

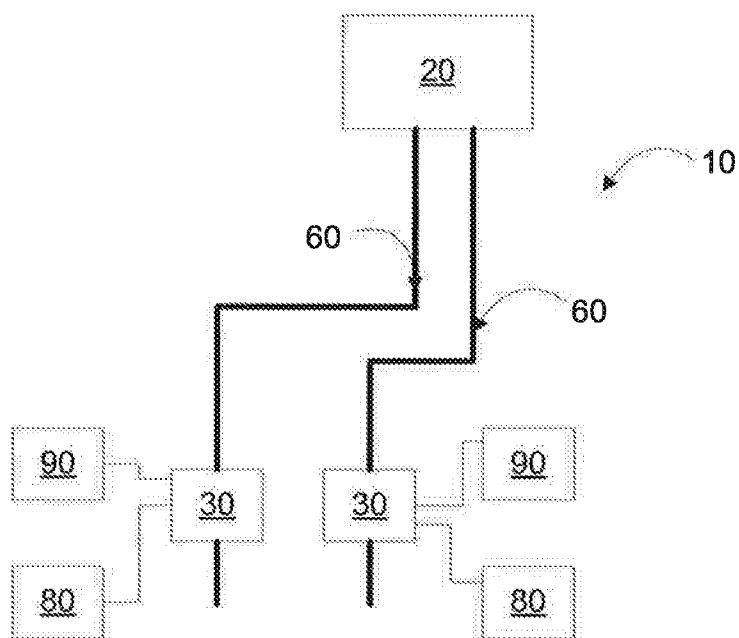


Fig. 1

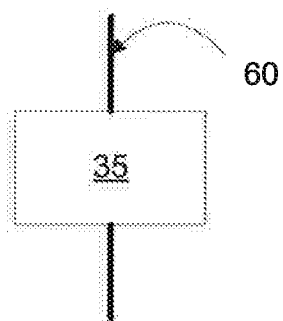


Fig. 2

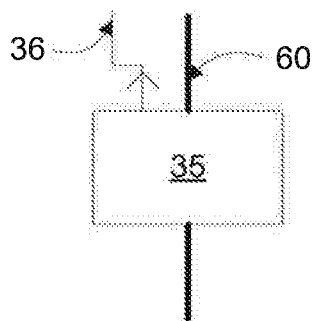


Fig. 3

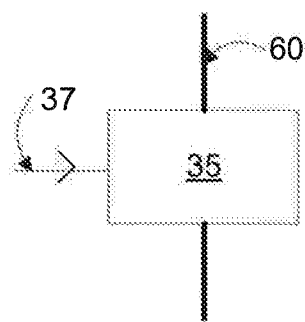


Fig. 4

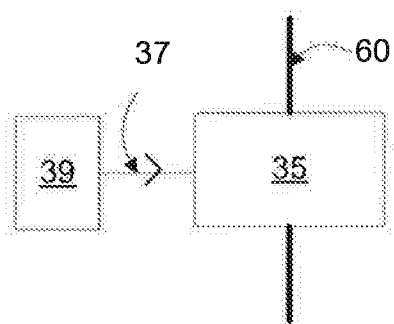


Fig. 5

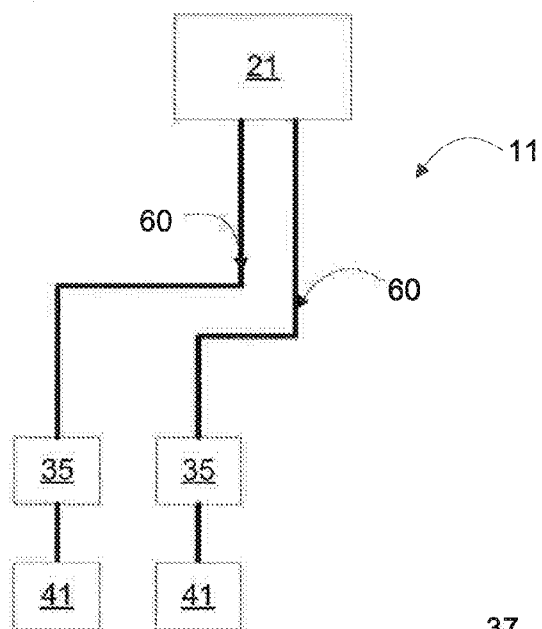


Fig. 6

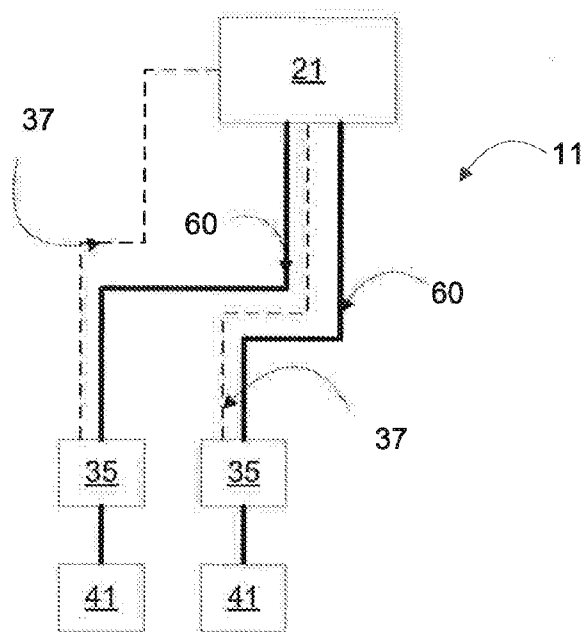


Fig. 7

CONTROL MEANS OF CENTRAL FLOW SYSTEM AND CENTRAL FLOW SYSTEM

TECHNICAL FIELD The present invention relates to an arrangement for automatic air treatment.

BACKGROUND ART

[0001] In surgery rooms of today, there is often a suction outlet. The suction outlet is intended to ventilate for example anesthetic gas leaking around the anesthesia mask or anesthesia as the patient exhales. These suction outlets are often linked to an extraction system consisting of a central suction unit, which through a piping system is connected to several sockets in different surgery rooms.

[0002] A problem associated with prior art central vacuum systems is that installation of them requires manual adjustment. Central vacuum systems also require manual adjustment during operation. This manual adjustment is sometimes done by means of a control knob in the surgery room.

[0003] The known central vacuum systems may have difficulties adjusting suction flow to varying loads on the central vacuum system, because of problematic pipe installation. If for example many surgeries are ongoing in parallel and multiple suction outlets are used simultaneously, the flow may vary at the individual suction outlets. Readjustment may need to be made on the control panels if you change or replace the patient systems connected to the suction outlets so that the flow resistance changes. Usually, negative pressure needs to be set extremely high in the systems, which draws energy unnecessarily.

[0004] There are also central vacuum systems that are controlled by valves, which are controlled based on the amount of harmful gases in the air. In these systems, there is a function of delay in that harmful gases are emitted before they are captured by the central vacuum system. Moreover, usually the flow is not measured, but only the vacuum level and thus, the flows cannot be set for the various suction outlets coupled to the central vacuum system.

[0005] There is therefore a need for an improved central vacuum system that solves or at least mitigates at least one of the above problems.

SUMMARY OF THE INVENTION

[0006] An object of the present invention is to reduce or solve at least one of the above problems.

[0007] A first embodiment of the present invention provides a control means for a channel connectable to a central flow system configured to create an underpressure or overpressure in said channel. The control means is configured to increase or decrease the flow resistance in said channel. The control means is configured to reduce flow resistance when the flow in said channel drops below a preset flow and to increase the flow resistance when the flow in said channel rises above said preset flow.

[0008] An object of the present invention is thus achieved by a control means connectable to a channel in a central flow system configured to create an underpressure or overpressure in said channel. Since the control means is configured to reduce flow resistance when the flow in said channel falls below a preset flow and to increase the flow resistance when the flow in said passage exceeds said preset flow, the preset

flow can be maintained in such a suction outlet coupled to the channel despite varying loads on the suction outlets and/or the central flow system.

[0009] An advantage of the present invention is that the preset flow for instance in a suction outlet in a central flow system can be maintained despite varying loads on the suction outlets and/or the central flow system.

[0010] A further advantage of the present invention is that the installation of a central flow system is substantially simplified when individual adjustment of separate suction outlets in a central flow system is not necessary. The control means automatically sets the correct flow resistance.

[0011] Further advantages and features of embodiments of the present invention will be apparent in the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 shows a schematic block diagram of a central flow system according to prior art

[0013] FIG. 2 shows a schematic block diagram of an example of a control means according to the present invention.

[0014] FIG. 3 shows a schematic block diagram of an example of a control means according to the present invention.

[0015] FIG. 4 shows a schematic block diagram of an example of a control means according to the present invention.

[0016] FIG. 5 shows a schematic block diagram of an example of a control means according to the present invention.

[0017] FIG. 6 shows a schematic block diagram of a central flow system according to one embodiment of the present invention.

[0018] FIG. 7 shows a schematic block diagram of a central flow system according to one embodiment of the present invention.

DETAILED DESCRIPTION

[0019] FIG. 1 shows a central flow system 10 according to prior art. The central flow system 10 can e.g. be installed in a hospital in order to provide the surgery rooms in a hospital with a suction outlet to ventilate anesthetic gases exhaled by a patient. The central flow system 10 includes a central fan 20 configured to create a vacuum in at least a channel 60 connected to said central fan 20. FIG. 1 illustrates only one channel 60 connected to said central fan 20, but there are usually several channels 60 connected to the central fan 20. In the channel 60, a control means 30 is configured to increase or reduce the flow resistance of said channel 60. The flow resistance of the control means 30 is controlled through a control panel 80 connected to said control means 30. On the control panel 80, the flow resistance of the control means 30 may be increased or decreased. A flow sensor 90 is also connected to the control means 30 or to the channel 60. The flow sensor shows the flow in the channel 60. By reading the flow of the flow sensor 90, an operator of the central flow system 10 can control the flow in the channel 60 on the control panel 80.

[0020] FIG. 2 shows an example of an embodiment of a control means 35 according to the present invention. The control means 35 can be connected in a channel 60 connected to a central flow system 10 configured to create an underpressure or overpressure in said channel 60. The control means 3

according to the present invention is configured to increase or reduce the flow resistance of said channel 60 automatically, without the need for an operator to manually adjust the flow resistance of the control means 35. The control means 35 of the present invention is configured to reduce the flow resistance when the flow in said channel 60 falls below a predetermined flow rate and to increase the flow resistance when the flow in said channel 60 rises above said predetermined flow rate. In an exemplary embodiment of a control means 35 according to the present invention, the flow resistance is controlled with a valve (not shown) that is automatically opened or closed to change the flow resistance. The preset value can be received from for instance a control knob or be stored in the control means 35. The control means may in one embodiment comprise means (not shown) to measure the flow through the control means 35. In another embodiment, the control means is configured to receive a signal indicating the flow through the control means 35.

[0021] In a further example of an embodiment of a control means 35, a processing means (not shown) is provided in the control means 35. The processing means can for example be a microprocessor. The processing means is configured to receive the preset flow and a signal indicative of the flow through the control means 35. The processing means is configured to send a signal to e.g. a valve in the control means so that the valve reduces flow resistance when the flow in the channel 60 falls below a preset flow and to increase the flow resistance when the flow in the channel 60 rises above said preset flow.

[0022] FIG. 3 shows a further example of an embodiment of a control means 35 according to the present invention, the control means 35 is further configured to send a first signal 36 to increase the pressure in case the flow does not reach said preset flow despite that said control means 35 is fully open in the event that that control means 35 is configured to regulate flow in a pressure relief systems and to reduce the pressure in case the flow does not reach said preset flow despite that said control means 35 is fully open in the event said control means 35 is configured to regulate the flow in a negative pressure system. The signal 36 may for example be sent to a central fan in the system in which the control means 35 is used.

[0023] FIG. 4 shows a further example of an embodiment of a control means 35 according to the present invention. In this exemplary embodiment, the control means 35 is further configured to receive a signal 37 indicative of the flow in said channel 60, said signal being a pressure change across a restriction in the said channel 60. In another example of an embodiment of a control means 35 according to the present invention, the signal 37 is a flow in the channel 60.

[0024] In a further example of an embodiment of a control means 35 according to the present invention, the control means 35 is further configured to send a second signal indicating the flow in said channel 60. The signal may for example be received by a flow viewer that shows the flow in the channel 60. The flow viewer may for example be present in a surgery room to which the control means 35 controls the flow.

[0025] FIG. 5 shows a further example of an embodiment of a control means 35 of the present invention. In this embodiment, the control means 35 is further configured to receive a signal 37 indicative of said preset flow in said channel 60. The signal may for instance be sent from a control panel 39 in the surgery room to which the channel 60 is connected. The default flow can also be stored in the control means 35.

[0026] In an exemplary embodiment of a control means 35 according to the present invention, the control means 35 is configured to control the flow in a negative pressure system.

[0027] In another example of an embodiment of a control means 35 according to the present invention, the control means 35 is configured to control the flow in an overpressure system.

[0028] In another example of an embodiment of a control means 35, said control means 35 includes a motor operated valve. In an exemplary embodiment of a control means 35 according to the present invention said motor operated valve is a diaphragm valve or other valve configured to cause minimal noise.

[0029] FIG. 6 shows another aspect of the present invention, which is a central flow system 11 comprising at least one control means 35 according to anyone of the previously described embodiments. The central flow system 11 may for example be installed in a hospital in order to provide surgery rooms in the hospital with a suction outlet 41 to ventilate for instance anesthetic gases exhaled by a patient. The central flow system 11 includes a central fan 21 configured to generate a negative pressure or positive pressure in the at least one channel 60 connected to said central fan 21. FIG. 6 illustrates only one channel 60 connected to said central fan 21, but there are usually several channels 60 connected to the central fan 21.

[0030] FIG. 6 illustrates a central fan 21, but the central flow system 11 may also include several central fans.

[0031] In another exemplary embodiment of the central flow system 11 according to the present invention, the central fan 21 is further configured to receive a first signal 37 and increase the pressure in case the central fan 21 is configured to create an excess pressure and reduce the pressure in the case the central fan 21 is configured to create a vacuum. The signal 37 may, in one embodiment, be transmitted from the one or more control means 35 of the central flow system 11.

[0032] In another exemplary embodiment of the central flow system 11 according to the present invention, the central fan 21 is a subchannel blower or other suction device configured to cause minimal noise.

[0033] In yet another exemplary embodiment of the central flow system 11 according to the present invention, the central fan 21 further configured to establish the increase or decrease in pressure during a certain period of time and then return to a normal state.

[0034] In all embodiments of the central flow system 11 according to the present invention, there may be one or more central fans 21. The central fans 21 may be either connected in series or connected in parallel.

1. Control means (35) for a channel (60) connectable to a central flow system (11) configured to create an underpressure or overpressure in said channel (60), said control means (35) being configured to increase or decrease the flow resistance in said channel (60);

characterized in that

said control means (35) is configured to reduce flow resistance when the flow in said channel (60) drops below a preset flow and to increase the flow resistance when the flow in said channel (60) rises above said preset flow.

2. Control means (35) of claim 1, wherein said control means is further configured to send a first signal (36) to increase the pressure in case the flow does not reach said preset flow despite that said control means (35) is fully open

in the event said control means (35) is configured to control the flow in a pressure relief systems and to reduce the pressure in case the flow does not reach said preset flow despite that said control means (35) is fully open in the event said control means (35) is configured to control the flow in a negative pressure system.

3. Control means (35) according to anyone of claim 1 or 2, wherein said control means (35) is further configured to receive a signal 37 indicative of the flow in said channel (60), said signal (37) being a pressure change across a restriction in said channel (60).

4. Control means (3) according to anyone of claims 1 to 3, wherein said signal (37) indicates the flow in said channel (60).

5. Control means (3) according to anyone of claims 1 to 4, wherein said control means (35) is further configured to send a second signal indicating the flow in said channel (60).

6. Control means (35) according to anyone of claims 1 to 5, wherein the control means (35) is configured to control the flow in a negative pressure system.

7. Control means (35) according to anyone of claims 1 to 5, wherein the control means (35) is configured to control the flow in an overpressure system.

8. Control means (35) according to anyone of claims 1 to 7, wherein said control means (35) comprises a motor operated valve.

9. Control means (35) according to claim 8, wherein said motor driven valve comprises a diaphragm valve or other valve configured to cause minimal noise.

10. A central flow system (11) comprising at least a control means (35) according to anyone of claims 1 to 9 and a central fan (21) configured to create said underpressure or overpressure in the at least one channel (60) connected to said central fan (21) and an outlet (41) connected to said channel (6).

11. A central flow system (11) according to claim 10, wherein said central fan (21) is further configured to receive said first signal (37) and increase the pressure in the case that said central fan (21) is configured to create an excess pressure and reduce the pressure in the case said central fan (21) configured to create a vacuum.

12. A central flow system (11) according to anyone of claims 10 to 11, wherein said central fan (21) is a subchannel blower or other suction device configured to cause minimal noise.

13. A central flow system (11) according to one of claims 11 to 12, wherein said central fan (21) is further configured to establish said increased or decreased pressure for a certain periods of time and then return to a normal state.

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