefined liquid level (38), and/or
operating a circulation pump (12) adapted to circulate the liquid in the home appliance.

10. Method according to any of the previous claims 5 to 9, wherein the determining step is performed by requesting a user input indicating the removal of the articles.

11. Method according to any of the previous claims 5 to 10, wherein the determining step is performed by detecting the removal of the articles and/or by detecting the articles being removed.

12. Method according to claim 11, wherein the home appliance comprises a detector adapted to detect the articles being removed, in particular a weight sensor and/or a ranging sensor.

13. Method according to claim 11 or 12, wherein the home appliance comprises a detector (30) adapted to detect the removal of the articles, in particular a door movement sensor.

14. Method according to any of the previous claims, wherein a program implementing the method of any of the previous claims is user activated.

15. Method according to claim 14, wherein a user warning signal indicates, if in the determining step it is determined that articles have not been removed from the home appliance.

16. Method according to any of the previous claims 5 to 15, wherein the previous article treatment program

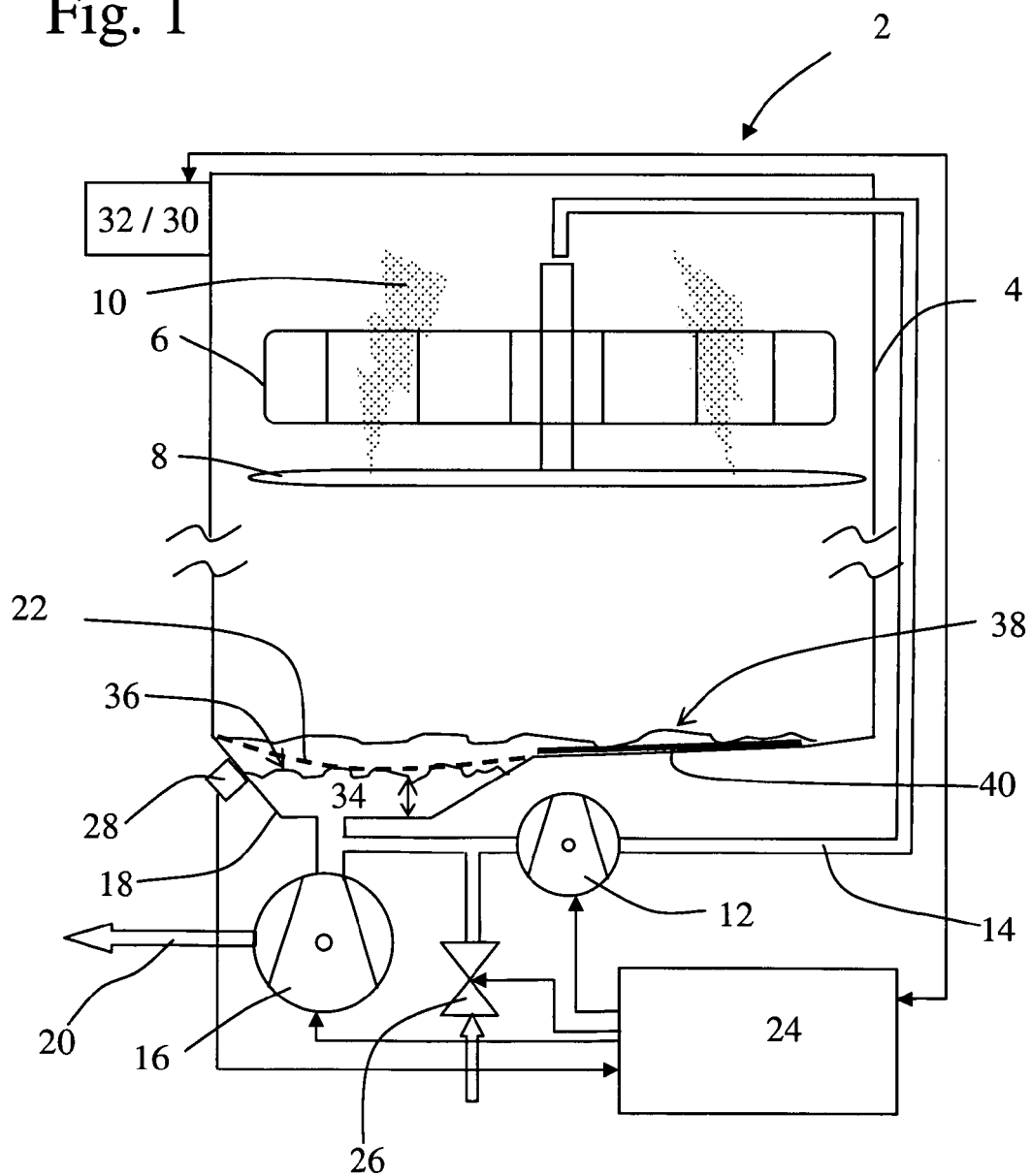
not requiring articles removal is a pre-wash program, in particular a dishes pre-wash program.

17. Method according to any of the previous claims, wherein at the end of a previous articles treatment program, the operation of the draining pump (16) is stopped before draining the sink to the lowest draining liquid level (36). 5
18. Method according to any of the previous claims, wherein the home appliance comprises a fresh water valve (26) which is preferably opened a predetermined time for supplying fresh water as liquid. 10
19. Method according to any of the previous claims, wherein the antimicrobial device (22, 40) is immersed in the liquid when the liquid (34) in the sink (18) has the predefined liquid level (38) or the predefined amount of liquid has been supplied. 15
20. Method according to claim 19, wherein at the predefined liquid level (38) the antimicrobial device (22, 40) is completely immersed or at least is immersed to a higher extend as the immersion at the lowest draining liquid level (36). 20
21. Method according to any of the previous claims, wherein the antimicrobial device (22) is partially immersed in the liquid (34) when the liquid in the sink has the lowest draining liquid level (36). 25
22. Method according to any of the previous claims, wherein the home appliance comprises at least one liquid level sensor (28) adapted to detect the predefined liquid level (38) and/or the lowest draining liquid level (36). 30
23. Method according to any of the previous claims, wherein the liquid (34) in the sink (18) is heated. 35
24. Method according to claim 23, wherein water is supplied to a predetermined liquid heating level for the heating of the liquid. 40
25. Method according to any of the previous claims, wherein the draining pump (16) and/or a circulation pump (12) is short-term operated or operated at minimal rotation speed, the draining pump in particular being operated without draining liquid to the outside of the home appliance. 45
26. Method according to any of the previous claims, wherein the home appliance comprises a circulation pump (12) adapted circulating the liquid (34) within the home appliance, and wherein the liquid in the sink (18) is temporarily circulated. 50
27. Method according to claim 25 or 26, wherein the cir-

ulation pump (12) is operated at a low liquid circulating speed or at a varying circulating speed, in particular by increasing the liquid circulation speed from a low circulation speed.

28. Method according to claim 25, 26 or 27, wherein the liquid is circulated for a predefined time or total time.
29. Method according to any of the previous claims 25 to 28, wherein, after circulating the liquid in the home appliance, the draining pump (16) is operated, in particular the liquid is pumped to the lowest draining liquid level (36).
30. Method according to any of the previous claims, wherein after a predefined time of interaction of the liquid (34) at the antimicrobial device (22, 40), the liquid is drained, in particular the liquid is drained or pumped to the lowest draining liquid level (36).
31. Home appliance, in particular dishwasher (2), having a control unit (24) adapted to execute an antimicrobial program implementing a method according to any of the previous claims.

Fig. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 02 0918

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* page 1, line 9 - line 38 * * page 2, line 4 - line 44 * * claim 1 *	4-31	
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A	* abstract; figure 1 * * claim 15 *	4-31	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 June 2007	Examiner FAYMANN, L
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			

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

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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
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