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(54) **CONTROLLING CONTAMINANT BUILD-UP IN AN AIR EXTRACTION SYSTEM**

STEUERUNG DER SCHMUTZABLAGERUNG IN EINEM LUFTEXTRAKTIONSSYSTEM

RÉGULATION DE L'ACCUMULATION DE CONTAMINANT DANS UN SYSTÈME D'EXTRACTION
D'AIR

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Description

[0001] The present invention relates to an air extraction system, in particular a kitchen air extraction system, for example installed above a cooking apparatus for extracting air from above the cooking apparatus. The present invention also relates to a method for controlling contaminant build-up in such an air extraction system.

[0002] It is known that contaminant deposits can build-up in the ducting of air extraction systems. This can present a safety hazard, for example in the case of grease the flow capacity of the air extraction system can be reduced and a fire hazard can be created. A particular problem is grease build-up in the ducting of kitchen air extraction systems, which may be installed above a cooking apparatus for extracting air from above the cooking apparatus. The contaminants, in particular grease, typically require periodic manual removal from the interior surfaces of the ducting, which is time consuming and costly, as well as an unpleasant operation, potentially requiring disassembly of the ducting in order to be able effectively to access the interior surfaces. The air extraction system needs to be turned off during the cleaning operation, and also, for a kitchen air extraction system installed above a cooking apparatus, the cooking apparatus could also not be used during the cleaning operation.

[0003] US-A-3785124 discloses a ventilating hood has an ascending exhaust duct equipped with a series of air cleaning and purifying instrumentalities for removing grease, smoke and fumes generated by cooking equipment. Air rising through the duct passes successively through a grease extractor, an electrostatic precipitator, an activated charcoal filter and a deodorizing chemical spray. The grease extractor and precipitator are provided with hot water and detergent washing sprays. A control system provides an automatic wash and dry cycle for the grease extractor.

[0004] FR-A-2915409 discloses a kitchen installation for treating grease and odors in gas by projection of droplets of a treating liquid. Active products are added in the liquid, where the products are separately dosed in different quantity and in different time.

[0005] The present invention aims to provide an air extraction system, and a corresponding method, of controlling contaminant build-up, in particular grease build-up, in ducting which can at least partially overcome these problems in known air extraction systems.

[0006] Accordingly, the present invention provides an air extraction system according to claim 1.

[0007] The present invention further provides a method for controlling contaminant build-up in an air extraction system according to claim 9.

[0008] In preferred embodiments of the present invention the air extraction system is a kitchen air extraction system and adapted to be installed above a cooking apparatus for extracting air from above the cooking apparatus.

[0009] In preferred embodiments of the present inven-

tion the decontaminating apparatus is a degreasing apparatus and grease build-up is controlled in the air flow duct.

[0010] In preferred embodiments of the present invention the airflow duct comprises a hood and the delivery mechanism delivers one or more actives into at least one of the ducting and the hood of the air flow duct.

[0011] In preferred embodiments of the present invention the decontaminating bacteria are incubated from bacteria spores and during the incubation the spores are activated to form vegetative bacteria, and then grown and conditioned (i.e. matured, typically to have a high level of bacterial activity) to form at least one living active bacterial colony. The incubation is carried out for an incubation period longer than the lag period of the spores, which is the minimum period to activate the spores to form vegetative bacteria. The incubation period is typically from 12 to 24 hours and typically at an elevated temperature (i.e. above room temperature of 20 °C), for example from 30 to 40 °C, the selected temperature being dependent upon the selected bacteria species and strain to achieve effective activation, growth and conditioning of the bacteria.

[0012] Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 is a schematic plan of a blending system, for blending active decontaminating agents and incubating decontaminating bacteria, in an air extraction system in accordance with an embodiment of the present invention; and

Figure 2 is a schematic plan showing a delivery mechanism coupled to the blending system and connected to the ducting and hood of the air extraction system of Figure 1.

[0013] Referring to Figures 1 and 2, in accordance with an embodiment of the present invention there is provided air extraction system 2. In this embodiment the air extraction system 2 is a kitchen air extraction system and is adapted to be installed above a cooking apparatus for extracting air from above the cooking apparatus. In other embodiments the air extraction system may be installed in other building or rooms, for example a clean room or a laboratory. The air extraction system 2 comprises an air flow duct 4, which is composed of ducting 6 and a hood 8 at an open end 8 of the air flow duct 4. In other embodiments the hood may be omitted.

[0014] The air extraction system 2 also comprises a decontaminating apparatus 10. In this embodiment the decontaminating apparatus 10 is configured as a degreasing apparatus 10. The degreasing apparatus 10 comprises a blending system 12, for storing active decontaminating agents and incubating decontaminating bacteria, and blending the active agents and incubated bacteria, and a delivery mechanism 14 coupled to the blending system 12 for delivering the active agents and

incubated bacteria to the air flow duct 4.

[0015] The degreasing apparatus 10 comprises first and second reservoirs 16, 18 for receiving respective active agents, such as a surfactant and an enzyme.

[0016] At least one of the first and second reservoirs 16, 18 may be provided by a removable container that may be detached from the remainder of the degreasing apparatus 10 and replaced. The removable containers may be disposable or refillable. At least one of the first and second reservoirs 16, 18 may, alternatively, comprise permanent chambers of the degreasing apparatus 10 that are adapted to be refilled in-situ instead of being removed to be refilled or replaced.

[0017] At least one of the first and second reservoirs 16, 18 of the degreasing apparatus 10 further comprises a bacteria incubator 22 adapted, in use, to incubate grease-consuming bacteria within the incubator 22 during an incubation period to increase the number and/or maturity of the bacteria within the incubator 22. Several species and strains of bacteria, in particular *Bacillus* bacteria are known to have grease-consuming properties.

[0018] A bacteria store 24 is coupled to the bacteria incubator 22. The bacteria store 24 is adapted to deliver bacteria, typically in the form of inactive bacteria spores, to the bacteria incubator 22 to be incubated to form active vegetative bacteria. Preferably the bacteria in the bacteria store 24 is in a concentrated spore form and in a preservative. The degreasing apparatus 10 may be configured to dilute the bacteria during and/or after delivery of the bacteria from the bacteria store 24 to the bacteria incubator 22.

[0019] A nutrient store 26 is coupled to the bacteria incubator 22. The nutrient is selected to provide a carbon/nitrogen/phosphate and micronutrient balance suitable to provide effective growth and conditioning for the selected vegetative bacteria. The nutrient store 26 is adapted to deliver at least one nutrient to the bacteria incubator 22 to feed the bacteria during incubation. Preferably the nutrient(s) in the nutrient store 26 is or are in a concentrated form. The degreasing apparatus 10 may be configured to dilute the nutrient(s) during and/or after delivery of the nutrient(s) from the nutrient store 26 to the bacteria incubator 22.

[0020] The bacteria store 24 and/or the nutrient store 26 may be provided by removable containers that may be detached from the remainder of the degreasing apparatus 10 and replaced. The removable container may be disposable or refillable. At least one of the bacteria store 24 and the nutrient store 26 may, alternatively, comprise permanent chambers of the degreasing apparatus 10 that are adapted to be refilled in-situ instead of being removed to be refilled or replaced.

[0021] The bacteria incubator 22 comprises a heater 28 configured to heat the bacteria incubator 22 during incubation periods. The heater 28 is controlled to maintain an interior of the bacteria incubator 22 at a temperature suitable for achieving effective growth and conditioning of the selected bacteria species and strain, typi-

cally the temperature is above room temperature (20 °C), such as in the range of from 30 to 40 °C. For example, for *Bacillus* bacteria the ideal incubation temperature is 37 °C.

[0022] The bacteria incubator 22 further comprises an aeration unit 30 configured to provide aeration to bacteria in the bacteria incubator 22 during incubation periods. The aeration unit 30 maintains the required minimum dissolved oxygen level in the bacteria growth medium. The aeration unit 30 may include a bubbler, a microbubble entrainment system and a bubble distribution system to provide sufficient air/liquid contact and agitation in the incubator 22 to achieve bacterial growth in a desired time period.

[0023] A water supply 32 is connected to each of the first and second reservoirs 16, 18 and the bacteria incubator 22. The water is required by the bacteria incubator 22 in order to activate and grow the bacteria. Water can fluidise and/or dilute actives in the first and second reservoirs 16, 18.

[0024] A mixing vessel 34 is disposed downstream of the first and second reservoirs 16, 18 and the bacteria incubator 22. The output 36 of the mixing vessel 34 is connected to the delivery mechanism 14, and may be controlled by an output valve 38, which may be in the form of a pump. The mixing vessel 34 is adapted, in use, to mix the active agents from the first and second reservoirs 16, 18 and the incubated bacteria from the bacteria incubator 22 to form an admixture of grease-reducing active components. As shown in Figure 1, water from the water supply 32 can be directly fed into the mixing vessel 34 to achieve the desired dilution.

[0025] A first water supply control valve 40 may be provided on the input side of the bacteria incubator 22. Correspondingly, second and third water supply control valves 42, 44 may be provided on the input side of the first and second reservoirs 16, 18. Each of the water supply control valves 40, 42, 44 is individually and independently controllable. Each of the water supply control valves 40, 42, 44 may be in the form of a pump. Accordingly the supply of grease-reducing actives from the first and second reservoirs 16, 18 and the bacteria incubator 22 is individually and independently controllable to provide any individual grease-reducing actives or combination of plural grease-reducing actives into the mixing vessel 34 and thus into the delivery mechanism 14.

[0026] In the illustrated embodiment the mixing vessel 34 may function as a dilution vessel disposed between at least one of the first and second reservoirs 16, 18 and the delivery mechanism 14 to mix at least one of the active agents with water supplied to the mixing vessel 34. In the illustrated embodiment a single vessel may function both as a mixing vessel and as a dilution vessel, being selectively supplied with a first active agent from the first reservoir, with a second active agent from the second reservoir, and with water from a separate water source. Alternatively, a separate dilution vessel may be provided upstream of the mixing vessel and used to dilute

a first one of the first and second active agents before the first and second active agents are mixed. Alternatively, a separate dilution vessel may be provided downstream of a mixing vessel and used to dilute a mixture of the first and second active agents received from the mixing vessel.

[0027] Optionally, as shown in the illustrated embodiment, the degreasing apparatus 10 may further comprise a third reservoir 20 for receiving a third active agent, for example a further detergent or surfactant, or a growth promoting medium for bacteria and/or bacteria nutrient. The degreasing apparatus 10 may additionally comprise further similarly configured reservoirs for receiving further active agents, for example a fourth reservoir, a fifth reservoir etc.. The skilled person will appreciate that any further reservoirs (in addition to the first and second reservoirs 16, 18) may be arranged similarly to the first and second reservoirs 16, 18, and that the features described below in relation to the first and second reservoirs 16, 18 may equally apply to any further reservoirs, if present.

[0028] Accordingly, the blending system 12 can supply, individually or in any desired combination, to the delivery mechanism 14 one or more decontaminating or grease-reducing agents comprising at least one of grease-consuming bacteria, optionally at least one strain of *Bacillus* bacteria, bacteria growth promoting medium, bacteria nutrient, detergent, surfactant and enzymes. It is noted that it is possible to place any fluid in the first and second reservoirs 16, 18 (and any further reservoirs), including water without any active agents. In addition, it is possible to place the same active agent (or combination of active agents) in all reservoirs. However, the apparatus is intended to be supplied with different active decontaminating agents (or combinations of active decontaminating agents) in each reservoir such that the supply of various different active decontaminating agents can be controlled to deliver optimised cleaning, as described above.

[0029] The delivery mechanism 14 is coupled to the first and second reservoirs 16, 18 and the incubator 22 via the mixing vessel 34. The delivery mechanism 14 is adapted, in use, to deliver an aqueous phase, preferably in the form of droplets, into the air flow duct 4, in particular into either or both of the ducting 6 and hood 8. The aqueous phase comprises the output of the mixing vessel 34 which, as described above, may comprise, individually or in any desired combination, one or more active grease-reducing agents comprising at least one of grease-consuming bacteria, optionally at least one strain of *Bacillus* bacteria, bacteria growth promoting medium, bacteria nutrient, detergent, surfactant and enzymes.

[0030] The delivery mechanism 14 comprises at least one droplet generation device 46 which is adapted in use, to generate aqueous droplets. In the illustrated embodiment, the droplet generation device 46 acts as a common droplet generation device 46 for the actives in both the first and second reservoirs 16, 18 and also the bacteria incubator 22. In other embodiments the delivery mechanism 14 may comprise plural droplet generation devices,

each coupled to a respective reservoir or incubator.

[0031] The droplet generation device 46 comprises at least one nozzle 48 adapted, in use, to generate the droplets and deliver the droplets to the air flow duct 4.

[0032] In an alternative embodiment, not illustrated, the droplet generation device 46 comprises at least one chamber comprising at least one vibratable body adapted, in use, to generate the droplets to be delivered to the air flow duct. The vibratable body may, for example, be a piezoelectric element, or be vibrated by a piezoelectric element. Alternatively, or in addition, the droplet generation device may comprise any other means for generating aqueous droplets.

[0033] The aqueous phase droplets may be introduced into the air flow duct 4 in the form of a spray, mist or fog.

[0034] A controller 50 is adapted, in use, to control supply of the grease-reducing agents via the delivery mechanism 14 into the air flow duct 4. The controller 50 allows the supply of individual or plural active agents to be varied in order to optimise the delivery of the active agents to maximise the cleaning effect provided by the active agents. It is noted that the aqueous droplets may be introduced at one or more points in the air flow duct 4, including the ducting or the hood, and different actives may be controllably delivered to different locations in the air flow duct 4. Typically, the controller 50 is adapted, in use, to control at least one of the rate, concentration and time of supply of at least one of, or any combination of, the grease-reducing agents.

[0035] Typically, the controller 50 is operable, in use, to control supply of the active agent from the first reservoir 16 independently of supply of the different active agent from the second reservoir 18, and each of them correspondingly independently of supply of the incubated bacteria from the bacteria incubator 22. For example, it may be possible to increase or decrease the rate at which the active agent is supplied from the first reservoir 16 via the delivery mechanism 14 into the air flow duct 4 independently of the rate at which the active agent is supplied from the second reservoir 18.

[0036] Typically, the controller 50 is operable, in use, to supply the grease-reducing agents at least partially simultaneously, or sequentially in any desired order or sequence and for any individual or cumulative time period.

[0037] The controller 50 is preferably operable individually to supply at least one of the agents into the air flow duct while not supplying any other agent.

[0038] The controller is preferably operable, in use, to continuously vary a rate and/or concentration of supply of at least one of the active agents. In this way a ratio between the supply rates of the selected agents may be continuously variable.

[0039] The controller 50 is preferably operable, in use, to control supply of the agents based on selected input information.

[0040] The input information may be inputted into the controller 50 by a user. A user may, therefore, be able

to increase or commence the supply of a particular active agent during a period in which that active agent is likely to be more effective or more efficiently used, and decrease or cease the supply of a particular active agent during a period in which that active agent is likely to be less effective.

[0041] The input information may relate to at least one of a fan speed of a fan associated with the air flow duct, an air flow speed through the air flow duct, a temperature reading taken for the air flow duct or surrounding environment and a grease load measurement relating to a quantity of grease in air passing through the air flow duct or a quantity of grease on a wall of the air flow duct. Such information may be determined by one or more sensors installed in the kitchen air extraction system or in a kitchen in which the kitchen air extraction system is installed. In this way the supply of one or more active agents may advantageously be automatically controlled to maximise the effectiveness of the active agents. For example, the supply of a particular active agent may be automatically increased or commenced during a period in which that active agent is likely to be more effective, and decreased or ceased during a period in which that active agent is likely to be less effective based on data from sensors.

[0042] The input information may comprise a pre-determined time-based schedule. For example, it may be advantageous to increase, decrease, commence or cease supply of the active agent at a particular time, for example to coincide with a period of high or low cooking load. For example, it may be beneficial to increase or commence a supply of grease-digesting bacteria at a time at which cooking load and/or fan speed is expected to be reduced or zero such that the bacteria is able to remain active within the air flow duct for longer. Similarly, it may be beneficial to reduce or cease the supply of grease-digesting bacteria at or before a time at which cooking load and/or fan speed is expected to increase again. Other types of active agent may similarly be distributed in at optimised times to maximise their efficiency. It may be possible to select a time-based schedule from a plurality of time-based schedules saved in a memory associated with the controller. It is particularly advantageous to supply grease-digesting bacteria into the air flow duct 4 after a cooking operation has ceased for a period, for example overnight, so that the grease-digesting bacteria can function to digest grease in the air flow duct 4 under controlled temperature and air flow conditions when the cooking apparatus is not be used.

[0043] The controller 50 is preferably operable, in use, to control supply of the active agents into the air flow duct 4 in response to an external event. For example, supply of the active agent may be controlled in response to a particular appliance being switched on or off or being used in a particular mode of operation.

[0044] The apparatus of Figures 1 and 2 may therefore be used in a method for controlling contaminant build-up in the air extraction system 2 comprising the air flow duct 4. The delivery mechanism 14 coupled to first and second

reservoirs respectively containing first and second active agents delivers an aqueous phase, optionally in the form of droplets, into the air flow duct 4. The aqueous phase comprises a selected one or both of the first and second active agents. The controller 50 controls supply of at least one, or both, of the first and second active agents from the first and second reservoirs 16, 18 via the delivery mechanism 14 into the air flow duct 4.

[0045] At least one of the rate, concentration and time of supply of at least one of the first and second active agents can be controlled. The supply of the first active agent from the first reservoir 16 can be controlled independently of supply of the second active agent from the second reservoir 18. The first and second active agents can be supplied at least partially simultaneously, or sequentially, in any order and for any individual or cumulative time period. The first and second active agents can be supplied while continuously varying a rate and/or concentration of supply of either or both of the first and second active agents via the delivery mechanism 14 into the air flow duct 4.

[0046] One of the agents comprises incubated decontaminating bacteria, and grease-consuming bacteria is incubated in the bacteria incubator 22, which functions as a reservoir for the decontaminating agent, before supplying the incubated bacteria from the bacteria incubator 22 to the air flow duct 4 via the delivery mechanism 14.

[0047] In the illustrated embodiment, reservoirs 16, 18 are provided in combination with the bacteria incubator 22. The bacteria incubator 22 functions as a reservoir for a grease-reducing agent and in accordance with one aspect of the present invention plural reservoirs are provided for supplying respective decontaminating agents to the air extraction system.

[0048] In accordance with aspects that are not claimed, the reservoirs 16, 18 are omitted and only the bacteria incubator 22 is provided, which supplies a specific decontaminating agent to the air extraction system, in particular in the form of active vegetative bacteria.

[0049] Accordingly, in this aspect the present invention further provides the air extraction system 2 comprising the air flow duct 4 and the decontaminating apparatus 10. The decontaminating apparatus 10 comprises the bacteria incubator 22 adapted, in use, to incubate bacteria within the bacteria incubator 22 during an incubation period to increase the number and/or maturity of the bacteria within the bacteria incubator 22. The delivery mechanism 14 coupled to the bacteria incubator 22 and adapted, in use, to deliver the aqueous phase, optionally in the form of droplets, into the air flow duct 4. The aqueous phase comprises bacteria, which are active vegetative bacteria, from the bacteria incubator 22, and the controller 50 is adapted, in use, to control supply of the bacteria from the bacteria incubator 22 via the delivery mechanism 14 into the air flow duct 4.

[0050] Accordingly, in this aspect the present invention further provides a method for controlling contaminant build-up in the air extraction system 2 comprising the air

flow duct 4. The method comprises incubating bacteria within the bacteria incubator 22 during an incubation period to increase the number and/or maturity of the bacteria within the incubator 22. Subsequently the delivery mechanism 14 coupled to the incubator 22 and to the air flow duct 4 is used to deliver an aqueous phase, optionally in the form of droplets, into the air flow duct 4. The aqueous phase, optionally in the form of droplets, comprises incubated bacteria from the bacteria incubator 22. The controller 50 is used to control supply of the incubated bacteria from the bacteria incubator 22 via the delivery mechanism 14 into the air flow duct 4.

[0051] In the air extraction system and method the supply of the incubated bacteria is as described above for the decontaminating agents, in particular the grease-reducing agents. In one embodiments, this may employ the step of reducing the speed of one or more fans operable to cause air to flow through the air flow duct before, during or after supplying the incubated bacteria to the air flow duct, and maintaining the one or more fans at a reduced speed. Slowing down the air speed within the air flow duct, or supplying the bacteria while the air speed is low, can enable the bacteria to coat the walls of the air supply duct more effectively.

[0052] In preferred embodiments of the present invention the bacteria are incubated from bacteria spores and during the incubation the spores are activated to form vegetative bacteria, and then grown and conditioned (i.e. matured, typically to have a high level of bacterial activity) to form at least one living active bacterial colony. The incubation is carried out for an incubation period longer than the lag period of the spores, which is the minimum period to activate the spores to form vegetative bacteria. The incubation period is typically from 12 to 24 hours and typically at an elevated temperature (i.e. above room temperature of 20 °C), for example from 30 to 40 °C, the selected temperature being dependent upon the selected bacteria species and strain to achieve effective activation, growth and conditioning of the bacteria.

[0053] The bacteria may be delivered to the bacteria incubator 22 from the bacteria store 24 coupled to the bacteria incubator 22 before and/or during an incubation period. The method may further comprise diluting the bacteria during and/or after delivery of the bacteria from the bacteria store 24 to the bacteria incubator 22.

[0054] At least one nutrient may be delivered to the bacteria incubator 22 from the nutrient store 26 coupled to the bacteria incubator 22 before and/or during an incubation period to feed the bacteria during an incubation period. The method may further comprise diluting the nutrients during and/or after delivery of the nutrients from the nutrient store 26 to the bacteria incubator 22.

[0055] The bacteria are typically heated in the incubator 22 during an incubation period. An interior of the bacteria incubator may be maintained at the desired elevated temperature to achieve effective incubation. Aeration may be provided to the bacteria in the bacteria incubator 22 during the incubation period. The incubated bacteria

may be diluted in a dilution vessel using water from a water source separate to the bacteria incubator before the incubated bacteria reaches the droplet generation device.

[0056] In addition, water, which does not contain any actives, may be additionally sprayed into the air flow duct 4 as a separate supply, which can assist maintaining a desired moisture content in the air flow duct 4 to achieve effective biological growth of the active vegetative bacteria. Various additions and modifications to the embodiments of the present invention described hereinabove will be apparent to those skilled in the art, whereby the scope of protection is defined only by the claims.

Claims

1. An air extraction system (2) comprising an air flow duct (4), and a decontaminating apparatus (10), the decontaminating apparatus comprising: a first reservoir (16) for receiving a first active decontaminating agent; a second reservoir for receiving a second active decontaminating agent; a delivery mechanism (14) coupled to the first reservoir and to the second reservoir and adapted, in use, to deliver an aqueous phase, optionally in the form of droplets, into the air flow duct, the aqueous phase comprising at least one of a first active decontaminating agent from the first reservoir and a second active decontaminating agent from the second reservoir; and a controller (50) adapted, in use, to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct, **characterised in that** at least one of the first and second reservoirs comprises a bacteria incubator (22) adapted, in use, to incubate decontaminating bacteria within the incubator during an incubation period to increase the number and/or maturity of the bacteria within the incubator and, in use, the respective first or second decontaminating agent in the bacteria incubator comprises the incubated decontaminating bacteria.
2. An air extraction system (2) according to claim 1, wherein the controller (50) is adapted, in use, to control at least one of the rate, concentration and time of supply of at least one of the first and second active decontaminating agents.
3. An air extraction system (2) according to claim 1 or 2, wherein the decontaminating apparatus further comprises a third reservoir (20) for receiving a third active decontaminating agent; wherein the delivery mechanism (14) is coupled to the third reservoir and adapted, in use, to deliver aqueous droplets into the air flow duct (4), the aqueous phase, optionally in the form of droplets, comprising a third active decontaminating agent from the third reservoir; and where-

in the controller (50) is adapted, in use, to control supply of the third active decontaminating agent from the third reservoir via the delivery mechanism into the air flow duct.

4. An air extraction system (2) according to any preceding claim, wherein (i) the controller (50) is operable, in use to control supply of the first active decontaminating agent from the first reservoir (16) independently of supply of the second active decontaminating agent from the second reservoir; and/or (ii) the controller is operable, in use, to supply the first active decontaminating agent and the second active decontaminating agent at least partially simultaneously, or sequentially in any order or sequence and for any individual or cumulative time period; and/or (iii) the controller is operable to supply at least one of the first and second active decontaminating agents from the first or second reservoir via the delivery mechanism (14) into the air flow duct (4) while not supplying the other one of the first and second active decontaminating agents from the first or second reservoir via the delivery mechanism into the air flow duct.
5. An air extraction system (2) according to any preceding claim, wherein (i) the controller (50) is operable, in use, to continuously vary a rate and/or concentration of supply of at least one of the first and second active decontaminating agents from the first or second reservoir (16) via the delivery mechanism (14) into the air flow duct (4); and/or (ii) the controller is operable, in use, to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct based on information inputted into the controller by a user; and/or (iii) the controller is operable, in use, to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct based on information relating to at least one of a fan speed of a fan associated with the air flow duct, an air flow speed through the air flow duct, a temperature reading taken for the air flow duct or surrounding environment and a grease load measurement relating to a quantity of grease in air passing through the air flow duct or a quantity of grease on a wall of the air flow duct; and/or (iv) the controller is operable, in use, to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct based on a pre-determined time-based schedule; and/or (v) the controller is operable, in use, to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct

in response to an external event.

6. An air extraction system (2) according to any preceding claim, wherein the delivery mechanism comprises at least one droplet generation device (46) coupled to the first reservoir (16) and to the second reservoir and adapted in use, to generate the aqueous droplets comprising at least one of a first active decontaminating agent from the first reservoir and a second active decontaminating agent from the second reservoir, optionally wherein (i) the droplet generation device comprises at least one nozzle (48) adapted, in use, to generate the droplets and deliver the droplets to the air flow duct; and/or (ii) the droplet generation device comprises at least one chamber comprising at least one vibratable body adapted, in use, to generate the droplets to be delivered to the air flow duct; and/or (iii) the air extraction system further comprises a mixing vessel (34) disposed between the first and second reservoirs and the droplet generation device, the mixing vessel adapted, in use, to mix a first active decontaminating agent from the first reservoir with a second active decontaminating agent from the second reservoir before the first and second active decontaminating agents reach the droplet generation device; and/or (iv) the air extraction system further comprising a dilution vessel (34) disposed between at least one of the first and second reservoirs and the droplet generation device, the dilution vessel adapted, in use, to mix at least one of the first and second active decontaminating agents with water supplied to the dilution vessel from a water source (32) separate to the first and second reservoirs before the first and/or second active decontaminating agents reach the droplet generation device.
7. An air extraction system (2) according to any preceding claim, wherein at least one of the first and second reservoirs (16) is provided by a removable container that may be detached from the remainder of the decontaminating apparatus (10) and replaced.
8. An air extraction system (2) according to any preceding claim, wherein the first active agent and/or the second active decontaminating agent comprises at least one of grease-consuming bacteria, optionally at least one strain of *Bacillus* bacteria, bacteria growth promoting medium, bacteria nutrient, detergent, surfactant and enzyme.
9. A method for controlling contaminant build-up in an air extraction system (2) comprising an air flow duct (4), the method comprising: using a delivery mechanism (14) coupled to a first reservoir (16) containing a first active decontaminating agent and to a second reservoir containing a second active decontaminating agent to deliver an aqueous phase, optionally in the form of droplets, into the air flow duct, the aqueous

ous phase comprising at least one of the first active decontaminating agent from the first reservoir and the second active decontaminating agent from the second reservoir; and using a controller (50) to control supply of at least one of the first and second active decontaminating agents from the first and second reservoirs via the delivery mechanism into the air flow duct, **characterised by** the method further comprising incubating grease-consuming bacteria in a bacteria incubator (22) which comprises one of the first and second reservoirs before supplying the incubated bacteria, comprised in the respective first or second active decontaminating agent in the bacteria incubator, from the bacteria incubator to the air flow duct via the delivery mechanism.

10. A method according to claim 9, wherein the first active decontaminating agent and/or the second active decontaminating agent comprises at least one of grease-consuming bacteria, optionally at least one strain of *Bacillus* bacteria, bacteria growth promoting medium, bacteria nutrient, detergent, surfactant and enzyme.

11. A method according to claim 9 or claim 10, comprising incubating the bacteria within the bacteria incubator (22) during an incubation period of at least 12 hours, optionally from 12 to 24 hours.

12. A method according to any of claims 9 to 11, comprising (i) delivering bacteria to the bacteria incubator (22) from a bacteria store (24) coupled to the bacteria incubator before and/or during an incubation period and/or delivering at least one nutrient to the bacteria incubator from a nutrient store (26) coupled to the bacteria incubator before and/or during an incubation period to feed the bacteria during an incubation period.

13. A method according to any of claims 9 to 12, comprising heating the bacteria incubator (22) during an incubation period and/or providing aeration to the bacteria in the bacteria incubator during an incubation period.

14. A method according to any of claims 9 to 13, comprising using a droplet generation device (46) coupled to the bacteria incubator to generate the aqueous droplets comprising the incubated bacteria from the bacteria incubator, optionally comprising (i) diluting the incubated bacteria in a dilution vessel (34) using water from a water source separate to the bacteria incubator before the incubated bacteria reaches the droplet generation device or (ii) diluting the incubated bacteria in a dilution vessel (34) using water from a water source separate to the bacteria incubator before the incubated bacteria reaches the droplet generation device.

15. A method according to any of claims 9 to 14, comprising using the delivery mechanism (14) to deliver aqueous droplets into the air flow duct (4), the aqueous droplets comprising one or more additional active decontaminating agents from one or more additional reservoirs, the additional active decontaminating agent comprises at least one of bacteria growth promoting medium, bacteria nutrient, detergent, surfactant and enzyme.

Patentansprüche

1. Abluftsystem (2), aufweisend umfasst einen Luftstromkanal (4) und eine Dekontaminierungsvorrichtung (10), wobei die Dekontaminierungsvorrichtung aufweist: ein erstes Reservoir (16) zum Aufnehmen eines ersten aktiven Dekontaminierungsmittels; ein zweites Reservoir zum Aufnehmen eines zweiten aktiven Dekontaminierungsmittels; einen Abgabemechanismus (14), der an das erste Reservoir und an das zweite Reservoir gekoppelt ist und angepasst ist, um im Gebrauch eine wässrige Phase, gegebenenfalls in Form von Tröpfchen, in den Luftstromkanal abzugeben, wobei die wässrige Phase wenigstens eines von einem ersten aktiven Dekontaminierungsmittel aus dem ersten Reservoir und einem zweiten aktiven Dekontaminierungsmittel aus dem zweiten Reservoir aufweist; und eine Steuerung (50), die angepasst ist, um im Gebrauch die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal zu steuern, **dadurch gekennzeichnet, dass** wenigstens eines der ersten und zweiten Reservoirs einen Bakterieninkubator (22) aufweist, der angepasst ist, um im Gebrauch dekontaminierende Bakterien im Inkubator während einer Inkubationsperiode zu inkubieren, um die Anzahl und/oder Reife der Bakterien im Inkubator zu erhöhen, und im Gebrauch das jeweilige erste oder zweite Dekontaminierungsmittel im Bakterieninkubator die inkubierten dekontaminierenden Bakterien aufweist.

2. Abluftsystem (2) nach Anspruch 1, bei welchem die Steuerung (50) angepasst ist, um im Gebrauch wenigstens eine der Rate, Konzentration und Zeit der Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel zu steuern.

3. Abluftsystem (2) nach Anspruch 1 oder 2, bei welchem die Dekontaminierungsvorrichtung ferner ein drittes Reservoir (20) zum Aufnehmen eines dritten aktiven Dekontaminierungsmittels aufweist; der Abgabemechanismus (14) mit an das dritte Reservoir gekoppelt ist und angepasst ist, um im Gebrauch wässrige Tröpfchen in den Luftstromkanal (4) abzu-

geben, wobei die wässrige Phase, gegebenenfalls in der Form von Tröpfchen, ein drittes aktives Dekontaminationsmittel aus dem dritten Reservoir aufweist; und die Steuerung (50) angepasst ist, um im Gebrauch die Zufuhr des dritten aktiven Dekontaminierungsmittels aus dem dritten Reservoir über den Abgabemechanismus in den Luftstromkanal zu steuern.

4. Abluftsystem (2) nach einem der vorhergehenden Ansprüche, bei welchem (i) die Steuerung (50) betriebsfähig ist, um im Gebrauch die Zufuhr des ersten aktiven Dekontaminationsmittels aus dem ersten Reservoir (16) unabhängig von der Zufuhr des zweiten aktiven Dekontaminierungsmittels aus dem zweiten Reservoir zu steuern; und/oder (ii) die Steuerung betriebsfähig ist, um im Gebrauch das erste aktive Dekontaminierungsmittel und das zweite aktive Dekontaminierungsmittel zumindest teilweise gleichzeitig oder sequentiell in beliebiger Folge oder Reihenfolge und für jede einzelne oder kumulative Zeitspanne zuzuführen; und/oder (iii) die Steuerung betriebsfähig ist, um wenigstens eines der ersten und zweiten aktiven Dekontaminierungsmittel aus dem ersten oder zweiten Reservoir über den Abgabemechanismus (14) in den Luftstromkanal (4) zuzuführen, während das andere der ersten und zweiten aktiven Dekontaminierungsmittel aus dem ersten oder zweiten Reservoir über den Abgabemechanismus in den Luftstromkanal nicht zugeführt wird.
5. Abluftsystem (2) nach einem der vorhergehenden Ansprüche, bei welchem (i) die Steuerung (50) betriebsfähig ist, um im Gebrauch kontinuierlich eine Rate und/oder Konzentration der Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus dem ersten oder zweiten Reservoir (16) über den Abgabemechanismus (14) in den Luftstromkanal (4) zu variieren; und/oder (ii) die Steuerung betriebsfähig ist, um im Gebrauch die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal basierend auf von einem Benutzer in die Steuerung eingegebenen Informationen zu steuern; und/oder (iii) die Steuerung betriebsfähig ist, um im Gebrauch die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal basierend auf Informationen betreffend wenigstens eines einer Lüfterdrehzahl eines dem Luftstromkanal zugeordneten Lüfters, einer Luftströmungsgeschwindigkeit durch den Luftstromkanal, einer für den Luftstromkanal oder die Umgebung genommenen Temperaturablesung und einer Fettlastmessung betreffend eine Menge von Fett in der Luft durch den Luftstromkanal oder eine Menge

von Fett an einer Wand des Luftstromkanals zu steuern; und/oder (iv) die Steuerung betriebsfähig ist, um im Gebrauch die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal basierend auf einem vorbestimmten Zeitplan zu steuern; und/oder (v) die Steuerung betriebsfähig ist, um im Gebrauch die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal als Reaktion auf ein externes Ereignis zu steuern.

6. Abluftsystem (2) nach einem der vorhergehenden Ansprüche, bei welchem der Abgabemechanismus wenigstens eine Tröpfchenerzeugungsvorrichtung (46) aufweist, die an das erste Reservoir (16) und an das zweite Reservoir gekoppelt ist und angepasst ist, um im Gebrauch die wässrigen Tröpfchen mit wenigstens einem ersten aktiven Dekontaminationsmittel aus dem ersten Reservoir und eines zweiten aktiven Dekontaminierungsmittel aus dem zweiten Reservoir zu erzeugen, wobei optional (i) die Tröpfchenerzeugungsvorrichtung wenigstens eine Düse (48) aufweist, die angepasst ist, um im Gebrauch die Tröpfchen zu erzeugen und die Tröpfchen an den Luftstromkanal abzugeben; und/oder (ii) die Tröpfchenerzeugungsvorrichtung wenigstens eine Kammer mit wenigstens einem schwingfähigen Körper aufweist, der angepasst ist, um im Gebrauch die an den Luftstromkanal abzugebenden Tröpfchen zu erzeugen; und/oder (iii) das Abluftsystem ferner ein Mischgefäß (34) aufweist, das zwischen den ersten und zweiten Reservoirs und der Tröpfchenerzeugungsvorrichtung angeordnet ist, wobei das Mischgefäß angepasst ist, um im Gebrauch ein erstes aktives Dekontaminationsmittel aus dem ersten Reservoir mit einem zweiten aktiven Dekontaminierungsmittel aus dem zweiten Reservoir zu mischen, bevor die ersten und zweiten aktiven Dekontaminierungsmittel die Tröpfchenerzeugungsvorrichtung erreichen; und/oder (iv) das Abluftsystem ferner ein Verdünnungsgefäß (34) aufweist, das zwischen wenigstens einem der ersten und zweiten Reservoirs und der Tröpfchenerzeugungsvorrichtung angeordnet ist, wobei das Verdünnungsgefäß angepasst ist, um im Gebrauch wenigstens eines der ersten und zweiten aktiven Dekontaminierungsmittel mit Wasser zu mischen, das dem Verdünnungsgefäß aus einer Wasserquelle (32) separat zu den ersten und zweiten Reservoirs zugeführt wird, bevor das erste und/oder das zweite aktive Dekontaminierungsmittel die Tröpfchenerzeugungsvorrichtung erreichen.
7. Abluftsystem (2) nach einem der vorhergehenden Ansprüche, bei welchem wenigstens eines der ersten und zweiten Reservoirs (16) durch einen entfer-

baren Behälter vorgesehen ist, der vom Restbestand der Dekontaminierungsvorrichtung (10) gelöst und ersetzt werden kann.

8. Abluftsystem (2) nach einem der vorhergehenden Ansprüche, bei welchem das erste aktive Mittel und/oder das zweite aktive Dekontaminierungsmittel wenigstens eines von fett-verzehrenden Bakterien, optional wenigstens einem Stamm von Bacillus-Bakterien, Bakterienwachstum förderndem Medium, Bakterien-Nährstoff, Detergens, Tensid und Enzym aufweist. 5
9. Ein Verfahren zum Steuern eines Fremdstoffaufbaus in einem Abluftsystem (2) mit einem Luftstromkanal (4), wobei das Verfahren aufweist: Verwenden eines Abgabemechanismus (14), der an ein erstes Reservoir (16), das ein erstes aktives Dekontaminierungsmittel enthält, und an ein zweites Reservoir, das ein zweites aktives Dekontaminierungsmittel enthält, gekoppelt ist, um eine wässrige Phase, gegebenenfalls in Form von Tröpfchen, in den Luftstromkanal zu geben, wobei die wässrige Phase wenigstens eines des ersten aktiven Dekontaminierungsmittels aus dem ersten Reservoir und des zweiten aktiven Dekontaminierungsmittels aus dem zweiten Reservoir aufweist; und Verwenden einer Steuerung (50), um die Zufuhr von wenigstens einem der ersten und zweiten aktiven Dekontaminierungsmittel aus den ersten und zweiten Reservoirs über den Abgabemechanismus in den Luftstromkanal zu steuern, **dadurch gekennzeichnet, dass** das Verfahren ferner ein Inkubieren von fett-verzehrenden Bakterien in einem Bakterieninkubator (22), der eines der ersten und zweiten Reservoirs aufweist, vor dem Zuführen der inkubierten Bakterien, die in dem jeweiligen ersten oder zweiten aktiven Dekontaminierungsmittel im Bakterieninkubator enthalten sind, aus dem Bakterieninkubator über den Abgabemechanismus in den Luftstromkanal aufweist. 10 15 20 25 30 35 40
10. Verfahren nach Anspruch 9, bei welchem das erste aktive Dekontaminierungsmittel und/oder das zweite aktive Dekontaminierungsmittel wenigstens eines von fett-verzehrenden, optional wenigstens einem Stamm von Bacillus-Bakterien, Bakterienwachstum förderndem Medium, Bakterien-Nährstoff, Detergens, Tensid und Enzym aufweist. 45
11. Verfahren nach Anspruch 9 oder Anspruch 10, aufweisend ein Inkubieren der Bakterien im Bakterieninkubator (22) während einer Inkubationszeitdauer von mindestens 12 Stunden, optional von 12 bis 24 Stunden. 50
12. Verfahren nach einem der Ansprüche 9 bis 11, aufweisend (i) ein Liefern von Bakterien zum Bakterieninkubator (22) aus einem an den Bakterieninku-

bator gekoppelten Bakterienspeicher (24) vor und/oder während einer Inkubationszeitspanne, und/oder Liefern von wenigstens einem Nährstoff zum Bakterieninkubator aus einem an den Bakterieninkubator gekoppelten Nährstoffspeicher (26) vor und/oder während einer Inkubationszeitspanne, um die Bakterien während einer Inkubationszeitspanne zuzubringen.

13. Verfahren nach einem der Ansprüche 9 bis 12, aufweisend ein Erwärmen des Bakterieninkubators (22) während einer Inkubationszeitspanne und/oder ein Vorsehen einer Belüftung für die Bakterien im Bakterieninkubator während einer Inkubationszeitspanne. 10 15
14. Verfahren nach einem der Ansprüche 9 bis 13, aufweisend ein Verwenden einer Tröpfchenerzeugungsvorrichtung (46), die an den Bakterieninkubator gekoppelt ist, um die wässrigen Tröpfchen zu erzeugen, die die inkubierten Bakterien aus dem Bakterieninkubator aufweisen, optional aufweisend (i) ein Verdünnen der inkubierten Bakterien in einem Verdünnungsgefäß (34) unter Verwendung von Wasser aus einer Wasserquelle separat zum Bakterieninkubator, bevor die inkubierten Bakterien die Tröpfchenerzeugungsvorrichtung erreichen, oder (ii) ein Verdünnen der inkubierten Bakterien in einem Verdünnungsgefäß (34) unter Verwendung von Wasser aus einer Wasserquelle separat zum Bakterieninkubator, bevor die inkubierten Bakterien die Tröpfchenerzeugungsvorrichtung erreichen. 20 25 30
15. Verfahren nach einem der Ansprüche 9 bis 14, aufweisend ein Verwenden des Abgabemechanismus (14), um wässrige Tröpfchen in den Luftstromkanal (4) abzugeben, wobei die wässrigen Tröpfchen ein oder mehr zusätzliche aktive Dekontaminierungsmittel aus ein oder mehr zusätzlichen Reservoirs aufweisen, wobei das zusätzliche aktive Dekontaminierungsmittel wenigstens eines von Bakterienwachstum förderndem Medium, Bakteriennährstoff, Detergens, Tensid und Enzym aufweist. 35 40

Revendications

1. Un système d'extraction d'air (2) comprenant un conduit d'écoulement d'air (4) et un appareil de décontamination (10), l'appareil de décontamination comprenant : un premier réservoir (16) destiné à recevoir un premier agent de décontamination actif ; un deuxième réservoir destiné à recevoir un deuxième agent de décontamination actif ; un mécanisme de distribution (14) couplé au premier réservoir et au deuxième réservoir et conçu, lors de l'utilisation, pour fournir une phase aqueuse, en option sous la forme de gouttelettes, dans le conduit d'écoulement 55

- d'air, la phase aqueuse comprenant au moins soit un premier agent de décontamination actif provenant du premier réservoir, soit un deuxième agent de décontamination actif provenant du deuxième réservoir ; et un dispositif de commande (50) conçu, lors de l'utilisation, pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des premier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air, **caractérisé en ce qu'**au moins un des premier et deuxième réservoirs comprend un incubateur bactériologique (22) conçu, lors de l'utilisation, pour incuber des bactéries de décontamination à l'intérieur de l'incubateur pendant une période d'incubation afin d'augmenter le nombre et/ou la maturité des bactéries à l'intérieur de l'incubateur et, lors de l'utilisation, le premier ou le deuxième agent de décontamination respectif dans l'incubateur bactériologique comprend les bactéries de décontamination incubées.
2. Un système d'extraction d'air (2) selon la revendication 1, dans lequel le dispositif de commande (50) est conçu, lors de l'utilisation, pour commander au moins soit la vitesse, soit la concentration, soit la durée de fourniture d'au moins un des premier et deuxième agents de décontamination actifs.
 3. Un système d'extraction d'air (2) selon la revendication 1 ou 2, dans lequel l'appareil de décontamination comprend en outre un troisième réservoir (20) destiné à recevoir un troisième agent de décontamination actif ; dans lequel le mécanisme de distribution (14) est couplé au troisième réservoir et conçu, lors de l'utilisation, pour fournir des gouttelettes aqueuses dans le conduit d'écoulement d'air (4), la phase aqueuse, en option sous la forme de gouttelettes, comprenant un troisième agent de décontamination actif provenant du troisième réservoir ; et dans lequel le dispositif de commande (50) est conçu, lors de l'utilisation, pour commander la fourniture du troisième agent de décontamination actif provenant du troisième réservoir par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air.
 4. Un système d'extraction d'air (2) selon l'une quelconque des revendications précédentes, dans lequel (i) le dispositif de commande (50) peut être utilisé, lors de l'utilisation, pour commander la fourniture du premier agent de décontamination actif provenant du premier réservoir (16) indépendamment de la fourniture du deuxième agent de décontamination actif provenant du deuxième réservoir ; et/ou (ii) le dispositif de commande peut être utilisé, lors de l'utilisation, pour fournir le premier agent de décontamination actif et le deuxième agent de décontamination actif au moins partiellement simultanément, ou séquentiellement dans un ordre ou une séquence quelconque et pour une période de temps individuelle ou cumulative quelconque ; et/ou (iii) le dispositif de commande peut être utilisé pour fournir au moins un des premier et deuxième agents de décontamination actifs provenant du premier ou du deuxième réservoir par l'intermédiaire du mécanisme de distribution (14) dans le conduit d'écoulement d'air (4) tout en ne fournissant pas l'autre des premier et deuxième agents de décontamination actifs provenant du premier ou du deuxième réservoir par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air.
 5. Un système d'extraction d'air (2) selon l'une quelconque des revendications précédentes, dans lequel (i) le dispositif de commande (50) peut être utilisé, lors de l'utilisation, pour varier en continu une vitesse et/ou une concentration de fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant du premier ou du deuxième réservoir (16) par l'intermédiaire du mécanisme de distribution (14) dans le conduit d'écoulement d'air (4) ; et/ou (ii) le dispositif de commande peut être utilisé, lors de l'utilisation, pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des premier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air sur la base des informations entrées dans le dispositif de commande par un utilisateur ; et/ou (iii) le dispositif de commande peut être utilisé, lors de l'utilisation, pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des premier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air sur la base des informations relatives à au moins soit une vitesse de ventilateur d'un ventilateur associé au conduit d'écoulement d'air, une vitesse d'écoulement de l'air à travers le conduit d'écoulement d'air, un relevé de température pris dans le conduit d'écoulement d'air ou le milieu ambiant et une mesure de la charge de graisse relative à une quantité de graisse dans l'air passant à travers le conduit d'écoulement d'air ou une quantité de graisse sur une paroi du conduit d'écoulement d'air ; et/ou (iv) le dispositif de commande peut être utilisé, lors de l'utilisation, pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des premier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air sur la base d'un calendrier basé sur une durée prédéterminée ; et/ou (v) le dispositif de commande peut être utilisé, lors de l'utilisation, pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des pre-

mier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air en réponse à un événement externe.

6. Un système d'extraction d'air (2) selon l'une quelconque des revendications précédentes, dans lequel le mécanisme de distribution comprend au moins un dispositif de production de gouttelettes (46) couplé au premier réservoir (16) et au deuxième réservoir et conçu, lors de l'utilisation, pour produire les gouttelettes aqueuses comprenant au moins soit un premier agent de décontamination actif provenant du premier réservoir, soit un deuxième agent de décontamination actif provenant du deuxième réservoir, en option dans lequel (i) le dispositif de production de gouttelettes comprend une ou plusieurs buses (48) conçues, lors de l'utilisation, pour produire les gouttelettes et fournir les gouttelettes au conduit d'écoulement d'air ; et/ou (ii) le dispositif de production de gouttelettes comprend une ou plusieurs chambres comprenant un ou plusieurs corps vibrants conçus, lors de l'utilisation, pour produire les gouttelettes à fournir au conduit d'écoulement d'air ; et/ou (iii) le système d'extraction d'air comprend en outre une cuve de mélange (34) disposée entre les premier et deuxième réservoirs et le dispositif de production de gouttelettes, la cuve de mélange étant conçue, lors de l'utilisation, pour mélanger un premier agent de décontamination actif provenant du premier réservoir avec un deuxième agent de décontamination actif provenant du deuxième réservoir avant que les premier et deuxième agents de décontamination actifs n'atteignent le dispositif de production de gouttelettes ; et/ou (iv) le système d'extraction d'air comprenant en outre une cuve de dilution (34) disposée entre au moins un des premier et deuxième réservoirs et le dispositif de production de gouttelettes, la cuve de dilution conçue, lors de l'utilisation, pour mélanger au moins un des premier et deuxième agents de décontamination actifs avec de l'eau fournie à la cuve de dilution par une source d'eau (32) distincte des premier et deuxième réservoirs avant que les premier et/ou deuxième agents de décontamination actifs n'atteignent le dispositif de production de gouttelettes.
7. Un système d'extraction d'air (2) selon l'une quelconque des revendications précédentes, dans lequel au moins un des premier et deuxième réservoirs (16) est muni d'un contenant amovible qui peut être détaché du reste de l'appareil de décontamination (10) et remplacé.
8. Un système d'extraction d'air (2) selon l'une quelconque des revendications précédentes, dans lequel le premier agent actif et/ou le deuxième agent de décontamination actif comprennent au moins un élément parmi des bactéries consommatrices de

graisses, en option au moins une souche de bactéries de Bacillus, un milieu favorisant la croissance des bactéries, un nutriment de bactéries, un détergent, un tensioactif et une enzyme.

9. Un procédé destiné à commander une accumulation de contaminants dans un système d'extraction d'air (2) comprenant un conduit d'écoulement d'air (4), le procédé consistant à : utiliser un mécanisme de distribution (14) couplé à un premier réservoir (16) contenant un premier agent de décontamination actif et à un deuxième réservoir contenant un deuxième agent de décontamination actif pour fournir une phase aqueuse, en option sous la forme de gouttelettes, dans le conduit d'écoulement d'air, la phase aqueuse comprenant au moins soit le premier agent de décontamination actif provenant du premier réservoir, soit le deuxième agent de décontamination actif provenant du deuxième réservoir ; et utiliser un dispositif de commande (50) pour commander la fourniture d'au moins un des premier et deuxième agents de décontamination actifs provenant des premier et deuxième réservoirs par l'intermédiaire du mécanisme de distribution dans le conduit d'écoulement d'air, **caractérisé en ce que** le procédé consiste en outre à incuber des bactéries consommatrices de graisses dans un incubateur bactériologique (22) qui comprend un des premier et deuxième réservoirs avant de fournir les bactéries incubées, comprises dans le premier ou deuxième agent de décontamination actif respectif dans l'incubateur bactériologique, provenant de l'incubateur bactériologique vers le conduit d'écoulement d'air par l'intermédiaire du mécanisme de distribution.
10. Un procédé selon la revendication 9, dans lequel le premier agent de décontamination actif et/ou le deuxième agent de décontamination actif comprennent au moins un élément parmi des bactéries consommatrices de graisses, en option au moins une souche de bactéries de Bacillus, un milieu favorisant la croissance des bactéries, un nutriment de bactéries, un détergent, un tensioactif et une enzyme.
11. Un procédé selon la revendication 9 ou la revendication 10, consistant à incuber les bactéries de décontamination à l'intérieur de l'incubateur bactériologique (22) pendant une période d'incubation d'au moins 12 heures, en option de 12 à 24 heures.
12. Un procédé selon l'une quelconque des revendications 9 à 11, consistant à (i) fournir des bactéries à l'incubateur bactériologique (22) provenant d'un magasin de bactéries (24) couplé à l'incubateur bactériologique avant et/ou pendant une période d'incubation et/ou à fournir au moins un nutriment à l'incubateur bactériologique provenant d'un magasin de nutriments (26) couplé à l'incubateur bactériologique

avant et/ou pendant une période d'incubation afin d'alimenter les bactéries pendant une période d'incubation.

13. Un procédé selon l'une quelconque des revendications 9 à 12, consistant à chauffer l'incubateur bactériologique (22) pendant une période d'incubation et/ou à fournir une aération aux bactéries dans l'incubateur bactériologique pendant une période d'incubation. 5
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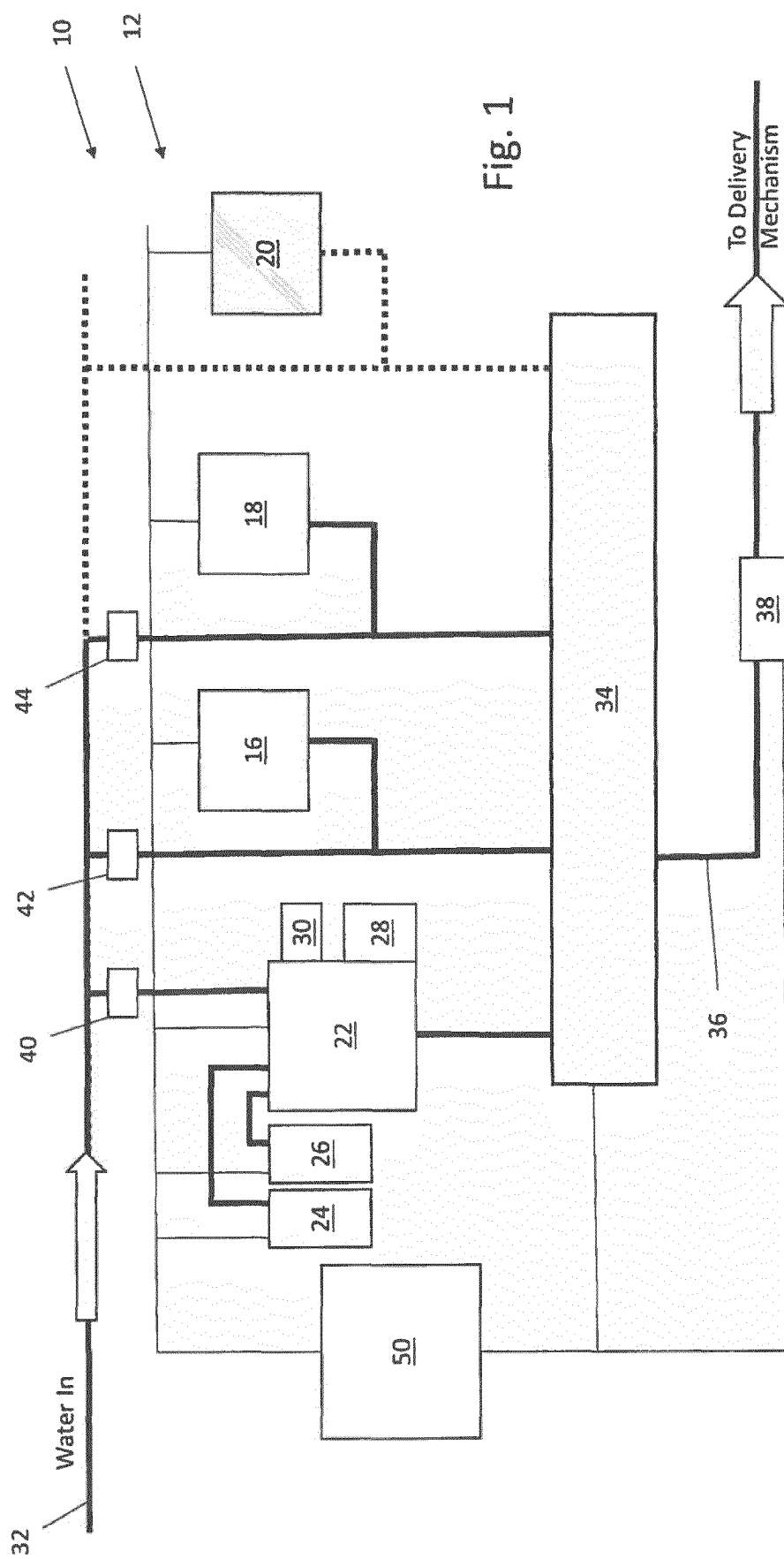
14. Un procédé selon l'une quelconque des revendications 9 à 13, consistant à utiliser un dispositif de production de gouttelettes (46) couplé à l'incubateur bactériologique pour produire les gouttelettes aqueuses comprenant les bactéries incubées provenant de l'incubateur bactériologique, en option consistant à (i) diluer les bactéries incubées dans une cuve de dilution (34) en utilisant de l'eau provenant d'une source d'eau distincte de l'incubateur bactériologique avant que les bactéries incubées n'atteignent le dispositif de production de gouttelettes ou (ii) à diluer les bactéries incubées dans une cuve de dilution (34) en utilisant de l'eau provenant d'une source d'eau distincte de l'incubateur bactériologique avant que les bactéries incubées n'atteignent le dispositif de production de gouttelettes. 15
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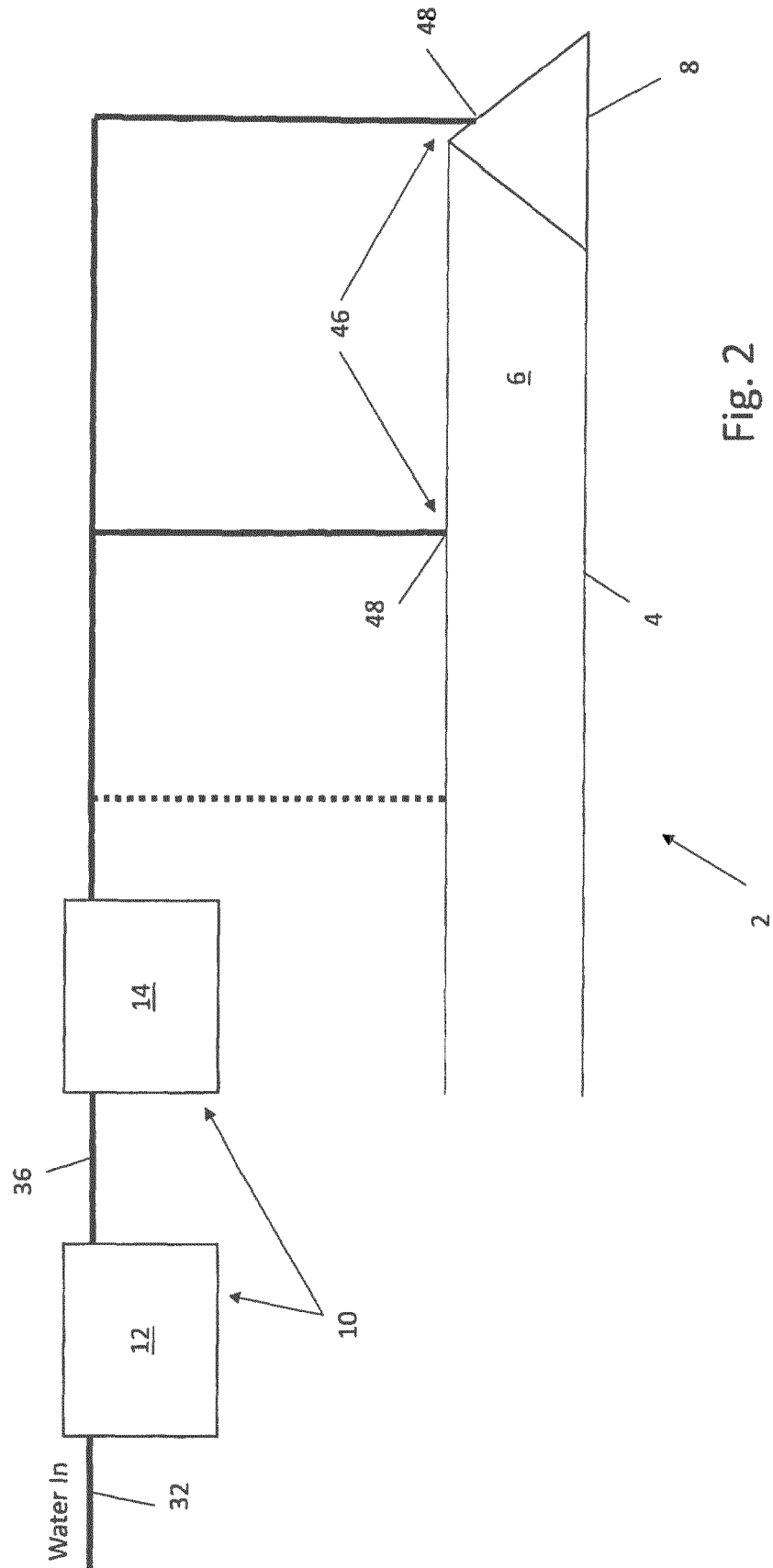
15. Un procédé selon l'une quelconque des revendications 9 à 14, consistant à utiliser le mécanisme de distribution (14) pour fournir des gouttelettes aqueuses dans le conduit d'écoulement d'air (4), les gouttelettes aqueuses comprenant un ou plusieurs agents de décontamination actifs supplémentaires provenant d'un ou plusieurs réservoirs supplémentaires, le deuxième agent de décontamination actif supplémentaire comprend au moins un élément parmi un milieu favorisant la croissance des bactéries, un nutriment de bactéries, un détergent, un tensioactif et une enzyme. 30
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REFERENCES CITED IN THE DESCRIPTION

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