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(54) Waste well

(57) The invention relates to a biowaste container (2) to be used for the temporary storage of organic waste in connection with buildings (10). The biowaste container (2) comprises an inlet (5). The building (10) comprises a collection apparatus (11) and a sewer system (8) for leading organic waste into the biowaste container (2) via the inlet (5) of the biowaste container (2). The biowaste container (2) also comprises at least one replacement air inlet (16) for the introduction of replacement air into the biowaste container (2) during its emptying, and a separator (6) formed in connection with the replacement air inlet (16), by means of which separator (6) fluid is separated from the solid matter in the sewage led into the biowaste container (2), and which fluid is discharged from the separator (6) via an outlet (7) from the biowaste container (2).

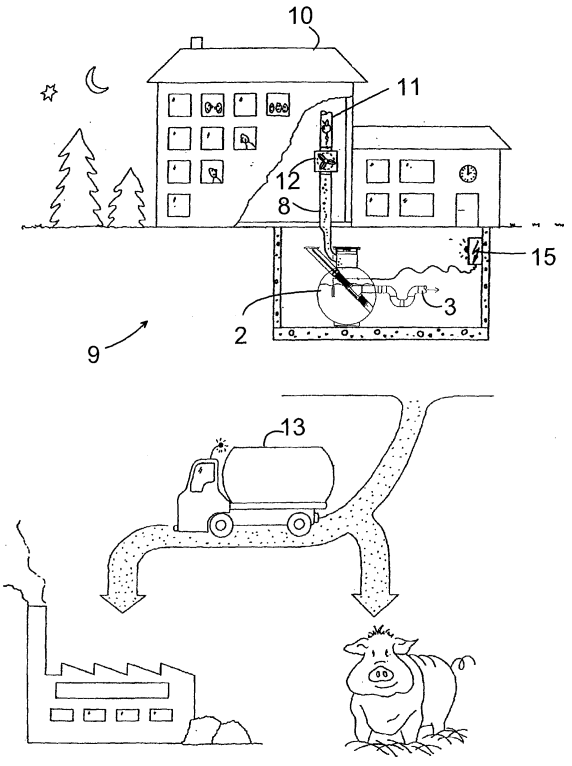

Fig. 1

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Description

[0001] The present invention relates to a container for organic waste (biowaste), to be used for the temporary storage of organic waste.

[0002] In areas with municipal engineering, organic toilet waste and other corresponding biowaste is normally led to the sewer system. Thus, toilet waste from houses, public institutions etc. is led from the toilet to the sewer system and through it to a sewage treatment plant. Even other organic waste can be thrown to the WC pan and further to the sewer system. The leading of such toilet waste and organic waste to the sewer system and to the sewage treatment plant causes a significant load in them. Thus, this load must be taken into account in the dimensioning of the sewers and the treatment plants, so that the sewers and treatment plants are not clogged up and/or overloaded.

[0003] Of household waste, biowaste is wet waste. It is collected in small lots and frequently, *e.g.* because it is easily decayed. Also, such biowaste soils the storage bins. If biowaste ends up in mixed waste or other waste, also this waste is soiled.

[0004] Food waste from institutional kitchens has several properties which make it particularly desirable *e.g.* for pig houses which utilize food waste. However, it has not been possible to store the biowaste at the collecting locations, and the use of organic food waste has been lost almost completely.

[0005] It is an aim of the present invention to eliminate the above-mentioned drawbacks to a great extent and to improve the state of art. The invention is based on the idea that solid waste is separated from fluid waste at the locations where organic waste is produced, and that primarily only the fluid separated from the solid waste is led to the sewer system and through it to the sewage treatment plant. To put it more precisely, the present invention is primarily characterized in that the biowaste container also comprises at least one replacement air inlet for introducing replacement air into the biowaste container during its emptying, and a separator formed in connection with the replacement air inlet, by means of which separator the fluid is arranged to be separated from the solid matter in the sewage led into the biowaste container, and which fluid is arranged to be discharged from the separator via an outlet from the biowaste container.

[0006] The present invention shows remarkable advantages over solutions of prior art. When using the arrangement of the invention, the collection of food waste in containers makes it possible to lead it to feed manufacturing. When food waste is stored in large lots of *e.g.* 1400 to 6000 litres, to be sterilized for months, this involves significant savings in the apparatus, treatment and transportation costs. The invention also makes it possible to use conventional kitchen equipment, a toilet seat, *etc.* for the collection of organic waste, wherein for the user, the functions become even easier, when the organic waste does not need to be separately carried to containers for organic waste outdoors, as is necessary in arrangements of prior art.

[0007] In the following, the invention will be described in more detail with reference to the appended drawings, in which

Fig. 1 shows a waste treatment system applying a container for organic waste according to an advantageous embodiment of the invention, and

Fig. 2 shows a container for organic waste according to an advantageous embodiment of the invention, in a reduced cross-sectional view from the side.

[0008] Figure 1 shows a waste treatment system 9. The system comprises one or more containers 2 for organic waste, for collecting toilet waste and other organic waste. The container 2 for organic waste shown in the figure is located in connection with a block of flats, but it will be obvious that the invention can also be applied in connection with other buildings 10, e.g. in terraced or semi-detached houses as well as in detached houses. The invention can also be applied in various buildings in areas with no municipal sewer network. Examples include cottages, houses and institutions in sparsely populated areas. Examples of such institutions include schools, public corporations, industrial plants, particularly plants of the food industry, institutional kitches, *etc.*

[0009] The biowaste container 2 according to the invention can be placed underground in a basement or in a space formed under a building 10. The organic waste is led into the biowaste container 2 via a collecting apparatus 11. This collecting apparatus 11 comprises a water system and a toilet seat 11 a, which are known as such from WC systems and in which the chopped-up waste is entered. In addition, the collecting apparatus 11 may comprise kitchen sinks, an outlet for a dishwasher, *etc.* Furthermore, the building 10 comprises a sewer system 8 which is intended to be connected to the collecting appratus 11 on the one hand and to the.biowaste container 2 on the other hand. Thus, organic waste coming through the collecting apparatus 11 can be led to the biowaste container 2. In larger locations where organic waste is produced, there may also be a waste grinder 12, such as a mill, as well as a water system in connection with the sewer system 8 and/or the collecting apparatus 11. By means of the crusher 12, it is possible to chop larger pieces of waste, if necessary.

[0010] All the organic waste is collected to the biowaste container 2 via a water seal. From the biowaste container 2, a substantially corresponding quantity of fluid is drained via the water seal 3a, or so-called stink trap, into the discharge pipe 3. Water seals are used to prevent the entry of oxygen into the biowaste container 2. Organic waste is stored in the biowaste container for a long time by using chemicals suitable for the purpose.

[0011] We shall next describe the structure of a biow-

aste container 2 according to an advantageous embodiment of the invention with reference to Fig. 2. The biowaste container 2 is provided with an inlet pipe 5, through which the wastewater is led to the biowaste container 2. The biowaste container 2 is provided with a separator 6, in which the fluid is separated from the solid matter. This separator 6 is connected to an outlet 7 which is in a flowing connection with the discharge pipe 3. The separator 6 is preferably formed to be cylindrical, such as tubular. The wall of the separator is equipped with a perforation which is provided around the whole cylindrical form, *e.g.* the pipe, in at least one point of this cylindrical form. The separator 6 is arranged in a preferably inclined position, for example at an angle of about 45° to the horizontal direction. The above-mentioned design of the separator makes it possible that even though the biowaste container 2 were filled, solid waste larger than the hole size of the perforation cannot be carried through or over the separator 6 to the discharge pipe 3.

[0012] When organic waste is led into the biowaste container 2, the sewage level and thereby the level of the mass formed by the solid waste contained therein is increased. The fluid begins to separate from the solid matter and will largely rise onto the solid matter. When the mass of the solid matter increases, the compressive force caused by it will further accelerate the rise of the fluid onto the solid matter. When the fluid level reaches the level of the lower edge of the perforation of the separator 6 in the biowaste container 2, the separated fluid starts to be drained from the top of the solid matter in the separator 6 via the outlet 7 to the discharge pipe 3. In the discharge pipe 3, the fluid is conveyed to the sewage network and through it to the sewage treatment plant. The discharge pipe 3 is equipped with a so-called stink trap 3a which prevents the access of odours from the sewer system via the biowaste container 2 to the building 10.

[0013] The biowaste container 2 can be used for the collection of e.g. organic waste from the household waste, and toilet waste. For the input of waste, it is possible to use water via the water seal, wherein the waste is carried more easily to the biowaste container 2. The user of the apparatus does not necessarily even notice the presence of the apparatus, because in view of the user, the waste treatment operations are carried out primarily in the conventional way.

[0014] In the biowaste container 2 according to the invention, the waste remains relatively unchanged for even long times. Furthermore, because the fluid is separated from the solid waste and is discharged from the biowaste container 2, the biowaste container can take in a large quantity of solid waste.

[0015] During its use, the biowaste container 2 is relatively air proof. Thus, when the fluid is discharged into the sewer system, air can also be discharged from the biowaste container 2. Thus, fresh air does not significantly enter the biowaste container 2 where an almost oxygen-free space is formed, which, for its part, also prevents the decaying of the waste in the biowaste container 2.

[0016] In an advantageous embodiment of the invention, the biowaste container 2 is preferably emptied and cleaned in the following way. To clean the biowaste container 2, the lid 14a of the discharge outlet 14 of the biowaste container 2 and the lid 16a of the replacement air inlet 16 are opened. After this, the suction end of the suction hose in a vehicle 13 for collecting waste, or the like, is inserted via the discharge outlet 14 into the biowaste container 2, and the suction of solid waste is started by suction from the biowaste container 2 into the container of the vehicle 13 for collecting waste. The suction will also cause the exit of air from the biowaste container 2, wherein replacement air must be led into the biowaste container 2. The replacement air inlet 16 is preferably provided in the same pipe 18 in which the separator 6 is placed. At the same time, this replacement air coming via the replacement air inlet 16 cleans the perforation of the separator 6 in the direction of the biowaste container 2. After the solid matter has been sucked up, the biowaste container can be washed. To carry out the washing, pressurized water is led, for example, via the suction hose into the container. After this, the washing water is sucked up from the container, and the perforation of the separator 6 is cleaned. This can be done by inserting the suction hose in the replacement air inlet 16 and starting the suction. In this way, replacement air flows via the discharge outlet 14 into the biowaste container 2. Because of the suction, impurities which are possibly still be found in the perforation of the separator 6, are primarily conveyed into the suction hose and further to a container in a vehicle for collecting waste. If the separator 6 or its perforation has been damaged, the separator 6 can be replaced with a clean separator 6 via the replacement air inlet 16.

[0017] After the cleaning of the waste container 2 and the separator 6, the lid 14 of the biowaste container can be placed in its position.

[0018] The waste container 2 can be provided with a sensor 17 to indicate the quantity of the waste in the biowaste container and/or the level of its top surface. The signal formed by this sensor can be transmitted in a way known as such, for example, to the building 10, to a control room, to a vehicle 13 for collecting waste, or to a mobile phone, wherein the biowaste container 2 can be collected. The sensor can be placed in the biowaste container 2 preferably so that the sensor 17 is connected to the lid 14a of the discharge outlet 14 by means of a fixing cable, a rope or the like. The fixing is preferably arranged so that the sensor 17 is placed at a desired height in the inner volume of the biowaste container 2. Such fixing to the lid 14a has, for example, the advantage that the sensor 17 can be lifted from the biowaste container 2 simultaneously when the lid 14a is lifted from its position. Thus, the sensor 17 will not be damaged in connection with the cleaning of the biowaste container 2 and, on the other hand, the sensor 17 itself can also be easily cleaned at the same time. After the sensor 17 has been cleaned, its operation can be secured e.g. by immersing the sensor

17 in a water vessel. Thus, if the sensor 17 and the rest of the alarm system 15 are in order, the alarm system should make an alarm signal, such as a tone and/or light signal. Thus, in connection with the acknowledgement of the alarm, the tone signal is turned off, but the light signal is preferably turned off first in connection with the emptying of the biowaste container 2.

[0019] The biowaste container 2 can be arranged to be emptied preferably at regular intervals. The frequency how often it should be emptied, will depend *e.g.* on the relationship between the inner volume of the biowaste container 2 and the quantity of waste produced. Also, the distance travelled by the vehicle 13 for collecting waste to empty the biowaste container 2 may affect the advantageous emptying interval. In practical applications, the aim is to plan the emptying intervals to be preferably such that the quantity of solid waste does not reach the level of the sensor 17 but remains as little as possible underneath it. Thus, by means of the alarm system, the premature filling up of the biowaste container 2 can be detected sufficiently early, and emptying can be ordered. This premature filling up may be a sign indicating a need for maintenance or repair in the collecting system. For example, the biowaste container 2 may be damaged, frozen, filled up by a landslide, or a part of the system has been displaced by soil frost. The reason for the filling up may also be that emptying has not been done by the due date.

[0020] The size of the perforations in the separator 6 may vary in different applications. In one advantageous embodiment, the hole size used in the perforation of the separator is about 1.25 mm. In this case, the particles larger than this in the sewage remain in the biowaste container 2.

[0021] The biowaste container 2 according to the invention can also be equipped with an acidity regulating device 19, by means of which the acidity of the organic waste in the biowaste container 2 can be controlled e.g. to prevent decaying and/or premature composting. Thus, for example at night, an acidity regulator, such as formic acid, is dropped from a container 19a via a pipework 19b into the biowaste container 2. This can be carried out, for example, by opening a valve 19c for a short time, until a sufficient quantity of the acidity regulator has been drained into the biowaste container 2. If necessary, the feeding of the acidity regulator can be arranged automatically e.g. by means of a timer.

[0022] The sewage treatment apparatus according to the present invention is a relatively simple, functional and reliable system which can be easily cleaned and maintained.

[0023] For example, the biowaste container 2 according to the invention stores organic food waste which can be used for preparing feed for animals. Organic waste collected in the biowaste container 2 can be used for preparing soil to be used, for example, as a soil conditioner. The biowaste container 2 can also be used for the storage of solid toilet waste and to prevent its entry into the sewer system.

[0024] The biowaste container 2 according to the invention can also be used for the collection of toilet waste and other organic waste in sparsely populated areas. In this case, the fluid to be removed from the biowaste container 2 is led e.g. to an absorption field made in the ground.

[0025] It will be obvious that the present invention is not limited solely to the above-presented embodiments but it can be modified within the scope of the appended claims.

Claims

1. A biowaste container (2) to be used for the temporary storage of organic waste in connection with a building (10), which biowaste container (2) comprises an inlet (5), and which building (10) comprises a collecting apparatus (11) and a sewer system (8) for leading organic waste into the biowaste container (2) via the inlet (5) of the biowaste container (2), **characterized in that** the biowaste container (2) also comprises at least one replacement air inlet (16) for introducing replacement air into the biowaste container (2) during its emptying, and a separator (6) formed in connection with the replacement air inlet (16), by means of which separator (6) the fluid is arranged to be separated from the solid matter in the sewage led into the biowaste container (2), and which fluid is arranged to be discharged from the separator (6) via an outlet (7) from the biowaste container (2).

2. The biowaste container (2) according to claim 1, **characterized in that** the collecting apparatus (11) comprises a WC system, wherein the biowaste container (2) is arranged in a flow connection with the collecting apparatus (11) to discharge organic waste from the WC system into the biowaste container (2).

3. The biowaste container (2) according to claim 2, **characterized in that** the biowaste container (2) is equipped with an acidity regulating device (19) for improving the preservability of the waste in the biowaste container (2) by controlling the acidity.

4. The biowaste container (2) according to claim 1, 2 or 3, **characterized in that** the separator (6) is arranged to be replaced via the replacement air inlet (16).

5. The biowaste container (2) according to any of claims 1 to 4, **characterized in that** the separator (6) is formed in the shape of a cylinder whose wall is provided with a perforation provided around the cylindrical shape in at least one point of the separator (6).

6. The biowaste container (2) according to any of the claims 1 to 5, **characterized in that** its cleaning is arranged to be carried out by means of the suction hose of a vehicle for collecting waste, in connection with the emptying of the biowaste container (2).

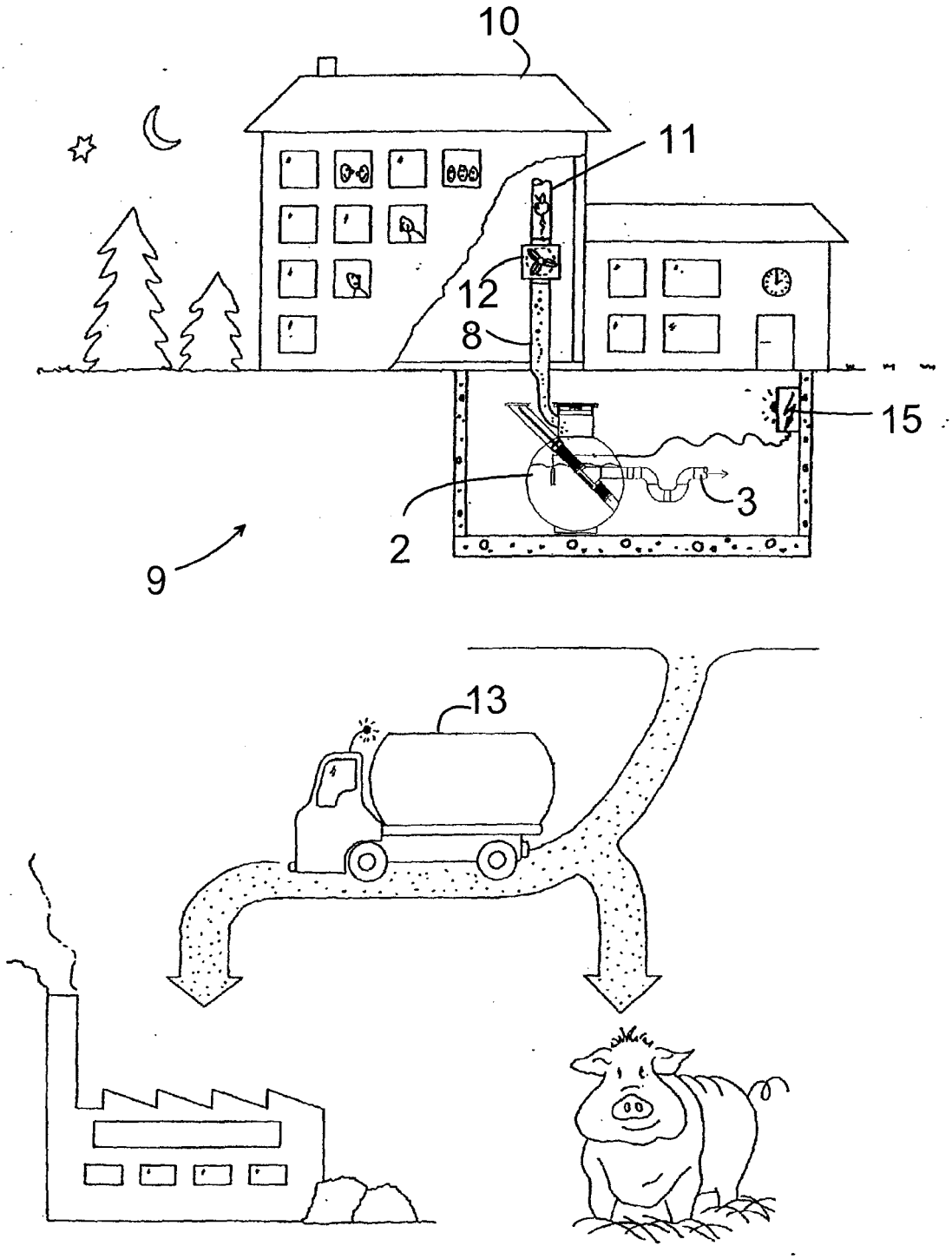

Fig. 1

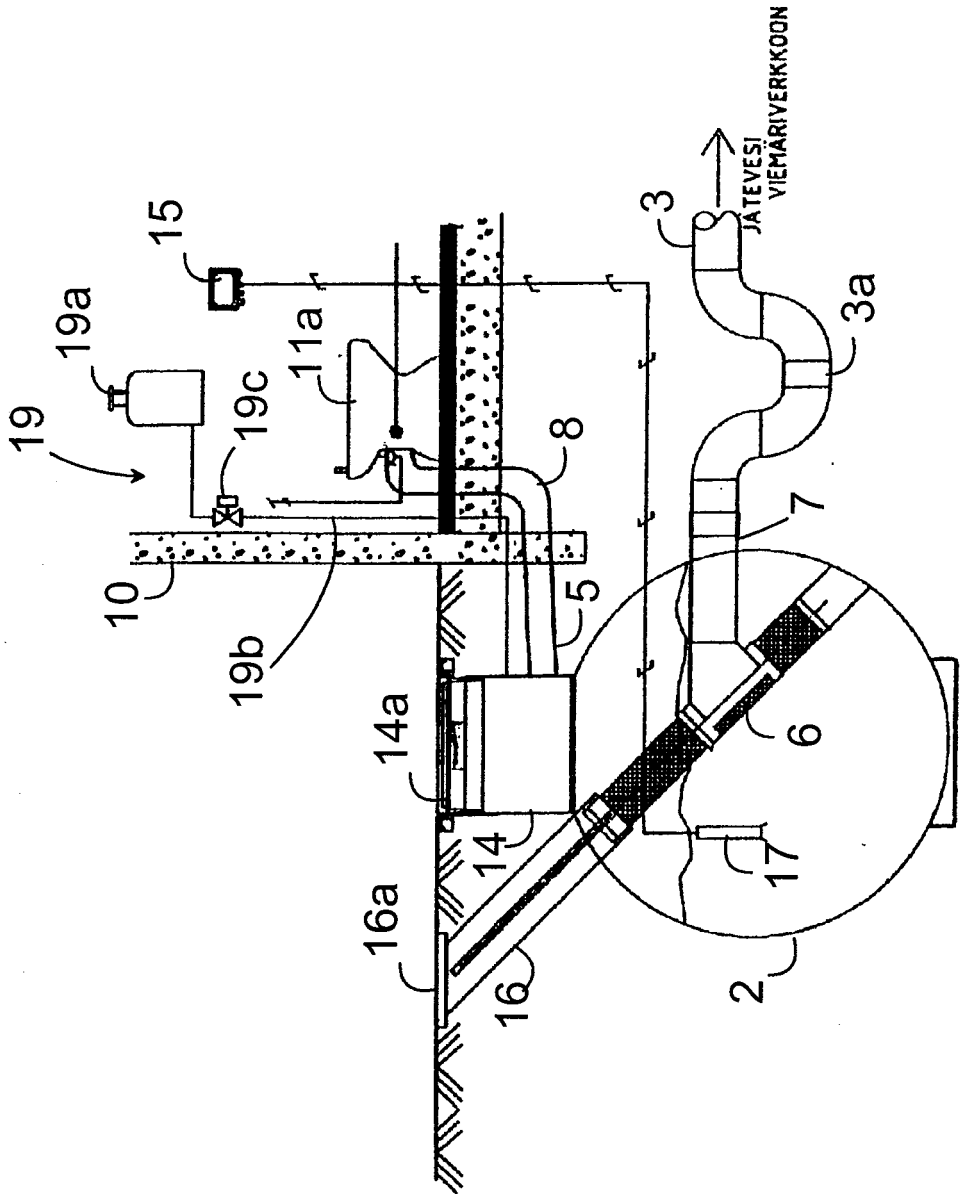
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Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 05 39 7011

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 September 2005	Geisenhofer, M

CATEGORY OF CITED DOCUMENTS

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