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### (54) Automatic evacuation system for waste water

(57) The invention concerns a method for evacuation of waste water via a central suction system with a number of fixed evacuation openings (drains) for waste water, wherein a removable suction pipe is connected to a drain of a fixed waste water evacuation system with a number of fixed drains, while said waste water evacuation system is connected with a central vacuum system and wherein the other drains than that to which the suction pipe is connected during a suction operation are closed.

The invention also concerns an automatic evaca-

tion installation for waste water which comprises a fixed waste water evacuation system with a number of fixed evacuation openings (drains), a central vacuum system connected with said waste water evacuation system and means, on connection of a removable suction pipe to one of the drains of the fixed waste water system, for closing the other drains and activating the central vacuum system.

## Description

**[0001]** The invention lies in the field of evacuation and cleaning installations with a central vacuum system.

**[0002]** An obvious idea in this context may reside in adapting such systems for the aspiration of waste water.

**[0003]** This would be very useful in particular for cleaning kitchens (in particular so called "large" kitchens, such as catering kitchens), butchers' shops, abattoirs, garages etc., but possibly also more generally in the domestic arena.

**[0004]** For example, a cleaning treatment could be possible with a (limited quantity of a detergent/disinfectant) fluid which could be aspirated (where applicable without rinsing), which could make the subsequent treatment of the generated waste streams considerably easier (both with regard to quantities and the efficient collection thereof).

**[0005]** The practical implementation of the above basic concept however entails a number of fundamental problems.

**[0006]** Namely the problem exists that a pipe system for air and dust evacuation is not directly suitable for fluid evacuation. Furthermore the problem arises that a fundamental height restriction applies to the raising (aspiration) of water.

**[0007]** These problems also have the consequence that the systems proposed in the prior art for the evacuation of waste water appear impractical and that most existing systems comprise a collection vessel, freestanding or otherwise, for the aspirated fluid which is located between the suction pipe and the vacuum system, and that they inherently require a number of laborious operations (disposal of waste water and cleaning of collection vessel).

**[0008]** In this context reference is made to French patent specification FR 2 669 206, French patent specification FR 2 726 198, American patent specification US 3.862.466, PCT publication WO9818377 and Japanese patent excerpt JP 199951.

**[0009]** The object of the invention is to avoid the disadvantages of the prior art and create a system which is economic and simple to implement, making use of common basic installations.

**[0010]** The basic concept of the invention lies in that a waste water disposal system (pre-existing or not) with a number of evacuation openings (drains, such as catchment points, discharge from disposal sink / "pompbak" installations), is combined with a central suction system for air and dust (as known per se), wherein, to be able to create the required negative pressure (vacuum) at one drain of the waste water evacuation system, the other drains are closed air-tight.

**[0011]** The invention thus provides creates a method for evacuation of waste water via a central evacuation system with a number of fixed drains for waste water, wherein a removable suction pipe is connected to a drain of a fixed waste water evacuation system with a number

of fixed drains, while said waste water evacuation system is connected with a central vacuum system and the other drains than that to which the suction pipe is attached are closed during the suction operation.

**[0012]** Such a method/system is ideal for application in kitchens (in particular "large" kitchens), butcher's shops, abattoirs, garages etc. but also for more general use in the domestic arena, by simple connection of a central dust extraction system to a "drain system", wherein an automatic activation allows to switch simply from dust extraction to fluid evacuation.

**[0013]** According to another feature of the invention, the method provides that during a suction operation the other drains than that to which the suction pipe is connected are closed, preferably automatically, while nonetheless an odour trap to the drains is maintained by means of a hydraulic siphon (in both the drain connected and the other drains) after the suction operation.

**[0014]** According to a specific embodiment of the invention, in a suction operation at one drain, preferably a removable automatic shut-off device at one drain is removed and the suction pipe connected hermetically to the drain, wherein specific detection and switching devices at said drain (such as in particular a REED switch, a telecontrol system, or the like) automatically activate the central vacuum system (activation of motor + turbine), while corresponding removable automatic shut-off devices at the other drains automatically close the other drains.

**[0015]** Evidently the detection and switching devices can also, in a similar manner, be provided to activate the central vacuum system on removal of one of the automatic shut-off devices at one drain, instead of on the connection of the suction pipe.

**[0016]** The automatic shut-off of the (other) drains takes place preferably by means of a ball float / disc float.

**[0017]** Ball floats are known in themselves in waste water evacuation systems to prevent vermin from entering a connected room via a waste water system (British patent document 2.286.207 and American patent US 5.662.138) or as a non-return valve in a floor drain (German patent application DE 403 39 57, European patent application EP 0 494 060 and PCT patent application WO 9902792).

**[0018]** Whereas a preferred embodiment of the method according to the invention involves means for automatically closing the other drains than that to which the suction pipe is connected, the method may also suitably involve evacuation openings (drains) that are "permanently" closed (for instance by means of removable stoppers); in that case, in order to connect the removable suction pipe to the evacuation system, the stopper of one of the evacuation openings is removed and replaced by the suction pipe.

**[0019]** In such alternative embodiment a (standard) permanent (S-bend type) hydraulic siphon may be provided in the evasions from the evacuation openings.

**[0020]** Separate means may also be provided for occasionally replenishing the hydraulic siphons (with water

or disinfectant solution), with or without removing the "permanent" closing stoppers.

**[0021]** It should furthermore be observed that the method according to the invention can easily be provided to evacuate / suck off, alternatively, liquids respectively dust (whereas in "dust evacuation" mode dust may suitably be captured via dust separation means such as filters, deflection means etc.), and/or to evacuate / suck off liquids via a (standard) cleaning machine (such as rotary brush cleaning machines). Such rotary brush machine embodiment of the system according to the invention may for instance involve water supply to the brushes and operation of the brushes by compressed air, whereas the used air and water are simultaneously sucked off and evacuated by the vacuum of the installation.

**[0022]** The invention furthermore provides an automatic evacuation installation for waste water using a central suction system, with a fixed waste water evacuation system with a number of fixed evacuation openings (drains) for waste water, with a central vacuum system connected with said waste water evacuation system, and with means, on connection of a removable suction pipe to one of the drains of the fixed waste water evacuation system, for closing the other drains and activating the central vacuum system.

**[0023]** As already stated above, the system according to the invention (method/installation) involves a number of evacuation openings/drains of the floor discharge type (such as catchment points) or drains of the disposal sink/"pompbak" type. It is essential that the waste water/waste fluid always flows down into the waste water evacuation system (natural water fall), wherein the vacuum (in the waste water evacuation system and the branch to the vacuum installation) serves merely to transfer the fluid in the removable suction pipe to the drain to which the suction pipe is connected.

**[0024]** According to another feature of the invention, each drain of the automatic evacuation system is preferably fitted with a hydraulic siphon.

**[0025]** According to a preferred embodiment of the automatic evacuation system according to the invention, each drain is fitted, at the bottom of the drain, with a connection to which a suction pipe can be hermetically connected, with detection and switching devices for automatic activation of the central vacuum system, and a removable shut-off device intended to cooperate with said connection for a suction pipe to close this automatically.

**[0026]** The shut-off devices preferably comprise a ball float, a disc float or similar. The float is held in place in the shut-off device by the specific form of the shut-off device (see figures 1 and 2).

**[0027]** According to an alternative embodiment of the invention, the automatic closure of the connection for the suction pipe at the "other drains" can of course also take place with other shut-off means (such as solenoid valves), where activation of the shut-off means can take place by the same detection and switching means on the

connection on suction pipe which also activate the vacuum system.

**[0028]** According to a further preferred characteristic of the invention, the removable shut-off device together with the connection for the suction pipe forms a hydraulic siphon in the base of the drain.

**[0029]** Here a mesh filter can be provided on the underside of the shut-off device which fits onto the connection for the suction pipe in order to retain particles which are carried with the discharging waste water in the siphon. In this construction the water closes the drain hydraulically even during/after aspiration with the vacuum system.

**[0030]** According to still a further alternative embodiment of the invention, the closure of the connection for the suction pipe at the "other drains" can also be non automatic (involving evacuation openings (drains) that are "permanently" closed (for instance by means of removable stoppers); to connect the removable suction pipe to the evacuation system, the stopper of one of the evacuation openings is then removed and replaced by the suction pipe.

**[0031]** The invention finally also concerns, more generally, a shut-off device for air-tight closure of a drain for fluids, intended to be placed in a suitable cavity in the drain, with integral means for closing an evacuation pipe which protrudes from the base of said cavity of the evacuation opening.

**[0032]** According to a preferred embodiment of the shut-off device according to the invention, the integral means comprise a ball float, a disc float or similar.

**[0033]** According to a further preferred characteristic of the invention, the removable shut-off device together with the connection for the suction pipe forms a hydraulic siphon in the base of the drain.

**[0034]** Further details and features of the invention are described below in relation to one specific embodiment thereof, with reference to the attached drawings in which:

**[0035]** Figure 1 is a diagrammatic depiction of an automatic evacuation installation for waste water according to the invention;

Figure 2 is an enlarged depiction of one drain of the installation in figure 1;

Figure 3 is a detailed depiction of one drain of the installation according to the invention, with removable mesh cover removed and suction pipe connected.

**[0035]** In the figures, the reference numerals of the various components indicate the following:

1 automatic evacuation installation for waste water according to the invention

2 ball float

3 disc float

4 connection for suction pipe

5 drain with ball float for closure of connection 4

- 6 drain with disc float for closure of a connection 4
- 7 removable shut-off device
- 8 pipe system of a fixed waste water evacuation system
- 9 pipe system of a central vacuum system
- 10 cyclone between waste water system 8 and vacuum system 9
- 11 drain of cyclone 10
- 12 turbine of vacuum system 9
- 13 motor of the vacuum system 9
- 14 REED suction pipe detector / switch for vacuum system 9, 12, 13
- 15 floor in which a drain 5 is provided
- 16 mesh of removable shut-off device 7
- 17 hydraulic siphon between shut-off device 7 and connection 4
- 18 filter mesh on the underside of shut-off device 7
- 19 removable suction pipe for evacuation of waste water
- 20 magnet as trigger for REED detector / switch 14
- 21 filter/mesh head on suction pipe 19
- 22 water remaining during/after suction operation in siphon 17

**[0036]** It is emphasised that the specific embodiment of the invention explained in this example serves purely for illustration and must certainly not be interpreted as a restriction in relation to content of the disclosure above and the attached claims.

## Claims

1. Method for evacuation of waste water via a central evacuation system with a number of fixed evacuation openings (drains) for waste water, **characterised in that** a removable suction pipe is connected to a drain of a fixed waste water evacuation system with a number of fixed drains, wherein said waste water evacuation system is connected with a central vacuum system and wherein the other drains than that to which the suction pipe is connected during a suction operation, are closed.
2. Method according to claim 1, **characterised in that** during a suction operation, the other drains than that to which the suction pipe is connected are closed automatically, while nonetheless an odour trap is maintained on the drains by means of hydraulic siphon after the suction operation.
3. Method according to one of claims 1 and 2, **characterised in that** on a suction operation, a removable automatic shut-off device at one drain is removed and said suction pipe is hermetically connected to the drain, wherein detection and switching devices on said drain automatically activate the central vacuum system, while corresponding removable auto-

matic shut-off devices on the other drains automatically close the other drains.

4. Method according to claim 3, **characterised in that** the automatic closure of the drains takes place by means of a ball float/disc float in the shut-off devices.
5. Automatic evacuation installation for waste water using a central suction system, **characterised in that** the installation comprises a fixed waste water evacuation system with a number of fixed evacuation openings (drains), a central vacuum system connected with said waste water evacuation system and means, on connection of a removable suction pipe to one of the drains of the fixed waste water system, for closing the other drains and activating the central vacuum system.
6. Automatic evacuation system according to claim 5, **characterised in that** each drain is fitted with a connection below the drain to which a suction pipe can be hermetically connected, with detection and switch devices for automatic activation of the central vacuum system and a removable shut-off device intended to cooperate with said connection for a suction pipe to close this automatically.
7. Automatic evacuation system according to claim 6, **characterised in that** said removable automatic shut-off device comprises a ball float, a disc float or similar.
8. Automatic evacuation system according to one of claims 6 and 7, **characterised in that** said removable automatic shut-off device with said connection for the suction pipe forms a hydraulic siphon in the drain.
9. Shut-off device for air-tight closure of a drain for fluids, **characterised in that** this is provided to be placed removably in a suitable cavity of the drain and is fitted with integral means for being able to close an evacuation pipe which protrudes from the floor of said cavity of the drain.
10. Shut-off device according to claim 9, **characterised in that** the integral means of said shut-off device comprise a ball float, a disc float or similar.
11. Shut-off device according to one of claims 9 and 10, **characterised in that** said shut-off device together with the evacuation pipe forms a hydraulic siphon.

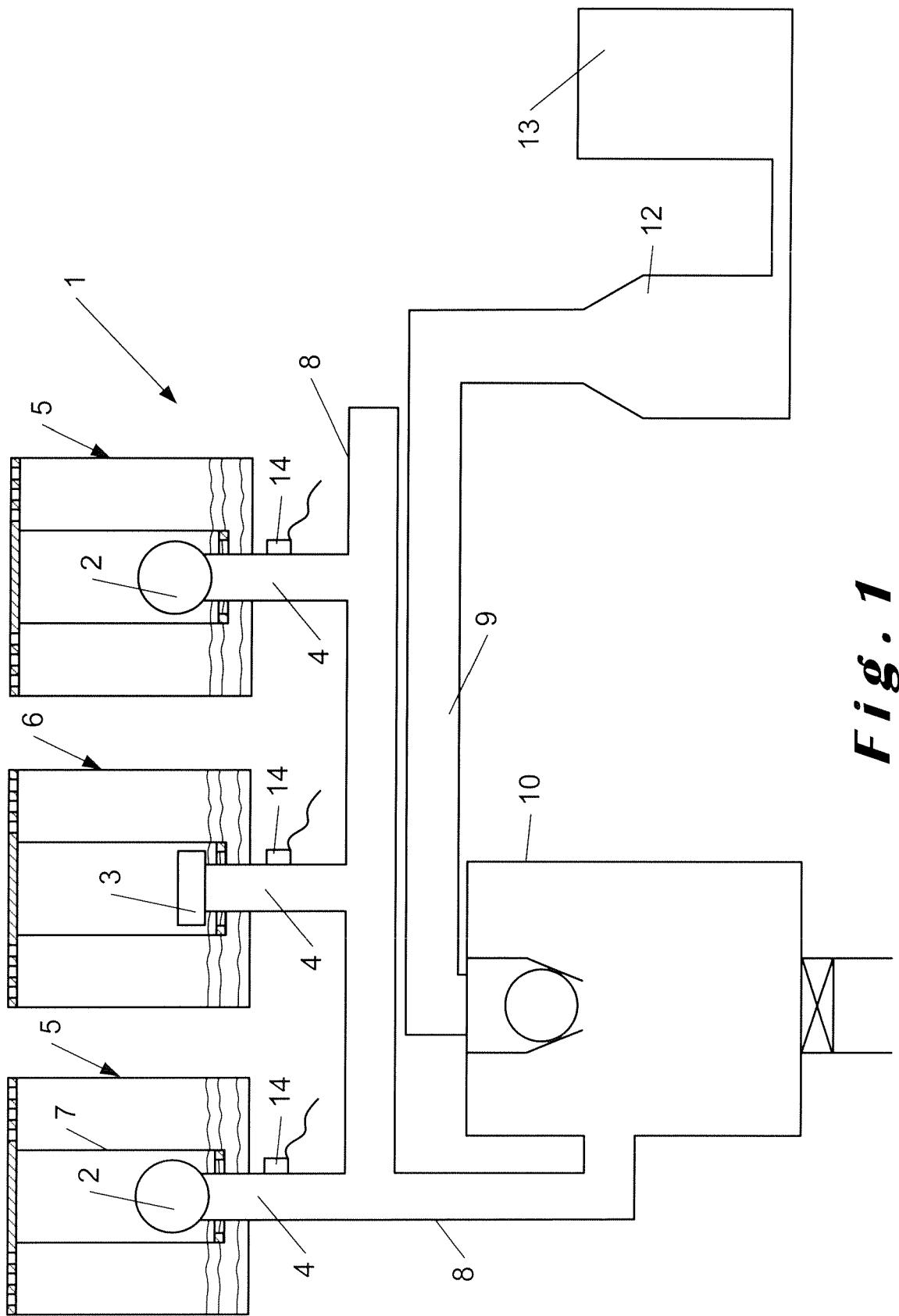
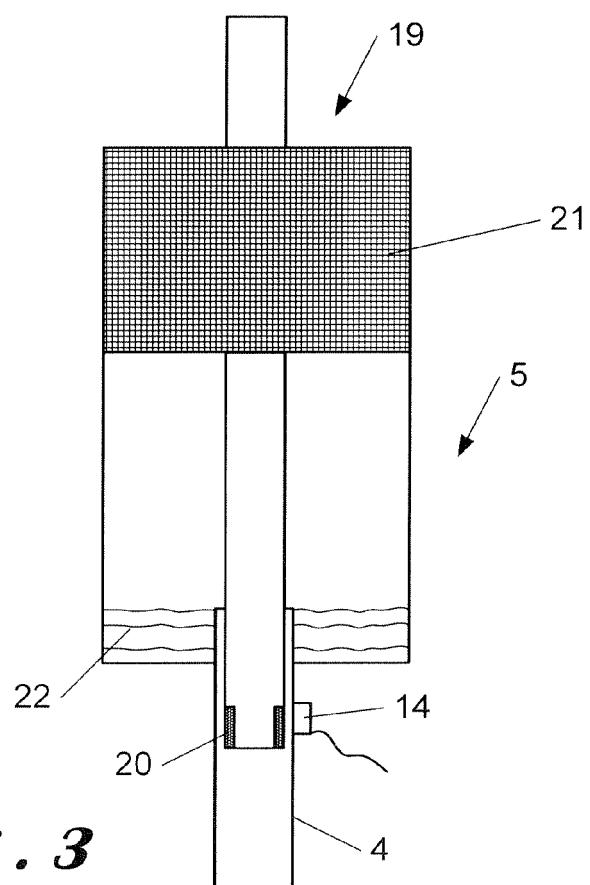
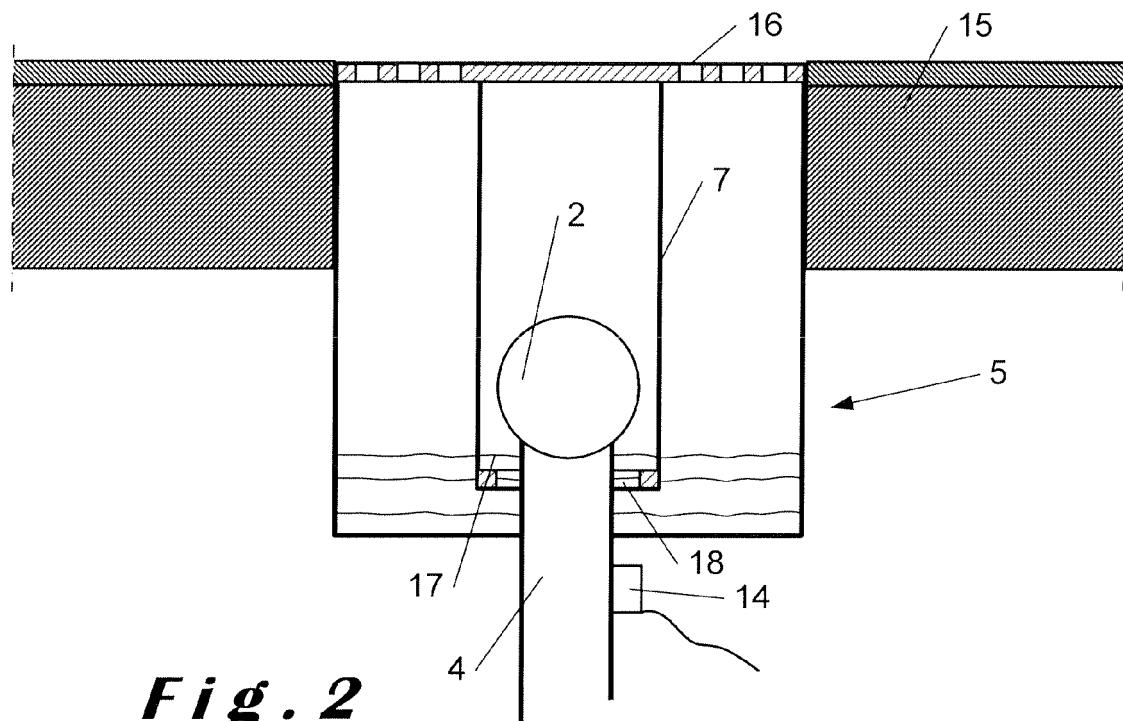


Fig. 1



**REFERENCES CITED IN THE DESCRIPTION**

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