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(54) **Suction system for cleaning trains**

(57) System (1) comprising at least two separate suction units (2, 3), with the first suction unit (2) for suction of liquids, for example sewage, being connected to a liquid container (4) for storing the sucked liquid and with the second suction unit (3) for suction of aerosols, for example liquid aerosols and/or solid aerosols, being connected to an aerosol container (5) for storing the sucked aerosols, wherein the two suction units are connected to a single line (6), to which at least a first suction inlet (7) for liquids, for example sewage and a second suction inlet (8)for aerosols, for example solid and/or liquid aerosols, are connected, with at least one valve (9) arranged such that at suction of the second suction unit (3)the first suction inlet (7) is substantially closed.

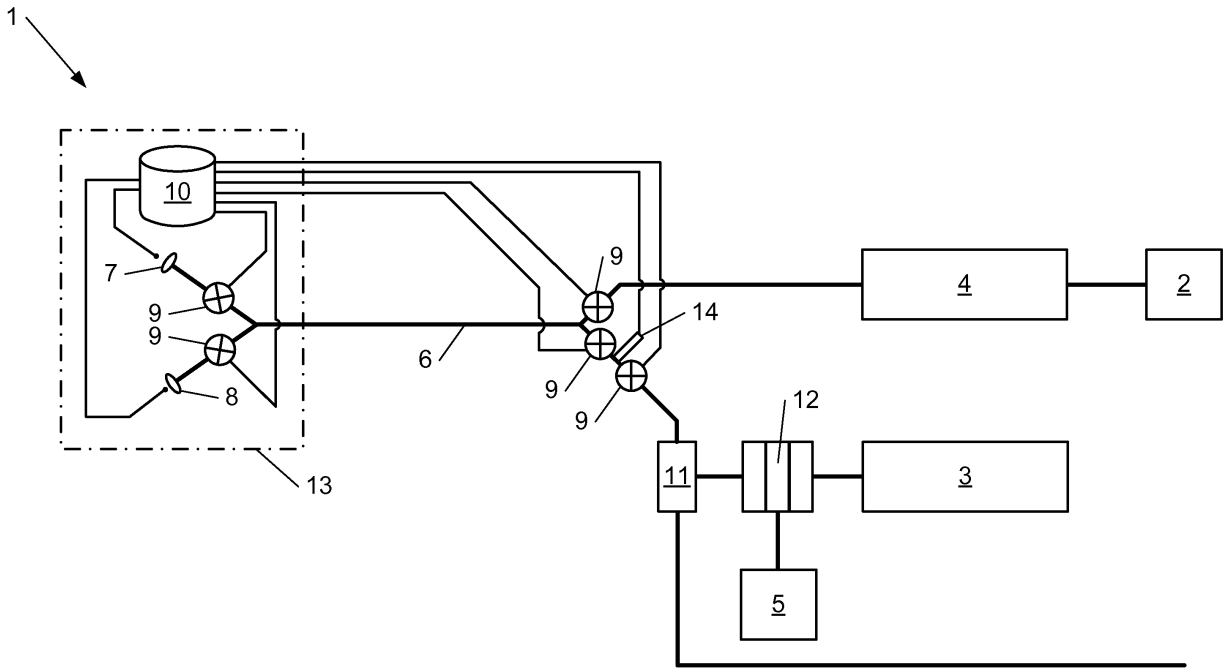

Fig. 1

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Description

[0001] The invention relates to a suction system according to the technical features of the first claim.

[0002] Rail-based transport for passengers is subjected to strict safety and maintenance regulations. At regular intervals, the trains are cleaned, for example using a fresh-water supply and the solid-waste containers of the wagons, for example sewage container are drained. The cleaning and maintenance activities are performed at various service points of the station and are quite time-consuming. To shorten the duration of these services, the maintenance and cleaning work is often gathered on a common service platform. Such a common service platform is for example described in DE20001916U. Specific technical requirements are to be met for the disposal of solid waste containers. The sewage is disposed of mainly by a suction system, while water points are needed in order to fill the water tanks in the passenger trains. Both systems can be combined in a single platform using separate water supply and sewage lines. Compliance with hygiene rules is assured by excluding an accidental contact between fresh water and sewage lines.

[0003] Such a system, however, does not address the issue of a suction system allowing the suction of both liquids such as sewage and aerosols, for example solid and/or liquid aerosols. It would make sense for reasons of cost, to combine both functions in a single suction system and saving in this manner several lengths of tubing lines. However, requirements for the tubing lines of liquids such as sewage on one hand and of solid and/or liquid aerosols are very different: tubing lines for liquids are typically made of plastic materials, for instance because plastic tubing is cheap and relatively easily made watertight; tubing lines for aerosols, for example solid and/or liquid aerosols, typically made of metals, often earthed, in order to avoid the built-up of static friction charges in the tubing. Combining both functions in a single line would be very complicated and expensive since the aggressive chemical environment of the sewage would require the use of stainless steel tubing and would cause hard-to-solve sealing problems between the different sections of the tubing.

[0004] Moreover, it has been found that when combining the lines provided for transporting sewage and for transporting aerosols into a single line the risk increases that by incorrectly coupling of further suction tubes to the inlets for example by maintenance people in charge of for example maintenance of the train, sewage wrongly ends up in the second suction unit, which is very undesired as this requires the second suction unit to be fully cleaned and often even serviced.

[0005] The invention therefore aims to provide a cost-effective and simple system allowing the suction of both liquids such as sewage and solid and/or liquid aerosols while avoiding suction of liquid such as sewage by and into the second suction unit.

[0006] Thereto, the invention provides a system comprising at least two separate suction units, with the first suction unit for suction of liquids, for example sewage, being connected to a liquid container for storing the sucked liquid and with the second suction unit for suction of aerosols, for example liquid aerosols and/or solid aerosols, being connected to an aerosol container for storing the sucked aerosols, wherein the two suction units are connected to a single line, to which at least a first suction inlet for liquids and a second suction inlet for aerosols, for example solid and/or liquid aerosols, are connected, with at least one valve arranged such that at suction of the second suction unit the first suction inlet is substantially closed or even closed.

[0007] Such a system would allow suction of both liquids such as sewage and solid and/or liquid aerosols through the same single line since contamination of the second suction unit with for example sewage drawn in through the second suction inlet is avoided by the presence of the valve which ensures that at suction of the second suction unit only liquid aerosols and/or solid aerosols are drawn in by substantially, preferably completely closing off the first suction inlet using the valve. The first suction inlet being closed off by the valve, the second suction inlet being open and the second suction unit operating, will allow the aerosols to enter the single line aspired by the second suction unit and substantially only liquid aerosols and/or solid aerosols are drawn in. Typically, the second suction unit is a vacuum cleaner, for example further comprising a cyclone separator and/or a filter, in order to remove the aerosols, preferably liquid aerosols and/or the solid aerosols, respectively, from the air stream which is drawn in by the second suction unit, keeping the second suction unit substantially free from for example dust and water droplets which could hamper the operation of the second suction unit. The second suction unit is connected to an aerosol container, which preferably is a dust container. Suction by first suction unit of liquid aerosols and/or solid aerosols drawn in through the second suction inlet does however affect the operation of the first suction unit less or even not at all and is not regarded as an obstacle to the functioning of the first suction unit. The first suction unit is connected to a liquid container, which preferably is a sewage container.

[0008] Preferably, the system comprises at least one valve mounted between the first suction inlet and the single line or mounted at the junction of the first and second suction inlet with the single line.

[0009] The presence of at least one valve mounted between the first suction inlet and the single line ensures that at suction of the second suction unit only liquid aerosols and/or solid aerosols are drawn in and avoid contamination of the suction unit, by closing the valve, thereby closing off the supply of liquids and in particular sewage. The presence of at least one valve mounted between the second suction inlet and the single line ensures that at suction of the first suction unit only liquid, more in particular sewage is drawn in and avoids contamination of the suction unit, by closing the valve, thereby closing

off the supply of aerosols. Alternatively, a valve may be mounted at the junction of the first and second suction inlet with the single line, which may close off, depending on which suction unit is operating, either the first or the second suction inlet.

[0010] Preferably, the system comprises at least one valve mounted between the single line and second suction unit or mounted at the junction of the first and second suction unit with the single line.

[0011] The presence of at least one valve mounted between the single line and second suction unit ensures that at suction of the first suction unit no liquids and in particular sewage are drawn in and avoids contamination of the second suction unit, by closing the valve, thereby closing off the supply of liquids, in particular sewage. The presence of at least one valve mounted between the single line and first suction unit ensures that at suction of the second suction unit no aerosols are drawn in and avoids contamination of the first suction unit, by closing the valve, thereby closing off the supply of aerosols. Alternatively, a valve may be mounted at the junction of the first and second suction unit with the single line, which may close off, depending on which suction unit is operating, either the first or the second suction unit. It is of course possible to combine both valves mounted between the first suction inlet and the single line or the second suction inlet and the single line or mounted at the junction of the first and second suction inlet with the single line with valves mounted between the single line and first and/or second suction unit or mounted at the junction of the first and second suction unit with the single line.

[0012] Preferably, the system comprises at least two valves between the first or second suction units, more preferably the second suction unit, and the single line and a pressure gauge between the two valves.

[0013] This configuration offers a supplementary safety feature, especially in the case the two valves are mounted between the second suction unit and the single line. In case liquid, for example sewage is accidentally drawn in and passes between the two valves, this would result in a change in pressure, for example a drop, which would be detected by measuring the pressure with the pressure gauge. A drop in pressure could for example automatically result in the shut-down of the second suction unit and/or closing of any further valves, for example any valves provided in between the first suction inlet and the single line, thereby protecting the second suction unit from contamination by the sewage.

[0014] Preferably, the single line is made from a plastic material, preferably polyethylene and preferably, the single line is earthed, preferably wherein the single line is made from a plastic material, it is connected to an earthed conducting wire, with the conducting wire running along the longitudinal direction of the line.

[0015] The single line is preferably made of a plastic material, since such tubing is easily sealed, which is important for liquid, especially sewage flows but also for reasons of cost, since such tubing is relatively cheap, compared to other materials. Polyethylene tubing is commercially widely available and is a material typically used when dealing with liquid flows, especially with flows of chemically aggressive substances, such as is the case with sewage. A flow of liquid aerosols and/or solid aerosols may, however, lead to friction in the line of plastic material and result in the built up of static electricity in the tubing. The built up of static electricity in tubing is a safety hazard and should be avoided, especially if the tubing is made from a non-conductive material such as the above-mentioned polyethylene. Therefore, the single line for example is earthed, for example by connecting it to an earthed conducting wire, for example with the conducting wire running along the longitudinal direction of the line. The earthing of the conducting wire may be present at one or more positions along the wire.

[0016] Preferably, the first and second suction inlets for liquids and for solid and/or liquid aerosols, respectively are part of a common service station. Such a common service station may further comprise any one or more of: an outlet for warm water, soap/water, compressed air, potable water.

[0017] It is possible to install the first and second suction inlets for liquids and for solid and/or liquid aerosols, respectively as part of a common service station. In such a service station these inlets may be provided in a space-saving manner and be used as a single point of service to for example a cleaning facility for vehicles. The service station would not only provide inlets for the disposal of liquids and solid and/or liquid aerosols but also outlets for for example warm water and/or soap/water and/or compressed air could be provided and offer a more elaborate common service station for cleaning for instance vehicles etc.

[0018] Preferably, the valves are controlled by a control module comprising a stack system, preferably a first-in-first-out stack system. The control module for example takes as an input signal a user request to use one of the first and the second inlet and as an output signal a block/release signal to one or more of the valves. So for example a user desiring to suck liquid, for example sewage, performs a user request to do so, for example by pushing a first button, for example on the service station should it be provided. This request is then put on the stack and is for example performed when all previously recorded user requests have been finished by opening or closing the corresponding valves and putting the first suction unit into operation. When the user desires to suck aerosols, for example dust, the user request to do so, for example by pushing a corresponding second button, for example on the service station should it be provided. This request is then put on the stack and is for example performed when all previously recorded user requests have been finished by opening or closing the corresponding valves and putting the second suction unit into operation. When for example multiple service stations are provided with respective first and second suction inlets connected to a single line, such a system makes it impossible that

an operator puts the second suction unit into operation while the first suction unit is in operation such that sewage may nevertheless find its way to the second suction unit.

[0019] According to preferred embodiments of the current invention, the control module may be provided such that when several subsequent requests are present in the stack, for example several requests for sucking sewage or several requests for sucking aerosols through the mutual single line, they are nevertheless allowed at the same time such that these operations can be performed in parallel with respect to each other.

[0020] A traincleaning system comprising one or more systems according to the invention as well as a railway yard comprising the traincleaning system according to the invention, are preferred embodiments of the present invention.

[0021] The system according to the invention is particularly suited for use in a traincleaning system or facility, typically located on a railway yard. Traincleaning systems need to be provided in such areas, adjacent to each train to be serviced. Access to trains should be designed so that cleaning staff can reach them safely whilst carrying their equipment, such as for example further tubing for example for connecting the first inlet to the sewage tanks of the train, for connecting the second inlet to a vacuum cleaner nozzle, brush, etc., which may be connected for example to the inlets and outlets of a common service station. Several of such service stations may be present within the traincleaning system. Preferably, each common service station is connected to a central suction unit for each type of suction inlet; i.e. for example the different inlets for solid and/or liquid aerosols could each be connected via a single line to a central vacuum cleaner, meaning that several operators could be vacuum cleaning simultaneously via different inlets. In such case, a stack system could put the operators using a central sewage suction on hold until a certain number of operators have completed their cleaning, to make sure that only solid and/or liquid aerosols are drawn in by the central vacuum cleaner.

[0022] The invention will now be further described with reference to an exemplary embodiment shown in the figures.

[0023] Figure 1 shows a schematic view of a suction system according to a preferred embodiment of the invention.

[0024] Figure 2 shows a schematic view of a railway yard with a traincleaning system comprising a preferred embodiment of the suction system according to the invention.

[0025] In the drawings one and the same reference numerals are assigned to the same or analogous element.

[0026] The present disclosure will be described with respect to particular embodiments and with reference to certain drawings but the disclosure is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the disclosure.

[0027] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the disclosure can operate in other sequences than described or illustrated herein.

[0028] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the disclosure described herein can operate in other orientations than described or illustrated herein.

[0029] Furthermore, the various embodiments, although referred to as "preferred" are to be construed as exemplary manners in which the disclosure may be implemented rather than as limiting the scope of the disclosure.

[0030] The term "comprising", used in the claims, should not be interpreted as being restricted to the elements or steps listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising A and B" should not be limited to devices consisting only of components A and B, rather with respect to the present disclosure, the only enumerated components of the device are A and B, and further the claim should be interpreted as including equivalents of those components.

[0031] Figure 1 shows a suction system 1 comprising at least two separate suction units 2,3, with the first suction unit 2 for suction of liquids, for example sewage, being connected to a liquid container 4 for storing the sucked liquid and with the second suction unit 3 for suction of aerosols, for example liquid aerosols and/or solid aerosols, being connected to an aerosol container 5 for storing the sucked aerosols. Such suction units 2,3 are known in the art. Preferably, the suction units 2,3 are driven by electric means. The first suction unit 2 for suction of liquids is for example a pump, comprising pistons; in such a pump the sewage may be sucked by reciprocation of the pistons and discharged in the liquid container 4 from where the sewage may be further discharged in the sewer. The first suction unit 2 may further comprise a pre-filter, for example a cyclone separator (not shown in the figures), which may be located between the liquid container 4 and the first suction unit 2. The sewage may for instance originate from the collection tank of the toilets of a train. The second suction unit 2 is for example a

vacuum cleaner, used to clean the interior of a train compartment. Typically the vacuum cleaner 2 sucks aerosols, for example liquid aerosols and/or solid aerosols, in particular liquids and/or dust and dirt present on for example the floor of a train compartment. The second suction unit 3 may comprise a cyclone separator 11 and a filter 12, as shown in Figure 1. The cyclone separator 11 may be used to separate liquid aerosols from the sucked air stream and the filter 12 to separate solid aerosols from the sucked air stream. The separated liquid aerosols may for example be discharged to the sewer, as shown in Figure 1. The solid aerosols separated by the filter 5 are for example stored in the aerosol container 5.

[0032] The two suction units 3,4 are connected to and in communication with a single line 6, to which at least a first suction inlet 7 for liquids, for example sewage and a second suction inlet 8 for aerosols, for example solid and/or liquid aerosols, are connected. The single line 6 may be made from any material, but preferably the single line 6 is made from a plastic material, in particular polyethylene. Such plastic materials are particularly suited is commercially widely available and is a material typically used when dealing with liquid flows, especially with flows of chemically aggressive substances, such as is the case with sewage. A flow of liquid aerosols and/or solid aerosols may, however, lead to friction in the line of plastic material and result in the built up of static electricity in the single line 6. The built up of static electricity in the line 6 is a safety hazard and should be avoided, especially if the tubing is made from a non-conductive material such as the above-mentioned polyethylene. Therefore, the single line 6 for example is earthed, for example by connecting it to an earthed conducting wire, for example with the conducting wire running along the longitudinal direction of the line 6. Such conducting wire may be made of any conducting material found suitable by the person skilled in the art, for example copper. The conducting wire may run along the longitudinal direction of the line 6 according to any chosen pattern. The earthing of the conducting wire may be present at one or more positions along the wire. The single line is preferably connected to the two suction units 3,4 and to the first suction inlet 7 for liquids and the second suction inlet 8 for aerosols in a liquid-tight manner using the appropriate connection means, known in the art, in order to avoid that the sucked liquids, in particular sewage, seeps out because this is unwanted.

[0033] At least a first suction inlet 7 for liquids, for example sewage and a second suction inlet 8 for aerosols, for example solid and/or liquid aerosols, are connected to the single line 6. The inlets 7, 8 are for example arranged in such a way that a tube for sucking up the liquid, preferably sewage and a tube for sucking up the aerosols, respectively, may be mounted on the first 7and second inlets 8. The inlet and tube may be coupled using for example a bayonet coupling, a clamp coupling, a screw coupling or any other coupling found suitable by the person skilled in the art. Preferably, these tubes comprise a flexible part such that the user is able to quickly suck up the liquid and the aerosols, also in hard-to-reach places.

[0034] As shown in figures 1 and 2, the first and second suction inlets may be part of a common service station 13. Using such a centralized common service station 13 often makes the cleaning operation quicker and easier to coordinate. The common service station 13 may further comprise any one or more of: an outlet for warm water, soap, a combination of water, for example warm water, and soap, compressed air, for example for driving further appliances and/or for driving for example valves such as explained further on, potable water, electrical power outlets, for example for different voltages either alternating current (AC) or direct current (DC), for example for 400V, preferably alternating current, and/or 230V, preferably alternating current, and/or 24V, preferably direct current, etc. The outlets are for example connected to several different supply lines. Each common service station 13 may have its separate set of supply lines and single lines but it is equally possible to use a single line and a single set of supply lines to which the different common service stations are coupled.

[0035] The common service station 13 can, although not critical for the invention, also be provided with, for example, a heating system for example for heating the interior of the common service station 13 as it has been found that often at least part of the components of the common service station 13 have to be kept above a certain minimal temperature for assuring a correct working of the those components. The heating system 13 can for example be an electrical heating system.

[0036] In a preferred embodiment shown in figure 2, a number of common service stations 13 are located adjacent rail road tracks, for example on a railway yard, such the common service stations 13 are adjacent to each train to be serviced. Access to trains should be designed so that cleaning staff can reach them safely whilst carrying their equipment, such as for example further tubing for example for connecting the first inlet 7 to the sewage tanks of the train, for connecting the second inlet 8 to a vacuum cleaner nozzle, brush, etc., which may be connected for example to the inlets 7, 8 and outlets of a common service station 13.

[0037] As shown in figure 1, at least one valve 9 is arranged such that at suction of the second suction unit 3 the first suction inlet 7 is substantially closed. The opening and the closing of the at least one valve may be controlled by an electric signal, actuating the valve from the closed position in to open position. As shown in figures 1 and 2, the system comprises at least one valve 9 mounted between the first suction inlet 7 and the single line 6. The valve 9 may also be mounted at the junction of the first 7 and second suction inlet 8 with the single line 6. The presence of at least one valve 9 mounted between the first suction inlet 7 and the single line 6 ensures that at suction of the second suction unit 3 only liquid aerosols and/or solid aerosols are drawn in and avoid contamination of the suction unit 3, by closing the valve 9, thereby

closing off the supply of liquids and in particular sewage. The presence of at least one valve 9 mounted between the second suction inlet 8 and the single line 6 ensures that at suction of the first suction unit 2 only liquid, more in particular sewage is drawn in and avoids contamination of the suction unit 2, by closing the valve 9, thereby closing off the supply of aerosols. Alternatively, a valve may be mounted at the junction of the first 7 and second suction inlet 8 with the single line 6, which may close off, depending on which suction unit is operating, either the first or the second suction inlet. The system 1 may comprise at least one valve mounted between the single line and second suction unit or mounted at the junction of the first and second suction unit with the single line, as shown in Figure 1. The presence of at least one valve 9 mounted between the single line 6 and second suction unit 3 ensures that at suction of the first suction unit 2 no liquids and in particular sewage are drawn in and avoids contamination of the second suction unit 3, by closing the valve 9, thereby closing off the supply of liquids, in particular sewage, ensuring that at suction of the second suction unit 3 no aerosols are drawn in and avoids contamination of the first suction unit 2, by closing the valve 9, thereby closing off the supply of aerosols. Alternatively, a valve may be mounted at the junction of the first 2 and second suction unit 3 with the single line 6, which may close off, depending on which suction unit is operating, either the first 2 or the second suction unit 3. It is of course possible to combine both valves 9 mounted between the first suction inlet 7 and the single line 6 or the second suction inlet 8 and the single line 6 or mounted at the junction of the first 7 and second suction inlet 8 with the single line 6 with valves 9 mounted between the single line 6 and first 2 and/or second suction unit 3 or mounted at the junction of the first 2 and second suction unit 3 with the single line 6, as illustrated in Figure 1. The valve 9 may be any kind of valve compatible with the system described above, for example a pneumatic valve.

[0038] The system 1 may also comprise at least two valves 9 between the first 2 or second suction units 3, more preferably the second suction unit 3, and the single line 6 and a pressure gauge 14 between the two valves 9. This configuration offers a supplementary safety feature, especially in the case the two valves 9 are mounted between the second suction unit 3 and the single line 6. In case liquid, for example sewage is accidentally drawn in and passes between the two valves, this would result in a change in pressure, for example a drop, which would be detected by measuring the pressure with the pressure gauge. A drop in pressure could for example automatically result in the shut-down of the second suction unit 3 and/or closing of any further valves 9, for example any valves 9 provided in between the first suction inlet 7 and the single line 6, thereby protecting the second suction unit 3 from contamination by the sewage.

[0039] The valves 9, according to a preferred embodiment, are controlled by a control module 10 comprising a stack system, preferably a first-in-first-out stack system, taking as an input signal a user request to use one of the inlets/outlets and as an output signal a block/release signal to one or more of the valves 9. The control module 10 may be located on the common service platform 13, as shown in figure 1. The control module may also take as an input signal a signal from the pressure gauge, if present and may control the power supply to one or more of the first 2 and second suction units 3. The valves 9 may be electrically connected by means of electric cables, as illustrated in figure 1, to the control module 10, which may comprise one or more microprocessors, which are capable of controlling the block/release signals to one or more of said valves. Advantageously, the control unit 10 may therefore be in a position remote from the one or more valves 9 controlled thereby. To this purpose, it is also possible to provide - as an alternative to a wired connection - for wireless communication means between the control unit 10 and the valves 9. The valves 9 can however also be hydraulically and/or pneumatically controlled, in which case the hydraulic and/or pneumatic actuators are electrically controlled by the control module, for example by wires and/or wireless.

[0040] In operation, for example a user desiring to suck liquid, for example sewage, performs a user request to do so, for example by pushing a first button, for example on the common service station 13 should it be provided. This request is then put on the stack and is for example performed when all previously recorded user requests have been finished by opening or closing the corresponding valves 9 and putting the first suction unit 2 into operation. The sewage is in such case sucked, for example from the sewage container of a train, through a flexible hose, via the first suction inlet 7, in the single line and sucked by the first suction unit 2 into the liquid container 4 and possibly further discharged in the sewer. When the user desires to suck aerosols, for example dust, the user request to do so, for example by pushing a corresponding second button, for example on the service station 13 should it be provided. This request is then put on the stack and is for example performed when all previously recorded user requests have been finished by opening or closing the corresponding valves 9 and putting the second suction unit 3 into operation. The sucked up aerosols follow a similar path through the system as described above for the sewage, mutatis mutandis. When for example common multiple service stations 13 are provided with respective first 7 and second suction inlets 8 connected to a single line 6, such a system makes it impossible that an operator puts the second suction unit 3 into operation while the first suction unit 2 is in operation such that sewage may nevertheless find its way to the second suction unit 3.

Claims

1. System (1) comprising at least two separate suction units (2,3), with the first suction unit (2) for suction

of liquids, for example sewage, being connected to a liquid container (4) for storing the sucked liquid and with the second suction unit (3) for suction of aerosols, for example liquid aerosols and/or solid aerosols, being connected to an aerosol container (5) for storing the sucked aerosols, wherein the two suction units are connected to a single line (6), to which at least a first suction inlet (7) for liquids, for example sewage and a second suction inlet (8) for aerosols, for example solid and/or liquid aerosols, are connected, with at least one valve (9) arranged such that at suction of the second suction unit (3) the first suction inlet (7) is substantially closed.

2. System (1) according to claim 1 comprising at least one valve (9) mounted between the first suction inlet (7) and the single line (6).

3. System (1) according to any one of the preceding claims comprising at least one valve (9) mounted between the second suction inlet (8) and the single line (6).

4. System (1) according to any one of the preceding claims comprising at least one valve (9) mounted at the junction of the first (7) and second suction inlet (8) with the single line (6).

5. System (1) according to any one of the preceding claims comprising at least one valve (9) mounted between the single line (6) and second suction unit (3).

6. System (1) according to any one of the preceding claims comprising at least one valve (9) mounted between the single line (6) and the first suction unit (2).

7. System (1) according to any one of the preceding claims comprising at least one valve (9) mounted at the junction of the first (2) and second suction unit (3) with the single line (6).

8. System (1) according to any one of the preceding claims comprising at least two valves (9) between the first (2) or second suction units (3) and the single line (6) and a pressure gauge between the two valves (9).

9. System (1) according to any one of the preceding claims, wherein the single line (6) is made from a plastic material, preferably polyethylene.

10. System (1) according to any one of the preceding claims **characterized in that** the single line (6) is earthed.

11. System (1) according to claim 10, preferably in combination with claim 9, wherein the single line (6) is connected to an earthed conducting wire, with the conducting wire running along the longitudinal direction of the line.

12. System (1) according to any one of the preceding claims **characterized in that** the valves (9) are controlled by a control module (10) comprising a stack system, preferably a first-in-first-out stack system, taking as an input signal a user request to use one of the inlets/outlets and as an output signal a block/release signal to one or more of the valves.

13. System (1) according to any one of the preceding claims, wherein the first suction unit (2) is a sewage suction unit and the liquid container (4) being a sewage container.

14. System (1) according to any one of the preceding claims, wherein the second suction unit (3) is a vacuum cleaner.

15. System (1) according to the preceding claim, wherein the second suction unit (3) comprises a cyclone separator (11) and/or a filter (12).

16. System (1) according to any one of the preceding claims, wherein the first (7) and second suction inlets (8) are part of a common service station (13).

17. System (1) according to the preceding claim, wherein the common service station (13) further comprising any one or more of: an outlet for warm water, soap/water, compressed air, potable water.

18. Traincleaning system comprising one or more systems (1) according to any one of the preceding claims.

19. Railway yard comprising the traincleaning system according to the previous claim.

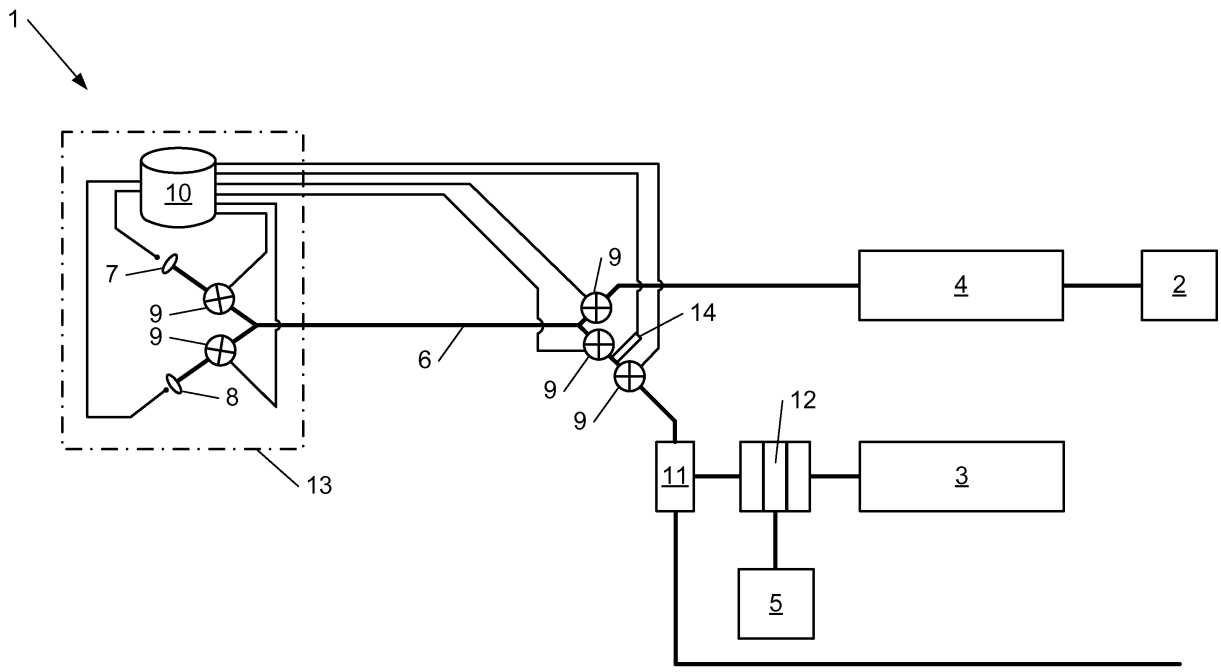

Fig. 1

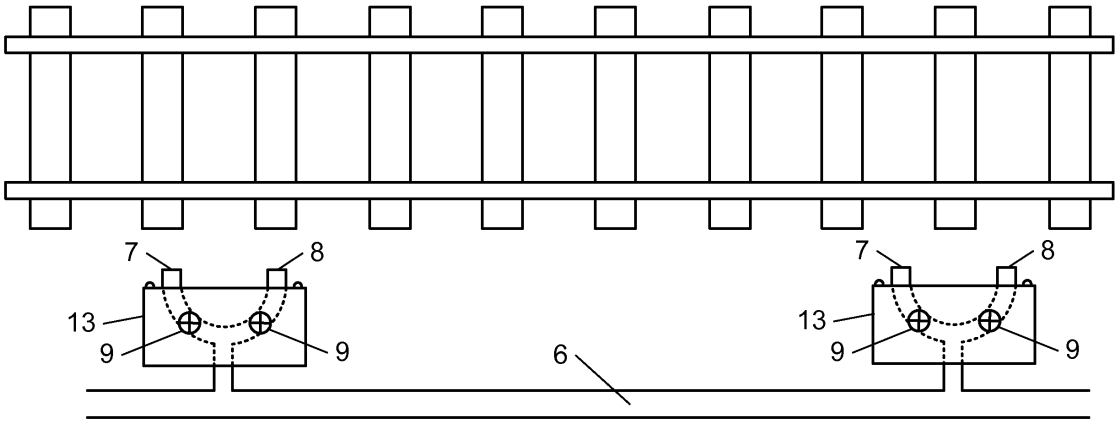

Fig. 2

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 13 16 0596

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	1 August 2013	Schultze, Yves

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 16 0596

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